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The part number of the divider tab list is 8673744.

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8673862

PUBLICATIONS REFERENCE DRAWING

MACHINE TYPE/MODEL NO. 3480

MACHINE NAME - Magnetic Tape Subsystem

FORM NO.	E C NO.	DESCRIPTION/COMMENTS
SY32-5049-0	991552	VOL. A02 - Maintenance Information REA 12-11654
	336326	TNL SN32-0308 IEC 0011225741 (REA 12-25742, REA 12-11657) IEC 0021225741 (REA 12-25492, REA 12-25497, REA 12-25650) IEC 0011211660 (REA 12-11660)
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SY32-5049-11	A57723	Twelfth Edition
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NAME.	PUB REF DWG (PRD)
DESIGN	SHT OF
DETAIL	
CHECK	CLASSIFICATION
APPRO	

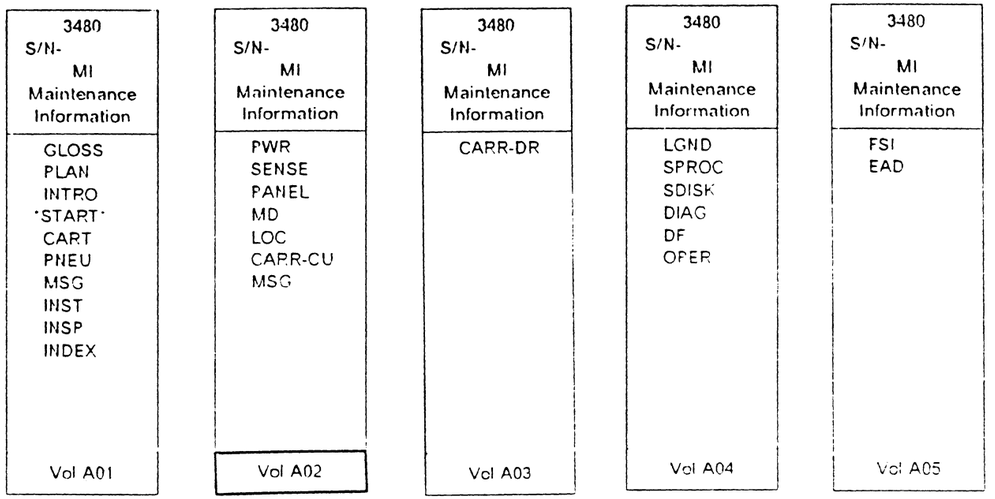
	DATE	CHANGE NO
REL	See EC History	
	7/24/89	A57723
	5/11/90	A57724
	09/30/91	C13783

	DATE	CHANGE NO

MUST CONFORM TO ENG SPEC	DEVELOPMENT NO	LOGIC PG NO
		RD002

8673862 B

Maintenance Information



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Logic Diagrams

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3480 Magnetic Tape Subsystem

SY32-5049-13

Preface

This manual contains maintenance information about the IBM 3480 Magnetic Tape Subsystem and is intended for customer engineers responsible for servicing the 3480 tape subsystem. This publication is designed to be used with the IBM Maintenance Device (MD). Therefore, CEs using this manual should be familiar with that tool.

Prerequisite Knowledge

It is assumed that you have a background in data processing concepts and that you are familiar with the hexadecimal numbering system, stored program concepts, and have a basic understanding of tape subsystems and their relationship to a processor I/O channel.

Related Publications

IBM System/360 and System/370 I/O Interface Channel to Control Unit Original Equipment Manufacturers' Information, GA22-6974.

IBM 3480 Magnetic Tape Subsystem Description, GA32-0042.

How to Update the Maintenance Information

This manual is form number controlled. The 3480 manuals will be updated by Technical Newsletters (TNLs). The TNL cover letter will indicate the new EC level. The entire manual will be updated by major revision. All updates are processed through normal MLC control. The Publications Reference Drawing (PRD) in the front of each volume contains the EC history.

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INTRO	3480 Introduction
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PNEU	Pneumatic Analysis
MSG	Console Messages and EREP
INST	Installation/Removal
INSP	Safety Check Procedures
INDEX	Index

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PWR	Power Maps
SENSE	Sense/Status
PANEL	Panel
MD	Maintenance Device
LOC	Locations
CARR-CU	Control Unit Checks/Adjustments/Removal/Replacement

Volume A03

CARR-DR	Drive Checks/Adjustments/Removal/Replacement

Volume A04

LGND	Legend
SPROC	Support Procedures
SDISK	Support Diskette Procedures
DIAG	Support Diagnostic Descriptions
DF	Data Fields and Registers
OPER	Theory of Operation

Volume A05

FSI	Fault Symptom Index
EAD	Error Analysis Diagrams

Contents

Introduction

PWR Purpose

This section contains the maps and procedures that will enable you to repair power related problems in the 3480 tape subsystem. A description of the DC test card and how it is used in both the control unit and tape unit is presented.

You will be sent into the PWR maps from either the START page or from the MD.

How to Use the DC Test Tool with the Control Unit

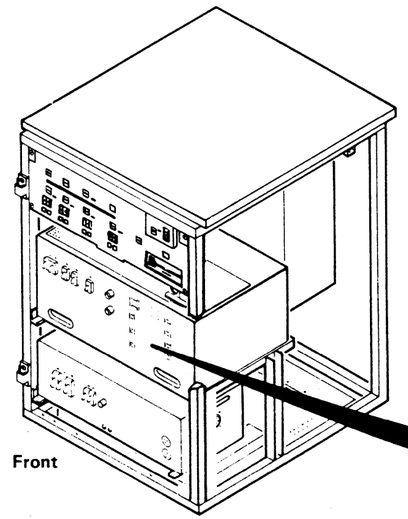
The dc test tool (part 8492781) is used to determine if all of the dc voltages are present at the output of the dc power supply. However, the tool only determines that a voltage is present or absent. It does not determine whether or not the voltages are in specifications.

Perform the following steps to determine if all the voltages are present:

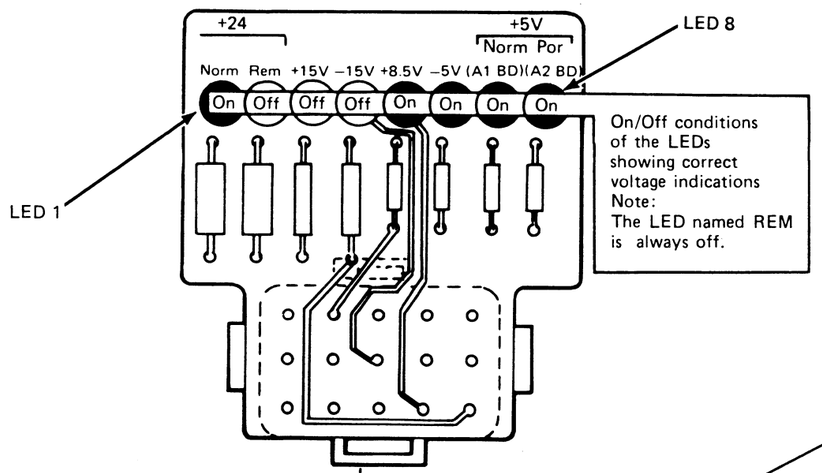
1. Open the front cover of the control unit and remove the safety cover (see CARR-CU 2-1).
2. With the control unit power on, plug the test tool connector into the J16 position on the dc power supply.
3. Match the On/Off conditions of the LEDs with the DC Test Tool illustration. The On condition of an LED indicates the voltage is present.

Verification Procedure (Optional)

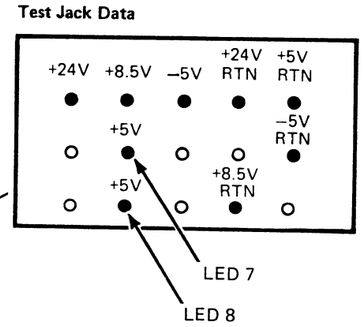
Should an LED fail to light, determine if the DC Test Tool is at fault or if the voltage is missing. Using a voltmeter, measure the voltage at the test jack J16. Measure between the voltage pin and the voltage return pin (RTN) using the Test Jack Data illustration as a reference. If the voltage is present at the test jack pins, the dc test tool is defective. If the voltage is not present, the dc supply is missing a voltage. Return to the procedure that sent you here.



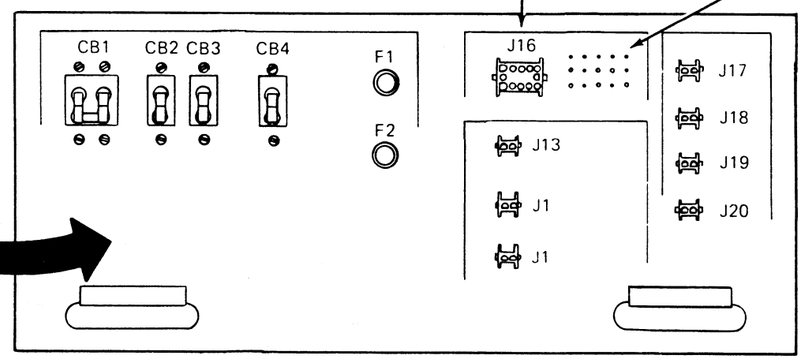
DC Test Tool



Test Jack Data



CU-PS02
DC Power Supply



Front View

How to Use the DC Test Tool with the Tape Unit

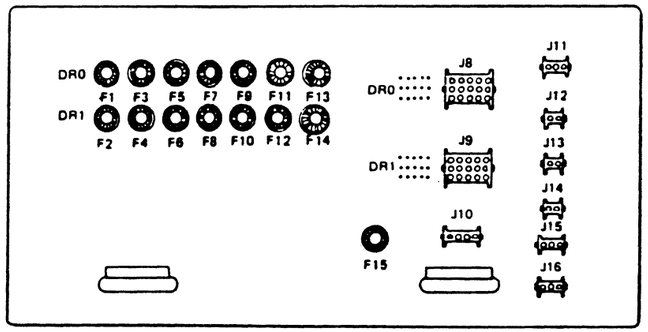
The dc test tool (part 8492781) is used to determine if all of the dc voltages are present at the output of the dc power supply. However, the tool only determines that a voltage is present or absent. It does not determine whether or not the voltages are within specifications.

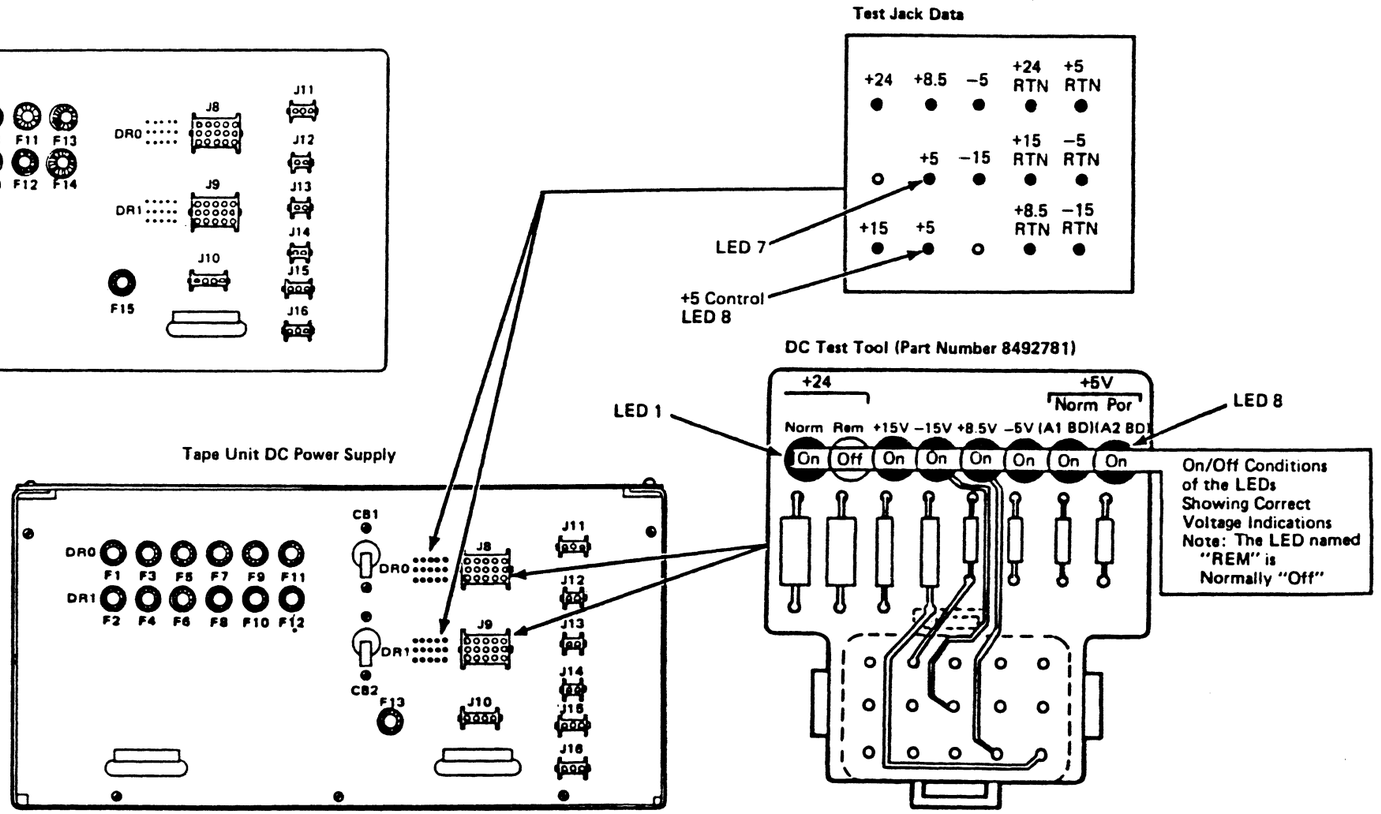
Perform the following steps to determine if all the voltages are present:

1. Open the front cover and remove the front safety cover (see CARR-CU 2-3).
2. With the tape unit power on, plug the test tool into the J8 (drive 0) or J9 (drive 1) position on the dc power supply.
3. Match the On/Off conditions of the LEDs with the DC Test Tool illustration. The On condition of a LED indicates the voltage is present.

Verification Procedure (Optional)

Should a LED fail to light, determine if the dc test tool is at fault or if the voltage is missing. Using a voltmeter, measure the voltage at test jack J8 (drive 0) or J9 (drive 1). Measure between the voltage pin and the voltage return pin (RTN) using the Test Jack Data illustration as a reference. If the voltage is present at the test jack pins, the dc test tool is defective. If the voltage is not present, the dc supply is missing a voltage. Return to the procedure that sent you here.





How to Use the DC Test Tool with the Tape Unit

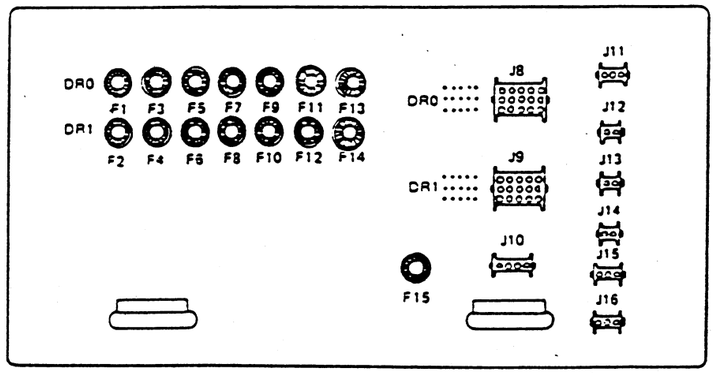
The dc test tool (part 8492781) is used to determine if all of the dc voltages are present at the output of the dc power supply. However, the tool only determines that a voltage is present or absent. It does not determine whether or not the voltages are within specifications.

Perform the following steps to determine if all the voltages are present:

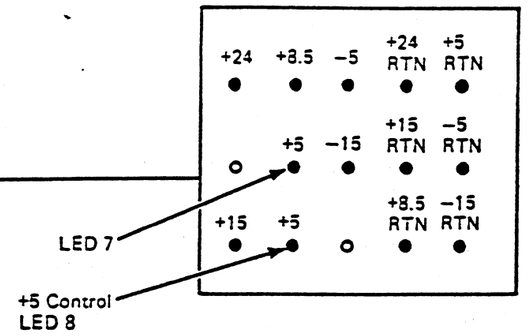
1. Open the front cover and remove the front safety cover (see CARR-CU 2-1 or 2-3).
2. With the tape unit power on, plug the test tool into the J8 (drive 0) or J9 (drive 1) position on the dc power supply.
3. Match the On/Off conditions of the LEDs with the DC Test Tool illustration. The On condition of a LED indicates the voltage is present.

Verification Procedure (Optional)

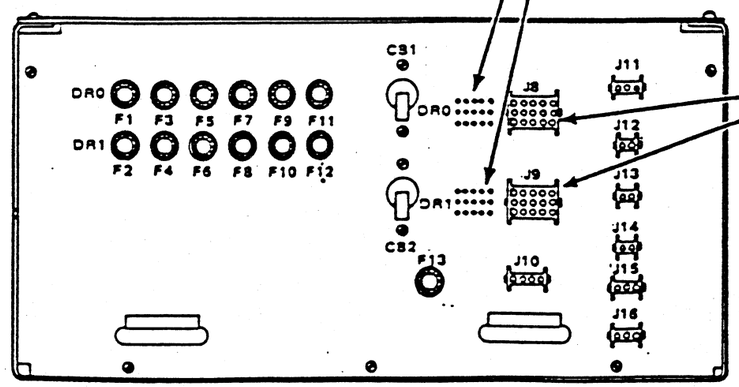
Should a LED fail to light, determine if the dc test tool is at fault or if the voltage is missing. Using a voltmeter, measure the voltage at test jack J8 (drive 0) or J9 (drive 1). Measure between the voltage pin and the voltage return pin (RTN) using the Test Jack Data illustration as a reference. If the voltage is present at the test jack pins, the dc test tool is defective. If the voltage is not present, the dc supply is missing a voltage. Return to the procedure that sent you here.



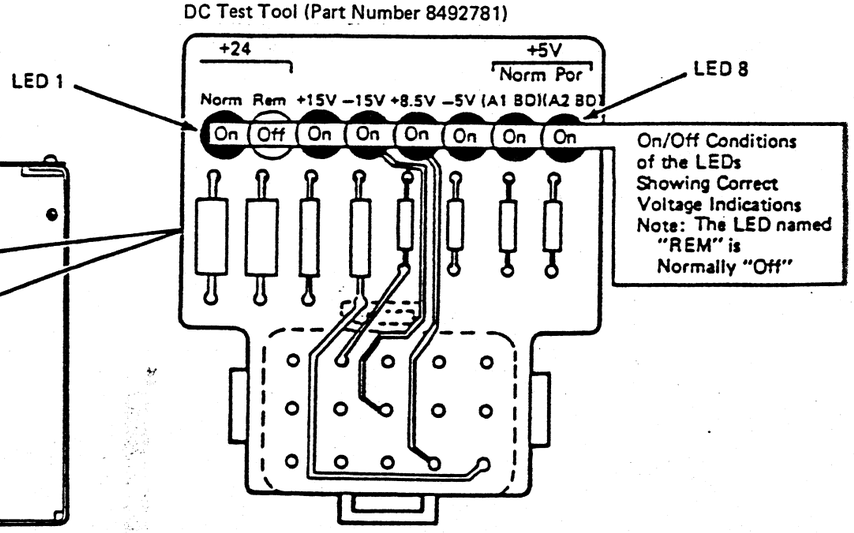
Test Jack Data



Tape Unit DC Power Supply



DC Test Tool (Part Number 8492781)



0 0 0 0 0 0 0 0 0 0

Control Unit Power Supply Jumpers

Use one of the following two tables to check the voltage settings. Ensure the jumpers are installed correctly for the voltage being used.

Note: For 50 Hz (except Japan) machines, if the Delta/Wye jumper has to be changed (J09 and J10 on CU-PS01), ensure that the cap is reinstalled on the empty socket.

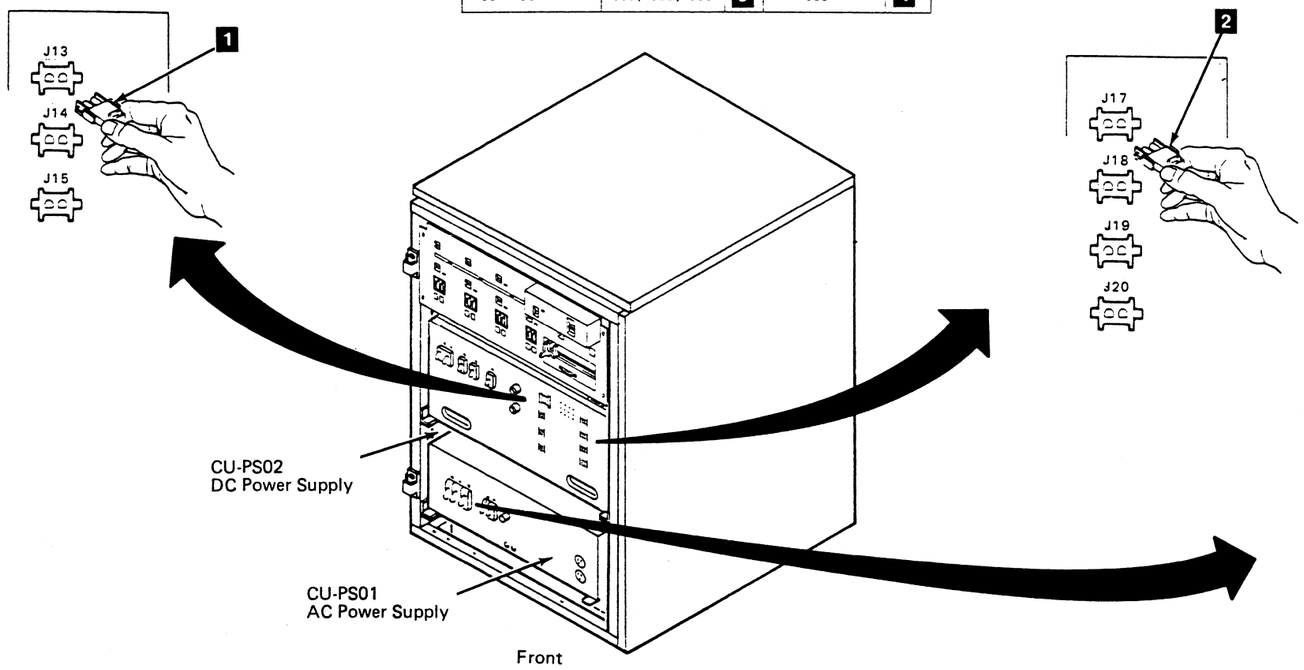
Control Unit Voltage Jumpers - 60 Hz and 50 Hz Japan				
CU Input Voltage	Position of AC (PS01) Jumpers	REF	Position of DC (PS02) Jumpers	REF
200/208 V ac	J09	4	J13	1
220 V ac	J10	4	J14	1
230/240 V ac	J11	4	J15	1
Convenience Outlet				
100 V ac	J12	3		
120 V ac	J13	3		

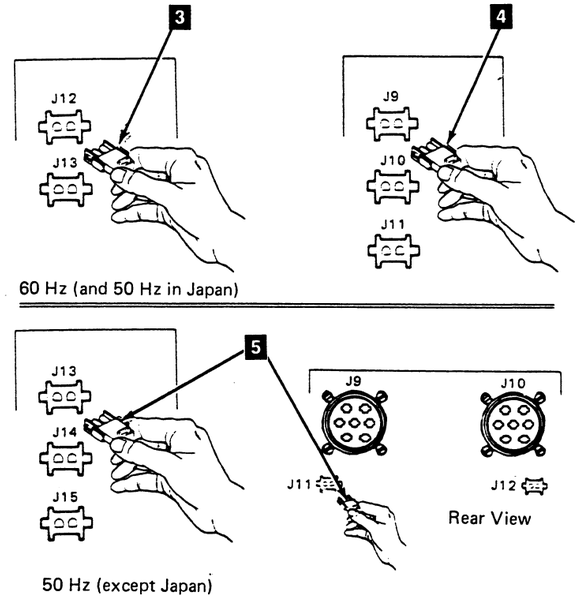
Control Unit Voltage Jumpers - 50 Hz (except Japan)				
CU Input Voltage	Position of AC (PS01) Jumpers	REF	Position of DC (PS02) Jumpers	REF
200/208 V ac	J09, J11, J13	5	J13	1
220 V ac	J09, J11, J14	5	J14	1
230/240 V ac	J09, J11, J15	5	J15	1
380 V ac	J10, J12, J14	5	J14	1
400 V ac	J10, J12, J15	5	J15	1
415 V ac	J10, J12, J15	5	J15	1

A control unit has from one to four channel adapters. The position of the jumper plug for CU-PS02-J17 through CU-PS02-J20 2 is determined by the number of channel adapters in the control unit. Use the following table to ensure that the control unit is jumpered for the correct number of channel adapters.

Note: If the power supply on the control unit has different jumper labels than described here, follow the instructions on the power supply template.

Control Unit Channel Jumpers	
Number of Channel Adapters	Position of DC (PS02) Jumper
1	J17
2	J18
3	J19
4	J20





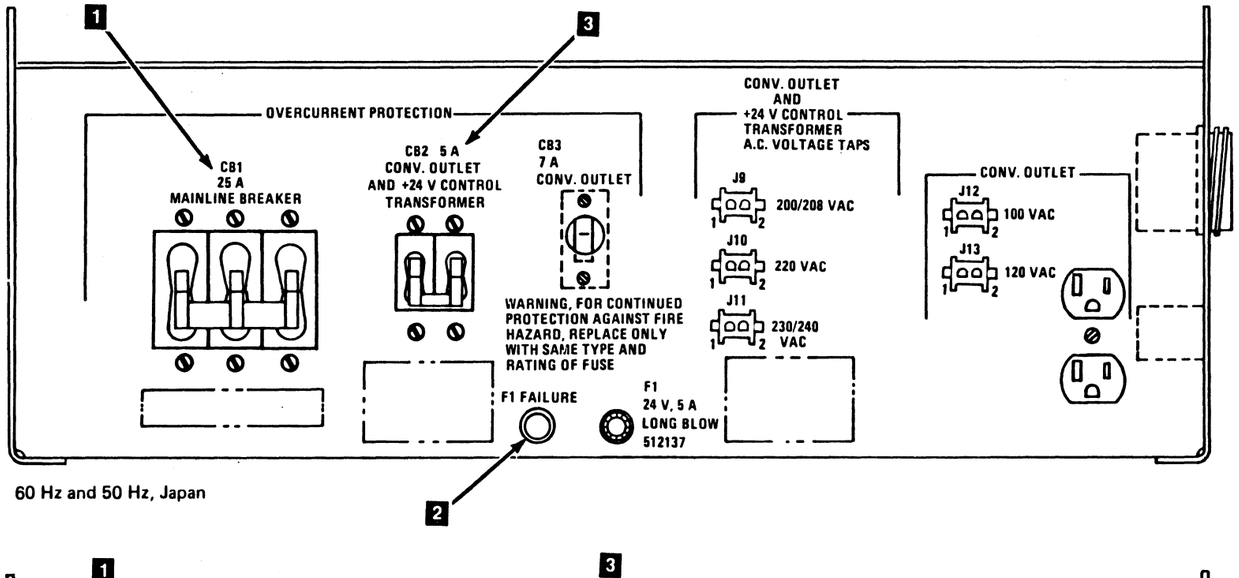
Control Unit AC Power Supply Panel

In addition to supplying ac power to the control unit, the control unit ac power supply distributes ac power to all the tape units attached to it. The figure shows the control panel for the control unit ac power supply. Note that this control panel is behind a safety shield.

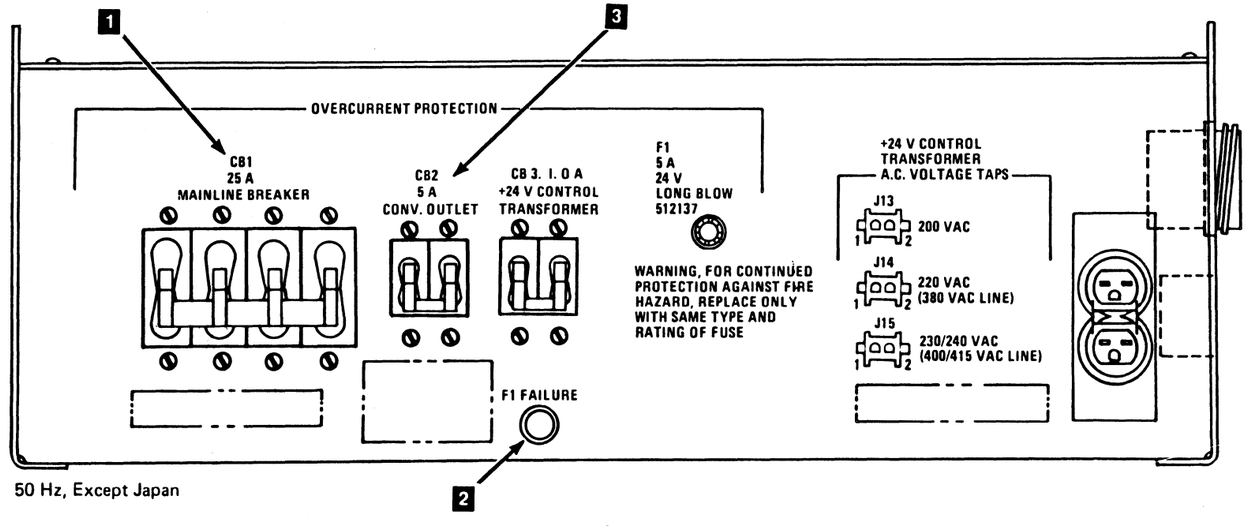
1 Mainline Circuit Breaker
- CB1 is the ac power mainline circuit breaker in the control unit. This switch trips automatically if the circuit is overloaded. CB1 can also be tripped by hand to remove ac power from the control unit and from all the tape units physically connected to that control unit.

2 F1 Failure
- This LED shows that fuse 1 on the ac power supply has blown. Fuse 1 controls the 24 V control voltage for activating the power supplies sequentially.

3 Convenience Outlet CB
- The convenience outlet circuit breaker removes power from the convenience outlet when it is tripped.



60 Hz and 50 Hz, Japan



50 Hz, Except Japan

AC Power 60 Hz and 50 Hz Japan

Voltage	Maximum	Minimum
200/208	220	180
220	238	193
230/240	259	202

AC Power 50 Hz Except Japan

Voltage	Maximum	Minimum
200	220	180
220	238	193
230/240	259	202
380	410	333
400	432	350
415	448	363

Note: See control unit or tape unit field wire net list and voltage distribution list for actual measuring points at each FRU for the voltages.

Control Unit DC Voltages 50 Hz and 60 Hz

Measured at Power Supply

Voltage	Maximum	Minimum
−5.0	−5.50	−4.70
+5.0	+5.60	+4.90
+8.5	+9.20	+7.80
+24	+32	+19

Measured at Logic Board

Voltage	Maximum	Minimum
−5.0	−5.45	−4.55
+1.70	+1.75	+1.65
+5.0	+5.45	+4.55
+8.5	+9.27	+7.74
+12.0	+12.36	+11.64
+24	+30.0	+18.0

Measuring Points

Voltage	From	To
−5	A1E2M06 A2R2B06	A1K2J08 A2K2J08
+1.7	A1T2B03	A1K2J08
+5	A1L2U03 A2R2U03	A1K2J08 A2K2J08
+8.5	A1E2M11 A2R2B11	A1K2J08 A2K2J08
+12	A1T2B11	A1K2J08
+24	A1T2S06	A1K2J08

Power Supply Ripple Check (Control Unit Only)

1. Using a voltmeter, measure the DC voltage at the desired point and record the reading.
2. Using an oscilloscope, measure the peak to peak AC ripple at the same voltage point selected in step 1.
3. Divide the peak to peak reading taken in step 2 by 2.
4. Add the DC voltage reading taken in step 1 to the result of step 3.
5. The result of step 4 must fall within the mini/max voltage range.

Tape Unit DC Voltages 50 Hz and 60 Hz

Measured at Power Supply

Voltage	Maximum	Minimum	Maximum Ripple (Peak-to-Peak)
−15.0	−16.5	−13.52	.300v
−5.0	−5.51	−4.55	.250v
+5.0	+5.51	+4.59	.250v
+8.5	+9.35	+7.67	.250v
+15.0	+16.50	+13.75	.300v
+24.0	+30.01	+22.88	2.4v

Note: If the drives are operating, there will be additional ripple generated by the starting and stopping of the drive motors. Therefore, this check should be done with the drives not moving tape.

Measured at Logic Board (or Load)

Voltage	Maximum	Minimum
−15.0	−16.50	−13.50
−5.0	−5.50	−4.50
+5.0	+5.50	+4.50
+8.5	+9.35	+7.65
+15.0	+16.50	+13.50
+24.0	+30.0	+22.0

Measuring Points

Voltage	See ALD
−15	PA00/001
−5	RP000
+5	RP000
+8.5	RP000
+15	VP000
+24	PA00/001

Note: The +15 volts are present only when the file protect switch is transferred.

0 0 0 0 0 0 0 0 0 0

Voltage Tolerance Tables

AC Power 60 Hz and 50 Hz Japan

Voltage	Maximum	Minimum
200/208	220	180
220	238	193
240	254	208

AC Power 50 Hz Except Japan

Voltage	Maximum	Minimum
200	220	180
220	238	193
230/240	259	202
380	410	333
400	432	350
415	448	363

Control Unit DC Voltages 50 Hz and 60 Hz

Measured at Power Supply

Voltage	Maximum	Minimum
-5.0	-5.5	-4.7
+5.0	+5.6	+4.9
+8.5	+9.3	+7.8
+24	+32	+19

Measured at Logic Board

Voltage	Maximum	Minimum
-5.0	-5.45	-4.55
+1.70	+1.75	+1.65
+5.0	+5.45	+4.75
+8.5	+9.05	+7.65
+12.0	+13.08	+10.92
+24	+30	+18

Measuring Points

Voltage	From	To
-5	A1E2M06 A2R2B06	A1K2J08 A2K2J08
+1.7	A1D2B11 A2R2M12	A1K2J08 A2K2J08
+5	A1L2U03 A2R2U03	A1K2J08 A2K2J08
+8.5	A1E2M11 A2R2B11	A1K2J08 A2K2J08
+12	A1B2B11	A1K2J08
+24	A1T2S06 A2H4J06	A1K2J08 A2K2J08

Note: See control unit or tape unit field wire net list - voltage distribution list for actual measuring points at each FRU for the voltages.

Tape Unit DC Voltages 50 Hz and 60 Hz

Measured at Power Supply

Voltage	Maximum	Minimum
-15.0	-16.5	-13.55
-5.0	-5.53	-4.6
+5.0	+5.61	+4.65
+8.5	+9.35	+7.68
+15.0	+16.5	+13.75
+24.0	+30.0	+22.5

Measured at Logic Board (or Load)

Voltage	Maximum	Minimum
-15.0	-16.5	-13.5
-5.0	-5.5	-4.5
+5.0	+5.5	+4.5
+8.5	+9.35	+7.65
+15.0	+16.5	+13.5
+24.0	+30.0	+22.0

Measuring Points

Voltage	See ALD
-15	PA00/001
-5	RP000
+5	RP000
+8.5	RP000
+15	VP000
+24	PA00/001

Note: The +15 volts are present only when the file protect switch is transferred.

Power Supply Ripple Check

1. Using a voltmeter, measure the DC voltage at the desired point and record the reading.
2. Using an oscilloscope, measure the peak to peak AC ripple at the same voltage point selected in step 1.
3. Divide the peak to peak reading taken in step 2 by 2.
4. Add the DC voltage reading taken in step 1 to the result of step 3.
5. The result of step 4 must fall within the mini-max voltage range.

PWR 30 Tape Unit Fuses Continue to Blow

If an exchanged fuse continues to blow or a circuit breaker continues to trip, disconnect the cable(s) associated with the fuse or circuit breaker to isolate the problem. If the fuse or circuit breaker continues to fail with the load removed, the power supply is suspect. If the fuse or circuit breaker no longer fails (with the load removed), reconnect the cable(s) associated with the fuse or circuit breaker.

Disconnect the loader cable J3 and power up. If there are no problems exchange the loader control card and/or the loader power cable. If the problem still exists then exchange the FRUs in the following table.

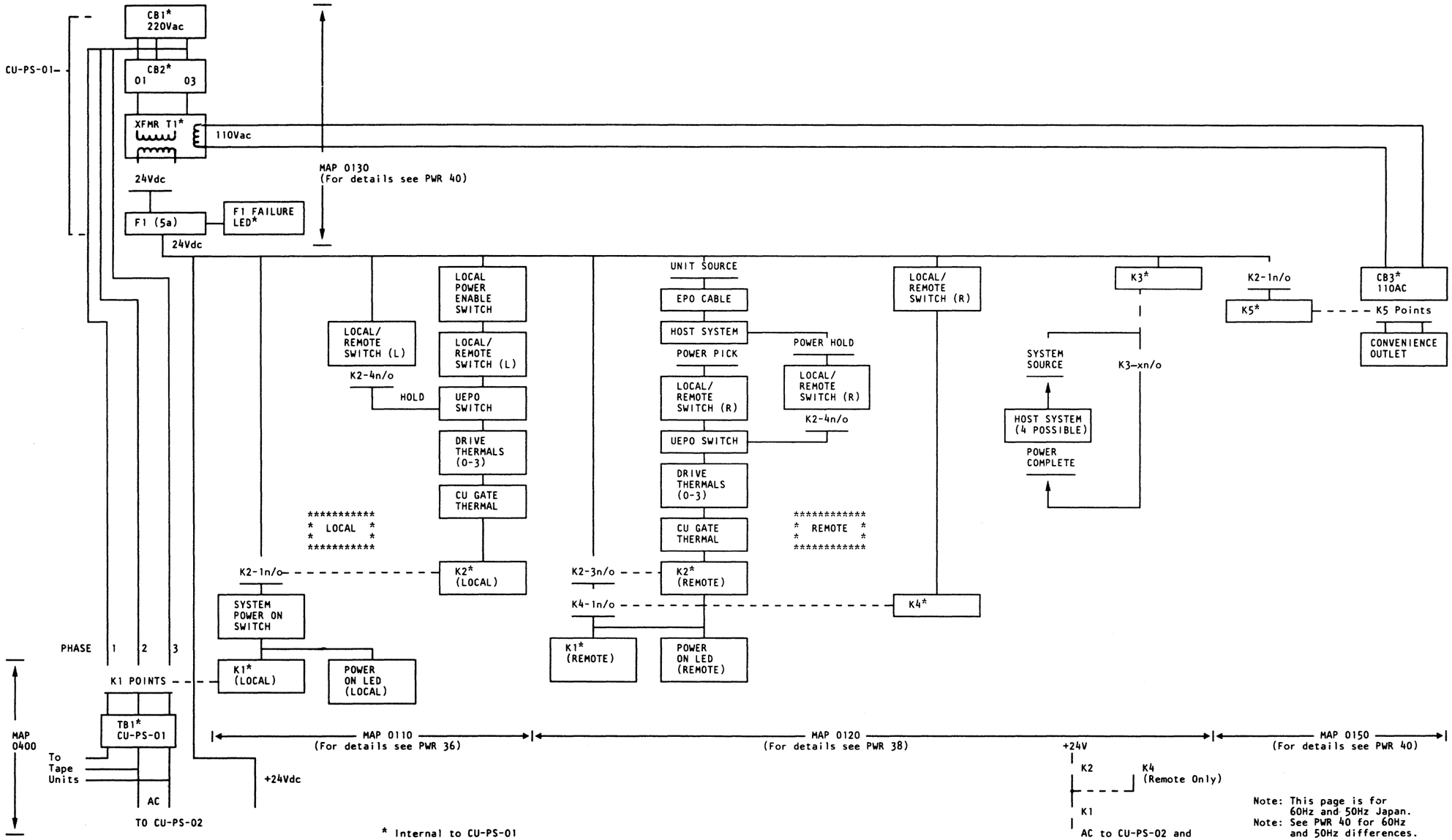
Reconnect the cables previously removed.

If the repair is successful, set the drive Online/Offline switch to Online (see LOC 1). Return to the MD and press the ENTER key.

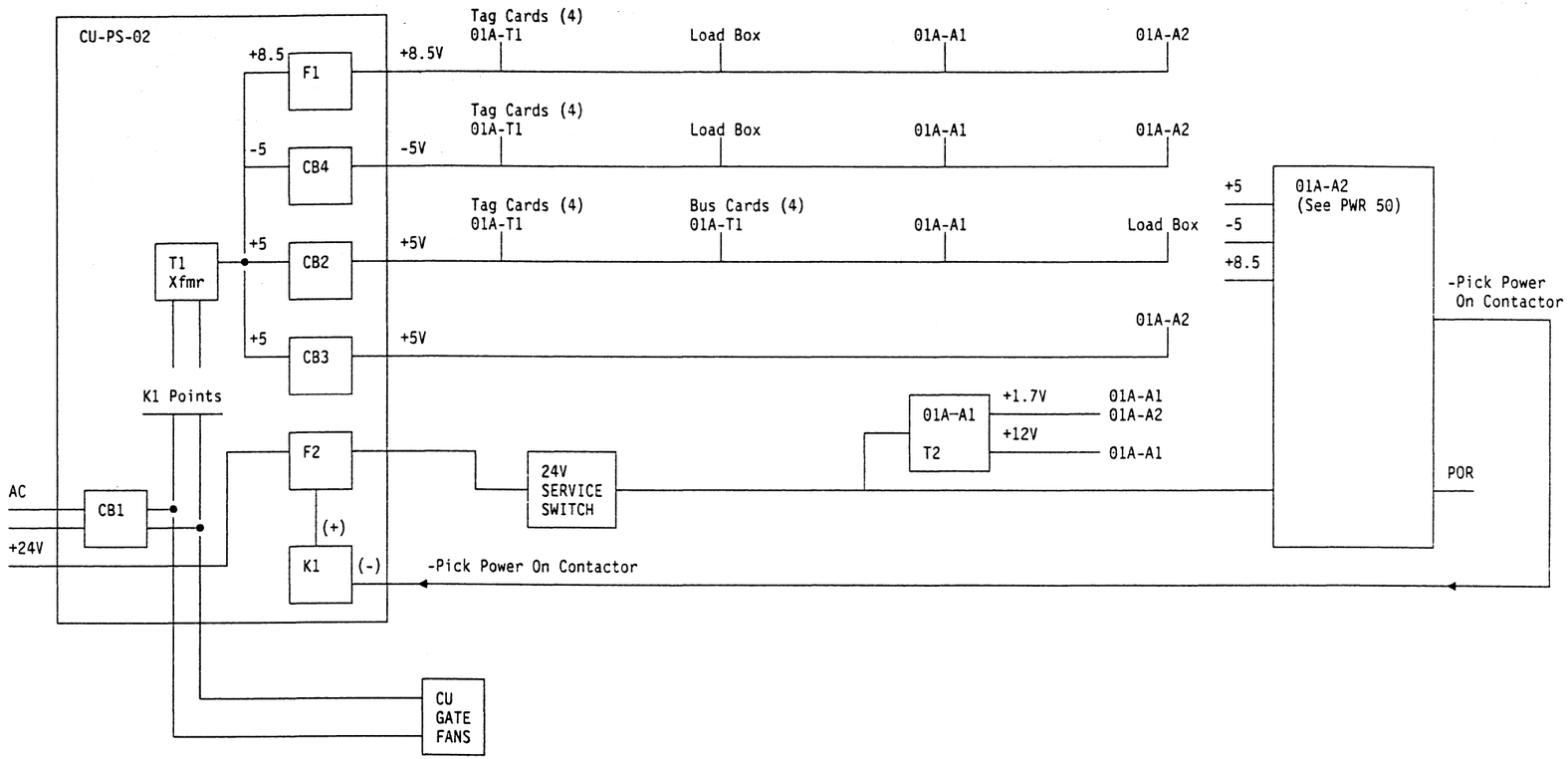
If the repair is not successful, request the assistance of your next level of support.

Cable locations are described on LOC 1.

Fuse or CB	Drive	Associated Cables	FRU
F1 (+24V dc)	0	J5	059–Power amplifier board
F2 (+24V dc)	1	J1	059–Power amplifier board
F3 (+15V dc)	0	J5	064–Write power card 059–Power amplifier board 058–Logic board (02A-A1)
F4 (+15V dc)	1	J1	064–Write power card 059–Power amplifier board 058–Logic board (02A-A1)
F5 (-15V dc)	0	J5	059–Power amplifier board
F6 (-15V dc)	1	J1	059–Power amplifier board
F7 (+8.5V dc)	0	J5, J7	060–Message display board 085–Drive control Card 058–Logic board (02A-A1)
F8 (+8.5V dc)	1	J1, J3	060–Message display board 085–Drive control Card 058–Logic board (2A-A1)
F9 (-5V dc)	0	J5, J7	059–Power amplifier board 058–Logic board (02A-A1)
F10 (-5V dc)	1	J1, J3	059–Power amplifier board 058–Logic board (02A-A1)
F11 (+5V dc ctrl)	0	J5	059–Power amplifier board 060–Message display board 079–DC distribution cable
F12 (+5V dc ctrl)	1	J2	059–Power amplifier board 060–Message display board 079–DC distribution cable
CB1 (+5V dc) F13 (+5V dc) - (EC A21676)	0	J6, J7	059–Power amplifier board 060–Message display board 079–DC pwr distribution cable 080–DC pwr distribution cable 058–Logic board (02A-A1) 281–Loader control card 287–Loader power cable
CB2 (+5V dc) F14 (+5V dc) - (EC A21676)	1	J2, J3	059–Power amplifier board 060–Message display board 079–DC pwr distribution cable 080–DC pwr distribution cable 058–Logic board (02A-A1) 281–Loader control card 287–Loader power cable
Tape unit power ac CB	0, 1	J4, J15, J16	020–Drive 0 blower 020–Drive 1 blower 030–Pneumatic pump/motor
Auto Loader Fuse (+5V dc)	0, 1	J2, J6,	281–Loader Control Card
Auto Loader Fuse (+24V dc)	0, 1	J2, J6,	281–Loader Control Card

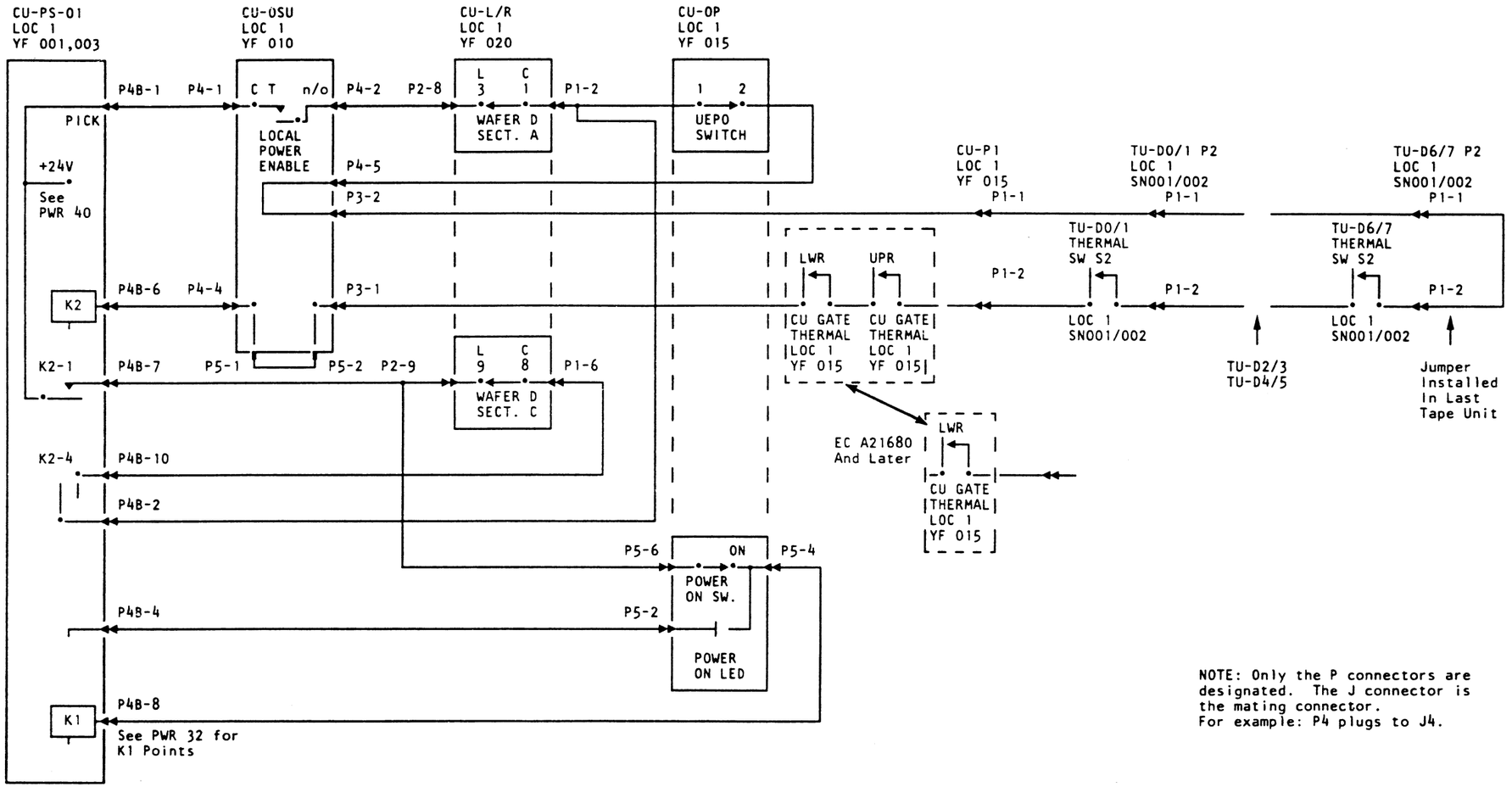


Control Unit DC Power Distribution Diagram PWR 34



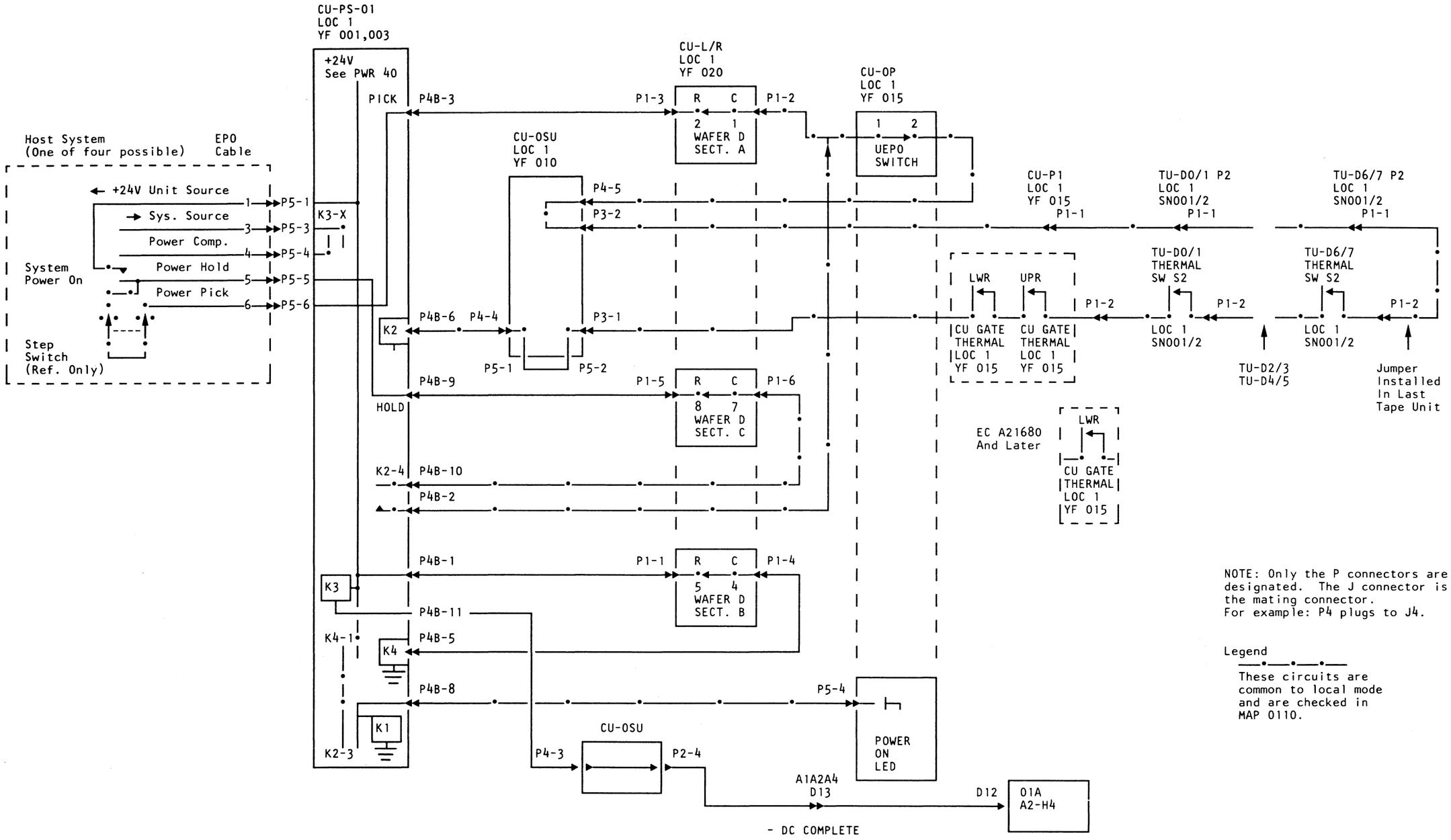
Control Unit DC Power Distribution Diagram PWR 34

Control Unit AC Power On (Local Mode) Diagram



NOTE: Only the P connectors are designated. The J connector is the mating connector. For example: P4 plugs to J4.

Control Unit AC Power On (Remote Mode) Diagram



NOTE: Only the P connectors are designated. The J connector is the mating connector.
For example: P4 plugs to J4.

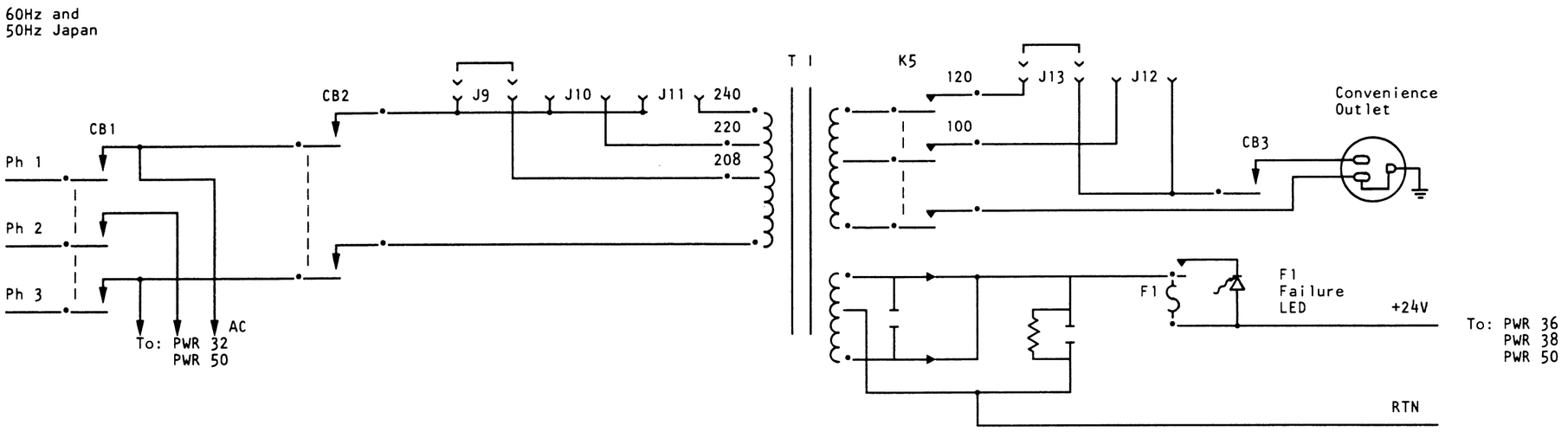
Legend

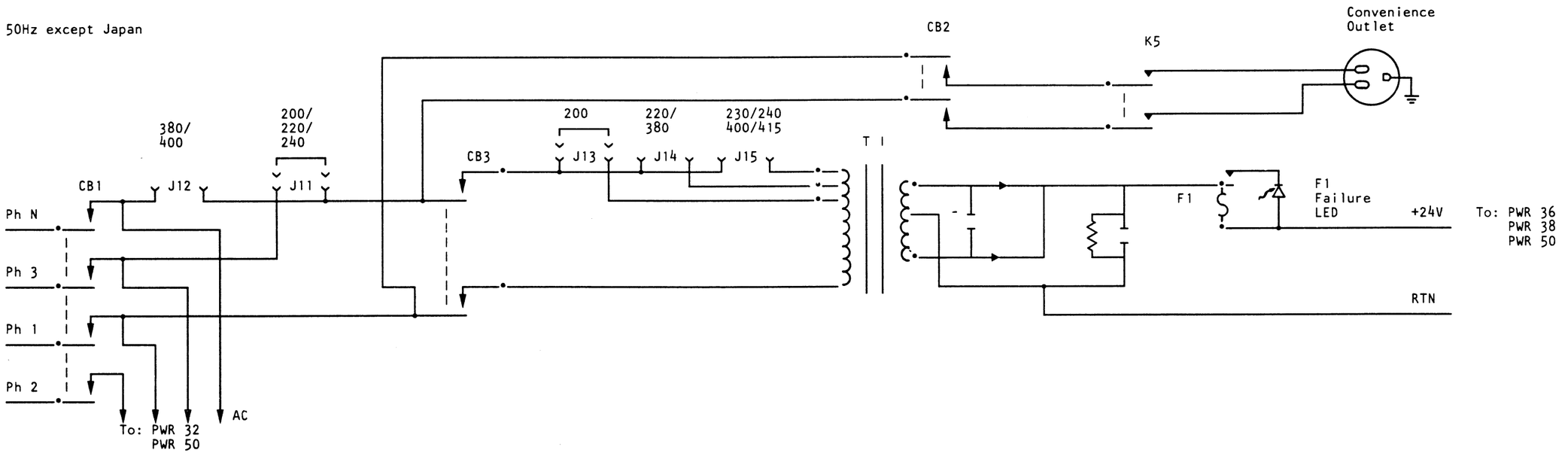
—•—•—•—

These circuits are common to local mode and are checked in MAP 0110.

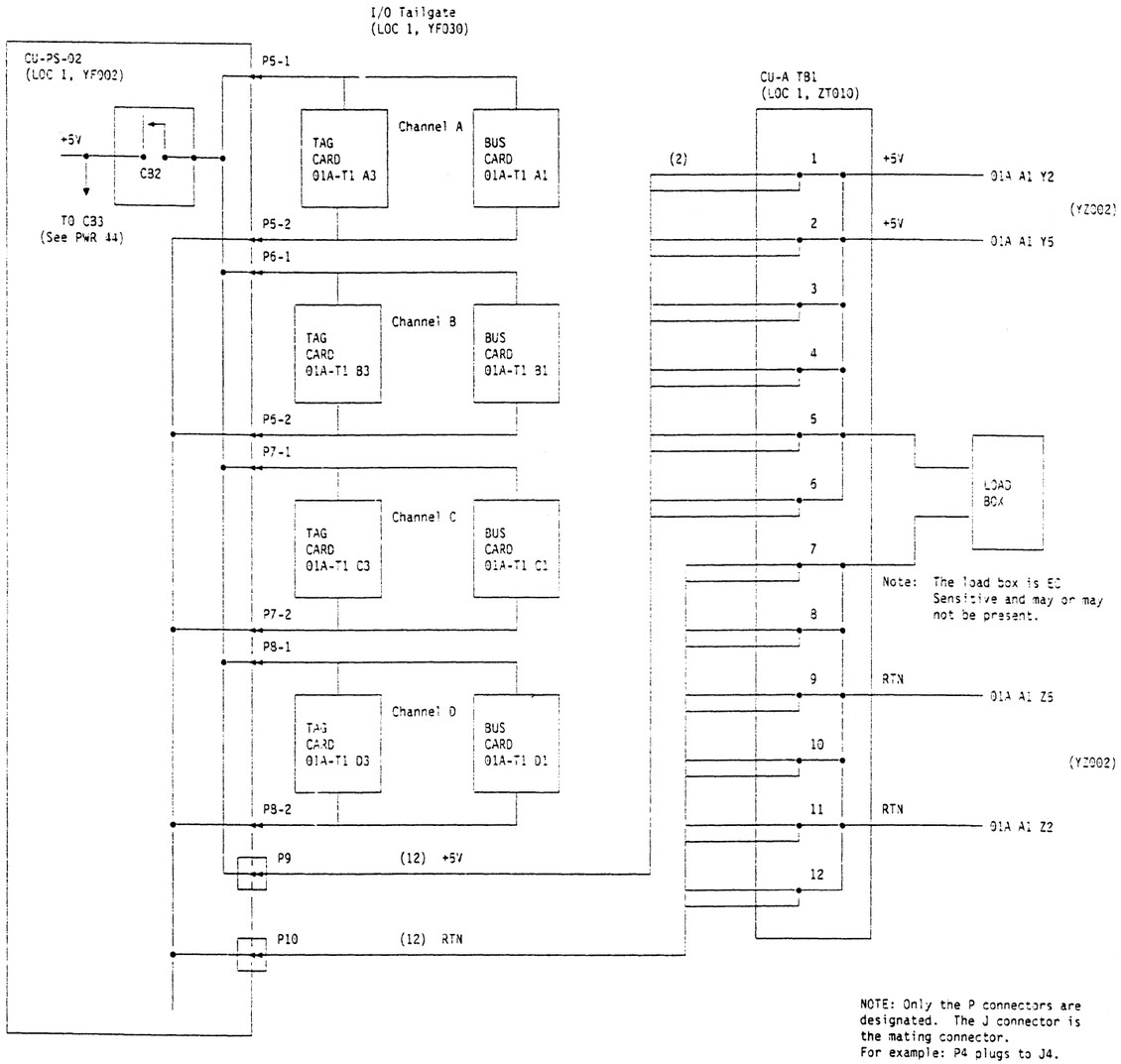
Control Unit AC Power On (Remote Mode) Diagram

+24 Volt Control Voltage Diagram **PWR 40**



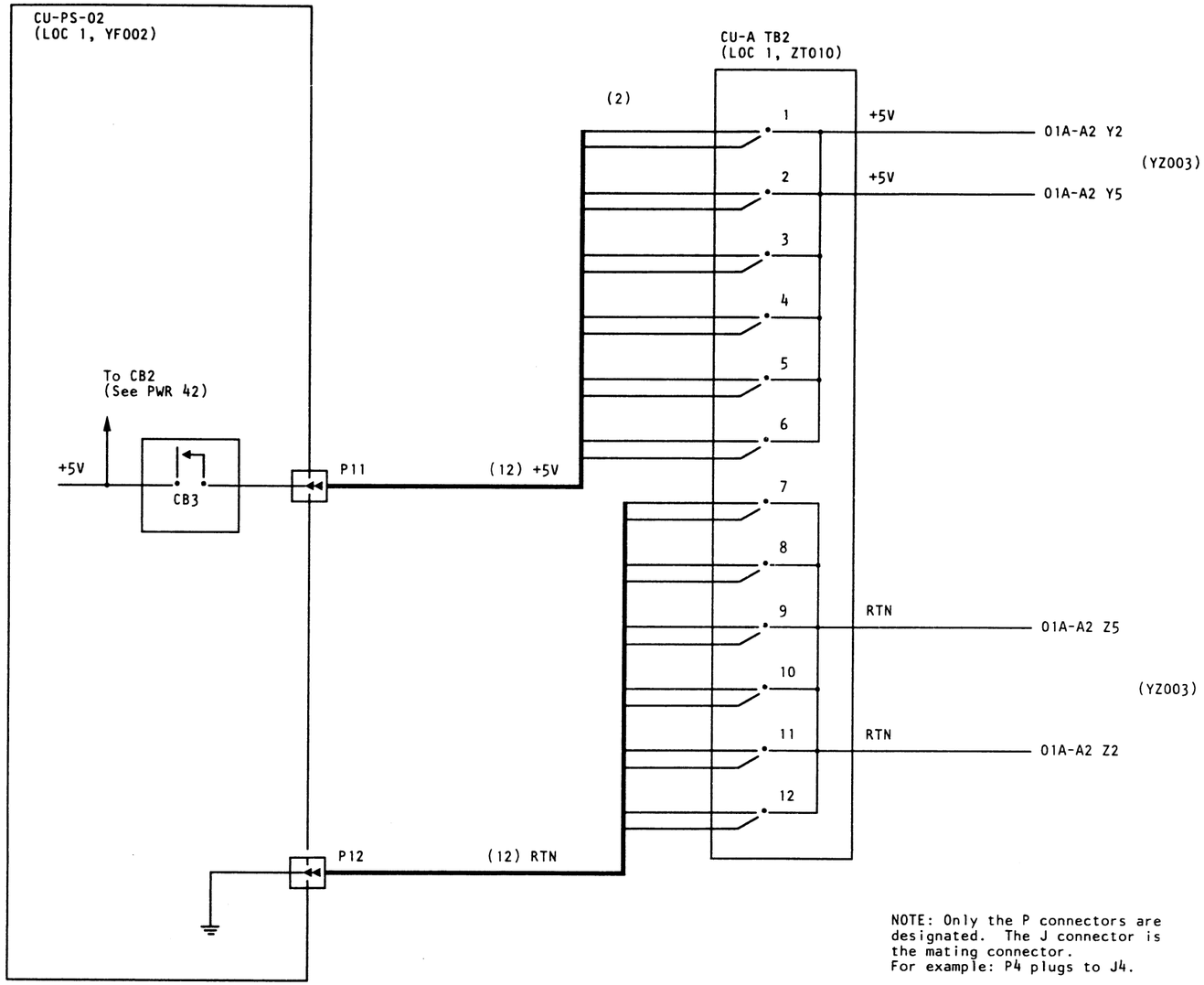


Control Unit +5 V dc Distribution Diagram



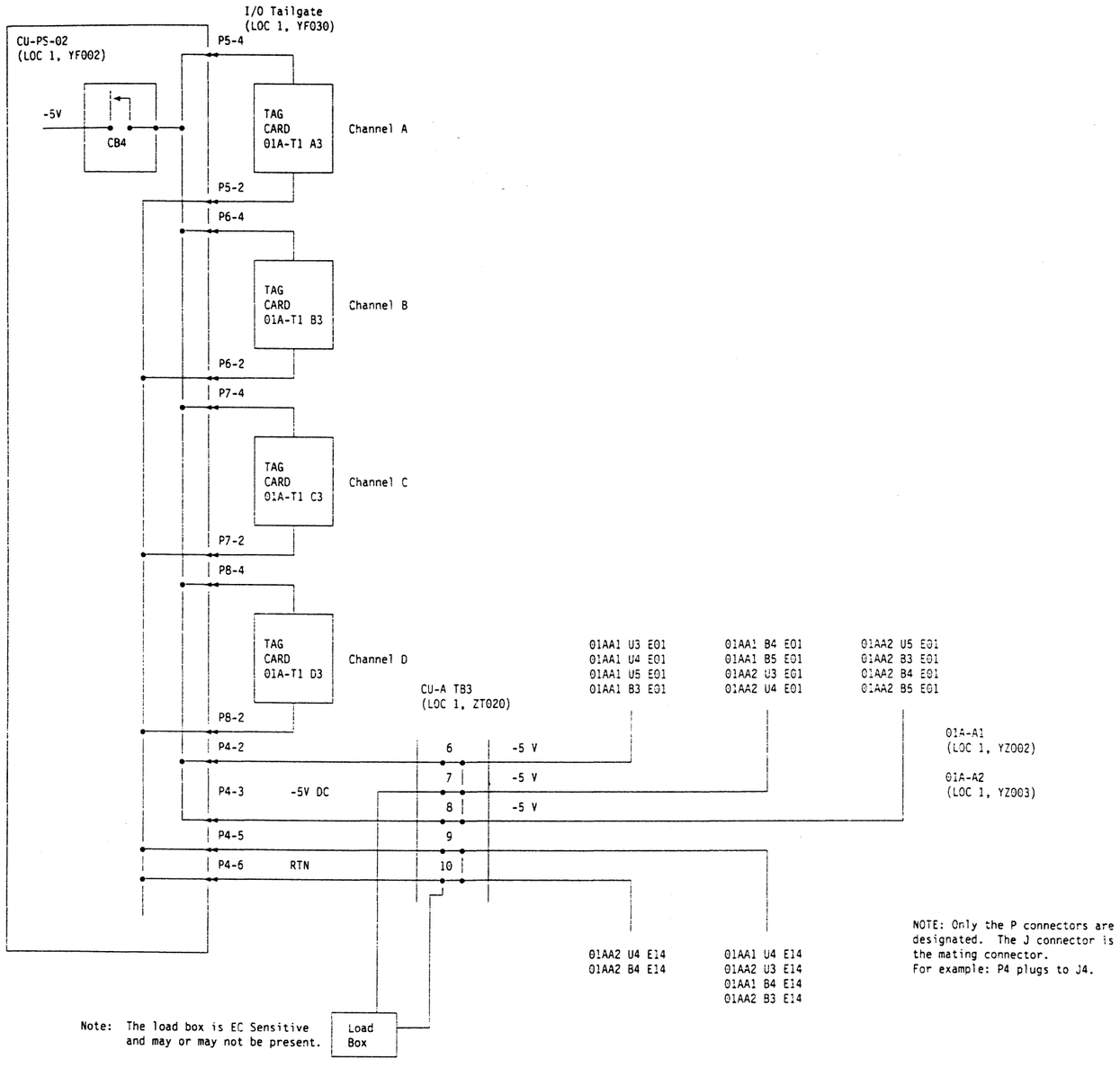
Control Unit +5 V dc Distribution Diagram

Control Unit +5 V dc Distribution Diagram (Continued)

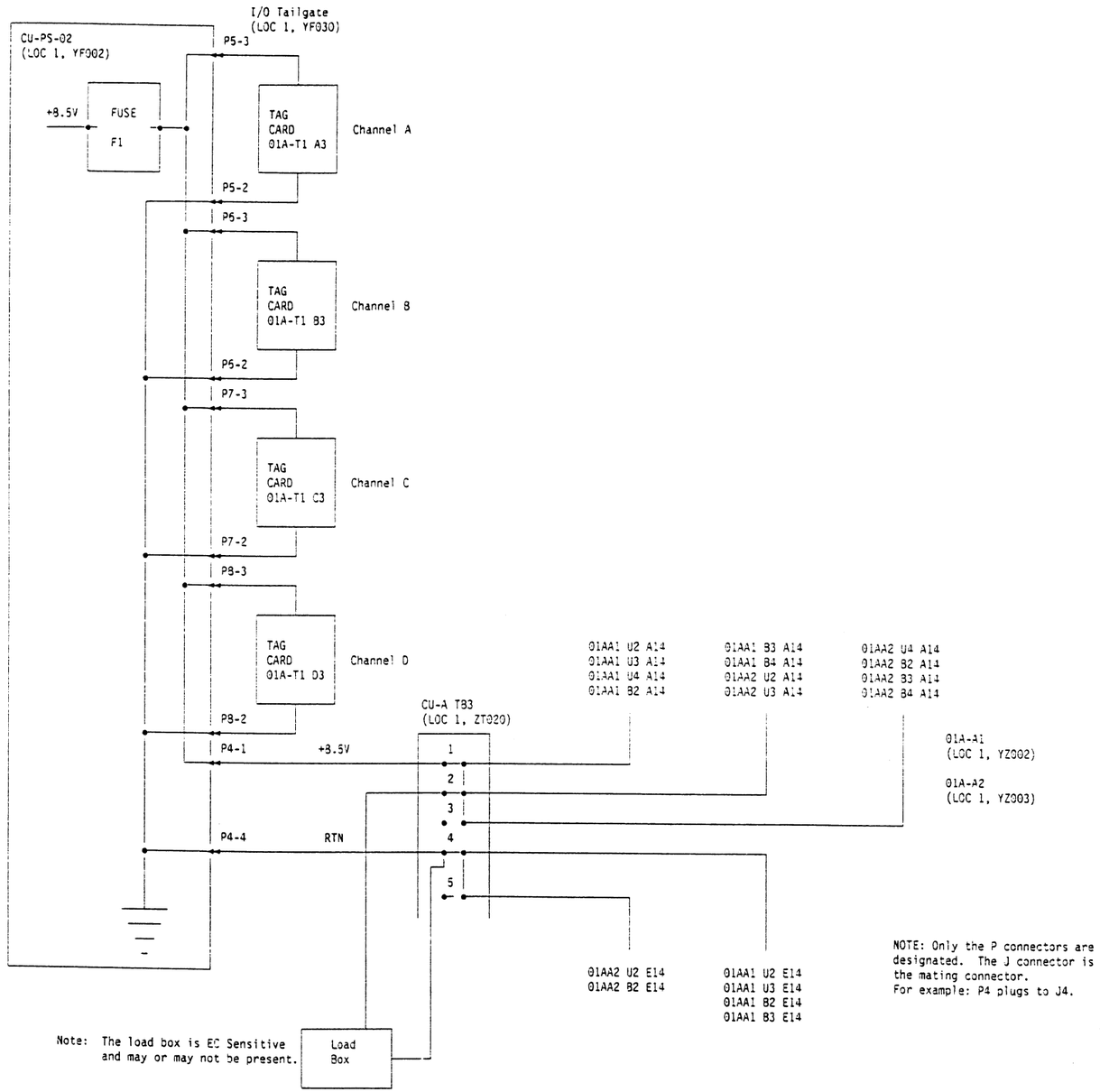


NOTE: Only the P connectors are designated. The J connector is the mating connector.
For example: P4 plugs to J4.

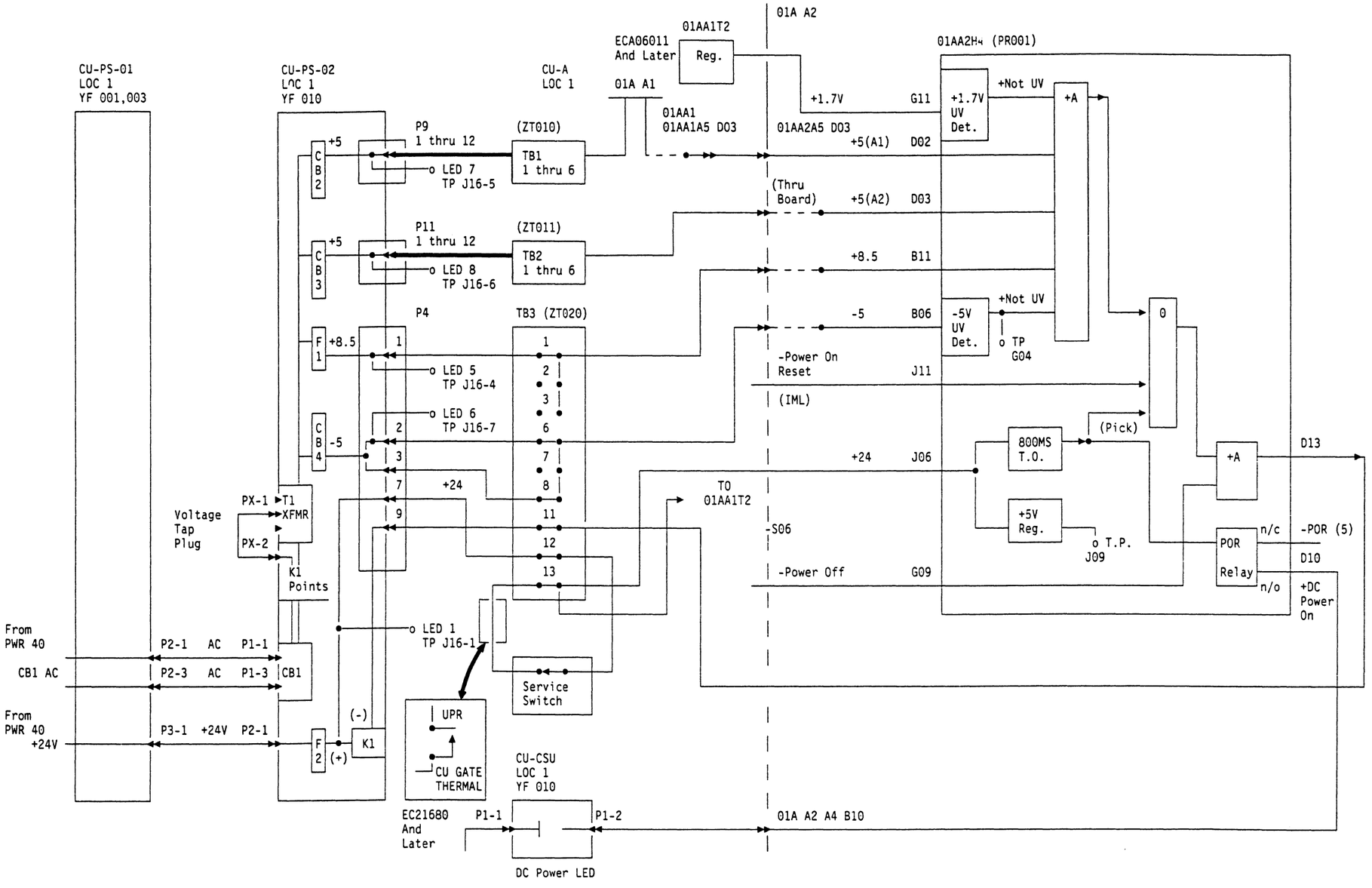
Control Unit –5 V dc Distribution Diagram



+8.5 V dc Distribution Diagram



Control Unit DC Power Control Diagram PWR 50



Control Unit DC Power Control Diagram PWR 50

MAP 0100 — Power Start

001
(Entry Point A)

DANGER

LETHAL VOLTAGES ARE PRESENT IN THE POWER SERVICE AREA.
SAFETY IS MOST IMPORTANT. TREAT ALL CIRCUITS AS LIVE UNTIL MEASURED.

CAPACITORS ARE POSSIBLE EXPLODING DEVICES. WEAR SAFETY GLASSES WHEN WORKING IN THE POWER AREA.

ALWAYS REINSTALL ALL SAFETY COVERS BEFORE POWERING ON THE MACHINE.

ARE YOU HERE BECAUSE YOU HAVE A CONVIENIENCE OUTLET ONLY PROBLEM ?
Y N

002

ARE YOU HERE FOR DRIVE POWER PROBLEMS?
Y N

003

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).

IS THE CONTROL UNIT POWER ON LED ON?
Y N

5 A 5 B 4 C 2 D

MAP DESCRIPTION: THIS MAP IS USED TO DETERMINE THE GENERAL AREA OF POWER PROBLEMS.

START CONDITIONS: YOU WERE DIRECTED TO THIS MAP BY THE MD OR MI BECAUSE OF SUSPECTED POWER PROBLEMS.

ADDITIONAL SERVICE AIDS:
-CONTROL UNIT AC POWER DISTRIBUTION DIAGRAM ON PWR 32.
-CONTROL UNIT DC POWER DISTRIBUTION DIAGRAM ON PWR 34.

POWER START

PAGE 1 OF 11

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0000	A	1	001
0101	B	2	009
0101	C	8	055
0101	D	9	062
0101	E	5	038
0101	F	11	079

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
6	041	0110	A
6	043	0110	D
7	052	0120	A
8	058	0120	A
7	050	0120	B
8	056	0120	D
5	040	0130	A
2	010	0130	B
3	016	0130	C
4	023	0130	D
4	030	0130	E
5	037	0150	A
5	035	0200	A
10	073	0200	A
5	036	0210	A
10	073	0210	A
9	064	0400	A
9	066	0410	A
10	068	0410	B
10	075	190	A

MAP 0100 — Power Start

D
1

POWER START

PAGE 2 OF 11

004

OBSERVE THE CONTROL UNIT
DC POWER LED (LOC 1).

IS THE CONTROL UNIT DC POWER LED ON?
Y N

005

PERFORM THE CONTROL UNIT VARY OFFLINE
PROCEDURE ON CARR-CU 5

OBSERVE THE POSITION OF THE UNIT EMERGENCY
POWER SWITCH (LOC 1).

IS THE UNIT EMERGENCY POWER SWITCH SET
TO THE POWER ENABLE POSITION?
Y N

006

CAUTION

FIND OUT WHY THE UNIT EMERGENCY POWER
SWITCH WAS SET TO THE POWER OFF POSITION.

CAUTION

SET THE UNIT EMERGENCY POWER SWITCH TO
THE POWER ENABLE POSITION.

POWER ON (LOC 1).
-SET THE LOCAL REMOTE
 SWITCH TO LOCAL.
-SET THE CONTROL UNIT POWER
 ON/OFF SWITCH TO ON.
-PRESS THE LOCAL
 POWER ENABLE SWITCH.
(Step 006 continues)

4
E F

F

(Step 006 continued)

OBSERVE THE CONTROL UNIT POWER ON LED (LOC
1).

IS THE CONTROL UNIT
POWER ON LED ON?
Y N

007
PERFORM THE CONTROL UNIT VARY OFFLINE
PROCEDURE ON CARR-CU 5
Go to Step 009, Entry Point B.

008

THE UNIT EMERGENCY POWER SWITCH WAS SET
TO THE POWER OFF POSITION.
Go to Page 11, Step 079, Entry Point F.

009
(Entry Point B)

OPEN THE FRONT DOOR OF THE CONTROL UNIT AND
REMOVE THE SUB COVER.

OBSERVE THE F1 FAILURE LED (LOC 1).

IS THE F1 FAILURE LED OFF?
Y N

010

Go To Map 0130, Entry Point B. THE CU-PS-01 +24VDC FUSE F1 IS BLOWN.

011

OBSERVE THE POSITION OF THE CU-PS-01 CB1 (LOC 1).

IS CU-PS-01 CB1 SET TO THE ON POSITION?
Y N

3 3
G H

MAP 0100 — Power Start

H
2

POWER START

PAGE 3 OF 11

012

SET CU-PS-01 CB1 TO THE ON POSITION.

POWER ON (LOC 1).
-SET THE LOCAL REMOTE
SWITCH TO LOCAL.
-SET THE CONTROL UNIT POWER
ON/OFF SWITCH TO ON.
-PRESS THE LOCAL
POWER ENABLE SWITCH.

WAIT 20 SECONDS.

DID CU-PS-01 CB1 TRIP?
Y N

013

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).

IS THE CONTROL UNIT POWER ON LED ON?
Y N

014

Go to Page 2, Step 009, Entry Point B.

CU-PS-01 CB1 WAS TRIPPED. THERE SEEMS TO BE A SECOND PROBLEM.

015

THE CU-PS-01 CB1 WAS TURNED OFF.
Go to Page 11, Step 079, Entry Point F.

016

Go To Map 0130, Entry Point C.

CU-PS-01 CB1 IS TRIPPING.

G
2

017

IS THIS A 50HZ MACHINE (EXCEPT JAPAN)?
Y N

018

OBSERVE THE POSITION OF THE CU-PS-01 CB2 (LOC 1).

IS CU-PS-01 CB2 SET TO THE ON POSITION?
Y N

019

SET CU-PS-01 CB2 TO THE ON POSITION.

POWER ON (LOC 1).
-SET THE LOCAL REMOTE
SWITCH TO LOCAL.
-SET THE CONTROL UNIT POWER
ON/OFF SWITCH TO ON.
-PRESS THE LOCAL
POWER ENABLE SWITCH.

WAIT 20 SECONDS.

DID CU-PS-01 CB2 TRIP?
Y N

020

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).

IS THE CONTROL UNIT POWER ON LED ON?
Y N

4 4 4 4 4
J K L M N

J K L M N
3 3 3 3 3

POWER START

PAGE 4 OF 11

021

Go to Page 2, Step 009, Entry Point B. — CU-PS-01 CB2 WAS TRIPPED. THERE SEEMS TO BE A SECOND PROBLEM.

022

THE CU-PS-01 CB2 WAS TURNED OFF.
Go to Page 11, Step 079, Entry Point F.

023

Go To Map 0130, Entry Point D. — CU-PS-01 CB2 IS TRIPPING.

024

Go to Page 5, Step 038, Entry Point E.

025

OBSERVE THE POSITION OF THE CU-PS-01 CB3 (LOC 1).

IS CU-PS-01 CB3 SET TO THE ON POSITION?
Y N

026

SET CU-PS-01 CB3 TO THE ON POSITION.

POWER ON (LOC 1).
-SET THE LOCAL REMOTE
 SWITCH TO LOCAL.
-SET THE CONTROL UNIT POWER
 ON/OFF SWITCH TO ON.
-PRESS THE LOCAL
 POWER ENABLE SWITCH.

WAIT 20 SECONDS.
(Step 026 continues)

P

C E P
1 2

(Step 026 continued)

DID CU-PS-01 CB3 TRIP?
Y N

027

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).

IS THE CONTROL UNIT POWER ON LED ON?
Y N

028

Go to Page 2, Step 009, Entry Point B. — CU-PS-01 CB3 WAS TRIPPED. THERE SEEMS TO BE A SECOND PROBLEM.

029

THE CU-PS-01 CB3 WAS TURNED OFF.
Go to Page 11, Step 079, Entry Point F.

030

Go To Map 0130, Entry Point E. — CU-PS-01 CB3 IS TRIPPING.

031

Go to Page 5, Step 038, Entry Point E.

032

THE OP PANEL (FRU142) IS FAILING
EXCHANGE FRU142 — SEE CARR-CU 1420
Go to Page 11, Step 079, Entry Point F.

033

Go to Page 9, Step 062, Entry Point D.

A B
1 1

POWER START

PAGE 5 OF 11

034

ARE BOTH DRIVES OF ONE TAPE UNIT FAILING?
(DR0 AND DR1, OR DR2 AND DR3, ETC.)
Y N

035

Go To Map 0200, Entry Point A.

036

Go To Map 0210, Entry Point A.

037
PERFORM THE CONTROL UNIT VARY OFFLINE PROCEDURE ON CARR-CU 5
Go To Map 0150, Entry Point A.

038
(Entry Point E)

RECORD THE POSITION OF THE LOCAL REMOTE SWITCH (LOC 1).

SET THE LOCAL REMOTE SWITCH TO THE LOCAL POSITION (LOC 1).

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE ON POSITION (LOC 1).

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH (LOC 1).

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).

IS THE CONTROL UNIT POWER ON LED ON?
Y N

039

RELEASE THE LOCAL POWER ENABLE SWITCH.

REMOVE CU-PS-01 FUSE F1 (LOC 1).

OBSERVE THE F1 FAILURE LED (LOC 1).

IS THE F1 FAILURE LED NOW ON?
Y N

040

REINSTALL FUSE F1.

Go To Map 0130, Entry Point A.

6 6
Q R

CU-PS-01 CB1, CB2, FUSE F1, AND THE UNIT EMERGENCY POWER SWITCH APPEAR TO BE OK, BUT THE CONTROL UNIT IS NOT POWERED ON. THIS SECTION ATTEMPTS TO POWER ON IN LOCAL MODE.

IF THE F1 FAILURE LED IS ON, +24VDC IS AVAILABLE.

THE +24VDC CONTROL VOLTAGE IS MISSING.

MAP 0100—Power Start

0 R
5 5

POWER START

PAGE 6 OF 11

041

REINSTALL FUSE F1.

Go To Map 0110, Entry Point A.

THE +24VDC CONTROL VOLTAGE IS OK, BUT THE CONTROL UNIT DID NOT POWER ON.

042

RELEASE THE LOCAL POWER ENABLE SWITCH.

THE LOCAL PICK CIRCUIT IS OK. THIS SECTION CHECKS THE HOLD CIRCUIT.

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).

IS THE CONTROL UNIT POWER ON LED ON?
Y N

043

Go To Map 0110, Entry Point D.

THE LOCAL HOLD CIRCUIT IS FAILING.

044

WAS THE ORIGINAL POSITION OF THE LOCAL REMOTE SWITCH, AS RECORDED, SET TO THE REMOTE POSITION?
Y N

045

THE ORIGINAL FAILURE (POWER ON LED WAS OFF) HAS DISAPPEARED.

POSSIBLE CAUSES FOR INTERMITTENT OR UNEXPLAINED POWER DROP ARE:
AC POWER SUPPLY (FRU144)
CU THERMAL SWITCH (FRU143)
TU THERMAL SWITCH (FRU082)
Go to Page 11, Step 079, Entry Point F.

REFER TO PWR 36 FOR AN OVERVIEW OF THE LOCAL PICK/HOLD CIRCUITS.

S

S

046

TO USE THE REMOTE MODE, THE CONTROL UNIT MUST BE ATTACHED TO A HOST SYSTEM WITH AN EPO CABLE AND THE HOST SYSTEM MUST BE POWERED ON.

IS AN EPO CABLE INSTALLED AND THE SYSTEM POWERED ON?
Y N

047

DO YOU WANT TO TEST THE REMOTE MODE?
Y N

048

THE CONTROL UNIT WAS SET TO REMOTE AND THE HOST SYSTEM WAS NOT POWERED ON, OR AN EPO CABLE WAS NOT INSTALLED.

INFORM THE SYSTEM CE.
Go to Page 11, Step 079, Entry Point F.

049

CAUTION

+24VDC IS PRESENT.

INSTALL A JUMPER FROM CU-PS-01 J5-1 TO J5-5 (LOC 1).

SET THE LOCAL REMOTE SWITCH TO THE REMOTE POSITION (LOC 1).

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).
(Step 049 continues)

THE CONTROL UNIT POWERS UP OK IN LOCAL MODE. THIS SECTION WILL CHECK THE REMOTE HOLD CIRCUIT BY USING A JUMPER TO SIMULATE AN EPO CABLE.

7
T

POWER START

PAGE 7 OF 11

(Step 049 continued)

IS THE CONTROL UNIT POWER ON LED ON?
Y N

050

Go To Map 0120, Entry Point B.

THE REMOTE HOLD CIRCUIT IS FAILING.

051

REMOVE THE JUMPER.

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).

INSTALL THE JUMPER FROM CU-PS-01 J5-1 TO J5-6 (LOC 1).

CAUTION

THE CONTROL UNIT IS EXPECTED TO POWER ON DURING THE NEXT STEP.

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE ON POSITION (LOC 1).

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).

IS THE CONTROL UNIT POWER ON LED ON?
Y N

052

Go To Map 0120, Entry Point A.

THE REMOTE PICK CIRCUIT IS FAILING.

U

THE REMOTE HOLD IS OK. THE PROBLEM MAY BE A FAILURE IN THE REMOTE PICK CIRCUIT.

T U
6

053

THE CONTROL UNIT REMOTE CIRCUITS ARE OK. THE CONTROL UNIT LOCAL REMOTE SWITCH WAS SET TO REMOTE AND THE HOST SYSTEM WAS NOT POWERED ON OR AN EPO CABLE WAS NOT INSTALLED.

INFORM THE SYSTEM CE.
Go to Page 11, Step 079, Entry Point F.

054

Go to Page 8, Step 055, Entry Point C.

SEE OVERVIEW DIAGRAM ON PWR 32.

MAP 0100 — Power Start PWR 100-7

POWER START

PAGE 8 OF 11

055
(Entry Point C)

SET THE LOCAL REMOTE SWITCH TO THE REMOTE POSITION (LOC 1).

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).

IS THE CONTROL UNIT POWER ON LED ON?
Y N

056

Go To Map 0120, Entry Point D.

THIS SECTION CHECKS THE REMOTE HOLD CIRCUIT.

THE REMOTE HOLD CIRCUIT IS FAILING.

057

THE REMOTE HOLD IS OK. THE PROBLEM MAY BE A FAILURE TO POWER ON FROM THE SYSTEM (REMOTE POWER PICK). A JUMPER WILL BE USED TO SIMULATE THE EPO CABLE.

SET THE LOCAL REMOTE SWITCH TO THE LOCAL POSITION (LOC 1).

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

DISCONNECT THE CABLE
CU-PS-01 P5, IF INSTALLED (LOC 1).

INSTALL A JUMPER FROM CU-PS-01 J5-1 TO J5-6 (LOC 1).

CAUTION

THE CONTROL UNIT IS EXPECTED TO POWER ON DURING THE NEXT STEP.
(Step 057 continues)

(Step 057 continued)

SET THE LOCAL REMOTE SWITCH TO THE REMOTE POSITION (LOC 1).

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).

IS THE CONTROL UNIT POWER ON LED ON?
Y N

058

Go To Map 0120, Entry Point A.

THE REMOTE PICK CIRCUIT IS FAILING.

059

ALL CIRCUITS APPEAR TO BE FUNCTIONING NORMALLY. THE POWER COMPLETE RELAY K3 MAY BE STUCK OR ITS PICK CIRCUIT MAY BE MALFUNCTIONING. THIS WOULD CAUSE A PREMATURE POWER COMPLETE TO BE SENT TO THE HOST ADVANCING THE STEPPER BEFORE THE 3480 ACTUALLY COMPLETED ITS POWER ON SEQUENCE.

SEE PWR38,YF001 AND YF020

SET THE SERVICE SWITCH TO OFF.

CONTINUITY CHECK
CU PSO1 P5-3 TO CU PS01 P5-4

DID YOU READ CONTINUITY ?
Y N

9 9
V W

V W
8 8

POWER START

PAGE 9 OF 11

060

RECONNECT THE CABLE
CU-PS-01 P5 (IF IT WAS PREVIOUSLY INSTALLED).

THE CONTROL UNIT POWER ON CIRCUITS APPEAR TO BE OK.

POSSIBLE CAUSES FOR INTERMITTENT OR UNEXPLAINED POWER DROP ARE:
AC POWER SUPPLY (FRU144)
CU THERMAL SWITCH (FRU143)
TU THERMAL SWITCH (FRU082)
Go to Page 11, Step 079, Entry Point F.

REFER TO PWR 38 FOR AN OVERVIEW OF THE REMOTE PICK/HOLD CIRCUITS.

061
POWER COMPLETE IS STUCK ACTIVE !

ISOLATE PROBLEM AND REPAIR USING PWR 38 AND LOGIC YF001 AND YF020.
AFTER REPAIR
Go to Page 11, Step 079, Entry Point F.

062
(Entry Point D)
THE CONTROL UNIT POWER ON LED IS LIT
ARE YOU HERE FOR A UEPO CHECK?
Y N

063

OBSERVE THE CONTROL UNIT
DC POWER LED (LOC 1).

IS THE CONTROL UNIT DC POWER LED ON?
Y N

064

Go To Map 0400, Entry Point A.

THERE IS A CU-PS-02 DC VOLTAGE FAILURE.

065

OBSERVE THE LEDS ON THE CONTROL UNIT REGULATOR CARD, 01AA1 T2 (LOC 1).

ARE ALL THE LEDS (4) OFF?
Y N

066

Go To Map 0410, Entry Point A.

THERE IS A REGULATOR VOLTAGE FAILURE.

067

SET THE MULTIMETER TO MEASURE +1.7VDC.

MEASURE THE +1.7VDC REGULATOR OUTPUT FROM 01AA1 T2 B03(+) TO 01AA1 T2 D08(-).

DOES THE METER INDICATE GREATER THAN 1.65VDC?
Y N

1 1 1
0 0 0
X Y Z

Y Z
9 9

POWER START

PAGE 10 OF 11

068

Go To Map 0410, Entry Point B. — THE 1.7VDC REGULATED VOLTAGE IS FAILING.

069

CONNECT METER TO MEASURE +12 VDC

MEASURE THE +12VDC REGULATOR OUTPUT FROM
01AA1 T2 B11(+) TO 01AA1 T2 D08(-).

IS THE VOLTAGE BETWEEN +11 AND +13 VDC?
Y N

070
THE +12VDC REGULATOR IS FAILING.
EXCHANGE FRU138
Go to Page 11, Step 079, Entry Point F. — SEE CARR-CU 1-1

071

MEASURE THE AC RIPPLE ON THE DC VOLTAGES. — SEE PWR 20

IS THE RIPPLE VOLTAGE IN TOLERANCE?
Y N

072
TOO MUCH RIPPLE ON THE DC VOLTAGE.
EXCHANGE FRU145
Go to Page 11, Step 079, Entry Point F. — SEE CARR-CU 1-1

A
A

X A
9 A

073

THE CONTROL UNIT POWER SEEMS TO BE OK. — SEE OVERVIEW DIAGRAM ON PWR 32.

FOR SINGLE DRIVE POWER PROBLEMS,
Go To Map 0200, Entry Point A.

FOR MULTIPLE DRIVE POWER PROBLEMS,
Go To Map 0210, Entry Point A.

IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD AND PRESS ENTER.

IF YOU ENTERED THIS MAP FROM THE START SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

IF YOU ENTERED THIS MAP FROM ANY OTHER SECTION OF THE MI, RETURN TO THAT SECTION AND CONTINUE WITH THE NEXT STEP.

074
SET THE UEPO SWITCH TO *OFF*. — UEPO FUNCTION CHECK
OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).
IS THE CONTROL UNIT
POWER ON LED ON?
Y N

075
UEPO CIRCUITS CHECK OKAY

SET THE UEPO SWITCH TO *ON*
Go To Map 190, Entry Point A.

1
1
A
B

A
B
1
0

POWER START

PAGE 11 OF 11

076
ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).
REMOVE WIRES FROM THE UEPO SWITCH.

SET UEPO SWITCH TO *OFF* POSITION

CONTINUITY CHECK UEPO SWITCH.
DO YOU READ CONTINUITY ACROSS THE SWITCH?
Y N

AC POWER SUPPLY OR UEPO SWITCH FAILURE

077
THE AC PS (FRU144) IS FAILING
EXCHANGE FRU144
Go to Step 079, Entry Point F.

SEE CARR-CU 1440

078
THE UEPO SWITCH (FRU198) IS FAILING
EXCHANGE FRU198
Go to Step 079, Entry Point F.

SEE CARR-CU 1980

079
(Entry Point F)
IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD, REIPL THE MD AND THEN SELECT THE UNIT TEST OPTION.

IF YOU ENTERED THIS MAP FROM ANY SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

MAP 0100 — Power Start

Notes

MAP 0100 — Power Start

POWER ON, LOCAL MODE

PAGE 1 OF 11

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001
0100	D	10	060
0111	B	11	067
0111	C	11	068
0111	E	2	008
0111	F	4	018
0111	G	5	032
0111	H	6	037

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
11	069	0100	A
11	071	0100	A
2	010	0190	A
3	016	0190	A
2	003	190	A
2	007	190	A
3	013	190	A
4	025	190	A
5	029	190	A
6	036	190	A
7	042	190	A
9	056	190	A
8	046	190	A

001
(Entry Point A)

(THE LOCAL POWER PICK CIRCUIT IS FAILING.)

MAP DESCRIPTION: MAP 0100 SENT YOU HERE WHEN THE CONTROL UNIT CANNOT POWER UP IN LOCAL MODE.

START CONDITIONS:
-POWER ON LED IS OFF
-LOCAL REMOTE SW SET TO LOCAL
-POWER ON SW SET TO ON
-UNIT EMERGENCY POWER SW SET TO ON.

FRUS DIAGNOSED:
-CU AC SUPPLY CU-PS-01
-UNIT EMERGENCY POWER SW
-LOCAL REMOTE SW
-LOCAL POWER ENABLE SW
-CU LOWER THERMAL
-TAPE UNIT THERMALS S2
-CU-OSU PANEL
(Step 001 continues)

(Step 001 continues)

(Step 001 continued)

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC-1).

DISCONNECT THE CABLE CU-PS-01 P4B (LOC-1).

CONNECT THE MULTIMETER TO P4B-1 AND P4B-6. (THE P CONNECTOR IS ON THE CABLE).

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH WHILE MAKING THE FOLLOWING MEASUREMENT (LOC-1).

CHECK FOR CONTINUITY FROM P4B-1 TO P4B-6.

DOES THE METER INDICATE CONTINUITY?
Y N

002

A JUMPER PLUG SHOULD BE INSTALLED IN THE THERMAL CIRCUIT OF THE LAST DRIVE.

IS THE JUMPER INSTALLED IN CONNECTOR TU-DX/X-P2 J1 (LOC-1)?
Y N

8 2 2
A B C

(Step 001 continued)
-CU GATE FANS

ADDITIONAL SERVICE AIDS:
-CONTROL UNIT AC POWER DISTRIBUTION DIAGRAM ON PWR 32.
-CONTROL UNIT AC POWER ON-LOCAL MODE DIAGRAM ON PWR 36.

STANDARD RELAY PROBES ARE USEFUL IN PROBING CONNECTORS.

THE +24V PICK CIRCUIT (K2 PICK) IS OPEN.

SEE DETAILED DIAGRAM ON PWR 36.

B C
1 1

POWER ON, LOCAL MODE

PAGE 2 OF 11

003

INSTALL THE JUMPER.

RECONNECT THE CABLE
CU-PS-01 P4B.
Go To Map 190, Entry Point A.

004

PROBLEM MAY BE IN THE HOLD CIRCUITS WHICH PASS THROUGH EACH TAPE UNIT.

SEE DETAILED DIAGRAM ON PWR 36.

DOES THE CONTROL UNIT HAVE BM 6460460 INSTALLED?
Y N

SEE LOC1 OR MACHINE HISTORY.

005

CHECK FOR CONTINUITY FROM
THE REAR (WIRE SIDE) OF CU-P1 J1-1 TO J1-2
(LOC-1).

DOES THE METER INDICATE CONTINUITY?
Y N

006

IN EACH OF THE ATTACHED TAPE UNITS, MEASURE FOR CONTINUITY ACROSS THE TU-PS1 THERMAL CONNECTOR J1-1 TO J1-2.

REFERENCE LOC 1 AND PWR 36.

DO YOU READ CONTINUITY ACROSS J1?
Y N

8 3
D E F G

F G

007

MOVE METER TO NEXT TAPE UNIT AND REPEAT

THE CONTINUITY CHECK ACROSS J1.

(IF YOU ARE ON THE LAST TAPE UNIT, THERE IS AN OPEN IN THE CABLE.)

REPAIR OPEN IN THE CABLE.
Go To Map 190, Entry Point A.

008
(Entry Point E)
THE FAILURE IS IN THE TAPE UNIT.

CONTINUITY CHECK ACROSS THE THERMAL SWITCH AT THE SWITCH.

DO YOU READ CONTINUITY ACROSS THE THERMAL SWITCH?
Y N

009

RESET THE OPEN THERMAL SWITCH.

DOES THE THERMAL SWITCH NOW INDICATE CONTINUITY?
Y N

010

THE THERMAL SWITCH S2 (FRU082) IS FAILING (LOC-1).

EXCHANGE THE THERMAL SWITCH .
Go To Map 0190, Entry Point A.

3 3
H J

J
2

POWER ON, LOCAL MODE

PAGE 3 OF 11

011

RECONNECT THE CABLE
CU-PS-01 P4B.

SET CU-PS-01 CB1 TO THE ON POSITION (LOC-1).

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH FOR SEVERAL SECONDS (LOC-1).

THE CONTROL UNIT POWER ON LED SHOULD NOW BE ON.
IF IT IS NOT ON, GO TO MAP 0100 E.P.A.

IN THE DRIVE THAT THE THERMAL WAS TRIPPED, CHECK THE TU-PS1 FAN FOR PROPER OPERATION (LOC-1).

IS THE FAN OPERATING CORRECTLY?
Y N

012

SET TU-CB1 TO OFF.

THE FAN (FRU071) IS FAILING.

----OR----

THE CABLE (FRU072) FROM THE FAN TO TU-CB1 IS OPEN.

CONTINUITY CHECK FRU072.

NOTE! ON 60HZ AND 50 HZ JAPAN MACHINES , THE POWER SUPPLY MUST BE REMOVED TO GAIN ACCESS TO TO THE CABLE. USE CARR-DR 710 TO GAIN ACCESS FOR THE CABLE CHECK.
(Step 012 continues)

K

THE THERMAL WAS TRIPPED.

E H K
2 2

(Step 012 continued)

DOES THE METER INDICATE CONTINUITY?
Y N

013

REPAIR CABLE.
Go To Map 190, Entry Point A.

014

EXCHANGE FRU071
Go to Page 11, Step 067, Entry Point B.

SEE CARR DR 710

015

CHECK FOR ANY OBSTRUCTION TO THE AIR FLOW.
CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION FOR THIS TAPE UNIT. TEST BOTH DRIVES.

016

REPAIR THE CABLE BETWEEN THERMAL CONNECTOR J1 AND P1
Go To Map 0190, Entry Point A.

017
CONNECT THE METER TO PINS CU-PS-01 P4B-6 AND THE REAR (WIRE SIDE) OF CU-P1 P1-2 AND CHECK FOR CONTINUITY (LOC-1).

DOES THE METER INDICATE CONTINUITY?
Y N

5 4
L M

MAP 0110 — Power On (Local Mode)

M
3

POWER ON, LOCAL MODE

PAGE 4 OF 11

018
(Entry Point F)
LEAVE THE METER CONNECTED.
RESET THE CONTROL UNIT GATE LOWER THERMAL (LOC-1).

DOES THE METER INDICATE CONTINUITY?
Y N

019

DISCONNECT THE CABLE CU-OSU P4 (LOC-1).

DISCONNECT THE CABLE CU-OSU P3 (LOC-1).

CHECK FOR CONTINUITY FROM
CU-OSU J4-4 TO J3-1 (LOC-1).
CU-OSU J3-2 TO J4-5 (LOC-1).

DOES THE METER INDICATE CONTINUITY?
Y N

020

THERE IS AN OPEN LAND
PATTERN ON THE CU-OSU
OR IN P5 JUMPER PLUG
IS THE P5 JUMPER PLUG ON THE OSU BOARD OPEN OR MISSING?
Y N

021

EXCHANGE FRU141 — SEE CARR CU 1-1.
Go to Page 11, Step 068, Entry Point C.

022

INSTALL OR REPAIR P5 JUMPER PLUG
Go to Page 11, Step 068, Entry Point C.

5
N P

P

023

THERE IS AN OPEN WIRE FROM
CU-PS-01 P4B-6 TO CU-OSU P4-4 (LOC-1). — SEE PWR 36

---OR---

THERE IS AN OPEN WIRE FROM
CU-OSU P3-1 TO CONTROL UNIT GATE LOWER THERMAL (LOC-1)

---OR---

A CONTROL UNIT GATE THERMAL (FRU143) IS FAILING (LOC-1).

CONTINUITY CHECK THE LOWER GATE THERMAL SWITCH — NOTE:IF EC A21680 HAS NOT BEEN INSTALLED,REFER TO PWR36 AND ALSO CHECK THE UPPER THERMAL SWITCH.

DOES THE METER INDICATE CONTINUITY?
Y N

024

EXCHANGE FRU143 — SEE CARR CU 1.
Go to Page 11, Step 068, Entry Point C.

025

REPAIR OPEN IN CABLE
Go To Map 190, Entry Point A.

N
4

POWER ON, LOCAL MODE

PAGE 5 OF 11

026

RECONNECT THE CABLE
CU-PS-01 P4B.

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH UNTIL POWER IS ON (LOC-1).

CHECK THE CONTROL UNIT GATE FANS FOR PROPER OPERATION (LOC-1).

ARE THE FANS OPERATING CORRECTLY?
Y N

027

ARE BOTH FANS FAILING?
Y N

028

THE CONTROL UNIT GATE FAN IS FAILING.

EXCHANGE FRU150
Go to Page 11, Step 068, Entry Point C.

029

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC-1).

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC-1).

THERE IS AN OPEN WIRE FROM
CU1A P1-1 TO CU-PS-02 P3-1 (YF005)(LOC-1)

---OR---

THERE IS AN OPEN WIRE FROM
(Step 029 continues)

Q

SEE CARR CU 1-1.

L Q
3

(Step 029 continued)
CU1A P1-3 TO CU-PS-02 P3-3 (LOC-1)

REPAIR OPEN IN CABLE
Go To Map 190, Entry Point A.

030

CHECK FOR ANY OBSTRUCTION TO THE AIR FLOW.

IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD AND PRESS ENTER.

IF YOU ENTERED THIS MAP FROM THE START SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

031

CHECK FOR CONTINUITY FROM
CU-PS-01 P4B-2 TO THE REAR (WIRE SIDE) OF CU-P1 P1-1 (LOC-1)

DOES THE METER INDICATE CONTINUITY?
Y N

032
(Entry Point G)
CHECK THE UNIT EMERGENCY POWER SWITCH FOR CONTINUITY (LOC-1).

DOES THE METER INDICATE CONTINUITY?
Y N

6 6 6
R S T

S 5 T 5

POWER ON, LOCAL MODE

PAGE 6 OF 11

033

THE UNIT EMERGENCY POWER SWITCH (FRU198) IS FAILING.

SEE DETAILED DIAGRAM ON PWR 36.

EXCHANGE FRU198)
Go to Page 11, Step 068, Entry Point C.

SEE CARR CU 1-1

034

DISCONNECT THE CABLE
CU-OSU P4 (LOC-1).

DISCONNECT THE CABLE
CU-OSU P3 (LOC-1).

CHECK FOR CONTINUITY FROM
CU-OSU J4-5 TO CU-OSU J3-2 (LOC-1).

DOES THE METER INDICATE CONTINUITY?
Y N

035

THERE IS AN OPEN LAND PATTERN ON THE CU-OSU BETWEEN J4-5 AND J3-2

SEE DETAILED DIAGRAM ON PWR 36.

EXCHANGE FRU141
Go to Page 11, Step 068, Entry Point C.

SEE CARR CU 1-1.

U

R 5 U

036

THERE IS AN OPEN WIRE FROM THE UNIT EMERGENCY POWER SWITCH TAB 2 TO CU-OSU P4-5 (LOC-1).

SEE DETAILED DIAGRAM ON PWR 36.

---OR---

THERE IS AN OPEN WIRE FROM CU-OSU P3-2 TO CU-P1 J1-1 (LOC-1)

REPAIR OPEN IN THE CABLE.
Go To Map 190, Entry Point A.

037
(Entry Point H)
PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH WHILE MAKING THE FOLLOWING MEASUREMENT (LOC-1).

CHECK FOR CONTINUITY FROM
CU-PS-01 P4B-1 TO THE UNIT EMERGENCY POWER SWITCH TAB 1 (LOC-1).

DOES THE METER INDICATE CONTINUITY?
Y N

038

DISCONNECT THE CABLE
CU-OSU P4 (LOC-1).

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH WHILE MAKING THE FOLLOWING MEASUREMENT (LOC-1).

CHECK FOR CONTINUITY FROM
CU-OSU J4-1 TO J4-2 (LOC-1).
(Step 038 continues)

7 V

POWER ON, LOCAL MODE

PAGE 7 OF 11

(Step 038 continued)

DOES THE METER INDICATE CONTINUITY?
Y N

039

THE LOCAL POWER ENABLE SWITCH IS FAILING (LOC-1).

SEE DETAILED DIAGRAM ON PWR 36.

EXCHANGE FRU141
Go to Page 11, Step 067, Entry Point B.

SEE CARR CU 1-1.

040

RECONNECT THE CABLE
CU-OSU P4 (LOC-1).

DISCONNECT THE CABLE
CU-L/R P1 (LOC-1).

DISCONNECT THE CABLE
CU-L/R P2 (LOC-1).

CHECK FOR CONTINUITY FROM
CU-L/R J2-8 TO CU-L/R J1-2 (LOC-1).

DOES THE METER INDICATE CONTINUITY?
Y N

041

THE LOCAL REMOTE SWITCH (FRU084) IS FAILING (LOC-1).

SEE DETAILED DIAGRAM ON PWR 36.

EXCHANGE FRU084
Go to Page 11, Step 067, Entry Point B.

SEE CARR CU 1-1.

W

V W
6

042

THERE IS AN OPEN WIRE FROM
CU-PS-01 P4B-1 TO CU-OSU P4-1 (LOC-1)

SEE DETAILED DIAGRAM ON PWR 36.

---OR---

THERE IS AN OPEN WIRE FROM
CU-OSU P4-2 TO CU-L/R P2-8 (LOC-1).

---OR---

THERE IS AN OPEN WIRE FROM
CU-L/R P1-2 TO THE
UNIT EMERGENCY POWER SWITCH TAB 1 (LOC-1).

REPAIR OPEN IN THE CABLE.
Go To Map 190, Entry Point A.

043

THE PROBLEM HAS DISAPPEARED.

IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD AND PRESS ENTER.

IF YOU ENTERED THIS MAP FROM THE START SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

---OR---

IF AN INTERMITTENT PROBLEM IS SUSPECTED, SEE DETAILED DIAGRAM ON PWR 36.

D
2

POWER ON, LOCAL MODE

PAGE 8 OF 11

044

GO TO THE TAPE UNIT IMMEDIATELY ADJACENT TO THE CONTROL UNIT. OPEN THE LOWER COVERS TO GAIN ACCESS TO THE THERMAL CONNECTOR P1.

DISCONNECT THERMAL CONNECTOR P1.

CONTINUITY CHECK THERMAL CONNECTOR P1-1 TO P1-2. THIS CHECKS THE INTERLOCK THROUGH ALL TAPE UNITS

DOES THE METER INDICATE CONTINUITY?
Y N

045

OPEN SOMEWHERE IN THE STRING. REFERENCE LOC 1 AND PWR 36.

IN EACH OF THE ATTACHED TAPE UNITS, MEASURE FOR CONTINUITY ACROSS THE TU THERMAL CONNECTOR P1-1 TO P1-2.

DO YOU READ CONTINUITY ACROSS P1?
Y N

046

MOVE METER TO NEXT TAPE UNIT AND REPEAT

THE CONTINUITY CHECK ACROSS P1.

(IF YOU ARE ON THE LAST TAPE UNIT, THERE IS AN OPEN IN THE CABLE OR THE JUMPER PLUG.)

REPAIR OPEN IN THE CABLE.
Go To Map 190, Entry Point A.

047

Go to Page 2, Step 008, Entry Point E.

X

A X
1

048

OPEN SOMEWHERE IN THE CONTROL UNIT. REFERENCE LOC 1 AND PWR 36.

MEASURE FOR CONTINUITY BETWEEN CU PS01 P4B-6 AND CU P1J1-2 (THERMAL CONNECTOR BETWEEN CU AND TAPE UNIT)

DOES THE METER INDICATE CONTINUITY?
Y N

049

Go to Page 4, Step 018, Entry Point F.

050

MEASURE FOR CONTINUITY BETWEEN CU PS01 P4B-2 AND CU P1J1-1 (THERMAL CONNECTOR BETWEEN CU AND TAPE UNIT) REFERENCE LOC 1 AND PWR 36.

DOES THE METER INDICATE CONTINUITY?
Y N

051

Go to Page 5, Step 032, Entry Point G.

052

Go to Page 6, Step 037, Entry Point H.

053

CHECK FOR CONTINUITY FROM CU-PS-01 P4B-7 TO P4B-8 (LOC-1).

DOES THE METER INDICATE CONTINUITY?
Y N

9 9
Y Z

Z
8

POWER ON, LOCAL MODE

PAGE 9 OF 11

054

THE CONTROL UNIT POWER ON SWITCH (FR142) IS FAILING (LOC-1).

---OR---

THERE IS AN OPEN WIRE FROM
CU-PS-01 P4B-7 TO CU-L/R P2-9 (LOC-1)

---OR---

THERE IS AN OPEN WIRE FROM
CU-L/R P2-9 TO CU-OP P5-6 (LOC-1).

---OR---

THERE IS AN OPEN WIRE FROM
CU-OP P5-4 TO CU-PS-01 P4B-8 (LOC-1)

DISCONNECT CABLE FROM CU-OP J5

CONTINUITY CHECK FROM CU-OP J5-6 TO J5-4

DOES THE METER INDICATE CONTINUITY?
Y N

055

EXCHANGE CU-OP PANEL FRU142
Go to Page 11, Step 068, Entry Point C.

056

REPAIR OPEN IN THE CABLE.
Go To Map 190, Entry Point A.

SEE CARR CU 1420

Y
8

057

OBSERVE THE CORRECT POLARITY IN THE FOLLOWING MEASUREMENT.

CHECK FOR CONTINUITY FROM
CU-PS-01 P4B-4 (-) TO P4B-8 (+).

DOES THE METER INDICATE CONTINUITY?
Y N

058

THE POWER ON LED IS FAILING.

----OR----

THERE IS AN OPEN WIRE FROM
CU-PS-01 P4B-4 TO CU-OP P5-2.

059

THE CONTROL UNIT AC SUPPLY, CU-PS-01,IS FAILING (LOC-1).

THE 24V PICK CIRCUIT IS OK BUT THE POWER ON LED WILL NOT TURN ON. THIS MUST BE A FAILURE INTERNAL TO THE AC SUPPLY.

SEE DETAILED DIAGRAM ON PWR 36.

POWER ON, LOCAL MODE

PAGE 10 OF 11

060
(Entry Point D)

(THE +24V HOLD CIRCUIT IS FAILING IN LOCAL MODE.)

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC-1).

DISCONNECT THE CABLE CU-PS-01 P4B (LOC-1).

CHECK FOR CONTINUITY FROM CU-PS-01 P4B-7 TO P4B-10. (THE P CONNECTOR IS ON THE CABLE).

DOES THE METER INDICATE CONTINUITY?
Y N

061

DISCONNECT THE CABLE CU-L/R P2 (LOC-1).

DISCONNECT THE CABLE CU-L/R P1 (LOC-1).

CHECK FOR CONTINUITY FROM CU-L/R J2-9 TO J1-6 (LOC-1).

DOES THE METER INDICATE CONTINUITY?
Y N

062

THE LOCAL REMOTE SWITCH IS FAILING (LOC-1).

THE K2 HOLD CIRCUIT IS OPEN.

SEE DETAILED DIAGRAM ON PWR 36.

A A
A B

063

THERE IS AN OPEN WIRE FROM CU-L/R P1-6 TO CU-PS-01 P4B-10 (LOC-1)

THE K2 HOLD CIRCUIT IS OPEN.

SEE DETAILED DIAGRAM ON PWR 36.

064

CHECK FOR CONTINUITY FROM CU-PS-01 P4B-2 TO UNIT EMERGENCY POWER SWITCH TAB 1 (LOC-1)

DOES THE METER INDICATE CONTINUITY?
Y N

065

THERE IS AN OPEN WIRE FROM CU-PS-01 P4B-2 TO UNIT EMERGENCY POWER SWITCH TAB 1 (LOC-1)

THE K2 HOLD CIRCUIT IS OPEN.

SEE DETAILED DIAGRAM ON PWR 36.

066

THE CONTROL UNIT AC SUPPLY,CU-PS-01,IS FAILING (LOC-1).

THE +24V LOCAL HOLD CIRCUIT (K2 HOLD) IS OK, BUT THE POWER ON LED WILL NOT STAY ON. THIS MUST BE A FAILURE INTERNAL TO THE AC SUPPLY.

SEE DETAILED DIAGRAM ON PWR 36.

POWER ON, LOCAL MODE

PAGE 11 OF 11

067
(Entry Point B)
SET THE DRIVE ONLINE/OFFLINE SWITCH TO ONLINE.

IF YOU CAME TO THE POWER MAPS FROM THE MD, RETURN TO THE MD AND CONTINUE THE MAINTENANCE CALL BY ACTIVATING THE ENTER KEY.

IF YOU CAME TO THE POWER MAPS FROM THE START SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

068
(Entry Point C)
PREPARE TO EXIT AFTER FRU EXCHANGE.
OBSERVE THE CONTROL UNIT POWER ON LED.
IS THE CONTROL UNIT POWER ON LED *ON*?
Y N

SEE LOC 1.

069
CONTROL UNIT AC POWER NOT ON.
Go To Map 0100, Entry Point A.

070
OBSERVE THE CONTROL DC POWER LED.

IS THE CONTROL UNIT POWER ON LED *ON*?
Y N

SEE LOC 1.

071
CONTROL UNIT DC POWER NOT ON.
Go To Map 0100, Entry Point A.

072

IF YOU CAME TO THE POWER MAPS FROM THE MD, RETURN TO THE MD AND CONTINUE THE MAINTENANCE CALL BY ACTIVATING THE ENTER KEY.

IF YOU CAME TO THE POWER MAPS FROM THE START SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

3480 MI EC A57721

MAP 0120 — Power On (Remote Mode)

PAGE 1 OF 3

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001
0100	B	2	004
0100	D	3	009

001
(Entry Point A)

(THE REMOTE PICK CIRCUIT FAILED USING A JUMPER. THE REMOTE HOLD IS OK.)

MAP DESCRIPTION: MAP 0100 SENT YOU HERE WHEN THE CONTROL UNIT POWER FAILS IN REMOTE MODE.

START CONDITIONS:
-POWER ON LED IS OFF,
-LOCAL REMOTE SW SET TO REMOTE,
-UNIT EMERGENCY POWER SW SET TO ON.
-CONTROL UNIT POWERS ON OK IN LOCAL.

FRUS DIAGNOSED:
-CU AC SUPPLY CU-PS-01,
-LOCAL REMOTE SW,

ADDITIONAL SERVICE AIDS:
-CONTROL UNIT AC POWER DISTRIBUTION DIAGRAM ON PWR 32.
-CONTROL UNIT AC POWER ON-REMOTE MODE DIAGRAM ON PWR 38.

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC-1).
(Step 001 continues)

(Step 001 continued)

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUB COVER.

DISCONNECT THE CABLE CU-PS-01 P4B (LOC-1).

CHECK FOR CONTINUITY FROM CU-PS-01 P4B-3 TO P4B-2 (LOC-1). (THE P CONNECTOR IS ON THE CABLE).

DOES THE METER INDICATE CONTINUITY?
Y N

002

THE LOCAL REMOTE SWITCH IS FAILING (LOC-1).

---OR---

THERE IS AN OPEN WIRE FROM CU-PS-01 P4B-3 TO CU-L/R P1-3 (LOC-1).

THE K2 REMOTE PICK CIRCUIT IS OPEN.

SEE DETAILED DIAGRAM ON PWR 38.

003

THE CONTROL UNIT AC SUPPLY, CU-PS-01, IS FAILING (LOC-1).

THE K2 PICK CIRCUIT WHICH IS UNIQUE TO THE REMOTE MODE IS OK. SINCE THE LOCAL PICK AND HOLD AND THE REMOTE HOLD CHECKED OUT OK, THE FAILURE MUST BE INTERNAL TO THE AC SUPPLY.

SEE DETAILED DIAGRAM ON PWR 38.

PAGE 2 OF 3

004
(Entry Point B)

(THE REMOTE HOLD CIRCUIT FAILED USING A JUMPER.)

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC-1).

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUB COVER.

DISCONNECT THE CABLE
CU-PS-01 P4B (LOC-1).

CHECK FOR CONTINUITY FROM
CU-PS-01 P4B-1 TO P4B-5 (LOC-1).
(THE P CONNECTOR IS ON THE CABLE).

DOES THE METER INDICATE CONTINUITY?
Y N

005

THE LOCAL REMOTE SWITCH IS FAILING (LOC-1).

---OR---

THERE IS AN OPEN WIRE FROM
CU-PS-01 P4B-1 TO CU-L/R P1-1 (LOC-1).

---OR---

THERE IS AN OPEN WIRE FROM
CU-L/R P1-4 TO CU-PS-01 P4B-5 (LOC-1).

THE K2 REMOTE HOLD CIRCUIT IS OPEN.

SEE DETAILED DIAGRAM ON PWR 38.

A

A

006

CHECK FOR CONTINUITY FROM
CU-PS-01 P4B-9 TO P4B-10 (LOC-1).

DOES THE METER INDICATE CONTINUITY?
Y N

007

THE LOCAL REMOTE SWITCH IS FAILING (LOC-1).

---OR---

THERE IS AN OPEN WIRE FROM
CU-PS-01 P4B-9 TO CU-L/R P1-5 (LOC-1).

THE K2 REMOTE HOLD CIRCUIT IS OPEN.

SEE DETAILED DIAGRAM ON PWR 38.

008

THE CONTROL UNIT AC SUPPLY, CU-PS-01, IS FAILING (LOC-1).

THE K2 HOLD CIRCUIT WHICH IS UNIQUE TO THE REMOTE MODE IS OK. SINCE THE CONTROL UNIT POWERS ON OK IN LOCAL MODE, THE FAILURE MUST BE INTERNAL TO THE AC SUPPLY.

SEE DETAILED DIAGRAM ON PWR 38.

009
(Entry Point D)

(THE REMOTE HOLD CIRCUIT FAILED WITH THE EPO CABLE INSTALLED.)

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUB COVER.

DISCONNECT THE CABLE
CU-PS-01 P5 ,IF INSTALLED (LOC-1).

CAUTION
24V IS PRESENT.

INSTALL A JUMPER FROM CU-PS-01 J5-1 TO J5-5 (LOC-1).

POWER ON AGAIN IN LOCAL MODE.
-SET THE CONTROL UNIT POWER ON SWITCH
 TO THE ON POSITION.
-SET THE LOCAL REMOTE SWITCH
 TO THE LOCAL POSITION.
-PRESS THE LOCAL POWER ENABLE SWITCH
 UNTIL POWER IS ON.

NOW SET THE LOCAL REMOTE SWITCH TO THE REMOTE POSITION (LOC-1).

OBSERVE THE CONTROL UNIT POWER ON LED (LOC-1).

IS THE CONTROL UNIT
POWER ON LED ON?
Y N

010

Go to Page 2, Step 004, Entry Point B.

THE REMOTE HOLD CIRCUIT ALSO FAILED USING A JUMPER TO SIMULATE AN EPO CABLE.

B

Map 0120 — Power On (Remote Mode) PWR 120-3

B

011

THE EPO CABLE IS FAILING
---OR---
THERE IS A SYSTEM PROBLEM.

CONTACT THE SYSTEM CE.

THE CONTROL UNIT REMOTE HOLD CIRCUIT CHECKED OUT OK.

SEE DETAILED DIAGRAM ON PWR 38.

Map 0130 — +24 Volt Control Voltage

+24VDC CONTROL VOLTAGE

PAGE 1 OF 7

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001
0100	B	5	021
0100	C	3	012
0100	D	4	015
0100	E	4	018
9999	F	7	046

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
1	002	0190	A
3	013	0190	A
4	016	0190	A
4	019	0190	A
2	009	0190	A
5	022	0190	A
7	046	0190	A

001

(Entry Point A)

(THE +24VDC CONTROL VOLTAGE IS MISSING)

DANGER

LETHAL VOLTAGES ARE PRESENT IN THE POWER SERVICING AREA.
SAFETY IS MOST IMPORTANT. TREAT ALL CIRCUITS AS LIVE UNTIL MEASURED.

CAPACITORS ARE POSSIBLE EXPLODING DEVICES. WEAR SAFETY GLASSES WHEN WORKING IN THE POWER AREA.

ALWAYS REINSTALL ALL SAFETY COVERS BEFORE POWERING ON THE MACHINE.

(Step 001 continues)

MAP DESCRIPTION: MAP 0100 DIRECTED YOU HERE BECAUSE OF PROBLEMS IN THE +24VDC CONTROL VOLTAGE CIRCUIT.

START CONDITIONS:
-POWER ON LED IS OFF.

FRUS DIAGNOSED:
-AC POWER SUPPLY, CU-PS-01
-DC POWER SUPPLY, CU-PS-02
-AC POWER SUPPLY VOLTAGE TAP PLUG
-AC POWER SUPPLY FUSE F1
-AC LINE CORD.

ADDITIONAL SERVICE AIDS:
-CONTROL UNIT AC POWER DISTRIBUTION DIAGRAM ON PWR 32.
-+24V CONTROL VOLTAGE DIAGRAM ON PWR 40.

(Step 001 continued)

IS THE LINE CORD CONNECTED TO CUSTOMER AC POWER?
Y N

002

DANGER

PERFORM CE POWER SAFETY CHECK FOUND ON INST 5 BEFORE CONNECTING LINE CORD.

CONNECT THE LINE CORD TO CUSTOMER AC POWER.
Go To Map 0190, Entry Point A.

003

A VOLTAGE TAP PLUG MUST BE USED TO SELECT THE PROPER OUTPUT BASED ON THE INPUT AC VOLTAGE. SEE CHART ON RIGHT.---->

CU INPUT AC	PLUG LOCATION ON CU-PS-01 (USE 60HZ FOR JAPAN) 60HZ	50HZ
200/208 VAC	J9	J11 AND J13
220 VAC	J10	J11 AND J14
230/240 VAC	J11	J11 AND J15
380 VAC		J12 AND J14
400/415 VAC		J12 AND J15

IS THE VOLTAGE TAP PLUG MISSING?
Y N

3 2
A B

Map 0130 — +24 Volt Control Voltage

Map 0130 — +24 Volt Control Voltage

B
1

+24VDC CONTROL VOLTAGE

PAGE 2 OF 7

004

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).

REMOVE THE VOLTAGE TAP PLUG FROM THE CONTROL UNIT AC POWER SUPPLY.

CONTINUITY CHECK THE VOLTAGE TAP PLUG.

CONTINUITY GOOD TO ALL POINTS?
Y N

005

REPAIR THE OPEN IN THE VOLTAGE TAP PLUG.

WHEN THE PROBLEM IS CORRECTED
Go to Page 7, Step 046, Entry Point F.

006

DANGER

180 TO 450 VAC IS PRESENT.

REMOVE THE AC INPUT FILTER COVER FROM THE CONTROL UNIT AC POWER SUPPLY (LOC 1).

SEE CARR 1440.

METER THE AC POWER AT THE INPUT FILTERS OF THE CONTROL UNIT AC POWER SUPPLY.

SEE VOLTAGE TOLERANCE TABLES ON PWR20.

IS CORRECT VAC PRESENT AT ALL POINTS?
Y N

C D

C D

007

DANGER

METER AC POWER AT THE CUSTOMER OUTLET.

IS CORRECT VAC PRESENT AT ALL POINTS?
Y N

008

INFORM CUSTOMER THAT AC POWER IS NOT AVAILABLE.

009

DANGER

THE AC LINE CORD IS FAILING.

PERFORM CE SAFETY CHECK FOUND ON INSP 15 BEFORE REMOVING THE AC LINE CORD.

EXCHANGE LINECORD (FRU149)
Go To Map 0190, Entry Point A.

SEE CARR 1490.

010

THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE THE AC POWER SUPPLY FRU144.

SEE CARR 1440.

Map 0130 — +24 Volt Control Voltage

A
1

+24VDC CONTROL VOLTAGE

PAGE 3 OF 7

011

INSTALL THE VOLTAGE TAP PLUG AT PROPER LOCATION.
SEE CHART ON RIGHT.----->

CU INPUT AC	PLUG LOCATION ON CU-PS-01 (USE 60HZ FOR JAPAN) 60HZ	50HZ
200/208 VAC	J9	J11 AND J13
220 VAC	J10	J11 AND J14
230/240 VAC	J11	J11 AND J15
380 VAC		J12 AND J14
400/415 VAC		J12 AND J15

WHEN THE PROBLEM IS CORRECTED
Go to Page 7, Step 046, Entry Point F.

012

(Entry Point C)

RESET CU-PS-01 CB1 (LOC 1).

DID CB1 TRIP AGAIN?
Y **N**

013

Go To Map 0190, Entry Point A.

014

THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE THE AC POWER SUPPLY FRU144. SEE CARR 1440.
Go to Page 7, Step 046, Entry Point F.

Map 0130 — +24 Volt Control Voltage

Map 0130 — +24 Volt Control Voltage

+24VDC CONTROL VOLTAGE

PAGE 4 OF 7

015

(Entry Point D)

(CB2 ON A 60HZ OR 50HZ JAPAN MACHINE IS TRIPPING).

RESET CU-PS-01 CB2.

DID CB2 TRIP AGAIN?
Y N

016

Go To Map 0190, Entry Point A.

017

THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE THE AC POWER SUPPLY FRU144.
Go to Page 7, Step 046, Entry Point F.

SEE CARR 1440.

018

(Entry Point E)

(CB3 ON A 50HZ MACHINE, EXCEPT JAPAN, IS TRIPPING).

RESET CU-PS-01 CB3.

DID CB3 TRIP AGAIN?
Y N

019

Go To Map 0190, Entry Point A.

020

THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE THE AC POWER SUPPLY FRU144.
Go to Page 7, Step 046, Entry Point F.

SEE CARR 1440.

+24VDC CONTROL VOLTAGE

PAGE 5 OF 8

021

(Entry Point B)

REPLACE CU-PS-01 FUSE F1 (LOC 1).

OBSERVE THE F1 FAILURE LED (LOC 1).

IS THE F1 FAILURE LED ON?
Y N

022

Go to Map 0190, Entry Point A.

023

SET THE LOCAL REMOTE SWITCH TO THE LOCAL POSITION (LOC 1).

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

DISCONNECT THE CABLE
CU-PS-01 P4B (LOC 1).

CHECK FOR CONTINUITY FROM
P4B-1 TO FRAME GROUND (LOC 1).

DOES THE METER INDICATE CONTINUITY?
Y N

7 E | 7 F

F

024

CONNECT THE METER TO P4B-2 AND FRAME GROUND.

CHECK FOR CONTINUITY FROM
P4B-2 TO FRAME GROUND.

DOES THE METER INDICATE CONTINUITY?
Y N

025

CHECK FOR CONTINUITY FROM
P4B-3 TO FRAME GROUND.

DOES THE METER INDICATE CONTINUITY?
Y N

026

CHECK FOR CONTINUITY FROM
P4B-5 TO FRAME GROUND.

DOES THE METER INDICATE CONTINUITY?
Y N

027

CHECK FOR CONTINUITY FROM
P4B-7 TO FRAME GROUND.

DOES THE METER INDICATE CONTINUITY?
Y N

028

CHECK FOR CONTINUITY FROM
P4B-9 TO FRAME GROUND.

DOES THE METER INDICATE CONTINUITY?
Y N

6 G | 6 H | 6 J | 6 K | 6 L | 6 H

M

029

RECONNECT THE CABLE
CU-PS-01 P4B.

DISCONNECT THE SYSTEM ATTACH CABLES (LOC 1).
SEE CHART ON RIGHT.--->

J5 FOR CPU 1.
J6 FOR CPU 2.
J7 FOR CPU 3.
J8 FOR CPU 4.

REPLACE CU-PS-01 FUSE F1.

IS THE F1 FAILURE LED ON?
Y N

030

PROBLEM IS IN THE SYSTEM ATTACH CIRCUITRY.

CALL THE SYSTEM CE TO ISOLATE THE PROBLEM.

WHEN THE PROBLEM IS CORRECTED
Go to Page 7, Step 046, Entry Point F.

031

DISCONNECT THE CABLE
CU-PS-01 P3 (LOC 1).

EXCHANGE FUSE F1.

IS THE F1 FAILURE LED ON?
Y N

6 N | 6 P

Map 0130 — +24 Volt Control Voltage

N 5 P 5

+24VDC CONTROL VOLTAGE

PAGE 6 OF 7

032

REMOVE CABLE CU-PS-02 P2 FOM THE DC POWER SUPPLY.

CHECK THE CABLE FOR PIN TO PIN SHORT CIRCUITS.

WERE ANY SHORT CIRCUITS FOUND IN THE CABLE?
Y N

033

THE DC POWER SUPPLY, CU-PS-02, IS FAILING.

EXCHANGE THE DC POWER SUPPLY FRU145.
Go to Page 7, Step 046, Entry Point F.

SEE CARR 1450.

034

REPAIR THE SHORT CIRCUIT IN THE CABLE.

WHEN THE PROBLEM IS CORRECTED
Go to Page 7, Step 046, Entry Point F.

035

THE AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE THE AC POWER SUPPLY FRU144.
Go to Page 7, Step 046, Entry Point F.

SEE CARR 1440.

K 5 L 5

036

THERE IS A SHORT CIRCUIT TO GROUND ON THE +24V NET.

SEE DETAILED DIAGRAM ON PWR 38.

ISOLATE THE SHORT CIRCUIT ON THE +24V NET.

NET:
-CU-PS-01 P4B-9 TO
-CU-L/R P1-5.

037

THERE IS A SHORT CIRCUIT TO GROUND ON THE +24V NET.

SEE DETAILED DIAGRAM ON PWR 36.

ISOLATE THE SHORT CIRCUIT ON THE +24V NET.

NET:
-CU-PS-01 P4B-7 TO
-CU-L/R P2-9 TO
-CU-OP P5-6.
OR
-CU-OP P5-4 TO
-CU-PS-01 P4B-8.
OR
-CU-L/R P1-6 TO
-CU-PS-01 P4B-10.

G 5 H 5 J 5

038

THERE IS A SHORT CIRCUIT TO GROUND ON THE +24V NET.

SEE DETAILED DIAGRAM ON PWR 38.

ISOLATE THE SHORT CIRCUIT ON THE +24V NET.

NET:
-CU-PS-01 P4B-5 TO
-CU-L/R P1-4.

039

THERE IS A SHORT CIRCUIT TO GROUND ON THE +24V NET.

SEE DETAILED DIAGRAM ON PWR 38.

ISOLATE THE SHORT CIRCUIT ON THE +24V NET.

NET:
-CU-PS-01 P4B-3 TO
-CU-L/R P1-3.

040

LEAVE THE METER CONNECTED TO P4B-2 AND GROUND.

SET THE UNIT EMERGENCY POWER SWITCH TO OFF.

DOES THE METER INDICATE CONTINUITY?
Y N

7 Q 7 R

Map 0130 — +24 Volt Control Voltage

Map 0130 — +24 Volt Control Voltage

R
6

+24VDC CONTROL VOLTAGE

PAGE 7 OF 7

041

LEAVE THE METER CONNECTED TO P4B-2 AND GROUND.

IN THE LAST ATTACHED TAPE UNIT, REMOVE THE JUMPER PLUG FROM TU-DX/X-P2 P1 (LOC 1).

SET THE UNIT EMERGENCY POWER SWITCH TO ON.

DOES THE METER INDICATE CONTINUITY?
Y N

042

CONNECT THE METER TO P4B-6 AND FRAME GROUND WHILE ISOLATING THE SHORT CIRCUIT.

THE METER SHOULD BE INDICATING CONTINUITY. (P4B-6 IS THE OTHER END OF THE SHORTED NET).

SEE DETAILED DIAGRAM ON PWR 36.

ISOLATE THE SHORT CIRCUIT ON THE +24V NET.

NET:
-CU-PS-01 P4B-6 TO
-CU-CSU P4-4.
OR
-CU-CSU P3-1 TO
-CU-GATE THERMAL LOWER TO
-CU-P1 P1-2 TO
-TU-D0/1 THERMAL SW S2 TO
-TU-D0/1-P2 P1-2 TO
-NEXT TAPE UNIT, ETC.

CHECK PARTICULARLY FOR PINCHED THERMAL SW S2 CABLES BETWEEN THE TAPE UNITS.

S

Q S
6

043

SEE DETAILED DIAGRAM ON PWR 36.

ISOLATE THE SHORT CIRCUIT ON THE +24V NET.

NET:
-UNIT EMERGENCY POWER
SW TAB 2 TO
-CU-CSU P4-12.
OR
-CU-CSU P3-2 TO
-CU-P1 P1-1 TO
-TU-D0/1-P2 P1-1 TO
-NEXT TAPE UNIT, ETC.

CHECK PARTICULARLY FOR PINCHED THERMAL SW S2 CABLES BETWEEN THE TAPE UNITS.

044

SEE DETAILED DIAGRAM ON PWR 36.

ISOLATE THE SHORT CIRCUIT ON THE +24V NET.

NET:
-CU-CSU P4-2 TO
-CU-L/R P2-8.
OR
-CU-L/R P1-2 TO
-UNIT EMERGENCY POWER
SW TAB 1 AND
-CU-PS-01 P4B-2.

E
5

045

THERE IS A SHORT CIRCUIT TO GROUND ON THE +24V NET.
SEE DETAILED DIAGRAM ON PWR 36.

ISOLATE THE SHORT CIRCUIT ON THE +24V NET.

NET:
-P4B-1 TO
-CU-CSU P4-1.

046
(Entry Point F)

CLEANUP AFTER REPAIR.

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO * THE OFF POSITION (LOC 1).

RECONNECT ANY CABLES REMOVED FOR TROUBLESHOOTING.

REMOVE ANY JUMPERS USED FOR TROUBLESHOOTING.
Go To Map 0190, Entry Point A.

Map 0130 — +24 Volt Control Voltage

Map 0150 — Convenience Outlet

CONVENIENCE OUTLET __

PAGE 1 OF 5

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0000	A	1	001
0100	A	1	001
0151	B	5	044

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
4	030	0100	A
1	005	0190	A
2	011	0190	A
2	017	0190	A

001
(Entry Point A)

IMPORTANT!!! READ NOTE!!!

NOTE!!! 50HZ MACHINES IN JAPAN USE THE SAME POWER SUPPLIES AS 60HZ MACHINES. TAKE THE YES LEG BELOW.

MAP DESCRIPTION: THIS MAP IS USED TO ISOLATE FAILURES IN THE CONVENIENCE OUTLET CIRCUIT.

START CONDITIONS: THE CONTROL UNIT POWERS ON OK.

FRUS DIAGNOSED:
-AC POWER SUPPLY, CU-PS-01
-AC POWER SUPPLY
 VOLTAGE PLUG, P12.

ADDITIONAL SERVICE AIDS:
-CONTROL UNIT AC POWER
 DISTRIBUTION DIAGRAM
 ON PWR 32.
-+24V CONTROL VOLTAGE DIAGRAM
 ON PWR 40.

IS THIS A 60HZ CONTROL UNIT?
Y N

002
OBSERVE CU-PS-01 CB2 (LOC 1).

IS CU-PS-01 CB2 TRIPPED?
Y N

3
A B C

B C

003
MEASURE THE VOLTAGE AT THE CONVENIENCE OUTLET.

WAS APPROXIMATELY 220/240 VAC MEASURED AT THE OUTLET?
Y N

004
THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144
Go to Page 5, Step 044, Entry Point B.

SEE CARR 1440.

005
THE CONVENIENCE OUTLET IS OK.
Go To Map 0190, Entry Point A.

006

IS ANYTHING PLUGGED INTO THE CONVENIENCE OUTLET?
Y N

007
RESET CB2

DID CB2 RESET WITHOUT TRIPPING AGAIN?
Y N

008
THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144
Go to Page 5, Step 044, Entry Point B.

SEE CARR 1440.

2 2
D E

Map 0150 — Convenience Outlet

D E
I I

CONVENIENCE OUTLET

PAGE 2 OF 5

009
MEASURE THE VOLTAGE AT THE CONVENIENCE OUTLET.

WAS APPROXIMATELY 220/240 VAC MEASURED AT THE OUTLET?
Y N

010
THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144
Go to Page 5, Step 044, Entry Point B.

SEE CARR 1440.

011
RESETTING CB2 RESOLVED THE PROBLEM
Go To Map 0190, Entry Point A.

012
REMOVE ALL PLUGS CONNECTED TO THE OUTLETS.

RESET CB2.

DID CB2 RESET WITHOUT TRIPPING AGAIN?
Y N

013
THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144
Go to Page 5, Step 044, Entry Point B.

SEE CARR 1440.

F

F

014
MEASURE THE VOLTAGE AT THE CONVENIENCE OUTLET.

WAS APPROXIMATELY 220/240 VAC MEASURED AT THE OUTLET?
Y N

015
THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144
Go to Page 5, Step 044, Entry Point B.

SEE CARR 1440.

016
THE DEVICE(S) THAT WERE PLUGGED INTO THE OUTLET MAY HAVE BEEN THE CAUSE OF THE OVERLOAD CONDITION.

PLUG THE DEVICE(S) PREVIOUSLY CONNECTED BACK INTO THE OUTLET.

DID CB2 TRIP AGAIN?
Y N

017
RESETTING CB2 RESOLVED THE PROBLEM
Go To Map 0190, Entry Point A.

018
THE OVERLOAD CONDITION IS BEING CAUSED BY ONE OF THE DEVICES THAT WAS PLUGGED INTO THE CONVENIENCE OUTLET.
Go to Page 5, Step 044, Entry Point B.

Map 0150 — Convenience Outlet

A
1

CONVENIENCE OUTLET

PAGE 3 OF 5

019
OBSERVE CU-PS-01 CB3 (LOC 1).

IS CU-PS-01 CB3 TRIPPED?
Y N

020
A VOLTAGE TAP PLUG MUST BE USED TO SELECT THE PROPER CONVENIENCE OUTLET VOLTAGE.
SEE CHART AT RIGHT.---->

AC OUTPUT *	PLUG LOCATION
100 VAC	PS1-J12
120 VAC	PS1-J13

IS THE VOLTAGE TAP PLUG INSTALLED AND IN THE PROPER POSITION?
Y N

021
SET CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).

INSTALL THE VOLTAGE TAP PLUG ON THE CONTROL UNIT AC POWER SUPPLY (PS1).
SEE CHART AT RIGHT.---->

AC OUTPUT *	PLUG LOCATION
100 VAC	PS1-J12
120 VAC	PS1-J13

SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE ON POSITION (LOC 1).

MEASURE THE VOLTAGE AT THE CONVENIENCE OUTLET.

DID THE OUTPUT OF THE CONVENIENCE OUTLET EQUAL THE DESIRED VOLTAGE? (APPROXIMATELY)
Y N

4
G H J K

H J K

022
SET CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).

REMOVE THE VOLTAGE TAP PLUG FROM THE CONTROL UNIT AC POWER SUPPLY (PS1).
SEE CHART AT RIGHT.---->

AC OUTPUT *	PLUG LOCATION
100 VAC	PS1-J12
120 VAC	PS1-J13

CONTINUITY CHECK THE VOLTAGE TAP PLUG.

CONTINUITY GOOD?
Y N

023
REPAIR THE OPEN ON THE PLUG.
Go to Page 5, Step 044, Entry Point B.

024
THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144
Go to Page 5, Step 044, Entry Point B.

SEE CARR 1440.

025
PLUGGING THE VOLTAGE TAP PLUG FIXED THE PROBLEM.
Go to Page 5, Step 044, Entry Point B.

026

MEASURE THE VOLTAGE AT THE CONVENIENCE OUTLET.

DID THE OUTPUT OF THE CONVENIENCE OUTLET EQUAL THE DESIRED VOLTAGE? (APPROXIMATELY)
Y N

4 4
L M

Map 0150 — Convenience Outlet

G 3 L 3 M 3 **CONVENIENCE OUTLET** --

PAGE 4 OF 5

027

SET CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).

REMOVE THE VOLTAGE TAP PLUG FROM THE CONTROL UNIT AC POWER SUPPLY (PS1). SEE CHART AT RIGHT.---->

AC OUTPUT *	PLUG LOCATION
100 VAC	PS1-J12
120 VAC	PS1-J13

CONTINUITY CHECK THE VOLTAGE TAP PLUG.

CONTINUITY GOOD?
Y N

028
REPAIR THE OPEN ON THE PLUG.
WHEN THE PROBLEM IS CORRECTED, GO TO THE CLEANUP MAP.
Go to Page 5, Step 044, Entry Point B.

029
THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144 SEE CARR 1440.
Go to Page 5, Step 044, Entry Point B.

030
THE CONVENIENCE OUTLET IS OK.
Go To Map 0100, Entry Point A.

031

IS ANYTHING PLUGGED INTO THE CONVENIENCE OUTLET?
Y N

N P

N P

032
RESET CB3

DID CB3 RESET WITHOUT TRIPPING AGAIN?
Y N

033
THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144 SEE CARR 1440.
Go to Page 5, Step 044, Entry Point B.

034
MEASURE THE VOLTAGE AT THE CONVENIENCE OUTLET.

WAS APPROXIMATELY 120 VAC MEASURED AT THE OUTLET?
Y N

035
THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144 SEE CARR 1440.
Go to Page 5, Step 044, Entry Point B.

036
RESETTING CB3 RESOLVED THE PROBLEM
Go to Page 5, Step 044, Entry Point B.

037
REMOVE ALL PLUGS CONNECTED TO THE OUTLETS.

RESET CB3.

DID CB3 RESET WITHOUT TRIPPING AGAIN?
Y N

5 Q 5 R

Map 0150 — Convenience Outlet

Map 0150 — Convenience Outlet

O R
4 4

CONVENIENCE OUTLET

PAGE 5 OF 5

038
THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144
Go to Step 044, Entry Point B.

SEE CARR 1440.

039
MEASURE THE VOLTAGE AT THE CONVENIENCE OUTLET.

WAS APPROXIMATELY 120 VAC MEASURED AT THE OUTLET?
Y N

040
THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144
Go to Step 044, Entry Point B.

SEE CARR 1440.

041
THE DEVICE(S) THAT WERE PLUGGED INTO THE OUTLET MAY HAVE BEEN THE CAUSE OF THE OVERLOAD CONDITION.

PLUG THE DEVICE(S) PREVIOUSLY CONNECTED BACK INTO THE OUTLET.

DID CB3 TRIP AGAIN?
Y N

042
RESETTING CB3 RESOLVED THE PROBLEM
Go to Step 044, Entry Point B.

S

S

043
THE OVERLOAD CONDITION IS BEING CAUSED BY ONE OF THE DEVICES THAT WAS PLUGGED INTO THE CONVENIENCE OUTLET.
Go to Step 044, Entry Point B.

044
(Entry Point B)
CONVENIENCE OUTLET PROBLEM RESOLVED.

REPLACE ALL COVERS REMOVED.

PERFORM END OF CALL DUTIES.

MAP 0190 — Power Restart

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0110	A	1	001
0120	A	1	001
0400	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
1	006	0100	A
1	007	0100	A
1	004	0400	A

001
(Entry Point A)

SET THE LOCAL REMOTE SWITCH TO THE LOCAL POSITION (LOC-1).

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE ON POSITION (LOC-15).

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH (LOC-1).

IS THE CONTROL UNIT POWER ON LED OFF?
Y N

002
RELEASE THE LOCAL POWER ENABLE SWITCH

OBSERVE THE CONTROL UNIT POWER ON LED (LOC-1).

IS THE CONTROL UNIT POWER ON LED OFF?
Y N

A B C

SEE LOC-1.

A B C

003

OBSERVE THE CONTROL UNIT DC POWER LED (LOC-1).

IS THE CONTROL UNIT DC POWER LED ON?
Y N

004
CHECK CONTROL UNIT DC POWER.
Go To Map 0400, Entry Point A.

005
CONTROL UNIT POWER OKAY.

IF YOU CAME TO THE POWER MAPS FROM THE MD, RETURN TO THE MD AND CONTINUE THE MAINTENANCE CALL BY ACTIVATING THE ENTER KEY.
IF YOU CAME TO THE POWER MAPS FROM THE START SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

006
LOCAL HOLD PROBLEM.
Go To Map 0100, Entry Point A.

007
LOCAL PICK PROBLEM.
Go To Map 0100, Entry Point A.

MAP 0190 — Power Restart

SINGLE DRIVE POWER ANALYSIS

PAGE 1 OF 6

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001
0201	B	3	018
0202	C	5	034
0203	D	5	035

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
2	007	0210	A

001
(ENTRY POINT A)
THE PROBLEM HAS BEEN ISOLATED TO A SINGLE DRIVE FAILURE. EITHER THE DRIVE WILL NOT POWER DOWN WITH THE DRIVE POWER SWITCH SET TO OFF OR ONE OR MORE VOLTAGES ARE MISSING AS VERIFIED BY METERING AT THE POWER SUPPLY TEST TOOL JACK.

DANGER

LETHAL VOLTAGES ARE PRESENT IN THE POWER SERVICE AREA. SAFETY IS MOST IMPORTANT. TREAT ALL CIRCUITS AS LIVE UNTIL MEASURED.
BECAUSE THIS FAILURE HAS BEEN IDENTIFIED AS A SINGLE DRIVE PROBLEM (THE OTHER DRIVE IN THE TAPE UNIT IS OPERATIONAL) NO ANALYSIS OF AC INPUT VOLTAGES WILL BE MADE.

ASSISTANCE MAY BE REQUIRED TO PERFORM SOME OF THE PROCEDURES FOUND IN THIS MAP.

ANALYSIS PROCEDURE

ON THE FAILING DRIVE, SET THE ONLINE/OFFLINE SWITCH TO OFFLINE.
(Step 001 continues)

SEE LOC 1.

(Step 001 continued)

ARE YOU HERE BECAUSE THE DRIVE WILL NOT POWER DOWN WHEN THE DRIVE POWER OFF SWITCH IS SET TO OFF?
Y N

002

IF YOU HAVE NOT ALREADY DONE SO, PLUG THE DC POWER TEST TOOL INTO THE FAILING DRIVE TEST JACK (J8 IF PROBLEM IS ON DRIVE 0 OR J9 IF PROBLEM IS ON DRIVE 1).

SEE PWR 12 FOR INFORMATION ABOUT THE DC POWER TEST TOOL.

IGNORE THE STATUS OF LED 2 WHEN ANSWERING QUESTIONS ABOUT LEDS THROUGHOUT THIS MAP.

ARE ANY LEDS ON?
Y N

003

SET THE DRIVE POWER SWITCH ON THE FAILING DRIVE TO OFF.
CONTINUITY CHECK FUSE 11 (DRIVE 0) OR FUSE 12 (DRIVE 1).

NO LEDS ON. +5V CONTROL VOLTAGE MISSING.

SEE CARR-DR 1-1

DOES THE FUSE CHECK O.K.?
Y N

004
EXCHANGE THE FUSE, SET THE DRIVE POWER SWITCH TO ON.

NOTE: IF FUSE CONTINUES TO BLOW, GO TO PWR 30.

GO TO PAGE 5, STEP 034, ENTRY POINT C.

5 2 2
A B C

0 0 0 0 0 0 0 0 0 0

~~A B C~~
B C PWR 200
1 1

PAGE 2 OF 6

005
NO OBSERVATIONS MAY HAVE BEEN
MADE REGARDING OTHER DRIVE.

IS THE AC POWER CB TRIPPED? (SEE
LOC 1)
Y N

006
EXCHANGE THE DC POWER SUPPLY (FRU095).
GO TO PAGE 5, STEP 034,
ENTRY POINT C.

SEE CARR-DR 1-1

007

GO TO MAP 0210, ENTRY POINT A.

008
DISREGARD STATUS OF LED 2.
ARE ALL LEDS ON?
Y N

009
IS LED 8 THE ONLY LED ON?
Y N

CHECKING FOR +5V CONTROL.

010
IS LED 5 ON?
Y N

CHECKING FOR +8.5 VOLTS.

011

GO TO PAGE 3, STEP 018,
ENTRY POINT B.

012
IS LED 7 ON?
Y N

CHECKING FOR +5 VOLTS.

5
D E F G

E F G

013

GO TO PAGE 3, STEP 018,
ENTRY POINT B.

014
REQUEST YOUR NEXT LEVEL OF
SUPPORT.

015
PRESS AND HOLD THE BLUE
RESET BUTTON AND OBSERVE
THE DC TEST TOOL.
RELEASE THE BLUE RESET BUTTON.

SEE LOC 1.

WAS LED 8 THE ONLY LED THAT WAS ON?
Y N

016

DID YOU OBSERVE ANY LEDS OFF
OTHER THAN LED 2?
Y N

017
EXCHANGE THE POWER AMP BOARD (FRU059).
GO TO PAGE 5, STEP 034,
ENTRY POINT C.

VOLTAGE DETECTOR CIRCUIT FAILURE.

3 3
H J

0 0 0 0 0 0 0 0 0 0

J
2

PWR 200

PAGE 3 OF 6

018
(ENTRY POINT B)
REFER TO TABLE ONE AND CHECK OR EXCHANGE THE FUSE OR RESET THE CB IN THE FAILING CIRCUIT. PRESS THE BLUE RESET BUTTON.

(THE LEDS ON THE DC TEST TOOL ARE NUMBERED LEFT TO RIGHT).

TABLE 1

LED	VOLTS	FUSE	CB
1	+24	1,2	
3	+15	3,4	
4	-15	5,6	
5	+8.5	7,8	
6	-5	9,10	
7	+ 5	13,14 OR 1,2	
8	+ 5	11,12	

NOTES:
1) IGNORE LED 2.
2) F13 AND F14 USED ON POWER SUPPLY PART NUMBERS 6177166 OR 6177167.

ARE ALL LEDS ON?
Y N

019
IS THE FUSE BLOWN OR CB TRIPPED AGAIN?
Y N

020

GO TO PAGE 5, STEP 035,
ENTRY POINT D.

021
GOTO PWR 30.

022

ATTEMPT SEVERAL LOAD/UNLOAD CARTRIDGE OPERATIONS.
DID A FUSE BLOW DURING THE LOAD/UNLOAD OPERATION?
Y N

K L

H K L
2

023
NOTE: FOR INTERMITTENT PROBLEMS, REFER TO PWR30 FRU LIST FOR POSSIBLE CAUSES.
GO TO PAGE 5, STEP 034,
ENTRY POINT C.

024

EXCHANGE THE POWER AMP BOARD (FRU059).
GO TO PAGE 5, STEP 034,
ENTRY POINT C.

SEE CARR-DR 1-1

025
IF DRIVE 0 IS THE FAILING DRIVE, DISCONNECT J5 AND J6 FROM THE POWER SUPPLY. JUMPER J5-11 TO J5-7. IF DRIVE 1 IS THE FAILING DRIVE, DISCONNECT J1 AND J2. JUMPER J1-11 to J1-7.

SEE LOC 1
FORCE POWER ON USING A JUMPER

IS LED 8 THE ONLY LED ON?
Y N

026
PROBLEM MAY BE IN THE "- PICK" LINE.

REMOVE THE JUMPER FROM PS J1 OR J5.

FORCING POWER ON WITH JUMPER WAS SUCCESSFUL.

CONTINUITY CHECK THE "- PICK" LINE.
DR0 PS01-J5-11 TO TUD0 PAJ8-7.
DR1 PS01-J1-11 TO TUD1 PAJ8-7.

SEE LOC 1

CONTINUITY OKAY?
Y N

5 4 4
H N P

0 0 0 0 0 0 0 0 0 0

N P
3 3

PWR 200

PAGE 4 OF 6

027

REPAIR OPEN IN "-PICK" LINE.

USE THE FOLLOWING REFERENCE DRAWINGS
YF100, ZZ20 OR ZZ220 AND PA 000/001

RECONNECT ALL CABLES DISCONNECTED WHILE TROUBLESHOOTING.
GO TO PAGE 5, STEP 034,
ENTRY POINT C.

028
EXCHANGE THE POWER AMPLIFIER BOARD (FRU059). SET THE DRIVE POWER SWITCH TO ON.

SEE CARR-DR 1-1

ARE ALL LEDS ON?
Y N

029
PREPARE TO REMOVE THE OPERATIONAL DRIVE FROM SERVICE.

HAVE THE CUSTOMER VARY THE DRIVE OFFLINE. SET THE DRIVE ONLINE/OFFLINE SWITCH TO OFFLINE. SET THE TAPE UNIT AC POWER CB TO OFF.

SEE LOC 1.

USING AN OHMMETER, VERIFY THE PROPER OPERATION OF THE DRIVE POWER SWITCH (FRU104).

DOES THE DRIVE POWER SWITCH (FRU104) FUNCTION PROPERLY?
Y N

5
Q R S

R S

030

EXCHANGE THE DRIVE POWER SWITCH (FRU104).
GO TO PAGE 5, STEP 034,
ENTRY POINT C.

SEE CARR-DR 1-1

031
CONTINUITY CHECK THE FOLLOWING CABLES:
ADDRESS SWITCH CABLE TO J4 (FRU106)
DC POWER DISTRIBUTION CABLE (FRU080)
DC DISTRIBUTION (FRU079)
TACHOMETER SENSOR (FRU081)
POWER AMPLIFIER J2 (FRU049).

REPAIR ANY OPEN FOUND IN THE CABLES.

WERE ANY OPENS FOUND IN THE CABLES?
Y N

032
REQUEST YOUR NEXT LEVEL OF SUPPORT.

033

GO TO PAGE 5, STEP 034,
ENTRY POINT C.

0 0 0 0 0 0 0 0 0 0

N Q PWR 200
3 4

PAGE 5 OF 6

034
(ENTRY POINT C)
SET THE DRIVE ONLINE/OFFLINE
SWITCH TO ONLINE.
IF YOU ENTERED THIS MAP FROM THE
MD, RETURN TO THE MD, REIPL THE
MD AND THEN SELECT THE UNIT TEST
OPTION

IF YOU ENTERED THIS MAP FROM ANY
SECTION OF THE MI, CONNECT THE MD
TO THE CONTROL UNIT AND SELECT
THE UNIT TEST OPTION.

035
(ENTRY POINT D)
PREPARE TO REMOVE THE OPERATIONAL
DRIVE FROM SERVICE.

HAVE THE CUSTOMER VARY THE DRIVE
OFFLINE. SET THE DRIVE
ONLINE/OFFLINE SWITCH TO OFFLINE.
SET THE TAPE UNIT AC POWER CB TO
OFF.

EXCHANGE THE DC POWER SUPPLY (FRU
95).

SEE LOC 1.

SEE CARR-DR 1-1

ARE ALL LEDS ON?
Y N

036
REQUEST YOUR NEXT LEVEL OF
SUPPORT.

037

GO TO STEP 034,
ENTRY POINT C.

A D
1 2

038
NOTE: IF YOU HAVE MADE NO REPAIRS
PERFORM THE POWER SUPPLY RIPPLE
CHECK FOUND ON PWR 20.

SET THE DRIVE ONLINE/OFFLINE
SWITCH TO ONLINE.

IF YOU CAME TO THE POWER MAPS
FROM THE MD, RETURN TO THE MD
AND CONTINUE THE MAINTENANCE
CALL BY ACTIVATING THE ENTER
KEY.

IF YOU CAME TO THE POWER MAPS
FROM THE START SECTION OF THE
MI, CONNECT THE MD TO THE
CONTROL UNIT AND SELECT THE
UNIT TEST OPTION.

NOTE: FOR INTERMITTENT PROBLEMS,
REFER TO PWR30 FRU LIST FOR
POSSIBLE CAUSES.

039
EXCHANGE THE FOLLOWING FRU'S:
POWER AMPLIFIER BOARD (FRU059)
DRIVE POWER SWITCH (FRU104)
DC POWER DISTRIBUTION CABLE (FRU079
DC POWER DISTRIBUTION CABLE (FRU080

SEE CARR-DR 1-1

DOES THE DRIVE POWER OFF NOW?
Y N

040
REQUEST YOUR NEXT LEVEL OF
SUPPORT.

6
T

0 0 0 0 0 0 0 0 0 0

MAP 0200—Drive DC Power (Single Drive)

T PWR 200
5

PAGE 6 OF 6

041

GO TO PAGE 5, STEP 034,
ENTRY POINT C.

0 0 0 0 0 0 0 0 0 0

MAP 0200 — Drive DC Power (Single Drive)

SINGLE DRIVE POWER ANALYSIS

PAGE 1 OF 5

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001
0201	B	3	020
0202	C	5	036
0203	D	5	037

001
(ENTRY POINT A)
THE PROBLEM HAS BEEN ISOLATED TO A SINGLE DRIVE FAILURE. EITHER THE DRIVE WILL NOT POWER DOWN WITH THE DRIVE POWER SWITCH SET TO OFF OR ONE OR MORE VOLTAGES ARE MISSING AS VERIFIED BY METERING AT THE POWER SUPPLY TEST TOOL JACK.

ASSISTANCE MAY BE REQUIRED TO PERFORM SOME OF THE PROCEDURES FOUND IN THIS MAP.

DANGER

LETHAL VOLTAGES ARE PRESENT IN THE POWER SERVICE AREA. SAFETY IS MOST IMPORTANT. TREAT ALL CIRCUITS AS LIVE UNTIL MEASURED.
BECAUSE THIS FAILURE HAS BEEN IDENTIFIED AS A SINGLE DRIVE PROBLEM (THE OTHER DRIVE IN THE TAPE UNIT IS OPERATIONAL) NO ANALYSIS OF AC INPUT VOLTAGES WILL BE MADE.

ANALYSIS PROCEDURE

ON THE FAILING DRIVE,SET THE ONLINE/OFFLINE SWITCH TO OFFLINE.
(Step 001 continues)

SEE LOC 1.

(Step 001 continues)

ARE YOU HERE BECAUSE THE DRIVE WILL NOT POWER DOWN WHEN THE DRIVE POWER OFF SWITCH IS SET TO OFF?
Y N

002

IF YOU HAVE NOT ALREADY DONE SO, PLUG THE DC POWER TEST TOOL INTO THE FAILING DRIVE TEST JACK (J8 IF PROBLEM IS ON DRIVE 0 OR J9 IF PROBLEM IS ON DRIVE 1).

SEE PWR 12 FOR INFORMATION ABOUT THE DC POWER TEST TOOL.

IGNORE THE STATUS OF LED 2 WHEN ANSWERING QUESTIONS ABOUT LEDS THROUGHOUT THIS MAP.

ARE ANY LEDS ON?
Y N

003

SET THE DRIVE POWER SWITCH ON THE FAILING DRIVE TO OFF. CONTINUITY CHECK FUSE 11 (DRIVE 0) OR FUSE 12 (DRIVE 1).

NO LEDS ON. +5V CONTROL VOLTAGE MISSING.

SEE CARR-DR 1-1

DOES THE FUSE CHECK O.K.?
Y N

004
EXCHANGE THE FUSE, SET THE DRIVE POWER SWITCH TO ON.

NOTE: IF FUSE CONTINUES TO BLOW, GO TO PWR 30.

GO TO PAGE 5, STEP 036, ENTRY POINT C.

5 2 2
A B C

050887

ECA47957

B C PWR 200
1 1

PAGE 2 OF 5

005
EXCHANGE THE DC POWER SUPPLY (FRU095).
GO TO PAGE 5, STEP 036, ENTRY POINT C.
SEE CARR-DR 1-1

006
DISREGARD STATUS OF LED 2.
ARE ALL LEDS ON?
Y N

007
IS LED 8 THE ONLY LED ON?
CHECKING FOR +5V CONTROL.
Y N

008
IS LED 5 ON?
CHECKING FOR +8.5 VOLTS.
Y N

009

GO TO PAGE 3, STEP 020, ENTRY POINT B.

010
IS LED 7 ON?
CHECKING FOR +5 VOLTS.
Y N

011

GO TO PAGE 3, STEP 020, ENTRY POINT B.

012
REQUEST YOUR NEXT LEVEL OF SUPPORT.

5
D E

E

MAP 0200-2

013
PRESS AND HOLD THE BLUE RESET BUTTON AND OBSERVE THE DC TEST TOOL.
RELEASE THE BLUE RESET BUTTON.
SEE LOC 1.

WAS LED 8 THE ONLY LED THAT WAS ON?
Y N

014

DID YOU OBSERVE ANY LEDS OFF OTHER THAN LED 2?
Y N

015

HAS THE POWER AMP BOARD (FRU059) BEEN RELPACED?
Y N

016
EXCHANGE THE POWER AMP BOARD (FRU059).
GO TO PAGE 5, STEP 036, ENTRY POINT C.
VOLTAGE DETECTOR CIRCUIT FAILURE.

017
CONTINUITY CHECK THE FOLLOWING CABLES:
DC POWER DISTRIBUTION CABLE (FRU080)
DC DISTRIBUTION (FRU079)

REPAIR ANY OPEN FOUND IN THE CABLES.

WERE ANY OPENS FOUND IN THE CABLES?
Y N

3 3 3 3
F G H J

050887

ECA47957

MAP 0200-2

G H J PWR 200
2 2 2

PAGE 3 OF 5

018
REQUEST YOUR NEXT LEVEL OF SUPPORT.

019

GO TO PAGE 5, STEP 036,
ENTRY POINT C.

020
(ENTRY POINT B)
REFER TO TABLE ONE AND CHECK OR EXCHANGE THE FUSE OR RESET THE CB IN THE FAILING CIRCUIT. PRESS THE BLUE RESET BUTTON.

(THE LEDS ON THE DC TEST TOOL ARE NUMBERED LEFT TO RIGHT).

TABLE 1

LED	VOLTS	FUSE	CB
1	+24	1,2	
3	+15	3,4	
4	-15	5,6	
5	+8.5	7,8	
6	-5	9,10	
7	+ 5	13,14 OR 1,2	
8	+ 5	11,12	

NOTES:
1) IGNORE LED 2.
2) F13 AND F14 USED ON POWER SUPPLY PART NUMBERS 6177166 OR 6177167.

ARE ALL LEDS ON?
Y N

021
IS THE FUSE BLOWN OR CB TRIPPED AGAIN?
Y N

022

GO TO PAGE 5, STEP 037,
ENTRY POINT D.

023
GOTO PWR 30.

K

F K
2

024

ATTEMPT SEVERAL LOAD/UNLOAD CARTRIDGE OPERATIONS.
DID A FUSE BLOW DURING THE LOAD/UNLOAD OPERATION?
Y N

025
NOTE: FOR INTERMITTENT PROBLEMS, REFER TO PWR30 FRU LIST FOR POSSIBLE CAUSES.
GO TO PAGE 5, STEP 036,
ENTRY POINT C.

026

EXCHANGE THE POWER AMP BOARD (FRU059).
GO TO PAGE 5, STEP 036,
ENTRY POINT C.

SEE CARR-DR 1-1

027
IF DRIVE 0 IS THE FAILING DRIVE, DISCONNECT J5 AND J6 FROM THE POWER SUPPLY. JUMPER J5-11 TO J5-7. IF DRIVE 1 IS THE FAILING DRIVE, DISCONNECT J1 AND J2. JUMPER J1-11 to J1-7.

SEE LOC 1
FORCE POWER ON USING A JUMPER

IS LED 8 THE ONLY LED ON?
Y N

5 4
L M

MAP 0200-3

050887

ECA47957

M PWR 200
3

PAGE 4 OF 5

028
PROBLEM MAY BE IN THE "- PICK" LINE.

FORCING POWER ON WITH JUMPER WAS SUCCESSFUL.

REMOVE THE JUMPER FROM PS J1 OR J5.

CONTINUITY CHECK THE "- PICK" LINE.
DR0 PS01-J5-11 TO TUD0 PAJ8-7.
DR1 PS01-J1-11 TO TUD1 PAJ8-7.

SEE LOC 1

CONTINUITY OKAY?
Y N

029

REPAIR OPEN IN "-PICK" LINE.

USE THE FOLLOWING REFERENCE DRAWINGS
YF100, ZZ20 OR ZZ220 AND PA 000/001

RECONNECT ALL CABLES DISCONNECTED WHILE TROUBLESHOOTING.
GO TO PAGE 5, STEP 036,
ENTRY POINT C.

030
EXCHANGE THE POWER AMPLIFIER BOARD (FRU059). SET THE DRIVE POWER SWITCH TO ON.

SEE CARR-DR 1-1

ARE ALL LEDS ON?
Y N

5
N P

P MAP 0200-4

031
PREPARE TO REMOVE THE OPERATIONAL DRIVE FROM SERVICE.

HAVE THE CUSTOMER VARY THE DRIVE OFFLINE. SET THE DRIVE ONLINE/OFFLINE SWITCH TO OFFLINE.
SET THE TAPE UNIT AC POWER CB TO OFF.

SEE LOC 1.

USING AN OHMMETER,VERIFY THE PROPER OPERATION OF THE DRIVE POWER SWITCH (FRU104).

DOES THE DRIVE POWER SWITCH (FRU104) FUNCTION PROPERLY?
Y N

032

EXCHANGE THE DRIVE POWER SWITCH (FRU104).
GO TO PAGE 5, STEP 036,
ENTRY POINT C.

SEE CARR-DR 1-1

033
CONTINUITY CHECK THE FOLLOWING CABLES:
ADDRESS SWITCH CABLE TO J4 (FRU106)
DC POWER DISTRIBUTION CABLE (FRU080)
DC DISTRIBUTION (FRU079)
TACHOMETER SENSOR (FRU081)
POWER AMPLIFIER J2 (FRU049).

REPAIR ANY OPEN FOUND IN THE CABLES.

WERE ANY OPENS FOUND IN THE CABLES?
Y N

5 5
Q R

050887

ECA47957

MAP 0200-4

L N Q R PWR 200
3 4 4 4

PAGE 5 OF 5

034
REQUEST YOUR NEXT LEVEL OF SUPPORT.

035

GO TO STEP 036,
ENTRY POINT C.

036
(ENTRY POINT C)
SET THE DRIVE ONLINE/OFFLINE SWITCH TO ONLINE.
IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD, REIPL THE MD AND THEN SELECT THE UNIT TEST OPTION

IF YOU ENTERED THIS MAP FROM ANY SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

037
(ENTRY POINT D)
PREPARE TO REMOVE THE OPERATIONAL DRIVE FROM SERVICE.

SEE LOC 1.

HAVE THE CUSTOMER VARY THE DRIVE OFFLINE. SET THE DRIVE ONLINE/OFFLINE SWITCH TO OFFLINE. SET THE TAPE UNIT AC POWER CB TO OFF.

EXCHANGE THE DC POWER SUPPLY (FRU 95). SEE CARR-DR 1-1

ARE ALL LEDS ON?
Y N

S T

A D S T
1 2

MAP 0200-5

038
REQUEST YOUR NEXT LEVEL OF SUPPORT.

039

GO TO STEP 036,
ENTRY POINT C.

040
NOTE: IF YOU HAVE MADE NO REPAIRS PERFORM THE POWER SUPPLY RIPPLE CHECK FOUND ON PWR 20.

NOTE: FOR INTERMITTENT PROBLEMS, REFER TO PWR30 FRU LIST FOR POSSIBLE CAUSES.
GO TO STEP 036,
ENTRY POINT C.

041
EXCHANGE THE FOLLOWING FRU'S: SEE CARR-DR 1-1
POWER AMPLIFIER BOARD (FRU059)
DRIVE POWER SWITCH (FRU104)
DC POWER DISTRIBUTION CABLE (FRU079
DC POWER DISTRIBUTION CABLE (FRU080

DOES THE DRIVE POWER OFF NOW?
Y N

042
REQUEST YOUR NEXT LEVEL OF SUPPORT.

043

GO TO STEP 036,
ENTRY POINT C.

050887

ECA47957

MAP 0200-5

2-DRIVE POWER ANALYSIS PROCEDURE

PAGE 1 OF 7

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0000	B	2	011
0000	C	7	054
0000	D	5	038
0100	A	1	001

001
(Entry Point A) SEE LOC 1
A POWER PROBLEM HAS BEEN IDENTIFIED AFFECTING BOTH DRIVES WITHIN THE TAPE UNIT.

DANGER
LETHAL VOLTAGES ARE PRESENT IN THE POWER SERVICE AREA. SAFETY IS MOST IMPORTANT. TREAT ALL CIRCUITS AS LIVE UNTIL MEASURED.

ANALYSIS PROCEDURE

PLUG THE DC TEST TOOL INTO J8 (DRIVE 0) AND FOLLOW THIS PROCEDURE:

SET THE DRIVE ONLINE/OFFLINE SWITCH TO OFFLINE. SEE LOC 1.

ARE ALL THE LEDS OFF?
Y N

002
EXCHANGE THE DC POWER SUPPLY (FRU095).

Go to Page 7, Step 054, Entry Point C. SEE CARR-DR 1-1

A

A

003
DOES THIS UNIT HAVE BM6460006 INSTALLED? SEE CARR DR 9 TO CHECK FOR BM6460006.
Y N

004
IS THE AC POWER CB TRIPPED? (SEE LOC 1)
Y N

005
REMOVE THE TAPE UNIT REAR COVER. SEE CARR-DR 2-3

IS THE PUMP MOTOR RUNNING?
Y N

006
MEASURE THE VOLTAGES AT TB1. THEY SHOULD MEASURE BETWEEN 180 AND 259 VOLTS AC. SEE LOC 1.

50 HZ EXCEPT JAPAN	60 HZ OR 50HZ JAPAN
TB1-1 TO TB1-2	TB1-1 TO TB1-2
TB1-3 TO TB1-4	TB1-1 TO TB1-3
TB1-5 TO TB1-6	TB1-2 TO TB1-3

DO ALL VOLTAGES MEASURE OK?
Y N

007
PROBLEM MAY BE IN PRECEEDING UNIT OR THE AC INPUT CABLE TO THIS UNIT.
IS THE PRECEEDING UNIT ANOTHER TAPE UNIT?
Y N

4 3 3 2 2 2
B C D E F G

F G
1 1

PWR 210

PAGE 2 OF 7

008

Go to Step 011, Entry Point B.

009
IS THE PUMP MOTOR OR BLOWER MOTOR RUNNING IN THE PRECEEDING TAPE UNIT?
Y N

010
POWER MAY BE MISSING IN PRECEEDING TAPE UNIT.
RESTART THIS MAP IN PRECEEDING UNIT.

011

(Entry Point B)
VERIFY THAT ALL PATHS TO THE CONTROL UNIT SUPPLYING AC POWER TO THIS STRING OF DRIVES ARE VARIED OFFLINE.

VERIFY THAT ALL PATHS THRU THE OTHER CONTROL UNIT TO THIS STRING OF DRIVES ARE VARIED OFFLINE.

SET THE CONTROL UNIT SUPPLYING AC POWER TO THIS STRING OF DRIVES TO OFFLINE.
SET THE CONTROL UNIT POWER SWITCH TO OFF.
CONTINUITY CHECK THE INPUT AC CABLE (FRU075).
EXCHANGE IF OPEN.

REFER TO YF060 FOR 60 HZ AND 50 HZ JAPAN MACHINES.
REFER TO YF050 FOR ALL OTHER 50 HZ MACHINES.
SEE CARR-DR 1-1

IF NO PROBLEM IS FOUND WITH THE CABLE (FRU075) THE PROBLEM IS MOST LIKELY LOCATED IN A PRIOR TAPE UNIT IN THE STRING OR IN THE CONTROL UNIT.

AFTER LOCATING AND CORRECTING THE PROBLEM IN THE AC DISTRIBUTION NET, SET THE CONTROL UNIT POWER ON SWITCH TO ON.
Go to Page 7, Step 054, Entry Point C.

E
1

012
SET THE AC POWER CB TO OFF

DISCONNECT P11 FROM THE DC POWER SUPPLY.

SET THE AC POWER CB TO ON

MEASURE THE AC VOLTAGE BETWEEN P11-1 AND P11-3

IS 180 TO 259 VAC MEASURED AT P11?
Y N

013

VERIFY THAT ALL PATHS TO THE CONTROL UNIT SUPPLYING AC POWER TO THIS STRING OF DRIVES ARE VARIED OFFLINE.

VERIFY THAT ALL PATHS THRU THE OTHER CONTROL UNIT TO THIS STRING OF DRIVES ARE VARIED OFFLINE.

SET THE CONTROL UNIT SUPPLYING AC POWER TO THIS STRING OF DRIVES TO OFFLINE.
SET THE CONTROL UNIT POWER SWITCH TO OFF.

CONTINUITY CHECK FRU076 BETWEEN TB1 AND FRU218 AC POWER CB. EXCHANGE IF OPEN.

LOC 1

REFER TO YF060 FOR 60 HZ AND 50 HZ JAPAN MACHINES.
REFER TO YF050 FOR ALL OTHER 50 HZ MACHINES.
SEE CARR-DR 1-1

CONTINUITY CHECK FRU218, AC POWER CB.
EXCHANGE IF OPEN.
CONTINUITY CHECK FRU076 FROM FRU218 AC POWER CB TO P11.EXCHANGE IF OPEN.
Go to Page 7, Step 054, Entry Point C.

014
EXCHANGE THE DC POWER SUPPLY (FRU095)
Go to Page 7, Step 054, Entry Point C.

C D
1 1

PWR 210

PAGE 3 OF 7

015

VERIFY THAT THE JUMPER AT J12, 13, OR 14 SHOWS CONTINUITY AND IS PLUGGED.

SEE LOC 1.

EXCHANGE THE DC POWER SUPPLY (FRU095).
Go to Page 7, Step 054, Entry Point C.

016
RESET THE CB.

DOES THE CB TRIP AGAIN?
Y N

017
RESETTING THE AC CB HAS CLEARED THE ORIGINAL PROBLEM.

FOR INTERMITTENT AC CB TRIPPING SUSPECT:

AC CB (FRU218)
POWER SUPPLY (FRU095)
POWER SUPPLY BLOWER (FRU071)
BLOWER ASSEMBLY (FRU020)
PUMP MOTOR (FRU030)
POWER SUPPLY BLOWER CABLE (FRU072)
Go to Page 7, Step 054, Entry Point C.

018
THE AC POWER CB TRIPS AFTER BEING RESET.

DISCONNECT P15 FROM THE DC POWER SUPPLY. SEE LOC 1.

RESET THE AC POWER CB

DOES THE AC POWER CB STILL TRIP?
Y N

H J

H J

019

RECONNECT P15 TO THE DC POWER SUPPLY.

DISCONNECT P3 FROM THE REAR OF THE DRIVE 0. SEE CARR-DR 200

RESET THE AC POWER CB

DOES THE AC POWER CB STILL TRIP?
Y N

020
REPLACE BLOWER ASSEMBLY (FRU020).
Go to Page 7, Step 054, Entry Point C.

021
PROBLEM IN CABLE BETWEEN DC POWER SUPPLY P15 AND DRIVE CONNECTION P3. ISOLATE AND CORRECT THE PROBLEM.
Go to Page 7, Step 054, Entry Point C.

022

DISCONNECT P16 FROM THE DC POWER SUPPLY. SEE LOC 1.

RESET THE AC POWER CB

DOES THE AC POWER CB STILL TRIP?
Y N

023

RECONNECT P16 TO THE DC POWER SUPPLY.

DISCONNECT P3 FROM THE REAR OF DRIVE 1. SEE CARR-DR 200

RESET THE AC POWER CB

DOES THE AC POWER CB STILL TRIP?
Y N

4 4 4
K L M

K 3 L 3 M 3 **PWR 210**

PAGE 4 OF 7

024
REPLACE BLOWER ASSEMBLY (FRU020).
Go to Page 7, Step 054, Entry Point C.

025
THE PROBLEM IS IN THE CABLE BETWEEN DC POWER SUPPLY P15 AND DRIVE CONNECTION P3. ISOLATE AND CORRECT THE PROBLEM.
Go to Page 7, Step 054, Entry Point C.

026
REMOVE P4 FROM THE DC POWER SUPPLY. SEE LOC 1.

RESET THE AC POWER CB.

SET THE DRIVE POWER SWITCH TO ON.

DOES THE AC POWER CB REMAIN RESET?
Y N

027

DISCONNECT P11 FROM THE DC POWER SUPPLY.

SET THE AC POWER CB TO ON

DID THE AC POWER CB TRIP AGAIN?
Y N

028
EXCHANGE THE DC POWER SUPPLY (FRU095).

EXCHANGE THE AC POWER CB (FRU218). SEE CARR-DR 1-1

Go to Page 7, Step 054, Entry Point C.

N P

B 1 N P

029

EXCHANGE THE POWER SUPPLY BLOWER ASSEMBLY (FRU071). SEE CARR-DR 710

EXCHANGE THE POWER SUPPLY BLOWER ASSEMBLY CABLE (FRU072).
Go to Page 7, Step 054, Entry Point C.

030
EXCHANGE THE PUMP MOTOR (FRU030). SEE CARR-DR 1-1

Go to Page 7, Step 054, Entry Point C.

031
IS THE AC POWER CB TRIPPED? (SEE LOC 1)
Y N

032
MEASURE THE VOLTAGE BETWEEN PS P16-1 AND P16-3. IT SHOULD MEASURE BETWEEN 180 AND 259 VOLTS AC. SEE LOC 1

DID VOLTAGES MEASURE OK? TOLERANCES ARE FOUND ON PWR 20
Y N

033
SET THE AC POWER CB TO OFF

DISCONNECT P11 FROM THE DC POWER SUPPLY.

SET THE AC POWER CB TO ON

MEASURE THE AC VOLTAGE BETWEEN P11-1 AND P11-3

IS 180 TO 259 VAC MEASURED AT P11?
Y N

6 Q 6 R 6 S 5 T

T
4

PWR 210

PAGE 5 OF 7

034
INPUT AC POWER MAY BE MISSING
IS THE PRECEEDING UNIT ANOTHER TAPE UNIT?
Y N

035

Go to Step 038, Entry Point D.

036
IS THE PUMP MOTOR OR BLOWER MOTOR RUNNING IN THE PRECEEDING TAPE UNIT?
Y N

037
POWER MAY BE MISSING IN PRECEEDING TAPE UNIT.
RESTART THIS MAP IN PRECEEDING UNIT.

038
(Entry Point D)
VERIFY THAT ALL PATHS TO THE CONTROL UNIT SUPPLYING AC POWER TO THIS STRING OF DRIVES ARE VARIED OFFLINE.

VERIFY THAT ALL PATHS THRU THE OTHER CONTROL UNIT TO THIS STRING OF DRIVES ARE VARIED OFFLINE.

SET THE CONTROL UNIT SUPPLYING AC POWER TO THIS STRING OF DRIVES TO OFFLINE.

SET THE CONTROL UNIT POWER SWITCH TO OFF.

REMOVE CABLE FROM AC CONNECTOR J1.

SEE LOC 1 FOR TAPE UNITS WITH BM6460006

SET THE CONTROL UNIT POWER SWITCH TO ON.
(Step 038 continues)

(Step 038 continued)

MEASURE THE VOLTAGES AT TAPE UNIT AC CONNECTOR J1. THEY SHOULD MEASURE BETWEEN 180 AND 259 VOLTS AC.

50 HZ EXCEPT JAPAN	60 HZ OR 50HZ JAPAN
J1-1 TO J1-6	J1-1 TO J1-2
J1-2 TO J1-7	J1-1 TO J1-3
J1-3 TO J1-5	J1-2 TO J1-3

DO ALL VOLTAGES MEASURE OK?
Y N

039

SET THE CONTROL UNIT SUPPLYING AC POWER TO THIS STRING OF DRIVES TO OFFLINE.
SET THE CONTROL UNIT POWER SWITCH TO OFF.
CONTINUITY CHECK THE INPUT AC CABLE .
EXCHANGE FRU218 IF OPEN.

REFER TO YF060 FOR 60 HZ AND 50 HZ JAPAN MACHINES.
REFER TO YF050 FOR ALL OTHER 50 HZ MACHINES.
SEE CARR-DR 1-1

IF NO PROBLEM IS FOUND WITH THE CABLE THE PROBLEM IS MOST LIKELY LOCATED IN A PRIOR TAPE UNIT IN THE STRING OR IN THE CONTROL UNIT.

AFTER LOCATING AND CORRECTING THE PROBLEM IN THE AC DISTRIBUTION NET, SET THE CONTROL UNIT POWER ON SWITCH TO ON.
Go to Page 7, Step 054, Entry Point C.

040
PROBLEM IS WITH CB1 OR THE CABLE FROM CB1 TO PS P11.
SET THE CONTROL UNIT POWER SWITCH TO OFF.
EXCHANGE FRU218.
Go to Page 7, Step 054, Entry Point C.

MAP 0210 — Drive DC Power (Same Symptom Both Drives)

Q R S
4 4 4

PWR 210

PAGE 6 OF 7

041
EXCHANGE THE DC POWER SUPPLY (FRU095)
Go to Page 7, Step 054, Entry Point C.

042
PROBLEM MAY BE DUE TO OPEN OR MISSING JUMPER PLUG ON J12,J13 OR J14
IS A JUMPER PLUG INSTALLED ON J12,J13 OR J14?
Y N

043
INSTALL JUMPER AT PROPER LOCATION.
REFER TO CARR DR 1 FOR FRU095 INSTALL
Go to Page 7, Step 054, Entry Point C.

044
CONTINUITY CHECK THE JUMPER.
CONTINUITY OF THE JUMPER OK?
Y N

045
REPAIR JUMPER
Go to Page 7, Step 054, Entry Point C.

046
EXCHANGE THE DC POWER SUPPLY (FRU095)
Go to Page 7, Step 054, Entry Point C.

047
RESET THE CB.

DOES THE CB TRIP AGAIN?
Y N

U V

U V

048
RESETTING THE AC CB HAS CLEARED THE ORIGINAL PROBLEM.

FOR INTERMITTENT AC CB TRIPPING SUSPECT:

AC CB (FRU218)
POWER SUPPLY (FRU095)
BLOWER ASSEMBLY (FRU020)
PUMP MOTOR (FRU030)
Go to Page 7, Step 054, Entry Point C.

049
THE AC POWER CB TRIPS AFTER BEING RESET.

DISCONNECT P15 FROM THE DC POWER SUPPLY.

RESET THE AC POWER CB

DOES THE AC POWER CB STILL TRIP?
Y N

050
REPLACE BLOWER ASSEMBLY (FRU020).
Go to Page 7, Step 054, Entry Point C.

051

RECONNECT P15 TO THE DC POWER SUPPLY.

DISCONNECT P4 FROM THE DC POWER SUPPLY.

RESET THE AC POWER CB

DOES THE AC POWER CB STILL TRIP?
Y N

052
EXCHANGE THE PUMP MOTOR (FRU030).

Go to Page 7, Step 054, Entry Point C.

W

W

053
EXCHANGE THE DC POWER SUPPLY (FRU095)
Go to Page 7, Step 054, Entry Point C.

LOC 1.

SEE CARR-DR 1-1

MAP 0210 — Drive DC Power (Same Symptom Both Drives)

PWR 210

PAGE 7 OF 7

054
(Entry Point C)
IF NOT ALREADY ON, SET THE AC POWER CB TO ON

SET THE THE DRIVE POWER ON SWITCHES TO ON

IF NECESSARY, PLUG THE DC POWER TEST TOOL INTO
THE TEST JACK (J8 ON DRIVE 0 OR J9 ON DRIVE 1).
OBSERVE THE LEDS ON THE DC TEST TOOL
IGNORE LED 2 WHEN RESPONDING TO QUESTIONS.
ARE ALL THE LEDS ON?
Y N

055
REQUEST YOUR NEXT LEVEL OF SUPPORT.

056
SET THE DRIVE ONLINE/OFFLINE SWITCH TO ONLINE.

IF YOU CAME TO THE POWER MAPS
FROM THE MD, RETURN TO THE MD
AND CONTINUE THE MAINTENANCE
CALL BY ACTIVATING THE ENTER
KEY.

IF YOU CAME TO THE POWER MAPS
FROM THE START SECTION OF THE
MI, CONNECT THE MD TO THE
CONTROL UNIT AND SELECT THE
UNIT TEST OPTION.

CONTROL UNIT DC POWER MAP

PAGE 1 OF 19

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001
0190	A	1	001
0401	B	17	104
0401	C	19	131
0401	D	19	132
0401	E	12	073

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
7	039	0100	A
2	007	0100	B
3	012	0100	B
19	131	0190	A
12	072	410	B
18	120	420	A
17	115	420	B
18	125	430	A
19	130	440	A

001
(Entry Point A)

DANGER

LETHAL VOLTAGES ARE PRESENT IN THE POWER SERVICE AREA.
SAFETY IS MOST IMPORTANT. TREAT ALL CIRCUITS AS LIVE UNTIL MEASURED.

CAPACITORS ARE POSSIBLE EXPLODING DEVICES. WEAR SAFETY GLASSES WHEN WORKING IN THE POWER AREA.

ALWAYS REINSTALL ALL SAFETY COVERS BEFORE POWERING ON THE MACHINE.

THE DC TEST TOOL IS NEEDED FOR THIS MAP. SEE PWR 10 FOR INFORMATION REGARDING USE, LAYOUT AND FUNCTION OF THE TOOL.

CAUTION

THE CONTROL UNIT SHOULD BE OFFLINE AND THE TAPE UNITS VARIED OFFLINE AND UNLOADED.
(Step 001 continues)

MAP DESCRIPTION: MAP 0100 DIRECTED YOU TO THIS MAP BECAUSE THE DC POWER LED IS OFF.

START CONDITIONS:
-DC POWER LED OFF
-POWER ON LED IS ON.

FRUS DIAGNOSED:
-AC POWER SUPPLY,CU-PS-01
-DC POWER SUPPLY,CU-PS-02
-DC POWER SUPPLY FUSE F1
-DC POWER SUPPLY FUSE F2
-CU-CSU PANEL
-POR CARD, 01A-A2H4
-DC VOLTAGE DISTRIBUTION CABLES
-CU-PS-01 TO CU-PS-02 CABLES
-AC VOLTAGE TAP PLUG
-CONTROL UNIT GATE FANS
-CONTROL UNIT GATE UPPER THERMAL

ADDITIONAL SERVICE AIDS:
(Step 001 continues)

(Step 001 continued)

OPEN THE FRONT DOOR OF THE CONTROL UNIT AND REMOVE THE SUB COVER.

(Step 001 continued)
-CONTROL UNIT AC POWER DISTRIBUTION DIAGRAM ON PWR 32.
-CONTROL UNIT DC POWER DISTRIBUTION DIAGRAM ON PWR 34.
-CONTROL UNIT DC DISTRIBUTION DIAGRAMS: PWR 42 (+5VDC, CB2), PWR 44 (+5VDC, CB3), PWR 46 (-5VDC), PWR 48 (+8.5VDC)
-CONTROL UNIT DC POWER CONTROL DIAGRAM ON PWR 50.

CONNECT THE DC TEST TOOL TO THE CONTROL UNIT DC SUPPLY CU-PS-02 J16 (LOC 1).

COMPARE THE LEDS ON THE DC TEST TOOL TO THE CHART ON THE RIGHT.
(THE LEDS ON THE DC TEST TOOL ARE NUMBERED LEFT TO RIGHT).

LED	ON/OFF	VDC	FUSE/CB
1	ON	24CTL	F2
2	OFF		N/A
3	OFF		N/A
4	OFF		N/A
5	ON	+8.5	F1
6	ON	-5	CB4
7	ON	+5	CB2
8	ON	+5	CB3

DOES THE CHART AND DC TEST TOOL AGREE?

Y **N**

002
IS LED 1 ON?

Y **N**

1 4 5 2
A B C

MAP 0400 — Control Unit DC Power

C
I

DC POWER MAP

PAGE 2 OF 19

003

SET THE LOCAL REMOTE SWITCH TO THE LOCAL POSITION (LOC 1).

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).

REMOVE CU-PS-02 FUSE F2 AND CONTINUITY CHECK THE FUSE (LOC 1).

IS FUSE F2 BLOWN?
Y N

004

REINSTALL FUSE F2

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUB COVER.

ON THE DC POWER SUPPLY,
DISCONNECT THE CABLE
CU-PS-02 P2 (LOC 1).

ON THE AC POWER SUPPLY,
DISCONNECT THE CABLE
CU-PS-01 P3 (LOC 1).

CHECK FOR CONTINUITY FROM
CU-PS-01 P3-1 TO CU-PS-02 P2-1 AND FROM
CU-PS-01 P3-2 TO CU-PS-02 P2-2

DOES THE METER INDICATE CONTINUITY?
Y N

3
D E F

THE +24VDC IS MISSING. IT IS DEVELOPED IN CU-PS-01.

E F

005

THERE IS AN OPEN WIRE FROM
CU-PS-01 P3-1 TO CU-PS-02 P2-1

OR
CU-PS-01 P3-2 TO CU-PS-02 P2-2
(YF001)(YF002).

REPAIR THE OPEN CIRCUIT.

Go to Page 19, Step 132, Entry Point D.

006

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE ON POSITION (LOC 1).

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE ON POSITION (LOC 1).

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH FOR SEVERAL SECONDS AND THEN RELEASE IT.

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).

IS THE CONTROL UNIT POWER ON LED ON?
Y N

007
AC POWER FAILED TO COME UP.
Go To Map 0100, Entry Point B.

3
G

24VDC MISSING AT DC POWER SUPPLY.
SEE DETAILED DIAGRAM ON PWR 50.

MAP 0400 — Control Unit DC Power

MAP 0400 — Control Unit DC Power

D 2 G 2

DC POWER MAP

PAGE 3 OF 19

008

SET THE MULTIMETER TO MEASURE +24VDC.

MEASURE THE VOLTAGE BETWEEN CU-PS-01 J3-1(+) AND CU-PS-01 J3-2(-) (LOC 1).

SEE PWR20 FOR VOLTAGE TOLERANCES

DOES THE MULTIMETER INDICATE GREATER THAN +19VDC?
Y N

009

THE AC POWER SUPPLY, CU-PS-01, IS FAILING (LOC 1).
EXCHANGE FRU144

THE +24VDC IS MISSING.
SEE DETAILED DIAGRAM ON PWR 50.

Go to Page 19, Step 132, Entry Point D.

010

THE DC POWER SUPPLY, CU-PS-02, IS FAILING (LOC 1).
RECONNECT CABLE CU-PS-01-P3
EXCHANGE FRU145

THE +24VDC IS OK FROM CU-PS-01.
SEE DETAILED DIAGRAM ON PWR 50.

Go to Page 19, Step 132, Entry Point D.

011

EXCHANGE FUSE F2.

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE ON POSITION (LOC 1).

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE ON POSITION (LOC 1).

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH FOR SEVERAL SECONDS AND THEN RELEASE IT.

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).
(Step 011 continues)

(Step 011 continues)

IS THE CONTROL UNIT POWER ON LED ON?
Y N

012

AC POWER FAILED TO COME UP.

Go To Map 0100, Entry Point B.

013

IS LED 1 ON?
Y N

014

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

OVERLOAD CONDITION MAY BE CAUSED BY FRU126 OR FRU138.

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).

ON THE DC SUPPLY, REMOVE CU-PS-02 FUSE F2 AND CONTINUITY CHECK IT. INSTALL A GOOD FUSE F2.

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUB COVER.

DISCONNECT THE CABLE CU-PS-02 P4.
(Step 014 continues)

THIS ISOLATES THE LOAD FROM THE 24VDC SOURCE.

5 H

DC POWER MAP

PAGE 4 OF 19

(Step 014 continued)

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE ON POSITION (LOC 1).

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH FOR SEVERAL SECONDS AND THEN RELEASE IT.

OBSERVE THE LEDS ON THE DC TEST TOOL.

IS LED 1 ON ?
Y N

015

THE CONTROL UNIT DC POWER SUPPLY, CU-PS-02, IS FAILING.

LED 1 STILL OFF AFTER THE LOAD WAS REMOVED. SEE DETAILED DIAGRAM ON PWR 50.

EXCHANGE FRU145
Go to Page 19, Step 132, Entry Point D.

016

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

SEE IF OVERLOAD IS CAUSED BY FRU126.

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).

RECONNECT THE CABLE
CU-PS-02 P4 (LOC 1).

REMOVE THE POR CARD, 01A-A2H4 (LOC 1).

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE ON POSITION (LOC 1).

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH FOR SEVERAL SECONDS AND THEN RELEASE IT.
OBSERVE THE LEDS ON THE DC TEST TOOL.
(Step 016 continues)

(Step 016 continued)

IS LED 1 ON?
Y N

017

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

SEE IF OVERLOAD IS CAUSED BY FRU138.

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).

RECONNECT THE CABLE
CU-PS-02 P4 (LOC 1).

REMOVE THE REG CARD, 01A-A1T2 (LOC 1).

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE ON POSITION (LOC 1).

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH FOR SEVERAL SECONDS AND THEN RELEASE IT.
OBSERVE THE LEDS ON THE DC TEST TOOL.

IS LED 1 ON?
Y N

018

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).

EXCHANGE FUSE F2.

REPAIR CABLE BETWEEN LOGIC GATE TB3 AND 01A-A2H4 OR 01A-A1T2.

SEE DETAILED DIAGRAM ON PWR 50.

Go to Page 19, Step 131, Entry Point C.

5 5
J K

MAP 0400 — Control Unit DC Power

H J K
3 4 4

DC POWER MAP

PAGE 5 OF 19

019

THE REG CARD, 01A-A1T2, IS FAILING.

SET THE SERVICE SWITCH TO OFF (LOC 1).

EXCHANGE FRU138. SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

020

THE POR CARD, 01A-A2H4, IS FAILING.

SET THE SERVICE SWITCH TO OFF (LOC 1).

EXCHANGE FRU126. SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

021
IS LED 1 THE ONLY LED ON?
Y N

022
FUSE FIXED THE PROBLEM.

Go to Page 19, Step 132, Entry Point D.

023

Go to Step 024, Entry Point G.

B
1

024
(Entry Point G)
PRESS AND HOLD THE IML SWITCH (LOC 1).

OBSERVE THE LEDS ON THE DC TEST TOOL.

THE ONLINE/OFFLINE SWITCH MUST BE OFFLINE TO ENABLE IML.

LED	ON/OFF	VDC	FUSE/CB
1	ON	24CTL	F2
2	OFF		N/A
3	OFF		N/A
4	OFF		N/A
5	ON	+8.5	F1
6	ON	-5	CB4
7	ON	+5	CB2
8	ON	+5	CB3

DUE TO BACK CIRCUITS,LED 5 MAY GLOW WHEN FUSE 1 IS BLOWN. COMPARE INTENSITY WITH LED 1.

DOES THE CHART AND DC TEST TOOL AGREE?
Y N

025
IS LED 1 THE ONLY LED ON?
Y N

026

Go to Page 17, Step 104, Entry Point B.

027

RELEASE THE IML SWITCH.

+24VDC IS AVAILABLE, BUT ONE OR MORE OF THE THE DC VOLTAGES ARE NOT ON.

CHECK THE POSITION OF THE SERVICE SWITCH (LOC 1).

IS THE SERVICE SWITCH IN THE ON POSITION?
Y N

1
I 6 6
L M N

M 5 N 5

DC POWER MAP

PAGE 6 OF 19

028

SERVICE SWITCH LEFT IN THE OFF POSITION

SET SERVICE SWITCH TO THE ON POSITION.

Go to Page 19, Step 132, Entry Point D.

029

CAUTION

IF THE CONTROL UNIT GATE UPPER THERMAL IS TRIPPED, RESETTING IT WILL CAUSE DC POWER TO TURN ON.

RESET THE CONTROL UNIT GATE UPPER THERMAL (LOC 1).

IS THE CONTROL UNIT DC POWER LED ON?
Y N

030

CHECK THE VOLTAGE TAP PLUG(S) FOR PROPER INSTALLATION (LOC 1).

SEE THE CHART ON THE RIGHT.----->

CU INPUT AC	PLUG LOCATION: CU-PS-02 (50HZ AND 60HZ)	PLUG LOCATION: CU-PS-01 (50HZ ONLY EX. JAPAN)
200/208 VAC	J13	J9
220 VAC	J14	J9
230/240 VAC	J15	J9
380 VAC	J14	J10
400/415 VAC	J15	J10

IS THE VOLTAGE TAP PLUG(S) PROPERLY CONNECTED?
Y N

1 1 P Q R

Q R

031

SET CU-PS-02 CB1 TO THE OFF POSITION (LOC 1).

CONNECT THE VOLTAGE TAP PLUG(S) AS SHOWN IN THE CHART AT RIGHT.

CU INPUT AC	PLUG LOCATION: CU-PS-02 (50HZ AND 60HZ)	PLUG LOCATION: CU-PS-01 (50HZ ONLY EX. JAPAN)
200/208 VAC	J13	J9
220 VAC	J14	J9
230/240 VAC	J15	J9
380 VAC	J14	J10
400/415 VAC	J15	J10

Go to Page 19, Step 131, Entry Point C.

032

OBSERVE THE CONTROL UNIT GATE FANS (LOC 1).

ARE THE FANS RUNNING?
Y N

033

OBSERVE CU-PS-02 CB1 (LOC 1).

THE AC CIRCUIT IS FAILING.

IS CB1 TRIPPED?
Y N

034

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

(Step 034 continues)

9 8 S T

MAP 0400 — Control Unit DC Power

DC POWER MAP

PAGE 7 OF 19

(Step 034 continued)

DISCONNECT THE VOLTAGE TAP PLUG(S) AS SHOWN IN THE CHART ON THE RIGHT.

CONTINUITY CHECK THE JUMPER PLUG(S).

CU INPUT AC	PLUG LOCATION: CU-PS-02 (50HZ AND 60HZ)	PLUG LOCATION: CU-PS-01 (50HZ ONLY EX. JAPAN)
200/208 VAC	J13	J9
220 VAC	J14	J9
230/240 VAC	J15	J9
380 VAC	J14	J10
400/415 VAC	J15	J10

DOES THE METER INDICATE CONTINUITY?
Y N

035
REPAIR THE VOLTAGE TAP PLUG.

Go to Page 19, Step 131, Entry Point C.

036

ON THE AC SUPPLY,
DISCONNECT THE CABLE
CU-PS-01 P2 (LOC 1).

ON THE DC SUPPLY,
DISCONNECT THE CABLE
CU-PS-02 P1 (LOC 1).

CHECK FOR CONTINUITY FROM
CU-PS-01 P2-1 TO CU-PS-02 P1-1 AND FROM CU-PS-01 P2-3 TO CU-PS-02 P1-3.

DOES THE METER INDICATE CONTINUITY?
Y N

U V

CHECK AC CABLE BETWEEN AC PS AND DC PS

U V

037

THERE IS AN OPEN WIRE FROM
CU-PS-01 P2-1 TO CU-PS-02 P1-1
(YF001)(YF002)

OR

CU-PS-01 P2-3 TO CU-PS-02 P1-3.

REPAIR OPEN IN CABLE.

Go to Page 19, Step 131, Entry Point C.

038

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE ON POSITION (LOC 1).

PRESS AND HOLD THE LOCAL POWER ENABLE SWITCH FOR SEVERAL SECONDS AND THEN RELEASE IT.

OBSERVE THE CONTROL UNIT POWER ON LED (LOC 1).

IS THE CONTROL UNIT POWER ON LED ON?
Y N

039
AC POWER FAILED TO COME UP.
Go To Map 0100, Entry Point A.

8 W

SEE DETAILED DIAGRAM ON PWR 50.

MAP 0400 — Control Unit DC Power

T W
6 7

DC POWER MAP

PAGE 8 OF 19

040
SET THE MULTIMETER TO MEASURE 220VAC.

MEASURE OUTPUT OF THE AC PS.

DANGER
HIGH VOLTAGE IS PRESENT.

MEASURE THE VOLTAGE BETWEEN CU-PS-01 J2-1 AND J2-3.

IS THE VOLTAGE BETWEEN 180VAC AND 240VAC?
Y N

041

THE CONTROL UNIT AC POWER SUPPLY, CU-PS-01, IS FAILING.

EXCHANGE FRU144

SEE CARR-CU 1440.

Go to Page 19, Step 132, Entry Point D.

042
THE CONTROL UNIT DC POWER SUPPLY, CU-PS-02, IS FAILING.

EXCHANGE FRU145

SEE CARR-CU 1450.

Go to Page 19, Step 132, Entry Point D.

043
RESET CB1.

PRESS AND HOLD THE IML SWITCH (LOC 1).
RELEASE THE IML SWITCH.

DID CB1 TRIP AGAIN?
Y N

X Y

X Y

044
RESETTING CB1 CORRECTED THE PROBLEM.

Go to Page 19, Step 132, Entry Point D.

045

DISCONNECT THE CONTROL UNIT GATE FAN 1 (LOC 1).

SEE CARR-CU 1500.

RESET CB1.

THE AC FOR THE GATE FANS GO THROUGH CU-PS-02 CB1.
SEE OVERVIEW DIAGRAM ON PWR 34.

DID CB1 TRIP ?
Y N

046

THE CONTROL UNIT GATE FAN 1 IS FAILING.

EXCHANGE FRU150.

SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

047

DISCONNECT THE CONTROL UNIT GATE FAN 2 (LOC 1).

SEE CARR-CU 1500.

RESET CB1.

DID CB1 TRIP ?
Y N

048

THE CONTROL UNIT GATE FAN 2 IS FAILING.

EXCHANGE FRU150.

SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

9
Z

MAP 0400 — Control Unit DC Power

S Z
6 8

DC POWER MAP

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049
THE CONTROL UNIT DC POWER SUPPLY, CU-PS-02, IS FAILING.

EXCHANGE FRU145.

SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

050

CONNECT METER TO MEASURE
+24VDC BETWEEN 01A-A2H4 J06(+)
AND 01A-A2H4 D08(-) (LOC 1).

+24VDC AND AC IS AVAILABLE TO THE DC SUPPLY, BUT THE DC VOLTAGES ARE NOT ON.
THIS SECTION CHECKS THE DC TURN ON CIRCUITS.

SEE DETAILED DIAGRAM ON PWR 50.

THE +24 VDC CHECKS THAT FOLLOW ARE NOT INTENDED TO BE TOLERANCE CHECKS BUT AS CHECKPOINTS FOR PROBLEM ANALYSIS. YOU WILL FIND TOLERANCE TABLES ON PWR20.

DID THE METER READ GREATER THAN +18VDC ?
Y N

051

ON THE CONTROL UNIT GATE, METER TB3-12 (+) TO TB3-10 (-) FOR +24VDC (LOC 1).

THE +24VDC IS MISSING AT THE POR CARD.

DID THE METER READ GREATER THAN +19VDC ?
Y N

1 A A
0 A B
A A C

A A
B C

052
SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

DISCONNECT THE CABLE
CU-PS-02 P4 (LOC 1).

CHECK FOR CONTINUITY FROM
CU-PS-02 P4-7 TO 01A-TB3-12 AND FROM CU-PS-02 P4-8 TO 01A-TB3-10

DOES THE METER INDICATE CONTINUITY?
Y N

053
REPAIR CABLE FROM CU-PS-02 P4 TO 01A-TB3

THE +24VDC IS MISSING AT TB3.

SEE DETAILED DIAGRAM ON PWR 50.

Go to Page 19, Step 131, Entry Point C.

054
THE CONTROL UNIT DC POWER SUPPLY, CU-PS-02, IS FAILING.

EXCHANGE FRU145.

SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

055

ON THE CONTROL UNIT GATE, METER TB3-13 (+) TO TB3-10 (-) FOR 24 VDC (LOC 1).

DID THE METER READ GREATER THAN +19VDC ?
Y N

1 1
0 0
A A
D E

AA9 AD9 AE9

DC POWER MAP

PAGE 10 OF 19

056

THE CONTROL UNIT GATE UPPER THERMAL IS FAILING.

OR

THE SERVICE SWITCH IS FAILING.

USING THE DIAGRAM ON PWR 50, ISOLATE TO THE FAILING COMPONENT. THEN.....

EXCHANGE FAILING COMPONENT.

Go to Page 19, Step 131, Entry Point C.

057

THERE IS AN OPEN WIRE FROM 01A-TB3-13 TO 01A-A2H4 J06.

SEE ALD ZT020.

REPAIR OPEN IN CABLE.

Go to Page 19, Step 131, Entry Point C.

058

ON THE DC POWER SUPPLY, SET CU-PS-02 CB1 TO OFF.

THE 24VDC IS OK TO THE POR CARD.

DISCONNECT THE CABLE CU-PS-02 P4 (LOC 1).

INSTALL A JUMPER FROM CU-PS-02 J4-8 TO J4-9 (LOC 1).

THIS JUMPER BYPASSES THE TURN ON CIRCUITRY.

SET CU-PS-02 CB1 TO ON.

OBSERVE THE LEDS ON THE DC TEST TOOL.
(Step 058 continues)

(Step 058 continued)

IS LED 1 ONLY LED ON?
Y N

059

REMOVE JUMPER FROM CU-PS-02 J4-8 TO J4-9 (LOC 1).

CHECK FOR CONTINUITY FROM CU-PS-02 P4-9 TO 01A-A2H4 D13.

DOES THE METER INDICATE CONTINUITY?
Y N

060

THERE IS AN OPEN WIRE FROM CU-PS-02 P4-9 TO 01A-TB3-11.

SEE ALD ZT020

-----OR-----

THERE IS AN OPEN WIRE FROM O1A-TB3-11 TO 01A-A2H4 D13.

REPAIR OPEN IN CABLE.

Go to Page 19, Step 131, Entry Point C.

061

THE POR CARD, 01A-A2H4, IS FAILING.

THE DC SUPPLY TURNS ON OK WITH THE BYPASS JUMPER. THE 24VDC TO THE POR CARD AND THE 'PICK POWER ON CONTACTOR' NET FROM THE POR CARD ARE OK.

EXCHANGE FRU126

SEE CARR-CU 1-1

Go to Page 19, Step 132, Entry Point D.

11AF

MAP 0400 — Control Unit DC Power PWR 400-11

P 6 A F 1 0

DC POWER MAP

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062

THE CONTROL UNIT DC POWER SUPPLY, CU-PS-02, IS FAILING.

EXCHANGE FRU145.

Go to Page 19, Step 132, Entry Point D.

063

CHECK THE CONTROL UNIT GATE FANS FOR PROPER OPERATION (LOC 1).

ARE THE FANS OPERATING CORRECTLY?
Y N

064

ARE BOTH FANS FAILING?
Y N

065

THE CONTROL UNIT GATE FAN IS FAILING.

EXCHANGE THE FAILING GATE FAN (FRU150).

SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

A G A H

L 5 A G A H

066

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

ON THE AC SUPPLY, SET CIRCUIT BREAKER CU-PS-01 CB1 TO THE OFF POSITION (LOC 1).

THERE IS AN OPEN WIRE FROM
CU1A P1-1 TO CU-PS-02 P3-1 (YF005)(LOC 1)

---OR---

THERE IS AN OPEN WIRE FROM
CU1A P1-3 TO CU-PS-02 P3-3 (LOC19)

REPAIR THE OPEN CIRCUIT.

Go to Page 19, Step 132, Entry Point D.

067

CHECK FOR ANY OBSTRUCTION TO THE AIR FLOW.

Go to Page 19, Step 132, Entry Point D.

068

RELEASE THE IML SWITCH.

OBSERVE THE LEDS ON THE DC TEST TOOL.

LED	ON/OFF	VDC	FUSE/CB
1	ON	24CTL	F2
2	OFF		N/A
3	OFF		N/A
4	OFF		N/A
5	ON	+8.5	F1
6	ON	-5	CB4
7	ON	+5	CB2
8	ON	+5	CB3

(Step 068 continues)

DC POWER MAP

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(Step 068 continued)

DOES THE CHART AND DC TEST TOOL AGREE?
Y N

069

IS EC A06011 INSTALLED ON THIS CONTROL UNIT?
Y N

070

Go to Step 073, Entry Point E.

071

CONNECT METER TO MEASURE
+1.7VDC BETWEEN 01A-A1T2 B03(+)
AND 01A-A1T2 D08(-).

OBSERVE THE METER WHILE PRESSING THE IML SWITCH.

DID THE METER READ ABOVE +1.6VDC?
Y N

072

MISSING 1.7 VDC AT THE POR CARD.
Go To Map 410, Entry Point B.

CHECK MACHINE HISTORY

CHECK FOR MISSING VOLTAGE AT THE REGULATOR CARD.

14 AJ

A K

A K

073

(Entry Point E)

CONNECT METER TO MEASURE
+1.7VDC BETWEEN 01A-A2H4 G11(+)
AND 01A-A2H4 D08(-).

OBSERVE THE METER WHILE PRESSING THE IML SWITCH.

DID THE METER READ ABOVE +1.6VDC?
Y N

074

THE 1.7VDC NET IS OPEN.

LOCATE AND REPAIR THE OPEN.

REFERENCE LOGIC PAGE RG001.

Go to Page 19, Step 131, Entry Point C.

CHECK FOR MISSING VOLTAGE AT POR CARD.

075

CONNECT METER TO MEASURE
-5VDC BETWEEN 01A-A2H4 D08(+)
AND 01A-A2H4 B06(-).

OBSERVE THE METER WHILE PRESSING THE IML SWITCH.

DID THE METER READ BETWEEN -4.5VDC AND -5.5VDC?
Y N

MISSING VOLTAGE AT POR CARD OR DEFECTIVE CARD.

13 AL

13 AM

A A
L M
1 1
2 2

DC POWER MAP

PAGE 13 OF 19

076

DID THE METER READ GREATER THAN 0V?
Y N

077

THE -5VDC NET IS OPEN.

REFERENCE ALDS YF002 AND ZT020.

SEE DETAILED DIAGRAM ON PWR 50.

REPAIR OPEN IN THE -5VDC NET

Go to Page 19, Step 131, Entry Point C.

078

THE DC POWER SUPPLY, CU-PS-02, IS FAILING.

EXCHANGE FRU145.

SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

079

CONNECT METER TO MEASURE
+5VDC BETWEEN 01A-A2H4 D02(+)
AND 01A-A2H4 D08(-).

OBSERVE METER WHILE PRESSING THE IML SWITCH.

DID THE METER READ +5VDC?
Y N

A A
N P

A A
N P

080

THE 01A-A1 +5V NET IS OPEN.

REFERENCE ALDS YF002 AND ZT010.

SEE DETAILED DIAGRAM ON PWR 50.

REPAIR OPEN IN THE +5VDC NET

Go to Page 19, Step 131, Entry Point C.

081

CONNECT METER TO MEASURE
+5VDC BETWEEN 01A-A2H4 D03(+)
AND 01A-A2H4 D08(-).

OBSERVE THE METER WHILE PRESSING THE IML SWITCH.

DID THE METER READ +5VDC?
Y N

082

THE 01A-A2 +5V NET IS OPEN.

REFERENCE ALDS YF002 AND ZT011.

SEE DETAILED DIAGRAM ON PWR 50.

REPAIR OPEN IN THE +5VDC NET

Go to Page 19, Step 131, Entry Point C.

1
4
A
Q

A013

DC POWER MAP

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083

CONNECT METER TO MEASURE
+8.5VDC BETWEEN 01A-A2H4 B11(+)
AND 01A-A2H4 D08(-).

OBSERVE THE METER WHILE PRESSING THE IML SWITCH.

DID THE METER READ +8.5VDC?
Y N

084

THE +8.5VDC NET IS OPEN. REFERENCE ALDS YF002 AND ZT020.

SEE DETAILED DIAGRAM ON PWR 50.

REPAIR OPEN IN THE +8.5VDC NET

Go to Page 19, Step 131, Entry Point C.

085

CONNECT METER TO MEASURE
+24VDC BETWEEN 01A-A2H4 J06(+)
AND 01A-A2H4 D08(-).

OBSERVE THE METER WHILE PRESSING THE IML SWITCH.

DID THE METER READ +24VDC?
Y N

AARS

AA1J12

AARS

086

THE +24VDC NET IS OPEN. REFERENCE ALDS YF002 AND ZT020.

SEE DETAILED DIAGRAM ON PWR 50.

REPAIR OPEN IN +24VDC NET.

Go to Page 19, Step 131, Entry Point C.

087

SET THE SERVICE SWITCH TO OFF (LOC 1).

THE POR CARD, 01A-A2H4, IS FAILING.

EXCHANGE FRU126. SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

088

SUSPECT INTERMITTENT PROBLEM ON THE POR CARD.

EXCHANGE FRU126. SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

089

CONNECT METER TO MEASURE
+5VDC BETWEEN 01A-A2H4 J11(+)
AND 01A-A2H4 D08(-).

THE DC LED IS OFF BUT ALL THE VOLTAGES APPEAR TO BE OK. THE LED OR THE POR CARD IS FAILING OR GROUNDED.

DID THE METER READ BETWEEN +4VDC AND +5VDC ?
Y N

15AT

15AU

A
U
1
4

DC POWER MAP

PAGE 15 OF 19

090

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

CHECK FOR CONTINUITY FROM
01A-A2H4 J11 TO 01A-A2 H4 D08.

DOES THE METER INDICATE CONTINUITY?
Y N

091

SET THE SERVICE SWITCH TO OFF (LOC 1).

THE POR CARD, 01A-A2H4, IS FAILING.
EXCHANGE FRU126.

SEE CARR-CU 1.

Go to Page 19, Step 132, Entry Point D.

092

SET THE SERVICE SWITCH TO OFF (LOC 1).

REMOVE THE POR CARD AT 01A-A2H4.

CHECK FOR CONTINUITY FROM
01A-A2H4 J11 TO 01A-A2 H4 D08.

DOES THE METER INDICATE CONTINUITY?
Y N

093

THE POR CARD, 01A-A2H4, IS FAILING.

EXCHANGE FRU126.

SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

A
V

A A
T V
1
4

094

DISCONNECT THE CABLE
CU-OSU P1 (LOC 1).

CHECK FOR CONTINUITY FROM
01A-A2H4 J11 TO 01A-A2 H4 D08.

DOES THE METER INDICATE CONTINUITY?
Y N

095

THE CU-OSU BOARD IS FAILING.

EXCHANGE FRU141.

SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

096

THE '+DC POWER ON' NET IS SHORT CIRCUITED TO GROUND.

SEE DETAILED DIAGRAM ON PWR 50.

REPAIR SHORT TO GROUND.

Go to Page 19, Step 131, Entry Point C.

097

CONNECT METER TO MEASURE
+8.5VDC BETWEEN 01A-A2H4 B04(+)
AND 01A-A2H4 D08(-).

DID THE METER READ BETWEEN +5VDC AND +10VDC ?
Y N

1 1
6 6
A A
W X

MAP 0400 — Control Unit DC Power

A
X
1
5

DC POWER MAP

PAGE 16 OF 19

098

CONNECT METER TO MEASURE
+5VDC BETWEEN 01A-A2H4 D10(+)
AND 01A-A2H4 D08(-).

DID THE METER READ BETWEEN +1VDC AND +5VDC ?

Y N

099

THE POR CARD, 01A-A2H4, IS FAILING.

EXCHANGE FRU126. SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

100

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

DISCONNECT THE CABLE
CU-OSU P1 (LOC 1).

CHECK FOR CONTINUITY FROM
01A-A2H4 D10 TO CU-OSU P1-2.

DOES THE METER INDICATE CONTINUITY?

Y N

101

THE '+DC POWER ON' NET IS OPEN.

SEE DETAILED DIAGRAM ON PWR 50.

REPAIR OPEN IN NET.

Go to Page 19, Step 131, Entry Point C.

A
Y

A A
W Y
1
5

102

(THE DC POWER LED IS FAILING.)

EXCHANGE FRU141. SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

103

SET THE SERVICE SWITCH TO OFF (LOC 1).

THE POR CARD, 01A-A2H4, IS FAILING.

EXCHANGE FRU126. SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

DC POWER MAP

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104
(Entry Point B)
IS LED 5 OFF OR DIM?
Y N

DUE TO BACK CIRCUITS,LED 5 MAY GLOW WHEN FUSE 1 IS BLOWN. COMPARE INTENSITY WITH LED 1.

105
IS LED 6 OFF?
Y N

106
IS LED 7 OFF?
Y N

107
IS LED 8 OFF?
Y N

108
RELEASE THE IML SWITCH.

IS LED 1 THE ONLY LED ON?
Y N

109

Go to Page 19, Step 132, Entry Point D.

110

SET THE SERVICE SWITCH TO OFF (LOC 1).

THE POR CARD, 01A-A2H4, IS FAILING.

EXCHANGE FRU126.

SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

111
IS CB3 TRIPPED?
Y N

1 8 A Z
1 8 B A
B B
B C
B D

B B B
B C D

112

EXCHANGE FRU145

SEE CARR-CU 1-1

Go to Page 19, Step 132, Entry Point D.

113

RESET CB3.

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB3 TRIP AGAIN?
Y N

114
RESETTING CB3 CORRECTED THE PROBLEM.

Go to Page 19, Step 132, Entry Point D.

115

ISOLATE CAUSE FOR CB3 TRIPPING.

Go To Map 420, Entry Point B.

116
IS CB2 TRIPPED?
Y N

117

EXCHANGE FRU145.

SEE CARR-CU 1-1.

Go to Page 19, Step 132, Entry Point D.

1 8 B E

B A 1 7 B E 1 7

DC POWER MAP

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118

RESET CB2.

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB2 TRIP AGAIN?
Y N

119
RESETTING CB2 CORRECTED THE PROBLEM.

Go to Page 19, Step 132, Entry Point D.

120

ISOLATE CAUSE OF CB2 TRIPPING.

Go To Map 420, Entry Point A.

121
IS CB4 TRIPPED?
Y N

122

EXCHANGE FRU145.
Go to Page 19, Step 132, Entry Point D.

SEE CARR-CU 1-1.

B F

A Z 1 7 B F

123

RESET CB4.

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB4 TRIP AGAIN?
Y N

124
RESETTING CB4 CORRECTED THE PROBLEM.

Go to Page 19, Step 132, Entry Point D.

125

ISOLATE CAUSE FOR CB4 TRIPPING.

Go To Map 430, Entry Point A.

126

CHECK CU-PS-02 FUSE F1.

IS FUSE F1 BLOWN?
Y N

127

THE 8.5 LED IS OFF AND FUSE F1 IS OK.

EXCHANGE FRU145.

Go to Page 19, Step 132, Entry Point D.

SEE CARR-CU 1-1.

1 9 B G

MAP 0400 — Control Unit DC Power

BG18

DC POWER MAP

PAGE 19 OF 19

128

EXCHANGE FUSE F1.

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID FUSE F1 BLOW AGAIN.
Y N

129
EXCHANGING FUSE F1 CORRECTED PROBLEM.

Go to Step 132, Entry Point D.

130

ISOLATE CAUSE OF F1 BLOWING.

Go To Map 440, Entry Point A.

131
(Entry Point C)
CLEANUP AFTER REPAIR.

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

RECONNECT ANY CABLES REMOVED FOR TROUBLESHOOTING.

REPLACE ANY FUSES REMOVED FOR TROUBLESHOOTING.

RESET ANY CB TRIPPED FOR TROUBLESHOOTING.

REMOVE ANY JUMPERS USED FOR TROUBLESHOOTING.

Go To Map 0190, Entry Point A.

132
(Entry Point D)
RETURN AFTER REPAIR.

IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD, REIPL THE MD AND THEN SELECT THE UNIT TEST OPTION.

IF YOU ENTERED THIS MAP FROM THE START SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

Map 0400 Control Unit DC Power

Notes

Map 0400 Control Unit DC Power

+1.7VDC REGULATOR

PAGE 1 OF 4

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0100	A	1	001
0100	B	2	010
0411	C	3	017
0411	D	4	018

001
(Entry Point A)

MAP DESCRIPTION: MAP 0100 DIRECTED YOU TO THIS MAP TO ISOLATE A FAILURE OF THE ON BOARD REGULATOR CARD, 01A-A1T2 .

START CONDITIONS:
-POWER ON LED ON
-AN 01A-A1T2 LED ON OR
 MISSING VOTAGE.

FRUS DIAGNOSED:
-REGULATOR CARD, 01A-A1T2
-REGULATOR CARD,
 01A-A1T2 FUSES.

ADDITIONAL SERVICE AIDS:
-CONTROL UNIT DC POWER
 DISTRIBUTION DIAGRAM
 ON PWR 34.
SEE LOC 1.

RESET THE VOLTAGE REGULATOR BY SETTING THE CONTROL UNIT SERVICE SWITCH TO OFF FOR FIVE SECONDS AND THEN BY SETTING THE CONTROL UNIT SERVICE SWITCH TO ON.

OBSERVE THE LEDS LOCATED ON THE CU REGULATOR CARD, 01A-A1T2.
(Step 001 continues)

(Step 001 continued)

ARE ANY LEDS ON?
Y N

002
RECYCLING POWER CORRECTED THE PROBLEM.

SUSPECT AN INTERMITTENT REGULATOR CARD
Go to Page 3, Step 017, Entry Point C.

003

MEASURE +24VDC BETWEEN
01A-A1T2 S06(+) AND 01A-A1T2 D08 (-).

USE ALD RG001 AS A REFERENCE.

+24VDC GOOD?
Y N

004

OPEN CIRCUIT BETWEEN 01A-A1T2 S06 AND 01A TB3-13.

REPAIR OPEN CKT.
Go to Page 4, Step 018, Entry Point D.

USE ALD RG001 AS A REFERENCE.

005

SET THE SERVICE SWITCH TO OFF (LOC 1).

REMOVE CARD 01A-A1T2 FROM THE GATE.

CHECK THE +24VDC FUSE ON THE REGULATOR CARD.

24VDC FUSE IS THE LOWER FUSE (F1).

NOTE: SOME MODELS OF THE REGULATOR CARD DO NOT HAVE AN F1 FUSE. IF FUSE F1 IS NOT PRESENT ON THE CARD YOU JUST REMOVED, ANSWER *YES* TO THE FOLLOWING QUESTION.
(Step 005 continues)

+1.7VDC REGULATOR

PAGE 2 OF 4

(Step 005 continued)

IS THE FUSE GOOD?
Y N

006
EXCHANGE +24VDC FUSE ON CARD 01A-A1T2.

REINSTALL CARD 01A-A1T2.

SET THE SERVICE SWITCH TO ON (LOC 1).

OBSERVE THE LEDS ON THE REGULATOR CARD.

ARE THE LEDS OFF?
Y N

007

Go to Page 3, Step 017, Entry Point C.

008
EXCHANGING FUSE CORRECTED PROBLEM.
Go to Page 4, Step 018, Entry Point D.

009

Go to Page 3, Step 017, Entry Point C.

010
(Entry Point B)
CHECK +5VDC INPUT TO THE REGULATOR CARD.

CONNECT METER TO MEASURE
+5VDC BETWEEN 01A-A1T2 D03(+)
AND 01A-A1T2 D08(-).

OBSERVE THE METER WHILE PRESSING THE IML SWITCH.

IS +5VDC INPUT VOLTAGE MISSING?
Y N

011

SET THE SERVICE SWITCH TO OFF (LOC 1).

REMOVE CARD 01A-A1T2 FROM THE GATE.

CHECK THE +5VDC FUSE.

+5VDC FUSE IS THE UPPER FUSE (F2).

NOTE: SOME MODELS OF THE REGULATOR CARD DO NOT HAVE AN F2 FUSE. IF FUSE F2 IS NOT PRESENT ON THE CARD YOU JUST REMOVED, ANSWER *YES* TO THE FOLLOWING QUESTION.

IS THE FUSE OKAY?
Y N

3A 3B 3C

A 2 B 2 C 2 **+1.7VDC REGULATOR**

PAGE 3 OF 4

012
EXCHANGE FUSE ON CARD 01A-A1T2.

REINSTALL CARD 01A-A1T2.

SET THE SERVICE SWITCH TO ON (LOC 1).

MEASURE REGULATOR +1.7VDC OUTPUT.
01A-A1T2 B03(+) TO 01A-A1T2 D08(-).

IS THE 1.7VDC MISSING?
Y N

013
EXCHANGING FUSE CORRECTED PROBLEM.
Go to Page 4, Step 018, Entry Point D.

014

Go to Step 017, Entry Point C.

015

Go to Step 017, Entry Point C.

016

SET THE SERVICE SWITCH TO OFF (LOC 1).

EXCHANGE BOARD 01AA1 (FRU139).
Go to Page 4, Step 018, Entry Point D.

SEE CARR-CU 1-1)

017
(Entry Point C)
REGULATOR CARD FAILURE.
EXCHANGE 01A-A1T2 (FRU138).

SEE CARR-CU 1-1

IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD, REIPL THE MD AND THEN SELECT THE UNIT TEST OPTION

IF YOU ENTERED THIS MAP FROM ANY SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

Map 0410 — +1.7 Volt DC Regulator

+1.7VDC REGULATOR

PAGE 4 OF 4

018
(Entry Point D)
IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD, REIPL THE MD AND THEN SELECT THE UNIT TEST OPTION

IF YOU ENTERED THIS MAP FROM ANY SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

Map 0410 — +1.7 Volt DC Regulator

CONTROL UNIT +5 VOLT CB TRIPPED

PAGE 1 OF 8

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0400	A	1	001
0400	B	6	020
0421	D	8	028
0421	E	8	027

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
8	027	0190	A

001
(ENTRY POINT A)

MAP DESCRIPTION: MAP 0400 DIRECTED YOU TO THIS MAP BECAUSE CB2 WILL NOT STAY RESET.

THERE IS AN OVERLOAD ON THE +5 V CIRCUIT TO THE 01A-A1 LOGIC BOARD.

THIS SECTION ISOLATES THE SHORT CIRCUIT.

SEE DETAILED DIAGRAM ON PWR 42.

REMOVE THE +8.5 VDC FUSE, CU-PS-02 F1.

REMOVING THE FUSE PREVENTS THE DC POWER FROM HOLDING DURING THIS SECTION.

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUB COVER.

DISCONNECT THE FOLLOWING CONNECTORS (LOC 1):
CU-PS-02 P5, IF INSTALLED.
CU-PS-02 P6, IF INSTALLED.
CU-PS-02 P7, IF INSTALLED.
CU-PS-02 P8, IF INSTALLED.

THESE CABLES DISTRIBUTE POWER TO THE BUS AND TAG CARDS.

RESET CB2 (LOC 1).
(Step 001 continues)

(Step 001 continued)

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.
(THE DC POWER WILL GO OFF BECAUSE F1 FUSE IS REMOVED.)

DID CB2 TRIP?
Y N

002

RECONNECT THE CONNECTORS P5 THROUGH P8, ONE AT A TIME. EACH TIME A CONNECTOR IS REINSTALLED, PRESS AND HOLD THE IML SWITCH AND CHECK IF CB2 TRIPS. REPEAT THIS STEP UNTIL CB2 TRIPS.

DID CB2 TRIP?
Y N

003

THE TROUBLE HAS DISAPPEARED.

INSPECT THE CABLES JUST INSTALLED FOR CHAFING.
REPAIR THE CABLES IF NECESSARY.

REINSTALL FUSE F1.

GO TO PAGE 8, STEP 027, ENTRY POINT E.

2 2
A B

0 0 0 0 0 0 0 0 0 0

B
1

+5 VOLT CB TRIPPED

PAGE 2 OF 8

004

THE LAST CABLE INSTALLED IS CAUSING THE CB TO TRIP.

SEE THE CHART ON THE RIGHT AND DISCONNECT THE TAG CARD CONNECTOR 01A-T1 XX P5 (LOC 1).

LAST CABLE INSTALLED	DISCONNECT TAG CARD CONNECTOR
P5 (CHANNEL A)	01A-T1A3 P5
P6 (CHANNEL B)	01A-T1B3 P5
P7 (CHANNEL C)	01A-T1C3 P5
P8 (CHANNEL D)	01A-T1D3 P5

RESET CB2.

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB2 TRIP?
Y N

005

REINSTALL FUSE F1.

EXCHANGE THE FAILING TAG CARD (LOC 1).
SEE THE CHART ON THE RIGHT.

LAST CABLE INSTALLED	FAILING TAG CARD
P5 (CHANNEL A)	01A-T1A3 (FRU137)
P6 (CHANNEL B)	01A-T1B3 (FRU234)
P7 (CHANNEL C)	01A-T1C3 (FRU236)
P8 (CHANNEL D)	01A-T1D3 (FRU238)

GO TO PAGE 8, STEP 028, ENTRY POINT D.

C

A C
1

006

REINSTALL FUSE F1.

EXCHANGE THE FAILING BUS CARD (LOC 1).
SEE THE CHART ON THE RIGHT.

GO TO PAGE 8, STEP 028, ENTRY POINT D.

LAST CABLE INSTALLED	FAILING BUS CARD
P5 (CHANNEL A)	01A-T1A1 (FRU136)
P6 (CHANNEL B)	01A-T1B1 (FRU233)
P7 (CHANNEL C)	01A-T1C1 (FRU235)
P8 (CHANNEL D)	01A-T1D1 (FRU237)

007

RECONNECT THE FOLLOWING CONNECTORS (LOC 1):
CU-PS-02 P5, IF INSTALLED.
CU-PS-02 P6, IF INSTALLED.
CU-PS-02 P7, IF INSTALLED.
CU-PS-02 P8, IF INSTALLED.

DISCONNECT THE CABLE CU-PS-02 P9 (LOC 1).

RESET CB2.

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB2 TRIP?
Y N

5 3
D E

0 0 0 0 0 0 0 0 0 0

E +5 VOLT CB TRIPPED
2

PAGE 3 OF 8

008

RECONNECT THE CABLE
CU-PS-02 P9 (LOC 1).

SET THE SERVICE SWITCH TO OFF
(LOC 1).

DISCONNECT THE 01A-A1 +5 V BUS
CABLES FROM 01A-A1 Y2 AND Y5
(LOC 1).
(SEE ALD PAGE YZ002).

SET THE SERVICE SWITCH TO ON
(LOC 1).

PRESS AND HOLD THE IML SWITCH
(LOC 1).

RELEASE THE IML SWITCH.

DID CB2 TRIP?
Y N

009

SET THE SERVICE SWITCH TO OFF
(LOC 1).

THIS REMOVES THE +24 VDC FROM THE LOGIC BOARDS.

RECONNECT 01A-A1 Y2 AND Y5
(YZ002) (LOC 1).

REMOVE ALL CARDS FROM THE 01A-A1
BOARD (LOC 1)
(SEE ALD PAGE AA000).

SET THE SERVICE SWITCH TO ON
(LOC 1).

PRESS AND HOLD THE IML SWITCH
(LOC 1).
(Step 009 continues)

4
F

(Step 009 continued)

RELEASE THE IML SWITCH.

DID CB2 TRIP?
Y N

010

SET THE SERVICE SWITCH TO OFF
(LOC 1).
REINSTALL THE CARDS, ONE AT A
TIME. DO NOT INSTALL THE TOP
CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED:
- SET THE SERVICE SWITCH TO ON.
- PRESS AND HOLD THE IML
  SWITCH FOR SEVERAL SECONDS.
- SET THE SERVICE SWITCH TO OFF.
- CHECK IF CB2 IS TRIPPED.

REPEAT THIS STEP UNTIL THE
FAILING CARD IS LOCATED.
THEN.....

REINSTALL FUSE F1.

EXCHANGE THE FAILING CARD.

GO TO PAGE 8, STEP 028,
ENTRY POINT D.

A LOGIC CARD IS CAUSING THE CB TO TRIP.

4
G

0 0 0 0 0 0 0 0 0 0

F G 3 3 +5 VOLT CB TRIPPED

PAGE 4 OF 8

011

THE 01A-A1 BOARD IS FAILING.

REINSTALL FUSE F1.

EXCHANGE FRU139. SEE CARR-CU 1-1.

GO TO PAGE 8, STEP 028,
ENTRY POINT D.

012

IF EC A57689 IS INSTALLED, A RESISTIVE PRELOAD IS REQUIRED TO MAINTAIN POWER SUPPLY REGULATION. SEE CARR-CU 4.

IS EC A57689 INSTALLED?
Y N

013

THERE IS A SHORT CIRCUIT FROM CU-PS-02 P9-1 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT CIRCUIT USING PWR 42 AS A TROUBLESHOOTING AID.

GO TO PAGE 8, STEP 027,
ENTRY POINT E.

H

H

014

IF EC A46536 IS INSTALLED, THE RESISTIVE PRELOAD CHANGES FROM A LOAD BOX MOUNTED TO THE FRAME TO A LOAD CARD LOCATED AT CARD SLOT A2P2. SEE CARR-CU 4.

IS EC A46536 INSTALLED?
Y N

015

SET THE SERVICE SWITCH TO OFF (LOC 1).

RECONNECT 01A-A1 Y2 AND Y5 (YZ002) (LOC 1).

DISCONNECT THE LOAD BOX +5 V CABLE FROM TB1-5 (SEE ALD PAGE ZT010). ISOLATE LOAD BOX FROM THE +5 V BUS.

RESET CB2.

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB2 TRIP?
Y N

5 5 5
J K L

0 0 0 0 0 0 0 0 0 0

J K L
4 4 4

+5 VOLT CB TRIPPED

PAGE 5 OF 8

016

THE LOAD BOX IS FAILING.

REINSTALL FUSE F1.

EXCHANGE FRU279. SEE CARR-CU 1-1.

GO TO PAGE 8, STEP 028,
ENTRY POINT D.

017

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P9-1 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT
CIRCUIT USING PWR 42 AS A
TROUBLESHOOTING AID.

GO TO PAGE 8, STEP 027,
ENTRY POINT E.

018

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P9-1 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT CIRCUIT
USING PWR 42 AS A TROUBLESHOOTING
AID.

GO TO PAGE 8, STEP 027,
ENTRY POINT E.

D
2

019

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145. SEE CARR-CU 1-1.

GO TO PAGE 8, STEP 028,
ENTRY POINT D.

0 0 0 0 0 0 0 0 0 0

+5 VOLT CB TRIPPED

PAGE 6 OF 8

020
(ENTRY POINT B)

MAP DESCRIPTION: MAP 0400 DIRECTED YOU TO THIS MAP BECAUSE CB3 WILL NOT STAY RESET.

THERE IS AN OVERLOAD ON THE +5 V CIRCUIT TO THE 01A-A2 LOGIC BOARD.

THIS SECTION ISOLATES THE SHORT CIRCUIT.

SEE DETAILED DIAGRAM ON PWR 42.

REMOVE THE +8.5 VDC FUSE, CU-PS-02 F1.

REMOVING THE FUSE PREVENTS THE DC POWER FROM HOLDING DURING THIS SECTION.

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUB COVER.

DISCONNECT THE CABLE CU-PS-02 P11 (LOC 1).

RESET CB3 (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH. (THE DC POWER WILL GO OFF BECAUSE F1 FUSE IS REMOVED.)

DID CB3 TRIP?
Y N

7
M N

N

021

RECONNECT THE CABLE CU-PS-02 P11 (LOC 1).

DISCONNECT THE 01A-A2 +5 V BUS CABLES FROM 01A-A2 Y2 AND Y5 (LOC 1). (SEE ALD PAGE YZ003).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB3 TRIP?
Y N

022

RECONNECT 01A-A2 Y2 AND Y5 (YZ003) (LOC 1).

SET THE SERVICE SWITCH TO OFF (LOC 1).

THIS REMOVES THE +24 VDC FROM THE LOGIC BOARDS.

REMOVE ALL CARDS FROM THE 01A-A2 BOARD (LOC 1) (SEE ALD PAGE AA001).

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB3 TRIP?
Y N

7 7 7
P Q R

0 0 0 0 0 0 0 0 0 0

Q R
6 6

+5 VOLT CB TRIPPED

PAGE 7 OF 8

023

SET THE SERVICE SWITCH TO OFF (LOC 1).
REINSTALL THE CARDS, ONE AT A TIME. DO NOT INSTALL THE TOP CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED:
- SET THE SERVICE SWITCH TO ON.
- PRESS AND HOLD THE IML SWITCH FOR SEVERAL SECONDS.
- SET THE SERVICE SWITCH TO OFF.
- CHECK IF CB3 IS TRIPPED.

REPEAT THIS STEP UNTIL THE FAILING CARD IS LOCATED.
THEN.....

REINSTALL FUSE F1.

EXCHANGE THE FAILING CARD.

GO TO PAGE 8, STEP 028,
ENTRY POINT D.

A LOGIC CARD IS CAUSING THE CB TO TRIP.

024

THE 01A-A2 BOARD IS FAILING.

REINSTALL FUSE F1.

EXCHANGE FRU140.

SEE CARR-CU 1-1.

GO TO PAGE 8, STEP 028,
ENTRY POINT D.

M P
6 6

025

THERE IS A SHORT CIRCUIT FROM CU-PS-02 P11-1 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT CIRCUIT USING PWR 42 AS A TROUBLESHOOTING AID.

GO TO PAGE 8, STEP 027,
ENTRY POINT E.

026

THE CONTROL UNIT DC SUPPLY, CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145.

SEE CARR-CU 1-1.

GO TO PAGE 8, STEP 028,
ENTRY POINT D.

0 0 0 0 0 0 0 0 0 0

+5 VOLT CB TRIPPED

PAGE 8 OF 8

027
(ENTRY POINT E)
CLEANUP AFTER REPAIR.

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

REMOVE ANY JUMPERS USED FOR TROUBLESHOOTING.

RECONNECT ANY CABLES REMOVED FOR TROUBLESHOOTING.

REINSTALL ANY FUSES REMOVED FOR TROUBLESHOOTING.

RESET ANY CB TRIPPED FOR TROUBLESHOOTING.

GO TO MAP 0190, ENTRY POINT A.

028
(ENTRY POINT D)
RETURN AFTER REPAIR.

IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD, RE-IPL THE MD, AND THEN SELECT THE UNIT TEST OPTION.

IF YOU ENTERED THIS MAP FROM ANY SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

0 0 0 0 0 0 0 0 0 0

MAP 0420 — Control Unit +5 Volt CB Tripped

CONTROL UNIT +5 VOLT CB TRIPPED

PAGE 1 OF 7

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0400	A	1	001
0400	B	5	018
0421	D	7	026
0421	E	7	025

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
7	025	0190	A

001
(ENTRY POINT A)

MAP DESCRIPTION: MAP 0400 DIRECTED YOU TO THIS MAP BECAUSE CB2 WILL NOT STAY RESET.

THERE IS AN OVERLOAD ON THE +5V CIRCUIT TO THE 01A-A1 LOGIC BOARD.

THIS SECTION ISOLATES THE SHORT CIRCUIT.

SEE DETAILED DIAGRAM ON PWR 42.

REMOVE THE +8.5 VDC FUSE, CU-PS-02 F1.

REMOVING THE FUSE PREVENTS THE DC POWER FROM HOLDING DURING THIS SECTION.

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUBCOVER.

DISCONNECT THE FOLLOWING CONNECTORS (LOC 1):

THESE CABLES DISTRIBUTE POWER TO THE BUS AND TAG CARDS.

CU-PS-02 P5, IF INSTALLED.
CU-PS-02 P6, IF INSTALLED.
CU-PS-02 P7, IF INSTALLED.
CU-PS-02 P8, IF INSTALLED.

RESET CB2 (LOC 1).
(Step 001 continues)

(Step 001 continued)

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.
(THE DC POWER WILL GO OFF SINCE F1 FUSE IS REMOVED.)

DID CB2 TRIP?
Y N

002

RECONNECT THE CONNECTORS P5 THRU P8, ONE AT A TIME. EACH TIME A CONNECTOR IS REINSTALLED, PRESS AND HOLD THE IML SWITCH AND CHECK IF CB2 TRIPS. REPEAT THIS STEP UNTIL CB2 TRIPS.

DID CB2 TRIP?
Y N

003

THE TROUBLE HAS DISAPPEARED.

INSPECT THE CABLES JUST INSTALLED FOR CHAFING.
REPAIR THE CABLES IF NECESSARY.

REINSTALL FUSE F1.

Go to Page 7, Step 025, Entry Point E.

2 2
A B

B

+5 VOLT CB TRIPPED

1

PAGE 2 OF 7

004

THE LAST CABLE INSTALLED IS CAUSING THE CB TO TRIP.

SEE THE CHART ON THE RIGHT AND DISCONNECT THE TAG CARD CONNECTOR 01A-T1 XX P5 (LOC 1).

LAST CABLE INSTALLED	DISCONNECT TAG CARD CONNECTOR
P5 (CHANNEL A)	01A-T1A3 P5
P6 (CHANNEL B)	01A-T1B3 P5
P7 (CHANNEL C)	01A-T1C3 P5
P8 (CHANNEL D)	01A-T1D3 P5

RESET CB2.

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB2 TRIP?

Y N

005

REINSTALL FUSE F1.

EXCHANGE THE FAILING TAG CARD (LOC 1).
SEE THE CHART ON THE RIGHT.

LAST CABLE INSTALLED	FAILING TAG CARD
P5 (CHANNEL A)	01A-T1A3 (FRU137)
P6 (CHANNEL B)	01A-T1B3 (FRU234)
P7 (CHANNEL C)	01A-T1C3 (FRU236)
P8 (CHANNEL D)	01A-T1D3 (FRU238)

Go to Page 7, Step 026, Entry Point D.

C

A C

1

006

REINSTALL FUSE F1.

EXCHANGE THE FAILING BUS CARD (LOC 1).
SEE THE CHART ON THE RIGHT.

LAST CABLE INSTALLED	FAILING BUS CARD
P5 (CHANNEL A)	01A-T1A1 (FRU136)
P6 (CHANNEL B)	01A-T1B1 (FRU233)
P7 (CHANNEL C)	01A-T1C1 (FRU235)
P8 (CHANNEL D)	01A-T1D1 (FRU237)

Go to Page 7, Step 026, Entry Point D.

007

RECONNECT THE FOLLOWING CONNECTORS (LOC 1):

CU-PS-02 P5, IF INSTALLED.
CU-PS-02 P6, IF INSTALLED.
CU-PS-02 P7, IF INSTALLED.
CU-PS-02 P8, IF INSTALLED.

DISCONNECT THE CABLE CU-PS-02 P9 (LOC 1).

RESET CB2.

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB2 TRIP?

Y N

5 3

D E

E
2

+5 VOLT CB TRIPPED

PAGE 3 OF 7

008

RECONNECT THE CABLE
CU-PS-02 P9 (LOC 1).

SET THE SERVICE SWITCH TO OFF (LOC 1).

DISCONNECT THE 01A-A1 +5V BUSS
CABLES FROM 01A-A1 Y2 AND Y5 (LOC 1).
(SEE ALD PAGE YZ002).

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB2 TRIP?
Y N

009

SET THE SERVICE SWITCH TO OFF (LOC 1).

THIS REMOVES THE +24 VDC FROM THE LOGIC BOARDS.

RECONNECT 01A-A1 Y2 AND Y5
(YZ002) (LOC 1).

REMOVE ALL CARDS FROM THE 01A-A1
BOARD (LOC 1)
(SEE ALD PAGE AA000).

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH
(LOC 1).
(Step 009 continues)

4
F

(Step 009 continued)

RELEASE THE IML SWITCH.

DID CB2 TRIP?
Y N

010

SET THE SERVICE SWITCH TO OFF (LOC 1).
REINSTALL THE CARDS, ONE AT A TIME. DO NOT INSTALL THE TOP CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED;

-SET THE SERVICE SWITCH TO ON.
-PRESS AND HOLD THE IML SWITCH FOR SEVERAL SECONDS.
-SET THE SERVICE SWITCH TO OFF.
-CHECK IF CB2 IS TRIPPED.

REPEAT THIS STEP UNTIL THE FAILING CARD IS LOCATED.
THEN.....

A LOGIC CARD IS CAUSING THE CB TO TRIP.

REINSTALL FUSE F1.

EXCHANGE THE FAILING CARD.

Go to Page 7, Step 026, Entry Point D.

4
G

F G
3 3 **+5 VOLT CB TRIPPED**

PAGE 4 OF 7

011

THE 01A-A1 BOARD IS FAILING.

REINSTALL FUSE F1.

EXCHANGE FRU139. SEE CARR-CU 1-1.

Go to Page 7, Step 026, Entry Point D.

012

IS EC A57689 INSTALLED? SEE CARR-CU 4.
Y N

013

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P9-1 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT
CIRCUIT USING PWR 42 AS A
TROUBLESHOOTING AID.

Go to Page 7, Step 025, Entry Point E.

014

SET THE SERVICE SWITCH TO OFF (LOC 1).

RECONNECT 01A-A1 Y2 AND Y5 (YZ002)
(LOC 1).

DISCONNECT THE LOAD BOX +5V CABLE
FROM TB1-5
(SEE ALD PAGE ZT010).

RESET CB2.
(Step 014 continues)

(Step 014 continued)

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB2 TRIP?
Y N

015

THE LOAD BOX IS FAILING.

REINSTALL FUSE F1.

EXCHANGE FRU279. SEE CARR-CU 1-1.

Go to Page 7, Step 026, Entry Point D.

016

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P9-1 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT CIRCUIT
USING PWR 42 AS A TROUBLESHOOTING
AID.

Go to Page 7, Step 025, Entry Point E.

D
2

+5 VOLT CB TRIPPED

PAGE 5 OF 7

017

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145.

SEE CARR-CU 1-1.

Go to Page 7, Step 026, Entry Point D.

018
(ENTRY POINT B)

MAP DESCRIPTION: MAP 400 DIRECTED YOU TO THIS MAP BECAUSE CB3 WILL NOT STAY RESET.

THERE IS AN OVERLOAD ON THE +5V CIRCUIT TO THE 01A-A2 LOGIC BOARD.

THIS SECTION ISOLATES THE SHORT CIRCUIT.

SEE DETAILED DIAGRAM ON PWR 42.

REMOVE THE +8.5 VDC FUSE, CU-PS-02 F1.

REMOVING THE FUSE PREVENTS THE DC POWER FROM HOLDING DURING THIS SECTION.

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUBCOVER.

DISCONNECT THE CABLE
CU-PS-02 P11 (LOC 1).

RESET CB3 (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.
(THE DC POWER WILL GO OFF SINCE F1 FUSE IS REMOVED.)

DID CB3 TRIP?
Y N

7 6
H J

J
5

+5 VOLT CB TRIPPED

PAGE 6 OF 7

019

RECONNECT THE CABLE
CU-PS-02 P11 (LOC 1).

DISCONNECT THE 01A-A2 +5V BUSS
CABLES FROM 01A-A2 Y2 AND Y5 (LOC 1).
(SEE ALD PAGE YZ003).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB3 TRIP?
Y N

020

RECONNECT 01A-A2 Y2 AND Y5
(YZ003) (LOC 1).

SET THE SERVICE SWITCH TO OFF
(LOC 1).

THIS REMOVES THE +24 VDC FROM THE LOGIC BOARDS.

REMOVE ALL CARDS FROM THE 01A-A2
BOARD (LOC 1)
(SEE ALD PAGE AA001).

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB3 TRIP?
Y N

7
K L M

L M

021

SET THE SERVICE SWITCH TO OFF
(LOC 1).
REINSTALL THE CARDS, ONE AT A
TIME. DO NOT INSTALL THE TOP
CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED:

-SET THE SERVICE SWITCH TO ON.
-PRESS AND HOLD THE IML
SWITCH FOR SEVERAL SECONDS.
-SET THE SERVICE SWITCH TO OFF.
-CHECK IF CB3 IS TRIPPED.

REPEAT THIS STEP UNTIL THE
FAILING CARD IS LOCATED.
THEN.....

REINSTALL FUSE F1.

EXCHANGE THE FAILING CARD.

Go to Page 7, Step 026, Entry Point D.

A LOGIC CARD IS CAUSING THE CB TO TRIP.

022

THE 01A-A2 BOARD IS FAILING.

REINSTALL FUSE F1.

EXCHANGE FRU140.

SEE CARR-CU 1-1.

Go to Page 7, Step 026, Entry Point D.

H K
5 6 **+5 VOLT CB TRIPPED**

PAGE 7 OF 7

023

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P11-1 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT
CIRCUIT USING PWR 42 AS A
TROUBLESHOOTING AID.

Go to Step 025, Entry Point E.

024

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145. SEE CARR-CU 1-1.

Go to Step 026, Entry Point D.

025
(ENTRY POINT E)
CLEANUP AFTER REPAIR.

SET THE CONTROL UNIT POWER ON/OFF
SWITCH TO THE OFF POSITION (LOC 1).

REMOVE ANY JUMPERS USED FOR
TROUBLESHOOTING.

RECONNECT ANY CABLES REMOVED FOR
TROUBLESHOOTING.

REINSTALL ANY FUSES REMOVED FOR
TROUBLESHOOTING.

RESET ANY CB TRIPPED FOR
TROUBLESHOOTING.

Go to MAP 0190, Entry Point A.

026
(ENTRY POINT D)
RETURN AFTER REPAIR.

IF YOU ENTERED THIS MAP FROM THE
MD, RETURN TO THE MD, RE-IPL THE MD,
AND THEN SELECT THE UNIT TEST
OPTION

IF YOU ENTERED THIS MAP FROM ANY
SECTION OF THE MI, CONNECT THE MD
TO THE CONTROL UNIT, AND SELECT THE
UNIT TEST OPTION.

MAP 0420 — Control Unit +5 Volt CB Tripped PWR 420-7

MAP 0430 — Control Unit -5 Volt CB Tripped

CONTROL UNIT -5 VOLT CB TRIPPED

ENTRY POINTS

FROM MAP NUMBER	ENTER THIS MAP: ENTRY POINT	PAGE NUMBER	STEP NUMBER
0400	A	1	001
0431	D	6	023
0431	E	6	022

EXIT POINTS

EXIT THIS MAP: PAGE NUMBER	STEP NUMBER	TO: MAP NUMBER	ENTRY POINT
6	022	0190	A

001
(ENTRY POINT A)

MAP DESCRIPTION: MAP 0400 DIRECTED YOU TO THIS MAP BECAUSE CB4 WILL NOT STAY RESET.

THERE IS AN OVERLOAD ON THE -5 VDC CIRCUIT.

THIS SECTION ISOLATES THE SHORT CIRCUIT.

SEE DETAILED DIAGRAM ON PWR 46.

REMOVING THE FUSE PREVENTS THE DC POWER FROM HOLDING DURING THIS SECTION.

REMOVE THE +8.5 VDC FUSE, CU-PS-02 F1.

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUBCOVER.

DISCONNECT THE FOLLOWING CONNECTORS (LOC 1):

CU-PS-02 P5, IF INSTALLED.
CU-PS-02 P6, IF INSTALLED.
CU-PS-02 P7, IF INSTALLED.
CU-PS-02 P8, IF INSTALLED.

RESET CB4 (LOC 1).
(Step 001 continues)

(Step 001 continued)

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.
(THE DC POWER WILL GO OFF SINCE F1 FUSE IS REMOVED.)

DID CB4 TRIP?
Y N

002

RECONNECT THE CONNECTORS P5 THRU P8, ONE AT A TIME. EACH TIME A CONNECTOR IS REINSTALLED, PRESS AND HOLD THE IML SWITCH AND CHECK IF CB4 TRIPS. REPEAT THIS STEP UNTIL CB4 TRIPS.

DID CB4 TRIP?
Y N

003

THE TROUBLE HAS DISAPPEARED.

INSPECT THE CABLES JUST INSTALLED FOR CHAFING.
REPAIR THE CABLES IF NECESSARY.

REINSTALL FUSE F1.

Go to Page 6, Step 022, Entry Point E.

2 2
A B

CONTROL UNIT -5 VOLT CB TRIPPED

PAGE 1 OF 7

ENTRY POINTS

FROM MAP NUMBER	ENTER THIS MAP ENTRY POINT	PAGE NUMBER	STEP NUMBER
0400	A	1	001
0431	D	7	027
0431	E	7	026

EXIT POINTS

EXIT THIS MAP PAGE NUMBER	STEP NUMBER	TO MAP NUMBER	ENTRY POINT
7	026	0190	A

001
(ENTRY POINT A)

MAP DESCRIPTION: MAP 0400 DIRECTED YOU TO THIS MAP BECAUSE CB4 WILL NOT STAY RESET.

THERE IS AN OVERLOAD ON THE -5 VDC CIRCUIT.

THIS SECTION ISOLATES THE SHORT CIRCUIT.

SEE DETAILED DIAGRAM ON PWR 46.

REMOVE THE +8.5 VDC FUSE, CU-PS-02, F1.

REMOVING THE FUSE PREVENTS THE DC POWER FROM HOLDING DURING THIS SECTION.

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUB COVER.

DISCONNECT THE FOLLOWING CONNECTORS (LOC 1):
CU-PS-02 P5, IF INSTALLED.
CU-PS-02 P6, IF INSTALLED.
CU-PS-02 P7, IF INSTALLED.
CU-PS-02 P8, IF INSTALLED.

RESET CB4 (LOC 1).
(Step 001 continues)

(Step 001 continued)

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.
(THE DC POWER WILL GO OFF BECAUSE F1 FUSE IS REMOVED.)

DID CB4 TRIP?
Y N

002

RECONNECT THE CONNECTORS P5 THROUGH P8, ONE AT A TIME. EACH TIME A CONNECTOR IS REINSTALLED, PRESS AND HOLD THE IML SWITCH AND CHECK IF CB4 TRIPS. REPEAT THIS STEP UNTIL CB4 TRIPS.

DID CB4 TRIP?
Y N

003

THE TROUBLE HAS DISAPPEARED.

INSPECT THE CABLES JUST INSTALLED FOR CHAFING. REPAIR THE CABLES IF NECESSARY.

REINSTALL FUSE F1.

GO TO PAGE 7, STEP 026, ENTRY POINT E.

2 2
A B

0 0 0 0 0 0 0 0 0 0

A B -5 VOLT CB TRIPPED
1 1

PAGE 2 OF 7

004

REINSTALL FUSE F1.

EXCHANGE THE FAILING TAG CARD
(LOC 11).

SEE THE CHART ON THE RIGHT.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

LAST CABLE INSTALLED	FAILING TAG CARD
P5 (CHANNEL A)	01A-T1A3 (FRU137)
P6 (CHANNEL B)	01A-T1B3 (FRU234)
P7 (CHANNEL C)	01A-T1C3 (FRU236)
P8 (CHANNEL D)	01A-T1D3 (FRU238)

005

RECONNECT THE FOLLOWING CONNECTORS
(LOC 1):
CU-PS-02 P5, IF INSTALLED.
CU-PS-02 P6, IF INSTALLED.
CU-PS-02 P7, IF INSTALLED.
CU-PS-02 P8, IF INSTALLED.

SET THE SERVICE SWITCH TO OFF
(LOC 1).

DISCONNECT THE 01A-A1 VOLTAGE
CROSSOVERS (6):
B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ002).

SET THE SERVICE SWITCH TO ON
(LOC 1).
RESET CB4.

PRESS AND HOLD THE IML SWITCH
(LOC 1).

RELEASE THE IML SWITCH.
(Step 005 continues)

(Step 005 continued)

DID CB4 TRIP?
Y N

006

SET THE SERVICE SWITCH TO OFF
(LOC 1).

RECONNECT THE 01A-A1 VOLTAGE
CROSSOVERS (6).
B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ002).

REMOVE ALL CARDS FROM THE 01A-A1
BOARD (LOC 1)
(SEE ALD PAGE AA000).

SET THE SERVICE SWITCH TO ON
(LOC 1).

PRESS AND HOLD THE IML SWITCH
(LOC 1).

RELEASE THE IML SWITCH.

DID CB4 TRIP?
Y N

3 3 3
C D E

o o o o o o o o o o

D E
2 2

-5 VOLT CB TRIPPED

PAGE 3 OF 7

007

SET THE SERVICE SWITCH TO OFF
(LOC 1).

REINSTALL THE CARDS, ONE AT A
TIME. DO NOT INSTALL THE TOP
CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED:
- SET THE SERVICE SWITCH TO ON.
- PRESS AND HOLD THE IML
  SWITCH FOR SEVERAL SECONDS.
- SET THE SERVICE SWITCH TO OFF.
- CHECK IF CB4 IS TRIPPED.

REPEAT THIS STEP UNTIL THE
FAILING CARD IS LOCATED.
THEN.....

REINSTALL FUSE F1.

EXCHANGE THE FAILING CARD.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

A LOGIC CARD IS CAUSING THE CB TO
TRIP.

008

THE 01A-A1 BOARD IS FAILING.

REINSTALL FUSE F1.

EXCHANGE FRU139.

SEE CARR-CU 1-1.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

C
2

009

SET THE SERVICE SWITCH TO OFF
(LOC 1).

RECONNECT THE 01A-A1 VOLTAGE
CROSSOVERS (6).
B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ002).

DISCONNECT THE 01A-A2 VOLTAGE
CROSSOVERS (6):
B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ003).

RESET CB2.

SET THE SERVICE SWITCH TO ON
(LOC 1).

PRESS AND HOLD THE IML SWITCH
(LOC 1).

RELEASE THE IML SWITCH.

DID CB4 TRIP?
Y N

4 4
F G

0 0 0 0 0 0 0 0 0 0

G -5 VOLT CB TRIPPED
3

PAGE 4 OF 7

010

SET THE SERVICE SWITCH TO OFF
(LOC 1).

RECONNECT 01A-A2 VOLTAGE
CROSSOVERS.
B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ003).

REMOVE ALL CARDS FROM THE 01A-A2
BOARD (LOC 1)
(SEE ALD PAGE AA002).

SET THE SERVICE SWITCH TO ON
(LOC 1).

PRESS AND HOLD THE IML SWITCH
(LOC 1).

RELEASE THE IML SWITCH.

DID CB4 TRIP?
Y N

011

SET THE SERVICE SWITCH TO OFF
(LOC 1).

REINSTALL THE CARDS, ONE AT A
TIME. DO NOT INSTALL THE TOP
CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED:
- SET THE SERVICE SWITCH TO ON.
- PRESS AND HOLD THE IML
  SWITCH FOR SEVERAL SECONDS.
- SET THE SERVICE SWITCH TO OFF.
- CHECK IF CB4 IS TRIPPED.
(Step 011 continues)

A LOGIC CARD IS CAUSING THE CB TO
TRIP.

H

F H
3

(Step 011 continued)

REPEAT THIS STEP UNTIL THE
FAILING CARD IS LOCATED.
THEN.....

REINSTALL FUSE F1.

EXCHANGE THE FAILING CARD.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

012

THE 01A-A2 BOARD IS FAILING.

REINSTALL FUSE F1.

EXCHANGE FRU140.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

SEE CARR-CU 1-1.

013

SET THE SERVICE SWITCH TO OFF
(LOC 1).

RECONNECT 01A-A2 VOLTAGE
CROSSOVERS.
B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ003).

IF EC A57689 IS INSTALLED, A
RESISTIVE PRELOAD IS REQUIRED TO
MAINTAIN POWER SUPPLY REGULATION.
(Step 013 continues)

SEE CARR-CU 4.

0 0 0 0 0 0 0 0 0 0

-5 VOLT CB TRIPPED

PAGE 5 OF 7

(Step 013 continued)

IS EC A57689 INSTALLED?
Y N

014

DISCONNECT THE CABLE
CU-PS-02 P4 (LOC 1).

CHECK FOR CONTINUITY FROM
CU-PS-02 P4-2 TO FRAME GROUND.
THE METER SHOULD INDICATE AN OPEN
CIRCUIT.

DOES THE METER INDICATE AN OPEN
CIRCUIT?
Y N

015

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P4-2 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT
CIRCUIT USING PWR 46 AS A
TROUBLESHOOTING AID.

GO TO PAGE 7, STEP 026,
ENTRY POINT E.

016

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145. SEE CARR-CU 1-1.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

J

J

017

IF EC A46536 IS INSTALLED, THE
RESISTIVE PRELOAD CHANGES FROM A
LOAD BOX MOUNTED TO THE FRAME TO A
LOAD CARD LOCATED AT CARD SLOT
A2P2. SEE CARR-CU 4.

IS EC A46536 INSTALLED?
Y N

018

DISCONNECT THE LOAD BOX -5 V CABLE
FROM TB3-7
(SEE ALD PAGE ZT020).

RESET CB4.

SET THE SERVICE SWITCH TO ON
(LOC 1).

PRESS AND HOLD THE IML SWITCH
(LOC 1).

RELEASE THE IML SWITCH.

DID CB4 TRIP?
Y N

019

THE LOAD BOX IS FAILING.

EXCHANGE FRU279. SEE CARR-CU 1-1.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

6 6
K L

o o o o o o o o o o

L -5 VOLT CB TRIPPED
5

PAGE 6 OF 7

020

SET THE SERVICE SWITCH TO OFF
(LOC 1).

RECONNECT THE LOAD BOX -5 V CABLE.

DISCONNECT THE CABLE
CU-PS-02 P4 (LOC 1).

CHECK FOR CONTINUITY FROM CU-PS-02
P4-2 TO FRAME GROUND. THE METER
SHOULD INDICATE AN OPEN CIRCUIT.

DOES THE METER INDICATE AN OPEN
CIRCUIT?
Y N

021

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P4-2 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT
CIRCUIT USING PWR 46 AS A
TROUBLESHOOTING AID.

GO TO PAGE 7, STEP 026,
ENTRY POINT E.

022

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145. SEE CARR-CU 1-1.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

K
5

023

SET THE SERVICE SWITCH TO OFF
(LOC 1).

DISCONNECT THE CABLE
CU-PS-02 P4 (LOC 1).

CHECK FOR CONTINUITY FROM CU-PS-02
P4-2 TO FRAME GROUND. THE METER
SHOULD INDICATE AN OPEN CIRCUIT.

DOES THE METER INDICATE AN OPEN
CIRCUIT?
Y N

024

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P4-2 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT
CIRCUIT USING PWR 46 AS A
TROUBLESHOOTING AID.

GO TO PAGE 7, STEP 026,
ENTRY POINT E.

025

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145. SEE CARR-CU 1-1.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

0 0 0 0 0 0 0 0 0 0

-5 VOLT CB TRIPPED

PAGE 7 OF 7

026
(ENTRY POINT E)
CLEANUP AFTER REPAIR.

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

REMOVE ANY JUMPERS USED FOR TROUBLESHOOTING.

RECONNECT ANY CABLES REMOVED FOR TROUBLESHOOTING.

REINSTALL ANY FUSES REMOVED FOR TROUBLESHOOTING.

RESET ANY CB TRIPPED FOR TROUBLESHOOTING.

GO TO MAP 0190, ENTRY POINT A.

027
(ENTRY POINT D)
RETURN AFTER REPAIR.

IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD, RE-IPL THE MD AND THEN SELECT THE UNIT TEST OPTION.

IF YOU ENTERED THIS MAP FROM ANY SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

0 0 0 0 0 0 0 0 0 0

MAP 0430—Control Unit -5 Volt CB Tripped Notes

0 0 0 0 0 0 0 0 0 0

A B
1 1

-5 VOLT CB TRIPPED

PAGE 2 OF 6

004

REINSTALL FUSE F1.

EXCHANGE THE FAILING TAG CARD (LOC 11).

SEE THE CHART ON THE RIGHT.

LAST CABLE INSTALLED	FAILING TAG CARD
P5 (CHANNEL A)	01A-T1A3 (FRU137)
P6 (CHANNEL B)	01A-T1B3 (FRU234)
P7 (CHANNEL C)	01A-T1C3 (FRU236)
P8 (CHANNEL D)	01A-T1D3 (FRU238)

Go to Page 6, Step 023, Entry Point D.

005

RECONNECT THE FOLLOWING CONNECTORS (LOC 1):

CU-PS-02 P5, IF INSTALLED.
CU-PS-02 P6, IF INSTALLED.
CU-PS-02 P7, IF INSTALLED.
CU-PS-02 P8, IF INSTALLED.

SET THE SERVICE SWITCH TO OFF (LOC 1).

DISCONNECT THE 01A-A1 VOLTAGE CROSSOVERS (6):

B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ002).

SET THE SERVICE SWITCH TO ON (LOC 1).
RESET CB4.

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.
(Step 005 continues)

(Step 005 continued)

DID CB4 TRIP?
Y N

006

SET THE SERVICE SWITCH TO OFF (LOC 1).

RECONNECT THE 01A-A1 VOLTAGE CROSSOVERS (6):

B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ002).

REMOVE ALL CARDS FROM THE 01A-A1 BOARD (LOC 1)
(SEE ALD PAGE AA000).

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB4 TRIP?
Y N

3 3 3
C D E

D E
2 2

-5 VOLT CB TRIPPED

PAGE 3 OF 6

007

SET THE SERVICE SWITCH TO OFF (LOC 1).

REINSTALL THE CARDS, ONE AT A TIME. DO NOT INSTALL THE TOP CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED:

-SET THE SERVICE SWITCH TO ON.
-PRESS AND HOLD THE IML SWITCH FOR SEVERAL SECONDS.
-SET THE SERVICE SWITCH TO OFF.
-CHECK IF CB4 IS TRIPPED.

REPEAT THIS STEP UNTIL THE FAILING CARD IS LOCATED.
THEN.....

REINSTALL FUSE F1.

EXCHANGE THE FAILING CARD.

Go to Page 6, Step 023, Entry Point D.

A LOGIC CARD IS CAUSING THE CB TO TRIP.

008

THE 01A-A1 BOARD IS FAILING.

REINSTALL FUSE F1.

EXCHANGE FRU139.

SEE CARR-CU 1-1.

Go to Page 6, Step 023, Entry Point D.

C
2

009

SET THE SERVICE SWITCH TO OFF (LOC 1).

RECONNECT THE 01A-A1 VOLTAGE CROSSOVERS (6):

B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ002).

DISCONNECT THE 01A-A2 VOLTAGE CROSSOVERS (6):

B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ003).

RESET CB4.

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB4 TRIP?
Y N

4 4
F G

G **-5 VOLT CB TRIPPED**
3

PAGE 4 OF 6

010

SET THE SERVICE SWITCH TO OFF (LOC 1).

RECONNECT 01A-A2 VOLTAGE
CROSSOVERS:

B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ003).

REMOVE ALL CARDS FROM THE 01A-A2
BOARD (LOC 1).
(SEE ALD PAGE AA002).

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB4 TRIP?
Y N

011

SET THE SERVICE SWITCH TO OFF
(LOC 1).

REINSTALL THE CARDS, ONE AT A
TIME. DO NOT INSTALL THE TOP
CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED;

-SET THE SERVICE SWITCH TO ON.
-PRESS AND HOLD THE IML
SWITCH FOR SEVERAL SECONDS.
-SET THE SERVICE SWITCH TO OFF.
-CHECK IF CB4 IS TRIPPED.
(Step 011 continues)

A LOGIC CARD IS CAUSING THE CB TO
TRIP.

H

F H
3

(Step 011 continued)

REPEAT THIS STEP UNTIL THE
FAILING CARD IS LOCATED.
THEN.....

REINSTALL FUSE F1.

EXCHANGE THE FAILING CARD.

Go to Page 6, Step 023, Entry Point D.

012

THE 01A-A2 BOARD IS FAILING.

REINSTALL FUSE F1.

EXCHANGE FRU140. SEE CARR-CU 1-1.

Go to Page 6, Step 023, Entry Point D.

013

SET THE SERVICE SWITCH TO OFF (LOC 1).

RECONNECT 01A-A2 VOLTAGE
CROSSOVERS:

B3 E01, B4 E01, B5 E01
U3 E01, U4 E01, U5 E01
(SEE ALD PAGE YZ003).

IS EC A57689 INSTALLED? SEE CARR-CU 4.
Y N

5 5
J K

K
4

-5 VOLT CB TRIPPED

PAGE 5 OF 6

014

DISCONNECT THE CABLE
CU-PS-02 P4 (LOC 1).

CHECK FOR CONTINUITY FROM CU-PS-02
P4-2 TO FRAME GROUND. THE METER
SHOULD INDICATE AN OPEN CIRCUIT.

DOES THE METER INDICATE AN OPEN CIRCUIT?
Y N

015

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P4-2 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT
CIRCUIT USING PWR 46 AS A
TROUBLESHOOTING AID.

Go to Page 6, Step 022, Entry Point E.

016

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145. SEE CARR-CU 1-1.

Go to Page 6, Step 023, Entry Point D.

J
4

017

DISCONNECT THE LOAD BOX -5V CABLE
FROM TB3-7
(SEE ALD PAGE ZT020).

RESET CB4.

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

DID CB4 TRIP?
Y N

018

THE LOAD BOX IS FAILING.

EXCHANGE FRU279 SEE CARR-CU 1-1

Go to Page 6, Step 023, Entry Point D.

019

SET THE SERVICE SWITCH TO OFF (LOC 1).

RECONNECT THE LOAD BOX -5V CABLE.
(Step 019 continues)

-5 VOLT CB TRIPPED

(Step 019 continued)

DISCONNECT THE CABLE
CU-PS-02 P4 (LOC 1).

CHECK FOR CONTINUITY FROM CU-PS-02
P4-2 TO FRAME GROUND. THE METER
SHOULD INDICATE AN OPEN CIRCUIT.

DOES THE METER INDICATE AN OPEN CIRCUIT?
Y N

020

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P4-2 TO FRAME GROUND.

LOCATE AND REPAIR THE SHORT
CIRCUIT USING PWR 46 AS A
TROUBLESHOOTING AID.

Go to Step 022, Entry Point E.

021

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145. SEE CARR-CU 1-1.

Go to Step 023, Entry Point D.

022
(ENTRY POINT E)
CLEANUP AFTER REPAIR.

SET THE CONTROL UNIT POWER ON/OFF
SWITCH TO THE OFF POSITION (LOC 1).

REMOVE ANY JUMPERS USED FOR
TROUBLESHOOTING.

RECONNECT ANY CABLES REMOVED FOR
TROUBLESHOOTING.

REINSTALL ANY FUSES REMOVED FOR
TROUBLESHOOTING.

RESET ANY CB TRIPPED FOR
TROUBLESHOOTING.

Go to MAP 0190, Entry Point A.

023
(ENTRY POINT D)
RETURN AFTER REPAIR.

IF YOU ENTERED THIS MAP FROM THE
MD, RETURN TO THE MD, RE-IPL THE MD,
AND THEN SELECT THE UNIT TEST
OPTION

IF YOU ENTERED THIS MAP FROM ANY
SECTION OF THE MI, CONNECT THE MD
TO THE CONTROL UNIT, AND SELECT THE
UNIT TEST OPTION.

MAP 0440 — Control Unit +8.5 Volt Fuse Blows

CONTROL UNIT +8.5 VOLT FUSE BLOWS

PAGE 1 OF 6

ENTRY POINTS

FROM MAP NUMBER	ENTER THIS MAP: ENTRY POINT	PAGE NUMBER	STEP NUMBER
0400	A	1	001
0401	C	6	022
0401	D	6	023

EXIT POINTS

EXIT THIS MAP: PAGE NUMBER	STEP NUMBER	TO: MAP NUMBER	ENTRY POINT
6	022	0190	A

001
(ENTRY POINT A)

MAP DESCRIPTION: MAP 0400 DIRECTED YOU TO THIS MAP BECAUSE FUSE F1 BLOWS REPEATEDLY.

THERE IS AN OVERLOAD ON THE +8.5V CIRCUIT.

THIS SECTION ISOLATES THE SHORT CIRCUIT.

SEE DETAILED DIAGRAM ON PWR 48.

SET CU-PS-02 CB4 TO THE OFF POSITION (LOC 1).

TRIPPING THE CB PREVENTS THE DC POWER FROM HOLDING DURING THIS SECTION.

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUB COVER.

DISCONNECT THE FOLLOWING CONNECTORS (LOC 10):

THESE CABLES DISTRIBUTE POWER TO THE BUS AND TAG CARDS.

CU-PS-02 P5, IF INSTALLED.
CU-PS-02 P6, IF INSTALLED.
CU-PS-02 P7, IF INSTALLED.
CU-PS-02 P8, IF INSTALLED.

EXCHANGE FUSE F1.
(SEVERAL FUSES MAY BE NEEDED).
(Step 001 continues)

(Step 001 continued)

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.
(THE DC POWER WILL GO OFF SINCE CB4 IS TRIPPED.)

IS FUSE F1 BLOWN?
Y N

002

RECONNECT THE CONNECTORS P5 THRU P8, ONE AT A TIME. EACH TIME A CONNECTOR IS REINSTALLED, PRESS AND HOLD THE IML SWITCH FOR SEVERAL SECONDS AND THEN CHECK IF F1 IS BLOWN. REPEAT THIS STEP UNTIL F1 BLOWS.

IS FUSE F1 BLOWN?
Y N

003

THE TROUBLE HAS DISAPPEARED.

INSPECT THE CABLES JUST INSTALLED FOR CHAFING.
REPAIR THE CABLES IF NECESSARY.

RESET CB4.

Go to Page 6, Step 022, Entry Point C.

2 2
A B

CONTROL UNIT +8.5 VOLT FUSE BLOWS

PAGE 1 OF 7

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0400	A	1	001
0401	C	7	026
0401	D	7	027

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
7	026	0190	A

001
(ENTRY POINT A)

MAP DESCRIPTION: MAP 0400 DIRECTED YOU TO THIS MAP BECAUSE FUSE F1 BLOWS REPEATEDLY.

THERE IS AN OVERLOAD ON THE +8.5 V CIRCUIT.

THIS SECTION ISOLATES THE SHORT CIRCUIT.

SEE DETAILED DIAGRAM ON PWR 48.

SET CU-PS-02 CB4 TO THE OFF POSITION (LOC 1).

TRIPPING THE CB PREVENTS THE DC POWER FROM HOLDING DURING THIS SECTION.

OPEN THE REAR DOOR OF THE CONTROL UNIT AND REMOVE THE SUB COVER.

DISCONNECT THE FOLLOWING CONNECTORS (LOC 10):
CU-PS-02 P5, IF INSTALLED.
CU-PS-02 P6, IF INSTALLED.
CU-PS-02 P7, IF INSTALLED.
CU-PS-02 P8, IF INSTALLED.

THESE CABLES DISTRIBUTE POWER TO THE BUS AND TAG CARDS.

EXCHANGE FUSE F1.
(SEVERAL FUSES MAY BE NEEDED.)
(Step 001 continues)

(Step 001 continued)

PRESS AND HOLD THE IML SWITCH
(LOC 1).

RELEASE THE IML SWITCH.
(THE DC POWER WILL GO OFF BECAUSE CB4 IS TRIPPED.)

IS FUSE F1 BLOWN?
Y N

002

RECONNECT THE CONNECTORS P5 THROUGH P8, ONE AT A TIME. EACH TIME A CONNECTOR IS REINSTALLED, PRESS AND HOLD THE IML SWITCH FOR SEVERAL SECONDS AND THEN CHECK IF F1 IS BLOWN. REPEAT THIS STEP UNTIL F1 BLOWS.

IS FUSE F1 BLOWN?
Y N

003

THE TROUBLE HAS DISAPPEARED.

INSPECT THE CABLES JUST INSTALLED FOR CHAFING. REPAIR THE CABLES IF NECESSARY.

RESET CB4.

GO TO PAGE 7, STEP 026, ENTRY POINT C.

2 2
A B

0 0 0 0 0 0 0 0 0 0

A B
1 1

+8.5 VOLT FUSE BLOWS

PAGE 2 OF 7

004

RESET CB4.

EXCHANGE THE FAILING TAG CARD
(LOC 11).
SEE THE CHART ON THE RIGHT.

LAST CABLE INSTALLED	FAILING TAG CARD
P5 (CHANNEL A)	01A-T1A3 (FRU137)
P6 (CHANNEL B)	01A-T1B3 (FRU234)
P7 (CHANNEL C)	01A-T1C3 (FRU236)
P8 (CHANNEL D)	01A-T1D3 (FRU238)

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

005

SET THE SERVICE SWITCH TO OFF
(LOC 1).

DISCONNECT THE 01A-A1 VOLTAGE
CROSSOVERS (6):
B2 A14, B3 A14, B4 A14
U2 A14, U3 A14, U4 A14
(SEE ALD PAGE YZ002).

EXCHANGE FUSE F1.

SET THE SERVICE SWITCH TO ON
(LOC 1).

PRESS AND HOLD THE IML SWITCH FOR
SEVERAL SECONDS.

RELEASE THE IML SWITCH.

IS FUSE F1 BLOWN?
Y N

3
C D

D

006

SET THE SERVICE SWITCH TO OFF
(LOC 1).

RECONNECT THE 01A-A1 VOLTAGE
CROSSOVERS (6).
B2 A14, B3 A14, B4 A14
U2 A14, U3 A14, U4 A14
(SEE ALD PAGE YZ002).

REMOVE ALL CARDS FROM THE 01A-A1
BOARD (LOC 7) (LOC 1).
(SEE ALD PAGE AA000).

SET THE SERVICE SWITCH TO ON
(LOC 1).

PRESS AND HOLD THE IML SWITCH FOR
SEVERAL SECONDS.

RELEASE THE IML SWITCH.

IS FUSE F1 BLOWN?
Y N

007

SET THE SERVICE SWITCH TO OFF
(LOC 1).

REINSTALL THE CARDS, ONE AT A
TIME. DO NOT INSTALL THE TOP
CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED:
- SET THE SERVICE SWITCH TO ON.
- PRESS AND HOLD THE IML
  SWITCH FOR SEVERAL SECONDS.
- SET THE SERVICE SWITCH TO OFF.
- CHECK IF F1 IS BLOWN.
(Step 007 continues)

A LOGIC CARD IS CAUSING THE CB TO
TRIP.

3
E

0 0 0 0 0 0 0 0 0 0

C E
2 2

+8.5 VOLT FUSE BLOWS

PAGE 3 OF 7

(Step 007 continued)

REPEAT THIS STEP UNTIL THE
FAILING CARD IS LOCATED.
THEN.....

RESET CB4.

EXCHANGE THE FAILING CARD.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

008

THE 01A-A1 BOARD IS FAILING.

EXCHANGE FRU139. SEE CARR-CU 1-1.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

009

SET THE SERVICE SWITCH TO OFF
(LOC 1).

DISCONNECT THE 01A-A2 VOLTAGE
CROSSOVERS (6):
B2 A14, B3 A14, B4 A14
U2 A14, U3 A14, U4 A14
(SEE ALD PAGE YZ003).

EXCHANGE FUSE F1.

SET THE SERVICE SWITCH TO ON
(LOC 1).

PRESS AND HOLD THE IML SWITCH
(LOC 1).
(Step 009 continues)

(Step 009 continued)

RELEASE THE IML SWITCH.

IS FUSE F1 BLOWN?
Y N

010

SET THE SERVICE SWITCH TO OFF
(LOC 1).

RECONNECT 01A-A2 VOLTAGE
CROSSOVERS (6).
B2 A14, B3 A14, B4 A14
U2 A14, U3 A14, U4 A14
(SEE ALD PAGE YZ003).

REMOVE ALL CARDS FROM THE 01A-A2
BOARD (LOC 7) (LOC 1).
(SEE ALD PAGE AA002).

SET THE SERVICE SWITCH TO ON
(LOC 1).

PRESS AND HOLD THE IML SWITCH FOR
SEVERAL SECONDS.

RELEASE THE IML SWITCH.

IS FUSE F1 BLOWN?
Y N

4 4 4
F G H

o o o o o o o o o

G H
3 3

+8.5 VOLT FUSE BLOWS

PAGE 4 OF 7

011

SET THE SERVICE SWITCH TO OFF (LOC 1).

REINSTALL THE CARDS, ONE AT A TIME. DO NOT INSTALL THE TOP CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED:
- SET THE SERVICE SWITCH TO ON.
- PRESS AND HOLD THE IML SWITCH FOR SEVERAL SECONDS.
- SET THE SERVICE SWITCH TO OFF.
- CHECK IF F1 IS BLOWN.

REPEAT THIS STEP UNTIL THE FAILING CARD IS LOCATED.
THEN.....

RESET CB4.

EXCHANGE THE FAILING CARD.

GO TO PAGE 7, STEP 027, ENTRY POINT D.

A LOGIC CARD IS CAUSING THE FUSE TO BLOW.

012

THE 01A-A2 BOARD IS FAILING.

EXCHANGE FRU140.

GO TO PAGE 7, STEP 027, ENTRY POINT D.

F
3

013

IF EC A57689 IS INSTALLED, A RESISTIVE PRELOAD IS REQUIRED TO MAINTAIN POWER SUPPLY REGULATION.

IS EC A57689 INSTALLED?
Y N

SEE CARR-CU 4.

014

DISCONNECT THE CABLE CU-PS-02 P4 (LOC 1).

CHECK FOR CONTINUITY FROM CU-PS-02 P4-1 TO FRAME GROUND. THE METER SHOULD INDICATE AN OPEN CIRCUIT.

DOES THE METER INDICATE AN OPEN CIRCUIT?
Y N

015

THERE IS A SHORT CIRCUIT FROM CU-PS-02 P4-1 TO FRAME GROUND.

SEE PWR 48 TO HELP ISOLATE THE SHORT CIRCUIT.

WHEN THE PROBLEM IS CORRECTED, RECONNECT THE VOLTAGE CROSSOVERS TO THE 01A-A1 AND 01A-A2 BOARDS (YZ002) (YZ003).

GO TO PAGE 7, STEP 026, ENTRY POINT C.

5 5
J K

0 0 0 0 0 0 0 0 0 0

J K
4 4

+8.5 VOLT FUSE BLOWS

PAGE 5 OF 7

016

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145. SEE CARR-CU 1-1.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

017

IF EC A46536 IS INSTALLED, THE RESISTIVE PRELOAD CHANGES FROM A LOAD BOX MOUNTED TO THE FRAME TO A LOAD CARD LOCATED AT CARD SLOT A2P2. SEE CARR-CU 4.

IS EC A46536 INSTALLED?
Y N

018

SET THE SERVICE SWITCH TO OFF
(LOC 1).

DISCONNECT THE LOAD BOX +8.5 V
CABLE FROM TB3-2
(SEE ALD PAGE ZT020).

EXCHANGE FUSE F1.

SET THE SERVICE SWITCH TO ON
(LOC 1).

PRESS AND HOLD THE IML SWITCH
(LOC 1).

RELEASE THE IML SWITCH.
(Step 018 continues)

6
L

(Step 018 continued)

IS FUSE F1 BLOWN?
Y N

019

THE LOAD BOX IS FAILING.

EXCHANGE FRU279. SEE CARR-CU 1-1.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

020

DISCONNECT THE CABLE
CU-PS-02 P4 (LOC 1).

CHECK FOR CONTINUITY FROM CU-PS-02 P4-1 TO FRAME GROUND. THE METER SHOULD INDICATE AN OPEN CIRCUIT.

DOES THE METER INDICATE AN OPEN CIRCUIT?
Y N

021

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P4-1 TO FRAME GROUND.

SEE PWR 48 TO HELP ISOLATE THE SHORT CIRCUIT.

WHEN THE PROBLEM IS CORRECTED,
RECONNECT THE VOLTAGE CROSSOVERS
TO THE 01A-A1 AND 01A-A2 BOARDS
(YZ002) (YZ003).

GO TO PAGE 7, STEP 026,
ENTRY POINT C.

6
M

0 0 0 0 0 0 0 0 0 0

L M
5 5

PAGE 6 OF 7

022

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

SEE CARR-CU 1-1.

023

DISCONNECT THE CABLE
CU-PS-02 P4 (LOC 1).

CHECK FOR CONTINUITY FROM CU-PS-02
P4-1 TO FRAME GROUND. THE METER
SHOULD INDICATE AN OPEN CIRCUIT.

DOES THE METER INDICATE AN OPEN
CIRCUIT?
Y N

024

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P4-1 TO FRAME GROUND.

SEE PWR 48 TO HELP ISOLATE THE
SHORT CIRCUIT.

WHEN THE PROBLEM IS CORRECTED,
RECONNECT THE VOLTAGE CROSSOVERS
TO THE 01A-A1 AND 01A-A2 BOARDS
(YZ002) (YZ003).

GO TO PAGE 7, STEP 026,
ENTRY POINT C.

N

N

025

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

EXCHANGE FRU145.

GO TO PAGE 7, STEP 027,
ENTRY POINT D.

SEE CARR-CU 1-1.

o o o o o o o o o o

+8.5 VOLT FUSE BLOWS

PAGE 7 OF 7

026
(ENTRY POINT C)
CLEANUP AFTER REPAIR.

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

REMOVE ANY JUMPERS USED FOR TROUBLESHOOTING.

RECONNECT ANY CABLES REMOVED FOR TROUBLESHOOTING.

REINSTALL ANY FUSES USED FOR TROUBLESHOOTING.

RESET ANY CB TRIPPED FOR TROUBLESHOOTING.

GO TO MAP 0190, ENTRY POINT A.

027
(ENTRY POINT D)
RETURN AFTER REPAIR.

IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD, RE-IPL THE MD AND THEN SELECT THE UNIT TEST OPTION.

IF YOU ENTERED THIS MAP FROM ANY SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION.

0 0 0 0 0 0 0 0 0 0

MAP 0440—Control Unit +8.5 Volt Fuse Blows

Notes

0 0 0 0 0 0 0 0 0 0

A B
1 1

+8.5 VOLT FUSE BLOWS

PAGE 2 OF 6

004

RESET CB4.

EXCHANGE THE FAILING TAG CARD (LOC 11).
SEE THE CHART ON THE RIGHT.

LAST CABLE INSTALLED	FAILING TAG CARD
P5 (CHANNEL A)	01A-T1A3 (FRU137)
P6 (CHANNEL B)	01A-T1B3 (FRU234)
P7 (CHANNEL C)	01A-T1C3 (FRU236)
P8 (CHANNEL D)	01A-T1D3 (FRU238)

Go to Page 6, Step 023, Entry Point D.

005

SET THE SERVICE SWITCH TO OFF (LOC 1).

DISCONNECT THE 01A-A1 VOLTAGE CROSSOVERS (6):

B2 A14, B3 A14, B4 A14
U2 A14, U3 A14, U4 A14
(SEE ALD PAGE YZ002).

EXCHANGE FUSE F1.

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH FOR SEVERAL SECONDS.

RELEASE THE IML SWITCH.

IS FUSE F1 BLOWN?
Y N

3
C D

D

006

SET THE SERVICE SWITCH TO OFF (LOC 1).

RECONNECT THE 01A-A1 VOLTAGE CROSSOVERS (6):

B2 A14, B3 A14, B4 A14
U2 A14, U3 A14, U4 A14
(SEE ALD PAGE YZ002).

REMOVE ALL CARDS FROM THE 01A-A1 BOARD (LOC 7) (LOC 1).
(SEE ALD PAGE AA000).

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH FOR SEVERAL SECONDS.

RELEASE THE IML SWITCH.

IS FUSE F1 BLOWN?
Y N

007

SET THE SERVICE SWITCH TO OFF (LOC 1).

REINSTALL THE CARDS, ONE AT A TIME. DO NOT INSTALL THE TOP CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED;

-SET THE SERVICE SWITCH TO ON.
-PRESS AND HOLD THE IML SWITCH FOR SEVERAL SECONDS.
-SET THE SERVICE SWITCH TO OFF.
-CHECK IF F1 IS BLOWN.
(Step 007 continues)

A LOGIC CARD IS CAUSING THE CB TO TRIP.

3
E

C E
2 2

+8.5 VOLT FUSE BLOWS

(Step 007 continued)

REPEAT THIS STEP UNTIL THE
FAILING CARD IS LOCATED.
THEN.....

RESET CB4.

EXCHANGE THE FAILING CARD.

Go to Page 6, Step 023, Entry Point D.

008

THE 01A-A1 BOARD IS FAILING.

EXCHANGE FRU139. SEE CARR-CU 1-1.

Go to Page 6, Step 023, Entry Point D.

009

SET THE SERVICE SWITCH TO OFF (LOC 1).

DISCONNECT THE 01A-A2 VOLTAGE
CROSSOVERS (6):

B2 A14, B3 A14, B4 A14
U2 A14, U3 A14, U4 A14
(SEE ALD PAGE YZ003).

EXCHANGE FUSE F1.

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).
(Step 009 continues)

(Step 009 continued)

RELEASE THE IML SWITCH.

IS FUSE F1 BLOWN?
Y N

010

SET THE SERVICE SWITCH TO OFF
(LOC 1).

RECONNECT 01A-A2 VOLTAGE
CROSSOVERS (6):

B2 A14, B3 A14, B4 A14
U2 A14, U3 A14, U4 A14
(SEE ALD PAGE YZ003).

REMOVE ALL CARDS FROM THE 01A-A2
BOARD (LOC 7) (LOC 1).
(SEE ALD PAGE AA002).

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH FOR
SEVERAL SECONDS.

RELEASE THE IML SWITCH.

IS FUSE F1 BLOWN?
Y N

4 4 4
F G H

G H
3 3

+8.5 VOLT FUSE BLOWS

PAGE 4 OF 6

011

SET THE SERVICE SWITCH TO OFF (LOC 1).

REINSTALL THE CARDS, ONE AT A TIME. DO NOT INSTALL THE TOP CARD CONNECTORS (TCC).

EACH TIME A CARD IS INSTALLED;

-SET THE SERVICE SWITCH TO ON.
-PRESS AND HOLD THE IML SWITCH FOR SEVERAL SECONDS.
-SET THE SERVICE SWITCH TO OFF.
-CHECK IF F1 IS BLOWN.

REPEAT THIS STEP UNTIL THE FAILING CARD IS LOCATED.
THEN.....

RESET CB4.

EXCHANGE THE FAILING CARD.

Go to Page 6, Step 023, Entry Point D.

A LOGIC CARD IS CAUSING THE FUSE TO BLOW.

012

THE 01A-A2 BOARD IS FAILING.

EXCHANGE FRU140

Go to Page 6, Step 023, Entry Point D.

F
3

013

IS EC A57689 INSTALLED?
Y N

SEE CARR-CU 4.

014

DISCONNECT THE CABLE CU-PS-02 P4 (LOC 1).

CHECK FOR CONTINUITY FROM CU-PS-02 P4-1 TO FRAME GROUND. THE METER SHOULD INDICATE AN OPEN CIRCUIT.

DOES THE METER INDICATE AN OPEN CIRCUIT?
Y N

015

THERE IS A SHORT CIRCUIT FROM CU-PS-02 P4-1 TO FRAME GROUND.

SEE PWR 48 TO HELP ISOLATE THE SHORT CIRCUIT.

WHEN THE PROBLEM IS CORRECTED, RECONNECT THE VOLTAGE CROSSOVERS TO THE 01A-A1 AND 01A-A2 BOARDS (YZ002) (YZ003).

Go to Page 6, Step 022, Entry Point C.

5 5
J K

J K
4 4

+8.5 VOLT FUSE BLOWS

PAGE 5 OF 6

016

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

SEE CARR-CU 1-1.

EXCHANGE FRU145.

Go to Page 6, Step 023, Entry Point D.

017

SET THE SERVICE SWITCH TO OFF (LOC 1).

DISCONNECT THE LOAD BOX +8.5V CABLE
FROM TB3-2.
(SEE ALD PAGE ZT020.)

EXCHANGE FUSE F1.

SET THE SERVICE SWITCH TO ON (LOC 1).

PRESS AND HOLD THE IML SWITCH (LOC 1).

RELEASE THE IML SWITCH.

IS FUSE F1 BLOWN?
Y N

018

THE LOAD BOX IS FAILING.

EXCHANGE FRU279.

SEE CARR-CU 1-1.

Go to Page 6, Step 023, Entry Point D.

L

L

019

DISCONNECT THE CABLE
CU-PS-02 P4 (LOC 1).

CHECK FOR CONTINUITY FROM CU-PS-02
P4-1 TO FRAME GROUND. THE METER
SHOULD INDICATE AN OPEN CIRCUIT.

DOES THE METER INDICATE AN OPEN CIRCUIT?
Y N

020

THERE IS A SHORT CIRCUIT FROM
CU-PS-02 P4-1 TO FRAME GROUND.

SEE PWR 48 TO HELP ISOLATE THE
SHORT CIRCUIT.

WHEN THE PROBLEM IS CORRECTED,
RECONNECT THE VOLTAGE CROSSOVERS
TO THE 01A-A1 AND 01A-A2 BOARDS
(YZ002) (YZ003).

Go to Page 6, Step 022, Entry Point C.

021

THE CONTROL UNIT DC SUPPLY,
CU-PS-02, IS FAILING (LOC 1).

SEE CARR-CU 1-1.

EXCHANGE FRU145.

Go to Page 6, Step 023, Entry Point D.

MAP 0440 — Control Unit +8.5 Volt Fuse Blows PWR 440-6

+8.5 VOLT FUSE BLOWS

PAGE 6 OF 6

022
(ENTRY POINT C)
CLEANUP AFTER REPAIR.

SET THE CONTROL UNIT POWER ON/OFF SWITCH TO THE OFF POSITION (LOC 1).

REMOVE ANY JUMPERS USED FOR TROUBLESHOOTING.

RECONNECT ANY CABLES REMOVED FOR TROUBLESHOOTING.

RE-INSTALL ANY FUSES USED FOR TROUBLESHOOTING.

RESET ANY CB'S TRIPPED FOR TROUBLESHOOTING.

Go to MAP 0190, Entry Point A.

023
(ENTRY POINT D)
RETURN AFTER REPAIR.

IF YOU ENTERED THIS MAP FROM THE MD, RETURN TO THE MD, RE-IPL THE MD, AND THEN SELECT THE UNIT TEST OPTION

IF YOU ENTERED THIS MAP FROM ANY SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT, AND SELECT THE UNIT TEST OPTION.

AUTOMATIC CARTRIDGE LOADER PROCEDURE

PAGE 1 OF 5

ENTRY POINTS

FROM	ENTER THIS MAP		
MAP NUMBER	ENTRY POINT	PAGE NUMBER	STEP NUMBER
0000	A	1	001

EXIT POINTS

EXIT THIS MAP		TO	
PAGE NUMBER	STEP NUMBER	MAP NUMBER	ENTRY POINT
3	024	0200	A
4	030	0200	A

001
(Entry Point A)

YOU ARE HERE BECAUSE THE POWER-ON LED AT THE OPERATOR PANEL OF THE AUTOMATIC CARTRIDGE LOADER IS NOT ON.

DANGER

LETHAL VOLTAGES ARE PRESENT IN THE POWER SERVICE AREA. SAFETY IS MOST IMPORTANT. TREAT ALL CIRCUITS AS LIVE UNTIL MEASURED.

BECAUSE THIS FAILURE HAS BEEN IDENTIFIED AS A SINGLE DRIVE PROBLEM (THE OTHER DRIVE IN THE TAPE UNIT IS OPERATIONAL) NO ANALYSIS OF AC INPUT VOLTAGES WILL BE MADE.

ON THE FAILING DRIVE, SET THE ONLINE/OFFLINE SWITCH TO OFFLINE.
POWER OFF THE FAILING DRIVE.

CONTINUITY CHECK THE +5V LOADER FUSE.

+5V FUSE IS THE LOWER FUSE ON THE LOADER.
REFER TO MI LOC001 FOR LOCATION.

IS THE FUSE OK?
Y N

2
A B

B

002

HAS THE FUSE BEEN EXCHANGED BEFORE?
Y N

003

EXCHANGE THE +5V LOADER FUSE.

POWER ON THE DRIVE.

IS THE LOADER POWER-ON LED ON?
Y N

004
Go to Step 001, Entry Point A.

005
Go to Page 5, Step 038, Entry Point C.

006

EXCHANGE THE LOADER CONTROL CARD.

SEE CARR-DR 1-1.
FRU 281 ----- ALD AL001

EXCHANGE THE +5V LOADER FUSE.
POWER ON THE DRIVE.

IS THE LOADER POWER-ON LED ON?
Y N

2 2
C D

A1 C1 D1 **PWR 0900**

PAGE 2 OF 5

007

EXCHANGE THE LOADER OPERATOR PANEL.

SEE CARR-DR 1-1.
FRU 298 ----- ALD AL002

EXCHANGE THE +5V LOADER FUSE.
POWER ON THE DRIVE.

IS THE LOADER POWER-ON LED ON?
Y N

008

GO TO POWER 30.

009
Go to Page 5, Step 038, Entry Point C.

010
Go to Page 5, Step 038, Entry Point C.

011

CONTINUITY CHECK THE +24V LOADER FUSE.

+24V FUSE IS THE UPPER FUSE ON THE LOADER.
REFER TO MI LOC001 FOR LOCATION.

IS THE FUSE OK?
Y N

012

HAS THE FUSE BEEN EXCHANGED BEFORE?
Y N

3 E F G

F G

013

EXCHANGE THE +24V LOADER FUSE.
POWER ON THE DRIVE.

IS THE LOADER POWER-ON LED ON?
Y N

014
Go to Page 1, Step 001, Entry Point A.

015
Go to Page 5, Step 038, Entry Point C.

016

EXCHANGE THE LOADER CONTROL CARD.

SEE CARR-DR 1-1.
FRU 281 ----- ALD AL001

EXCHANGE THE +24V LOADER FUSE.
POWER ON THE DRIVE.

IS THE LOADER POWER-ON LED ON?
Y N

017

EXCHANGE THE LOADER OPERATOR PANEL.

SEE CARR-DR 1-1.
FRU 298 ----- ALD AL002

EXCHANGE THE +24V LOADER FUSE.
POWER ON THE DRIVE.

IS THE LOADER POWER-ON LED ON?
Y N

018

GO TO POWER 30.

3 3
H J

E2 H2 J2 **PWR 0900**

PAGE 3 OF 5

019
Go to Page 5, Step 038, Entry Point C.

020
Go to Page 5, Step 038, Entry Point C.

021
VERIFY THAT THE CONNECTIONS FROM THE LOADER POWER CABLE TO THE FUSE HOLDERS ARE GOOD.
POWER ON THE DRIVE.

IS THE LOADER POWER-ON LED ON?
Y N

022

DISCONNECT LOADER POWER CABLE (CONNECTOR J3) FROM LOADER CONTROL CARD.

REFER TO MI LOC001 FOR CONNECTOR DIAGRAM.

POWER ON THE DRIVE AND MEASURE VOLTAGE ACROSS AL-D0/1-CC-P3-4 (+5V) AND AL-D0/1-CC-P3-3 (COM) WITH A VOLTMETER.

IS VOLTAGE WITHIN LIMIT +4.5 AND +5.5 VDC?
Y N

023

POWER OFF THE DRIVE AND DISCONNECT THE INTERPOSER CABLE AND CONNECTOR FROM THE POWER DISTRIBUTION CABLE CONNECTOR.

REFER TO MI LOC001 FOR CONNECTOR DIAGRAM.

POWER ON THE DRIVE AND MEASURE VOLTAGE ACROSS TU-D0/1-P1-P1-3 (+5V) AND TU-D0/1-P1-P1-9 (COM) WITH A VOLTMETER.

ALD ZZ020 OR ALD ZZ120

IS VOLTAGE WITHIN LIMIT +4.5 AND +5.5 VDC?
Y N

5 4
K L M N

M N

024

Go To Map 0200, Entry Point A.

025

POWER OFF THE DRIVE.
RE-CONNECT THE INTERPOSER CABLE AND CONNECTOR TO THE POWER DISTRIBUTION CABLE CONNECTOR.

REMOVE THE LOADER MECHANICAL ASSEMBLY.

SEE CARR-DR 1-1.
FRU 285

POWER ON THE DRIVE AND MEASURE THE VOLTAGE ACROSS TU-D0/1-P1-J6-1 (+5V) AND TU-D0/1-P1-J6-2 (COM).

IS VOLTAGE WITHIN LIMIT +4.5 AND +5.5 VDC?
Y N

026

THE INTERPOSER CABLE AND CONNECTOR IS DEFECTIVE.

EXCHANGE THE INTERPOSER CABLE AND CONNECTOR.

SEE CARR-DR 1-1.
FRU 269 ----- ALD ZZ020/120

Go to Page 5, Step 038, Entry Point C.

027

THE LOADER POWER CABLE IS DEFECTIVE.

EXCHANGE THE LOADER POWER CABLE.

SEE CARR-DR 1-1.
FRU 287 ----- ALD ZZ020/120

Go to Page 5, Step 038, Entry Point C.

MAP 0900 — Automatic Cartridge Loader Procedure

L3

PWR 0900

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028

MEASURE VOLTAGE ACROSS CC-P3-2 (+24V) AND CC-P3-1 (COM) WITH A VOLTMETER.

REFER TO MI LOC001 FOR CONNECTOR DIAGRAM.

IS VOLTAGE WITHIN LIMIT +21.6 AND +26.4 VDC?
Y N

029

POWER OFF THE DRIVE AND DISCONNECT THE INTERPOSER CABLE AND CONNECTOR FROM THE POWER DISTRIBUTION CABLE CONNECTOR.

REFER TO MI LOC001 FOR CONNECTOR DIAGRAM.

POWER ON THE DRIVE AND MEASURE VOLTAGE ACROSS TU-D0/1-P1-P2-1 (+24V) AND TU-D0/1-P1-P2-7 (COM) WITH A VOLTMETER.

ALD ZZ020 OR ALD ZZ120

IS VOLTAGE WITHIN LIMIT +21.6 AND +26.4 VDC?
Y N

030

Go To Map 0200, Entry Point A.

031

POWER OFF THE DRIVE.
RE-CONNECT THE INTERPOSER CABLE AND CONNECTOR TO THE POWER DISTRIBUTION CABLE CONNECTOR.

REMOVE THE LOADER MECHANICAL ASSEMBLY.

SEE CARR-DR 1-1.
FRU 285

POWER ON THE DRIVE AND MEASURE THE VOLTAGE ACROSS TU-D0/1-P1-J6-3 (+24V) AND TU-D0/1-P1-J6-2 (COM).

IS VOLTAGE WITHIN LIMIT +21.6 AND +26.4 VDC?
Y N

P Q R

P Q R

032

THE INTERPOSER CABLE AND CONNECTOR IS DEFECTIVE.

EXCHANGE THE INTERPOSER CABLE AND CONNECTOR.

SEE CARR-DR 1-1.
FRU 269 ----- ALD ZZ020/120

Go to Page 5, Step 038, Entry Point C.

033

THE LOADER POWER CABLE IS DEFECTIVE.

EXCHANGE THE LOADER POWER CABLE.

SEE CARR-DR 1-1.
FRU 287 ----- ALD ZZ020/120

Go to Page 5, Step 038, Entry Point C.

034

POWER OFF THE DRIVE.

RE-CONNECT CONNECTOR J3 AND MAKE CERTAIN THAT THE CONNECTION IS GOOD.

POWER ON THE DRIVE.

IS THE LOADER POWER-ON LED ON?
Y N

035

EXCHANGE THE LOADER OPERATOR PANEL.

SEE CARR-DR 1-1.
FRU 298 ----- ALD AL002

POWER ON THE DRIVE.

IS THE LOADER POWER-ON LED ON?
Y N

5S 5T 5U

MAP 0900 — Automatic Cartridge Loader Procedure

K34 S44 T44 U44 **PWR 0900**

PAGE 5 OF 5

036

EXCHANGE THE LOADER CONTROL CARD.

SEE CARR-DR 1-1.
FRU 281 ----- ALD AL001

Go to Step 038, Entry Point C.

037

Go to Step 038, Entry Point C.

038

(Entry Point C)

RECONNECT ANY CABLES REMOVED FOR TROUBLESHOOTING.
REPLACE ANY FUSES REMOVED FOR TROUBLESHOOTING.
REPLACE ANY FRUS REMOVED FOR TROUBLESHOOTING.

SET THE ONLINE/OFFLINE SWITCH TO ONLINE.

IF YOU CAME TO THE POWER MAPS FROM THE MD, RETURN TO THE MD AND CONTINUE THE MAINTENANCE CALL BY ACTIVATING THE ENTER KEY.

IF YOU CAME TO THE POWER MAPS FROM THE START SECTION OF THE MI, CONNECT THE MD TO THE CONTROL UNIT AND SELECT THE UNIT TEST OPTION. ANSWER 'YES' WHEN ASKED IF YOU WANT TO RUN THE FULL FUNCTION AUTOMATIC CARTRIDGE LOADER TEST.

039
Go to Step 038, Entry Point C.

Contents

Notes SENSE 2

Notes SENSE 2

Sense Description

The 3480 subsystem control unit and tape drive microprocessors repeatedly check all subsystem operations for errors. Some errors can be corrected by the subsystem microcode and error correction circuits. These errors are recorded for later analysis if necessary. Other errors that cannot be corrected cause an interruption in subsystem operation. All available information about the error is recorded as sense data to aid in finding the subsystem problem that caused the error.

Sense data is recorded in six formats—19, 20, 22, 24, and 21 or 30. Each tape drive has sense data stored in the control unit. A Sense command causes Formats 19 and 20 data to be transferred to the host system channel. A Rewind Unload command causes Format 22 to be sent to the host channel. A Read Buffered Log command causes Format 21, 24, or 30 to be sent to the host channel.

How to Determine the Sense Data Format

Sense bytes 0 through 7 are common to the five sense formats. See SENSE 105 through SENSE 130 for a detailed description of these eight bytes. The format of bytes 8 through 31 is indicated in sense byte 7.

- Sense byte 7 = X'19' or X'20' (format 19 or 20).

  Bytes 8 to 31 of both formats contain drive and control unit error information. However, when Format 19 is indicated, the Force Error Logging bit has been set by the MD and the sense data is also logged in an EREP Report.

- Sense byte 7 = X'21' (format 21).

  Bytes 8 to 31 contain statistical information about subsystem operations.

- Sense byte 7 = X'22' (Format 22).

  Bytes 8 to 31 contain statistical information about subsystem operations.

- Sense byte 7 = X'24' (Format 24).

  Bytes 8 to 31 contain statistical information about subsystem operations.

- Sense byte 7 = X'30' (Format 30).

  Bytes 8 to 63 contain statistical information about subsystem operations.

  Note: If both types of sense formats are saved in the control unit for one drive, the first sense command to that drive receives Format 22 sense data. The second sense command receives the Format 19 or 20 sense data.

Formats 19 and 20

Formats 19 and 20 consist of drive and control unit error information. The formats are given when a Sense command is received by the selected drive.

Sense data in formats 19 and 20 are not valid for a drive after the following operations:

- System reset
- Selective reset
- Power on reset
- Any I/O command other than Test I/O or NOP after a contingent connection
- A temporary error that has been recovered.

See SENSE 135 through SENSE 160 for a detailed description of the formats 19 and 20 sense bytes.

Format 21

Format 21 consists of 32 bytes of buffered log data and is obtained by a Read Buffered Log command when the Improved Data Recording Capability feature is not installed or allowed. Format 21 is also given when:

- A Sense command is received and one or more of the temporary error counters has an overflow.

Buffered log (format 21) data is reset to zero after a:

- Read Buffered Log command
- System reset
- Selective reset
- Power on reset.

If a unit check occurs, the control unit keeps a contingent connection to the selected drive on the same channel path as the original unit check was received. This contingent connection is kept until a command other than Test I/O or NOP is received by that drive. The host system program usually sends a Sense command to get the failure information.

See SENSE 165 through SENSE 190 for a detailed description of the format 21 sense bytes.

Format 22

Format 22 consists of End of Volume sense data and is obtained when a Rewind Unload command is received.

See SENSE 195 through 210 for a detailed description of Format 22 sense bytes.

Format 24

Format 24 consists of 32 bytes of sense data, which reports information from the VOLID mark.

Format 30

Format 30 consists of 64 bytes of buffered log data and is obtained by a Read Buffered Log command when the Improved Data Recording Capability feature is installed and allowed.

See SENSE 215 through 275 for a detailed description of Format 30 sense bytes.

Sense Analysis

Sense byte analysis is under the direction of the MD. To analyze sense bytes, connect the MD to a control unit and select option 1, Start Repair. If sense byte analysis is required, the MD will request that you enter specific sense byte data. The MD will analyze this data and develop a fault symptom code (FSC).

For single-drive failure analysis, the following sense byte data is requested in the sequence shown:

1. Sense byte 21, formats 19 and 20 (first drive error code).
2. Sense byte 23, formats 19 and 20 (last drive error code).
3. Sense bytes 16 and 17, format 20 (control unit hardware detected error).
4. Sense bytes 10 and 11, formats 19 and 20 (first control unit microcode detected error).
5. Sense bytes 12 and 13, formats 19 and 20 (second control unit microcode detected error).
6. Sense bytes 14 and 15, formats 19 and 20 (last control unit microcode detected error).

For multiple-drive failure analysis, the following sense byte data is requested in the sequence shown:

Note: To determine the failing path in a multiple-path subsystem, see START 400. Use the analysis procedure described to verify that the MD is connected to the correct control unit.

1. Sense bytes 16 and 17, formats 19 and 20 (control unit hardware detected error).
2. Sense bytes 10 and 11, formats 19 and 20 (first control unit microcode detected error).
3. Sense bytes 12 and 13, formats 19 and 20 (second control unit microcode detected error).
4. Sense bytes 14 and 15, formats 19 and 20 (last control unit microcode detected error).

Note: Use caution when using the second or last control unit error codes. These codes may cause you to use the wrong symptoms for problem analysis.

FORMATS 19, 20, 21, 22, and 30

BYTE/BIT	MEANING	PAGE
Byte 0		
Bit 0	Command reject	110
Bit 1	Intervention required	110
Bit 2	Bus out check	110
Bit 3	Equipment check	110
Bit 4	Data check	110
Bit 5	Overrun	110
Bit 6	Deferred Unit Check	110
Bit 7	Assigned elsewhere	110
Byte 1		
Bit 0	Locate failure	110
Bit 1	Drive online to control unit	110
Bit 2	Reserved	
Bit 3	Record sequence error	110
Bit 4	Beginning of tape (BOT)	110
Bit 5	Write mode	110
Bit 6	Write protect	110
Bit 7	Not capable	110
Byte 2		
Bits 0-3	Reporting channel path	110
Bit 4	Reporting control unit	110
Bit 5	Automatic cartridge loader active	110
Bit 6	Tape synchronous mode	110
Bit 7	Tape positioning	110
Byte 3	Error Recovery Action (ERA) code	115
Byte 4		
Bits 0-1	Format indication 00 = Standard 3480 format 01 = Reserved 10 = 3480 Improved Data Recording Capability 11 = Special Marks	130
Bits 2-7	High-order channel logical block number	130
Bytes 5 and 6	Low-order channel logical block number	130
Byte 7	Format of bytes 8-31	130

FORMATS 19 and 20

BYTE/BIT	MEANING	PAGE
Byte 8	Drive Error Recovery Action (ERA) code	140
Byte 9	First CU microcode error flags	140
Bytes 10 and 11	First CU microcode error code	140
Bytes 12 and 13	Second CU microcode error code	140
Bytes 14 and 15	Last CU microcode error code	140
Bytes 16 and 17	CU hardware error code	150
Byte 18	Drive flag 1	150
Byte 19	Hardware EC Switches	150
Bits 0-7	Device level register (DLR) contents	150
Byte 20	Drive command code 1	150
Byte 21	Drive error code 1	150
Byte 22	Drive command code 2	150
Byte 23	Drive error code 2	150
Byte 24		
Bits 0-3	Channel adapters installed	160
Bits 4-7	Data transfer mode	160
Byte 25	Control unit features	160
Bit 0	Two control unit feature	160
Bit 1-3	Reserved	160
Bit 4	Improved Data Recording Capability Allowed	160
Bit 5	Improved Data Recording Capability Installed	160
Bit 6	Upgraded buffer	160
Bit 7	Automatic cartridge loader installed	160
Byte 26	Control unit microcode EC level	160
Byte 27	Control unit identification	160
Bit 0	0 = Two board control unit 1 = One board control unit	160
Bits 1-3	100 = 3490 Model A01/A02 101 = 3480 Model A11 110 = 3490 Model D31/D32 111 = 3480 Model A22	160
Bits 4-7	Control unit serial number (high order digit)	160
Bytes 28 and 29	Control unit serial number (low-order digit)	160
Byte 30	Drive address	160
Bits 0-3	Logical drive address	160
Bits 4-7	Physical drive address	160
Byte 31	Buffered data bytes	160

FORMAT 21

BYTE/BIT	MEANING	PAGE
Byte 8	Read forward data checks	170
Byte 9	Read backward data checks	170
Byte 10	Write data checks	170
Byte 11	Read blocks corrected	170
Byte 12	Write blocks corrected	170
Byte 13	Control unit equipment checks	170
Bytes 14 and 15	Read bytes processed	170
Bytes 16 and 17	Write bytes processed	180
Byte 18	Read blocks processed	180
Byte 19	Write blocks processed	180
Byte 20	Write transient conditions	180
Byte 21	Read transient conditions	180
Byte 22	Criteria write data checks	180
Byte 23	Criteria read data checks	180
Byte 24	Write recovery erase gap count	190
Byte 25	Drive detected errors	190
Byte 26	Low order of read or write blocks processed	190
Byte 27	Control unit identification	190
Bit 0	0 = Two board control unit 1 = One board control unit	190
Bits 1-3	100 = 3490 Model A01/A02 101 = 3480 Model A11 110 = 3490 Model D31/D32 111 = 3480 Model A22	190
Bits 4-7	Control unit serial number (high order digit)	190
Bytes 28 and 29	Control unit serial number (low-order digit)	190
Byte 30	Read recovery retry count	190
Byte 31	Drive address	190
Bits 0-3	Logical drive address	190
Bits 4-7	Physical drive address	190

FORMAT 22

BYTE/BIT	MEANING	PAGE
Bytes 8-25	Reserved	210
Byte 26	Device and/or cartridge action	210
Bit 0	Clean device	210
Bits 1-5	Reserved	
Bits 6-7	01 = Rewrite cartridge 11 = Replace cartridge	
Byte 27	Control unit identification	210
Bit 0	0 = Two board control unit 1 = One board control unit	210
Bits 1-3	100 = 3490 Model A01/A02 101 = 3480 Model A11 110 = 3490 Model D31/D32 111 = 3480 Model A22	210
Bits 4-7	Control unit serial number (high order digit)	210
Bytes 28-29	Control unit serial number (low order digit)	210
Byte 30	Drive address	210
Bits 0-3	Logical drive address	210
Bits 4-7	Physical drive address	210
Byte 31	Reserved	210

FORMAT 24

BYTE/BIT	MEANING	PAGE
Byte 8	Reserved	214
Byte 9		214
Bit 0	VOLID mark was detected on the volume	214
Bit 1	Volume identifier is valid	214
Bit 2	Volume identifier is in EBCDIC	214
Bit 3	Volume identifier is in ASCII	214
Bits 4-7	Reserved	214
Bytes 10-15	Volume identifier	214
Byte 16	Accessibility	214
Byte 17	Label standard level	214
Bytes 18-26	Reserved	214
Byte 27		
Bits 0-3	Control unit hardware information	214
Bits 4-7	Control unit sequence number	214
Bytes 28-29		
Bits 0-7	Control unit serial number (low order digit)	214
Bytes 30-31	Reserved	214

Sense Byte Summary (Continued)

FORMAT 30 BYTE/BIT	MEANING	PAGE
Byte 8	Device read forward data checks	220
Byte 9	Device write forward data data checks	220
Byte 10	Device read backward data checks	220
Byte 11	Reserved	220
Byte 12	Device read criteria data checks	220
Byte 13	Device write criteria data checks	220
Byte 14	Device read recovery retries	220
Byte 15	Device write recovery erase gaps	220
Byte 16	Device read transient conditions	230
Byte 17	Device write transient conditions	230
Byte 18	Device read blocks corrected	230
Byte 19	Device write blocks corrected	230
Bytes 20-21	Reserved	230
Byte 22	Channel read data request timeouts	230
Byte 23	Channel write data request timeouts	230
Byte 24	Channel transfer equipment checks	240
Byte 25	Drive detected errors	240
Byte 26	Device and/or Cartridge Action	240
Byte 27	Control unit identification	240
Bit 0	0 = Two board control unit 1 = One board control unit	240
Bit 1-3	100 = 3490 Model A01/A02 101 = 3480 Model A11 110 = 3490 Model D31/D32 111 = 3480 Model A22	240
Bit 4-7	Control unit serial number (high order digit)	240
Bytes 28-29	Control unit serial number (low order digit)	240
Byte 30	Drive address	240
Bits 0-3	Logical drive address	240
Bits 4-7	Physical drive address	240
Byte 31	Reserved	240

FORMAT 30 BYTE/BIT	MEANING	PAGE
Bytes 32-34	Channel read bytes processed	250
Bytes 35-37	Channel write bytes processed	250
Bytes 38-40	Device read bytes processed	250
Bytes 41-43	Device write bytes processed	260
Bytes 44-46	Channel read blocks processed	260
Bytes 47-49	Channel write blocks processed	260
Bytes 50-52	Device read block processed	270
Bytes 53-55	Device write blocks processed	270
Bytes 56-63	Reserved	270

Formats 19, 20, 21, 22, 24, and 30 Sense Bytes 0-2 Table

Formats 19, 20, 21, 22, 24, and 30 Sense Bytes 0-2 Table

FORMATS 19, 20, 21, 22, 24 and 30 BYTES 0-2								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
0	Command Reject	Intervention Required	Bus Out Check	Equipment Check	Data Check	Overrun	Deferred Unit Check	Assigned Elsewhere
1	Locate Failure	Device Online to CU	Reserved	Record Sequence Error	Beginning-of-Tape (BOT)	Write Mode	Write Protect	Not Capable
2	Reporting channel path				Reporting Control Unit	Automatic Cartridge Loader Active	Tape Synchronous Mode	Tape Positioning

Formats 19, 20, 21, 22, 24, and 30 Sense Bytes 0-2 Description

Sense bytes 0-7 are common to all formats. Bytes 0-2 have the following meaning:

Byte 0

Bit 0 - Command Reject: This bit is set when:

- A Write, Write Tape Mark, Erase Gap, or Data Security Erase command is sent to a tape that is file protected.
- The control unit receives a not valid command.
- A Data Security Erase command is sent that is not command-chained to an Erase Gap command.
- The subsystem received an inhibited supervisor channel command.
- The subsystem senses a not valid channel program sequence.
- A not valid argument is specified in a command.

Bit 1 - Intervention Required: This bit is set when the addressed drive is not ready or does not exist.

Bit 2 - Bus Out Check: This bit is set when the channel bus out has wrong parity during a command or flag byte movement.

Bit 3 - Equipment Check: This bit is set when:

- An error is sensed during a read operation in read buffered mode.
- No other bit is set in sense bytes 0 and 1 and there is an error for the drive.

Bit 4 - Data Check: This bit is set when an error is sensed during an operation in which data is being written on or read from the tape.

Bit 5 - Overrun: This bit is set when a data movement in tape synchronous mode finds the control unit buffer full during a read operation or finds the control unit buffer empty during a write operation. The subsystem attempts error recovery procedures before this bit is set. Data overrun is the only type of overrun from which the subsystem attempts to recover, and the data overrun condition is not sent to the host.

Bit 6 - Deferred Unit Check: This bit is set to 1 if the data is associated with unit check status which is generated for a condition which is not related to the execution of the current command.

Bit 7 - Assigned Elsewhere: This bit is set to 1 if the data is associated with unit check status which is generated because the device is disabled by dynamic partitioning on the selected channel path.

Byte 1

Bit 0 - Locate Failure: This bit is set to 1 if the data is associated with unit check status which is generated because the block requested by a Locate command could not be found.

Bit 1 - Device Online to Control Unit: This bit is set to 1 if the device state in the control unit is "online".

Bit 2 - Reserved: This bit is always 0.

Bit 3 - Record Sequence Error: This bit is set if an out-of-sequence record is detected while reading the block ID.

Bit 4 - Beginning-of-Tape (BOT): This bit is set when the tape is at the beginning-of-tape (BOT) position.

Bit 5 - Write Mode: This bit is set when the latest command sent to the drive was a write-type command.

Bit 6 - Write Protect: This bit is set when the cartridge in the selected drive is protected against write operations. This bit is valid only when byte 1 bit 1, device online is also set to 1.

Bit 7 - Not Capable: This bit is set when the data on the cartridge cannot be read because the format is not correct.

Byte 2

Bits 0, 1, 2, and 3 - Channel Adapter Code: Bits 0, 1, 2, and 3 identify the channel adapter that reported this sense record.

BIT 0 1 2 3	MEANING
0 0 0 0	No Channel Command Received
0 0 1 0	CU0 Channel Interface A
0 1 0 0	CU0 Channel Interface B
0 1 1 0	CU0 Channel Interface C
1 0 0 0	CU0 Channel Interface D
0 0 1 1	CU1 Channel Interface A
0 1 0 1	CU1 Channel Interface B
0 1 1 1	CU1 Channel Interface C
1 0 0 1	CU1 Channel Interface D

Bit 4 - Reporting Control Unit: This bit indicates the control unit that detected and generated the sense data. If bit 4 equals 0, the sense data was assembled in control unit 0. If bit 4 equals 1, the sense data was assembled in control unit 1. In a single control unit configuration, this bit is always zero.

Bit 5 - Automatic Cartridge Loader Active: The automatic cartridge loader is in system or automatic mode; there are more cartridges in the input stack and the automatic cartridge loader is capable of indexing at least one cartridge into the drive.

Bit 6 - Tape Synchronous Mode: The drive in synchronous data transfer mode bit is set when the control unit places the drive in tape synchronous mode.

Bit 7 - Tape Positioning: This bit is active if channel block ID needs to be adjusted to obtain the channel block ID associated with the failing block.

FORMATS 19, 20, 21, 22, 24, and 30 BYTE 3								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
3	Subsystem Error Recovery Action (ERA) Code							

Formats 19, 20, 21, 22, 24, and 30 Sense Byte 3 Description

Byte 3

Byte 3 contains the subsystem Error Recovery Action (ERA) code. It describes the action that the host system should take to recover from an error the subsystem.

Note: See SENSE 120 for a description of the host recovery action.

ERA CODE (HEX)	DESCRIPTION OF ERROR	HOST ACTION
00	Unsolicited sense	If in response to unit check status logs permanent errors, else no action.
01-20	Reserved	
21	Data streaming not operational	Retry
22	Path equipment check	DDR
23	Read data check	DDR
24	Load display command to prior CHK message	Resume
25	Write data check	DDR
26	Read data check *	Retry
27	Command reject	Permanent error
28	Write ID mark check	DDR
29	Reserved	
2A	Unsolicited environmental data (error counter overflow)	Retry
2B	Environmental data present after a rewind unload command	Resume
2C	Permanent equipment check	Permanent error
2D	Date security erase failure	Permanent error
2E	Not capable (BOT error)	DDR
2F	Reserved	
30	Write protected	Operator intervention
31	Tape void	DDR
32	Lost tape tension	Permanent error
33	Load failure	Operator intervention
34	Unload failure	Operator intervention
35	Drive equipment check	Permanent error
36	Reserved	

ERA CODE (HEX)	DESCRIPTION OF ERROR	HOST ACTION
37	Tape length check error	Permanent error
38	Physical end of tape	Permanent error
39	Backward at Beginning-of-Tape	Permanent error if block ID not = 0, else job terminated
3A	Drive switched not ready	Operator intervention
3B	Manual Rewind or Unload	DDR
3C-3F	Reserved	
40	Overrun	DDR
41	Record sequence error	Permanent error
42	Degraded mode errors	Retry
43	Drive not ready	Operator intervention
44	Locate block unsuccessful	Permanent error
45	Drive assigned elsewhere	Permanent error
46	Drive not online	Permanent error
47	Volume fenced	Permanent error
48	Unsolicited informational data	Retry
49	Bus Out check	DDR
4A	Control Unit ERP failed	Permanent error
4B	Control Unit & drive are incompatible	Permanent error + DDR
4C	Recovered CK1 failure	Retry
50	Read buffered log (overflow)	Resume
51	Read buffered log (EOV)	Resume
52	End of volume complete	Resume

Dynamic Device Reconfiguration (DDR)

Dynamic device reconfiguration allows an operator to move a tape cartridge from a failing tape drive to another without restarting the channel program. If dynamic device reconfiguration is not available, a permanent error condition is sent to the access method or user program.

If available in the host system, the DDR should be used to move the cartridge to a different drive. This action assumes that the drive that indicated the error is suspected of causing the error. To correctly save the data that may be in the control unit buffer, the DDR must:

1. Save the CSW that indicated the original unit check for step 6. This CSW shows where to continue the user's channel program. If not write mode, go to step 3.

2. Give a sequence of Read Buffer commands to recover write data from the buffer to the host main storage if the user's program was writing data when the error occurred.

3. Give a Read Block ID command to identify the current tape position. If the error occurred while the tape was moving forward, the tape is stopped immediately past the failing block. If the error occurred while the tape was moving backward, the tape is stopped immediately before the failing block.

4. Give a Locate Block command to locate the tape correctly after the operator has moved the tape to a different drive. The argument for the Locate Block ID command is the first four bytes returned by the Read Block ID command.

5. If not write mode, go to step 6. Write the data that was read in step 2 to the tape installed on a different drive. Tape Write Mode is recommended for this writing.

6. Continue with the user's channel program. If the program was being written in Buffered Write Mode, the user can continue in that mode. The address field of the CSW that was saved in step 1 points to the place where the user's program can be continued (plus eight bytes). Data chaining can change the location of the starting point when the user continues the operation of the I/O chain.

Permanent Error

The host system should send a permanent error signal to the access method or user program.

Operator Intervention

The operator must perform some manual action, such as moving a tape, to continue processing on the subsystem.

Resume

The channel program continues processing at the point of interruption after the system control program has performed any needed action. No error signal is sent to the user, or the channel program starts processing again at the command following the command that was in error. In this event, the Channel Status Word (CSW) address field contains the address of the next command if command chaining was specified in the command in error and data chaining was not specified.

Note: The host system program analyzes the Channel Command Words (CCWs) when the restart is to continue at a command following the command in error.

Retry

The channel program retries the failing CCW.

Formats 19, 20, 21, 22, 24, and 30 Sense Bytes 4-7 Table

FORMATS 19, 20, 21, 22, 24, AND 30 BYTES 4-7								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
4	Format Mode			High-order channel logical block number				
5	Mid-Order channel logical block number							
6	Low-Order channel logical block number							
7	Sense Byte Format							

Formats 19, 20, 21, 22, 24, and 30 Sense Bytes 4-7 Description

Byte 4

Bits 0-1 - Format Mode:

These two bits indicate the format mode at the time the error occurred. A 3480 Improved Data Recording Capability indicates that the data was processed with Improved Data Recording Capability enabled by the control unit.

00 = 3480 Format
01 = Reserved
10 = 3480 Improved Data Recording Capability
11 = Special Marks

Bits 2-7 - High-Order Channel Logical Block Number:

These bits contain the high-order bits of the channel logical block number which would be accessed in the forward direction from the control program's perspective.

Bytes 5 and 6

These bytes contain the low-order bits of the channel logical block number which would be accessed in the forward direction from the control program's perspective.

Byte 7

The contents of byte 7 determine the format of bytes 8 through 31. If byte 7 contains X'19' or X'20', the format represents subsystem error sense data. If byte 7 contains X'22', the format represents operating condition data and buffered log information (format 22). Only 19, 20, 21, 22, 24, or 30 is valid in sense byte 7.

FORMATS 19 and 20 BYTES 8-15								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
8	Drive Error Recovery Action (ERA) Code							
9	Control unit flags							
10	First CU Microcode Error Code							
11	First CU Microcode Error Code							
12	Second CU Microcode Error Code							
13	Second CU Microcode Error Code							
14	Last CU Microcode Error Code							
15	Last CU Microcode Error Code							

Formats 19 and 20 Sense Bytes 8-15 Description

Byte 8 - Drive Error Recovery Action (ERA) Code

Byte 8 contains the ERA code when a drive has asked for action from the error recovery procedures. The ERA codes and control unit actions are described in the following table:

ERA CODE (HEX)	CONTROL UNIT ACTION
4D or CD	Backspace and write block again
4F or CF	If a write operation, reposition tape and issue the failing command again. If a read operation, do nothing unless it is a control unit failure.
5B or DB	Give the last (failing) command again. The drive has automatically returned the tape to the preceding position after a failure.
5F or DF	Give the preceding serial command. The serial command was not processed.
61 or E1	Give a RESETA command and continue.
63 or E3	If the BLKID=0, this is a permanent error. If not, give a Locate command and attempt again.
66 or E6	Load the drive patch area.
69 or E9	Manual action needed. Operator can remove any slack in the tape by pressing the Rewind switch to reload the tape.
6B or EB	Give a RESETB command, find block where error occurred, and continue operation.
6C or EC	Manual action needed. Equipment check bit is set.
6D or ED	If a data path transfer error occurred, return the tape to its preceding position and attempt the command again.
6E or EE	Give a Locate command to Segment 55, followed by a rewind operation to the BOT.
70 or F0	Manual action needed. Operator must unload the tape, change the position of the file protect switch on the cartridge, and load the cartridge again. A write command was given to a file-protected tape.
71 or F1	Forward command at PEOT, stop-lock, on moving forward into PEOT during a read operation, or moving forward into PEOT during a write operation.
72 or F2	Sends an equipment check message to the console. DSE failed (write RAS not valid)
73 or F3	Manual action needed. The equipment check bit is set. The operator must load or unload the tape.
75 or F5	Sends an equipment check message to the console. Send a Load Display command to the failing drive.
76 or F6	Give a Rewind Unload command from the host. If the tape does not unload, tape damage can result.
78 or F8	Manual Rewind command has been initiated. The operator pressed the Not Ready and Rewind switches.
79 or F9	Request control unit issue a Rewind Unload command.
7D or FD	Log temporary error to host.
BF	Read one block to identify a tape position reference, then continue.
EF	If a data path transfer error occurred, inhibit autospace operations on this block. If not, no control unit is needed.

Byte 9 - Control Unit Flags

Byte 9 contains more information about the first control unit microcode error code (bytes 10 and 11), if available. See the error code in the FSI section for byte 9's meaning.

Bytes 10 and 11 - First CU Microcode Error Code

Bytes 10 and 11 contain the control unit microcode detected error code for the first error of the control unit or drive. See the FSI section for the meaning of the error codes.

Bytes 12 and 13 - Second CU Microcode Error Code

Bytes 12 and 13 contain the control unit microcode detected error code for the second error of the control unit or drive. See the FSI section for the meaning of the error codes.

Bytes 14 and 15 - Last CU Microcode Error Code

Bytes 14 and 15 contain the control unit microcode detected error code for the last error of the control unit or drive. See the FSI section for the meaning of the error codes.

FORMATS 19 AND 20 BYTES 16-23								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
16	CU Hardware Error Code							
17	CU Hardware Error Code							
18	Drive Flag - 1							
19	Hardware EC Switches							
20	Drive Command Code - 1							
21	Drive Error Code - 1							
22	Drive Command Code - 2							
23	Drive Error Code - 2							

Formats 19 and 20 Sense Bytes 16-23 Description

Bytes 16 and 17 - CU Hardware Error Code

Bytes 16 and 17 contain the Control Unit Hardware Detected Error Code. For a specific error code, see the EAD section for the meaning of that code.

Byte 18 - Drive Flag 1

Byte 18 contains engineering information. See the specific error code in the FSI section for the meaning of byte 18, if available.

Byte 19 - Hardware EC Switches

The bits in byte 19 are set by the switches under the covers of the control unit. Usually, they are changed only by maintenance personnel during service or by plant personnel during manufacture. See CARR-CU 1189 for how to set the Device Level Register (DLR) switches.

Bits 0-3 - DLR Register bits 0-3
Bits 4-7 - Reserved

Byte 20 - Drive Command Code 1

The command active or last given at the time that drive error code 1 occurred. See the "Drive Command Codes" list on this page.

Byte 21 - Drive Error Code 1

Byte 21 contains the first error detected since the last device sense command. For a specific error code, see the FSI section for the meaning of that code. The error code number is the same as the CHK number.

Byte 22 - Drive Command Code 2

The command active or last given at the time that drive error code 2 was detected. See the "Drive Command Codes" list on this page.

Byte 23 - Drive Error Code 2

Byte 23 contains the last error that occurred, whether or not more than two errors occurred since the last drive sense command was sent. For a specific error code, see the FSI section for the meaning of that code. The error code number is the same as the CHK number.

Drive Command Codes

Command Code	Description
00	Test I/O
02	Read Forward
03	Read Backward
04	Sense
05	Patch Load
06	Clamp
07	Unclamp
08	Reset A
09	Reset B
0A	Write or Erase Gap
0C	Set Diagnostic
0D	Load Display
10	Read Control Store
11	Write Control Store
12	Data Security Erase
15	Autospace Backward
16	Autospace Forward
18	Rewind
19	Rewind/Unload
1A	Locate
1B	Read LSRs
1C	Read X-Regs
1D	Write X-Regs
1E	Load Automatic Cartridge Loader code
EE*	Bus Parity error when loading commands
FF*	Load/Unload and unloaded drive

* Not actual command codes. These codes are used when no command is being executed.

FORMATS 19 AND 20 BYTES 24-31								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
24	Channel adapter installed				Data transfer mode			
25	Two Control Unit Communication Feature	Reserved			Extended Data Record-ing Format Allowed	Extended Data Record-ing Format Installed	Upgraded Buffer	Automatic Cartridge Loader Installed
26	Control Unit Microcode EC Level							
27	0 = Two Board 1 = One Board	Subsystem Type			Control Unit Serial Number (High Order Digit)			
28	Control Unit Serial Number (Low Order)							
29	Control Unit Serial Number (Low Order)							
30	Logical Drive Address				Physical Drive Address			
31	Buffered Data Bytes							

Formats 19 and 20 Sense Bytes 24-31 Description

Byte 24 - Control Unit Channel Adapters Installed

Byte 24 indicates the channel adapters that are installed on the control unit and the mode to which the active channel adapter is set on the control unit panel. Bits 0 through 3 are relative to the subsystem path described in sense byte 2.

Bit 0 - Channel Adapter A

Bit 1 - Channel Adapter B

Bit 2 - Channel Adapter C

Bit 3 - Channel Adapter D

Bits 4 5 6 7

Bits 0 0 0 0 Reserved

Bits 0 0 0 1 DCI

Bits 0 1 0 1 2 Megabyte Streaming

Bits 0 1 1 0 3 Megabyte Streaming

Bits 0 1 1 1 4.5 Megabyte Streaming

Byte 25 - Control Unit/Drive Features

Bit 0 - Two Control Unit Feature: This bit indicates that a two Control Unit communication feature is installed.

Bits 1 through 3 - Reserved: Bits 1 through 3 are reserved and are always 0.

Bit 4 - Improved Data Recording Capability Allowed: This bit on indicates that data can be processed with Improved Data Recording Capability enabled as it is received from the channel adapter.

Bit 5 - Improved Data Recording Capability Installed: This bit on indicates that the Improved Data Recording Capability feature is installed.

Bit 6 - Upgraded Buffer

Bit 7 - Automatic Cartridge Loader Installed

Byte 26 - Control Unit Microcode EC Level

The bits in byte 26 vary when new versions of control unit microcode are used on the subsystem.

Byte 27 - Control Unit Identification

The bits in byte 27 are set by the switches under the covers of the control unit. Usually, they are changed only by maintenance personnel during service or by plant personnel during manufacture.

Bit 0 - Control Unit Logic Gate:

```
0 = Two board control unit
1 = One board control unit
```

Bits 1-3 Subsystem Type

```
100 = 3490 Model A01/A02
101 = 3480 Model A11
110 = 3490 Model D31/D32
111 = 3480 Model A22
```

Bits 4 through 7 - Control Unit Serial Number (High-Order Digit)

Bytes 28 and 29 - Control Unit Serial Number (Low Order)

Bytes 28 and 29 contain the low-order digits of the control unit serial number. Usually, they are changed only by maintenance personnel during service or by plant personnel during assembly.

Byte 30 - Drive Address

Bits 0 through 3 - Logical Drive Address: Bits 0 through 3 are the low-order bits of the external drive address. This field contains the value that the drive responds to upon receipt of a command from the host.

Bits 4 through 7 - Physical Drive Address: Bits 4 through 7 contain a number that cannot be modified by the operator. It is set at installation of the drive by the Service Representative. (No duplicate numbers should be set on any drives in this subsystem.)

Byte 31 - Data Byte Count

Byte 31 contains a count of the blocks of data in the buffer. The count is specified in 4K blocks. For example, a 3,456-byte block of data is given as a count of '01', and a 5,678-byte block of data is given as a count of '02'.

FORMAT 21 BYTES 8-15								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
8	Read Forward Data Checks							
9	Read Backward Data Checks							
10	Write Data Checks							
11	Read Blocks Corrected							
12	Write Blocks Corrected							
13	Control Unit Equipment Checks							
14	Read Bytes Processed							
15	Read Bytes Processed							

Format 21 Sense Bytes 8-15 Description

Byte 8 - Read Forward Data Checks

Byte 8 contains a count of the temporary read errors that needed ERP action.

Byte 9 - Read Backward Data Checks

Byte 9 contains a count of the temporary read backward errors that needed ERP action.

Byte 10 - Write Data Checks

Byte 10 contains a count of the temporary write errors that needed ERP action.

Byte 11 - Read Blocks Corrected

Byte 11 contains a count of the read errors corrected without needing ERP action.

Byte 12 - Write Blocks Corrected

Byte 12 contains a count of the write errors corrected without needing ERP action.

Byte 13 - Control Unit Equipment Checks

Byte 13 contains a count of the recoverable errors that were found during uses of the external registers.

Bytes 14 and 15 - Read Bytes Processed

Bytes 14 and 15 contain a count of the bytes read from the drive to the channel. Each count has a value of 4K bytes.

Format 21 Sense Bytes 16-23 Table

FORMAT 21 BYTES 16-23								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
16	Write Bytes Processed							
17	Write Bytes Processed							
18	Read Blocks Processed							
19	Write Blocks Processed							
20	Write Transient Conditions							
21	Read Transient Conditions							
22	Criteria Write Data Checks							
23	Criteria Read Data Checks							

0 0 0 0 0 0 0 0 0 0

Format 21 Sense Bytes 16-23 Description

Bytes 16 and 17 - Write Bytes Processed

Bytes 16 and 17 contain a count of the bytes written from the channel to the drive. Each count is equal to 4K bytes.

Byte 18 - Read Blocks Processed

Byte 18 contains a count of the blocks read forward and backward for this volume. Each count has a value of 256 read blocks.

Byte 19 - Write Blocks Processed

Byte 19 contains a count of the blocks written on this volume. Each count is equal to 256 write blocks, and a maximum value of 65,536 write blocks can be counted.

Sense Byte 20 Write Transient Conditions

Cartridge stress conditions such as exposure to extreme heat or cold can cause short-term velocity changes to occur while writing the tape. This condition is detected and the event is recorded in this sense byte as a temporary, recoverable event.

Sense Byte 21 Read Transient Conditions

Cartridge stress conditions such as exposure to extreme heat or cold can cause short-term velocity changes to occur while reading the tape. This condition is detected and the event is recorded in this sense byte as a temporary, recoverable event.

Bytes 22 - Criteria Write Data Checks

A count of temporary data checks that occurred with no hardware FRU indicators. These counts are a subset of the count contained in sense byte 10 and are included in sense byte 10.

Bytes 23 - Criteria Read Data Checks

A count of temporary read data checks that occurred with no hardware FRU indicators. These counts are a subset of the count contained in sense bytes 8 and 9 and are included in sense bytes 8 and 9.

FORMAT 21 BYTES 24-31								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
24	Write Recovery Erase Gape Count							
25	Drive Detected Errors							
26	Low-Order Read Blocks Processed				Low-Order Write Blocks Processed			
27	0 = Two Board 1 = One Board	Subsystem Type			Control Unit Serial Number (High Order)			
28	Control Unit Serial Number (Low-Order)							
29	Control Unit Serial Number (Low-Order 4 Digits)							
30	Read Recovery Retry Count							
31	Logical Drive Address				Physical Drive Address			

Format 21 Sense Bytes 24-31 Description

Byte 24 - Write Recovery Erase Gap Check

Control Unit error recovery procedure was required to erase and rewrite a block or tape mark.

Byte 25 - Drive Detected Errors

Byte 25 contains a count of unit checks set by the drive.

Byte 26 - Low-Order Read or Write Blocks Processed

Bits 0 through 3 contain a low-order count of the blocks read forward and backward for this volume; see byte 18 for the high-order count. Each count has a value of 16 read blocks.

Bits 4 through 7 contain a low-order count of the blocks written on this volume; see byte 19 for the high-order count. Each count has a value of 16 write blocks.

Byte 27 - Control Unit Information

The bits in byte 27 are set from switches under the covers of the control unit. Usually, they are changed only by maintenance personnel during service or by plant personnel during assembly.

Bit 0 - Control Unit Logic Gate

0 = Two board control unit
1 = One board control unit

Bit 1-3 Subsystem Type

100 = 3490 Model A01/A02
101 = 3480 Model A11
110 = 3490 Model D31/D32
111 = 3480 Model A22

Bits 4 through 7 - Control Unit Serial Number (High-Order Digit)

Bytes 28 and 29 - Control Unit Serial Number

Bytes 28 and 29 contain the low-order 4 digits of the control unit serial number. The serial number is set by switches on FRU118. The serial number must match the base casting serial number.

Byte 30 - Read Recovery Retry Count

Byte 30 contains a count of the times the control unit attempted consecutive read recovery actions for the same block.

Byte 31 - Drive Address

Bits 0 through 3 - Logical Drive Address: Bits 0 through 3 are the low-order bits of the external drive address. This field contains the value that the drive responds to upon receipt of a command from the host.

Bits 4 through 7 - Physical Drive Address: Bits 4 through 7 contain a number that cannot be modified by the operator. It is set at installation of the drive by the Service Representative. (No duplicate numbers should be set on any drives in this subsystem.)

Format 22 Sense Bytes 8-15 Table

FORMAT 22 BYTES 8 - 15								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
8	Reserved							
9	Reserved							
10	Reserved							
11	Reserved							
12	Reserved							
13	Reserved							
14	Reserved							
15	Reserved							

FORMAT 22 BYTES 16-23								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
16	Reserved							
17	Reserved							
18	Reserved							
19	Reserved							
20	Reserved							
21	Reserved							
22	Reserved							
23	Reserved							

Format 22 Sense Bytes 24-31 Table

FORMAT 22 BYTES 24 - 31								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
24	Reserved							
25	Reserved							
26	Clean Device	Reserved					01 = Rewrite Cartridge 11 = Replace Cartridge	
27	0 = Two Board 1 = One Board	Subsystem Type			Control Unit Serial Number (High order)			
28	Control Unit Serial Number (Low order)							
29	Control Unit Serial Number (Low order 4 digits)							
30	Logical Drive Address				Physical Drive Address			
31	Reserved							

Format 22 Sense Bytes 8-31 Description

Bytes 8 - 25

Reserved

Byte 26 - Device and/or Cartridge Action

Bit 0 - Clean Device

Bit 1 through 5: Reserved

Bit 6 and 7: Cartridge Action

01 = Rewrite Cartridge
11 = Replace Cartridge

Byte 27 - Control Unit Identification

The bits in byte 27 are set from switches under the control unit covers. Usually, they are changed only by maintenance personnel during service or by plant personnel during assembly.

Bit 0 - Control Unit Logic Gate:

0 = Two board control unit
1 = One board control unit

Bit 1-3 Subsystem Type:

100 = 3490 Model A01/A02
101 = 3480 Model A11
110 = 3490 Model D31/D32
111 = 3480 Model A22

Bits 4 through 7 - Control Unit Serial Number (High order digit)

Bytes 28 and 29 - Control Unit Serial Number

Bytes 28 and 29 contain the low order 4 digits of the control unit serial number. The serial number is set by switches on FRU118. The serial number must match the base casting serial number.

Byte 30 - Drive Address

Bits 0 through 3 - Logical Drive Address:

Bits 0 through 3 are the low order bits of the external drive address. This field contains the value that the drive responds to upon receipt of a command from the host.

Bits 4 through 7 - Physical Drive Address:

Bits 4 through 7 contain a number that cannot be modified by the operator. It is set by the Customer Engineer during installation. No duplicate numbers should be set on any drives in this subsystem.

Byte 31 - Reserved

Format 24 Sense Bytes 8-15 Table

FORMAT 24 BYTES 8 - 15								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
8	Reserved							
9	VOLID Mark	Volume ID is valid	Volume ID is in EBCDIC	Volume ID is in ASCII	Reserved			
10	Volume Identifier							
11	Volume Identifier							
12	Volume Identifier							
13	Volume Identifier							
14	Volume Identifier							
15	Volume Identifier							

Format 24 Sense Bytes 16-23 Table

FORMAT 24 BYTES 16-23								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
16	Accessibility							
17	Label Standard Level							
18	Reserved							
19	Reserved							
20	Reserved							
21	Reserved							
22	Reserved							
23	Reserved							

Format 24 Sense Bytes 24-31 Table

FORMAT 24 BYTES 24-31								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
24	Reserved							
25	Reserved							
26	Reserved							
27	Control Unit Hardware Information				Control Unit Serial Number			
28	Control Unit Serial Number							
29	Control Unit Serial Number							
30	Reserved							
31	Reserved							

Format 24 Sense Bytes 8-31 Description

Byte 8 - Reserved

Byte 9 - Volume Identifier, Validity and Format

Bit 0 - when 1, the VOLID Mark was detected on the volume

Bit 1 - when 1, the volume identifier is valid

Bit 2 - when 2, the volume identifier is in EBCDIC

Bit 3 - when 1, the volume identifier is in ASCII

Bit 4-7 Reserved

Bytes 10-15 - Volume Identifier

Identifier of the volume in EBCDIC or ASCII. Sense byte 9 defines the format.

Byte 16 - Accessibility

Refer to *MVS/XA Architecture Magnetic Tape Labels and File Structures*, GC26-4003-2.

Byte 17 - Label Standard Level

Refer to *MVS/XA Architecture Magnetic Tape Labels and File Structures*, GC26-4003-2.

Bytes 18-26 - Reserved

Byte 27- Hardware Control Unit Information

The bits in byte 27 are set by switches. They are changed only by maintenance personnel during service or by plant personnel during manufacture.

Bit 0 - Control Unit Logic Gate

0 = Two board control unit
1 = One board control unit

Bit 1-3 Subsystem Type:

100 = 3490 Model A01/A02
101 = 3490 Model A11
110 = 3490 Model D31/D32
111 = 3490 Model A22

Bits 4 through 7 - Control Unit Serial Number (High order digit)

Bytes 28 and 29 - Control Unit Serial Number

Bytes 28 and 29 contain the low order of the control unit serial number. They are changed only by maintenance personnel during service or by plant personnel during assembly.

Bytes 30 and 31 - Reserved

Format 30 Sense Bytes 8-15 Table

FORMAT 30 BYTES 8 - 15								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
8	Device read forward data checks							
9	Device write forward data checks							
10	Device read backward data checks							
11	Reserved							
12	Device read criteria data checks							
13	Device write criteria data checks							
14	Device read recovery retries							
15	Device write recovery erase gaps							

Byte 8 - Device Read Forward Data Checks

Byte 8 contains a count of the temporary read errors that needed ERP action.

Byte 9 - Device Write Forward Data Checks

Byte 9 contains a count of the temporary write errors that needed ERP action.

Byte 10 - Device Read Backward Data Checks

Byte 10 contains a count of the temporary read backward errors that needed ERP action.

Byte 11 - Reserved

Byte 12 - Device Read Criteria Data Checks

Byte 12 contains a count of temporary read data checks that occured with no hardware error indications. These counts are a subset of the count contained in log bytes 8 and 10 and are included in log bytes 8 and 10.

Byte 13 - Device Write Criteria Data Checks

Byte 13 contains a count of temporary write data checks that occured with no hardware error indications. These counts are a subset of the count contained in sense byte 9 and are included in sense byte 9.

Byte 14 - Device Read Recovery Retry Count

Byte 14 contains a count of the times the control unit attempted consecutive read recovery actions for the same block.

Byte 15 - Device Write Recovery Erase Gaps

Byte 15 contains a count of the times a block is erase and written again during error recovery for the addressed drive.

0 0 0 0 0 0 0 0 0 0

Format 30 Sense Bytes 16-23 SENSE 225

FORMAT 30 BYTES 16-23								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
16	Device read transient conditions							
17	Device write transient conditions							
18	Device read blocks corrected							
19	Device write blocks corrected							
20	Reserved							
21	Reserved							
22	Channel read data request timeouts							
23	Channel write data request timeouts							

0 0 0 0 0 0 0 0 0 0

Format 30 Sense Bytes 16-23 Description

Byte 16 - Device Read Transient Conditions

Cartridge stress conditions such as exposure to extreme heat or cold can cause short-term velocity changes to occur while reading the tape. This condition is detected and the event is recorded in this sense byte as a temporary, recoverable event.

Byte 17 - Device Write Transient Conditions

Cartridge stress conditions such as exposure to extreme heat or cold can cause short-term velocity changes to occur while writing to the tape. This condition is detected and the event is recorded in this sense byte as a temporary, recoverable event.

Byte 18 - Device Read Blocks Corrected

Byte 18 contains a count of the blocks that had read errors corrected without needing ERA action.

Byte 19 - Device Write Blocks Corrected

Byte 19 contains a count of the blocks that had write errors corrected without needing ERA action.

Bytes 20 and 21 - Reserved

Byte 22 - Channel Read Data Request Timeouts

Byte 22 contains a count of the data request timeouts detected during data transfers from the control unit buffer to the host channel.

Byte 23 - Channel Write Data Request Timeouts

Byte 23 contains a count of the data request timeouts detected during data transfers from host channel to the control unit.

Format 30 Sense Bytes 24-31 Table

FORMAT 30 BYTES 24 - 31								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
24	Channel transfer equpment checks							
25	Drive detected errors							
26	Clean Device	Reserved					01 = Rewrite Cartridge 11 = Replace Cartridge	
27	0 = Two Board 1 = One Board	Subsystem Type			Control Unit Serial Number (High order)			
28	Control Unit Serial Number (Low order 4 digits)							
29	Control Unit Serial Number (Low order 4 digits)							
30	Logical Drive Address				Physical Drive Address			
31	Reserved							

Format 30 Sense Bytes 24-31 Description

Byte 24 - Channel Transfer Equipment Checks

Byte 24 contains a count of the number of errors, excluding data request timeouts, detected during data transfer between the host channel and the control unit buffer.

Byte 25 - Drive Detected Errors

Byte 25 contains a count of unit checks set by the drive.

Byte 26 - Device and/or Cartridge Action

Bit 0 - Clean Device

Bit 1 through 5 - Reserved

Bits 6 and 7 - Cartridge Action:

```
01 = Rewrite Cartridge
11 = Replace Cartridge
```

Byte 27 - Control Unit Identification

The bits in byte 27 are set from switches under the control unit covers. Usually, they are changed only by maintenance personnel during service or by plant personnel during assembly.

Bit 0 - Control Unit Logic Gate:

```
0 = Two board control unit
1 = One board control unit
```

Bits 1-3 Subsystem Type:

```
100 - 3490 Model A01/A02
101 = 3480 Model A11
110 = 3490 Model D31/D32
111 - 3480 Model A22
```

Bits 4 through 7 - Control Unit Serial Number (High order digit)

Bytes 28 and 29 - Control Unit Serial Number

Bytes 28 and 29 contain the low order 4 digits of the control unit serial number. The serial number is set by switches on FRU118. The serial number must match the base casting serial number.

Byte 30 - Drive Address

Bits 0 through 3 - Logical Drive Address:

Bits 0 through 3 are the low order bits of the external drive address. This field contains the value that the drive responds to upon receipt of a command from the host.

Bits 4 through 7 - Physical Drive Address:

Bits 4 through 7 contain a number that cannot be modified by the operator. It is set by the Customer Engineer during installation. No duplicate numbers should be set on any drives in this subsystem.

Byte 31 - Reserved

Format 30 Sense Bytes 32-40 Table

FORMAT 30 BYTES 32-40								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
32	Channel read bytes processed hi (4096)							
33	Channel read bytes processed mid (4096)							
34	Channel read bytes processed lo (4096)							
35	Channel write bytes processed hi (4096)							
36	Channel write bytes processed mid (4096)							
37	Channel write bytes processed lo (4096)							
38	Device read bytes processed hi							
39	Device read bytes processed mid							
40	Device read bytes processed lo							

Bytes 32 - 34 - Channel Bytes Processed

Bytes 32 through 34 contain a count of the number of bytes read from the control unit buffer to the channel.

This count includes:

- Formatted data block
- Data block trailer
- Pad bytes
- Residual count
- Cyclical redundancy check (RCR).

Bytes 32, 33, and 34 are combined to form a 24 bit binary counter of write bytes processed. Each count is equal to 4096 (X'1000') and the counter has a maximum value of 256 gigabytes.

When each tape sychronous mode read block is processed, the true byte count is not known, therefore a number is added to the Read Bytes Processed counter equal to the current segment size.

Bytes 35 - 37 - Channel Write Bytes Processed

Bytes 35 through 37 contain a count of the number of bytes written from the channel to the control unit buffer.

This count includes:

- Formatted data block
- Data block trailer.

Bytes 35, 36, and 37 are combined to form a 24 bit binary counter of write bytes processed. Each count is equal to 4096 (X'1000') and the counter has a maximum value of 256 gigabytes.

Bytes 38 - 40 - Device Read Bytes Processed

Bytes 38 through 40 contain a count of the blocks read forward and backward for this volume from the device to the control unit buffer.

Bytes 38, 39, and 40 are combined to form a 24 bit binary counter of read and read backward blocks processed. Each count is equal to one block. The maximum value of the counter is 16 megablocks.

0 0 0 0 0 0 0 0 0 0

Format 30 Sense Bytes 41-49

FORMAT 30 BYTES 41-49								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
41	Device write bytes processed hi							
42	Device write bytes processed mid							
43	Device write bytes processed lo							
44	Channel read blocks processed hi							
45	Channel read blocks processed mid							
46	Channel read blocks processed lo							
47	Channel write blocks processed hi							
48	Channel write blocks processed mid							
49	Channel write blocks processed lo							

0 0 0 0 0 0 0 0 0 0

Byte 41 - 43 - Device Write Bytes Processed

Bytes 41 through 43 contain a count of the blocks written on this volume from the control unit buffer to the device.

Bytes 41, 42, and 43 are combined to form a 24 bit binary counter of write blocks processed. Each count is equal to one block. The maximum value of the counter is 16 megablocks.

Byte 44 - 46 - Channel Read Blocks Processed

Bytes 44 through 46 contain the number of logical blocks which were successfully read by the channel.

Bytes 47 - 49 - Channel Write Blocks Processed

Bytes 47 through 49 contain the number of logical blocks which were successfully written by the channel.

0 0 0 0 0 0 0 0 0 0

FORMAT 30 BYTES 50-55								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
50	Device read blocks processed hi							
51	Device read blocks processed mid							
52	Device read blocks processed lo							
53	Device write blocks processed hi							
54	Device write blocks processed mid							
55	Device write blocks processed lo							

0 0 0 0 0 0 0 0 0 0

Format 30 Sense Bytes 56-63 Table

FORMAT 30 BYTES 56-63								
BYTE	BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
56	Reserved							
57	Reserved							
58	Reserved							
59	Reserved							
60	Reserved							
61	Reserved							
62	Reserved							
63	Reserved							

Format 30 Sense Bytes 56-63 Description

Byte 50 - 52 - Device Read Blocks Processed

Bytes 50 through 52 contain the number of physical blocks which were read from the device to the control unit buffer.

Byte 53 - 55 - Device Write Blocks Processed

Bytes 53 through 55 contain the number of physical blocks which were written from the control unit buffer to the device.

Byte 56 - 63 - Reserved

Status Byte Description

The Status Byte

The status byte contains information about the current condition of different parts of the subsystem. When the control unit needs to present status for an addressed drive, the status is represented in a single byte of data. The status bits are described on SENSE 290.

Status Byte							
BIT 0	BIT 1	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7
Attention	Status Modifier	Control Unit End	Busy	Channel End	Device End	Unit Check	Unit Exception

Status Byte Bits 0-7 Description

Bit 0 - Attention:

Bit 0 is set when the drive is changed from a not-ready to a ready condition. The change of condition is caused by loading a tape in the drive or by the operator changing the drive from offline to online status, but only if the drive has been primed. See device end (bit 5) for a description of primed. Device end (bit 5) and unit exception (bit 7) are also set when the drive is changed to the ready condition.

Bit 1 - Status Modifier:

Bit 1 in combination with busy (bit 3) indicates the control unit is busy. This bit in combination with channel end (bit 4) and unit check (bit 6) is used to place the channel in retry status. When an immediate retry is requested, device end is set with channel end and unit check bits. If the retry is not immediate, device end is set by a delayed interrupt when the channel is ready to retry.

Bit 2 - Control Unit End:

If the control unit was busy during initial selection, bit 2 is set when the control unit is no longer busy and can perform a command. This bit is set with busy (bit 3) and status modifier (bit 1) when the control unit is busy for only a short time.

This bit is always set with device end (bit 5) if channel end (bit 4) was set earlier and unit check or unit exception is set with device end.

Bit 3 - Busy:

Bit 3 is set when the drive is busy on another channel path. This bit is set with status modifier (bit 1) when the control unit is busy. This bit is always set with status modifier and control unit end bits when the control unit is busy for only a short time.

If this bit is set during a deferred unit check, the busy status condition is associated with a preceding command. Unit check timing (sense byte 0 bit 6) is set when the status is sent as a result of a deferred unit check.

Bit 4 - Channel End:

Bit 4 is set when the data transmit part of an I/O operation is complete or when control information between the channel and the control unit or drive is complete and the channel is no longer needed for processing the current command.

Bit 5 - Device End:

Bit 5 is set when an I/O command has completed. It is also set with the attention and unit exception bits when a drive is changed from the not-ready to the ready condition and has been primed.

A drive is primed when an operator presses the Rewind Unload push button, when an I/O command is given while the drive is in the not-ready condition, or when the host gives an I/O request and busy (bit 3) is returned. In the last event, the control unit sets this bit to indicate the drive-busy condition has cleared.

Primed has a different meaning when a channel path group is operating in multipath mode. In this event, the primed status is associated with the host ID and not with a specific channel path. So, although more than one channel is primed in a channel path group that is operating in multipath mode, any one of the channels in the channel path group is selected to receive the status. Only one device end status condition is supplied to the channel path group, regardless of the number of primed channels in that group. See "Commands" for a description of the Set Path Group ID command.

Bit 6 - Unit Check:

Bit 6 is set when one of the following conditions is sensed in the 3480 Magnetic Tape Subsystem:

- The drive is in a not-ready condition and a movement-type command is given to it.
- An error condition prevents an operation from completing successfully.
- A Read Backward, Backspace Block, or Backspace File command is given to a drive that is at the BOT position.
- The drive has received a Rewind Unload command.
- A deferred unit check status occurs.
- A not valid parity occurs on a command.
- A command or command sequence is not valid.
- Chaining occurs to or from a Set Path Group ID command or a Sense Path Group ID command.
- A write-type command is given to a file-protected tape.
- The drive is assigned to exclusive use by another channel path group.
- The buffered log has had an overflow.
- A deferred unit check occurs from an earlier I/O operation.
- A forward-movement command is given to a drive that is at the physical end-of-tape position.

  Note: The tape must be moved backward to at least the logical end of tape before any forward-movement command can be performed.

In response to a unit check status, the host must give a Sense command to obtain the information necessary to record the error. The control unit maintains a contingent connection between the host and the drive when unit check status occurs. Until the host gives a command other than Test I/O or No Operation, the addressed drive is busy to other I/O requests to ensure that the host can obtain the sense information.

Bit 7 - Unit Exception:

Bit 7 is set if the logical end of tape is reached during processing of a Write, Write Tape Mark, or Erase Gap command. It is also set if a tape mark is sensed during the processing of a Read, Read Backward, Forward Space Block, or Backspace Block command.

This bit is set with status modifier (bit 1) and device end (bit 5) when a drive is changed from the not-ready to the ready condition.

Note: The unit exception status condition should be processed as soon as it occurs to prevent a unit check status condition and a possible loss of data caused by a physical end-of-tape condition during write-forward operations. However, there is enough space left on the tape after the logical end of tape and before the physical end of tape for all of the contents of the buffer to be written on the tape.

0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0

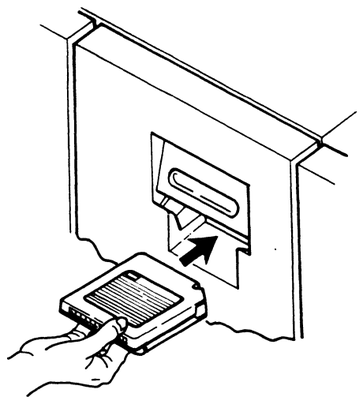
Contents

How to Prepare the Drive for Operation

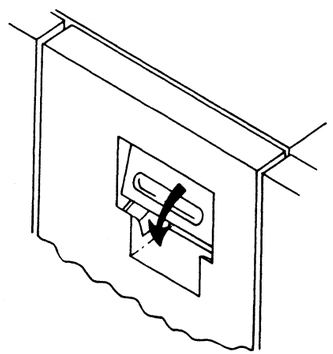
To prepare the drive for operation, perform the following steps:

1. If the tape drive cartridge latch is closed, press the Unload switch **3**.

   Hold the cartridge as shown and slide the cartridge into the opening in the front cover.



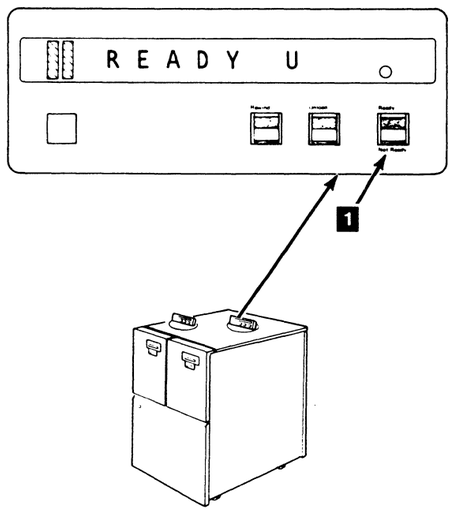
2. Move the latch cover down until it stops.



3. Move the Ready/Not Ready switch **1** to the Ready position.

   The Operator Panel message display will show READY F or READY U condition.

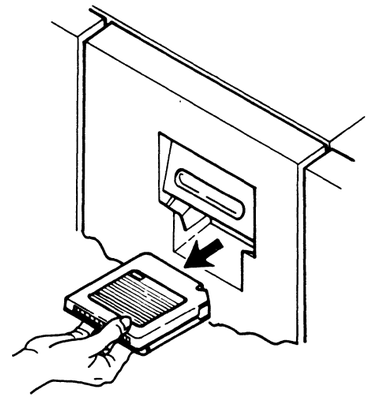
   If any other message or indicator is displayed, go to START 10.



How to End Drive Operation

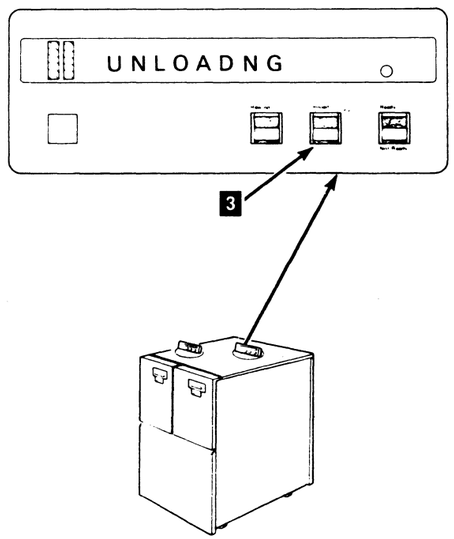
To end drive operation, perform the following steps:

1. Move the Ready/Not Ready switch **2** to the Not Ready position.



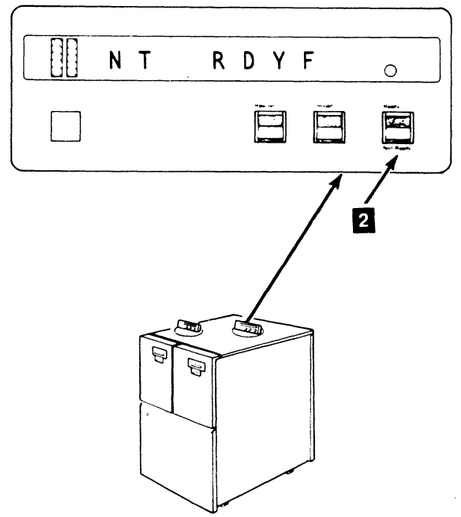
2. Press the Unload switch **3**.

   Note: Pressing the Unload switch rewinds the tape, opens the latch door, and locates the cartridge for removal.



3. Remove the cartridge from the tape unit. If the latch door does not open, go to START 10.

   Note: The cartridge latch should be closed when the tape drive is not being used. (A cartridge need **not** be in the drive.) When the tape drive is needed, open the cartridge latch by pressing the Unload switch.



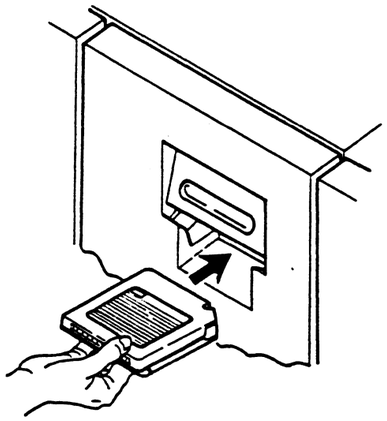
How to Operate the Drive **PANEL 5**

How to Prepare the Drive for Operation

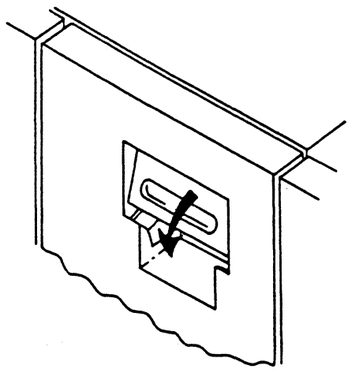
To prepare the drive for operation, perform the following steps:

1. If the tape drive cartridge latch is closed, press the Unload switch **3**.

   Hold the cartridge as shown and slide the cartridge into the opening in the front cover.



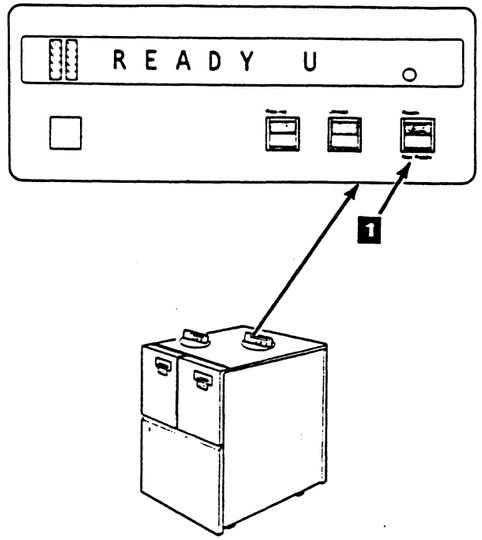
2. Move the latch cover down until it stops.



3. Move the Ready/Not Ready switch **1** to the Ready position.

   The Operator Panel message display will show READY F or READY U condition.

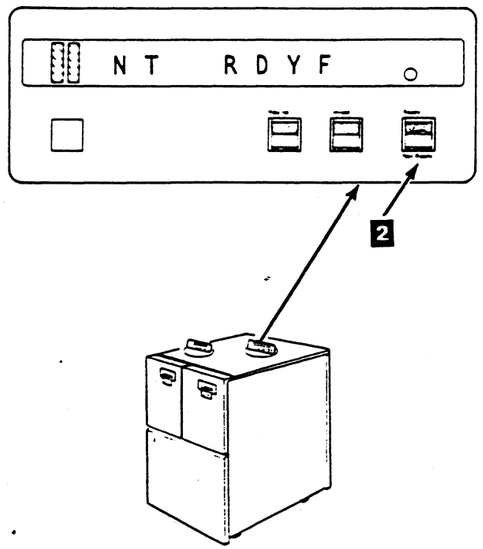
   If any other message or indicator is displayed, go to START 10.



How to End Drive Operation

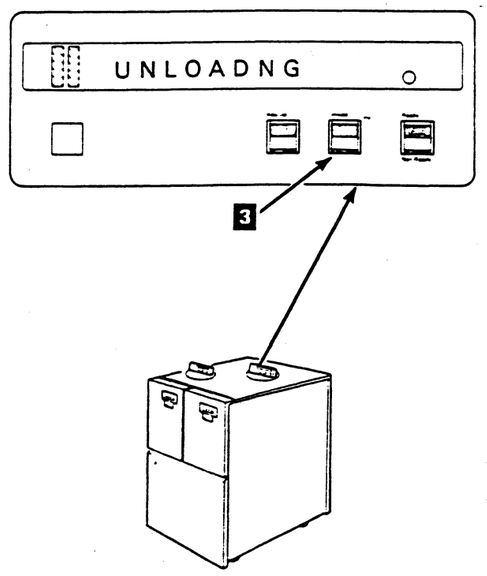
To end drive operation, perform the following steps:

1. Move the Ready/Not Ready switch **2** to the Not Ready position.



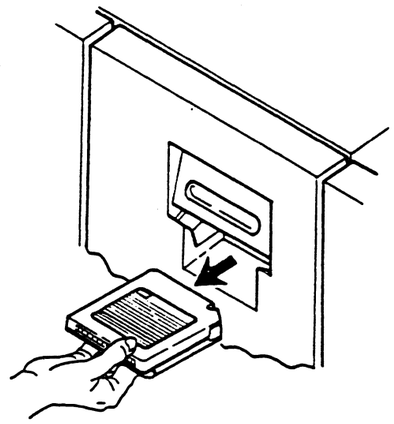
2. Press the Unload switch **3**.

   Note: Pressing the Unload switch rewinds the tape, opens the latch door, and locates the cartridge for removal.



3. Remove the cartridge from the tape unit. If the latch door does not open, go to START 10.

   Note: The cartridge latch should be closed when the tape drive is not being used. (A cartridge need not be in the drive.) When the tape drive is needed, open the cartridge latch by pressing the Unload switch.



0 0 0 0 0 0 0 0 0 0

IML Procedure

To IML the control unit perform the following:

1. Ensure that the subsystem power is on.
2. Place the control unit Online/Offline switch in the Offline position.
3. Place the control unit Normal/Test switch in the Normal position.
4. Insert the IML diskette into the IML device.

   5.25 Inch Diskette

   a. Open the latch on the IML diskette drive and remove the head protector.

   b. Insert the IML diskette (label up and toward you) and close the drive latch.

   3.5 Inch Diskette

   a. Push the release button on the IML diskette drive and remove the head protector.

   b. Insert the IML diskette (label up and toward you) and push until the drive closes.
5. Press the control unit IML switch to the IML position.
6. When the IML completes successfully, the "wait" LED comes on.
7. If you were sent here by the MD, return to the MD and press ENTER.
8. Place the control unit Online/Offline switch in the Online position. The Offline indicator turns off.

   If you were sent here by the maintenance information manual, connect the MD and select option 1, Start Repair.
9. If the IML is not successful, connect the MD and select option 1, Start Repair.

IML Fail Indication

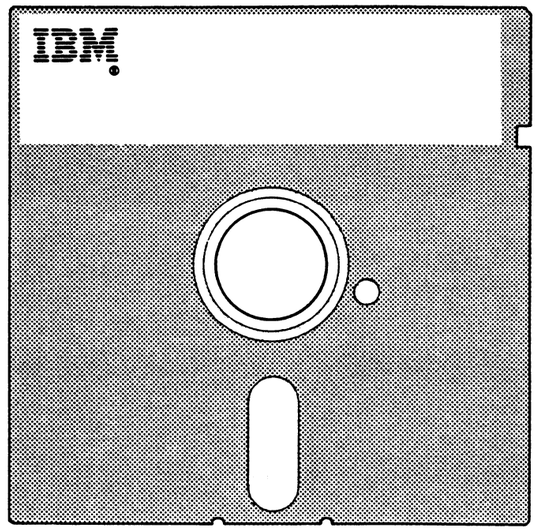
An IML Failure is indicated by the "error" LED on the control unit switch panel.

Diskettes that are write protected will cause an error during Power On and IML.

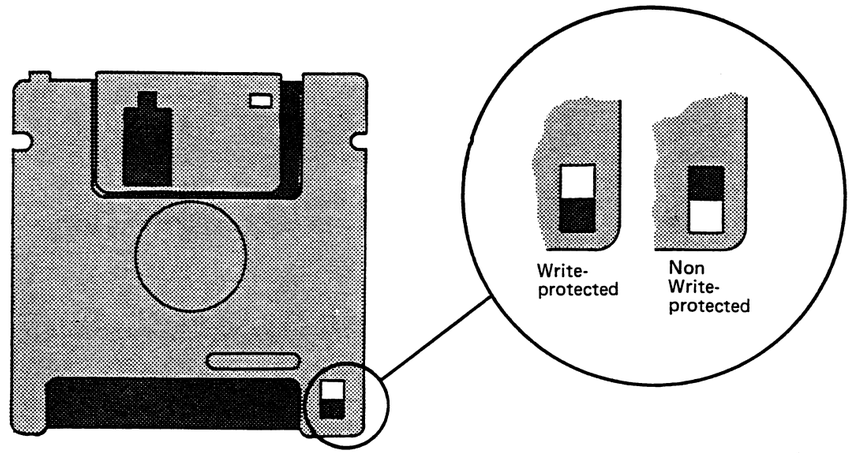
WRITE-PROTECTED DISKETTES

IML Diskettes used in the 3480 Control Unit should not be write-protected. Diskettes that are write-protected will cause an error during Power On and IML.

- 5.25 inch diskettes have a notch called a write-protect notch. If the notch is covered, the diskette is write-protected. To write-protect a 5.25 inch diskette, cover the notch with a piece of tape (do not use transparent tape).



- On the reverse side of a 3.5 inch diskette, in the lower corner, there is a write-protect window. When you slide the plastic tab so that the window is open, the diskette is write-protected. When the window is closed, data can be written on the diskette.



0 0 0 0 0 0 0 0 0 0

IML Procedure

IML Procedure

To IML the control unit perform the following:

1. Ensure that the subsystem power is on.
2. Place the control unit Online/Offline switch in the Offline position.
3. Place the control unit Normal/Test switch in the Normal position.
4. Insert the IML diskette into the IML device.

   5.25 Inch Diskette

   a. Open the latch on the IML diskette drive and remove the head protector.

   b. Insert the IML diskette (label up and toward you) and close the drive latch.

   3.5 inch Diskette

   a. Push the release button on the IML diskette drive and remove the head protector.

   b. Insert the IML diskette (label up and toward you) and push until the drive closes.

5. Press the control unit IML switch to the IML position.
6. When the IML completes successfully, the "wait" LED comes on.
7. If you were sent here by the MD, return to the MD and press ENTER.
8. Place the control unit Online/Offline switch in the Online position. The Offline indicator turns off.

   If you were sent here by the maintenance information manual, connect the MD and select option 1, Start Repair.

9. If the IML is not successful, connect the MD and select option 1, Start Repair.

IML Fail Indication

An IML Failure is indicated by the "error" LED on the control unit switch panel.

Control Unit Switches and Indicators

The control unit has switches that permit the customer and the CE to control specific subsystem functions. The switches are located on the control unit panel. The front cover must be open to get access to the control unit switches except for the Unit Emergency Power and Power On/Off switches.

Normal/Test **1**: This switch is placed in the Normal position for usual control unit operations. When the switch is placed in the Test position, the IML switch is placed in the IML position, and the IML diskette is in the IML device, the control unit performs the needed tests to verify subsystem operation.

DC Power Indicator **2**: This is an LED that lights when dc power is available to the control unit.

CU0/CU1 **3**: This switch must be set at the time of installation to a specific value, 0 or 1, to match the subsystem cable configuration. In a single control unit subsystem, this switch must be set to 0. In a dual control unit subsystem this switch must be set to 0 on the primary control unit and set to 1 on the secondary control unit. The switch cannot be changed unless the cable configuration for the two-control unit feature is changed.

Error Indicator **4**: The Error Indicator either blinks or stays on when an error is detected.

CU Online/Offline **5**: This switch is placed in the online position to permit control unit communication with all of the attached host channels. When this switch is placed in the Off-line position, any attempt by any host channel to select a drive will be bypassed. In a dual control unit configuration, all 'load balancing' is suspended.

CU Off-line Indicator **6**: This is a green LED that lights when the CU Online/Offline switch is placed in the Off-line position and all channel activity to this CU has stopped to indicate that the control unit is not available to any attached host channel. In a dual control unit configuration, all activity from both control units and all the channel paths must be stopped before the green LED will light.

Wait Indicator **7**: The Wait Indicator blinks or stays on when the microcode is executing. It is off when the microcode is not loaded or not executing correctly.

IML **8**: The IML switch is a momentary switch. When the switch is pressed, the control unit performs an IML operation.

Power On/Off **9**: The Power On/Off switch is a two-position switch. The Local/Remote switch **17** is set to Local and the Power On/Off switch is placed in the On position to supply ac power to the control unit and all attached TUs. When ac power is supplied, the dc power supplies are started and a Power On Reset is generated. Placing this switch in the Off position removes the ac power from the subsystem.

Power On Indicator **10**: This is a green LED that lights when the control unit Power On switch is placed in the On position to indicate that the control unit ac power is on.

Unit Emergency Power **11**: The Unit Emergency Power switch supplies an emergency disconnect from the ac power source. When the emergency switch is pushed, the ac power is immediately removed from the subsystem without the delay that occurs when the Power On/Off switch is placed in the Off position. The Unit Emergency Power switch must be placed in the Power Enable position and the Local Power Enable pushbutton **12** must be activated to restore power to the subsystem.

Local Power Enable **12**: This pushbutton switch resets the ac power supply to allow power in the control unit when the Unit Emergency Power switch **11** is in the Power Enable position.

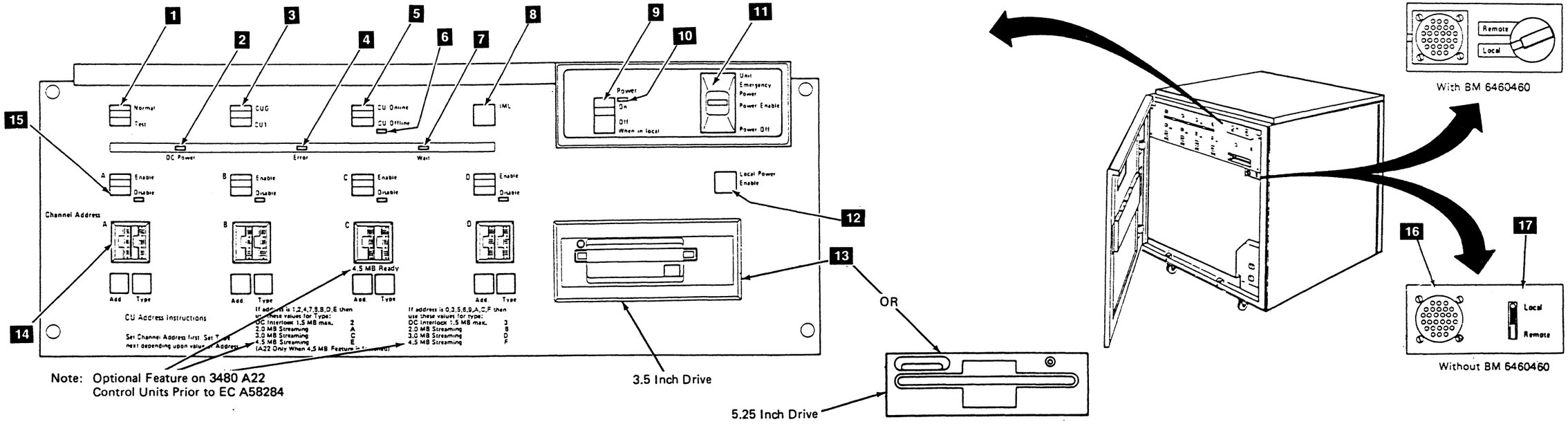
Diskette Drive **13**: The diskette drive contains either a 3.5 or a 5.25 inch IML diskette and is used in conjunction with the IML switch.

Channel Address **14**: These eight thumbwheel switches represent (in groups of two) the four channel adapters that can be installed. The first switch in each group has the hexadecimal value of 0-F, and is set to the control unit address of the corresponding channel adapter. The second switch in each group is set to a value that specifies the type of channel that is attached to the corresponding channel adapter. See PANEL 12 for the correct setting of these thumbwheel switches.

Enable/Disable **15**: There are up to four two-position switches (A-D), one for each attached channel, used to control the communication path to the host system. When a channel switch is placed in the Enable position, communication with the corresponding attached channel is permitted. When the switch is placed in the Disable position, communication with the corresponding attached channel is prevented and the Disable Indicator comes on.

MD Connector **16**: This 28 pin connector is used to attach the maintenance device to the control unit.

Local/Remote **17**: This switch is placed in the Remote position to enable the subsystem to power up when the host system power is switched on and to power down when the host system power is switched off. When this switch is placed in the Local position, subsystem power is controlled by the Power On/Off switch.



Setting Address Switches

The following procedure is used to set the control unit addresses. Depending on how many channel adapters are installed, there may be switches for channels A, B, C, and D.

Each installed channel adapter has two thumbwheel switches. The left switch is set to the control unit address. The right switch is set to a value to be determined by the channel type and the control unit address.

These switches should not be changed unless correct procedure is followed --- channel errors may occur. The correct procedure is on this page.

Note: The 3480 is a non-shared device. Check the system requirements for control unit addressing and unit control word (UCW) assignment before setting the address switches.

Setting the Control Unit Addresses

1. For a single control unit subsystem, set the CU0/CU1 switch to the CU0 position.

   For a dual control unit subsystem, set the CU0/CU1 switch for control unit 0 to CU0, and set the CU0/CU1 switch for control unit 1 to CU1.

   Note: CU0 has drive string containing addresses 0-7 physically attached.

2. Obtain the control unit address and type of channel being used from the customer.

   The channel types are:

   - DC Interlocked (DCI 1.5 Mb)
   - 2-Megabyte Data Streaming (2 Mb)
   - 3-Megabyte Data Streaming (3 Mb)
   - 4.5 Megabyte Data Streaming (4.5 Mb).

     Note: 4.5 megabyte data streaming is a control unit feature. Ensure that –4.5 Mb Ready– is displayed under the channel switch before setting it for this data rate.

3. Start with the switches for Channel Address A (channel adapter A): set the left thumbwheel switch to the control unit address.

4. Use the information below to find the value for the right thumbwheel switch:

   - If the control unit address is 1, 2, 4, 7, 8, B, D, or E: then use these values for Type:

     DC Interlock 1.5 Mb - 2
     2 Mb Data Streaming - A
     3 Mb Data Streaming - C
     4.5 Mb Data Streaming - E

   - If the control unit address is 0, 3, 5, 6, 9, A, C, or F; then use these values for Type:

     DC Interlock 1.5 Mb - 3
     2 Mb Data Streaming - B
     3 Mb Data Streaming - D
     4.5 Mb Data Streaming - F

5. Set the right thumbwheel switch.

6. Repeat steps 1 through 5 for all remaining channel adapters.

Setting Drive Addresses (Attached to CU0)

The following procedure is used to set the drive addresses for control unit0:

1. On the drives attached to CU0, set the address switches in the range of 0 through 7. No two drives may have the same address.

2. Attach the address labels to the drive operator panels. Each label should match the number set on the switch for that drive.

Setting Drive Addresses (Attached to CU1)

The following procedure is used to set the drive addresses for control unit 1:

1. On the drives attached to CU1, set the address switches in the range of 8 through F. No two drives may have the same address.

2. Attach the address labels to the drive operator panels. Each label should match the number set on the switch for that drive.

Changing the Control Unit Address Switch Settings

Use this procedure to change the control unit address (STI-FIPS adapter address) after installation:

1. Have the customer vary offline all affected devices for that channel.

2. Set the Enable/Disable switch to Disable.

3. Change the thumbwheel switches to the desired valid settings.

4. Set the Enable/Disable switch to Enable.

5. Have the customer vary online all affected devices.

Tape Units Without Bill of Material 6460006 (See CARR-DR 9)

The tape unit has switches that permit the customer and the service representative to control specific drive functions. The switches are located on an operator panel 4, one for each drive, on the top of the tape unit. The tape unit ac power CB 5 is located at the front of the tape unit below the two drive drawers. The tape unit front cover must be open, and the safety cover must be removed to get access to this switch. Switches are also located on a drive switch panel 6, one for each drive, located at the front of the tape unit below the drive. The tape unit front cover must be open for access to the drive switch panel.

Drive Operator Panel

The drive operator panel switches and indicators are:

Bar LEDs: 1 When lighted, the bar LEDs indicate that operator action is needed before the drive can continue operations.

Message Display: 2 This is a red eight-character dot matrix LED display that supplies error, service representative information, drive status, and host response messages. (See PANEL 30 for a description of these messages.)

Selected Indicator: 3 The selected indicator, when on, indicates that the drive is selected by a control unit.

Ready/Not Ready: 11 When this switch is placed in the Ready position and tape tension is correct, the drive is placed in a ready condition and READY F is displayed on the operator panel if the tape is file protected. If the tape is not file protected READY U is displayed. When this switch is placed in the Not Ready position, the drive ready condition is removed and NT RDY F or NT RDY U is displayed. This permits the operator to perform a rewind or unload operation.

Unload: 12 When this switch is pressed, and the drive is in a not ready condition (Ready Indicator off), the drive rewinds the tape and performs an unload operation.

Rewind: 13 When this switch is pressed, and the drive is in a not ready condition (Ready Indicator off), the drive rewinds the tape to the beginning-of-tape (BOT). In addition, if tape tension is lost and the Rewind switch is pressed, the drive performs a midtape load operation and rewinds the tape to the BOT.

Drive Switch Panel

The Drive Switch panel switches are:

Drive Power On/Off: 7 This switch is placed in the On position to supply ac to the fans, and dc to pick the contactors in the power supply. When the switch is placed in the Off position the ac and dc power is removed from the corresponding drive. Drive should be offline before power is removed.

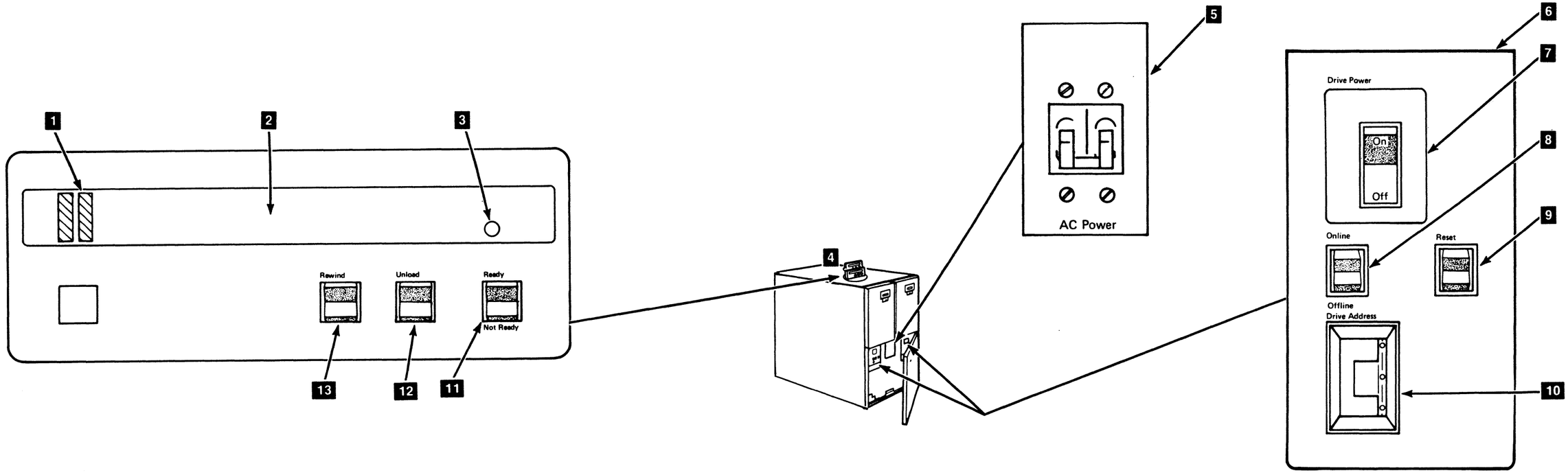
Online/Offline: 8 This switch is placed in the Online position to permit drive communication with the control unit. When this switch is placed in the Offline position the drive is not permitted to communicate with the control unit.

Reset: 9 When this switch is pressed, the drive will perform a Power On Reset.

Drive Address: 10 This thumbwheel switch has the hexadecimal value of 0-F, and is set to the drive address. Drives physically attached to the control unit with the CU 0/1 switch set to 0 must be addressed in the range of 0 - 7. Drives physically attached to the control unit with the CU 0/1 switch set to 1 must be addressed in the range of 8 - F. No two drives on the same control unit may have the same drive address set in their thumbwheel switches.

Tape Unit AC Power CB

5 The tape unit ac power circuit breaker supplies ac to the pump/motor, the blower assemblies, and the dc power supply. Before ac power is removed, both drives in the tape unit should be offline.



Tape Unit Switches and Indicators

Tape Units With Bill of Material 6460006 (See CARR-DR 9)

The tape unit operator panel switches 4 permit the customer and the service representative to control specific drive functions.

The tape unit ac power CB 6 is located at the front of the tape unit at the bottom right. The tape unit front cover must be open and the safety cover must be removed to get access to this switch.

Switches are also located on a drive switch panel 5 located at the front center of the tape unit below the drives. The four switches at the left are used with drive 0, and the four switches at the right are used with drive 1. The tape unit front cover must be open for access to the drive switch panel.

Drive Operator Panel

The drive operator panel switches and indicators are:

Bar LEDs When lighted, the bar LEDs 1 indicate that operator action is needed before the drive can continue operations.

Message Display This is a red eight-character dot matrix LED display 2 that supplies error, service representative information, drive status, and host response messages. (See PANEL 30 for a description of these messages.)

Selected Indicator The selected indicator 3, when on, indicates that the drive is selected by a control unit.

Ready/Not Ready When the Ready/Not Ready switch 11 is placed in the Ready position and tape tension is correct, the drive is placed in a ready condition and READY F is displayed on the operator panel if the tape is file protected. If the tape is not file protected READY U is displayed.

When the Ready/ Not Ready switch is placed in the Not Ready position, the drive ready condition is removed and NT RDY F or NT RDY U is displayed. This permits the operator to perform a rewind or unload operation.

Unload When the Unload switch 12 is pressed, and the drive is in a not ready condition (Ready Indicator off), the drive rewinds the tape and performs an unload operation.

Rewind When the Rewind switch 13 is pressed, and the drive is in a not ready condition (Ready Indicator off), the drive rewinds the tape to the beginning-of-tape (BOT). In addition, if tape tension is lost and the Rewind switch is pressed, the drive performs a midtape load operation and rewinds the tape to the BOT.

Tape Unit AC Power CB

The tape unit ac power circuit breaker 10 supplies ac voltage to the pump/motor, the blower assemblies, and the dc power supply. Before ac power is removed, both drives in the tape unit should be offline.

Drive Switch Panel

The drive switch panel switches are:

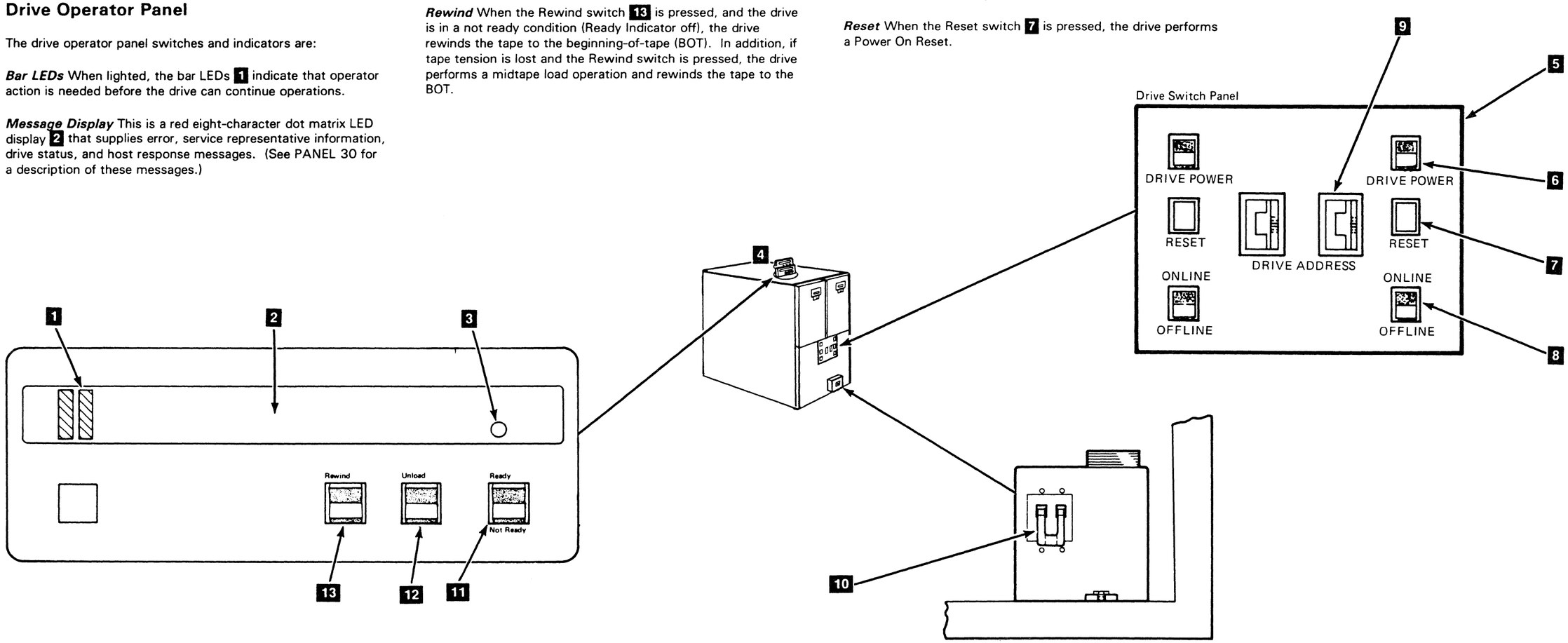
Drive Power On/Off The Drive Power On/Off switch 6 is placed in the On position to supply ac voltage to the fans, and to supply dc voltage to pick the contactors in the power supply. When the switch is placed in the Off position the ac and dc power is removed from the corresponding drive. The drive should be offline before power is removed.

Reset When the Reset switch 7 is pressed, the drive performs a Power On Reset.

Online/Offline The Online/Offline switch 8 is placed in the Online position to permit drive communication with the control unit. When this switch is placed in the Offline position the drive is not permitted to communicate with the control unit.

Drive Address The Drive Address thumbwheel switch 9 can have the hexadecimal value of 0-F, and is set to the drive address. Drives physically attached to the control unit with the CU 0/1 switch set to 0 must be addressed in the range of 0-7. Drives physically attached to the control unit with the CU 0/1 switch set to 1 must be addressed in the range of 8-F.

Note: No two drives on the same control unit can have the same drive address set in their thumbwheel switches.



Message Display Messages

The following types of messages can be displayed on the message display:

- Error Message
- Customer Engineer Information
- Drive Status
- Drive Status When the Drive Is Offline
- Host Response.

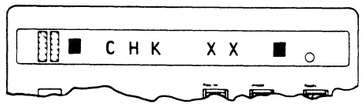
Message Display Characters

In addition to alphabetic characters, the message display can show two other symbols:

x. 'rectangle' (all the LEDs that make up a character in one position are lighted)

* 'asterisk'

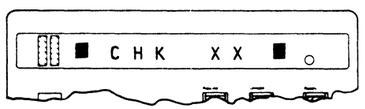
LED Positions on the Message Display



1 2 3 4 5 6 7 8 position number

Error Messages

An error message is displayed when a failure is detected in the drive whether it is online or offline. This message has priority over all other types of messages and will remain displayed until the failure is corrected. The error message code identifies possible failing FRUs which are displayed on the Maintenance Device (MD).



This is an error code message.

XX = Hexadecimal error code

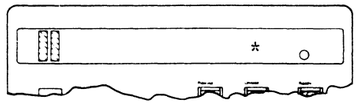
Service Representative Information

Information messages are diagnostic aids for the service representative who is performing FRU isolation on the 3480. These are not error messages.

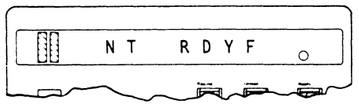
This drive is being tested.

Drive Status When the Drive is Online

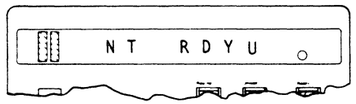
The drive status messages are generated by the 3480 drive to indicate the status of the drive or the operation that is being performed.



No cartridge loaded.



Loaded, not ready, file protected.

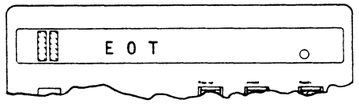


Loaded, not ready, not file protected.

Indicates that the cleaning cartridge should be inserted to clean the read/write head.

Loaded, ready, file protected.

Loaded, ready, not file protected.



Logical End-Of-Tape reached.

High-speed locate in operation.

Data security erase in operation.

Rewind in operation.

Unload in operation.

Drive Status When the Drive Is Offline

When the drive is offline, LED positions 1 and 8 are rectangles. For drive status messages, any characters normally in positions 1 and number 8 are not visible. Any drive status message may be displayed with the drive offline.

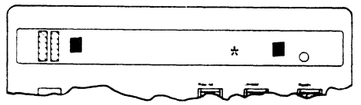
Example:

Drive is offline; loaded, ready. Can be file protected or not file protected.

Example:

Drive is offline; loaded, not ready. Can be file protected or not file protected.

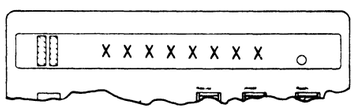
Example:



Drive is offline; no cartridge loaded.

Host Response

The host response messages are customer programmed messages sent to the drive from the host system by using the Load Display command.



Customer programmed messages.

Automatic Loader Switches and Indicators

Mode Selection Switch

The mode selection switch 1 is a three position rocker switch.

- Auto
- System
- Manual

You can change the position of the switch at any time. Generally the device switches to the new mode automatically without any action by you. The one exception is when switching to Auto mode. The Start switch must be pressed to activate the new mode.

Auto Mode:

In this mode cartridges in the input stack are sequentially loaded into the drive, and upon completion of use by the drive, will be unloaded and positioned in the output stack.

Manual Mode:

In this mode you must manually insert the cartridges into the drive, one at a time.

System Mode:

This mode incorporates the attributes of both the Auto and Manual modes. This mode is controlled by the contents of the Load Display command which is controlled by the operating system.

Start Switch

The Start switch 2 is used by the operator to initialize Auto or System mode after a Power-On-Reset, IML, or switching from Manual/System to Auto mode.

Reinitialize Auto or System mode after an input stack empty or output stack full condition. Cartridges must be added to the input stack or removed from the output stack before pressing the Start switch.

Activate each manual cartridge load cycle in Manual or System mode.

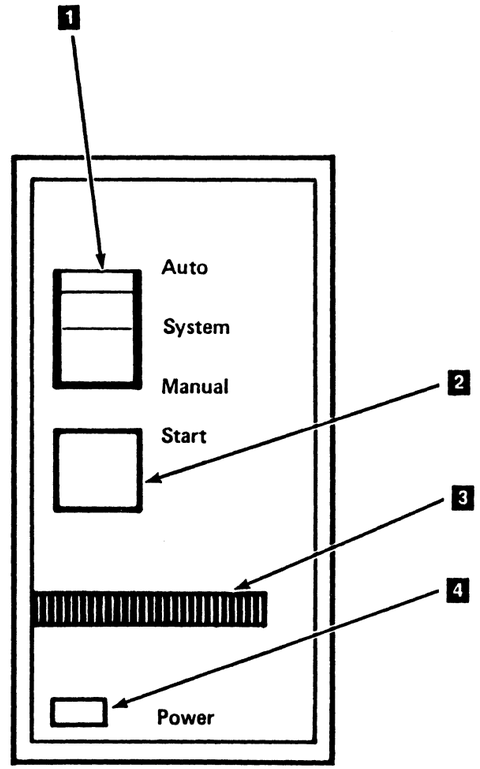
Attention Indicator

When the Attention indicator 3 Led is flashing indicates to the operator that action is needed before the automatic cartridge loader can continue operation.

When the Led is on solid, indicates an error condition. The indication remains on until a power off or a manual reset/IML of the drive, or the error condition has been cleared by pressing the drive Unload switch.

Power On Indicator

The Power On Indicator 4 is on when the dc voltages supplied by the drive power supply are on and are regulated.



Contents

Maintenance Device Description

The Maintenance Device (MD) is the primary maintenance tool for the 3480 Magnetic Tape Subsystem.

Most 3480 maintenance analysis procedures (MAPs) are resident on the 3480 maintenance device product diskette. When this diskette is inserted into the maintenance device, the maintenance device processes MAPs to analyze machine symptoms and display data to guide you to the failure. When necessary, you enter symptom information on the maintenance device keyboard/display as additional input to the MAPs.

Maintenance Device Models

Two models of the maintenance device are now being used; the MD-1 and the MD-2. The location of some controls and indicators are different on the two models, however, the 3480 diskettes can be swapped and the keyboard/display controls are the same. (The MD-2 is smaller and less heavy than the MD-1).

The maintenance device education course for each model identifies the differences in operating procedures and control panels. The description in this section is intended to be independent of the maintenance device model that you are using. However important differences are identified when they are visible as you operate the maintenance device.

The maintenance device contains the following:

Label: The label 1 explains how to load, IPL, and use the maintenance device. It also explains what to do when the maintenance device fails.

Maintenance Diskettes: The maintenance diskettes 2 are inserted into the MD only as shown on the MD label. The diskette is inserted into the MD-2 opposite to the way it is inserted into the MD-1.

MD Product Cable: The MD product cable 3 is connected to the 3480 control unit to supply the communication path between the MD and the 3480. The MD connector is located in the front of the 3480 control unit above and to the right of the power supplies.

Keyboard/Display: The keyboard/display 4 is a hand held unit that permits communication with the maintenance procedures. The keyboard lets you enter control information and respond to questions asked during MAP processing. The display supplies you with visual status of the MAP processing and displays questions and information messages from the MAP that is being processed.

Operator Panel: The operator panel 5 contains the switches that power up or power down, reset, and IPL the MD. Also located on the operator panel are sockets to attach other devices.

MD Diskette Insert Slot: The maintenance diskettes are inserted into the MD drive through the diskette insert slot 6. The MD drive reads the information on the diskette to supply input to the MD. The MD drive can also write information on the diskette.

Load/Open Switch: The Load/Open switch 7 permits you to insert or remove the diskette.

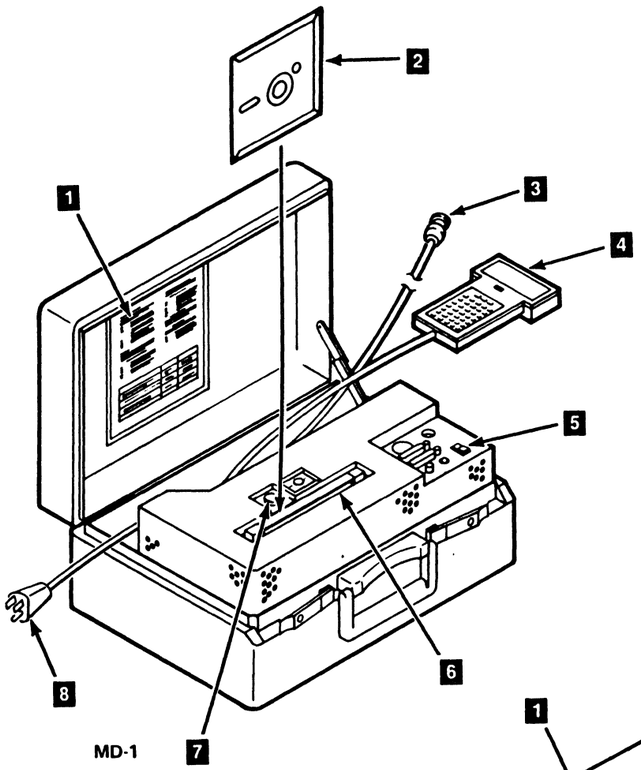
MD AC Power Cord: The MD ac power cord 8 is used to connect the MD to a correct ac voltage outlet.

MD Education Course

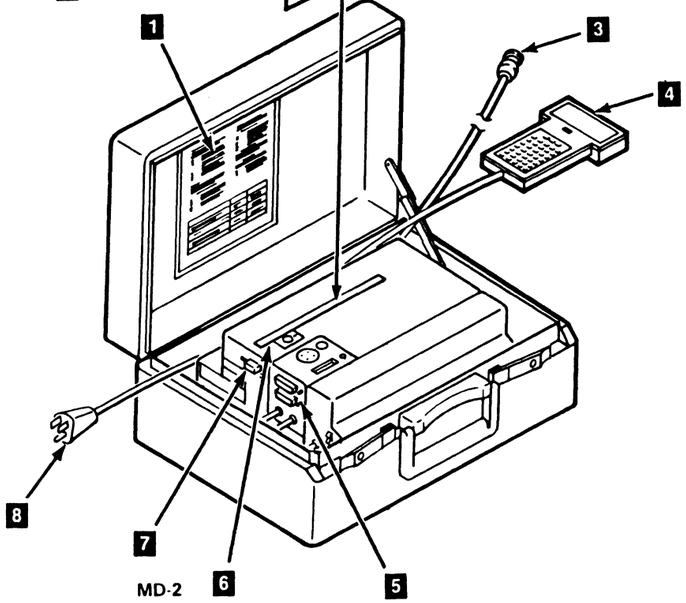
Service representatives should complete the MD education course before using the 3480 maintenance package. This education course is resident on the MD maintenance diskette, part number 8547642, which is the diskette used to maintain the MD.

Perform the following procedure to start the module:

1. Connect the MD ac power cord to a correct ac voltage outlet.
2. Follow the directions on the MD instruction label and power up the MD.
3. Follow the directions on the MD instruction label and insert the MD maintenance diskette.
4. Press the IPL/Reset switch located on the MD operator panel to IPL the diskette.
5. Press the ENTER key on the Keyboard/Display when the diskette identification message is displayed.
6. Press the NO key (the NO is on the keyboard face above the T key) on the keyboard/display when the Repair/Test question is displayed.
7. Press the YES key (the YES is on the keyboard face above the 0 key) on the keyboard/display when the education question is displayed.
8. Follow the directions displayed on the keyboard/display.



MD-1



MD-2

Keyboard/Display

The MD includes a hand-held keyboard/display that permits two-way communication between the service representative and the MAPs and MD functions. The display is included in the keyboard/display assembly.

MD Display

The display has four rows of 20 characters each, and messages appear at the top, left-aligned. A cursor is placed after the message unless the message is 80 characters long.

When a message is continued from one display to another, each continued frame contains three periods (...) in the lower right corner of the display.

When a message has a reference frame that supplies additional information about the message, the REF indicator is turned on automatically when the message is displayed.

When you enter data, it appears in the display starting in the cursor location.

When the contents of a display frame are shown in the maintenance information, the text of the frame is shown as it is displayed.

```
MD DISPLAYS ARE
SHOWN THIS WAY IN
THE 3480 MI.
```

MD Indicators

READY When on, the MD keyboard can be used.

A/N (Alphanumeric) Determines the value of the characters entered.

Alphanumeric Entry Mode: When the A/N indicator is on, information entered from the keyboard is alphanumeric as indicated by the keybutton values.

Control Entry Mode: When the A/N indicator is off, information entered from the keyboard includes special characters of control information as indicated by the values on the keyboard face above each key.

Note: *Changing from one entry mode to the other is a keyboard shift change. Usually, the entry mode is determined automatically by the type of response that is expected. Exceptions, such as the use of the PF, REF, or RET pushbuttons, might need a keyboard shift before entering.*

REF (Reference) When on, this indicator informs you that a reference frame with additional information about the current display can be looked at. Pressing the REF pushbutton displays the reference frame. The indicator remains on when displaying the reference frame.

MD Pushbuttons

This section is separated into a general description of the pushbutton attributes and a description of each pushbutton.

Description

All control pushbuttons are self-entering; you do not have to press the ENTER pushbutton to input them. Control pushbuttons include the following: PF, REF, UP, YES, PULSE, FWD, OPEN, RET, DOWN, BKWD, NO, and RESET.

Notes:

1. *When you enter control functions, the MD keyboard must be in control entry mode (the A/N indicator is off).*
2. *The SPACE, BKSP, SHIFT, and ENTER pushbuttons perform the same function in either entry mode.*

Pushbutton Operations

This section describes the operations that occur when the MD keyboard/display pushbuttons are pressed.

PF (Program Function) When pressed, this pushbutton causes the current operation to be started again.

- During processing of a MAP, pressing the PF pushbutton causes the MAP Processing Control menu to be displayed.

UP, PULSE (Pulsing), OPEN, DOWN When pressed, these pushbuttons supply responses to questions asked about probing points during MAP processing.

REF (Reference) With the REF indicator, pressing the REF pushbutton displays the first 80-character reference frame. If the reference frame is continued, three periods (...) are displayed in the lower right corner of the display. Each time you press the REF pushbutton, an additional reference frame is displayed. If no additional reference frame is available, the original message is displayed.

If the REF indicator is off, pressing the REF pushbutton has no effect.

Note: The A/N indicator must be off to display reference information. If it is on, press the SHIFT pushbutton to turn it off.

YES, NO When pressed, these pushbuttons enter an alphabetic Y or N character to supply answers to a question in the current message frame.

Note: *If you enter an alphabetic Y or N character instead of pressing YES or NO in response to a question, the MD displays a message that states the entry is not valid. If this occurs, press ENTER to display the question again.*

FWD (Forward) Advances to the next display or the next operation.

RET (Return) If pressed when a reference frame is displayed, this pushbutton causes the original message frame to be displayed.

BKWD (Backward) When frames of a continued message are being displayed, pressing this pushbutton causes the preceding frame to be displayed.

ENTER When pressed, this pushbutton signals the MD to read the data that is displayed on the MD keyboard/display. The enter pushbutton may also be used to advance to the next display or next operation.

SHIFT When pressed, this pushbutton switches the entry mode of the MD keyboard between A/N entry and control entry mode. The status of the A/N indicator is also switched to show the current MD keyboard entry mode.

BKSP (Backspace) This pushbutton permits you to correct A/N entry errors. Each time you press the BKSP pushbutton, the cursor moves backward one space and erases that character. A backspace past the first character position does not occur.

SPACE When pressed, this pushbutton causes a space character to be inserted in your input message. The space character appears as a blank on the display.

RESET When pressed, this pushbutton causes the current operation to be ended and causes the MD main menu to be displayed.

MD Messages

Information and direction messages are displayed on the keyboard/display when the MD is used with the 3480 maintenance package. The following information and examples describe how the messages are made up and the types of messages that are displayed.

How MD Messages Are Generated

- An easily understood complete statement or idea is displayed on a single screen.
- When the text cannot be contained on a single new screen, three dots (...) are displayed in the lower right corner of the screen to indicate that more text follows.
- No specific instructions for *information* or *question* type messages are displayed as a part of the message. For example: FORWARD, FWD, ENT, YES/NO, or Y/N instructions are not displayed as part of the message.
- When the MD/subsystem is busy, locking out the keyboard, the displayed message indicates that a machine action is taking place.
- A message that is displayed for more than ten seconds either changes to indicate that the machine is not hung in a loop or an approximate run time is displayed.
- When using the product diskette the RESET key always returns to the main menu.
- In the case of multiple screen text where responses are expected, the responses are permitted at any time.
- All questions end with a question mark and must be given a YES or NO response.
- If no other instructions are given and the keyboard/display READY indicator is on, press the enter key to advance the display.

MD Message Types

The 3480 message types are:

- Fix
- Information
- Menu
- Probe
- Question
- Reference
- Request
- Check.

Fix Message

The fix message supplies a list of the Field Replaceable Units (FRUs) to be exchanged. The repair messages that have FRU lists larger than 3 FRUs are displayed on multiple screens. Press the ENTER key to display the additional FRUs, and press the BKWD key (the BKWD is on the keyboard face above the O key) to go back to the preceding display. The FRUs can be either electronic cards or mechanical parts and are listed as the following examples show.

Fix Message Format

```
9725.01 EXCHANGE
1.FRU003
2.FRU001
3.FRU016          000
```

9725.01 = 7 character fix identification (FIX ID)

FRU003 = 8 character (maximum) FRU identification/code

000 = ... = Text continuation characters

Example of a Fix Message

Each fix message has a corresponding reference message that supplies additional information about the listed FRUs. The following example shows a fix message and the corresponding reference message.

Main Screen

```
4700.64  EXCHANGE
1. FRU003
2. FRU001
3. FRU016
```

Reference Screen

```
SEE MI CARR 1 FOR
FRU IDENTIFICATION,
LOCATION AND
EXCHANGE PROCEDURES.
```

4500.64 = The 7 character fix identification (FIX ID)

FRU 003 = The 8 character (maximum) FRU identification code

- FRU Number
- Field Replaceable unit

Information Message

The information messages are used to inform you that the MD is performing a function that takes time and is not idle.

Example of an Information message

```
RUNNING DIAGNOSTIC
ON READ AREA.
```

Menu Message

The menu message supplies a titled list of options from which you can select the option of your selection. The list of options can cause multiple screen displays, which are indicated by three dots (...) displayed in the lower right corner. Press the ENTER key, or press the SHIFT key and then the FWD key (the FWD is on the keyboard face above the E key), to display the continued list. Press the BKWD key (the BKWD is on the keyboard face above the O key) to go back to the preceding display.

Because a response is needed, the keyboard/display READY indicator will be on. You can select an option while any part of the option list is being displayed. To select an option, press the key corresponding to the option and then press the ENTER key.

Example of a Menu message

Screen 1

```
  ***MAIN MENU***
ENTER A NUMBER
FROM THE FOLLOWING
LIST              ...
```

Screen 2

```
1. START REPAIR
2. CALL DEFERRED
3. UNIT TEST
4. DISPLAY FRUS  ...
```

Screen 3

```
5. UTILITIES
```

Probe Message

The Probe message gives directions to probe a point. The only accepted response to a probe message is one of the four probe pushbuttons (UP, PULSE, OPEN OR DOWN).

Example of a Probe message

```
47150.50
PROBE MACHINE REEL
TACH B AT
02A-A1C2P10
```

MD Messages (Continued)

Question Message

The question message asks a question that must be given a YES or a NO answer and ends with a question mark (?). Because a response must be given, the keyboard/display READY indicator will be on. To respond, press the YES key (the YES is on the keyboard face above the O key) or press the NO key (the NO is on the keyboard face above the T key).

Example of a Question message

```
DOES THE SYSTEM WAIT
LIGHT GO OUT? _
```

Reference Message

The reference message supplies additional information about the main display. When a reference message is available, the REF indicator on the keyboard/display will be on. To display the reference message, press the REF key (the REF is on the keyboard face above the 5 key). To display the next screen, if there is a multiple screen reference, press the REF key again. To return to the main display, advance the Reference display to the last screen and press the REF key.

Example of a Reference message

Reference display

```
SEE MI LOC 25. _
```

Request Message

When input is needed, you are instructed to enter the data and shown the correct data format. The keyboard/display READY indicator will be on. To respond, enter the requested data in the format shown on the screen and press the ENTER key.

Examples of a Request message

```
ENTER TODAYS DATE.
EXAMPLE: 04JAN84
         _
```

Check Messages

There are two check messages displayed by the MD that pertain to the MD itself. One is a program check and the other is an operational error. Both of these displays indicate that an error in the MD microcode was detected. IPL the MD and try again.

If the error occurs again, IPL with a different diskette, or try another MD.

Examples of a Check message

```
MDC15 PROGRAM CHECK XX
MDCP IC = aaaa
MDIL IC = bbbb
```

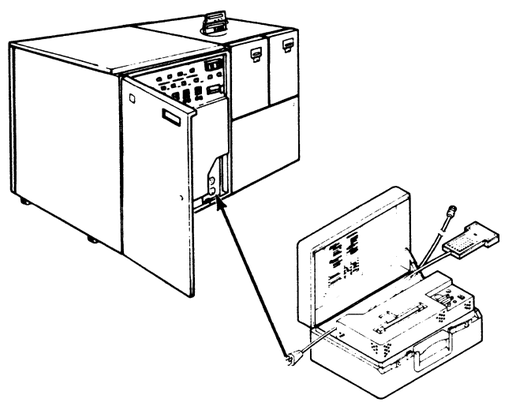
```
MDC 30 OPERATIONAL
ERROR XX OCCURRED AT
STORAGE ADDRESS aaa2
```

Note: This operational error message is an example of one of the four error messages that can be displayed.

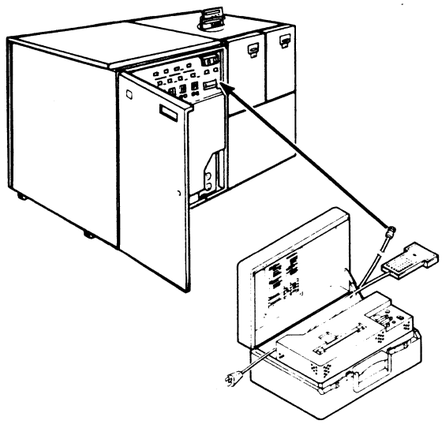
How to Use the MD with the 3480

To connect the MD to the 3480 and start a maintenance action, perform the following steps.

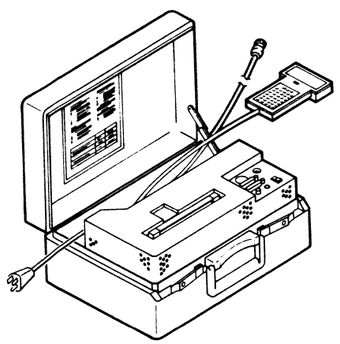
1. Connect the MD ac power cord to the 3480 control unit convenience outlet.



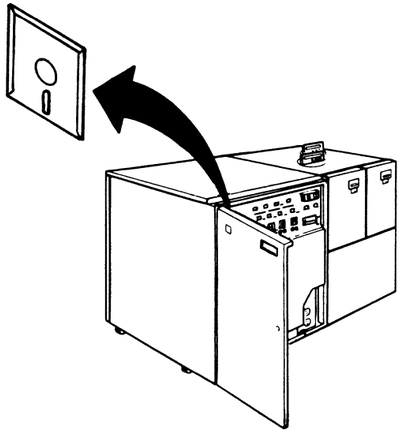
2. Connect the MD product cable to the control unit MD adapter port.



3. Power up the MD. The power up instructions are on the MD instruction label. If the MD does not run, connect the MD ac power cord to a known good outlet. If the MD still does not run, get another MD and return to step 1.

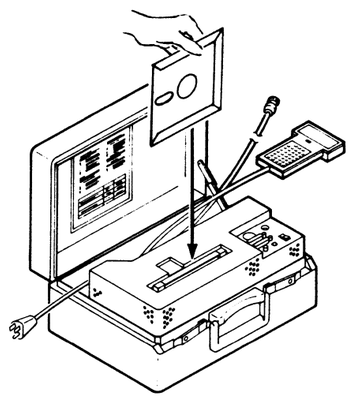


4. Get the product maintenance diskette and verify that the diskette serial number matches the control unit serial number. The diskette is located inside the control unit front cover.

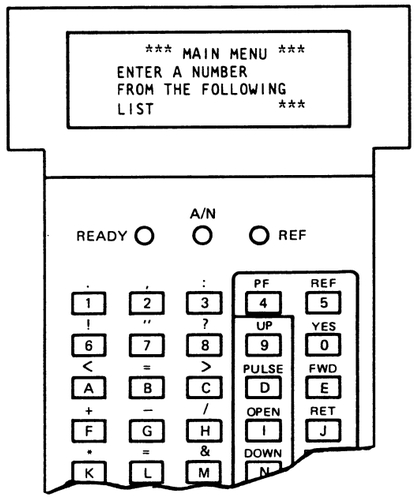


5. Insert the product diskette into the MD and IPL the MD. The load and IPL instructions are on the MD instruction label.

   Note: MD-1 shown. For MD-2 see MD 10.



6. Select an option from the Main Menu list and follow the instructions that are displayed.



Menu Options

Main Menu

The main menu is the first menu displayed when using the 3480 product diskette. It is a list of the primary maintenance options that can be selected. These options are:

1. Start Repair
2. Call Deferred
3. Unit Test
4. Display FRUs
5. Utilities.

1 = Start Repair

The Start Repair option starts a MD repair action sequence. When you select this option, you are prompted to enter the symptom of the error, the address of the failing drive or the address of the drive that is to be tested.

The MD modules then perform tests that verify if the failure is solid, or if the failure is intermittent. If an error is detected, the MAP module for the detected error is run. If no error is detected, you are asked if there are other error symptoms (symptoms detected outside of the 3480). A fault symptom code (FSC) is developed from these symptoms and the correct MAP module is invoked. If there were no externally detected symptoms, you are asked to run the OLT to develop an error condition. When an error is caused by the OLT, the OLT sense data is used to build an FSC and invoke the correct MAP module. If no error is found, the customer is asked to retry the failing operation. If the customer is still having problems, you are directed to request the next level of support. When the customer cannot recreate the failure and no symptoms have been given, you have a trouble not found call.

The MAP modules that are selected display a FRU list or instruct you to perform additional action.

2 = Call Deferred

The Call Deferred option permits you to end the MD connection for a repair action that was not completed. You can use this option when you need to obtain parts or delay the maintenance action to a later time. When the repair action is started again, it must be started as a new repair action by selecting option 1, Start Repair.

3 = Unit Test

The Unit Test option is used to check for correct 3480 operation. It can be selected to verify an externally generated repair, to verify an EC installation, or as part of preventive maintenance (PM). If an error is detected while the Unit Tests are running, the correct MAP is selected and a repair action is started.

4 = Display FRUs

The Display FRUs option is an informational only option used to display FRUs for an error symptom. You are directed to enter the source of the error symptom and are prompted for additional information as required to develop a FRU list. Use of this option provides ***NO*** isolation and should not be used to bypass the Start Repair option.

5 = Utilities

This menu allows access to additional options that are on the product diskette. These options are:

1. Read Tape
2. Real Time Analysis
3. Main Menu

1 = Read Tape

The Read Tape option can be used by the service representative to read and display records written on a customer tape such as the volume or header labels. See PLAN 45 for more details.

2 = Real Time Analysis

The Real Time Analysis option can be used by the service representative to enable or disable the real time statistical analysis and reporting system. See OPER 245 for more details.

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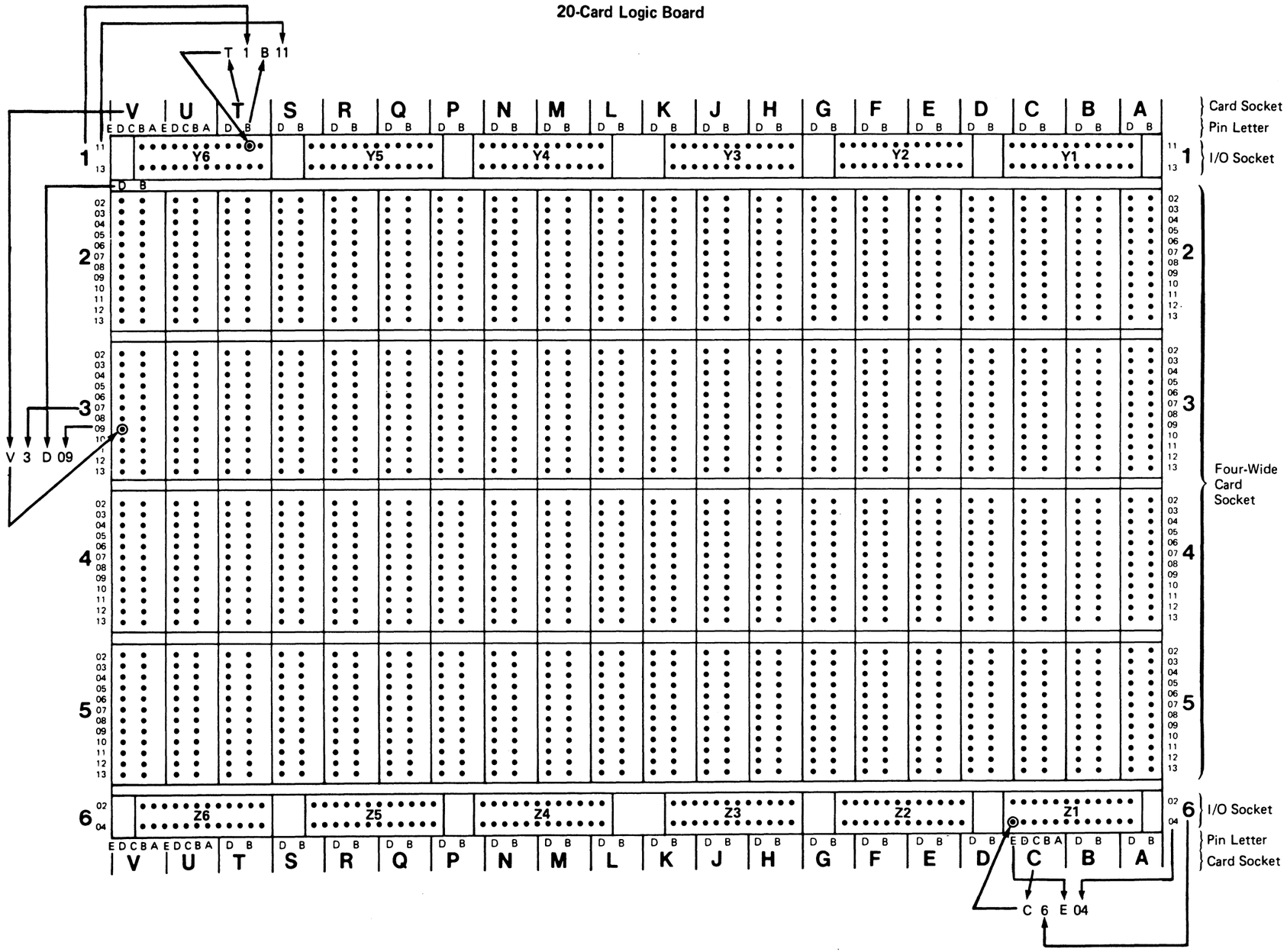
Contents

CONTINUED ON THE NEXT PAGE

Contents (Continued)

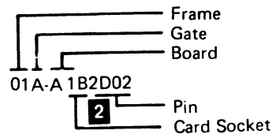
Logic Board Layout Pin Side

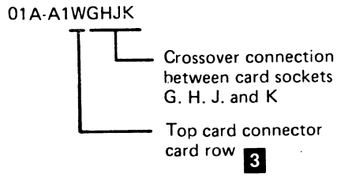
20-Card Logic Board

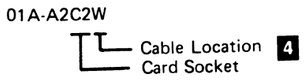


Card Identification

Location Identification Example:

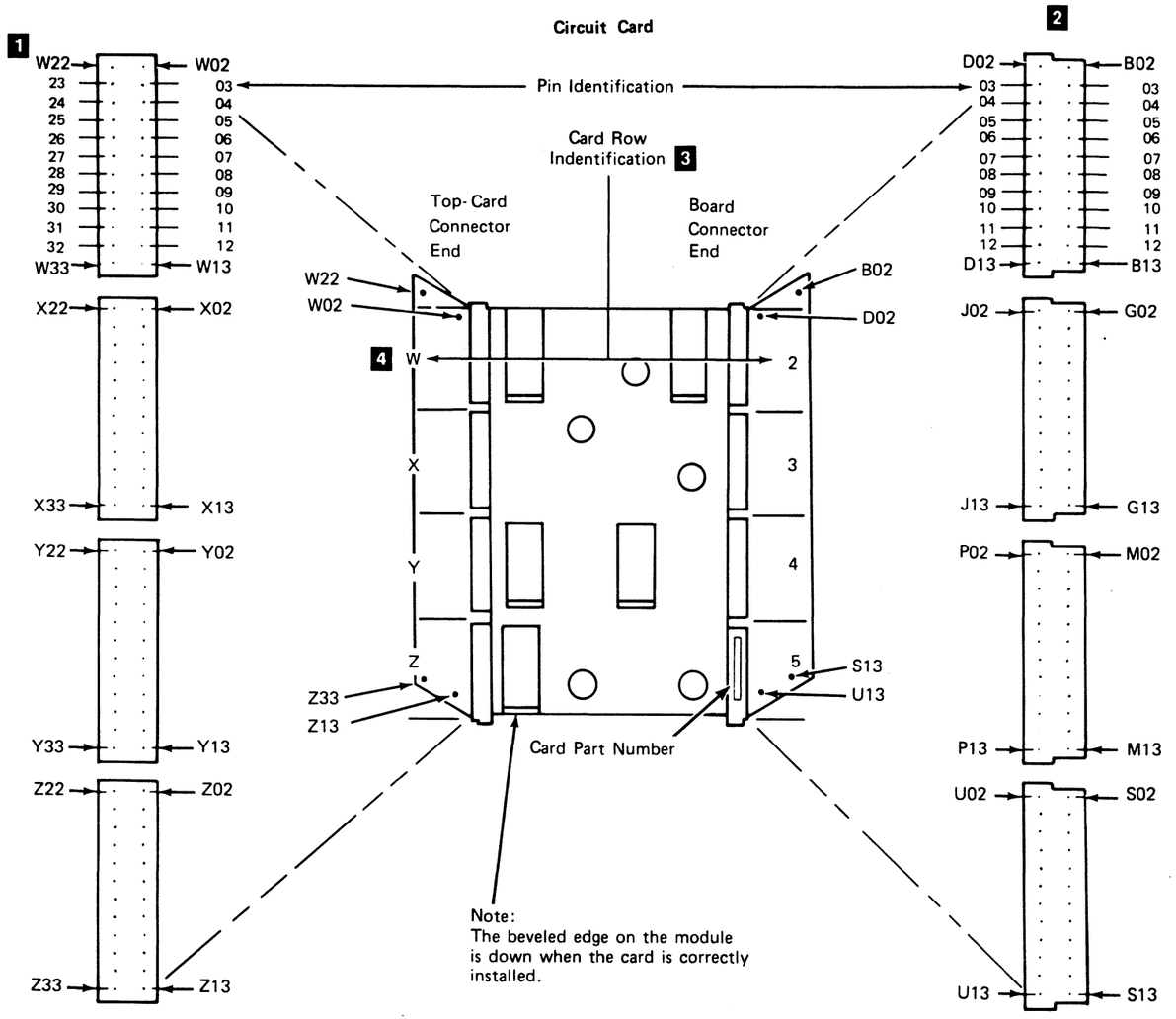






Ground Pins

W24	W06
W29	W11
X24	X06
X29	X11
Y24	Y06
Y29	Y11
Z24	Z06
Z29	Z11



Control Unit Locations (Continued)

Logic Boards, Card Side

* This FRU is a feature on 3480 Model A11 and standard on 3480 Model A22.

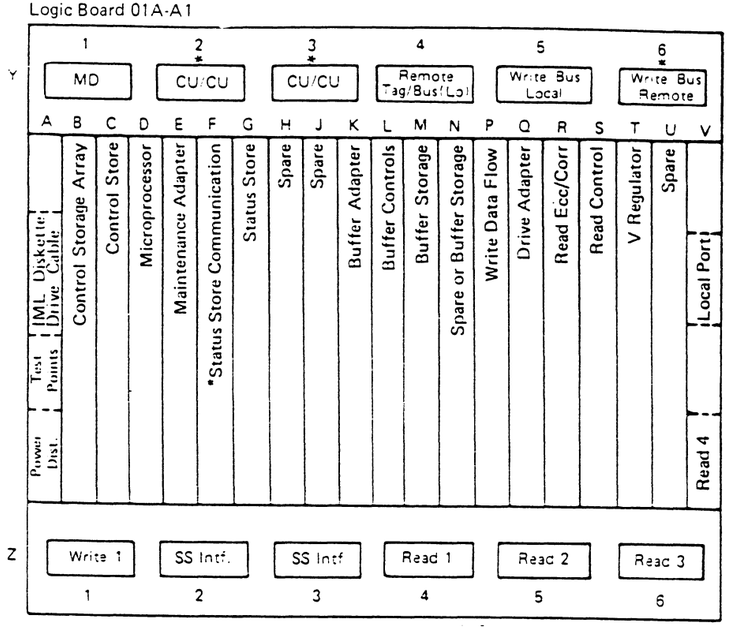
** EC Sensitive FRU. See CARR-CU 4

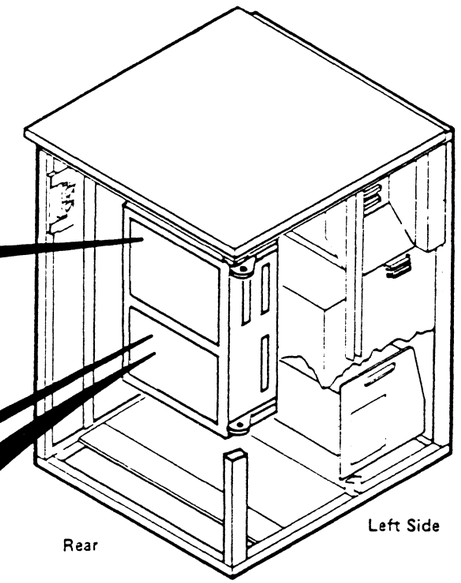
Logic Board 01A-A2 With Engineering Change (EC) A57689 Installed

*** EC Sensitive FRU, may or may not be present.

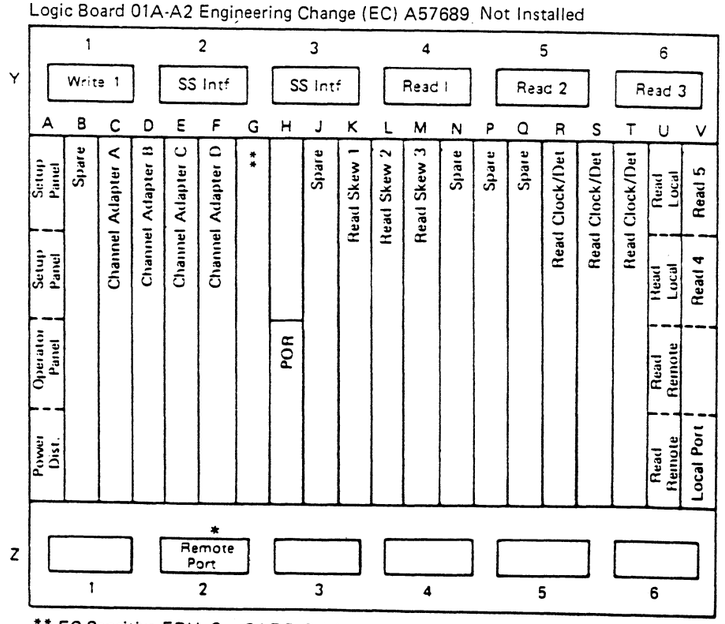
(Top Card Connectors and Cables- See LOC 20)

Logic Board 01A-A1



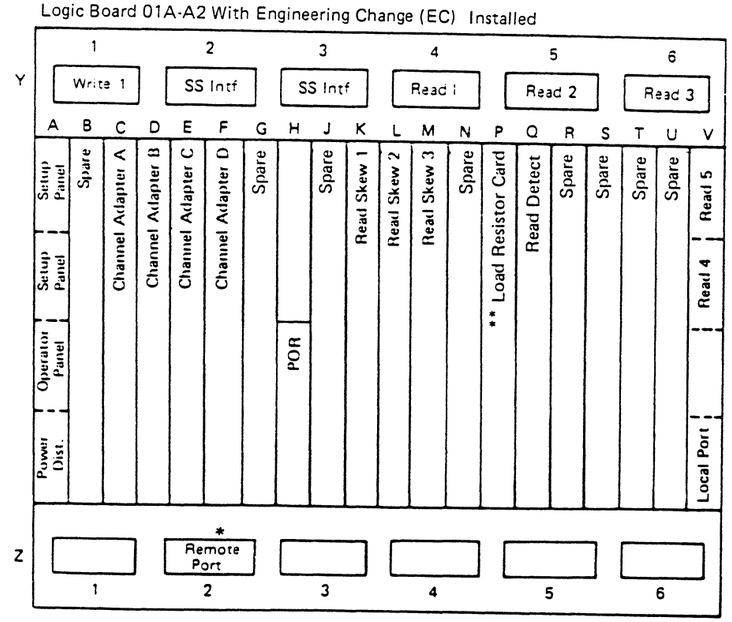


Logic Board 01A-A2 Engineering Change (EC) A57689 Not Installed



** EC Sensitive FRU. See CARR-CU 4

Logic Board 01A-A2 With Engineering Change (EC) Installed



Control Unit Locations (Continued)

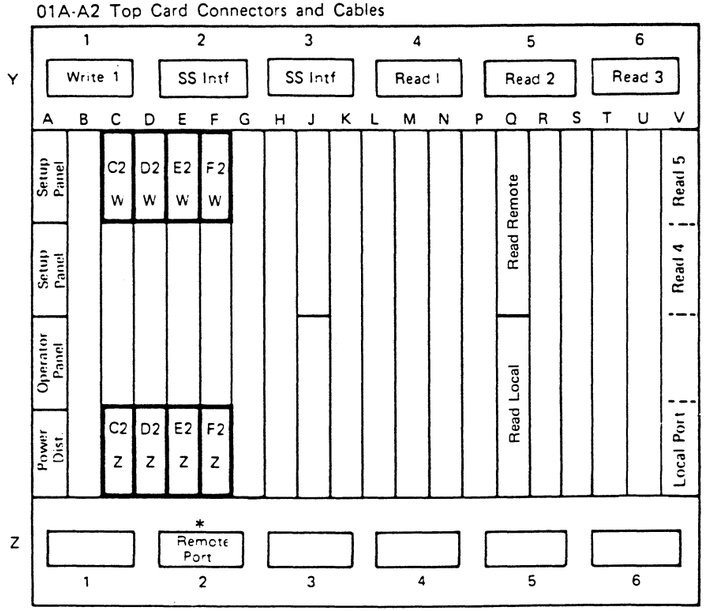
Top Card Connectors and Cables

Notes:

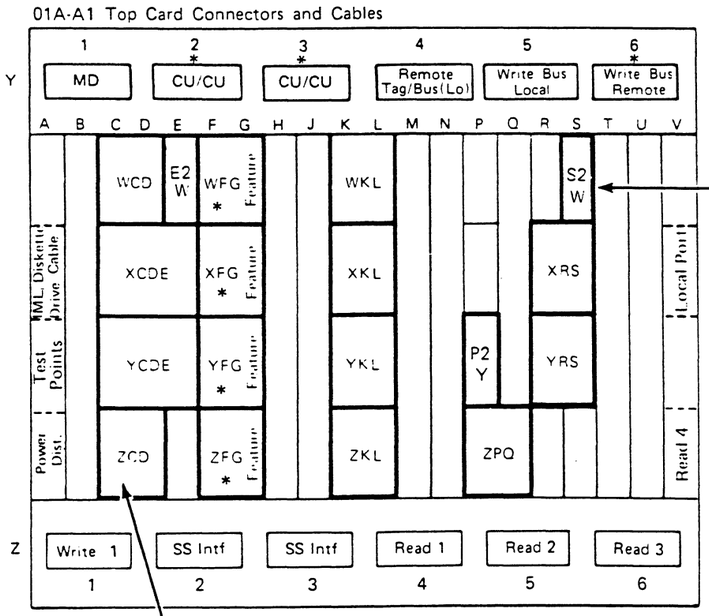
1. *The documentation may refer to the same connector in more than one way. For example, 01A-A1S2W may also be referred to as CU-A1S2W.*

2. *Labeling is different for top card connectors that mount on a single card, such as 01A-A1S2W, and top card connectors that mount on multiple cards, such as 01A-A1ZCD. The single card connectors are labeled with the card given first (S2), then the position of the connector on that card (W). The multiple card connectors are labeled with the position of the connector given first (Z), then the cards (CD).*

Logic Board 01A-A2 With Engineering Change (EC) A57689 Installed
01A-A2 Top Card Connectors and Cables



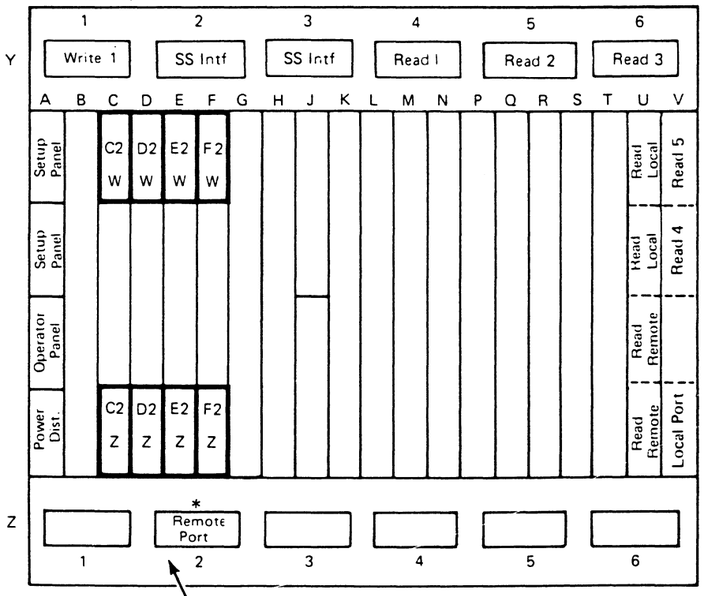
01A-A1 Top Card Connectors and Cables



Top Card Connector Cable 01A - A1S2W (CU - A1S2W *)

01A-A1ZCD Connector (CU-A1ZCD*)

Logic Board 01A-A2 Engineering Change (EC) A57689 Not Installed
01A-A2 Top Card Connectors and Cables



01A-A2Z2 (CU-A2Z2*)

* This FRU is a feature on 3480 Model A11 and standard on 3480 Model A22.

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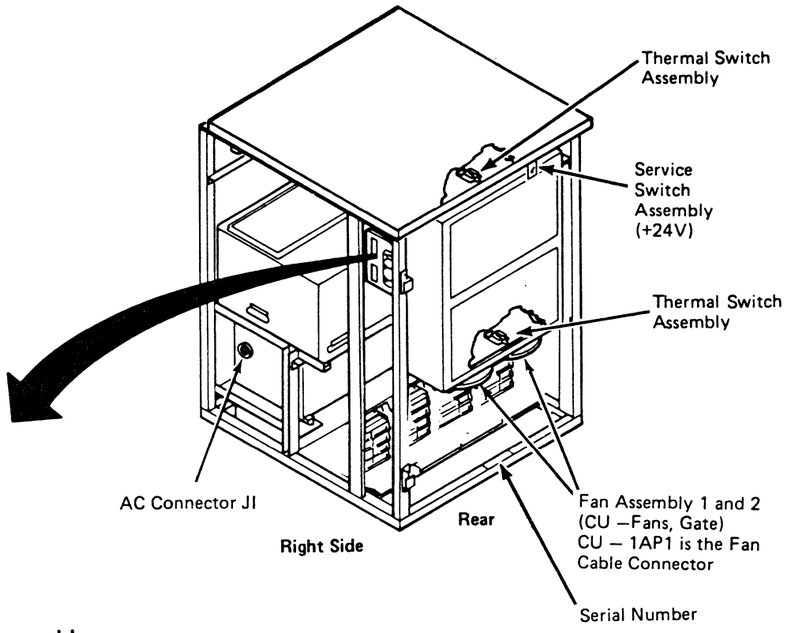
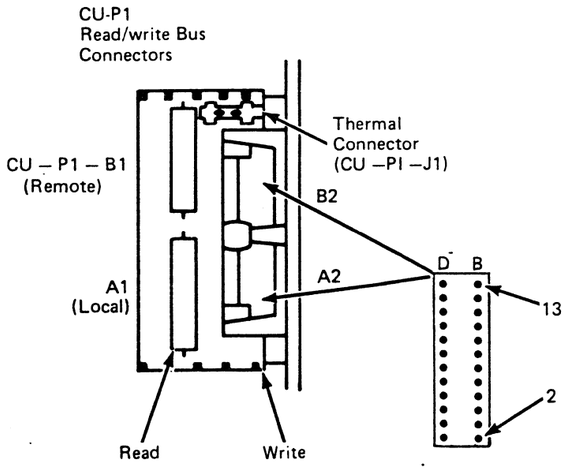
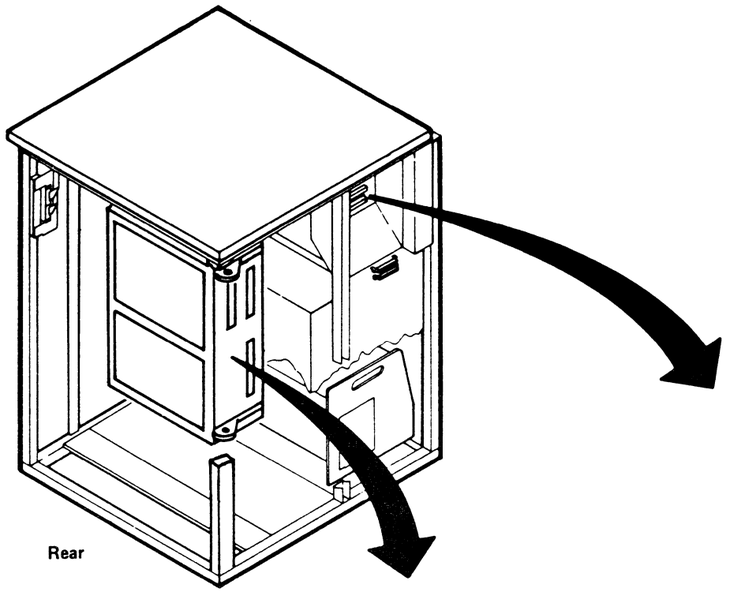
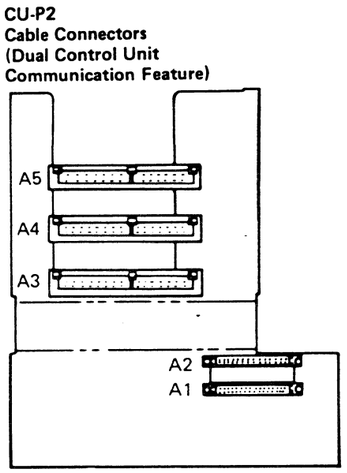
Control Unit Locations (Continued)

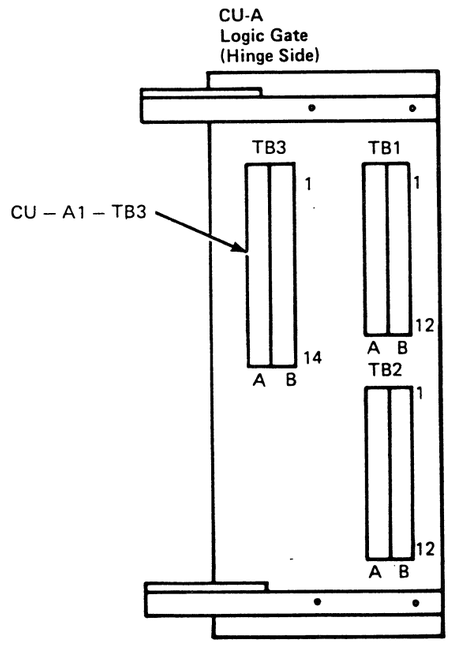
This page is for control units without BM 6460460







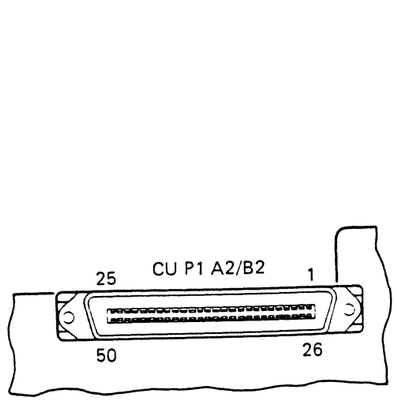


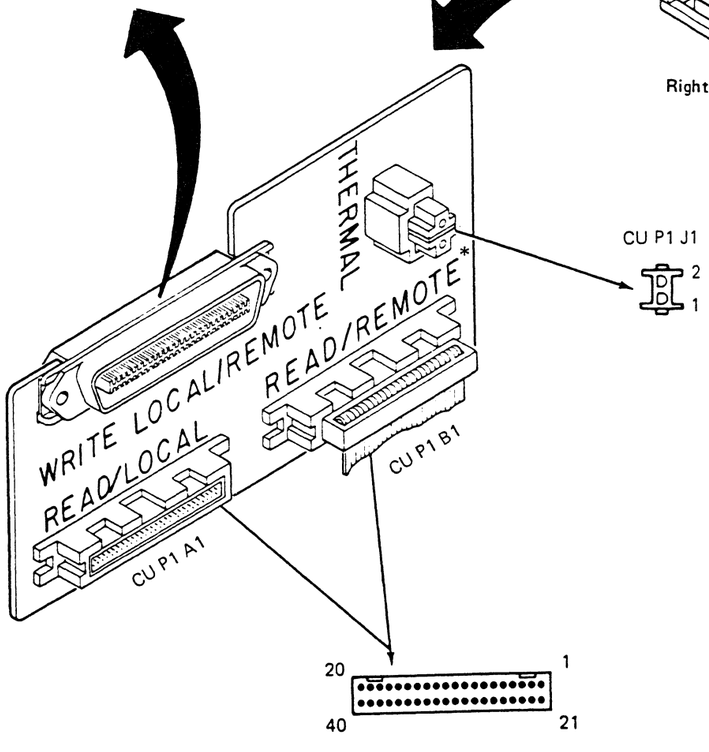


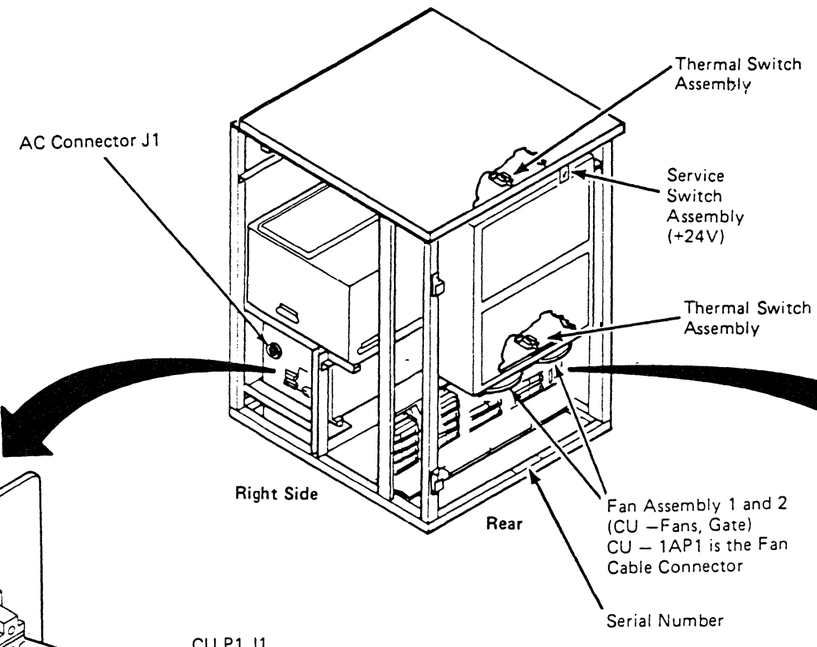
Control Unit Locations (Continued)

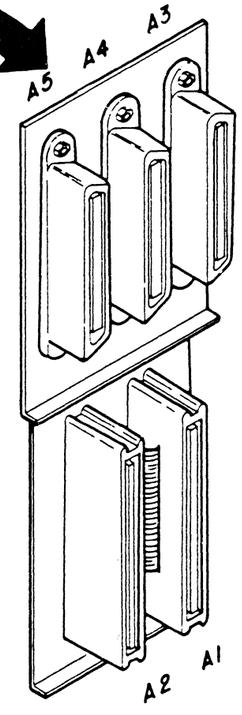
This page is for control units with BM 6460460

* This is a feature on 3480 Model A11 and standard on 3480 Model A22.

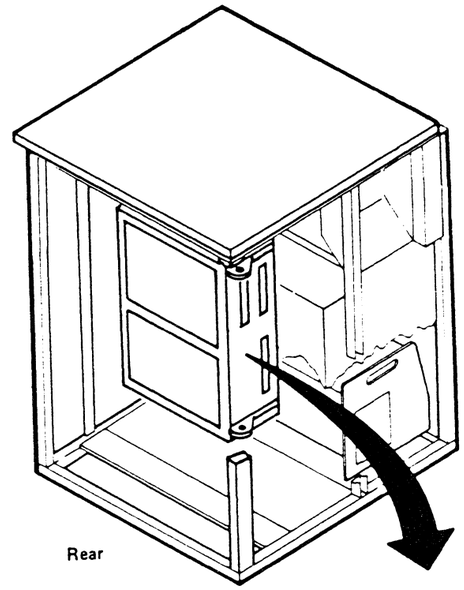


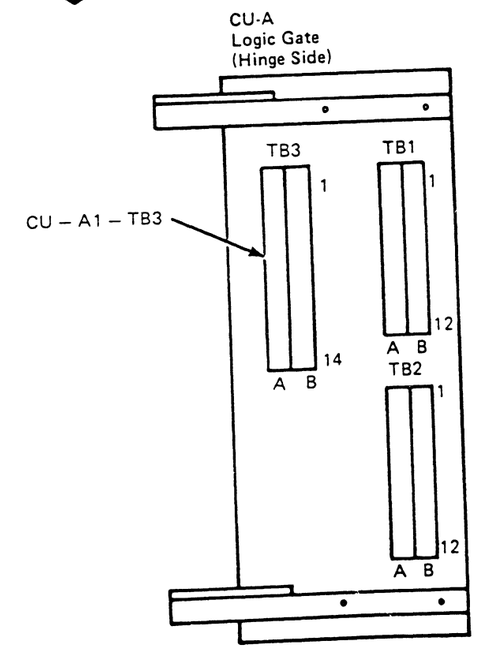






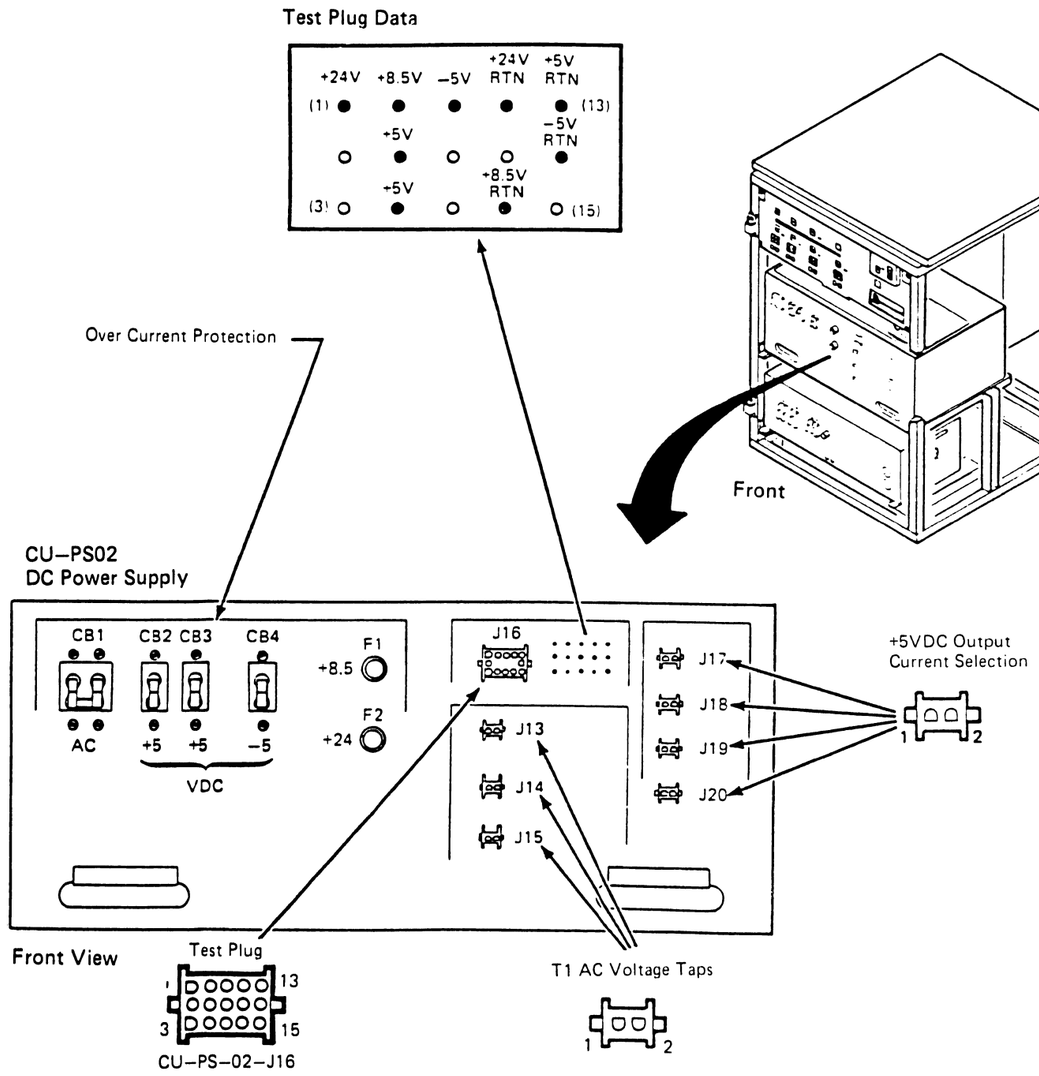
* CU—P2 Cable Connectors (Dual Control Unit Communication Feature)

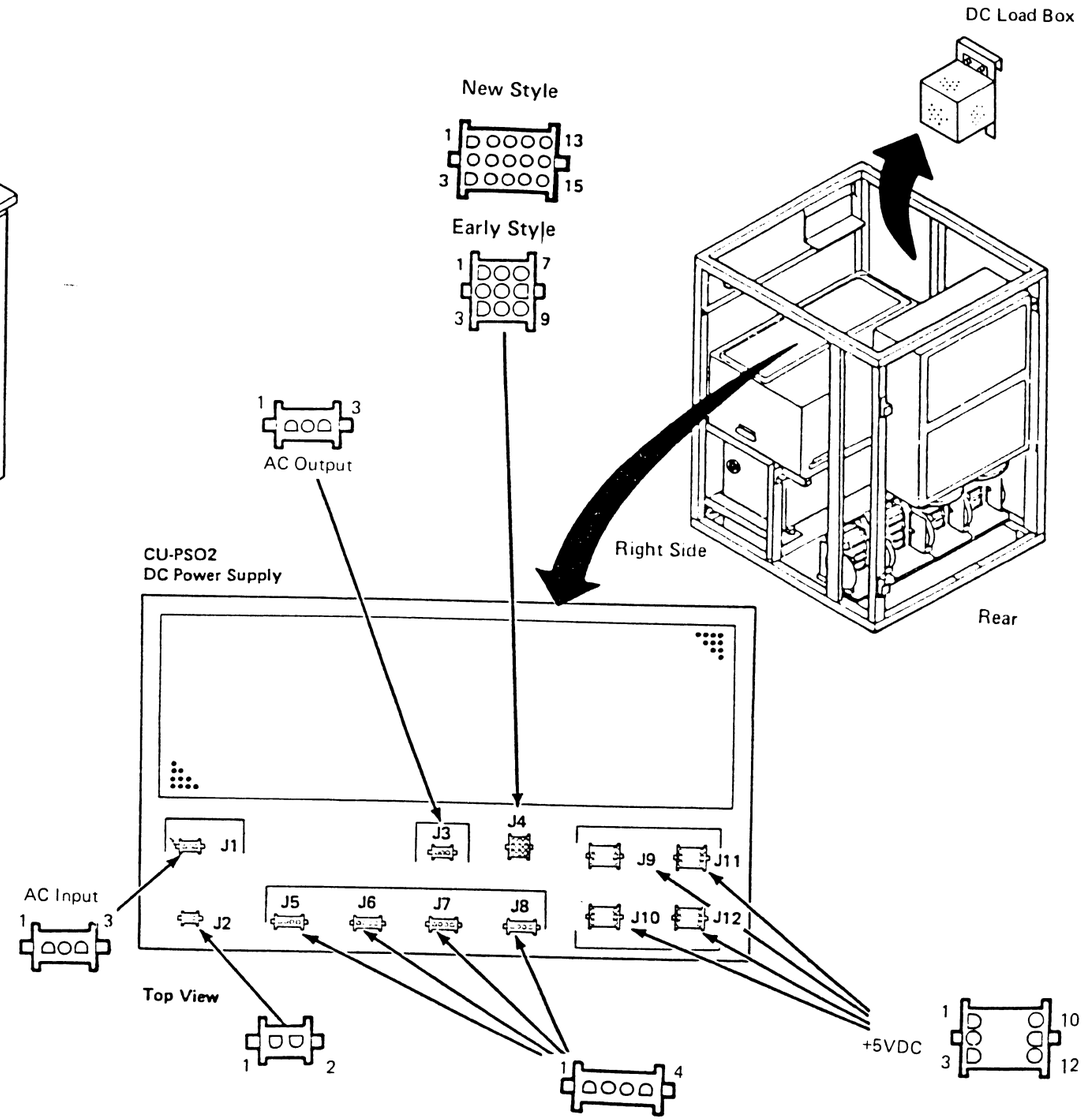




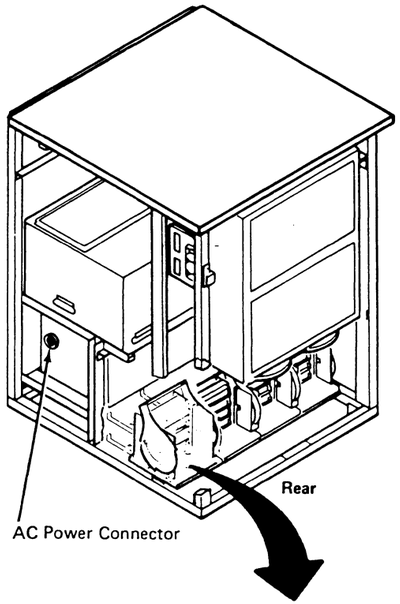
3480 MI ECA57693

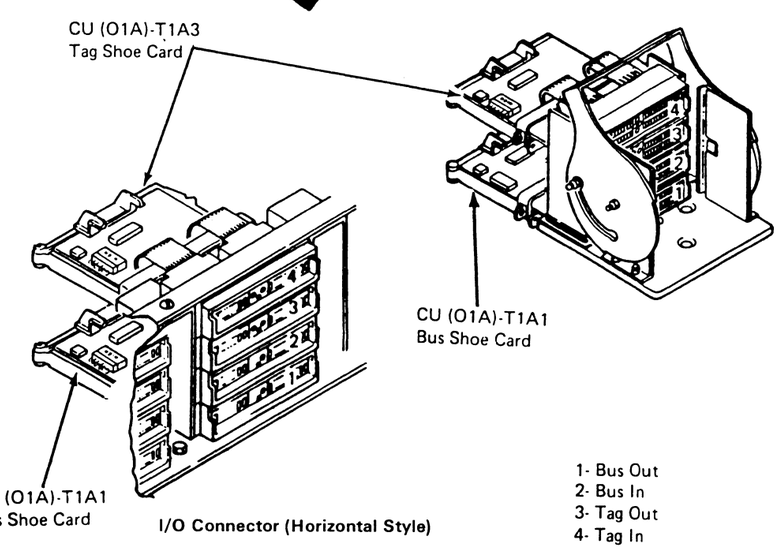
CU-PS02 Control Unit DC Power Supply





This page is for control units without vertical style I/O connectors

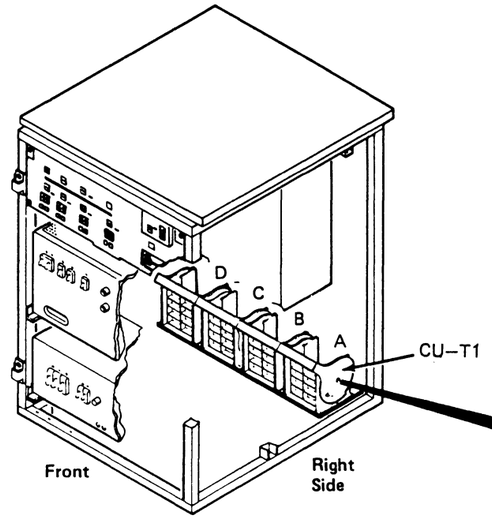


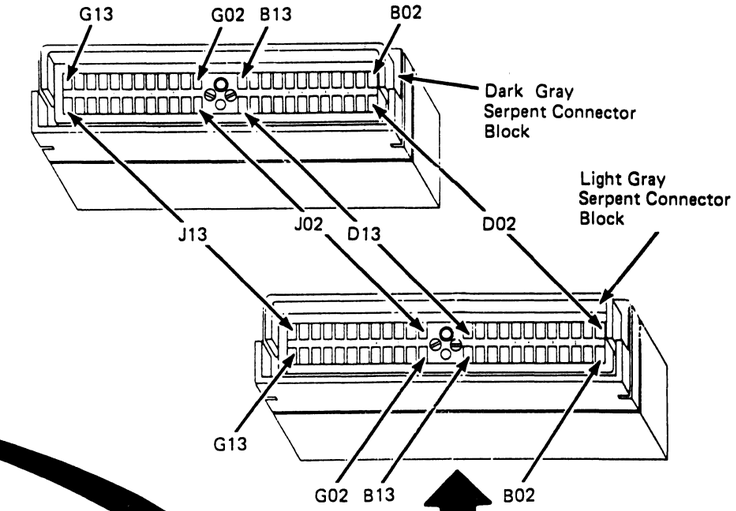


I/O Connector (Movable Rail Style)

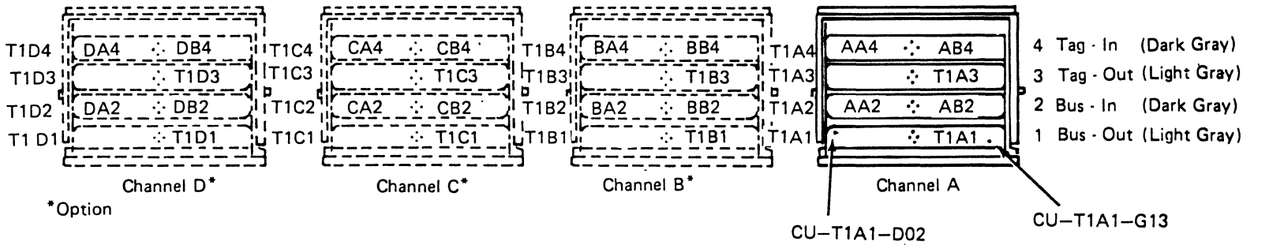
1- Bus Out
2- Bus In
3- Tag Out
4- Tag In

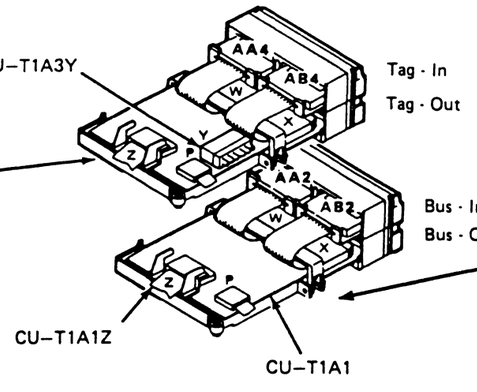
CU (O1A) (I/O Tailgate Connectors, Serpent Connector Side)





CU (O1A) (I/O Tailgate Connectors Card Side)



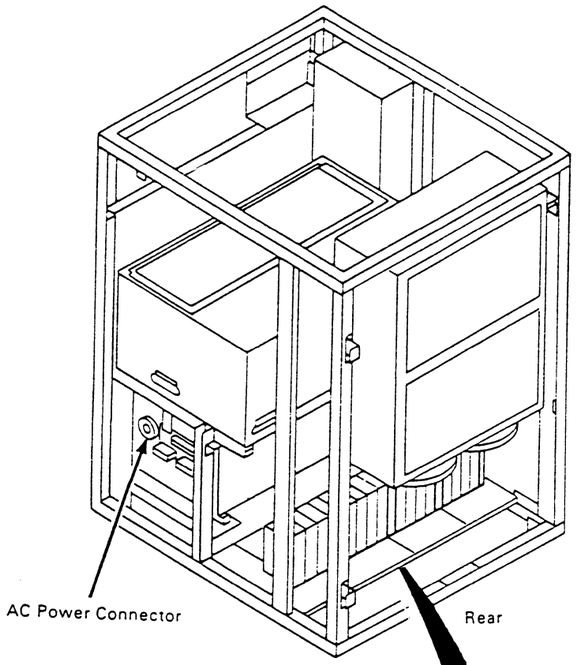


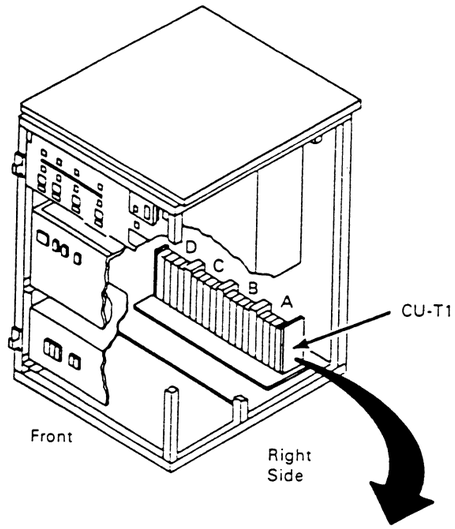
I/O Tailgate Connector Assembly	Tag Shoe Card
A	T1A3
B	T1B3
C	T1C3
D	T1D3

I/O Tailgate Connector Assembly	Bus Shoe Card
A	T1A1
B	T1B1
C	T1C1
D	T1D1

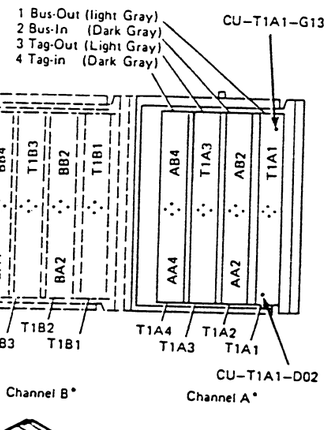
Control Unit Locations (Continued)

This page is for control units with vertical style I/O connectors

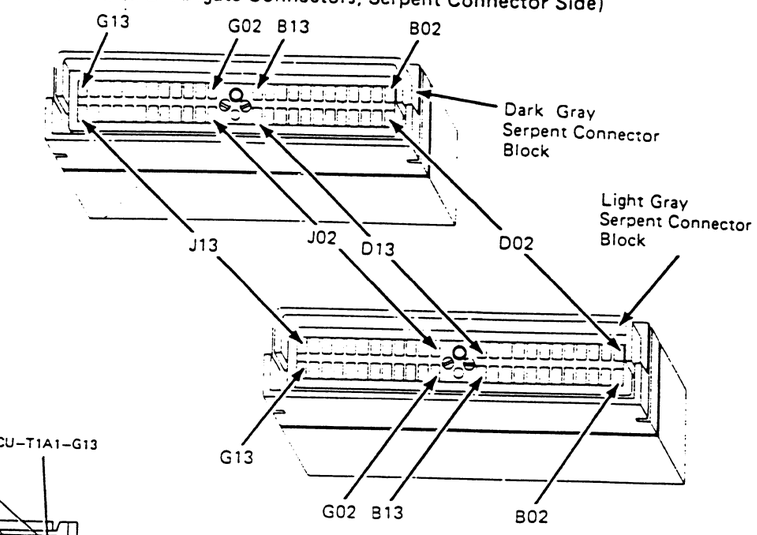




CU (01A) (I/O Tailgate Connectors Card Side)

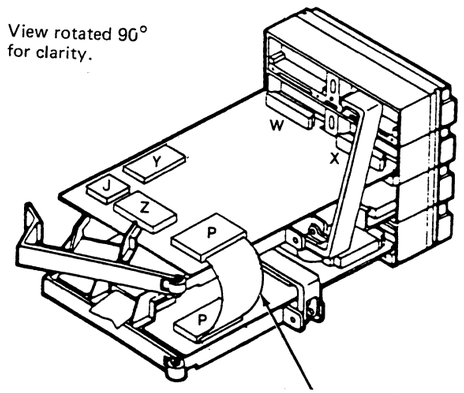


CU (O1A) (I/O Tailgate Connectors, Serpent Connector Side)

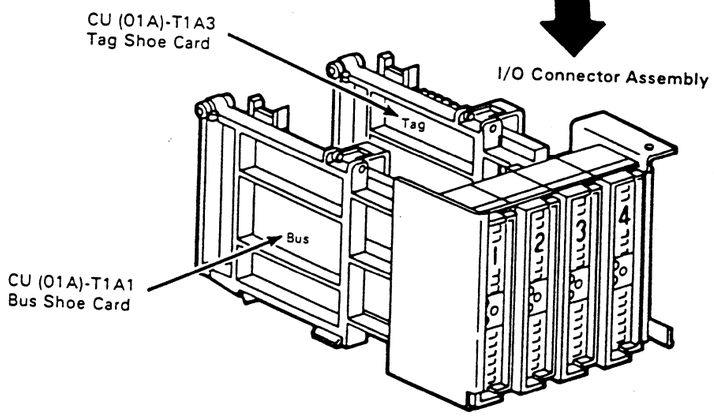


4.5 MB/S Channel Attachment Feature

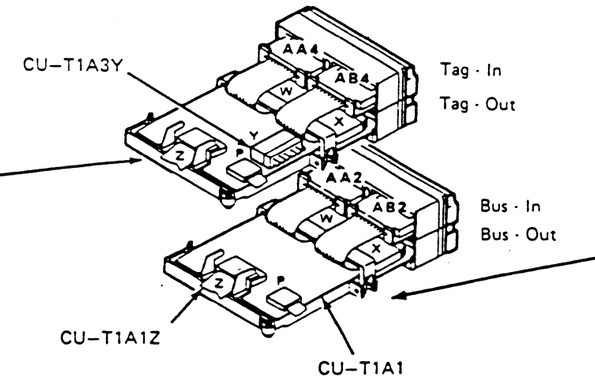
View rotated 90° for clarity.



Bus Tag Interposer Cable

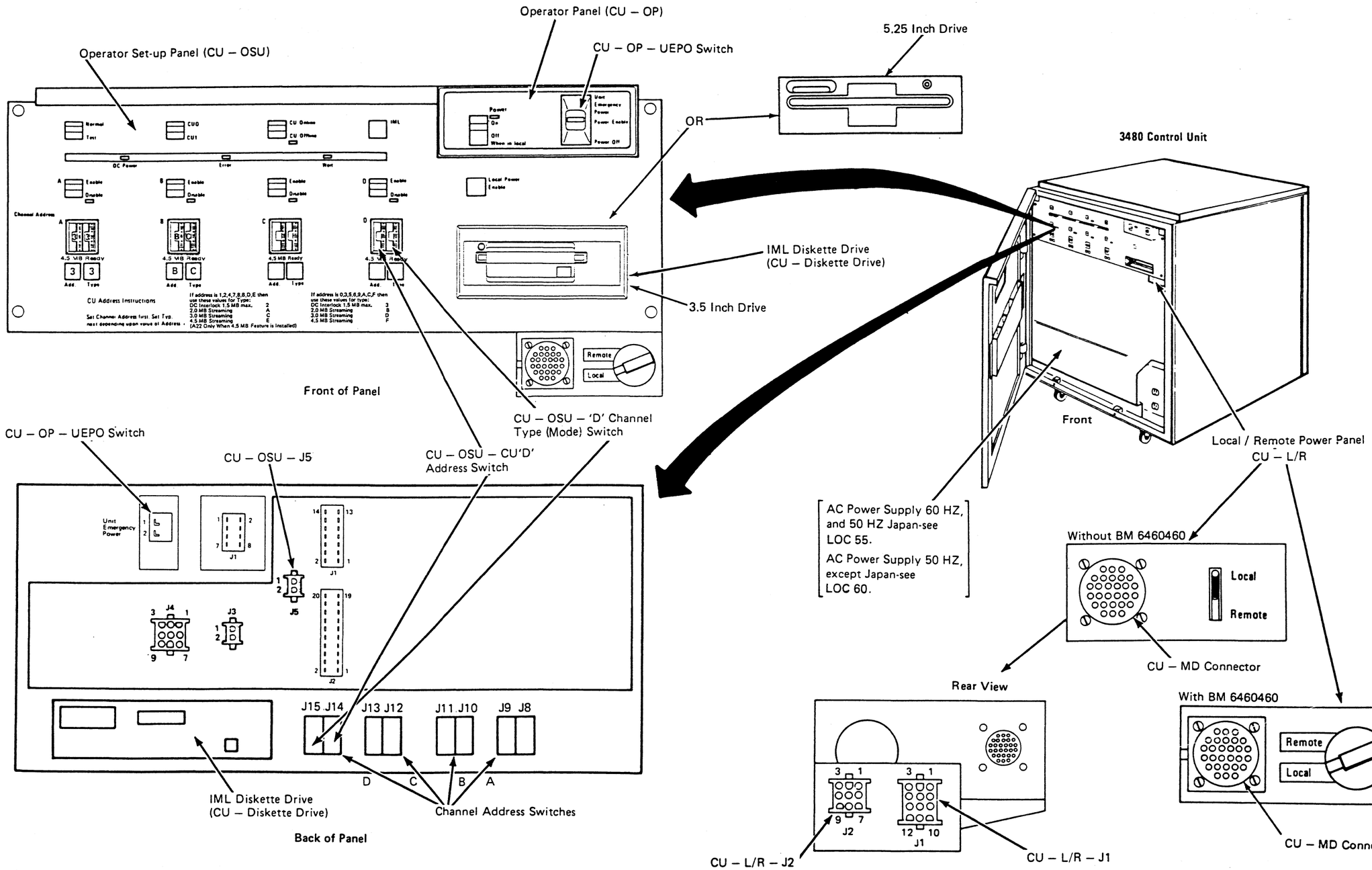


I/O Tailgate Connector Assembly	Tag Shoe Card
A	T1A3
B	T1B3
C	T1C3
D	T1D3



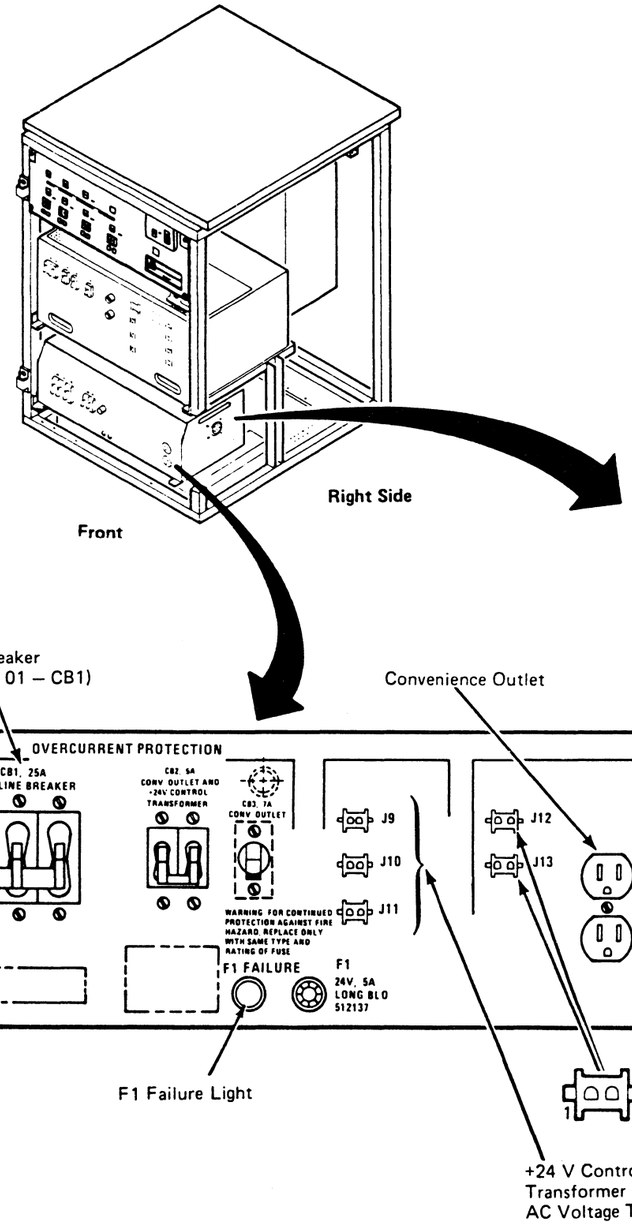
I/O Tailgate Connector Assembly	Bus Shoe Card
A	T1A1
B	T1B1
C	T1C1
D	T1D1

Control Unit Locations (Continued) **LOC 50**



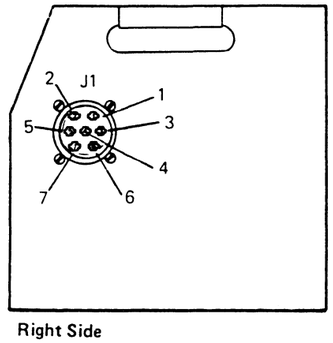
Control Unit Locations (Continued) **LOC 50**

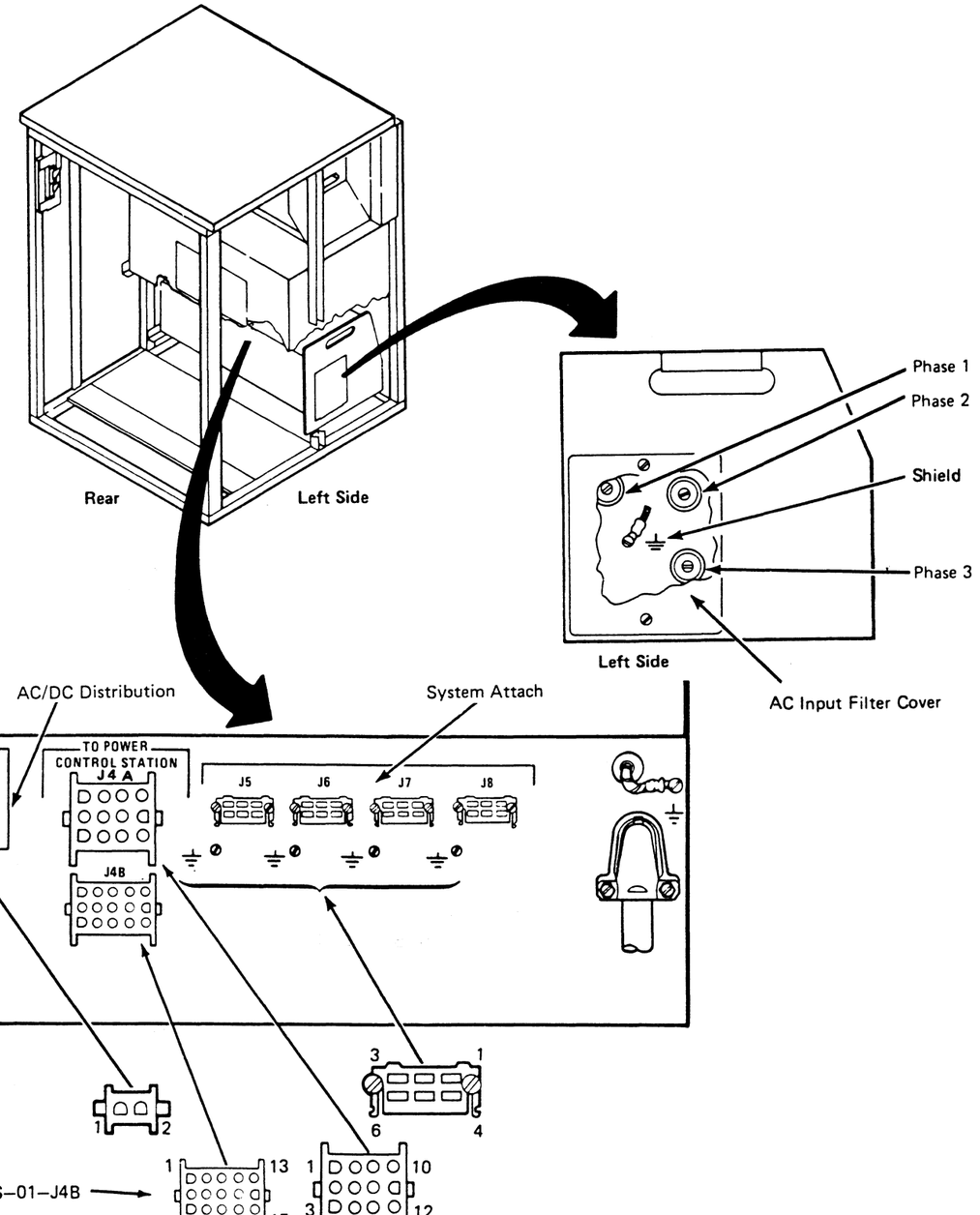
CU-PS01 Control Unit AC Power Supply 60 Hz, and 50 Hz Japan



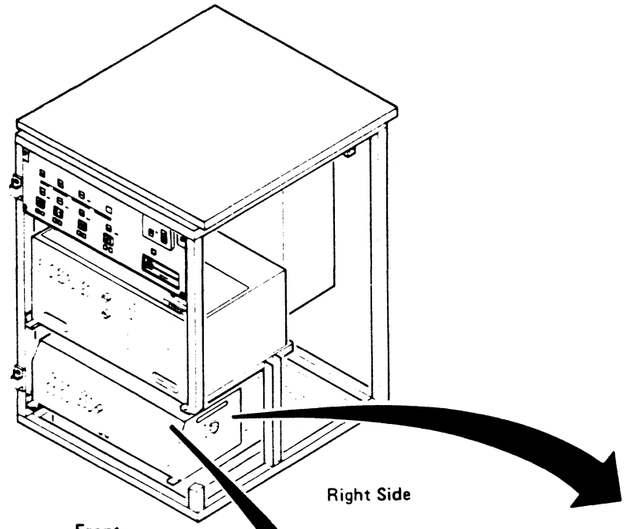
The resistance between the machine frame and the ground pin (pin 4) on the AC output socket of the Control Unit should be 0.1 ohm (See diagram A below).

DIAGRAM A
AC OUTPUT SOCKET (CU)



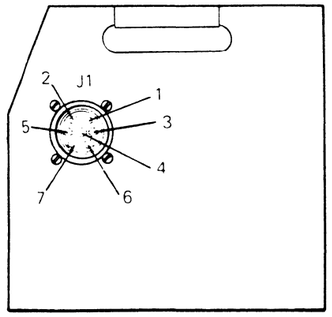


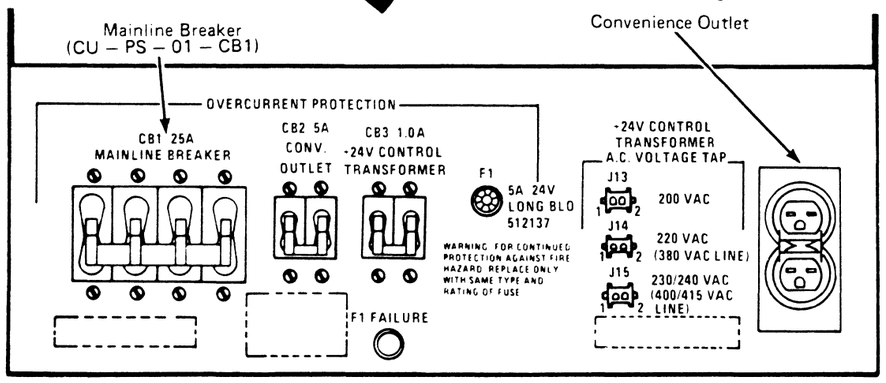
CU-PS01 Control Unit AC Power Supply 50 Hz, Except Japan

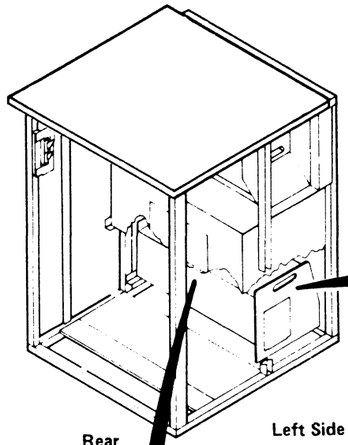


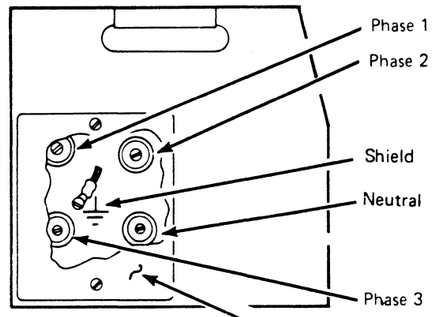
The resistance between the machine frame and the ground pin (pin 4) on the AC output socket of the Control Unit should be 0.1 ohm (See diagram A below).

DIAGRAM A
AC OUTPUT SOCKET (CU)

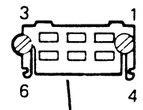


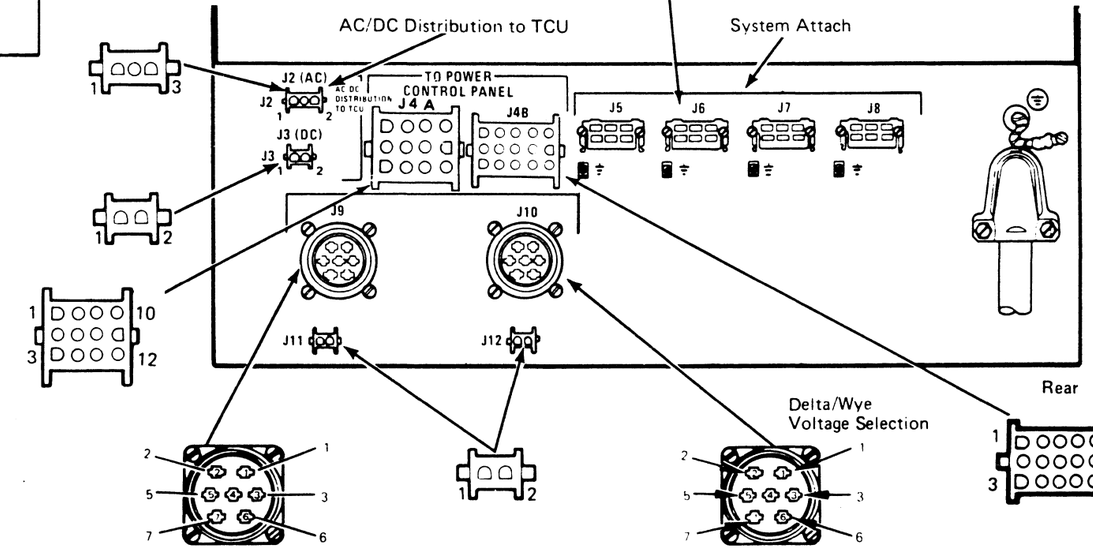






CU-PS01
AC Power Supply 50 Hz,
Except Japan.

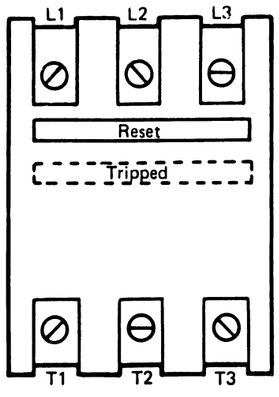




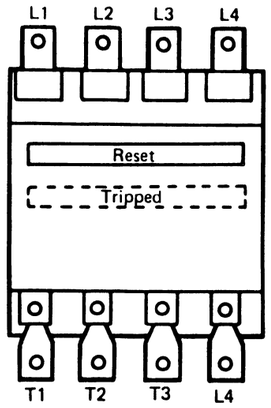
Control Unit Locations (Continued)

Circuit Breaker Terminals

CB1, All 60 Hz, and 50 Hz Japan



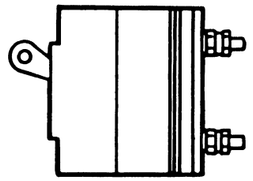
CB1, 50 Hz, Except Japan



Control Unit CBs

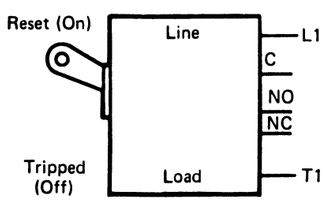
CB2 60 Hz

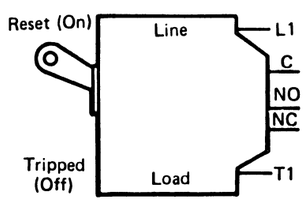
CB2, CB3 50 Hz

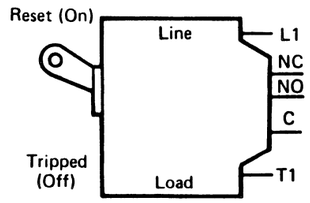


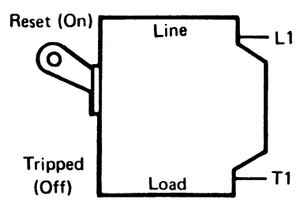
Subsystem Circuit Breakers

The circuit breakers shown represent typical breakers as found in both the Control Unit and the Tape Unit. The Auxiliary contacts, even if present, are not used.

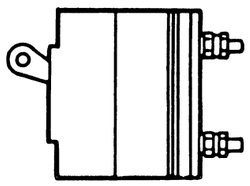




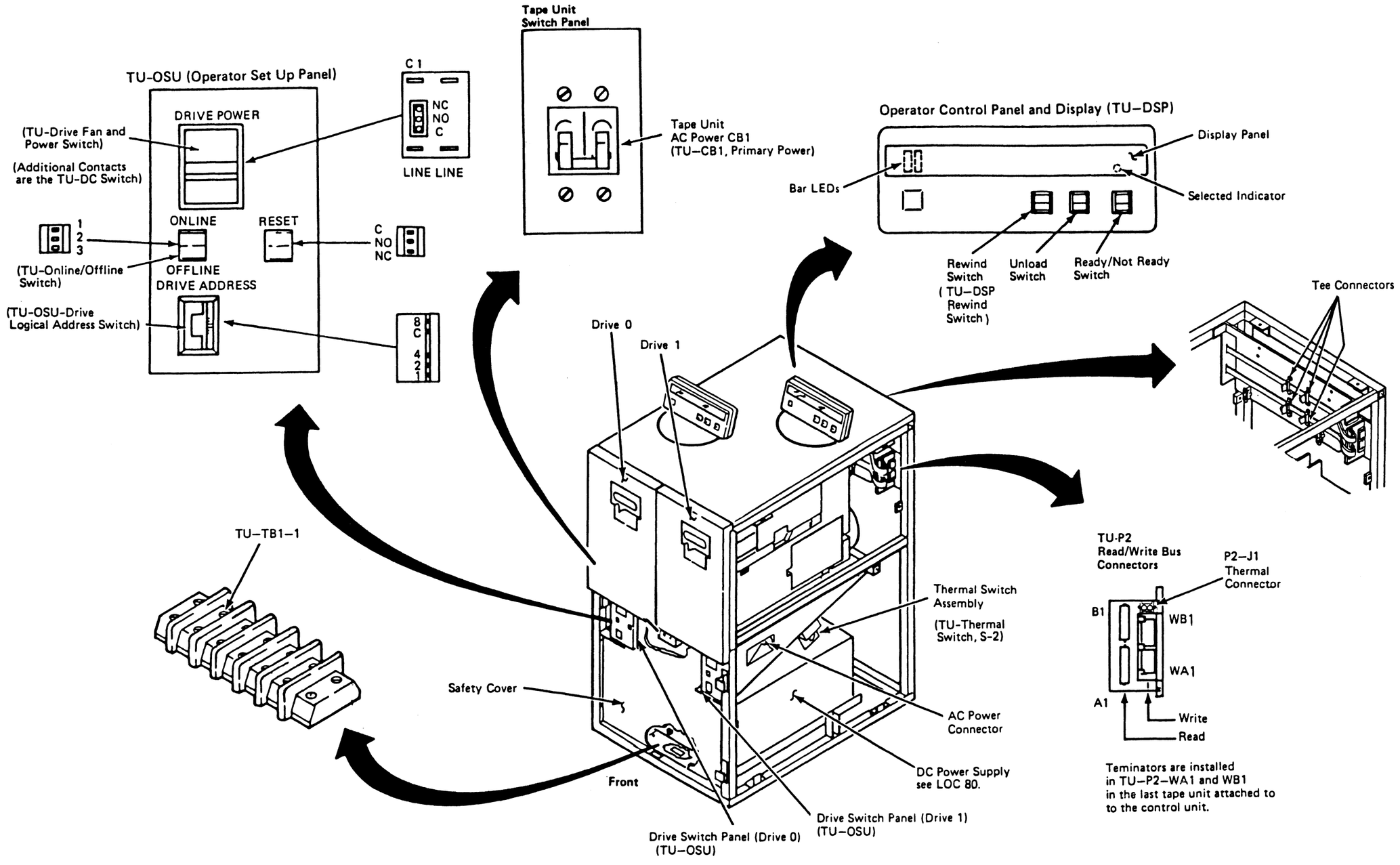




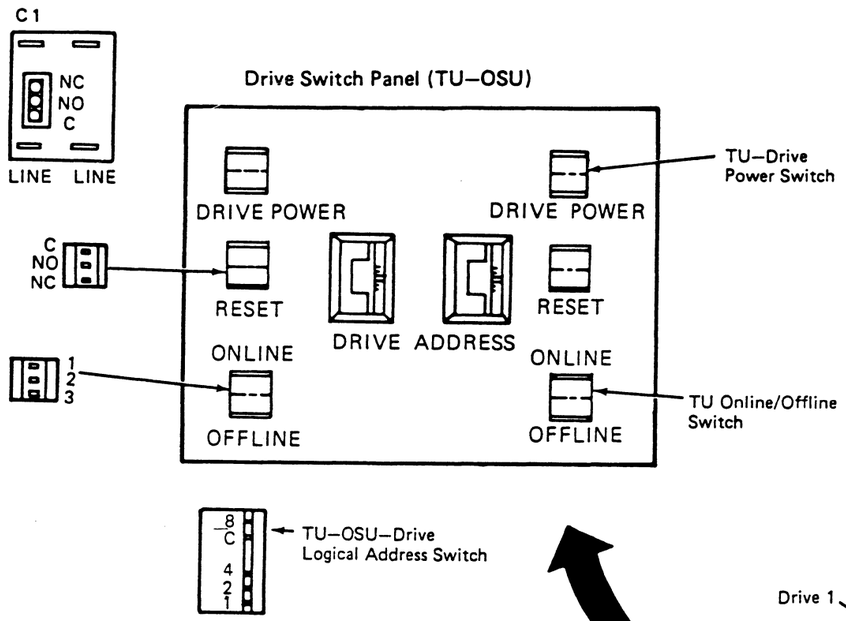
Tape Unit AC Power Circuit Breaker 60 Hz, and 50 Hz Japan

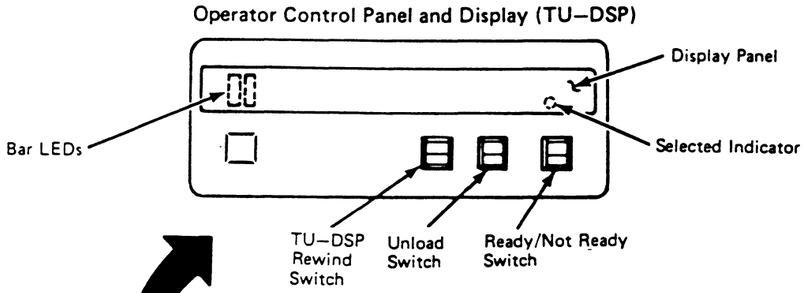


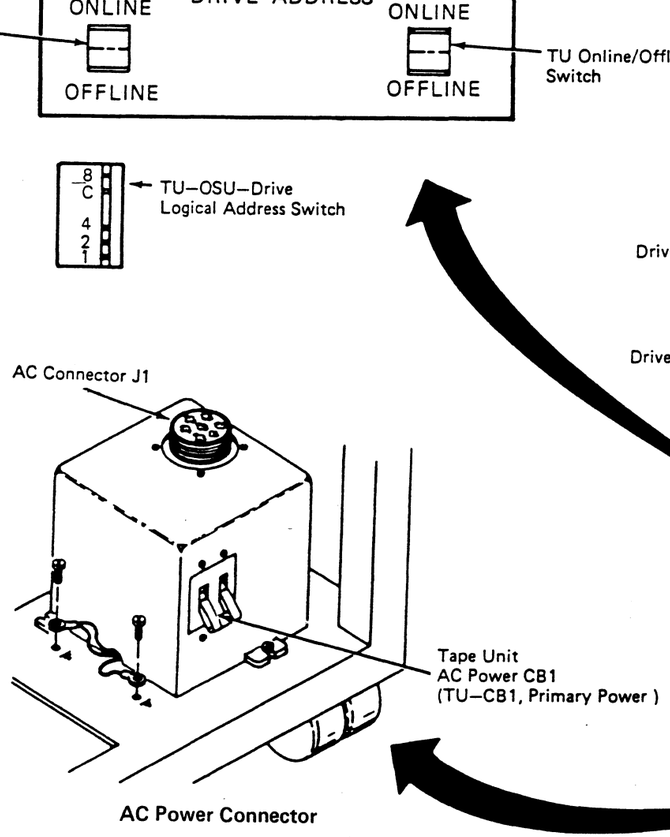
This page is for tape units without BM 6460006

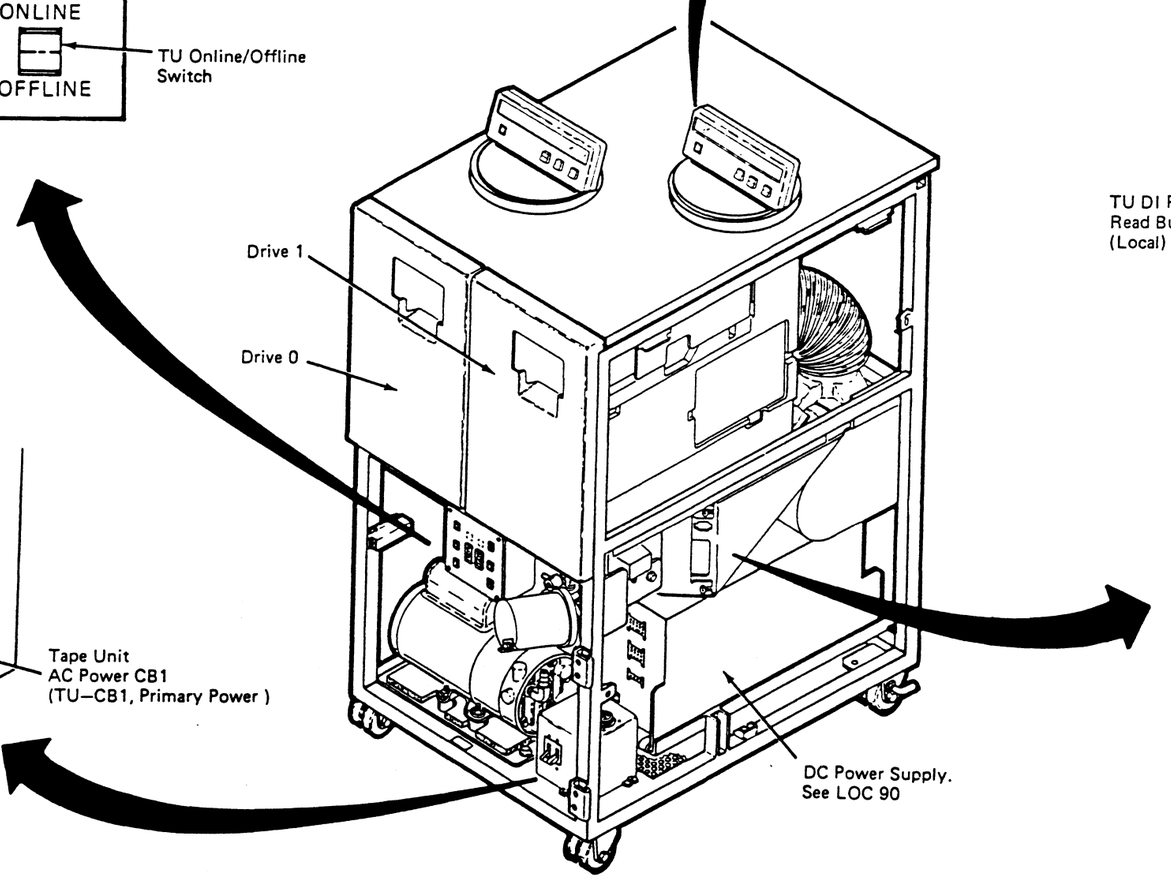


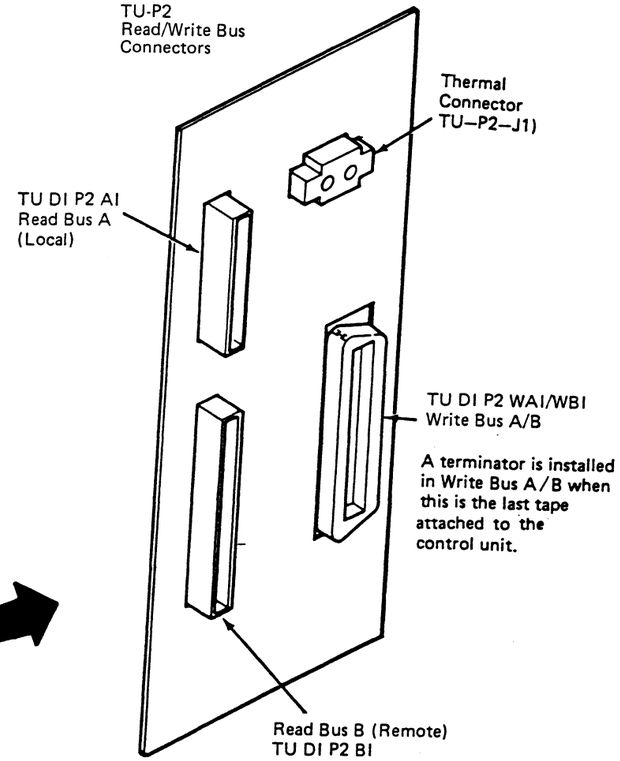
This page is for tape units with BM 6460006





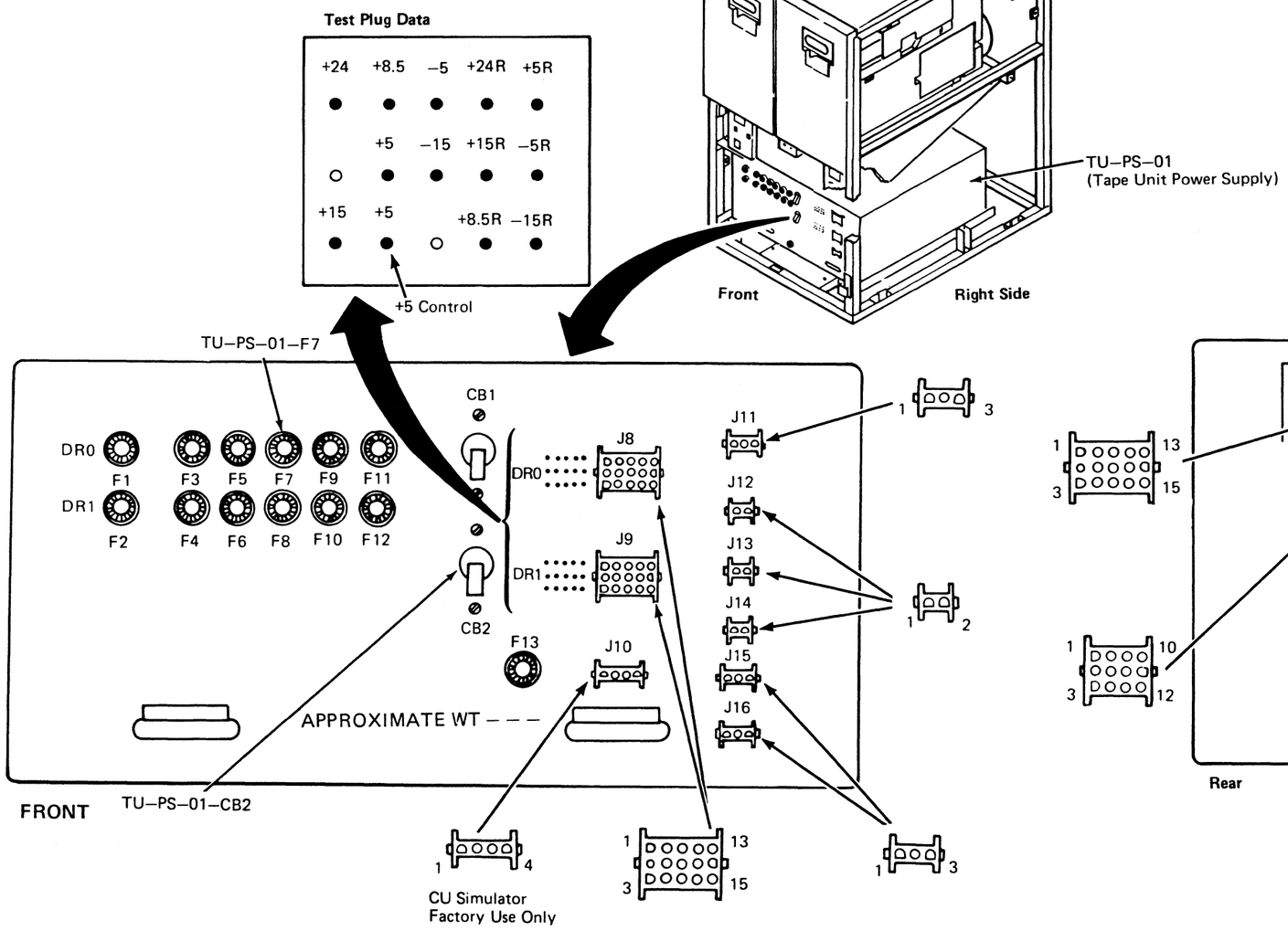


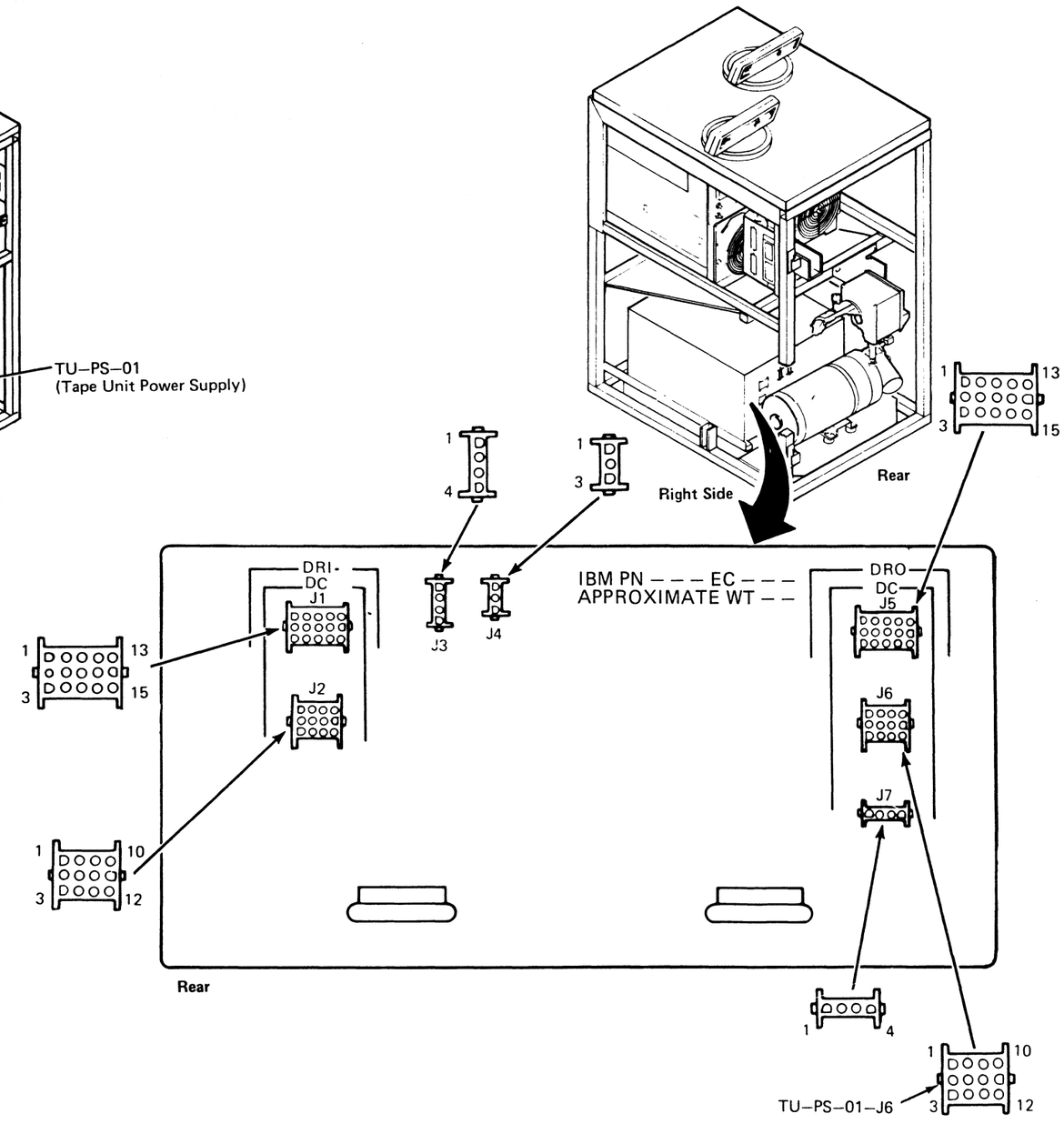




This page is for tape units without BM 6460006

DR 0/1 PS01 Tape Unit DC Power Supply

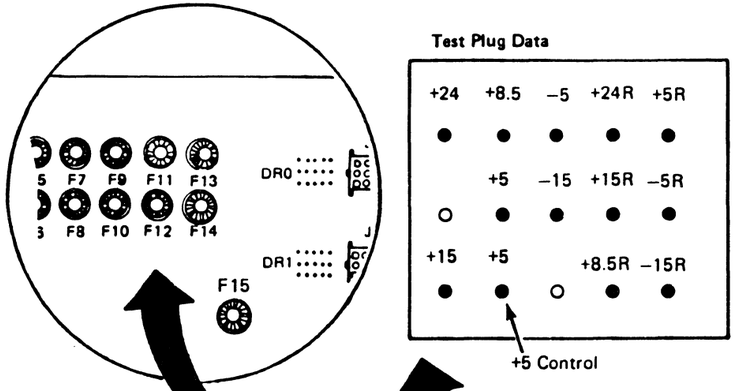




Tape Unit Locations (Continued)

This page is for tape units with BM 6460006

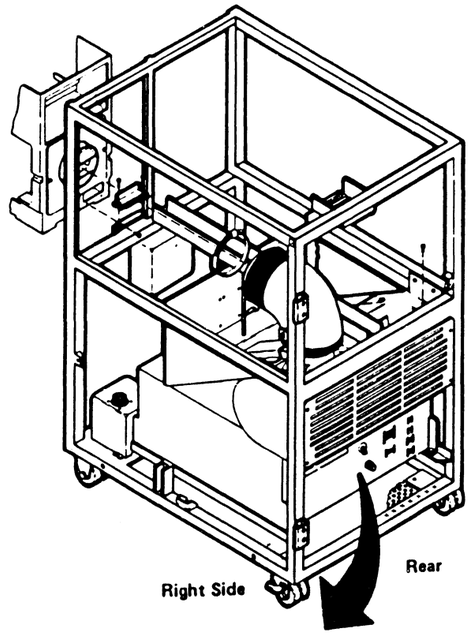
DR 0/1 PS01 Tape Unit DC Power Supply

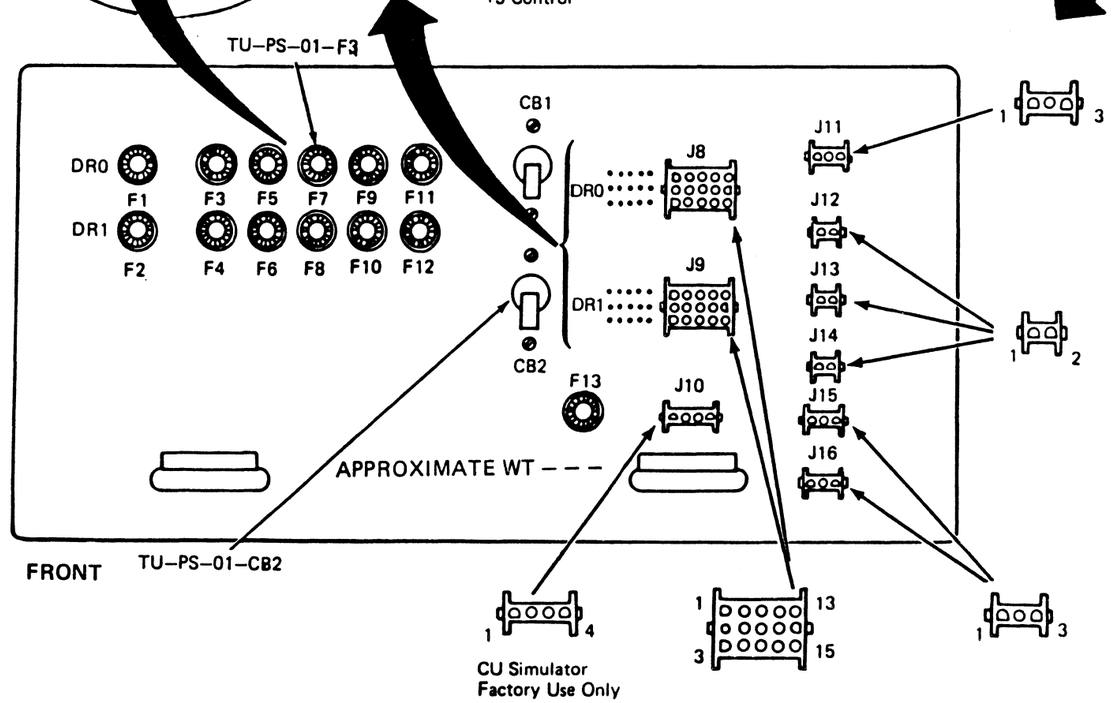


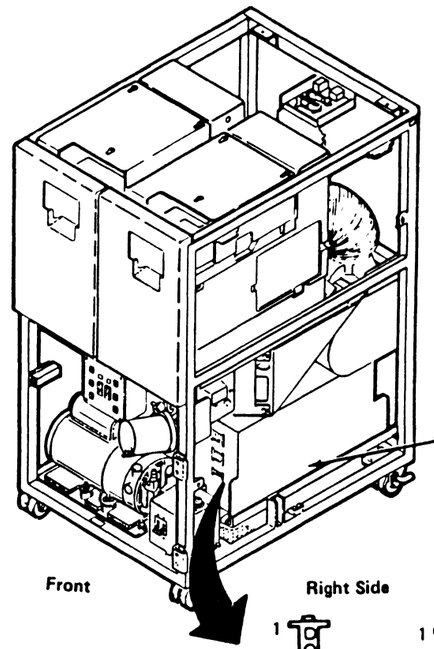
Test Plug Data

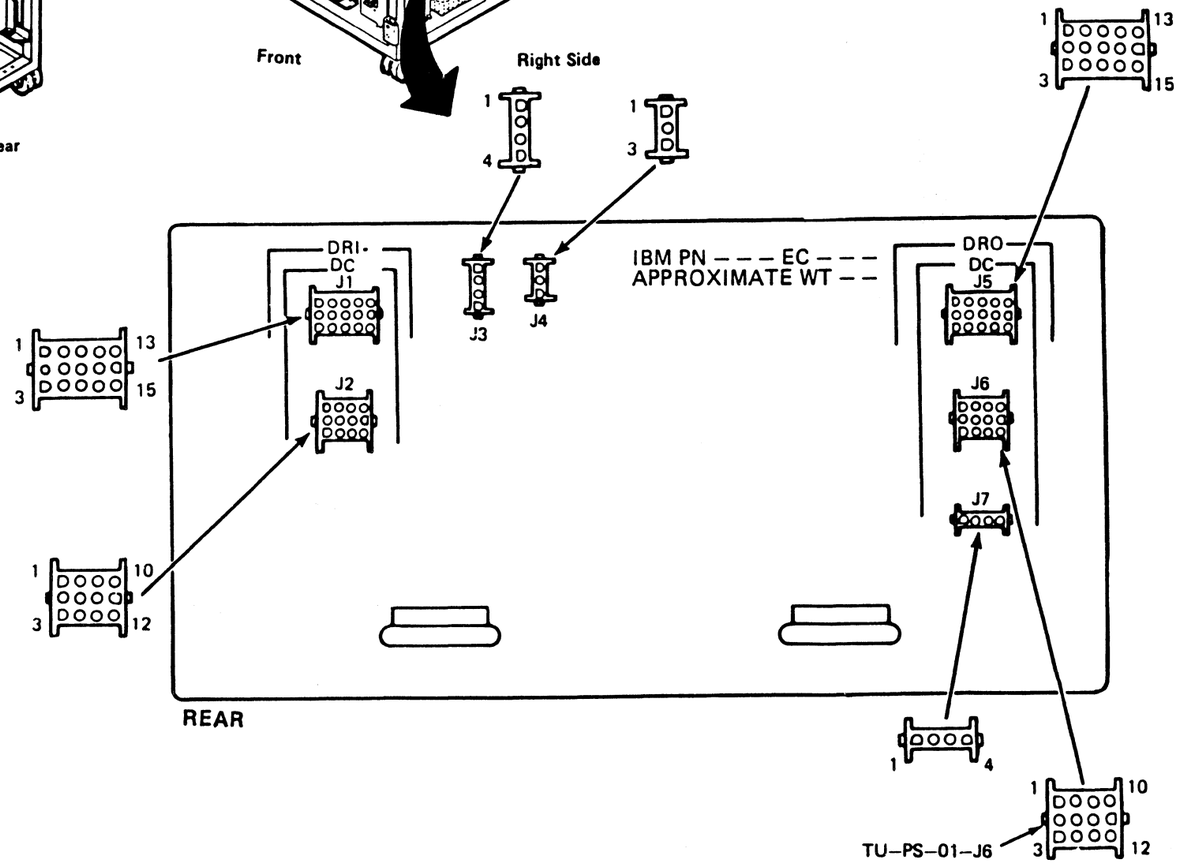
+24	+8.5	−5	+24R	+5R
	+5	−15	+15R	−5R
+15	+5		+8.5R	−15R

+5 Control

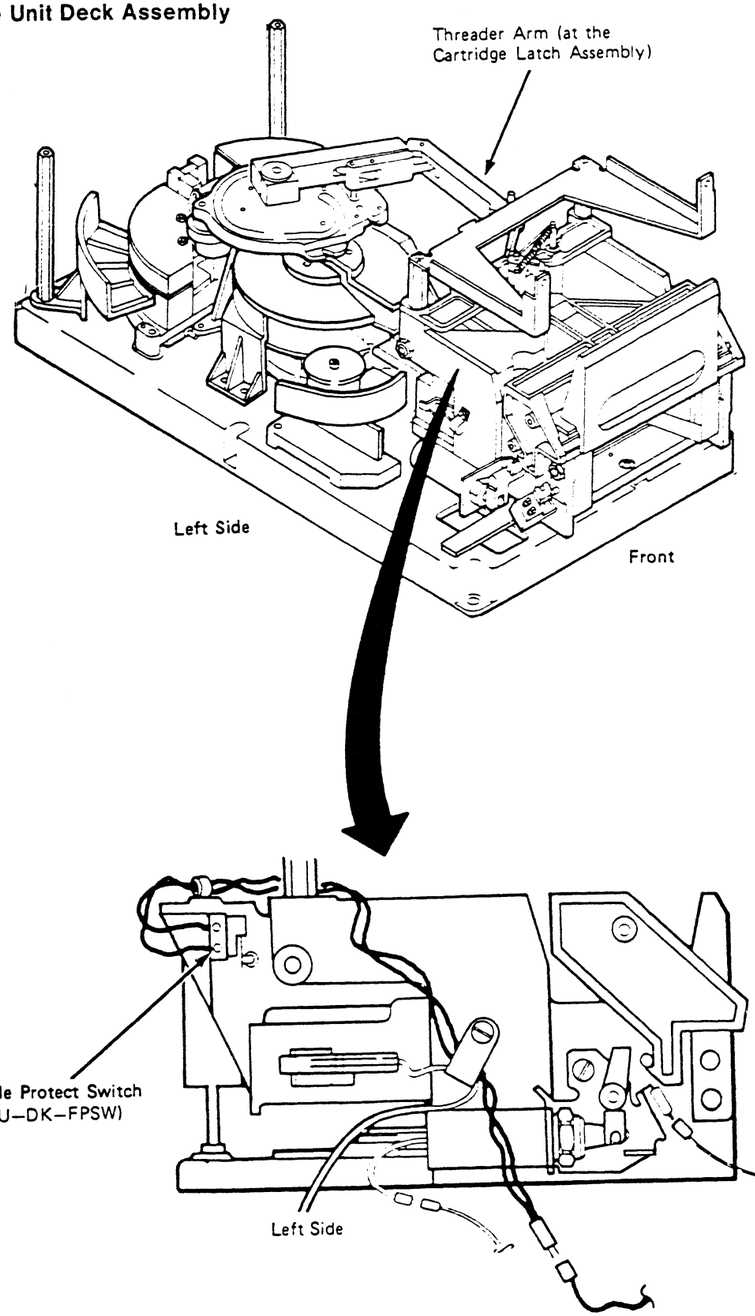


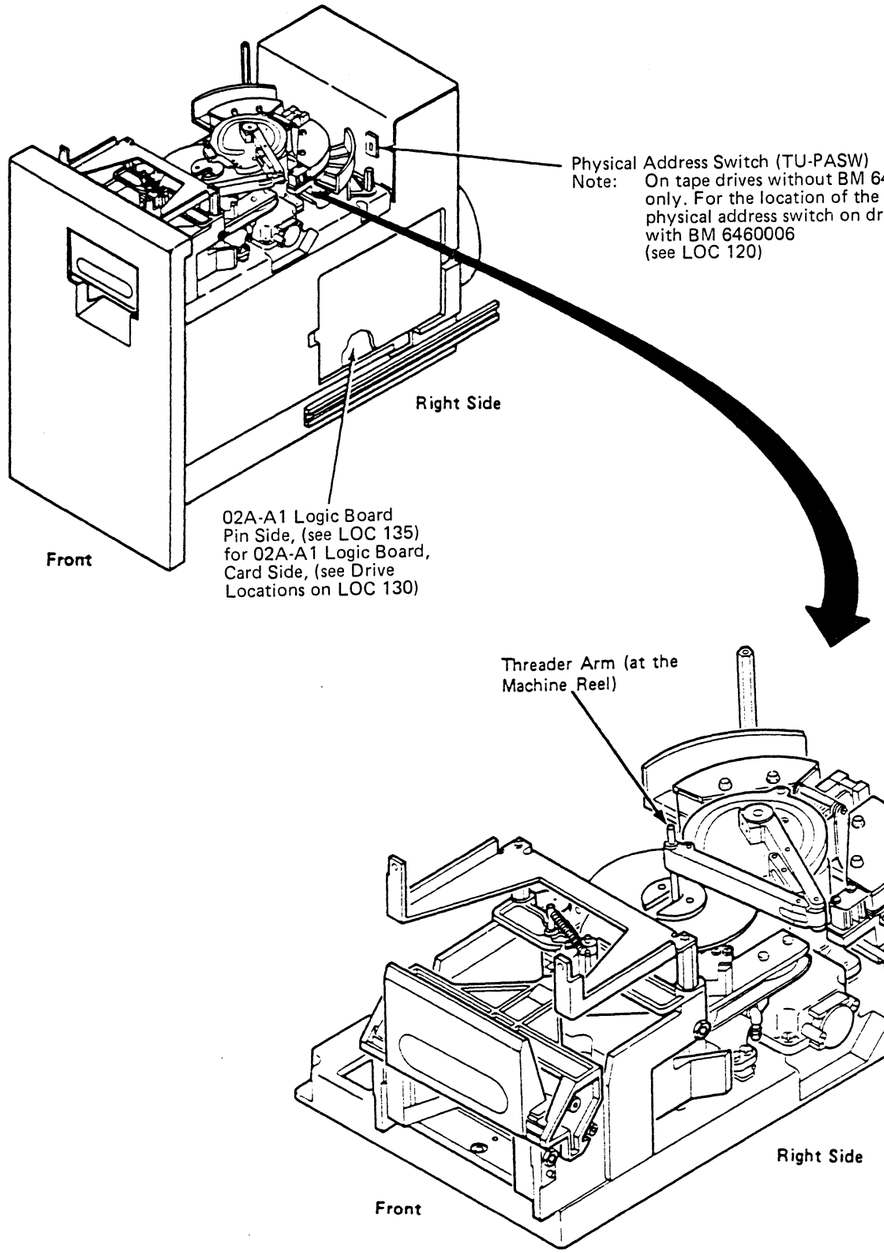




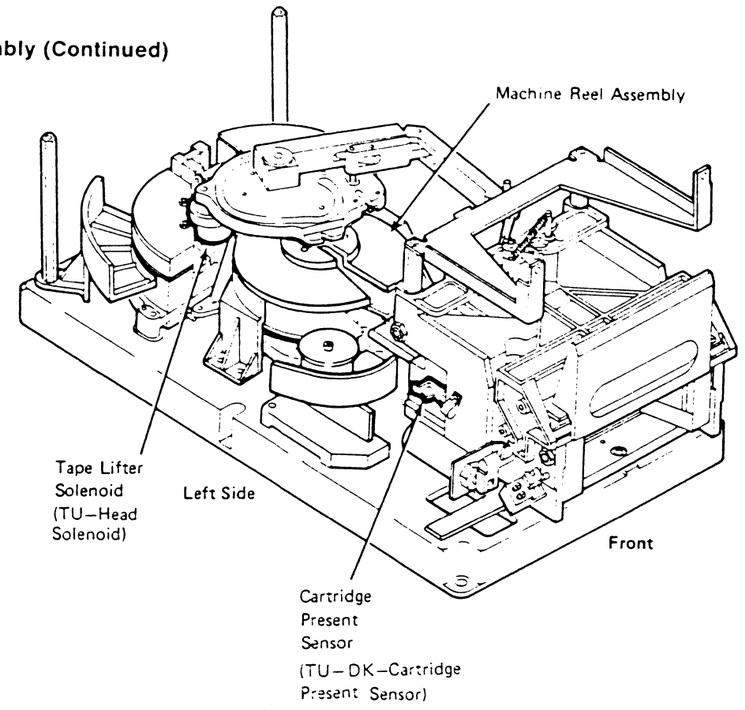


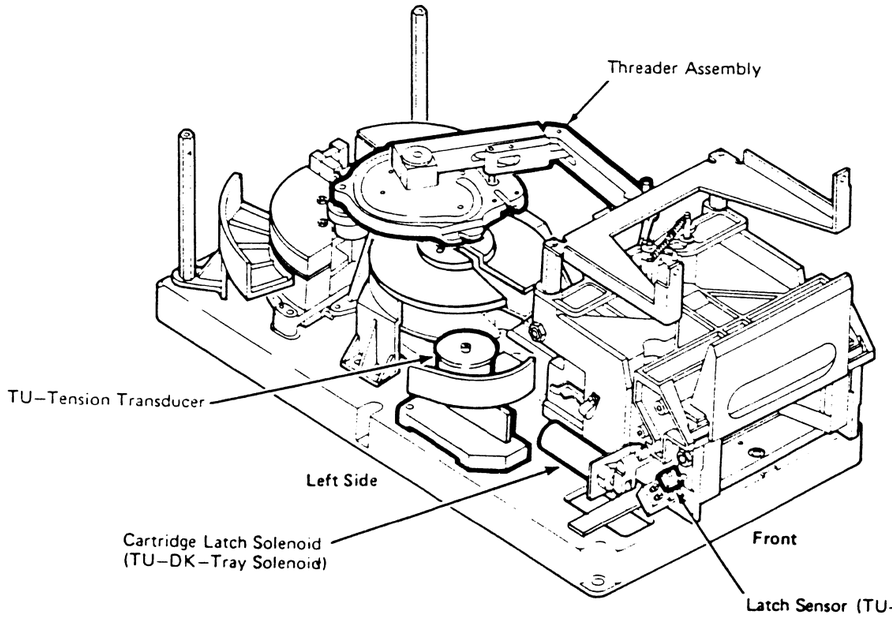
TU-DK, Tape Unit Deck Assembly

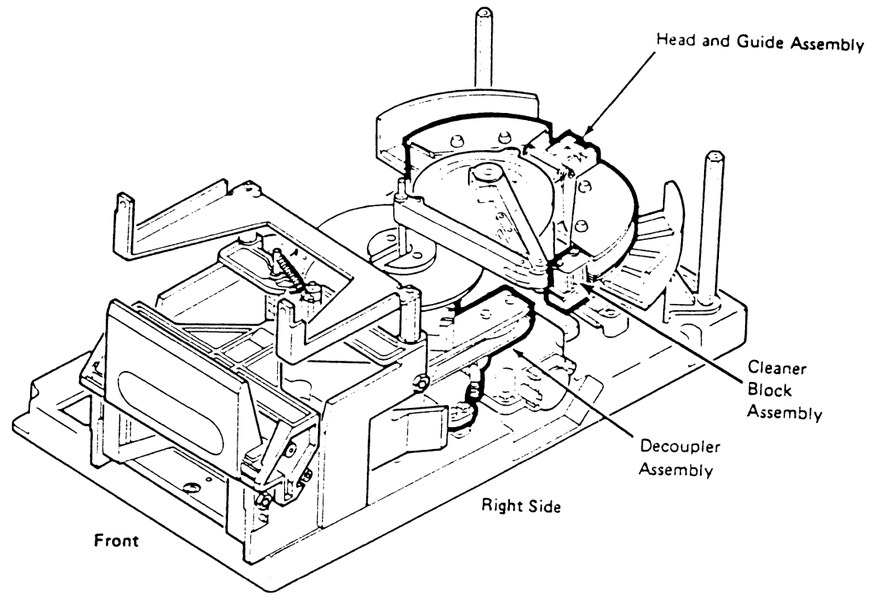


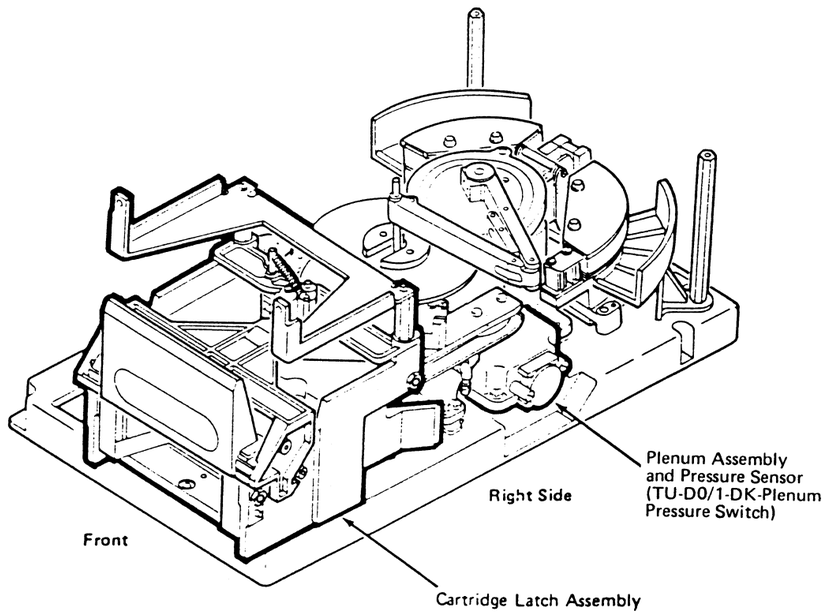


TU-DK, Tape Unit Deck Assembly (Continued)

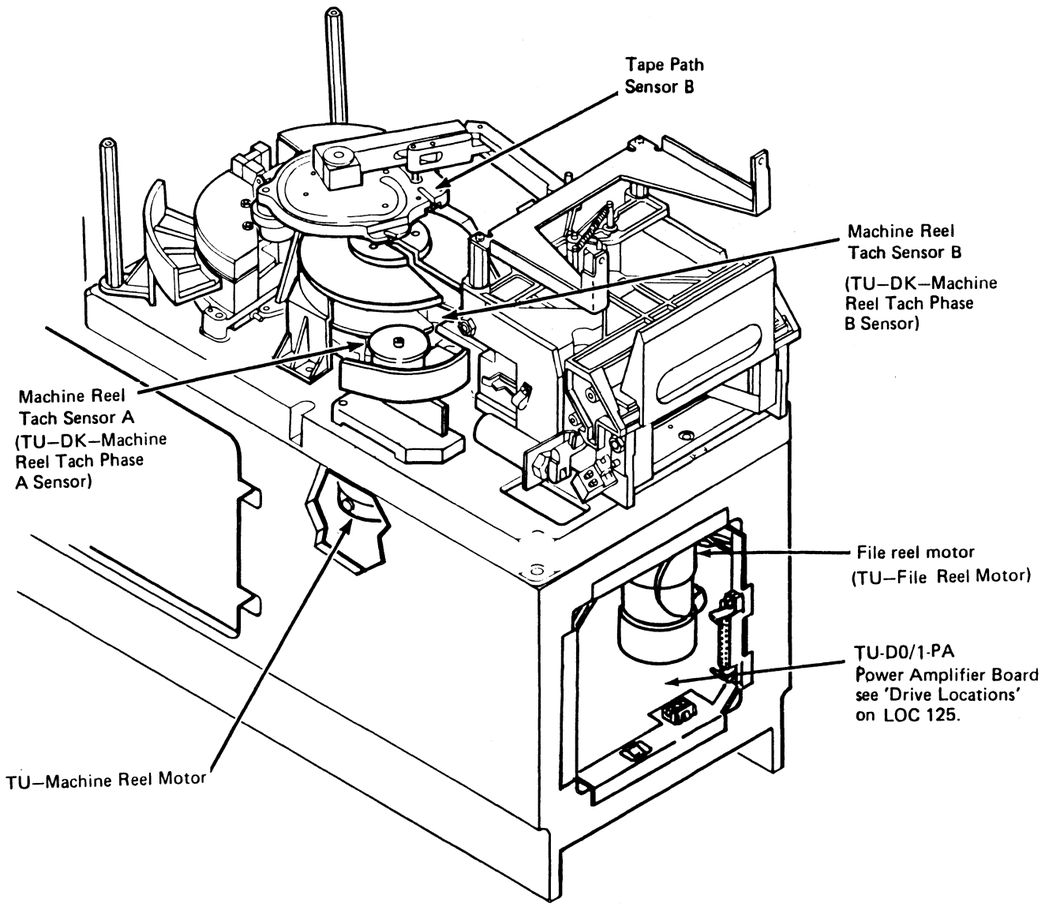


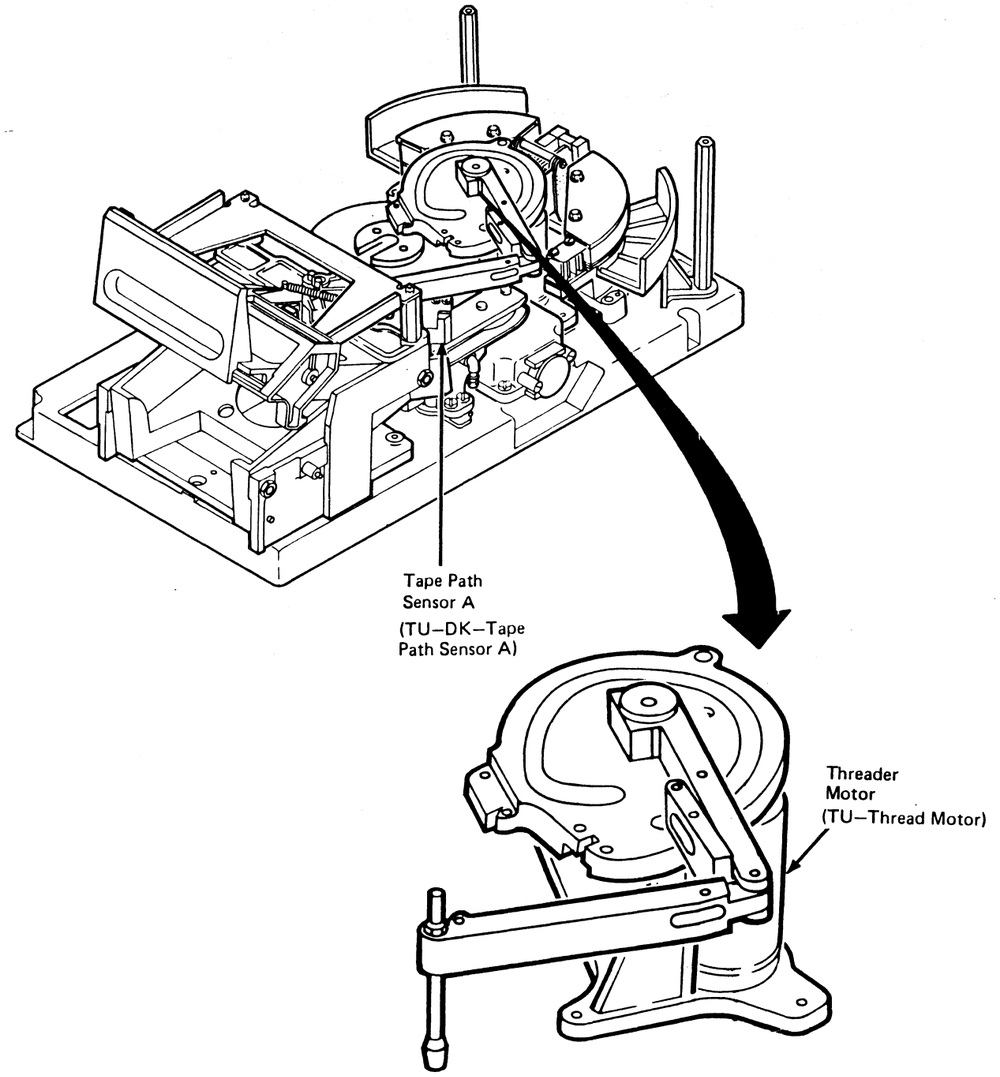






TU-DK, Tape Unit Deck Assembly (Continued)



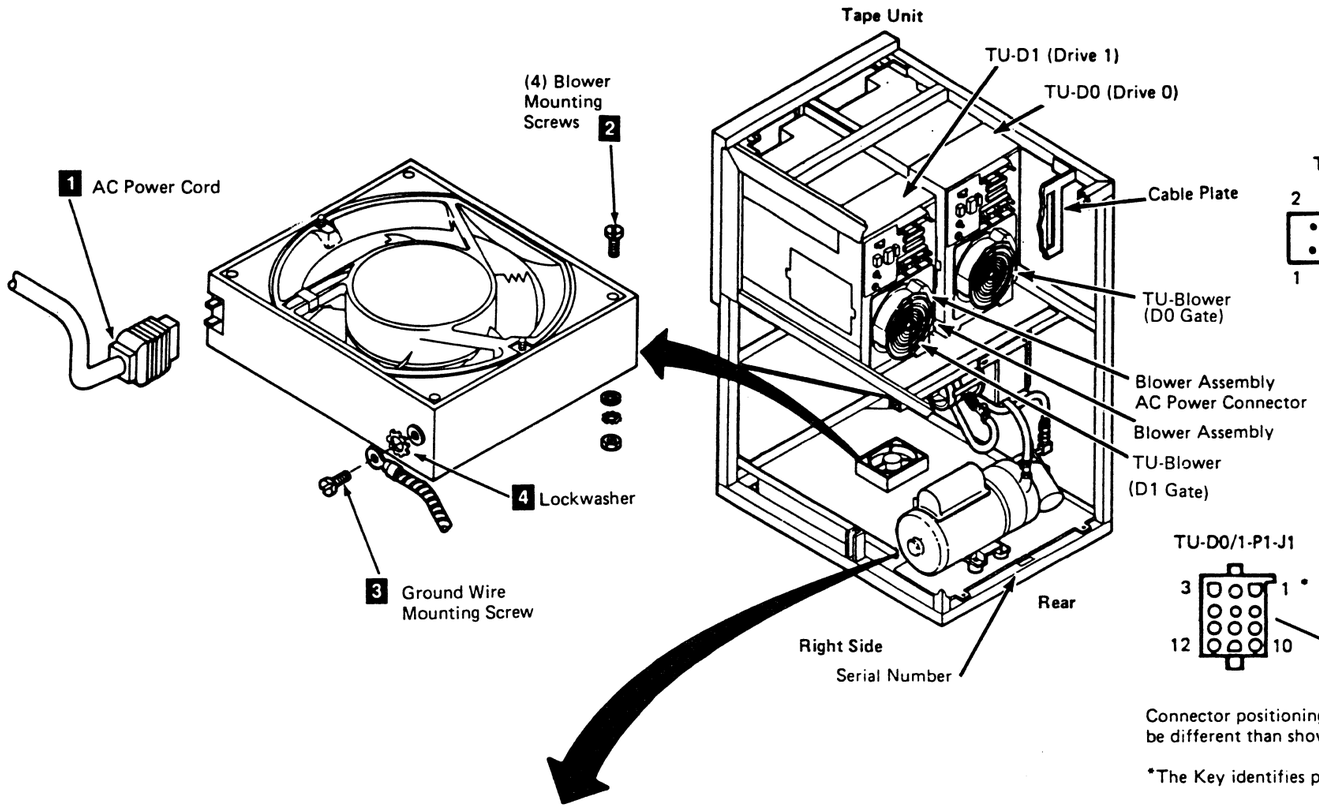


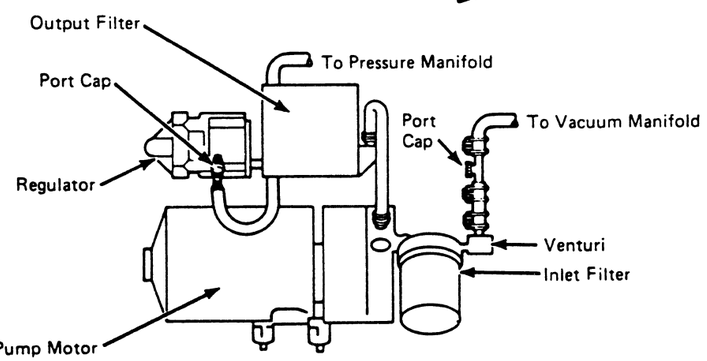
Drive Locations (Continued) LOC 105

Tape Unit Locations (Continued)

This page is for tape units without BM 6460006

60 Hz

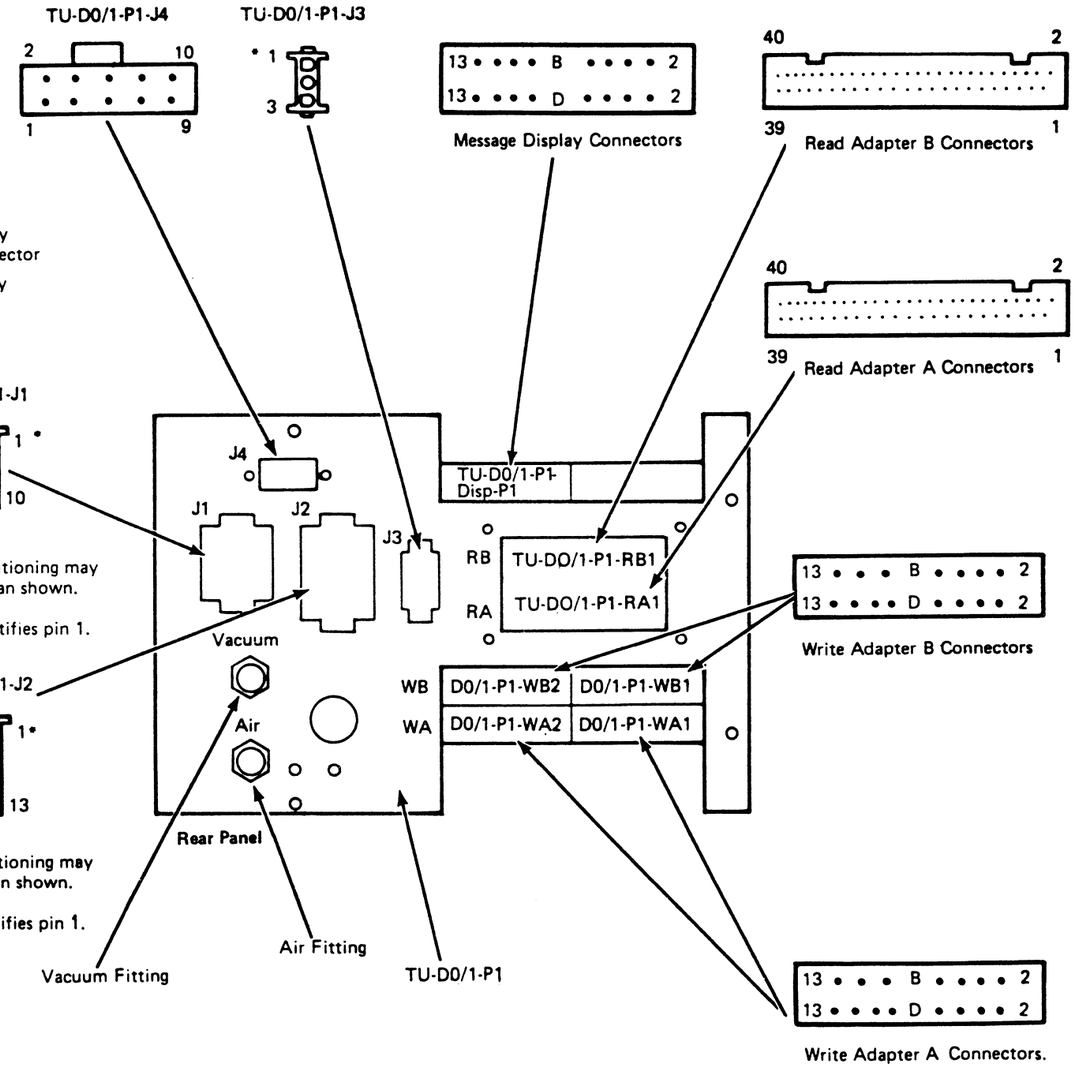




Pneumatics Supply Assembly

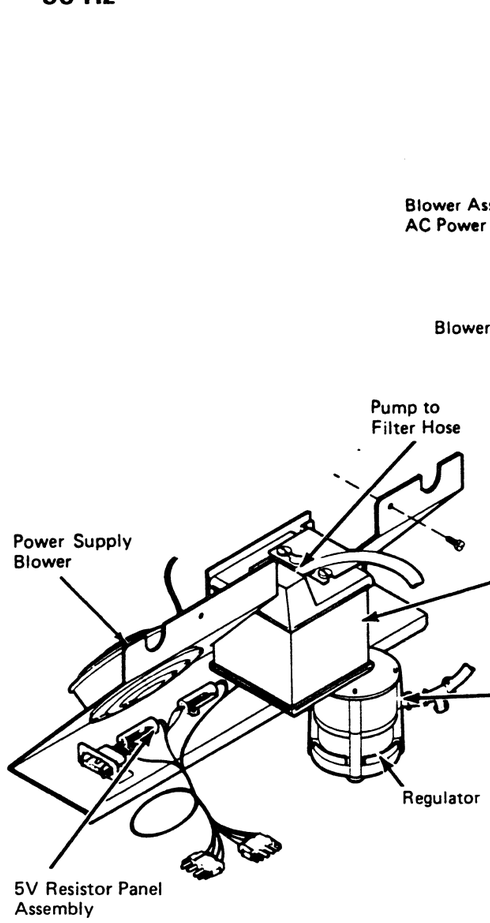
Connector positioning may be different than shown.

* The key identifies pin 1.

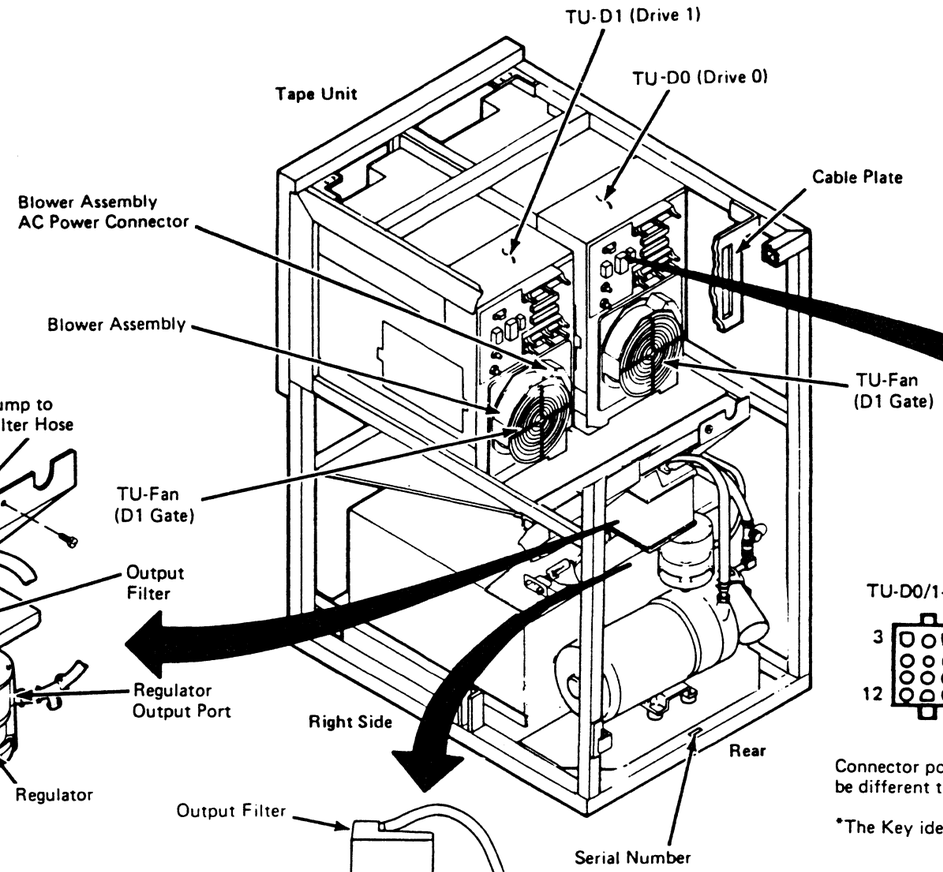


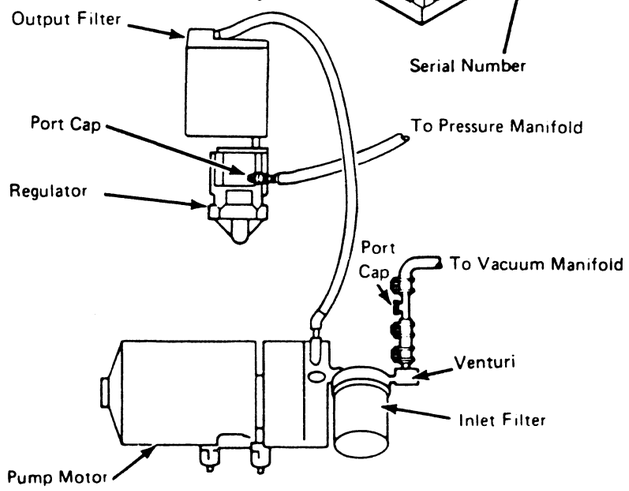
This page is for tape units without BM 6460006

50 Hz

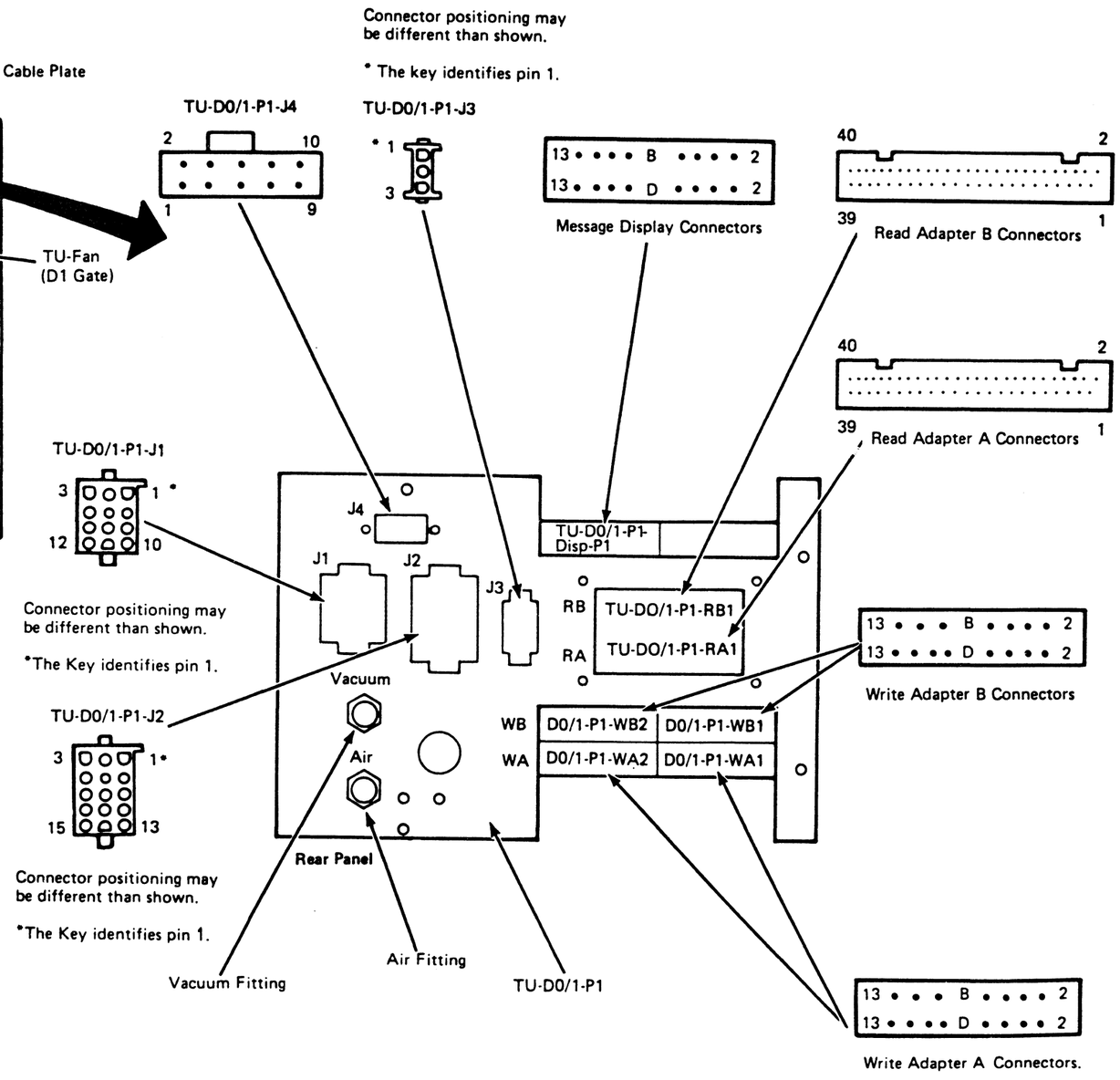


External Load Resistor Panel

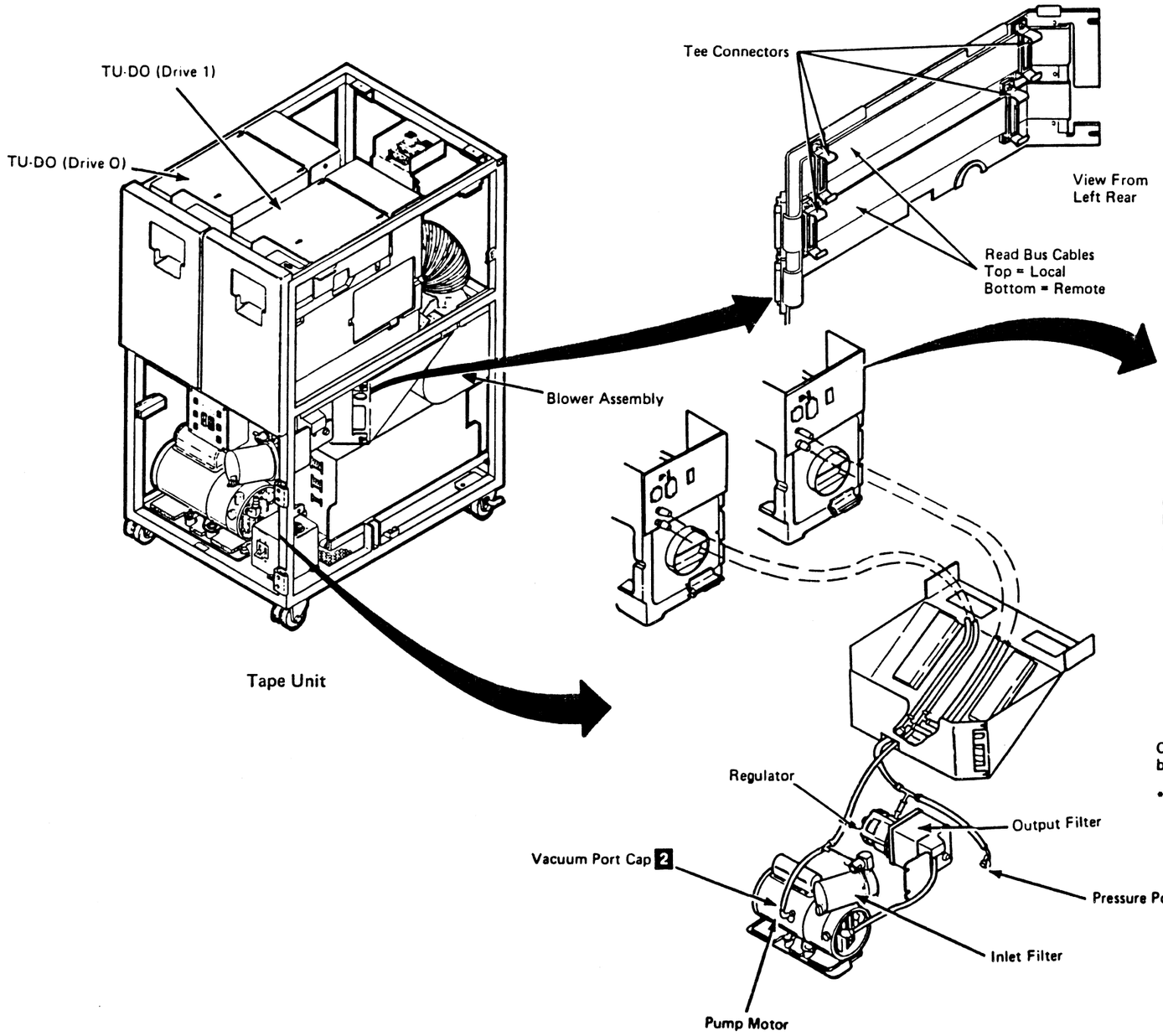


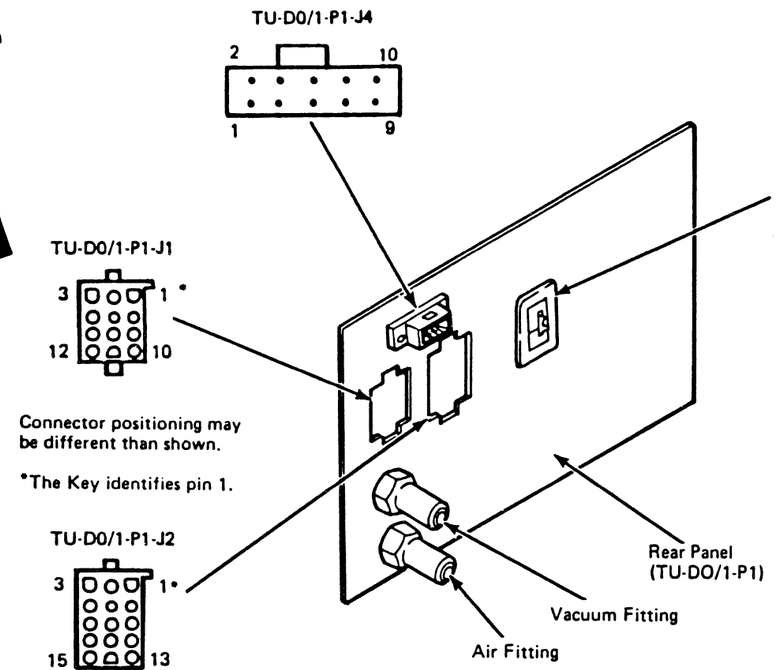


Pneumatics Supply Assembly, 50 Hz

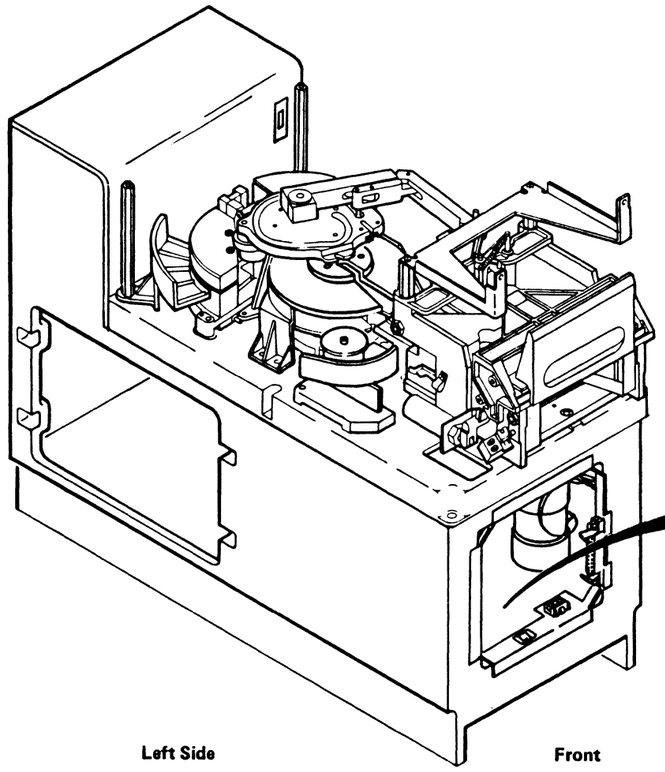


This page is for tape units with BM 6460006





Drive Locations (Continued) **LOC 125**



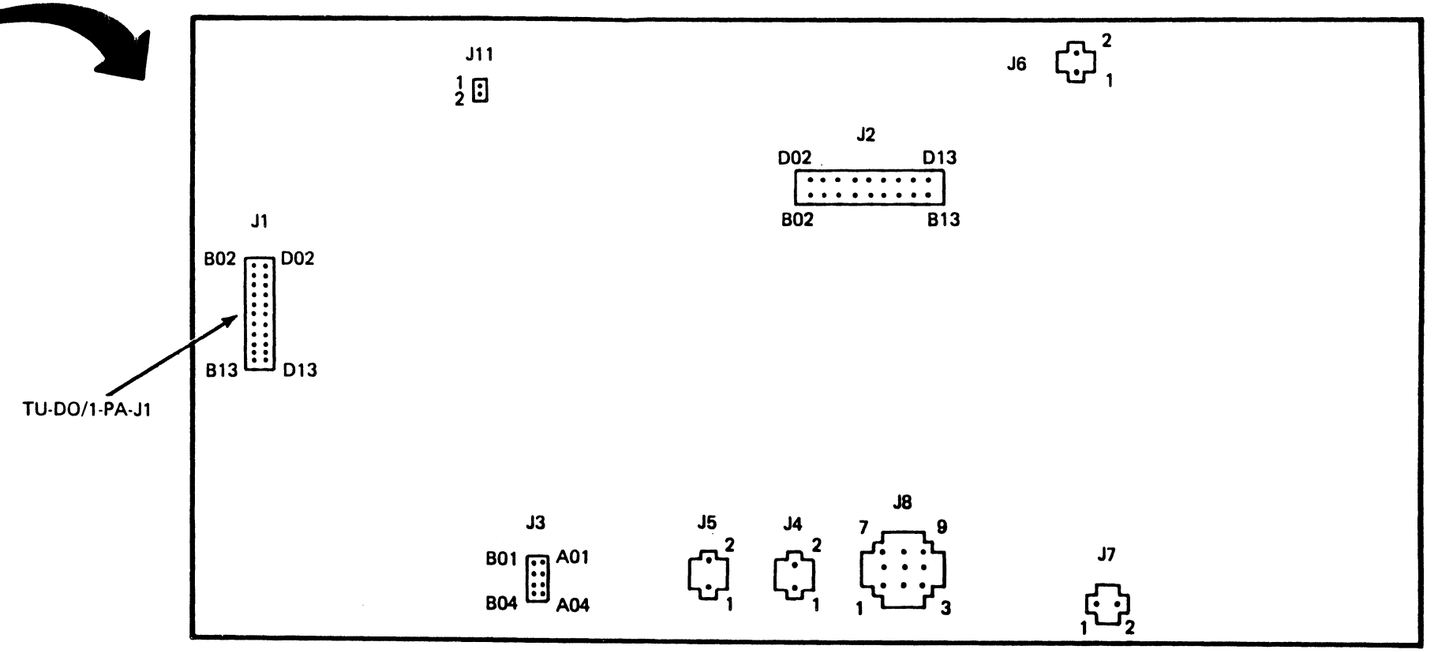
Left Side

Front

TU-DO/1-PA
Power Amplifier
Board

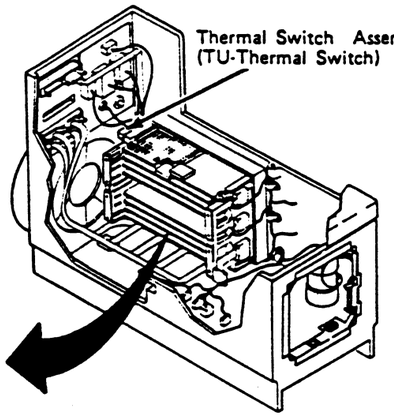
TU-DO/1-PA-J1

TU-D0/1-PA
Power Amplifier Board Connectors



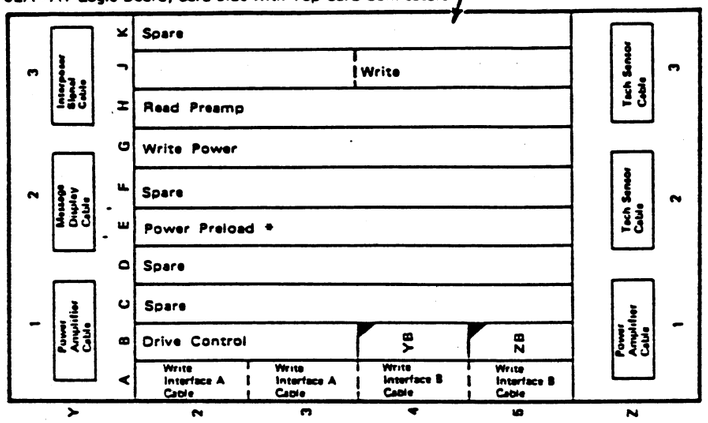
Drive Locations (Continued) **LOC 125**

Engineering Change (EC) 333293 Installed

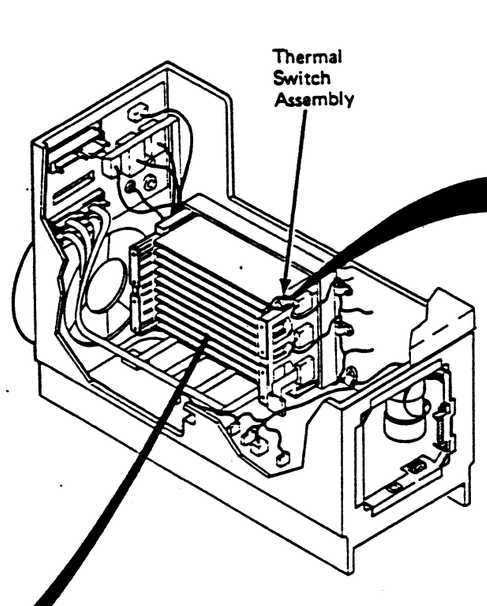


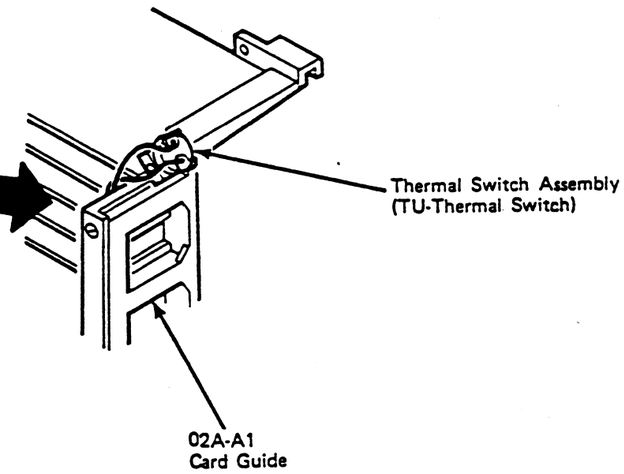
02A-A1 Logic Board
(TU-A1)

02A - A1 Logic Board, Card Side with Top Card Connectors



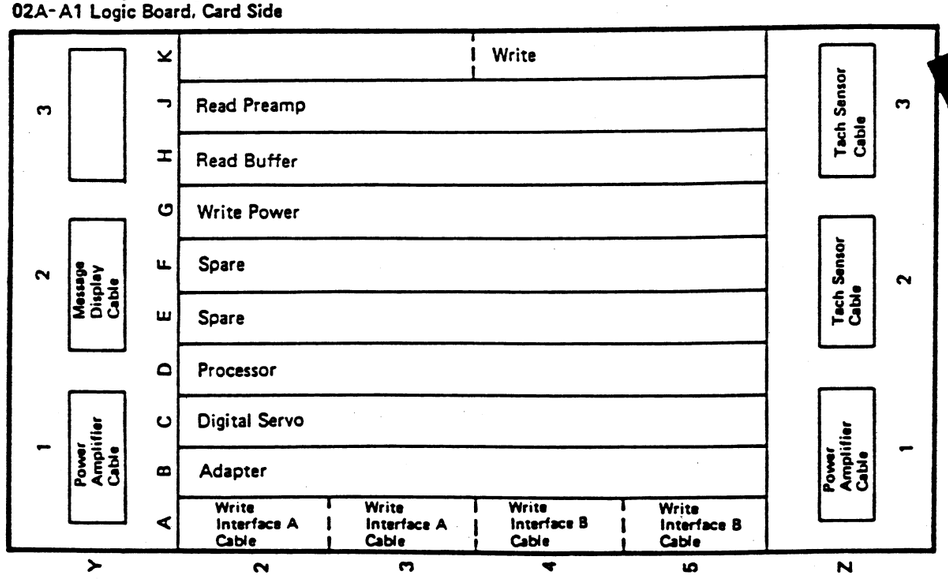
* Will be spare on drives with power supplies PN 13F4244, 13F4255, 6177166 or 6177167 installed.





Engineering Change (EC) 333293 Not Installed

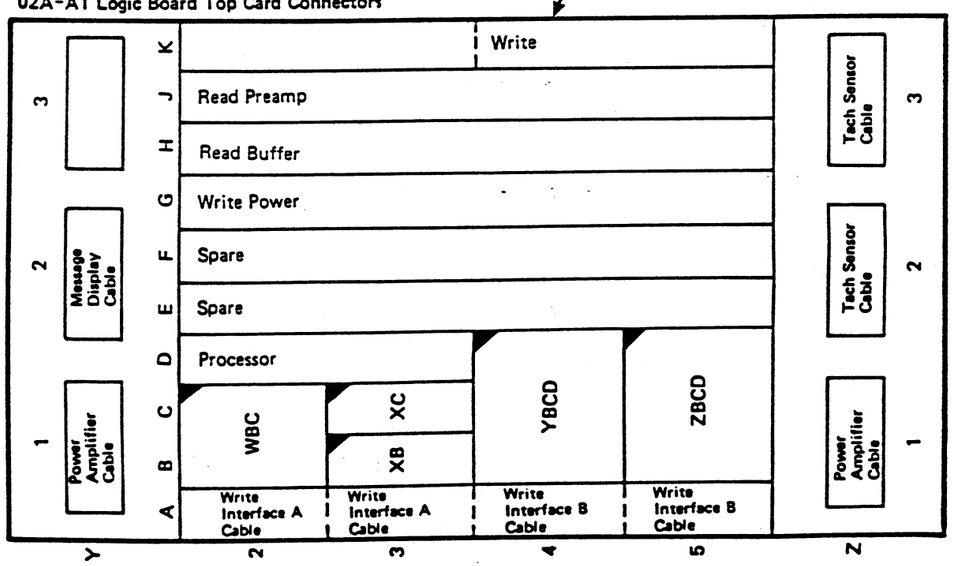
02A-A1 Logic Board, Card Side



02A-A1 Logic Board
(TU-A1)

Engineering Change (EC) 333293 Not Installed

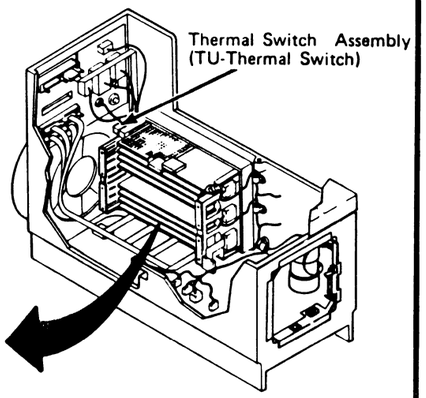
02A-A1 Logic Board Top Card Connectors



Card Side

0 0 0 0 0 0 0 0 0 0

Engineering Change (EC) 333293 Installed

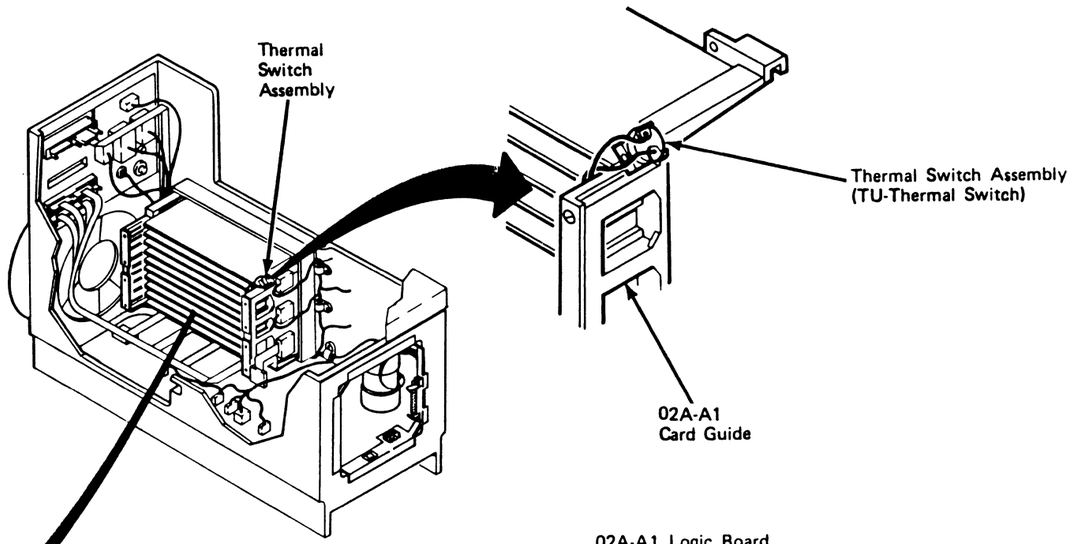


02A-A1 Logic Board
(TU-A1)

02A - A1 Logic Board, Card Side with Top Card Connectors

		K	Spare					
3	Interposer Ribbon Cable	J	Write				Tach Sensor Cable	3
		H	Read Preamp					
		G	Write Power					
2	Message Display Cable	F	Spare				Tach Sensor Cable	2
		E	Power Preload *					
		D	Spare					
1	Power Amplifier Cable	C	Spare				Power Amplifier Cable	1
		B	Drive Control		YB	ZB		
		A	Write Interface A Cable	Write Interface A Cable	Write Interface B Cable	Write Interface B Cable		
		Y	2	3	4	5	Z	

* Will be spare on drives with power supplies PN6177166 or 6177167 installed.



Engineering Change (EC) 333293 Not Installed

02A-A1 Logic Board, Card Side

		K		Write				
3		J	Read Preamp				Tach Sensor Cable	3
		H	Read Buffer					
		G	Write Power					
2	Message Display Cable	F	Spare				Tach Sensor Cable	2
		E	Spare					
		D	Processor					
1	Power Amplifier Cable	C	Digital Servo				Power Amplifier Cable	1
		B	Adapter					
		A	Write Interface A Cable	Write Interface A Cable	Write Interface B Cable	Write Interface B Cable		
		Y	2	3	4	5	Z	

Engineering Change (EC) 333293 Not Installed

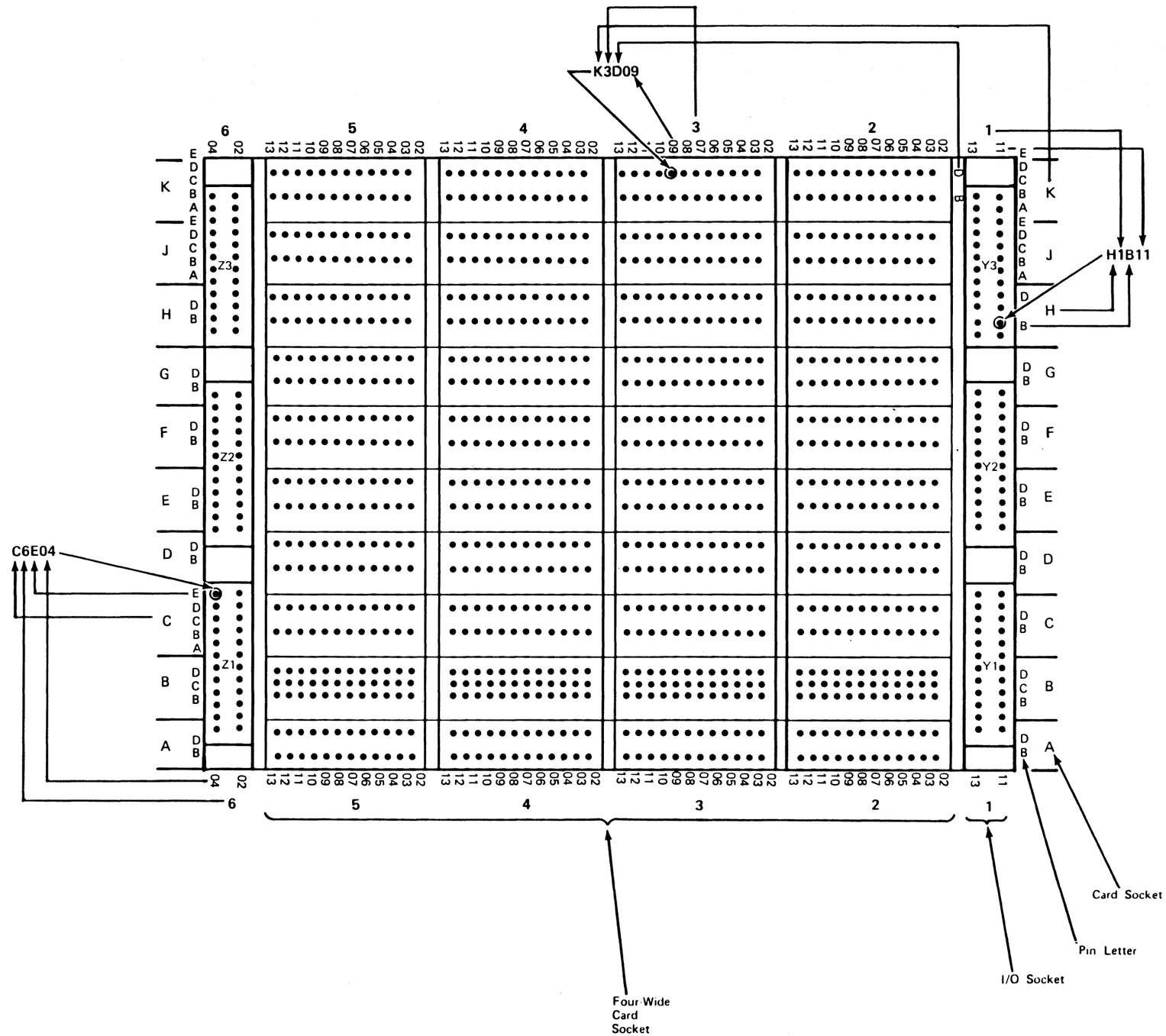
02A-A1 Logic Board Top Card Connectors

		K		Write				
3		J	Read Preamp				Tach Sensor Cable	3
		H	Read Buffer					
		G	Write Power					
2	Message Display Cable	F	Spare				Tach Sensor Cable	2
		E	Spare					
		D	Processor					
1	Power Amplifier Cable	C	WBC	XC	YBCD	ZBCD	Power Amplifier Cable	1
		B		XB				
		A	Write Interface A Cable	Write Interface A Cable	Write Interface B Cable	Write Interface B Cable		
		Y	2	3	4	5	Z	

Card Side

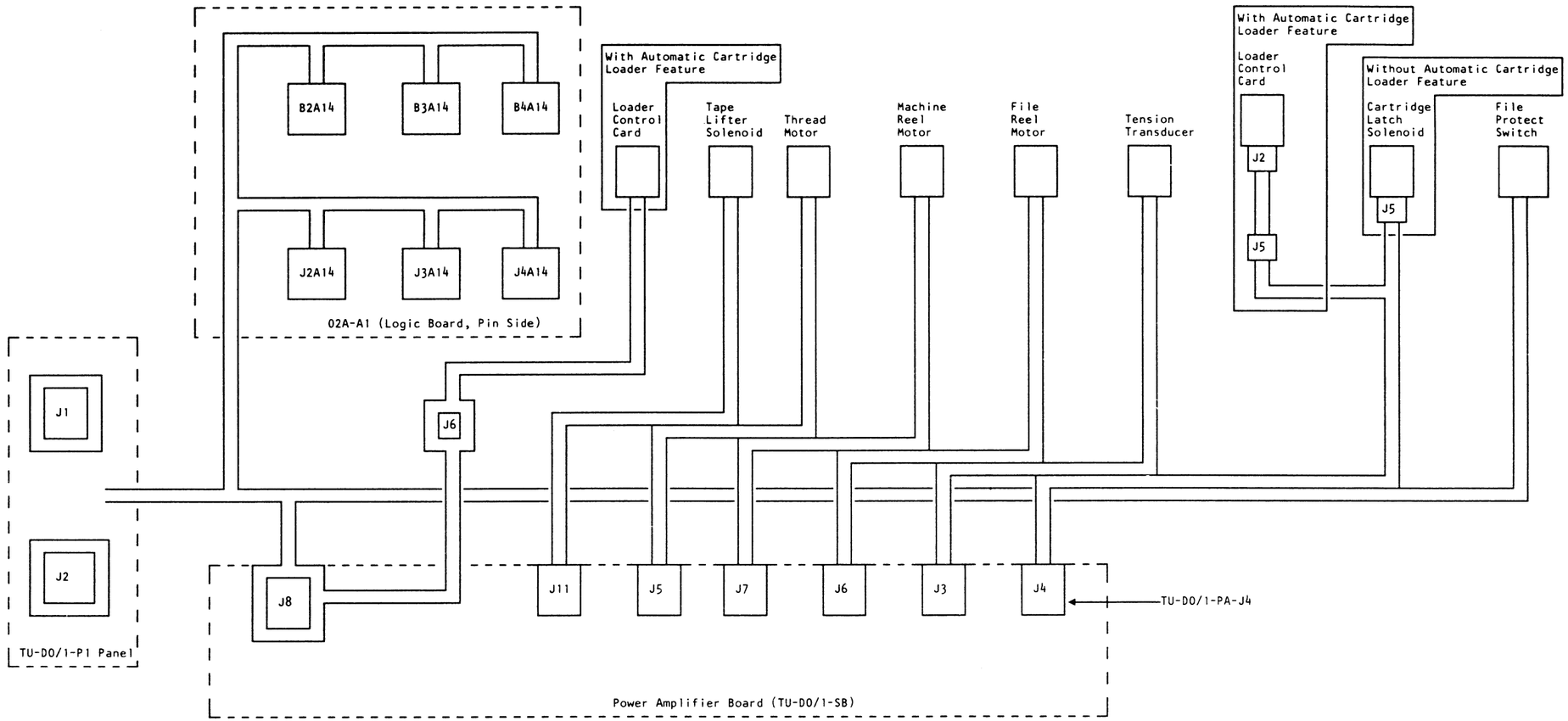
Logic Board Layout Pin Side

Drive Locations (Continued) LOC 135



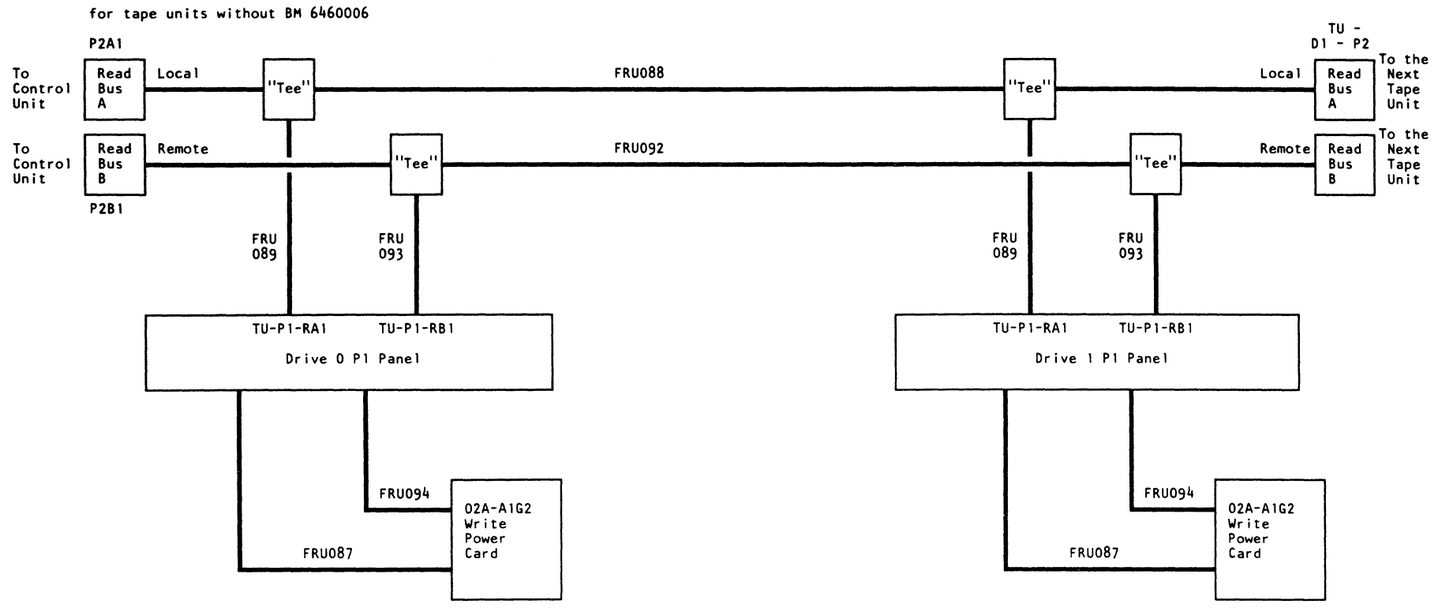
Drive Locations (Continued) LOC 135

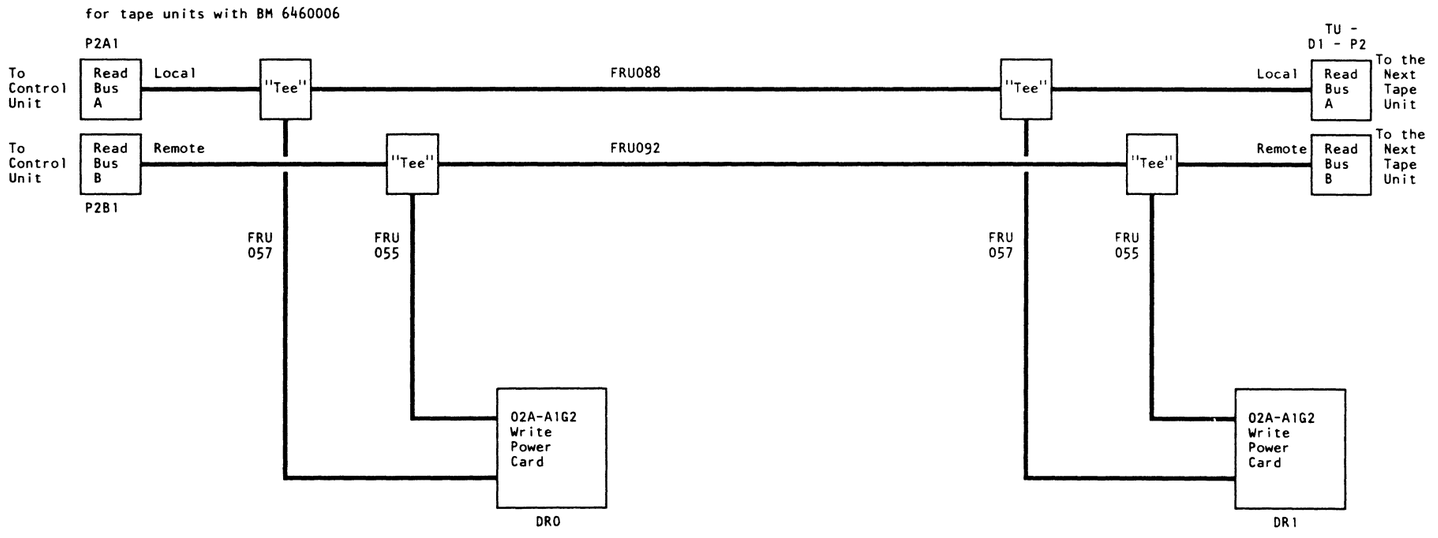
DC Distribution Cable (Internal)



Drive Locations (Continued)

Read Adapter Cables

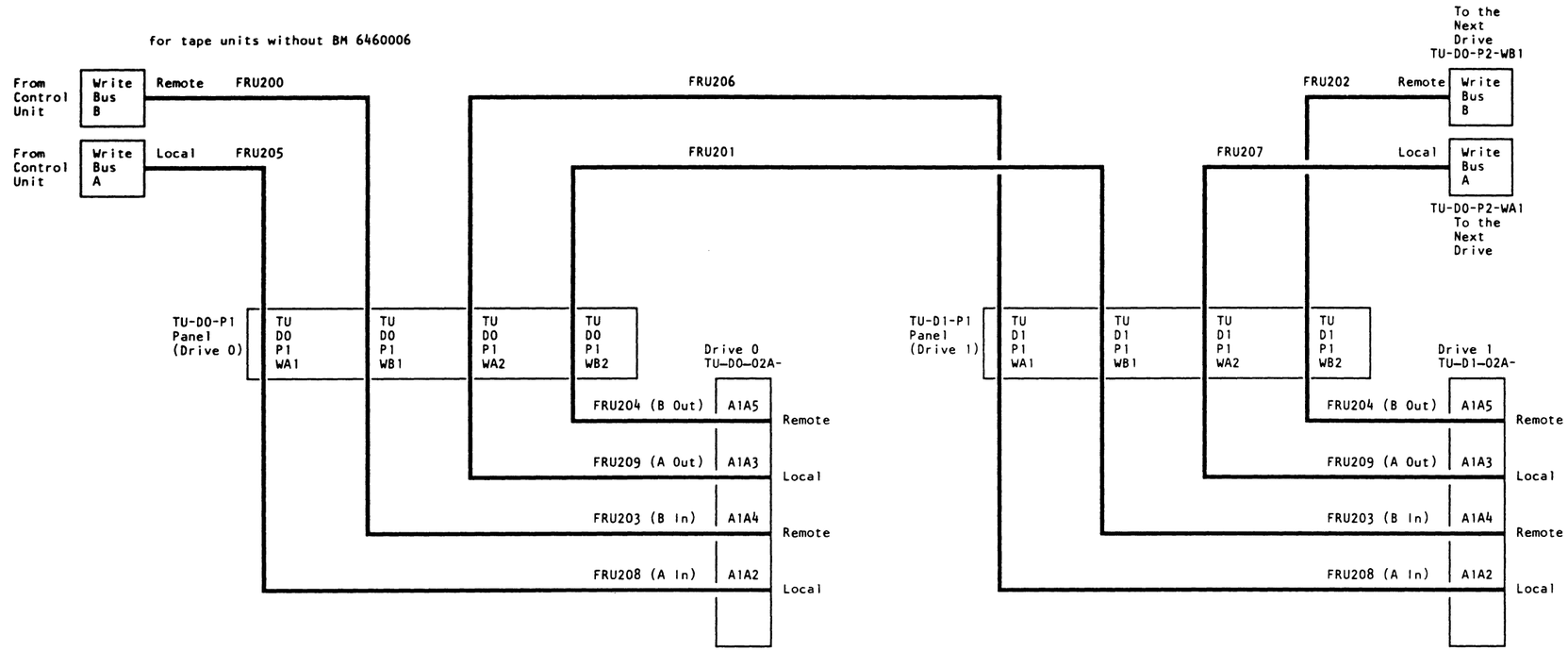


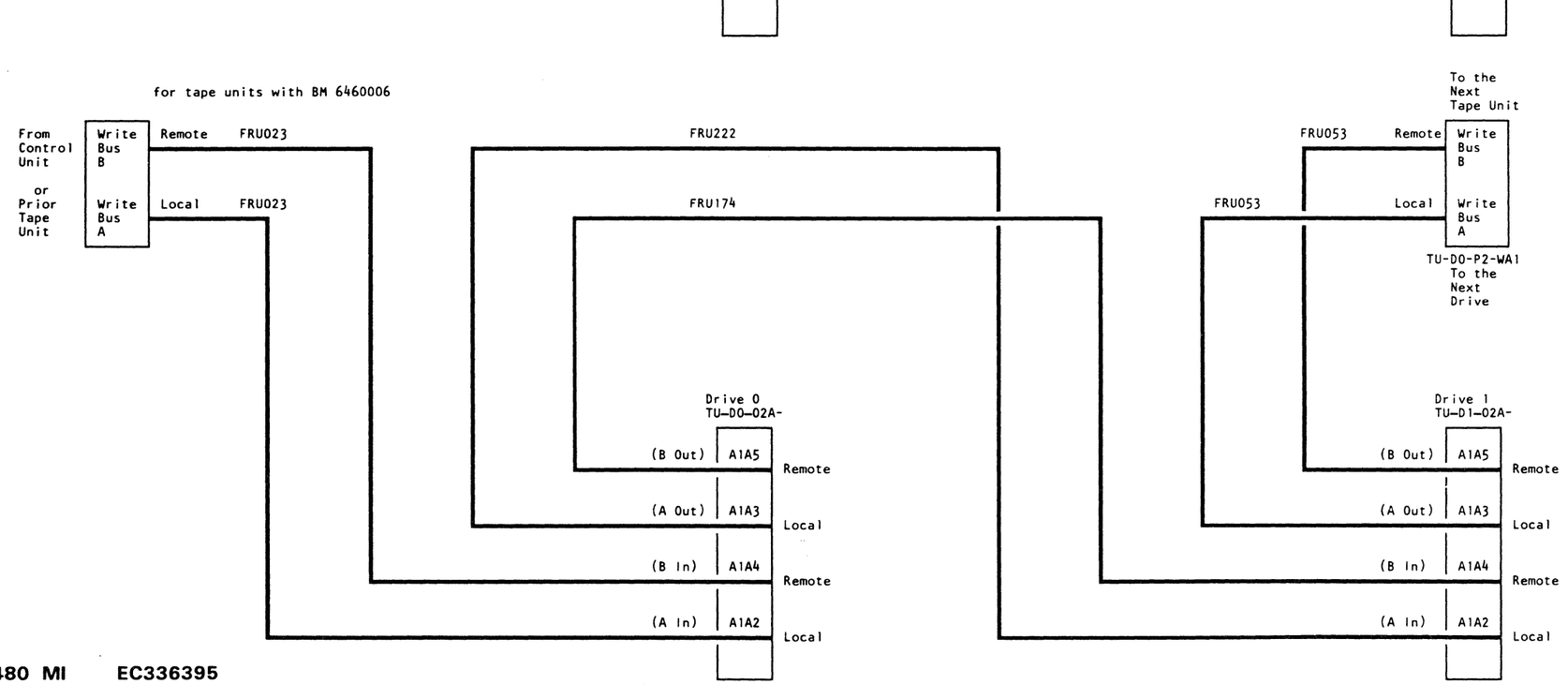


Drive Locations (Continued)

Drive Locations (Continued) LOC 150

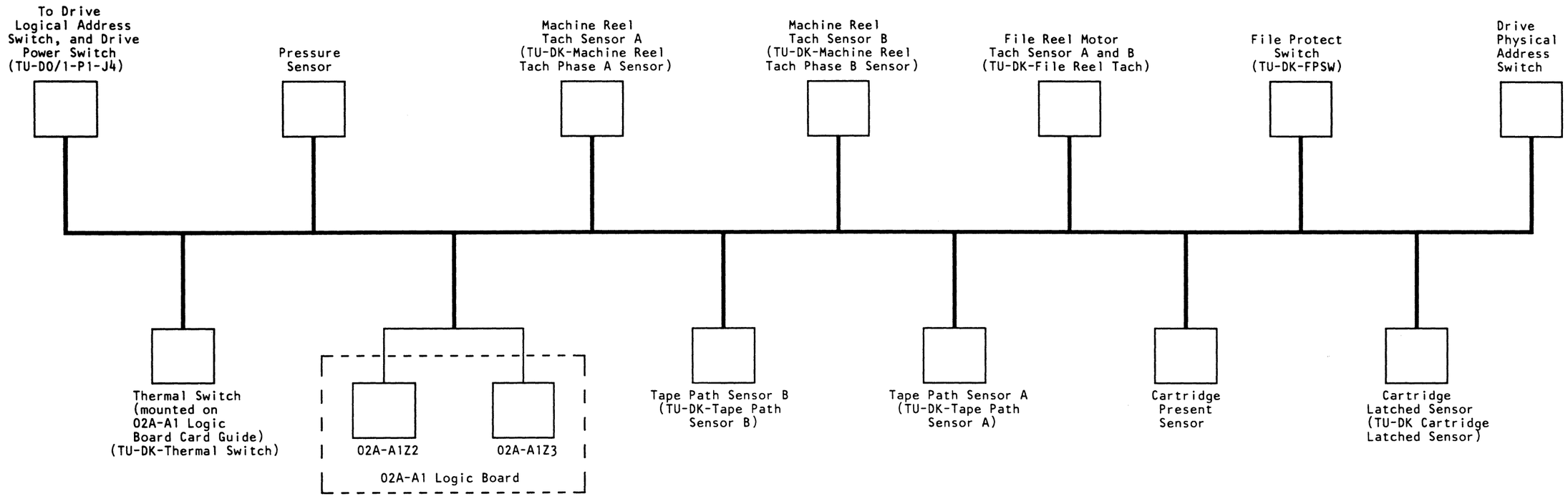
Write Adapter Cables





Drive Locations (Continued)

Tach Sensor Cable

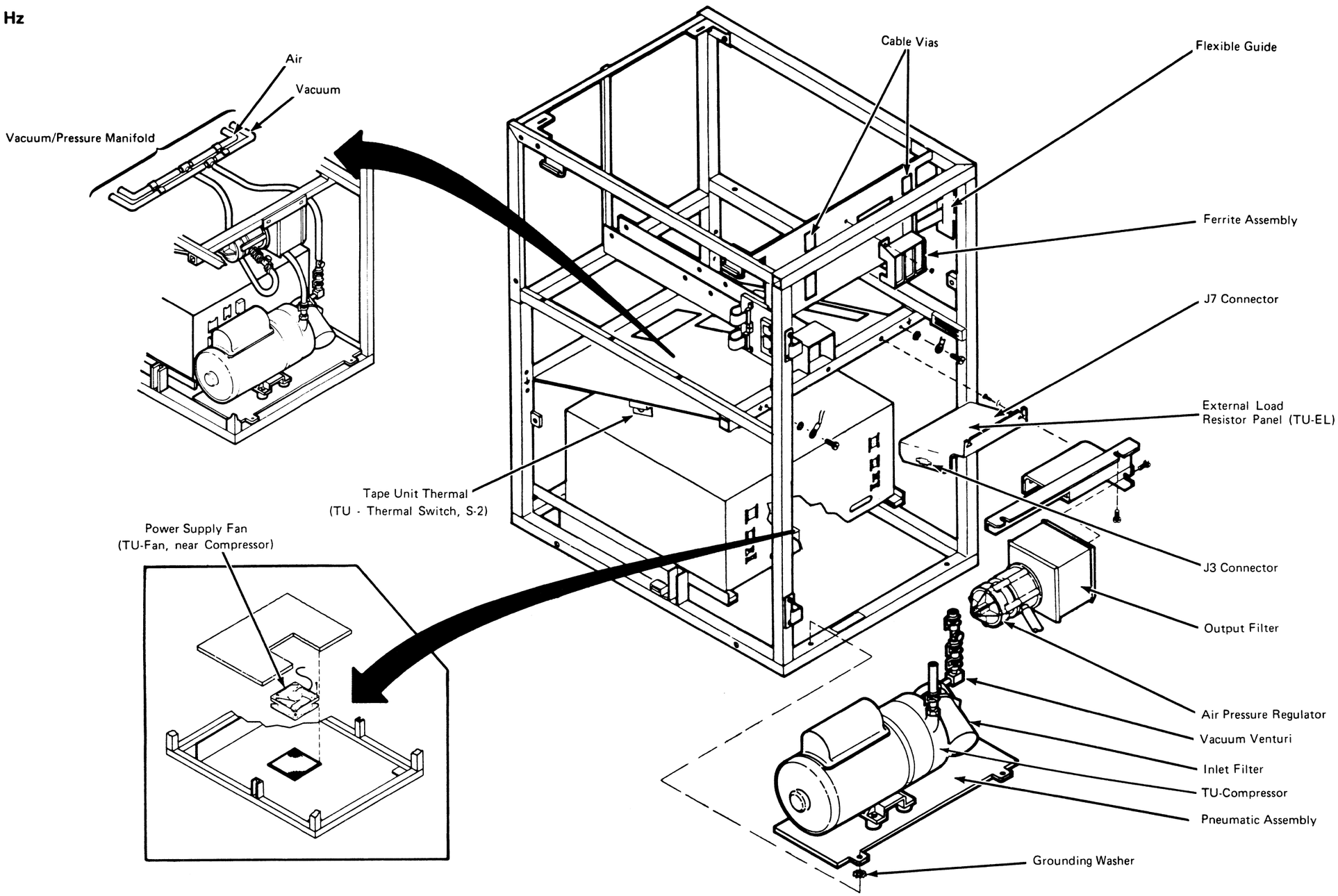


Drive Locations (Continued)

Tape Unit Locations (Continued)

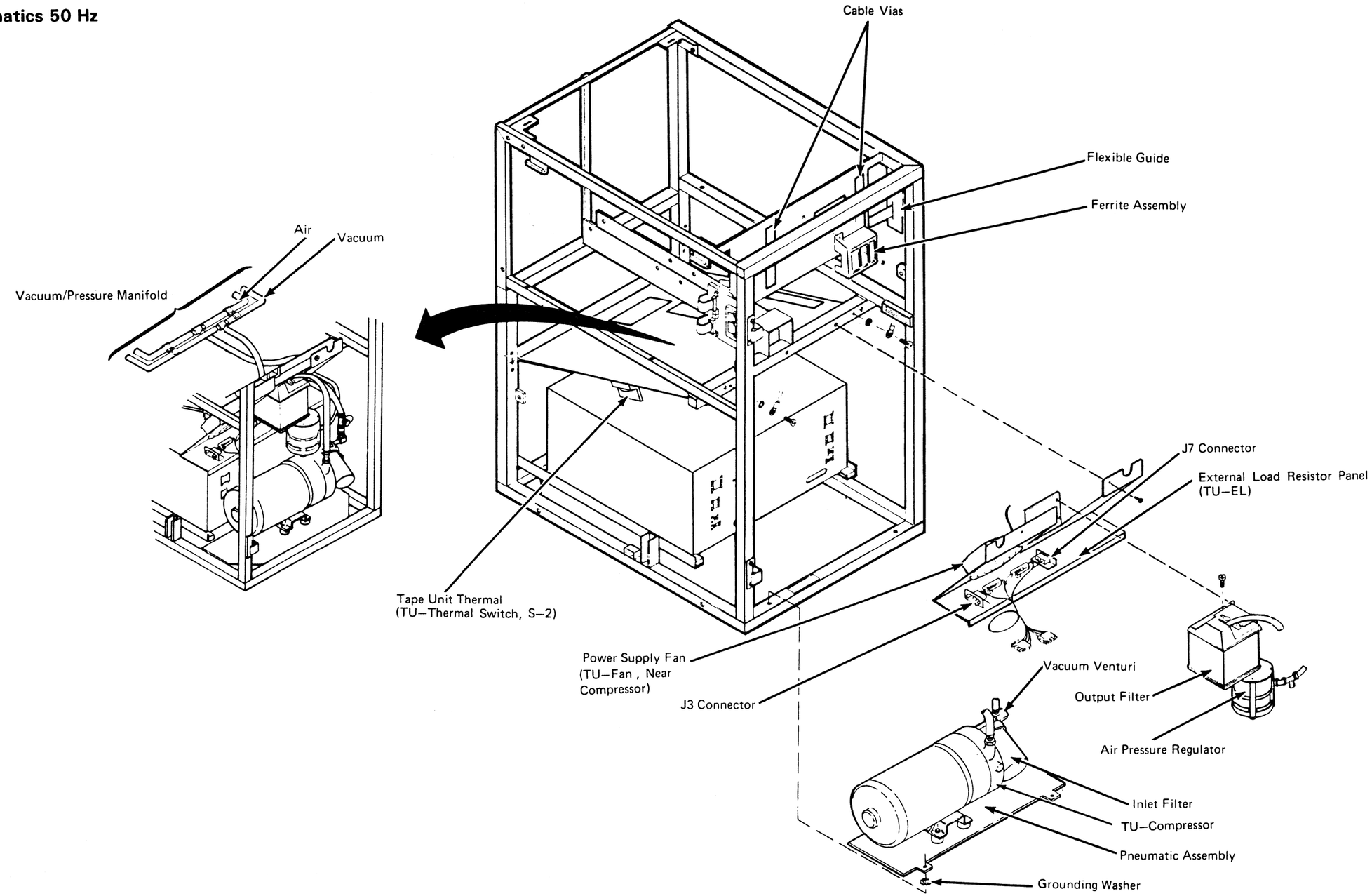
This page is for tape units without BM 6460006

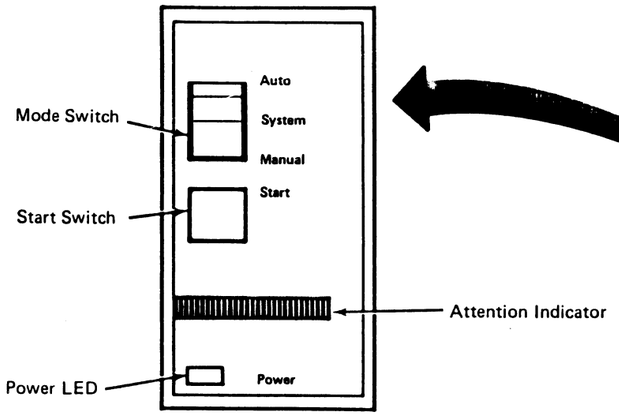
Pneumatics 60 Hz



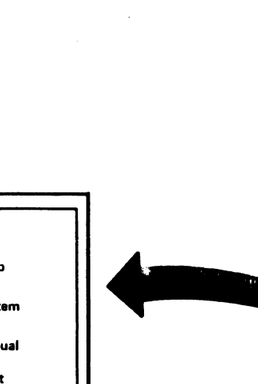
This page is for tape units without BM 6460006

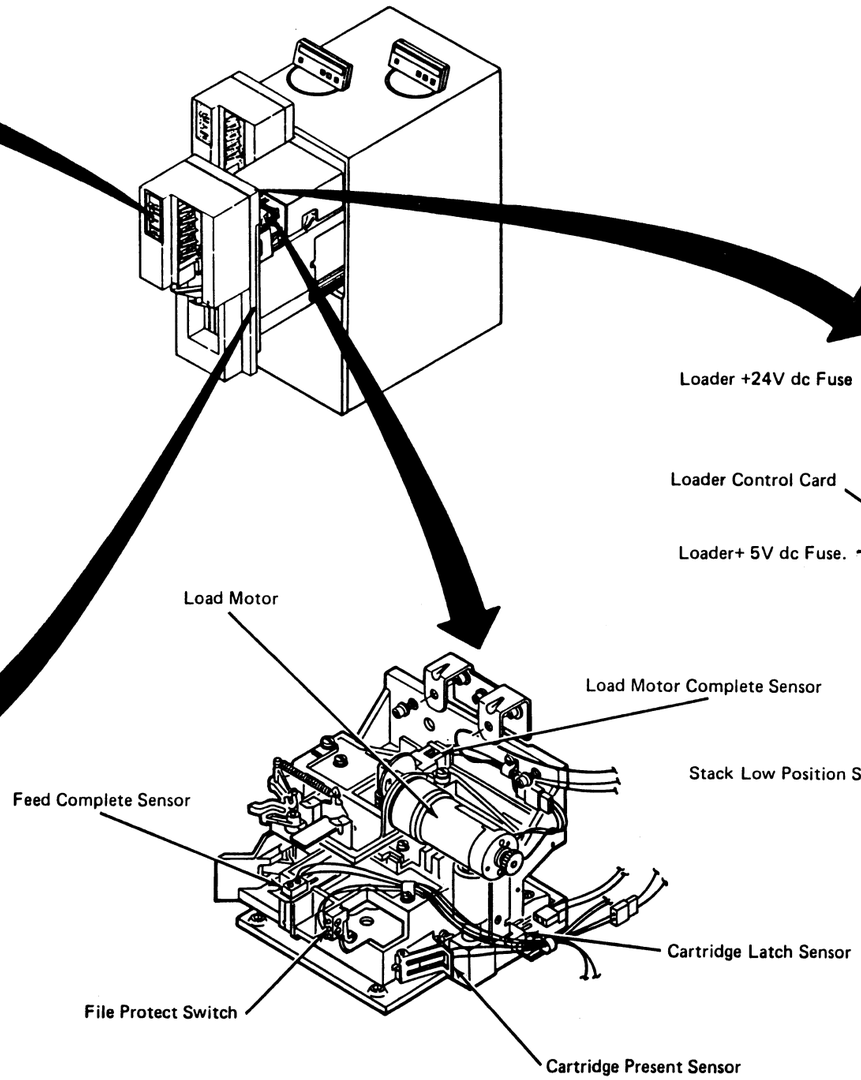
Pneumatics 50 Hz



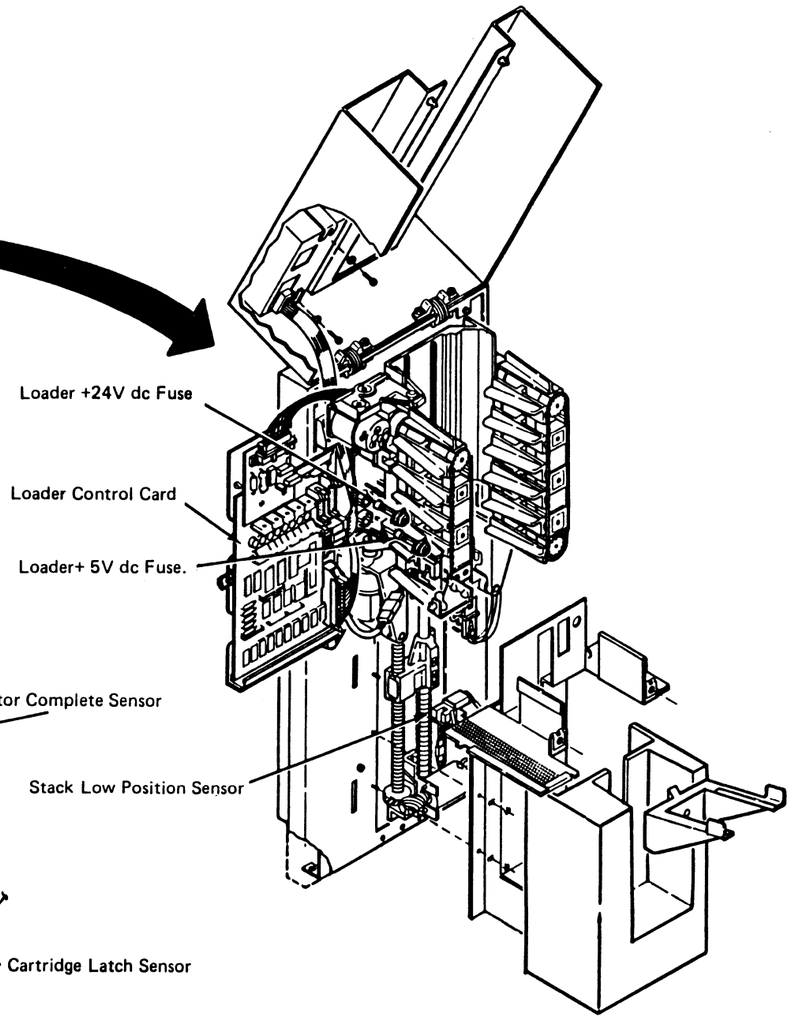


LOADER OPERATOR PANEL

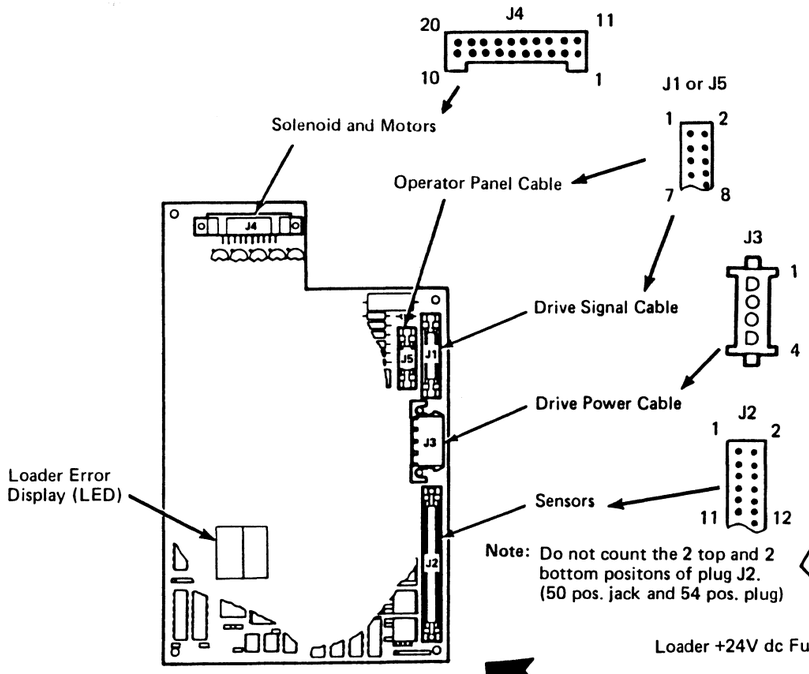




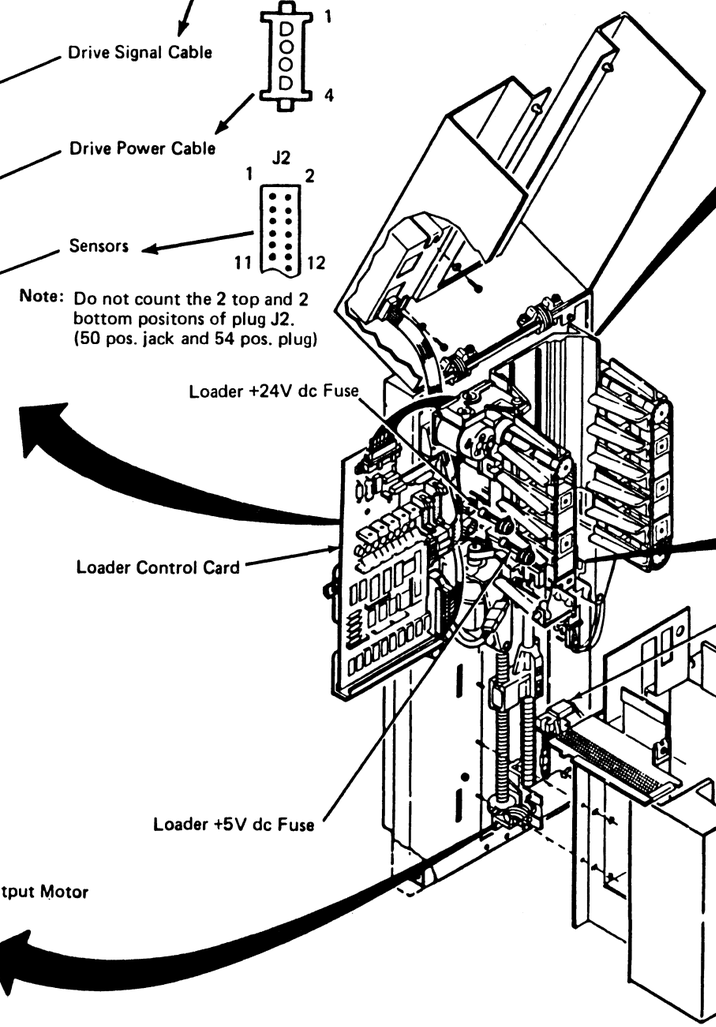
LOAD ASM
(view turned 180°)



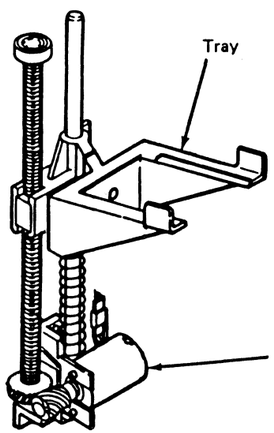
LOADER MECHANICAL ASM
with CONTROL CARD
(view turned 90°)



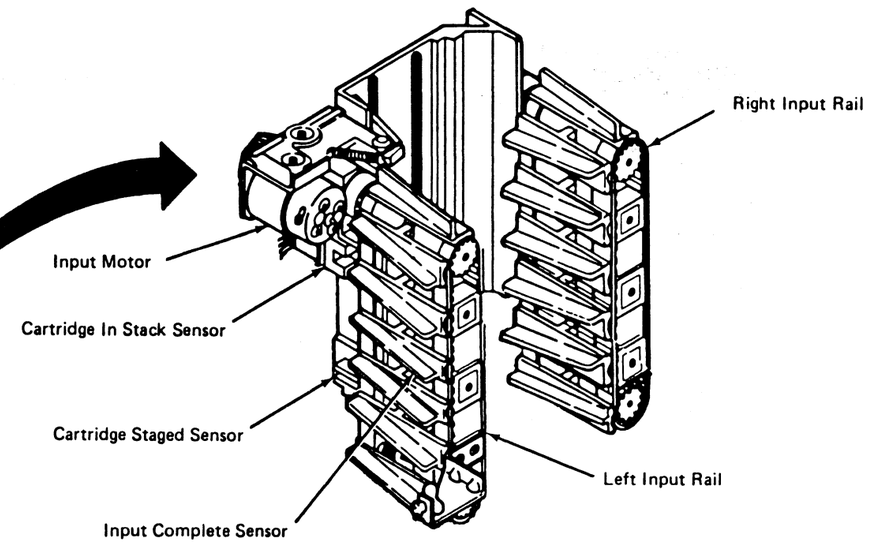
LOADER CONTROL CARD



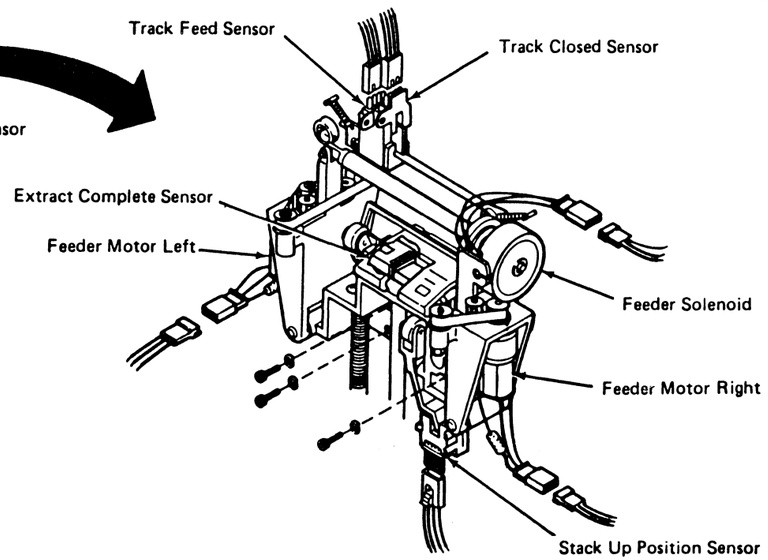
LOADER MECHANICAL ASM
with CONTROL CARD
(view turned 90°)



OUTPUT STACK ASM



INPUT STACK ASM



FEED ASM
(view turned 90°)

Remove/Replace Procedures by FRU Number

This directory lists all field-replaceable units (FRUs) for the 3480 Tape Subsystem, and includes all control unit and drive assembly FRUs.

To locate a specific FRU removal or replacement procedure, use the FRU number displayed on the maintenance device (MD) and perform the following:

1. Locate the FRU number in the FRU NUMBER column.
2. The VOLUME column indicates where the information for the FRU is located. Volume A02 contains the information for the control unit. Volume A03 contains the information for the drive. The name of the FRU is listed in the FRU NAME column.
3. Go to the page listed in the REMOVE column to perform the removal procedure.
4. Go to the page listed in the REPLACE column to perform the replacement procedure.

Control Unit cover removals and replacements are described on CARR-CU 2-1 through 2-4.

Drive cover removals and replacements are described on CARR-DR 2-1 through 2-6.

Plenum supply hose clamping procedures are described on CARR-DR 3-1.

Tape lifter solenoid response time checking procedures are described on CARR-DR 3-2.

FRU NUMBER	VOLUME	FRU NAME	CU WITH BM6460460 DRIVE WITH BM 6460006 REMOVE PAGE	CU WITH BM6460460 DRIVE WITH BM 6460006 REPLACE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REMOVE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REPLACE PAGE
FRU001	A03	Threader Assembly	10	10	10	10
FRU002	A03	Latch Solenoid	20	20	20	20
FRU003	A03	File Reel Motor	30	30	30	30
FRU004	A03	Machine Reel Motor and Hub Mount	40	40	40	40
FRU005	A03	Lower Flange	50	50	50	50
FRU006	A03	Tape Path Sensor A	60	60	60	60
FRU007	A03	Tape Path Sensor B	70	70	70	70
FRU008	A03	Cartridge Latch Assembly	80	80	80	80
FRU009	A03	File Protect Switch	90	90	90	90
FRU010	A03	Cartridge Present Sensor	100	100	100	100
FRU011	A03	Cartridge Latched Sensor	110	110	110	110
FRU012	A03	Decoupler Assembly	120	120	120	120
FRU013	A03	Head and Guide Assembly	130	130	130	130
FRU014	A03	Tension Transducer	140	140	140	140
FRU015	A02	A1V5-A2V3 Cable	150	150	150	150
FRU016	A03	Latch Spring	160	160	160	160
FRU017	A03	Plunger Spring	170	170	170	170
FRU018	A03	Compression Spring	180	180	180	180
FRU019	A03	Interlock Spring	190	190	190	190
FRU020	A03	Blower Assembly	200	200	205	205
FRU022	A02	Read Bus Cable - Local	150	150	150	150
FRU024 *	A02	Read Bus Cable - Remote	150	150	150	150
FRU025 *	A02	Read Bus Cable - Remote	150	150	150	150
FRU026 *	A02	Device Data Bus Cable - Remote	150	150	150	150
FRU027	A02	Device Data Bus Cable - Remote	150	150	150	150
FRU029	A02	Device Data Bus Cable - Local	150	150	150	150
FRU030	A03	Pump Motor	300	300	305	305
FRU031	A03	Regulator (60 Hz)	310	310	315	315
	A03	Regulator (50 Hz)	310	310	318	318
FRU032	A03	Output Filter (60 Hz)	320	320	325	325
	A03	Output Filter (50 Hz)	320	320	328	328
FRU033	A03	Inlet Filter	330	330	335	335
FRU034	A03	Pressure Hose Assembly (60 Hz)	340	340	345	345
	A03	Pressure Hose Assembly (50 Hz)	340	340	348	348
FRU035	A03	Vacuum Hose Assembly (60 Hz)	350	350	355	355
	A03	Vacuum Hose Assembly (50 Hz)	350	350	358	358
FRU036	A03	-5V dc Resistor Panel (60 Hz)	360	360	365	365
	A03	-5V dc Resistor Panel (50 Hz)	360	360	368	368
FRU037	A03	Manifold-In Pressure Hose (60 Hz)			370	370
	A03	Manifold-In Pressure Hose (50 Hz)			378	378
FRU038	A03	Manifold-In Vacuum Hose (60 Hz)			380	380
	A03	Manifold-In Vacuum Hose (50 Hz)			388	388
FRU039	A03	Plenum Supply Hose	390	390	390	390
FRU040	A03	Pressure Sensor	400	400	400	400
FRU041	A03	Plenum Assembly, Includes Pressure Sensor	410	410	410	410
FRU042	A03	Decoupler Pressure Hose	420	420	420	420
FRU043	A03	Decoupler Vacuum Hose	430	430	430	430
FRU044	A03	Right Guide Bearing Hose	440	440	440	440
FRU045	A03	Left Guide Bearing Hose	450	450	450	450
FRU046	A03	Tension Transducer Hose	460	460	460	460
FRU047	A03	Cleaner Supply Hose	470	470	470	470
FRU048	A02	Power Bus Cable	150	150	150	150
FRU049	A03	Logic Board to Power Amplifier J2 Cable	490	490	490	490
FRU054	A03	Upper Flange	540	540	540	540
FRU056 *	A02	Status Store Communication Cable - Dual CU	150	150	150	150
FRU058	A03	Logic Board (02A-A1)	580	580	580	580
FRU059	A03	Power Amplifier Board	590	590	590	590

0 0 0 0 0 0 0 0 0 0

Remove/Replace Procedures by FRU Number

This directory lists all field-replaceable units (FRUs) for the 3480 Tape Subsystem, and includes all control unit and drive assembly FRUs.

To locate a specific FRU removal or replacement procedure, use the FRU number displayed on the maintenance device (MD) and perform the following:

1. Locate the FRU number in the FRU NUMBER column.
2. The VOLUME column indicates where the information for the FRU is located. Volume A02 contains the information for the control unit. Volume A03 contains the information for the drive. The name of the FRU is listed in the FRU NAME column.
3. Go to the page listed in the REMOVE column to perform the removal procedure.
4. Go to the page listed in the REPLACE column to perform the replacement procedure.

Control Unit cover removals and replacements are described on CARR-CU 2-1 through 2-4.

Drive cover removals and replacements are described on CARR-DR 2-1 through 2-6.

Plenum supply hose clamping procedures are described on CARR-DR 3-1.

Tape lifter solenoid response time checking procedures are described on CARR-DR 3-2.

FRU NUMBER	VOLUME	FRU NAME	CU WITH BM6460460 DRIVE WITH BM 6460006 REMOVE PAGE	CU WITH BM6460460 DRIVE WITH BM 6460006 REPLACE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REMOVE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REPLACE PAGE
FRU001	A03	Threader Assembly	10	10	10	10
FRU002	A03	Latch Solenoid	20	20	20	20
FRU003	A03	File Reel Motor	30	30	30	30
FRU004	A03	Machine Reel Motor and Hub Mount	40	40	40	40
FRU005	A03	Lower Flange	50	50	50	50
FRU006	A03	Tape Path Sensor A	60	60	60	60
FRU007	A03	Tape Path Sensor B	70	70	70	70
FRU008	A03	Cartridge Latch Assembly	80	80	80	80
FRU009	A03	File Protect Switch	90	90	90	90
FRU010	A03	Cartridge Present Sensor	100	100	100	100
FRU011	A03	Cartridge Latched Sensor	110	110	110	110
FRU012	A03	Decoupler Assembly	120	120	120	120
FRU013	A03	Head and Guide Assembly	130	130	130	130
FRU014	A03	Tension Transducer	140	140	140	140
FRU015	A02	A1V5-A2V3 Cable	150	150	150	150
FRU016	A03	Latch Spring	160	160	160	160
FRU017	A03	Plunger Spring	170	170	170	170
FRU018	A03	Compression Spring	180	180	180	180
FRU019	A03	Interlock Spring	190	190	190	190
FRU020	A03	Blower Assembly	200	200	205	205
FRU021	A03	Message Display LEDs (LEDs 1 through 8)	210	210	210	210
FRU022	A02	Read Bus Cable - Local	150	150	150	150
FRU024 *	A02	Read Bus Cable - Remote	150	150	150	150
FRU025 *	A02	Read Bus Cable - Remote	150	150	150	150
FRU026 *	A02	Device Data Bus Cable - Remote	150	150	150	150
FRU027	A02	Device Data Bus Cable - Remote	150	150	150	150
FRU029	A02	Device Data Bus Cable - Local	150	150	150	150
FRU030	A03	Pump Motor	300	300	305	305
FRU031	A03	Regulator (60 Hz)	310	310	315	315
	A03	Regulator (50 Hz)	310	310	318	318
FRU032	A03	Output Filter (60 Hz)	320	320	325	325
	A03	Output Filter (50 Hz)	320	320	328	328
FRU033	A03	Inlet Filter	330	330	335	335
FRU034	A03	Pressure Hose Assembly (60 Hz)	340	340	345	345
	A03	Pressure Hose Assembly (50 Hz)	340	340	348	348
FRU035	A03	Vacuum Hose Assembly (60 Hz)	350	350	355	355
	A03	Vacuum Hose Assembly (50 Hz)	350	350	358	358
FRU036	A03	-5V dc Resistor Panel (60 Hz)	360	360	365	365
	A03	-5V dc Resistor Panel (50 Hz)	360	360	368	368
FRU037	A03	Manifold-In Pressure Hose (60 Hz)			370	370
	A03	Manifold-In Pressure Hose (50 Hz)			378	378
FRU038	A03	Manifold-In Vacuum Hose (60 Hz)			380	380
	A03	Manifold-In Vacuum Hose (50 Hz)			388	388
FRU039	A03	Plenum Supply Hose	390	390	390	390
FRU040	A03	Pressure Sensor	400	400	400	400
FRU041	A03	Plenum Assembly, includes Pressure Sensor	410	410	410	410
FRU042	A03	Decoupler Pressure Hose	420	420	420	420
FRU043	A03	Decoupler Vacuum Hose	430	430	430	430
FRU044	A03	Right Guide Bearing Hose	440	440	440	440
FRU045	A03	Left Guide Bearing Hose	450	450	450	450
FRU046	A03	Tension Transducer Hose	460	460	460	460
FRU047	A03	Cleaner Supply Hose	470	470	470	470
FRU048	A02	Power Bus Cable	150	150	150	150
FRU049	A03	Logic Board to Power Amplifier J2 Cable	490	490	490	490
FRU054	A03	Upper Flange	540	540	540	540
FRU056 *	A02	Status Store Communication Cable - Dual CU	150	150	150	150
FRU058	A03	Logic Board (02A-A1)	580	580	580	580
FRU059	A03	Power Amplifier Board	590	590	590	590

FRU NUMBER	VOLUME	FRU NAME	CU WITH BM6460460 DRIVE WITH BM 6460006 REMOVE PAGE	CU WITH BM6460460 DRIVE WITH BM 6460006 REPLACE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REMOVE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REPLACE PAGE
FRU060	A03	Message Display Board	600	600	600	600
FRU061	A03	Machine Reel Hub	610	610	610	610
FRU062	A03	EC Sensitive (See CARR-DR 4)				
FRU063	A03	EC Sensitive (See CARR-DR 4)				
FRU064	A03	EC Sensitive (See CARR-DR 4)				
FRU065	A03	Pump to Output Filter Hose	650	650	655	655
FRU066	A03	Top Card Connector B2X			660	660
FRU067	A03	Top Card Connector C2X			660	660
FRU068	A03	Top Card Connector WBC			660	660
FRU069	A03	Top Card Connector YBCD			660	660
FRU070	A03	Top Card Connector ZBCD			660	660
FRU071	A03	Power Supply Blower (60 Hz)			710	710
	A03	Power Supply Blower (50 Hz)			718	718
FRU072	A03	AC CB to Power Supply Blower Cable	490	490	490	490
FRU073	A03	Logic Board to Power Amplifier J1 Cable	490	490	490	490
FRU074	A03	Tape Unit AC Power CB Cable	490	490	490	490
FRU075	A03	AC Power Supply Cable			750	750
FRU076	A03	AC Distribution Cable			765	765
FRU077	A03	Blower Assembly AC Power Cable (Tape Unit to both Drives)	490	490	490	490
FRU078	A03	Blower Assembly AC Power Cable	490	490	490	490
FRU079	A03	EC Sensitive (See CARR-DR 4)	790	790		
	A03	DC Power Distribution Cable (Drive External)			796	796
FRU080	A03	DC Power Distribution Cable	800	800		
FRU081	A03	Tachometer Sensor Cable	810	810	815	815
FRU082	A03	Thermal Switch	820	820	823	823
FRU083	A03	Thermal Switch Cable	830	830	833	833
FRU084	A02	Local/Remote Power Panel	840	840	840	840
FRU085	A03	EC Sensitive (See CARR-DR 4)				
FRU086	A02	IML Diskette Drive	860	860	860	860
FRU087	A03	Read Data Local Cable (02A-A1G2 to TU-D0/1-P1RA1) Internal	490	490	490	490
FRU088	A03	Read Bus Local Adapter Cable to TU-D1-P2A1	880	880	490	490
FRU089	A03	Read Adapter Local Cable from Tee to P1RA1	490	490	490	490
FRU090	A03	Message Display DC Power Cable	900	900	905	905
FRU091	A02	Power Bus Cable	150	150	150	150
FRU092	A03	Read Bus Remote Adapter to TU-D1-P2B1 Cable	880	880	490	490
FRU093	A03	Read Adapter Remote Cable from Tee to P1RB1	490	490	490	490

FRU NUMBER	VOLUME	FRU NAME	CU WITH BM6460460 DRIVE WITH BM 6460006 REMOVE PAGE	CU WITH BM6460460 DRIVE WITH BM 6460006 REPLACE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REMOVE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REPLACE PAGE
FRU094	A03	Read Data Remote Cable (02A-A1G2 to TU-D0/1-P1B1)	490	490	490	490
FRU095	A03	DC Power Supply	950	950	955	955
FRU096	A03	Fuse F1 +24V Drive 0 Fuse F2 +24V Drive 1	960	960	960	960
FRU097	A02	Power Bus Cable	150	150	150	150
FRU098	A03	Fuse F3 +15V Drive 0 Fuse F4 +15V Drive 1	960	960	960	960
FRU099	A03	Fuse F5 -15V Drive 0 Fuse F6 -15V Drive 1	960	960	960	960
FRU100	A03	Fuse F7 +8.5V Drive 0 Fuse F8 +8.5V Drive 1	960	960	960	960
FRU101	A03	Fuse F9 -5V Drive 0 Fuse F10 -5V Drive 1	960	960	960	960
FRU102	A03	Fuse F11 +5V Drive 0 Fuse F12 +5V Drive 1	960	960	960	960
FRU103	A02	Power Bus Cable	150	150	150	150
FRU104	A03	Drive Power Switch	1040	1040	1045	1045
FRU105	A03	Online/Offline Switch (Drive)	1040	1040	1045	1045
FRU106	A03	Address Switch Cable to J4 (rear of deck)	490	490	490	490
FRU107	A03	Reset Switch	1040	1040	1045	1045
FRU108	A03	Drive Address Switch	1040	1040	1045	1045
FRU109	A03	Operator Panel Switch Board (contains Rewind Switch Unload Switch, and Ready/Not Ready Switch)	1090	1090	1090	1090
FRU110	A03	EC Sensitive (See CARR-DR 4)				
FRU111	A02	Read ECC/CORR Card 01A-A1R2	1110	1110	1110	1110
FRU112	A02	Buffer Storage Card 01A-A1N2	1110	1110	1110	1110
FRU113	A02	Buffer Storage Card 01A-A1M2	1110	1110	1110	1110
FRU114	A02	Buffer Control Card 01A-A1L2	1110	1110	1110	1110
FRU115	A02	Maintenance Adapter Card 01A-A1E2	1110	1110	1110	1110
FRU116	A02	Write Data Flow Card 01A-A1P2	1110	1110	1110	1110
FRU117	A02	Microprocessor Card 01A-A1D2	1110	1110	1110	1110
FRU118	A02	Drive Adapter Card 01A-A1Q2	1180	1180	1180	1180
FRU119	A02	Read Clock and Format Card 01A-A1S2	1110	1110	1110	1110
FRU120	A02	Buffer Adapter Card 01A-A1K2	1200	1200	1200	1200
FRU121	A02	Status Store Basic Card 01A-A1G2	1110	1110	1110	1110

FRU NUMBER	VOLUME	FRU NAME	CU WITH BM6460460 DRIVE WITH BM 6460006 REMOVE PAGE	CU WITH BM6460460 DRIVE WITH BM 6460006 REPLACE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REMOVE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REPLACE PAGE
FRU122 *	A02	Status Store Communication Card 01A-A1F2	1110	1110	1110	1110
FRU123	A02	Read Skew Buffer Card 1 01A-A2K2	1110	1110	1110	1110
FRU124	A02	Read Skew Buffer Card 2 01A-A2L2	1110	1110	1110	1110
FRU125	A02	Read Skew Buffer Card 3 01A-A2M2	1110	1110	1110	1110
FRU126	A02	Power/POR Card 01A-A2H4	1260	1260	1260	1260
FRU127	A03	Latch Interlock	1270	1270	1270	1270
FRU128	A03	EC Sensitive (See CARR-DR 4)	640	640		
FRU129	A03	Physical Address Switch	1290	1290	1295	1295
FRU130	A02	EC Sensitive (See CARR-CU 4)	***	***	***	***
FRU131	A02	EC Sensitive (See CARR-CU 4)	***	***	***	***
FRU132	A02	EC Sensitive (See CARR-CU 4)	***	***	***	***
FRU133	A02	Channel Adapter Card (Channel A) 01A-A2C2	1110	1110	1110	1110
FRU134	A02	Control Store Card 01A-A1C2	1110	1110	1110	1110
FRU135	A02	Control Storage Array Card 01A-A1B2	1110	1110	1110	1110
FRU136	A02	Bus Shoe Card (Channel A) 01A-T1A1	1360	1360	1360	1360
FRU137	A02	Tag Shoe Card (Channel A) 01A-T1A3	1360	1360	1360	1360
FRU138	A02	V Regulator Card 01A-A1T2	1260	1260	1260	1260
FRU139	A02	Logic Board A1	1390	1390	1390	1390
FRU140	A02	Logic Board A2	1400	1400	1400	1400
FRU141	A02	Control Unit Switch Panel Card (includes Offline Indicator, IML Switch, Normal/Test Switch, CU0/CU1 Switch, Control Unit Online/Offline Switch) Enable/Disable Switch (A, B, C, D)	1410	1410	1410	1410
FRU142	A02	Control Unit Operator Panel Printed Circuit Board (includes Power On/Off Switch, and Power Indicator)	1420	1420	1420	1420
FRU143	A02	Thermal Switch (CU Gate) Lower	1430	1430	1430	1430
FRU144	A02	AC Power Supply	1440	1440	1440	1440
FRU145	A02	DC Power Supply	1450	1450	1450	1450
FRU146	A02	AC Fuse F1 + 24V	1460	1460	1460	1460
FRU147	A02	DC Fuse F1 + 8.5V	1470	1470	1470	1470
FRU148	A02	DC Fuse F2 + 24V	1470	1470	1470	1470
FRU149	A02	AC Line Cord	1490	1490	1490	1490
FRU150	A02	Blower Assembly 1	1500	1500	1500	1500
FRU151	A02	Blower Assembly 2	1500	1500	1500	1500
FRU152	A02	Channel Adapter Card (Channel B) 01A-A2D2	1110	1110	1110	1110

FRU NUMBER	VOLUME	FRU NAME	CU WITH BM6460460 DRIVE WITH BM 6460006 REMOVE PAGE	CU WITH BM6460460 DRIVE WITH BM 6460006 REPLACE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REMOVE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REPLACE PAGE
FRU153	A02	Channel C D Address Feature Cable	150	150	150	150
FRU154 **	A02	Channel Timeout Card 01A-A2G2	1110	1110	1110	1110
FRU155	A02	Thermal Switch Cable	150	150	150	150
FRU156	A02	Power Bus Cable	150	150	150	150
FRU157	A02	Top Card Connector WKL	1570	1570	1570	1570
FRU158	A02	Top Card Connector XKL	1570	1570	1570	1570
FRU159	A02	Top Card Connector YKL	1570	1570	1570	1570
FRU160	A02	DC Power Supply to Gate TB Cable	1600	1600	1600	1600
FRU161	A03	Cleaner Block	1610	1610	1610	1610
FRU162	A02	Service Switch	1620	1620	1620	1620
FRU163	A02	I/O Card DC Cable (Channel A)	150	150	150	150
FRU164	A02	GTE DC Distribution Cable Assembly	150	150	150	150
FRU165	A02	Gate Fan Cable	1650	1650	1650	1650
FRU166	A02	AC Power Supply to DC Power Supply Cable	150	150	150	150
FRU167	A02	Power Bus Cable	150	150	150	150
FRU168	A02	Control Unit Switch Panel to Gate Cable	150	150	150	150
FRU169	A02	A1Y1 to MD Connector Cable	150	150	150	150
FRU170	A02	I/O Tag Cable (Channel A)	150	150	150	150
FRU171	A02	I/O Bus Cable (Channel A)	150	150	150	150
FRU172	A02	I/O Tag/Bus Jumper Cable (Channel A)	150	150	150	150
FRU173	A02	Channel A,B Address Cable	150	150	150	150
FRU175	A02	Read Bus Cable - Single CU	150	150	150	150
FRU176	A02	CU AC Control Switch Panel Cable	150	150	150	150
FRU177	A02	AC Power to Gate Cable	1770	1770	1770	1770
FRU178	A02	A1S2W to A2V2 Cable	150	150	150	150
FRU179	A02	Power Bus Cable	150	150	150	150
FRU180	A02	Top Card Connector ZCD	1570	1570	1570	1570
FRU181	A02	Top Card Connector P2Y	1570	1570	1570	1570
FRU182	A02	Top Card Connector WE	1570	1570	1570	1570
FRU183	A02	Top Card Connector WCD	1570	1570	1570	1570
FRU184	A02	Top Card Connector ZPQ	1570	1570	1570	1570
FRU185	A02	Top Card Connector XRS	1570	1570	1570	1570
FRU186	A02	Top Card Connector YRS	1570	1570	1570	1570

FRU NUMBER	VOLUME	FRU NAME	CU WITH BM6460460 DRIVE WITH BM 6460006 REMOVE PAGE	CU WITH BM6460460 DRIVE WITH BM 6460006 REPLACE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REMOVE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REPLACE PAGE
FRU187	A02	Top Card Connector ZFG	1570	1570	1570	1570
FRU188	A02	Top Card Connector ZKL	1570	1570	1570	1570
FRU189	A02	Top Card Connector WFG	1570	1570	1570	1570
FRU190	A02	Top Card Connector XFG	1570	1570	1570	1570
FRU191	A02	Top Card Connector YFG	1570	1570	1570	1570
FRU192	A02	Top Card Connector XCDE	1570	1570	1570	1570
FRU193	A02	Top Card Connector YCDE	1570	1570	1570	1570
FRU194	A02	IML Diskette Drive Cable (Drive to 01A-A1A3)	150	150	150	150
FRU195	A02	Channel Adapter Card (Channel C) 01A-A2E2	1110	1110	1110	1110
FRU196	A02	Channel Adapter Card (Channel D) 01A-A2F2	1110	1110	1110	1110
FRU197	A02	Channel Address Switch (Channel A, Channel B , Channel C, or Channel D)	1970	1970	1970	1970
FRU198	A02	UEPO Switch	1980	1980	1980	1980
FRU199	A02	Write Bus Terminator CU0 (Local)	1995	1995	1990	1990
FRU200	A03	Write Adapter B Cable (CU to Drive 0 P1WB1)	490	490	490	490
FRU201	A03	Write Adapter B Cable (Drive 0 P1WB2 to Drive 1 P1WB1)	490	490	490	490
FRU202	A03	Write Adapter B Cable (TU-D1-P1WB2 to TU-D1-P2B2)	490	490	490	490
FRU203	A03	Write Adapter B Cable (A1A4 to P1WB1)	490	490	490	490
FRU204	A03	Write Adapter B Cable (A1A5 to P1WB2)	490	490	490	490
FRU205	A03	Write Adapter A Cable (CU to Drive 0 P1WA1)	490	490	490	490
FRU206	A03	Write Adapter A Cable (Drive 0 P1WA2 to Drive 1 P1WA1)	490	490	490	490
FRU207	A03	Write Adapter A Cable (TU-D1-P1WA2 to TU-D1-P2A2)	490	490	490	490
FRU208	A03	Write Adapter A Cable (A1A2 to P1WA1)	490	490	490	490
FRU209	A03	Write Adapter A Cable (A1A3 to P1WA2)	490	490	490	490
FRU210	A03	Message Display Cable	490	490	490	490
FRU211	A03	Message Display Cable	2110	2110	2115	2115
FRU212	A03	Vacuum Supply Hose	2120	2120	2120	2120
FRU213	A03	Message Display Board to Message Display Switch Board Cable	2130	2130	2130	2130
FRU214	A02	I/O Tag Cable (Channel B)	150	150	150	150
FRU215	A03	Tape Lifter Solenoid Input Hose	2150	2150	2150	2150
FRU216	A03	Tape Lifter Solenoid	2160	2160	2160	2160
FRU217	A02	A2Z2 to Gate TB2 Cable	150	150	150	150
FRU218	A03	AC Power Circuit Breaker	2180	2180	2185	2185

FRU NUMBER	VOLUME	FRU NAME	CU WITH BM6460460 DRIVE WITH BM 6460006 REMOVE PAGE	CU WITH BM6460460 DRIVE WITH BM 6460006 REPLACE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REMOVE PAGE	CU WITHOUT BM6460460 DRIVE WITHOUT BM6460006 REPLACE PAGE
FRU219	A03	Vacuum Distribution Tee	2190	2190	2190	2190
FRU220	A02	I/O Tag Cable (Channel C)	150	150	150	150
FRU221	A02	I/O Tag Cable (Channel D)	150	150	150	150
FRU223	A03	Convoluted Bellows	2230	2230		
FRU224	A02	Thermal Switch (CU Gate) Upper	2240	2240	2240	2240
FRU225	A03	Machine Reel Tach Sensor A	2250	2250	2250	2250
FRU226	A03	Machine Reel Tach Sensor B	2260	2260	2260	2260
FRU227	A03	Machine Reel Tape Guide	2270	2270	2270	2270
FRU228	A03	Head Tape Guide (Left)	2280	2280	2280	2280
FRU229	A03	Head Tape Guide (Right)	2290	2290	2290	2290
FRU230	A03	Tension Transducer Tape Guide	2300	2300	2300	2300
FRU231	A03	Center Tape Guide	2310	2310	2310	2310
FRU232	A03	Cartridge	2320	2320	2320	2320
FRU233	A02	Bus Shoe Card (Channel B) 01A-T1B1	1360	1360	1360	1360
FRU234	A02	Tag Shoe Card (Channel B) 01A-T1B3	1360	1360	1360	1360
FRU235	A02	Bus Shoe Card (Channel C) 01A-T1C1	1360	1360	1360	1360
FRU236	A02	Tag Shoe Card (Channel C) 01A-T1C3	1360	1360	1360	1360
FRU237	A02	Bus Shoe Card (Channel D) 01A-T1D1	1360	1360	1360	1360
FRU238	A02	Tag Shoe Card (Channel D) 01A-T1D3	1360	1360	1360	1365
FRU239	A02	I/O Card DC Cable (Channel B)	150	150	150	150
FRU240	A02	I/O Card DC Cable (Channel C)	150	150	150	150
FRU241	A02	I/O Card DC Cable (Channel D)	150	150	150	150
FRU242	A02	I/O Bus Cable (Channel B)	150	150	150	150
FRU243	A02	I/O Tag Bus Jumper Cable (Channel B)	150	150	150	150
FRU244	A02	I/O Bus Cable (Channel C)	150	150	150	150
FRU245	A02	I/O Tag Bus Jumper Cable (Channel C)	150	150	150	150
FRU246	A02	I/O Bus Cable (Channel D)	150	150	150	150
FRU247	A02	I/O Tag Bus Jumper Cable (Channel D)	150	150	150	150
FRU248	A02	Write Bus Terminator CU0 (Remote)	1990	1990	1990	1990
FRU249	A02	A1Z1-A2Y1 Cable	150	150	150	150

Remove/Replace Procedures by FRU Number CARR-CU 1-5

FRU NUMBER	VOLUME	FRU NAME	DRIVE WITH BM 6460006 REMOVE PAGE	DRIVE WITH BM 6460006 REPLACE PAGE	DRIVE WITHOUT BM 6460006 REMOVE PAGE	DRIVE WITHOUT BM 6460006 REPLACE PAGE
FRU258	A02	IML Diskette	2580	2580	2580	2580
FRU260	A02	CU to CU Read Cable - Remote	150	150	150	150
FRU261	A02	CU to CU Write Cable - Remote	150	150	150	150
FRU262	A03	Air Pressure Test Port Hose Assembly	2620	2620		
FRU263	A03	Vacuum Test Port Hose Assembly	2630	2630		
FRU264	A02	Write Bus Terminator CU1 (Local)	1990	1990	1990	1990
FRU265	A02	Write Bus Terminator CU1 (Remote)	1990	1990	1990	1990
FRU267	A03	Top Card Connector B2X	660	660		
FRU268	A03	Top Card Connector B2Y	660	660		
FRU270	A03	Interposer Signal Cable 02A-A1Y3 to P1-J2	490	490	490	490
FRU271	A02	I/O Bus Tag Interposer Cable	150	150	150	150
FRU277	A03	Head Compliant Guide	2770	2770	2770	2770
FRU280	A03	Fuse 13 +5 V DC Drive 0, Fuse 14 +5 V DC Drive 1	960	960		
FRU281	A03	Loader Control Card	2810	2810	2810	2810
FRU282	A03	Load Assembly	2820	2820	2820	2820
FRU283	A03	Load Motor	2830	2830	2830	2830
FRU284	A03	Load Motor Complete Sensor	2840	2840	2840	2840
FRU285	A03	Loader Mechanical Assembly	2850	2850	2850	2850
FRU286	A03	Loader Signal Cable	2860	2860	2860	2860
FRU287	A03	Loader Power Cable	2860	2860	2860	2860
FRU288	A03	Loader Fuse +24 V DC	2880	2880	2880	2880
FRU289	A03	Stack Low Position Sensor	2890	2890	2890	2890
FRU290	A03	Input Stack Assembly	2900	2900	2900	2900
FRU291	A03	Cartridge In Stack Sensor	2910	2910	2910	2910
FRU292	A03	Cartridge Staged Sensor	2920	2920	2920	2920
FRU293	A03	Left Input Rail Assembly	2930	2930	2930	2930
FRU294	A03	Right Input Rail Assembly	2940	2940	2940	2940
FRU295	A03	Feed Assembly	2950	2950	2950	2950
FRU296	A03	Stack Up Position Sensor	2960	2960	2960	2960
FRU297	A03	Output Stack Assembly	2970	2970	2970	2970
FRU298	A03	Loader Operator Panel	2980	2980	2980	2980
FRU299	A03	Loader Fuse +5 V DC	2880	2880	2880	2880
FRU300	A03	Feed Assembly Motor	3000	3000	3000	3000

FRU Name	FRU No.	Page
AC		
Fuse 1 + 24 V ac	146	1465
Line Cord	149	1490
Power Supply	144	1440
BOARD		
Control Unit Switch Panel Printed Circuit	141	1410
Logic A1	139	1390
Logic A2	140	1400
Op Panel Printed Circuit	142	1420
CABLE		
AC Line Cord	149	1490
AC Power to Gate	177	1770
AC Power Supply to DC Power Supply	166	150
A1A5 to A2 A5	255	150
A1S2W to A2V2	178	150
A1V3 to A2V5	256	150
A1V5 to A2V3	015	150
A1Y1 to MD Connector	169	150
A1Z1 to A2Y1	249	150
A1Z2 to A2Y2	250	150
A1Z3 to A2Y3	251	150
A1Z4 to A2Y4	252	150
A1Z5 to A2Y5	253	150
A1Z6 to A2Y6	254	150
Channel A/B Address	173	150
Channel C/D Address	153	150
Control Unit Switch Panel Voltage	176	150
Control Unit Switch Panel to Gate	168	150
Control Unit to Control Unit Read - Remote	260	150
Control Unit to Control Unit Write - Remote	261	150
DC Distribution	164	150
DC Power to Gate TB	160	1600
Device Data Bus - Local	029	150
Device Data Bus - Remote	026	150
Device Data Bus - Remote	027	150
Gate Fan	165	1650
I/O Bus (Channel A)	171	150
I/O Bus (Channel B)	242	150
I/O Bus (Channel C)	244	150
I/O Bus (Channel D)	246	150
I/O Bus Tag Interposer Cable	271	150
I/O Card DC (Channel A)	163	150
I/O Card DC (Channel B)	239	150
I/O Card DC (Channel C)	240	150
I/O Card DC (Channel D)	241	150
I/O Tag (Channel A)	170	150
I/O Tag (Channel B)		
I/O Tag (Channel C)	220	150
I/O Tag (Channel D)	221	150
I/O Tag/Bus Jumper (Channel A)	172	150
I/O Tag/Bus Jumper (Channel B)	243	150
I/O Tag/Bus Jumper (Channel C)	245	150
I/O Tag/Bus Jumper (Channel D)	247	150
IML Diskette Drive	194	150
Power Bus	048	150
Power Bus	091	150
Power Bus	097	150
Power Bus	103	150
Power Bus	167	150
Power Bus	179	150
Power Bus (UEPO Switch)	156	150
Read Bus - Local	175	150
Read Bus - Remote	022	150
Read Bus - Remote	024	150
Read Bus - Remote	025	150
Remote Exit - 2 CU	217	150
Status Store - 2 CU	056	150

FRU Name	FRU No.	Page
Thermal Switch	155	150
CARD		
Buffer Adapter (A1K2)	120	1200
Buffer Control (A1L2)	114	1110
Buffer Memory Reference	276	7
Buffer Storage Card 1 (A1M2)	113	1110
Buffer Storage Card 2 (A1N2)	112	1110
Bus Shoe (Channel A)	136	1360
Bus Shoe (Channel B)	233	1360
Bus Shoe (Channel C)	235	1360
Bus Shoe (Channel D)	237	1360
Channel A Adapter (A2C2)	133	1110
Channel B Adapter (A2D2)	152	1110
Channel C Adapter (A2E2)	195	1110
Channel D Adapter (A2F2)	196	1110
Channel Timeout (A2G2)	154	1110
Channel Storage	135	1110
Control Storage (A1C2)	134	1110
Drive-Adapter (A1Q2)	118	1180
Ketch Card 1 (A1N2)	112	1110
Ketch Card 2 (A1M2)	113	1110
Load Resistor Card (A2P2)	272	1110
Maintenance Adapter (A1E2)	115	1110
Microprocessor (A1D2)	117	1110
POR (Power On Reset) (A2H4)	126	1260
Read Clock and Format (A1S2)	119	1110
Read Detect Card (A2Q2)	278	4
Read Detect 1 (A2R2)	130	4
Read Detect 2 (A2S2)	131	4
Read Detect 3 (A2T2)	132	4
Read ECC/Correction (A1R2)	111	1110
Read Skew Buffer 1 (A2K2)	123	1110
Read Skew Buffer 2 (A2L2)	124	1110
Read Skew Buffer 3 (A2M2)	125	1110
Regulator (A1T2)	138	1260
Status Store (A1G2)	121	1110
Store Status Communicator (A1F2)	122	1110
Tag Shoe (Channel A)	137	1360
Tag Shoe (Channel B)	234	1360
Tag Shoe (Channel C)	236	1360
Tag Shoe (Channel D)	238	1360
Voltage Regulator (A1T2), POR (A2H2)	138	1260
Write Data Flow (A1P2)	116	1110
Channel Address Switch		
SWITCH		
Channel Address	197	1970
Local/Remote (Power Panel)	084	840
Service Assembly	162	1620
Thermal (CU Gate) Lower	143	1430
Thermal (CU Gate) Upper	224	2240
UEPO (Unit Emergency Power Off)	198	1980
Terminator Write Bus CU0 (Local)	199	1990
Terminator Write Bus CU0 (Remote)	248	1990
Terminator Write Bus CU1 (Local)	264	1990
Terminator Write Bus CU1 (Remote)	265	1990
TOP CARD		
Connector A1WCD	183	1570
Connector A1E2W	182	1570
Connector A1WFG	189	1570
Connector A1WKL	157	1570
Connector A1XCDE	192	1570
Connector A1XFG	190	1570
Connector A1XKL	158	1570
Connector A1XRS	185	1570
Connector A1YCDE	193	1570
Connector A1YFG	191	1570
Connector A1YKL	159	1570

FRU Name	FRU No.	Page
Connector A1P2Y	181	1570
Connector A1YRS	186	1570
Connector A1ZCD	180	1570
Connector A1ZFG	187	1570
Connector A1ZKL	188	1570
Connector A1ZPQ	184	1570
UEPO (Unit Emergency Power Off) Switch	198	1980
Write Bus Terminator CU0 (Local)	199	1990
1990	1990	1990

Introduction

This section contains the removal and replacement procedures for all Field Replaceable Units (FRUs) in the 3480 tape subsystem. Checks and adjustment procedures are also included.

Carr Layout

CARR-CU pages 1-1 through 1-4 (in volume A02) contain a complete FRU list for the control unit and tape unit. An error code or FRU number that is displayed on the Maintenance Device (MD) operator panel will make reference to this FRU list. The corresponding procedure should be performed. The FRU removal procedure is given first and the FRU replacement procedure immediately follows for the same FRU. All procedures are shown in a step by step method with keyed reference to views.

Common Procedures

Procedures for cover removal and replacement, are given on CARR-CU 2-1 through CARR-CU 2-4. You will be sent to these common procedures by the FRU removal and replacement procedures.

Read through the complete procedure before performing it and give attention to caution and danger notes.

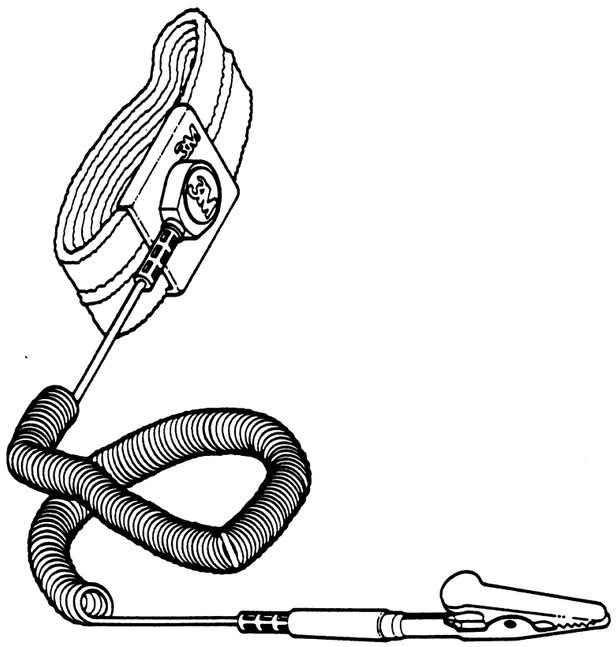


Figure 1. ESD Grounding Wrist Strap

Instructions for Working With ESD-Sensitive Parts

To prevent damage when you work with electrostatic discharge (ESD) sensitive parts, observe the following instructions. These instructions are in addition to all the usual precautions.

- ESD-sensitive parts that are shipped in a special ESD bag should be left in this bag until you are ready to immediately install them into the machine.
- Before touching the ESD-sensitive part, put on the ESD Grounding Wrist Strap on either wrist. This strap has a high resistance (1 megohm) resistor in series with the grounding clip, so there is no danger to you. It discharges the static electricity from your body. Connect the clip to the flex ground strap of the gate to the frame. Keep the strap on while you are inserting or removing a logic card or handling any ESD-sensitive part.
- Do not place the ESD-sensitive part on the machine cover or on a metal table. If you need to put down the ESD-sensitive part for any reason, first put it into its special bag. (Large metal objects can be discharge paths without being grounded.)
- Prevent ESD-sensitive parts from being touched by other personnel, such as service representatives or customers. Reinstall all covers when you are not working on the machine.
- If possible, keep all ESD-sensitive parts in a grounded metal cabinet (case).
- Be extra careful in working with ESD-sensitive parts when cold-weather heating is used. Heating of cold air lowers the relative humidity which increases the static electricity.

CAUTION
When wearing the ESD grounding wrist strap, ensure that the flex ground strap remains connected. Failure to do this creates a safety exposure in the same manner as wearing jewelry while working on live exposed electrical circuits.

Use the most current IBM part number available for the ESD Wrist Strap.

- The following is a list of the ESD-sensitive parts in the 3480 subsystem:
  - All of the logic cards in the control unit and the drives
  - Message display card in the drives
  - Transducer FRU in the drives.

Control Unit Cover and Safety Cover Removal

Control Unit With BM 6460460 (see CARR-CU 9)

This page contains the steps needed for removing any of the control unit covers.

Control Unit Front or Rear Cover Removal

The control unit front and rear covers are held closed by a latch assembly.

To open the front cover, push on the left center to release the latch. To open the rear cover, insert a small screw driver into the slot in the right center of the cover and push to the left to release the latch.

1. Press in on the cover in the area shown **1**.
2. Remove the grounding strap from the cover.
3. Open the cover far enough to get access to the hinge pins **5**.
4. Lift the hinge pins out of the hinges and remove the cover from the control unit.
5. Return to the procedure that sent you here.

Control Unit Top Cover Removal

1. Open the rear cover.
2. Release the two rear latch screws **6** (these are captive screws).
3. Pivot the top cover on its front locating tabs and brackets **7** by lifting the cover from the rear of the control unit.
4. Lift the front locating tabs from the brackets and remove the top cover from the control unit.
5. Return to the procedure that sent you here.

Control Unit Side Cover Removal

The control unit side covers are held at the top by two tabs **2** which slide into slots in the control unit frame. The bottom is held in place by a latch assembly.

1. To open the side cover, insert a small screw driver into the slot in the bottom center of the cover and push upward to release the latch.
2. Pull the bottom of the cover away from the tape unit, then lift the cover straight up and out of the brackets attached to the tape unit frame.
3. Return to the procedure that sent you here.

Control Unit Front Safety Cover Removal

The front safety cover is held in the control unit frame with four sliding brackets **3**. It is not necessary to loosen all of them to remove the cover.

1. Loosen the left and right side brackets and slide them toward the inside of the safety cover.
2. Remove the grounding strap from the cover.
3. Lift the safety cover up and out of the control unit.
4. Return to the procedure that sent you here.

Control Unit Rear Safety Cover Removal

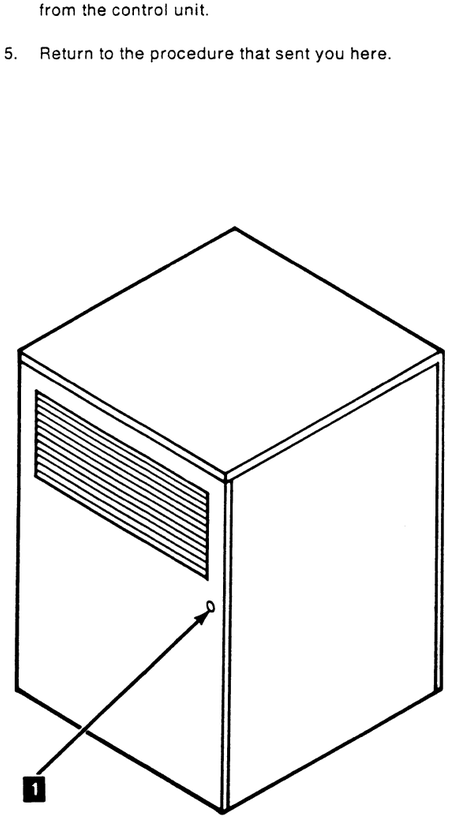
The rear safety cover is held in the control unit frame with three sliding brackets **4**. It is not necessary to loosen all of them to remove the cover.

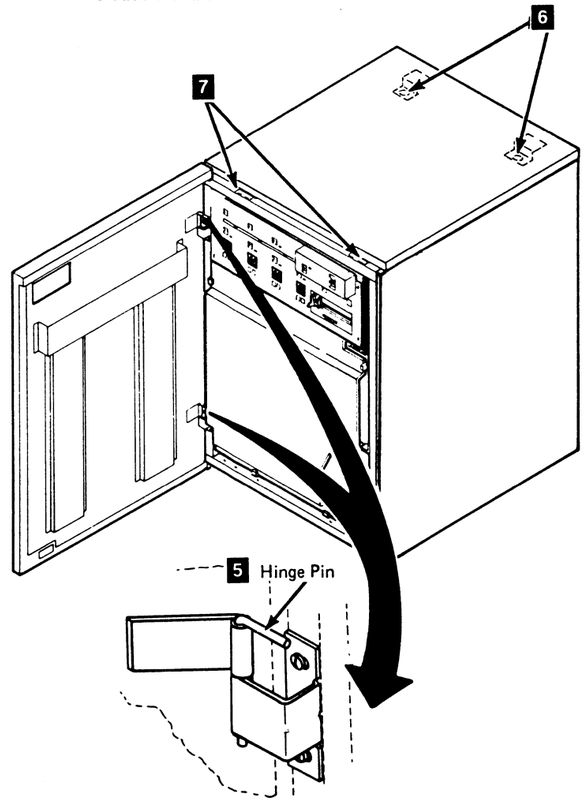
1. Remove the grounding strap from the cover.
2. Loosen the left bracket bolt, slide the bracket in, and at the same time pull the left side of the safety cover out and away from the control unit.
3. Return to the procedure that sent you here.

Drip-Screen Guard Removal

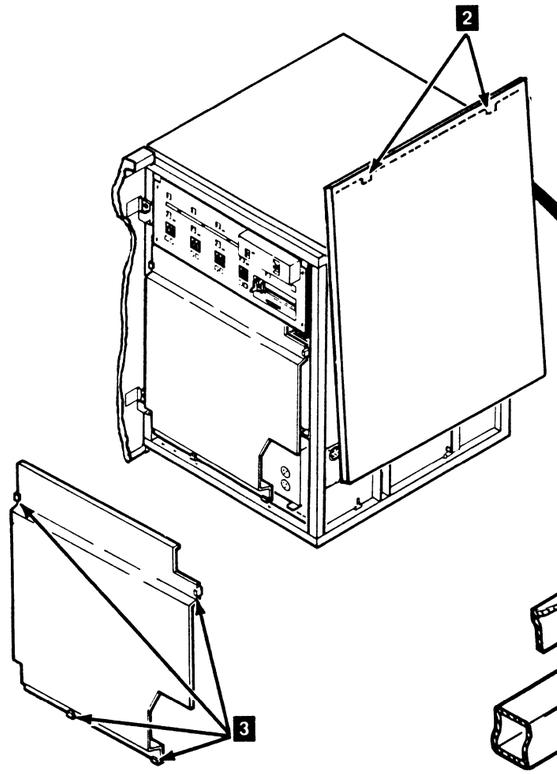
(Control units with vertical style I/O connectors)

1. Loosen the two screws that attach the guard to the I/O tailgate. Slide the guard to the left and lift off the rear frame member.
2. Return to the procedure that sent you here.

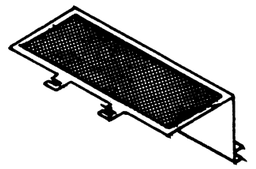


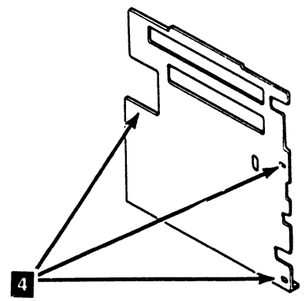


Hinge



Front Safety Cover


Drip-Screen Guard



Rear Safety Cover

3480 MI EC A47957

Control Unit Cover and Safety Cover Installation

Control Unit With BM 6460460 (see CARR-CU 9)

This page contains the steps needed to reinstall any of the control unit covers.

Control Unit Front or Rear Cover Replacement

1. Move the cover into position near the hinges. Align the hinges of the door and the control unit **1** and insert the pins one at a time.
2. Reconnect the grounding strap to the cover.
3. Close the cover until it is held by the latch.
4. Return to the procedure that sent you here.

Control Unit Front Cover Adjustment

Note: *The control unit front cover must be adjusted so that it does not open to the casual or incidental touch. The cover should only open by the use of an intentional force in the proper area.*

When the control unit front cover is adjusted correctly, the IML diskette drive should be parallel to the front cover and extend through the front cover approximately 2 mm (5/64 inch) (check the parallel adjustment with your six-inch straight edge).

1. As a starting point, loosen the two latch assembly holding screws and position the front of the latch assembly **7** to extend approximately 2 mm (5/64 inch) beyond the front of the side-frame.
2. Partially close the front cover and ensure that the catch mechanism **8** aligns with the latch assembly.
3. Close the front cover to ensure that it will stay closed with the latch assembly in this position (2 mm beyond the front side-frame).
4. Continue the adjustment by changing the 2 mm adjustment (distance from the front side-frame to the latch assembly) until the IML diskette drive is parallel (approximately) to the front cover and extends through the front cover approximately 2 mm (5/64 inch) (check the parallel adjustment with your six-inch straight edge).
5. Tighten the two latch assembly holding screws.
6. Return to the procedure that sent you here.

Drip-Screen Guard Replacement

(Control units with vertical style I/O connectors)

1. Slide the guard over the rear frame member and to the right under the two screws on the I/O tailgate. Tighten the two screws.
2. Return to the procedure that sent you here.

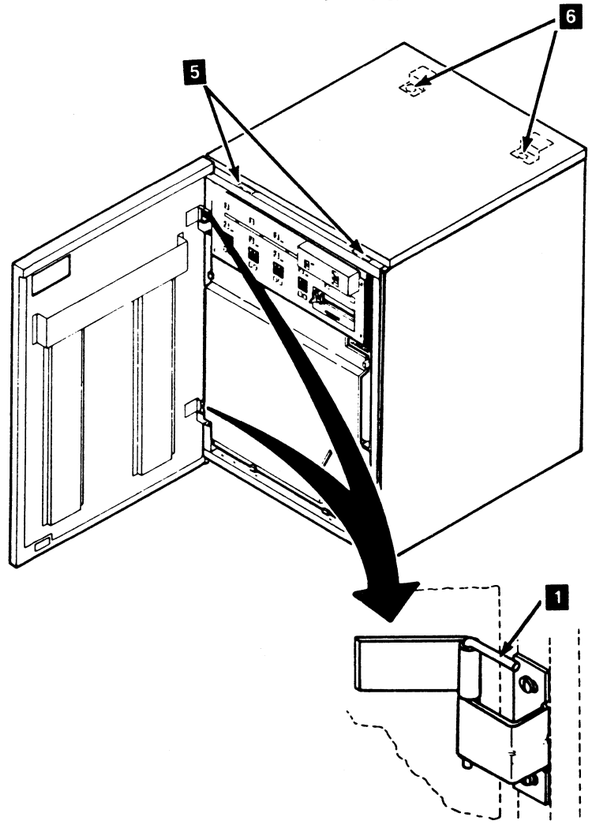
Control Unit Top Cover Replacement

1. Replace the top cover by inserting the front locating tabs into the brackets **5**.
2. Pivot the rear of the cover down and latch into position with the two captive screws **6**.
3. Return to the procedure that sent you here.

Control Unit Side Cover Replacement

The side covers are held by two tabs **2** at the top that fit into slots in the control unit frame, and by a latch assembly at the bottom.

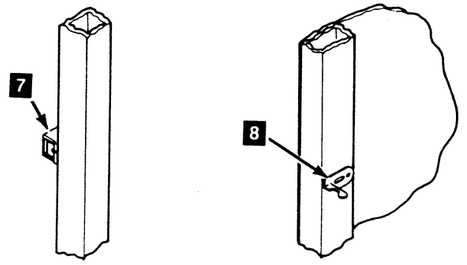
1. Lower the cover onto the control unit frame so the two tabs on the cover move into the slots in the control unit frame.
2. Reconnect the grounding strap to the cover, if present.
3. Continue to lower the cover, and at the same time move the cover bottom toward the control unit until it is held by the latch.
4. Return to the procedure that sent you here.

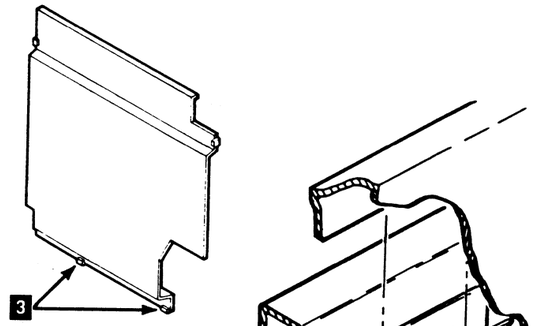


Control Unit Front Safety Cover Replacement

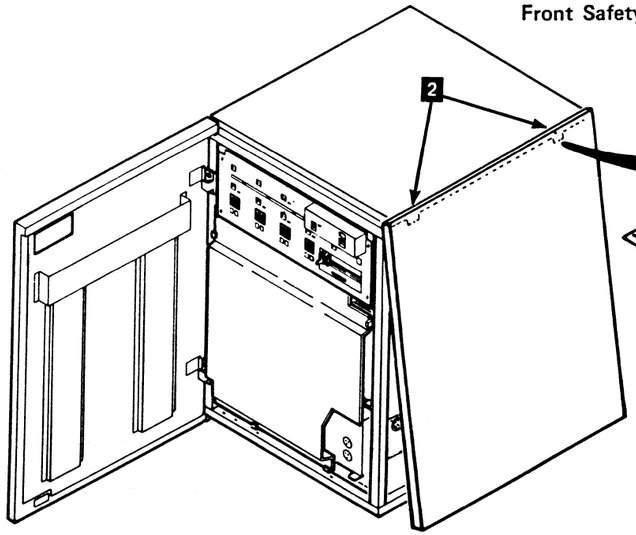
It will be easier to install the safety cover if the bottom brackets are extended.

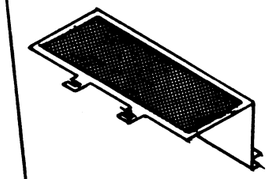
1. Check to see if the bottom brackets **3** are extended as far as possible. If not, loosen the bolts and move the brackets out as far as you can, then tighten the bolts.
2. Lift the cover into the control unit, setting the two bottom brackets into the holes in the control unit frame.
3. Continue to push the cover into the control unit until the left and right brackets are aligned with the holes in the control unit.
4. Reconnect the grounding strap to the cover.
5. Loosen the bracket bolts, slide the brackets into the control unit frame, and tighten the bracket bolts.
6. Return to the procedure that sent you here.





Front Safety Cover





Drip-Screen Guard

Control Unit Rear Safety Cover Replacement

It will be easier to install the safety cover if the right side brackets **4** are extended.

1. Check to see if the two right side brackets are extended out as far as possible. If not, loosen the bracket bolts and slide the brackets out as far as you can, then tighten the bolts.
2. Lift the cover into the control unit, inserting the two right side brackets into the holes of the control unit frame.
3. Continue pushing the cover in until the left side bracket is aligned with the hole in the control unit frame.
4. Reconnect the grounding strap to the cover.
5. Loosen the bracket bolt, slide the bracket into the hole in the control unit frame, then tighten the bolt.
6. Return to the procedure that sent you here.

Rear Saftey Cover

3480 MI **EC A47957**

Control Unit **CARR-CU 2-2**

Control Unit Cover and Safety Cover Removal

Control Unit Without BM 6460460 (see CARR-CU9)

This page contains the steps needed for removing any of the control unit covers.

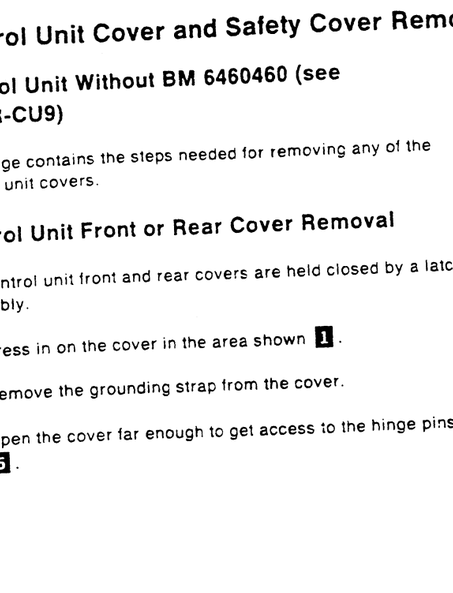
Control Unit Front or Rear Cover Removal

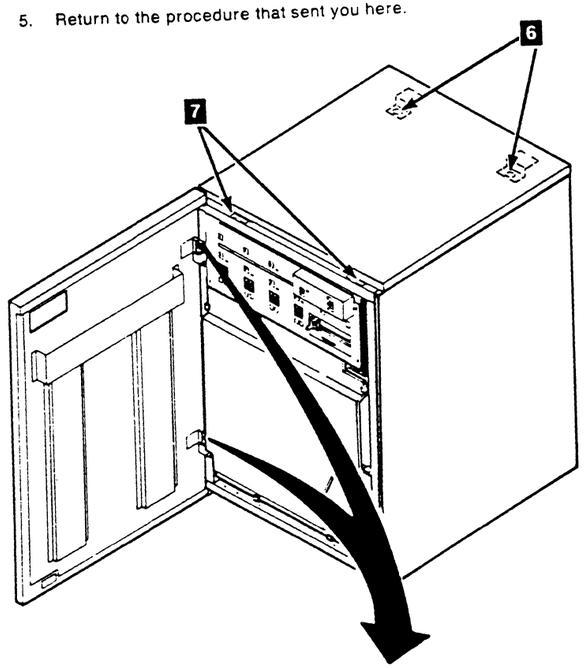
The control unit front and rear covers are held closed by a latch assembly.

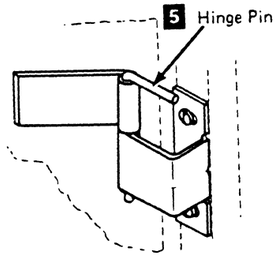
1. Press in on the cover in the area shown **1**.
2. Remove the grounding strap from the cover.
3. Open the cover far enough to get access to the hinge pins **5**.
4. Lift the hinge pins out of the hinges and remove the cover from the control unit.
5. Return to the procedure that sent you here.

Control Unit Top Cover Removal

1. Open the rear cover.
2. Release the two rear latch screws **6** (these are captive screws).
3. Pivot the top cover on its front locating tabs and brackets **7** by lifting the cover from the rear of the control unit.
4. Lift the front locating tabs from the brackets and remove the top cover from the control unit.
5. Return to the procedure that sent you here.







Hinge

Control Unit Side Cover Removal

The control unit side covers are held at the top by two tabs **2** which slide into slots in the control unit frame. The bottom is held in place by a latch assembly.

1. Remove the grounding strap from the cover, if present.
2. Press in on the bottom center of the cover to release the latch, then lift the cover straight up to lift the two tabs out of the control unit frame.
3. Return to the procedure that sent you here.

Control Unit Front Safety Cover Removal

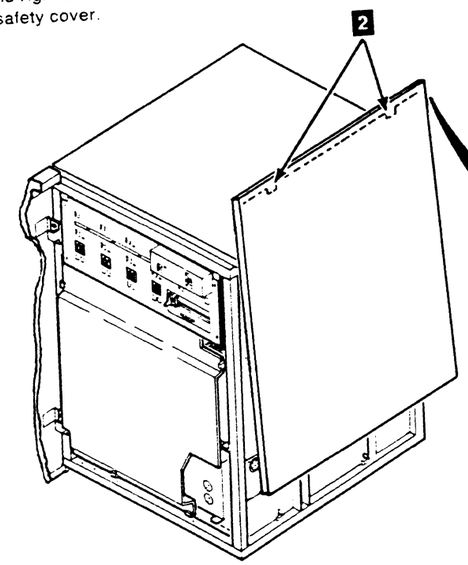
The front safety cover is held in the control unit frame with four sliding brackets **3**. It is not necessary to loosen all of them to remove the cover.

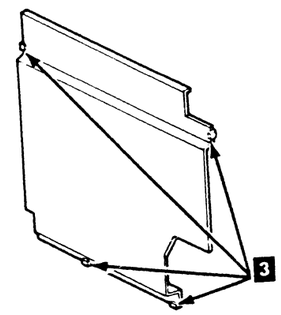
1. Loosen the left and right side brackets and slide them toward the inside of the safety cover.
2. Remove the grounding strap from the cover.
3. Lift the safety cover up and out of the control unit.
4. Return to the procedure that sent you here.

Control Unit Rear Safety Cover Removal

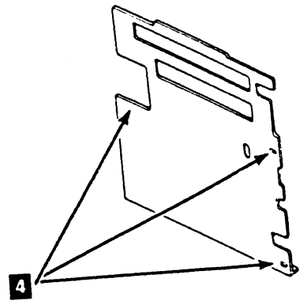
The rear safety cover is held in the control unit frame with three sliding brackets **4**. It is not necessary to loosen all of them to remove the cover.

1. Remove the grounding strap from the cover.
2. Loosen the left bracket bolt, slide the bracket in, and at the same time pull the left side of the safety cover out and away from the control unit.
3. Return to the procedure that sent you here.





Front Safety Cover



3480 MI EC A47957

Control Unit Cover and Safety Cover Installation

Control Unit Without BM 6460460 (see CARR-CU 9)

This page contains the steps needed to reinstall any of the control unit covers.

Control Unit Front or Rear Cover Replacement

1. Move the cover into position near the hinges. Align the hinges of the door and the control unit **1** and insert the pins, one at a time.
2. Reconnect the grounding strap to the cover.
3. Close the cover until it is held by the latch.
4. Return to the procedure that sent you here.

Control Unit Front Cover Adjustment

Note: *The control unit front cover must be adjusted so that it does not open to the casual or incidental touch. The cover should only open by the use of an intentional force in the proper area.*

When the control unit front cover is adjusted correctly, the IML diskette drive should be parallel to the front cover and extend through the front cover approximately 2 mm (5/64 inch) (check the parallel adjustment with your six-inch straight edge).

1. As a starting point, loosen the two latch assembly holding screws and position the front of the latch assembly **7** to extend approximately 2 mm (5/64 inch) beyond the front of the side-frame.
2. Partially close the front cover and ensure that the catch mechanism **8** aligns with the latch assembly.
3. Close the front cover to ensure that it will stay closed with the latch assembly in this position (2 mm beyond the front side-frame).
4. Continue the adjustment by changing the 2 mm adjustment (distance from the front side-frame to the latch assembly) until the IML diskette drive is parallel (approximately) to the front cover and extends through the front cover approximately 2 mm (5/64 inch) (check the parallel adjustment with your six-inch straight edge).
5. Tighten the two latch assembly holding screws.
6. Return to the procedure that sent you here.

Control Unit Top Cover Replacement

1. Replace the top cover by inserting the front locating tabs into the brackets **5**.
2. Pivot the rear of the cover down and latch into position with the two captive screws **6**.
3. Return to the procedure that sent you here.

Control Unit Side Cover Replacement

The side covers are held by two tabs **2** at the top that fit into slots in the control unit frame, and by a latch assembly at the bottom.

1. Lower the cover onto the control unit frame so the two tabs on the cover move into the slots in the control unit frame.
2. Reconnect the grounding strap to the cover, if present.
3. Continue to lower the cover, and at the same time move the cover bottom toward the control unit until it is held by the latch.
4. Return to the procedure that sent you here.

Control Unit Front Safety Cover Replacement

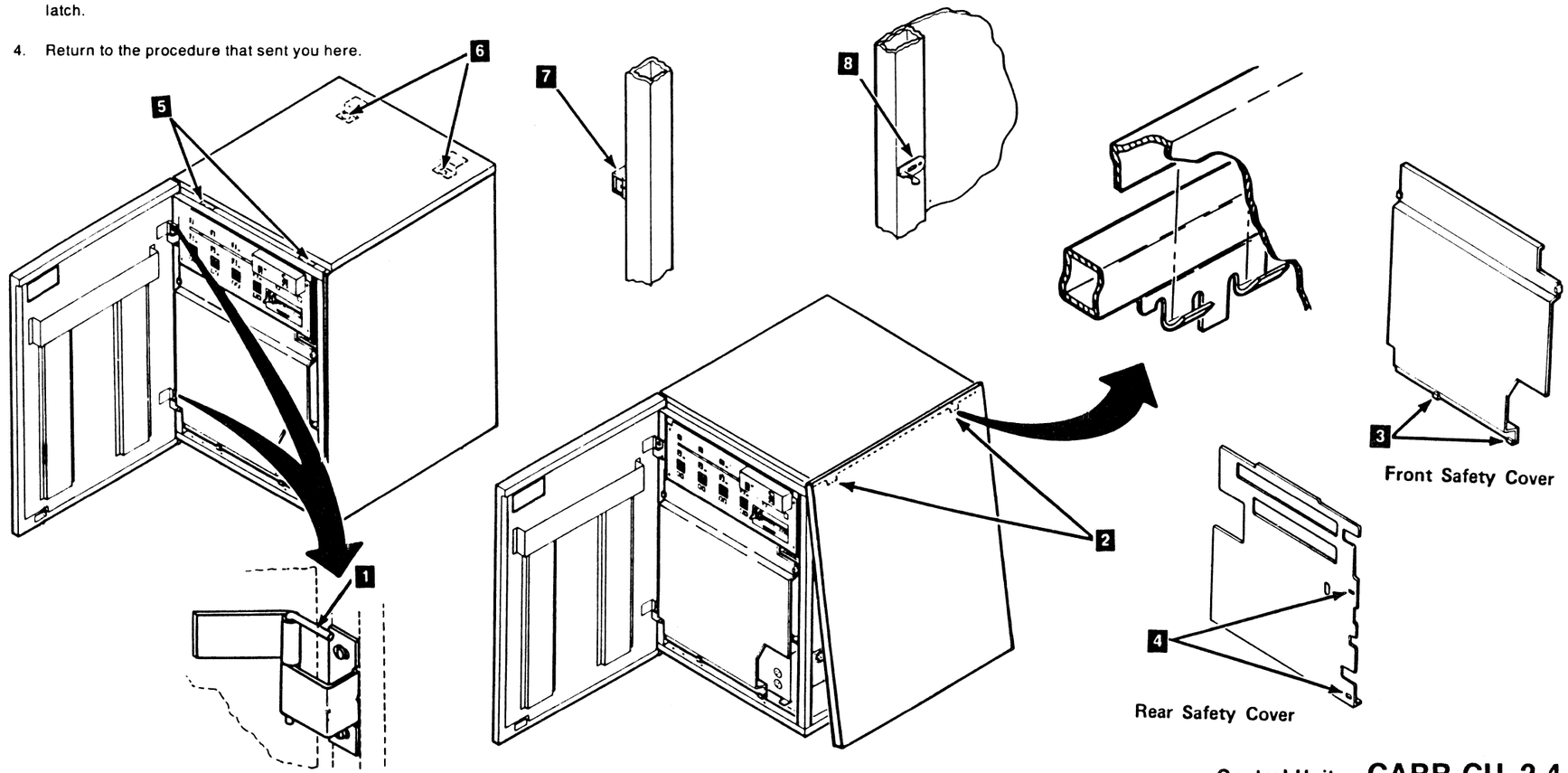
It will be easier to install the safety cover if the bottom brackets are extended.

1. Check to see if the bottom brackets **3** are extended as far as possible. If not, loosen the bolts and move the brackets out as far as you can, then tighten the bolts.
2. Lift the cover into the control unit, setting the two bottom brackets into the holes in the control unit frame.
3. Continue to push the cover into the control unit until the left and right brackets are aligned with the holes in the control unit.
4. Reconnect the grounding strap to the cover.
5. Loosen the bracket bolts, slide the brackets into the control unit frame, and tighten the bracket bolts.
6. Return to the procedure that sent you here.

Control Unit Rear Safety Cover Replacement

It will be easier to install the safety cover if the right side brackets **4** are extended.

1. Check to see if the two right side brackets are extended out as far as possible. If not, loosen the bracket bolts and slide the brackets out as far as you can, then tighten the bolts.
2. Lift the cover into the control unit, inserting the two right side brackets into the holes of the control unit frame.
3. Continue pushing the cover in until the left side bracket is aligned with the hole in the control unit frame.
4. Reconnect the grounding strap to the cover.
5. Loosen the bracket bolt, slide the bracket into the hole in the control unit frame, then tighten the bolt.
6. Return to the procedure that sent you here.



Control Unit FRU's that are EC Sensitive

This page contains a listing of the FRU's that are engineering change (EC) sensitive.

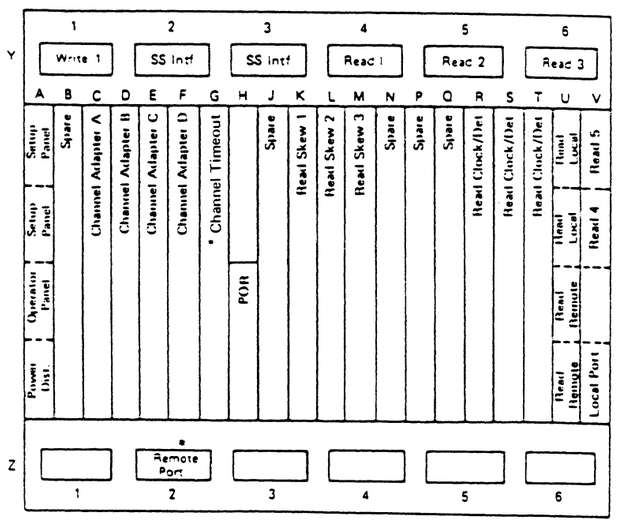
Due to changes in manufacturing and in the level of the diskettes used in the maintenance device (MD), invalid FRU's may be selected by the maintenance package. With the procedures on this page you will be able to select the correct FRU to be replaced in your control unit.

FRU Selection Procedure

1. Open the control unit rear cover and remove the rear safety cover (see CARR-CU 2-1).
2. Open the 01A-A2 logic board cover.
3. Compare the arrangement of the logic cards in your control unit with the figures on this page.
4. Use the charts under figure selected to choose the correct FRU to be replaced in your control unit.

   Note: There may be control units at different EC levels in the subsystem. Ensure the logics you are using have the same serial number as the control unit you are working on.

Logic Board 01A-A2 Engineering Change (EC) A57689 Not Installed



Engineering Change (EC) A57689 Not Installed

- FRU 130
  Replace logic card 01A-A2R2 (see CARR-CU 1110).

- FRU 131
  Replace logic card 01A-A2S2 (see CARR-CU 1110).

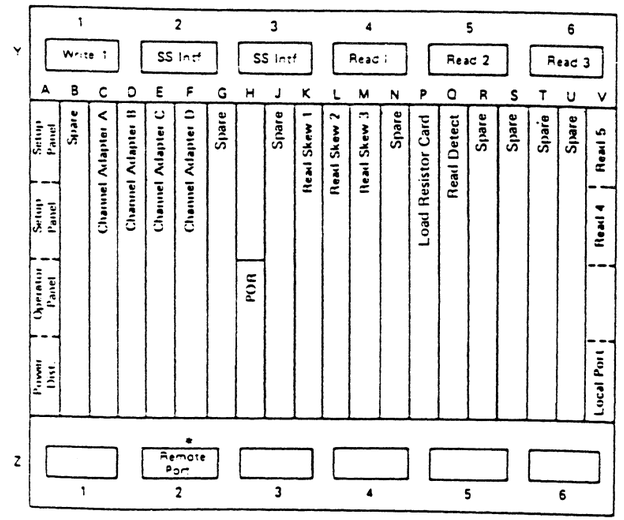
- FRU 132
  Replace logic card 01A-A2T2 (see CARR-CU 1110).

- FRU 278
  Replace all 3 logic cards.

  01A-A2R2 (see CARR-CU 1110)
  01A-A2T2 (see CARR-CU 1110)
  01A-A2S2 (see CARR-CU 1110).

* FRU 154
  Logic card 01A-A2G2
  EC A06010 removed this card
  Field ECA 025, EC A06010B

Logic Board 01A-A2 Engineering Change (EC) A57689 Installed



Engineering Change (EC) A57689 Installed

- FRU 130
  Replace logic card 01A-A2Q2 (see CARR-CU 1110).

- FRU 131
  Replace logic card 01A-A2Q2 (see CARR-CU 1110).

- FRU 132
  Replace logic card 01A-A2Q2 (see CARR-CU 1110).

- FRU 278
  Replace logic card 01A-A2Q2 (see CARR-CU 1110).

- FRU 272
  Logic card 01A-A2P2 (EC A46536 adds this card).

Control Unit Offline Verification Procedure

This page contains the steps needed to verify, and if necessary, to vary the control unit offline.

Getting Started

1. First, if you haven't already done so, try to vary the control unit offline using the following procedure:

   a. Set the control unit Online/Offline switch to Offline (see LOC 1).

   b. Wait (up to a minute) for the control unit Offline light to come on (see LOC 1).

   If the control unit Offline light comes on, return to the procedure that sent you here.

2. If the control unit Offline light fails to come on within a minute, proceed as follows:

   a. Ensure that none of the host processors are stopped.

   b. Ensure that the operators respond to all outstanding console messages.

   c. Ensure that the customer has no system problems that could affect channel operation.

   If the control unit Offline light comes on, return to the procedure that sent you here.

3. If the control unit Offline light fails to come on within a minute, proceed as follows:

   With the meter set on the 10 volt scale, meter the offline light (from - at 01A-A2B2D08 to + at 01A-A2A4D09).

   Is the meter reading greater that 1 volt?

   ```
   YES NO
   |   |
   |   With the meter set on the 10 volt
   |   scale, meter the Offline switch
   |   (from - at 01A-A2B2D08 to + at
   |   01A-A2A4D07).
   |
   |   Does the meter read 5 volts
   |   +/- .5 volt?
   |   YES NO
   |   |   |
   |   |   The Offline switch is shorted in
   |   |   the Online position.  Proceed to
   |   |   step 4 to put the control unit
   |   |   into a serviceable condition.
   |   |
   |   The Offline switch and light are
   |   alright.  Proceed to step 4.
   |
   This control unit is actually offline.
   The Offline light is open.  Power off the
   control unit and replace FRU 141, Control
   Unit Operator Setup Panel (see CARR-CU 1-1).
   Return to the procedure that sent you here
   and continue with the next step of that
   procedure.
   ```

4. Inform the customer that you will need the entire subsystem to complete the repair action.

5. When you have been given the subsystem, verify with the customer that all paths to the subsystem are offline to the host processors.

6. Ignore the status of the Offline light. There is no host activity to this subsystem.

7. If the Offline switch was indicated shorted in step 3 above, power off the control unit and replace FRU 141, Control Unit Operator Setup Panel (see CARR-CU 1-1).

8. Return to the procedure that sent you here and continue with the next step of that procedure.

Control Unit Power Off and Power On Procedures

This page contains the steps needed to remove and restore power to the control unit of the 3480 Tape Subsystem.

To power Off: first complete the "Power Off Procedure" on this page, then go to the desired section:

- AC Power Off
- DC Power Off.

To power On: go to the desired section:

- AC Power On
- DC Power On.

Power Off Procedure

1. Verify that all paths to the failing control unit are offline to the operating systems.

2. Verify that all paths from any other control unit to drives on the failing control unit are offline to the operating systems.

3. Set the failing control unit Online/Offline switch to Offline (see LOC 1).

4. Wait (up to a minute) for the control unit Offline light to come on (see LOC 1). If the light comes on, continue with this procedure.

   If the control unit Offline light fails to come on within a minute, go to CARR-CU 5 and do the procedure for control unit offline verification, return here when finished.

AC Power Off

Note: *When the ac power is removed from the control unit, the ac power is also removed from all attached drives.*

1. If there is a cartridge in any drive, remove it using the following three steps:

   a. Set the drive Ready/Not Ready switch to Not Ready (see LOC 1).

   b. Press the drive Unload switch (see LOC 1).

   c. Remove the cartridge from the drive. If the cartridge cannot be removed, go to "Cartridge Removal By Hand" on CART 10, return here after the cartridge has been removed.

2. If the subsystem power is normally controlled by an emergency power off (EPO) cable, set the control unit Local/Remote switch (see LOC 1) to the Local position.

3. Set the control unit Power On/Off switch (see LOC 1) to the Off position.

4. Open the control unit front cover and remove the front safety cover and ground connector, if present (see CARR-CU 2-1 or 2-3).

5. The next step will remove power from the convenience outlet. If you were sent to this procedure by the maintenance device (MD), remove the diskette from the MD.

DANGER
Electric shock. When setting the control unit AC Power circuit breaker Off, hazardous voltages are still present on the AC Power circuit breaker and on the AC Power line cord.

. . . . . .

. . . . . .

. . . . . .

6. Set CB1 on the control unit ac power supply to Off (see LOC 1). There are two CB1s in the control unit, so do not confuse CB1 on the ac supply with CB1 on the dc supply.

7. Return to the procedure that sent you here.

DC Power Off

1. Open the control unit rear cover (see CARR-CU 2-1 or 2-3).

   Note: *The service switch is a three position switch:*

   Top = ON

   Middle = POR (Power On Reset)

   Down = OFF.

2. Set the control unit service switch to Off (see LOC 1).

3. Return to the procedure that sent you here.

AC Power On

1. Set CB1 on the control unit ac power supply (see LOC 1) to On.

2. Press the Local Power switch (see LOC 1).

3. Set the Power On/Off switch (see LOC 1) to the On position.

4. Press the unit emergency power reset switch (see LOC 1).

5. Press the control unit IML switch (see LOC 1) to IML and initiate a Power On Reset (POR).

6. If the subsystem power is normally controlled by an emergency power off (EPO) cable, set the Local/Remote switch (see LOC 1) to the remote position.

7. Replace the front safety cover and ground connector, if present (see CARR-CU 2-2 or 2-4).

8. Close the control unit front cover (see CARR-CU 2-2 or 2-4).

9. Continue by selecting one of the following:

   - If you were sent to this procedure by the maintenance device (MD), insert the maintenance diskette in the MD. Select option 3, Unit Test.

   - If you were sent to this procedure by the Maintenance Information, return to the MAP or procedure that sent you here.

DC Power On

Note: *The service switch is a three position switch:*

UP = ON

MID = POR (Power On Reset)

DOWN = OFF.

1. Set the control unit service switch (see LOC 1) to the MID position for one second, then to the On position.

2. Close the control unit rear cover (see CARR-CU 2-1).

3. Continue by selecting one of the following:

   - If you were sent to this procedure by the maintenance device (MD), insert the maintenance diskette in the MD. Select option 3, Unit Test.

   - If you were sent to this procedure by the Maintenance Information, return to the MAP or procedure that sent you here.

This page contains the steps needed to remove and restore power to the control unit of the 3480 Tape Subsystem.

To power Off: first complete the "Power Off Procedure" on this page, then go to the desired section:

- AC Power Off
- DC Power Off.

To power On: go to the desired section:

- AC Power On
- DC Power On.

Power Off Procedure

1. Verify that all paths to the failing control unit are offline to the operating systems.

2. Set the failing control unit Online/Offline switch to Offline (see LOC 1).

3. Wait (up to a minute) for the control unit Offline light to come on (see LOC 1). If the light comes on, continue with this procedure.

   If the control unit Offline light fails to come on within a minute, go to CARR-CU 5 and do the procedure for control unit offline verification, return here when finished.

AC Power Off

Note: When the ac power is removed from the control unit, the ac power is also removed from all attached drives.

1. Verify that all paths from any other control unit to drives on the failing control unit are offline to the operating system.

2. If there is a cartridge in any drive, remove it using the following three steps:

   a. Set the drive Ready/Not Ready switch to Not Ready (see LOC 1).

   b. Press the drive Unload switch (see LOC 1).

   c. Remove the cartridge from the drive. If the cartridge cannot be removed, go to "Cartridge Removal By Hand" on CART 10, return here after the cartridge has been removed.

3. If the subsystem power is normally controlled by an emergency power off (EPO) cable, set the control unit Local/Remote switch (see LOC 1) to the Local position.

4. Set the control unit Power On/Off switch (see LOC 1) to the Off position.

5. Open the control unit front cover and remove the front safety cover and ground connector, if present (see CARR-CU 2-1 or 2-3).

6. The next step will remove power from the convenience outlet. If you were sent to this procedure by the maintenance device (MD), remove the diskette from the MD.

   DANGER

   Electric shock. When setting the control unit AC Power circuit breaker Off, hazardous voltages are still present on the AC Power circuit breaker and on the AC Power line cord.

7. Set CB1 on the control unit ac power supply to Off (see LOC 1). There are two CB1s in the control unit, so do not confuse CB1 on the ac supply with CB1 on the dc supply.

8. Return to the procedure that sent you here.

AC Power On

1. Set CB1 on the control unit ac power supply (see LOC 1) to On.

2. Press the Local Power switch (see LOC 1).

3. Set the Power On/Off switch (see LOC 1) to the On position.

4. Press the unit emergency power reset switch (see LOC 1).

5. Press the control unit IML switch (see LOC 1) to IML and initiate a Power On Reset (POR).

6. If the subsystem power is normally controlled by an emergency power off (EPO) cable, set the Local/Remote switch (see LOC 1) to the remote position.

7. Replace the front safety cover and ground connector, if present (see CARR-CU 2-2 or 2-4).

8. Close the control unit front cover (see CARR-CU 2-2 or 2-4).

9. Continue by selecting one of the following:

   - If you were sent to this procedure by the maintenance device (MD), insert the maintenance diskette in the MD. Select option 3, Unit Test.
   - If you were sent to this procedure by the Maintenance Information, return to the MAP or procedure that sent you here.

DC Power Off

1. Open the control unit rear cover (see CARR-CU 2-1 or 2-3).

   Note: The service switch is a three position switch:

   Top = ON

   Middle = POR (Power On Reset)

   Down = OFF.

2. Set the control unit service switch to Off (see LOC 1).

3. Return to the procedure that sent you here.

DC Power On

Note: The service switch is a three position switch:

UP = ON

MID = POR (Power On Reset)

DOWN = OFF.

1. Set the control unit service switch (see LOC 1) to the MID position for one second, then to the On position.

2. Close the control unit rear cover (see CARR-CU 2-1).

3. Continue by selecting one of the following:

   - If you were sent to this procedure by the maintenance device (MD), insert the maintenance diskette in the MD. Select option 3, Unit Test.
   - If you were sent to this procedure by the Maintenance Information, return to the MAP or procedure that sent you here.

Control Unit CARR-CU 6

0 0 0 0 0 0 0 0 0 0

Buffer Memory Reference

This page contains information about the control unit buffer memory cards that are engineering change (EC) and/or field bill of material (FBM) sensitive.

Warning: Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See CARR-CU 1-9 for "Instructions for Working With ESD-Sensitive Parts."

Warning: Buffer memory cards are not the same in all 3480 control units.

The buffer memory card may be one of two different types. The original buffer used two memory cards for the data buffer storage. The new buffers use one memory card for the data buffer storage.

With a modification (see NOTE on this page) to the 01A-A1 logic board and a new buffer control card in 01A-A1L2, the two original memory cards in 01A-A1M2 and 01A-A1N2 may be replaced by a single new memory card in 01A-A1M2.

Without a modification (see NOTE on this page) to the 01A-A1 logic board and a new buffer control card in 01A-A1L2, the two original memory cards in 01A-A1M2 and 01A-A1N2 must be replaced by two original memory cards (PN 5659577). The original buffer control card is PN 4853969 or 4853970.

Note: The EC level of the control unit logic (VOL C01) pages for the buffer control card in 01A-A1L2 (AA110) and buffer memory card in 01A-A1M2 (AA111) indicate if the modification for support of the new memory logic card has been installed on the control unit.

You Were Sent Here By the Maintenance Device (MD) to Exchange FRU276

Warning: Always use the control unit logic book (VOL C01) for the correct control unit. Ensure that the serial number of the control unit matches the serial number of the control unit logic book (VOL C01).

1. Check the control unit logic book (VOL C01), page AA111 for the primary part number (in the card plug list). If the primary part number is 5659577, go to step 2 on this page. If the primary part number is ***not*** 5659577, go to step 5 on this page.
2. Using CARR-CU 1110, remove FRU112 (01A-A1N2) and FRU113 (01A-A1M2) from the control unit.
3. Using CARR-CU 1110, replace FRU112 (01A-A1N2) and FRU113 (01A-A1M2) with logic cards having the primary part number from control unit logic page (VOL C01) AA111.
4. Return to the MD.
5. Using CARR-CU 1110, remove FRU112 (01A-A1N2) and FRU113 (01A-A1M2) from the control unit.
6. Using CARR-CU 1110, replace FRU113 (01A-A1M2) with a logic card having the primary part number from control unit logic page (VOL C01) AA111.

   Note: At this EC level, no logic card is required in 01A-A1N2.
7. Install a 4W6H card spacer (PN 470531) in 01A-A1N2 (the position where FRU112 was installed).
8. Return to the MD.

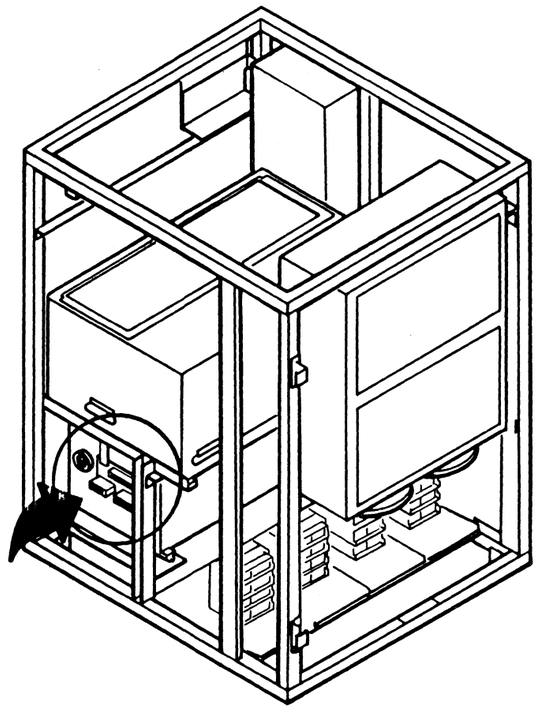
Procedure for Determining If BM 6460460 Is Installed On Control Unit

Due to changes in manufacturing there may be more than one style of control units installed on a subsystem.

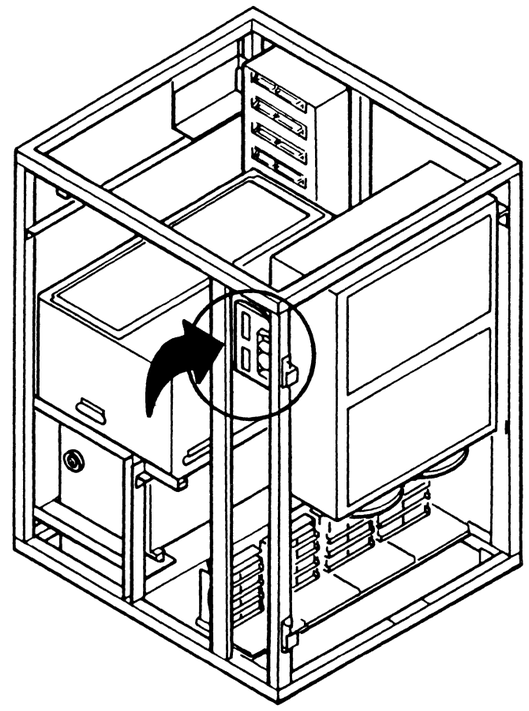
With the procedures on this page you will be able to determine if BM 6460460 is installed on a control unit.

Determining If BM Is Installed

1. Open the front and/or rear cover(s) of the control unit.
2. Compare your control unit with the figures on this page to determine if BM 6460460 is installed on your control unit.
3. Return to the procedure that sent you here.



Bill of Material (BM) 6460460 Installed



Bill of Material (BM) 6460460 Not Installed

3480 MI EC336396

FRU015 Control Unit Cables Removal and Replacement Procedure

This page is meant only to provide general instructions for removing and replacing control unit cables. Any of the cables that are in the tables starting on CARR-CU 157 can be removed and replaced using these procedures.

Warning: Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See CARR-CU 1-9 for "Instructions For Working With ESD-Sensitive Parts."

Since this procedure requires the ac power to be removed from the control unit, it is necessary to have all the drives attached to the control unit available.

Removing Control Unit Cables

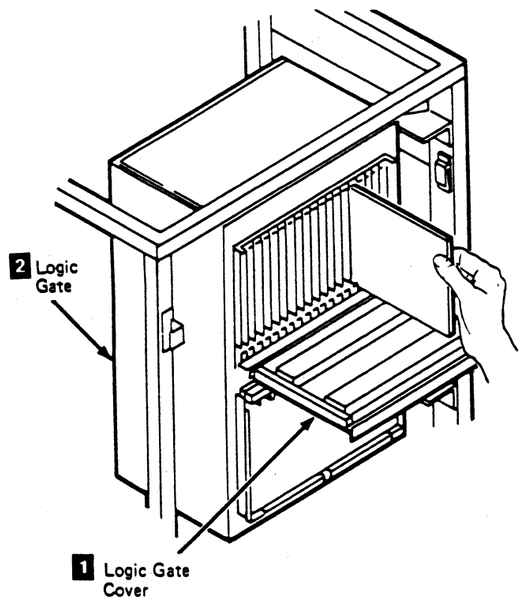
1. Go to CARR-CU 6 for the procedure to remove ***ac power*** from the control unit.
2. Open the control unit rear cover.
3. Remove the control unit rear safety cover 6 (see CARR-CU 2-1 or 2-3).
4. Open the logic gate 2 .
5. Find the cable "from" and "to" locations using the table beginning on CARR-CU 157.
6. To remove the cables from the control unit, it is necessary to remove some, or all of the following:
   - Logic gate covers 1
   - Logic card retainers 5
   - Top card connectors (TCC) 3
   - Top card cable connectors 4
   - Logic cards
   - Drip screen guard 7 .
7. Disconnect both ends of the cable to be removed.
8. Remove any cable retention hardware as needed to remove the cable.
9. Remove the cable from the control unit.

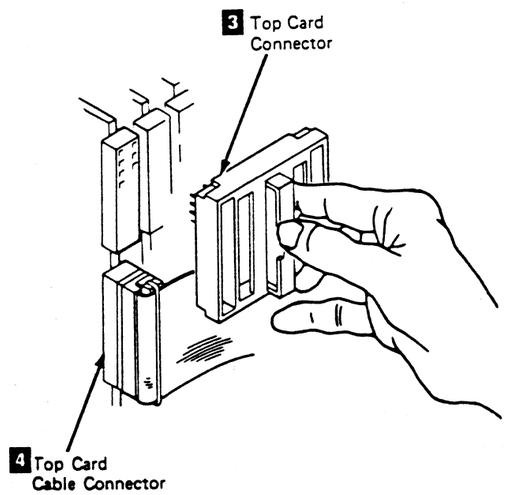
Replacing Control Unit Cables

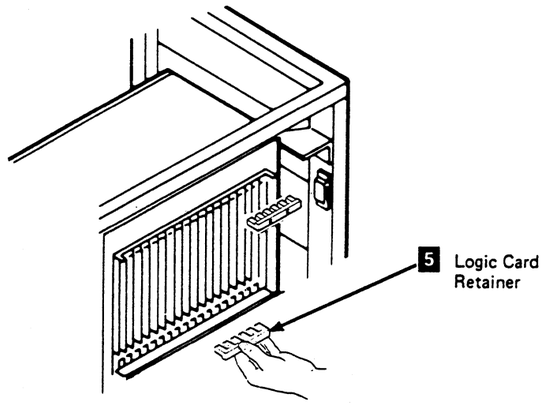
1. Find the cable "from" and "to" locations in the tables starting on CARR-CU 157.
2. Place the cable in the control unit following the same path as the removed cable.

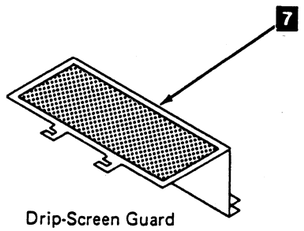
   Install the cable retention (if any) as you install the cable.

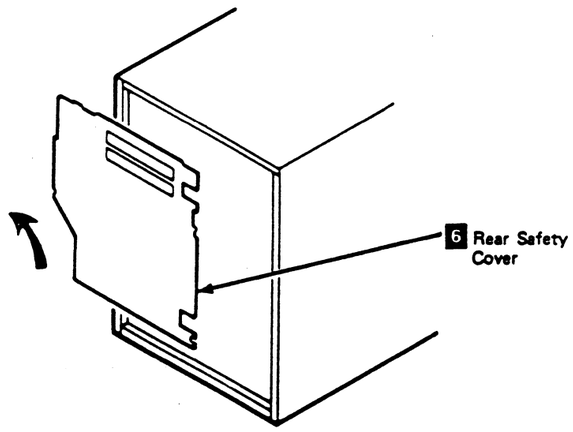
   Connect both ends of the cable.
3. Install any of the following items that have been removed:
   - Logic gate covers 1
   - Logic card retainers 5
   - Top card connectors (TCC) 3
   - Top card cable connectors 4
   - Logic cards
   - Drip screen guard 7 .
4. Close the logic gate 2 .
5. Install the rear safety cover 6 (see CARR-CU 2-2 or 2-4).
6. Go to CARR-CU 6 for the procedure to restore ***ac power*** to the control unit.











Control Unit Cable Location Listing

This table shows the FROM and TO locations for each cable listed.

FRU	FRU NAME	FROM	LOC PAGE	TO	LOC PAGE
FRU015	A1V5 to A2V3 Cable	01A-A1V5	15	01A-A2V3	15
FRU022	Read Bus Cable - Local	See Note 1	20	CU-P1-A1	25
FRU024	Read Bus Cable - Remote	See Note 2	20	CU-P2-A2	25
FRU025 *	Read Bus Cable - Remote	CU-P2-A1	25	CU-P1-B1	25
FRU026 *	Write Adapter Cable - CU to Remote Drives	CU-P2-A5	25	01A-A1Y6 01A-A2Z2	15
FRU027	Data Bus Cable - Remote	CU-P2-A3	25	01A-A1Y4 01A-A1Y5	15
FRU028	Write Adapter Cable - CU Local/Remote	CU-P1-A/B2	25	01A-A1Y5 01A-P2A3	15
FRU029	Data Data Bus Cable - Local	CU-P1-A2	25	01A-A1Y5	15
FRU048	Power Bus Cable	01A-A1Y2	15	CU-GTE-TB1	25
FRU053	Write Adapter A/B Cable	TU-D1-A1A3 TU-D1-A1A5	15	TU-D1-P2-A/B2	25
FRU056 *	Status Store Communication Cable - Dual CU	01A-A1Y3 01A-A1Y2	25	CU-P2-A4	25
FRU091	Power Bus Cable	01A-A1Y5	15	CU-GTE-TB1	25
FRU097	Power Bus Cable	01A-A1Z5	15	CU-GTE-TB1	25
FRU103	Power Bus Cable	01A-A1Z2	15	CU-GTE-TB1	25
FRU153	Channel C, D Address Feature Cable	01A-A2A3	15	CU-OSU-J12 CU-OSU-J13 CU-OSU-J14 CU-OSU-J15	50
FRU155	Thermal Switch Cable	Gate Thermal	25	CU-CSU-J3	50
FRU156	Power Bus Cable	01A-A2Y5	15	CU-GTE-TB2	25
FRU163	I/O Card DC Cable (Channel A)	CU-PS-02-J5	35	CU-T1A3P CU-T1A1P	40
FRU164	GTE DC Distribution Cable Assembly				
FRU165	Gate Fan Cable	Gate Connector		Gate Fan	30
FRU166	AC Power Supply to DC Power Supply Cable	CU-PS-01-J3	55 or 60	CU-PS-02-J2	35
FRU167	Power Bus Cable	01A-A2Y2	20	CU-GTE-TB2	25
FRU168	Control Unit Switch Panel to Gate Cable	01A-A2A4	20	CU-OSU-J2 CU-OSU-J1	50
FRU169	A1Y1 to MD Connector Cable	01A-A1Y1	20	MD Connector	50
FRU170	I/O Tag Cable (Channel A)	01A-A2C2W	20	CU-T1A3Z	40
FRU171	I/O Bus Cable (Channel A)	01A-A2C2Z	20	CU-T1A1Z	40
FRU172	I/O Tag/Bus Jumper Cable	CU-T1A1W CU-T1A1X CU-T1A3W CU-T1A3X	40	CU-T1A2W CU-T1A2X CU-T1A4W CU-T1A4X	40
FRU173	Channel A, B Address Cable	01A-A2A2	20	CU-OSU-J8 CU-OSU-J9 CU-OSU-J10 CU-OSU-J11	50
FRU175	Read Bus Cable - Single CU	See Note 1	20	CU-P1-A1	25
FRU176	Control Unit Switch Panel Voltage Cable	CU-PS-01-J4 (J4A & J4B)	55 or 60	CU-OSU-J4, Local/Remote Switch Connectors J1 & J2, CU-OP Panel J5, and CU UEPO Switch	50
FRU177	AC Power to Gate Cable	CU-PS-02-J3 (J4A & J4B)	35	Gate Connector	
FRU178	A1S2W to A2V2 Cable	01A-A1S2W	20	01A-A2V2	15
FRU179	Power Bus Cable	01A-A2Z5	15	CU-GTE-TB2	25
FRU194	IML Diskette Drive Cable	01A-A1A3	20	IML Diskette Drive	25
FRU214	I/O Tag Cable (Channel B)	01A-A2D2W	20	CU-T1B3Z	40
FRU217	A2Z2 to Gate TB2 Cable	01A-A2Z2	15	01A-GTE-TB2	25
FRU220	I/O Tag Cable (Channel C)	01A-A2E2W	20	CU-T1C3Z	40
FRU221	I/O Tag Cable (Channel D)	01A-A2F2W	20	CU-T1D3Z	40
FRU239	I/O Card DC Cable (Channel B)	CU-PS-02-J6	35	CU-T1B3P CU-T1B1P	40
FRU240	I/O Card DC Cable (Channel C)	CU-PS-02-J7	35	CU-T1C3P CU-T1C1P	40
FRU241	I/O Card DC Cable (Channel D)	CU-PS-02-J8	35	CU-T1D3P CU-T1D1P	40
FRU242	I/O Bus Cable (Channel B)	01A-A2D2Z	20	CU-T1B1Z	40
FRU243	I/O Tag/Bus Jumper Cable (Channel B)	CU-T1B1W CU-T1B1X CU-T1B3W CU-T1B3X	40	CU-T1B2W CU-T1B2X CU-T1B4W CU-T1B4X	40
FRU244	I/O Bus Cable (Channel C)	01A-A2E2Z	20	CU-T1C1Z	40
FRU245	I/O Tag/Bus Jumper Cable (Channel C)	CU-T1C1W CU-T1C1X CU-T1C3W CU-T1C3X	40	CU-T1C2W CU-T1C2X CU-T1C4W CU-T1C4X	40
FRU246	I/O Bus Cable (Channel D)	01A-A2F2Z	20	CU-T1D1Z	40
FRU247	I/O Tag/Bus Jumper Cable (Channel D)	CU-T1D1W CU-T1D1X CU-T1D3W CU-T1D3X	40	CU-T1D2W CU-T1D2X CU-T1D4W CU-T1D4X	40

* This FRU is a feature on 3480 Model A11 and standard on 3480 Model A22.

Notes:

1. *FRU022 and FRU175 connect from 01A-A2U2 to CU-P1-A1 on machines without EC A57689 installed.*
   FRU022 FRU175 connect from 01A-A2Q4 to CU-P1-A1 on machines with EC A57689 installed. (See Location Page 20.)

2. *FRU024 connects from 01A-A2U4 to CU-P2-A2 on machines without EC A57689 installed.*
   FRU024 connects from 01A-A2Q4 to CU-P2-A2 on machines with EC A57689 installed. (See Location Page 20.)

This table shows the FROM and TO locations for each cable listed.

FRU	FRU NAME	FROM	LOC PAGE	TO	LOC PAGE
FRU249	A1Z1 to A2Y1 Cable	01A-A1Z1	15	01A-A2Y1	15
FRU250	A1Z2 to A2Y2 Cable	01A-A1Z2	15	01A-A2Y2	15
FRU251	A1Z3 to A2Y3 Cable	01A-A1Z3	15	01A-A2Y3	15
FRU252	A1Z4 to A2Y4 Cable	01A-A1Z4	15	01A-A2Y4	15
FRU253	A1Z5 to A2Y5 Cable	01A-A1Z5	15	01A-A2Y5	15
FRU254	A1Z6 to A2Y6 Cable	01A-A1Z6	15	01A-A2Y6	15
FRU255	A1A5 to A2A5 Cable	01A-A1A5	15	01A-A2A5	15
FRU256	A1V3 to A2V5 Cable	01A-A1V3	15	01A-A2V5	15
FRU260	CU to CU Read Cable - Remote	CU0-P2A2 CU1-P2A2	25 or 30	CU1-P2A1 CU0-P2A1	25 or 30
FRU261	CU to CU Write Cable - Remote	CU0-P2A3 CU0-P2A4 CU0-P2A5	25 or 30	CU1-P2A5 CU1-P2A4 CU1-P2A3	25 or 30
FRU271	Bus Tag Interposer Cable	CU-T1A1P CU-T1B1P CU-T1C1P CU-T1D1P	45	CU-T1A3P CU-T1B3P CU-T1C3P CU-T1D3P	45
FRU273	Cartridge Automation Feature Cable	01A-A1C2Z2	15	CU-P01	15

0 0 0 0 0 0 0 0 0 0

Control Unit Cable Location Listing Continued)

This table shows the FROM and TO locations for each cable listed.

FRU	FRU NAME	FROM	LOC PAGE	TO	LOC PAGE
FRU249	A1Z1 to A2Y1 Cable	01A-A1Z1	15	01A-A2Y1	15
FRU250	A1Z2 to A2Y2 Cable	01A-A1Z2	15	01A-A2Y2	15
FRU251	A1Z3 to A2Y3 Cable	01A-A1Z3	15	01A-A2Y3	15
FRU252	A1Z4 to A2Y4 Cable	01A-A1Z4	15	01A-A2Y4	15
FRU253	A1Z5 to A2Y5 Cable	01A-A1Z5	15	01A-A2Y5	15
FRU254	A1Z6 to A2Y6 Cable	01A-A1Z6	15	01A-A2Y6	15
FRU255	A1A5 to A2A5 Cable	01A-A1A5	15	01A-A2A5	15
FRU256	A1V3 to A2V5 Cable	01A-A1V3	15	01A-A2V5	15
FRU260	CU to CU Read Cable - Remote	CU0-P2A2 CU1-P2A2	25 or 30	CU1-P2A1 CU0-P2A1	25 or 30
FRU261	CU to CU Write Cable - Remote	CU0-P2A3 CU0-P2A4 CU0-P2A5	25 or 30	CU1-P2A5 CU1-P2A4 CU1-P2A3	25 or 30
FRU271	Bus Tag Interposer Cable	CU-T1A1P CU-T1B1P CU-T1C1P CU-T1D1P	45	CU-T1A3P CU-T1B3P CU-T1C3P CU-T1D3P	45

FRU084 Local/Remote Power Panel Removal and Replacement Procedure

This page contains the steps needed to remove and replace the Local/Remote power panel in the control unit.

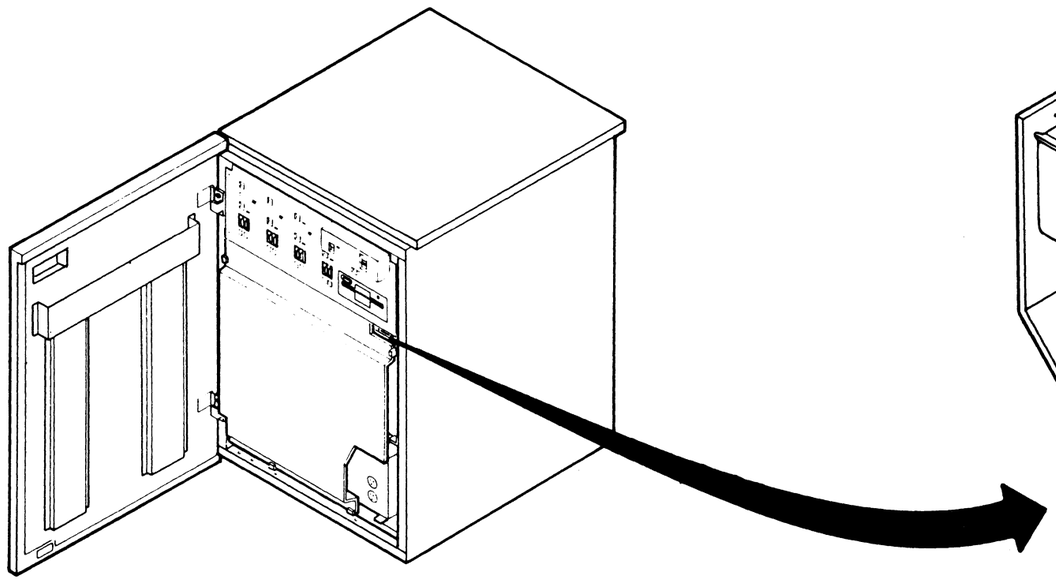
Since this procedure requires the ac voltage to be switched off, it is necessary to have all tape drives attached to the control unit available for service.

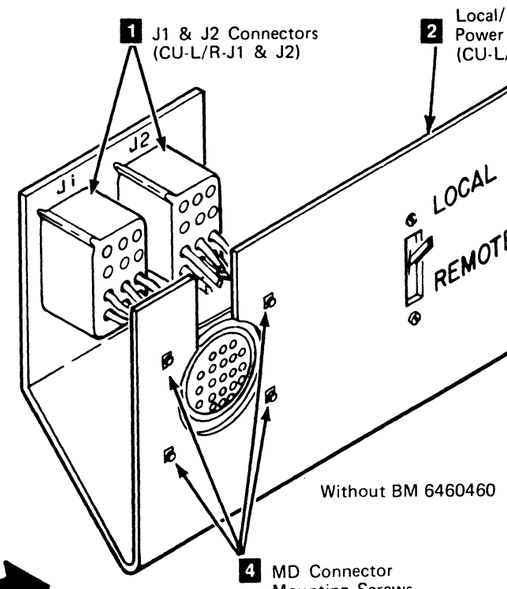
Local/Remote Power Panel Removal Procedure

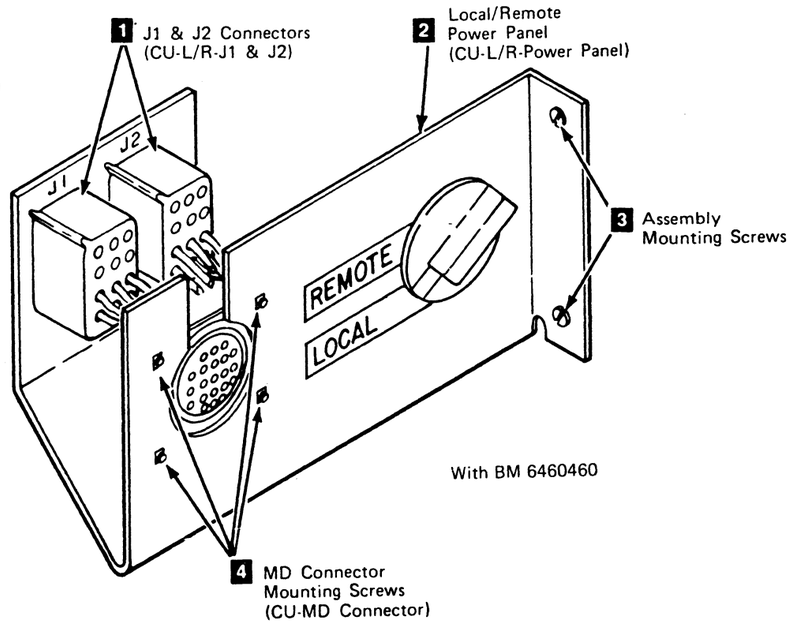
1. Go to CARR-CU 6 for the procedure to remove the ***ac power*** from the control unit.
2. Remove the control unit front safety cover (see CARR-CU 2-1 or 2-3).
3. Remove the four mounting screws **4** holding the maintenance device (MD) connector to the Local/Remote power panel **2**. Then remove the connector from the Local/Remote power panel.
4. While holding the Local/Remote power panel, remove the two mounting screws **3** securing the panel to the control unit frame.
5. Lower the Local/Remote power panel **2** and remove cable plugs P1 and P2 from the J1 and J2 connectors **1**.
6. Remove the Local/Remote power panel **2** from the control unit.
7. Save the mounting screws for the replacement procedure.

Local/Remote Power Panel Replacement

1. Install cable plugs P1 and P2 into the J1 and J2 connectors **1** on the Local/Remote power panel **2**.
2. Hold the Local/Remote power panel in position and install the two mounting screws **3** securing the Local/Remote power panel **2** to the control unit frame.
3. Install the maintenance device (MD) connector on the Local/Remote power panel **2** with the four mounting screws **4**.
4. Install the control unit front safety cover (see CARR-CU 2-2 or 2-4).
5. Go to CARR-CU 6 for the procedure to restore ***ac power*** to the control unit.







FRU086 IML Diskette Drive Removal and Replacement Procedure

This page contains the steps needed to remove and replace the IML diskette drive in the control unit.

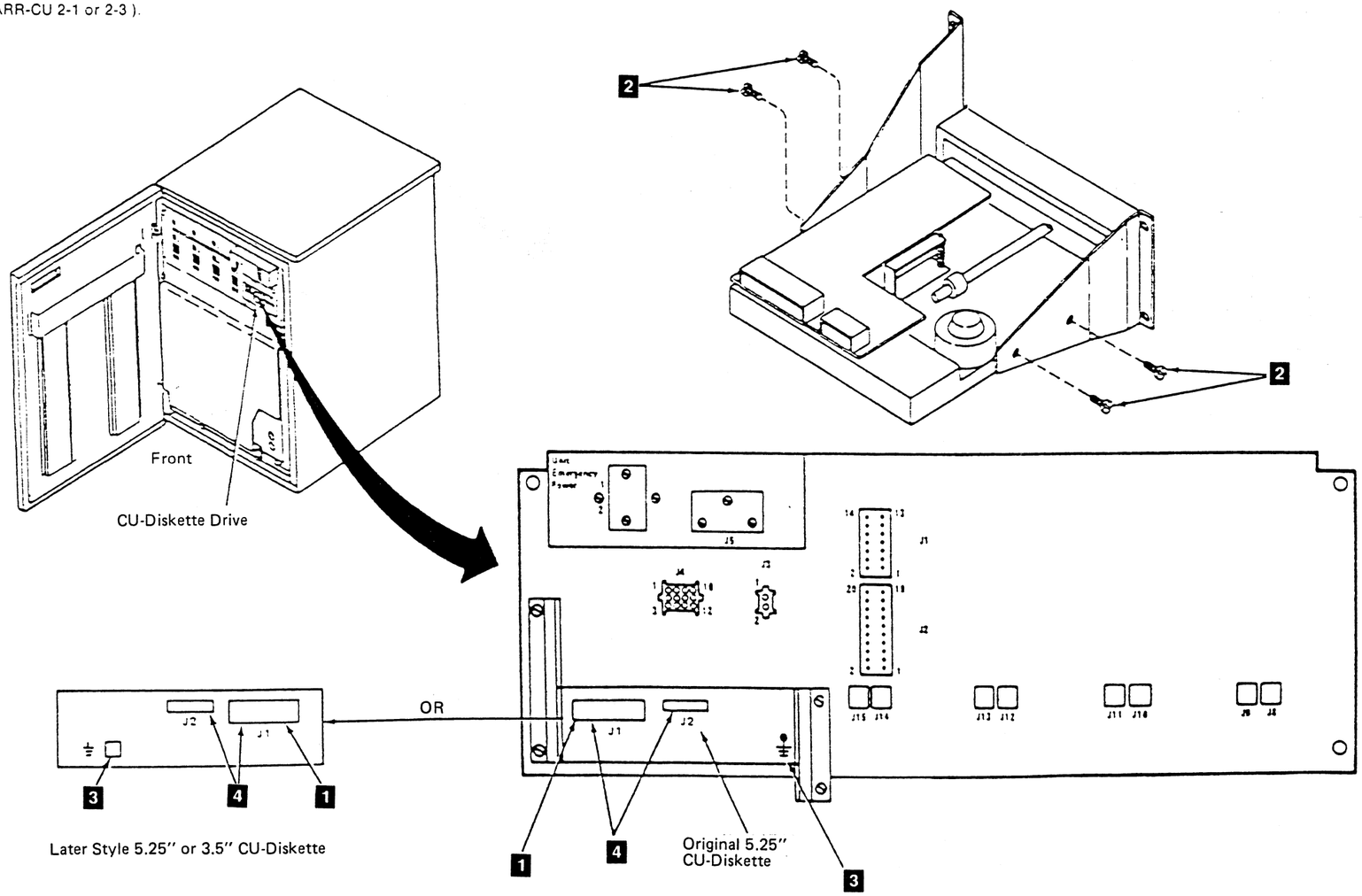
Note: This FRU can be removed and replaced without affecting the attached tape units by removing dc power from the control unit with the service switch.

Removing the IML Diskette Drive

1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the rear safety cover (see CARR-CU 2-1 or 2-3).
3. Remove the control unit top cover (see CARR-CU 2-1 or 2-3).
4. Remove cable plugs P1 and P2 **4** from the J1 and J2 connectors (CU-Diskette Drive J1 and J2) on the rear of the diskette drive **1** .
5. Remove the ground wire **3** attached to the rear of the diskette drive.
6. Remove the four screws that hold the IML diskette drive on the mounting brackets **2** .
7. Remove the diskette drive from the front of the control unit switch panel.
8. Save the screws for the replacement procedure.

Replacing the IML Diskette Drive

1. Place the diskette drive in the opening in the control unit switch panel from the front of the control unit.
2. Install the four screws **2** that hold the diskette drive to the mounting brackets.
3. Replace cable plugs P1 and P2 **4** in the J1 and J2 connectors (CU-Diskette Drive J1 and J2) on the rear of the diskette drive **1** .
4. Replace the ground wire **3** attached to the rear of the diskette drive.
5. Replace the control unit top cover (see CARR-CU 2-2 or 2-4).
6. Replace the control unit rear safety cover (see CARR-CU 2-2 or 2-4) and close the rear cover.
7. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.



FRU111 Control Unit Logic Card Removal and Replacement Procedure

The page contains the steps needed to remove and replace any of the logic cards in the control unit. It is not necessary to power off the control unit; however, the dc voltage must be removed from the control unit.

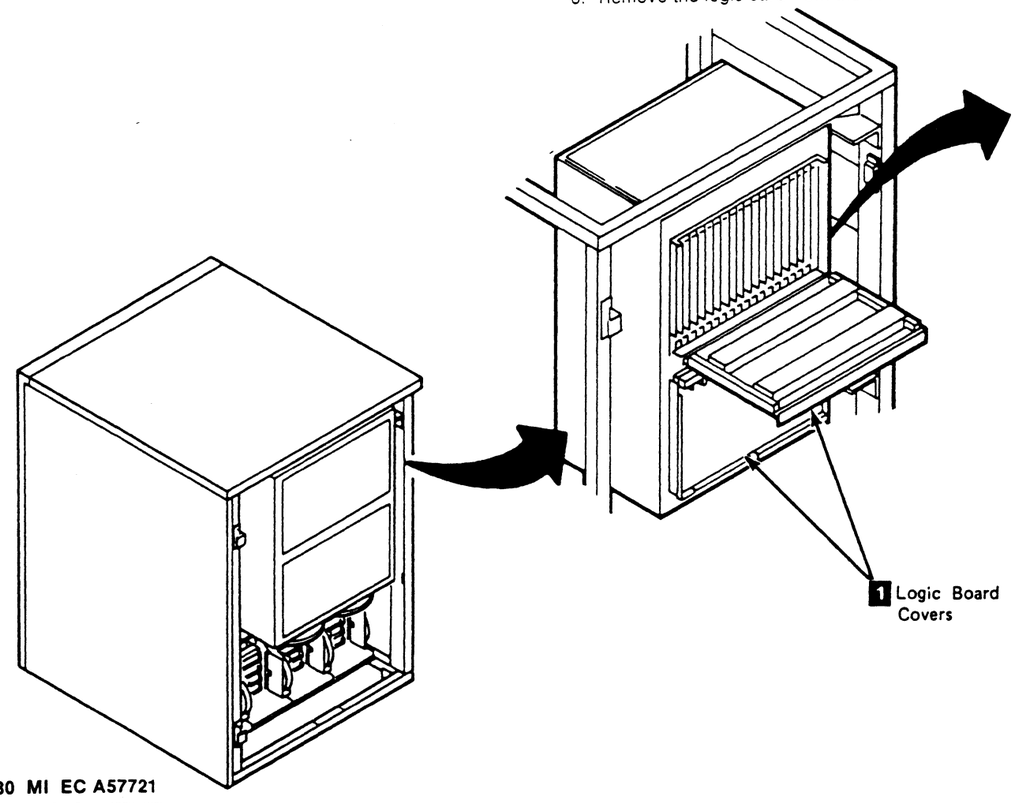
See LOC 1 for the card locations.

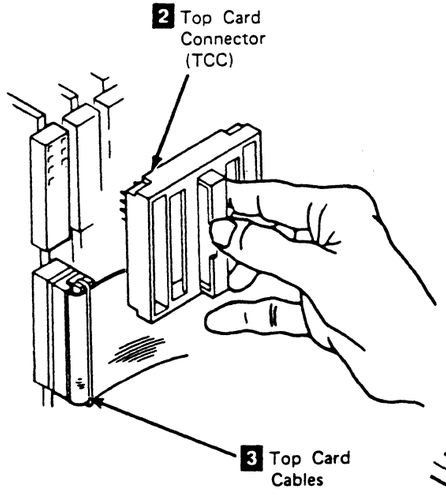
Warning: Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See CARR-CU 1-9 for "Instructions For Working With ESD-Sensitive Parts."

Warning: FRU 126 Power/POR card (01A-A2H4) or FRU 138 Voltage Regulator card (01A-A1T2) cannot be removed by this procedure without circuit damage. Go to CARR-CU 1260 for removal of Power/POR card or Voltage Regulator card.

Removing the Logic Cards

1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the rear safety cover (see CARR-CU 2-1).
3. Open the logic board cover **1**.
4. Remove the top card connectors (TCC) **2** as needed to remove the logic card.
5. Remove the top card cables **3** as needed to remove the logic card.
6. Remove the logic card retainers **4** to remove the logic card.
   a. Remove the two mounting screws **5** holding each retainer.
   b. Pull the retainer out of the logic gate.
7. Remove the logic card by pulling it straight out from the logic board.
8. Remove the logic card from the card holder.



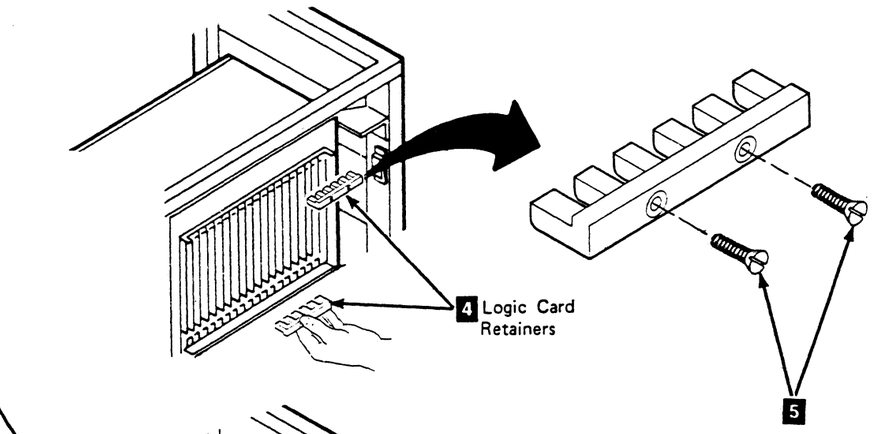


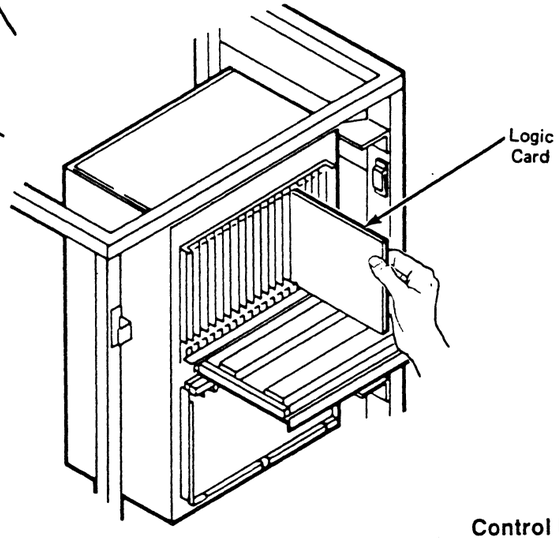
Replacing the Logic Cards

Warning: Before installing the control unit logic cards, check the logic board for any damaged or bent pins.

Note: If you are replacing logic card 01A-A1S2, check the setting of DLR switch position four (see CARR-CU 1189).

1. Install the logic card in the card holder.
2. Install the logic card on the board being careful not to damage pins or connections. See LOC 1 for card locations.
3. Install the top and bottom logic card retainers **4**.
   a. Slide the card retainers into the logic gate.
   b. Install the two mounting screws **5** into each retainer.
4. Install the top card connections (TCC) **2**. See LOC 1 for TCC locations.
5. Install the top card cables **3**. See LOC 1 for top card cable locations.
6. Close the logic board cover **1**.
7. Install the rear safety cover and close the rear cover (see CARR-CU 2-2).
8. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.





3480 MI EC A57721

FRU118 Drive-Adapter Card (01A-A1Q2) Removal and Replacement Procedure

This page contains the steps needed to remove and replace the drive- adapter card in the control unit. It is not necessary to power off the control unit; however, the dc voltage must be removed from the control unit.

Warning: Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See CARR-CU 1-9 for "Instructions For Working With ESD-Sensitive Parts."

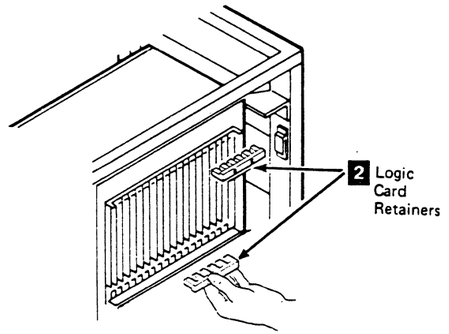
Removing the Drive-Adapter Card

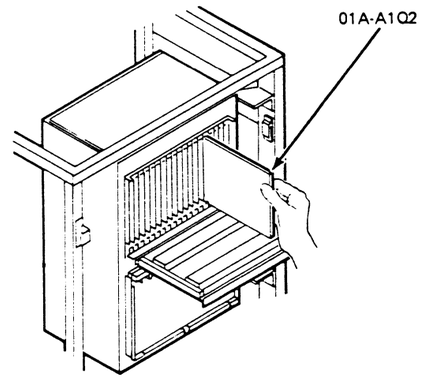
1. Go to CARR-CU 6 for the procedure to remove **dc power** from the control unit.
2. Open the control unit rear cover and remove the rear safety cover (see CARR-CU 2-1 or 2-3).
3. Open the A1 logic board cover **1** .
4. Remove the card retainers **2** .
   a. There are two mounting screws in each card retainer.
   b. Pull the retainer out of the logic gate.
5. Remove the top card connectors on 01A-A1P5 and 01A-A1Q5 (see LOC 1).
6. Remove the drive-adapter card by pulling it straight out from the logic board. The drive-adapter card is in location 01A-A1Q2.
7. Remove the drive-adapter card from the card holder.
8. Place the drive-adapter card so that the switches **3** are positioned as shown. Write down the switch settings for later reference.
9. Save the card holder for the replacement procedure.

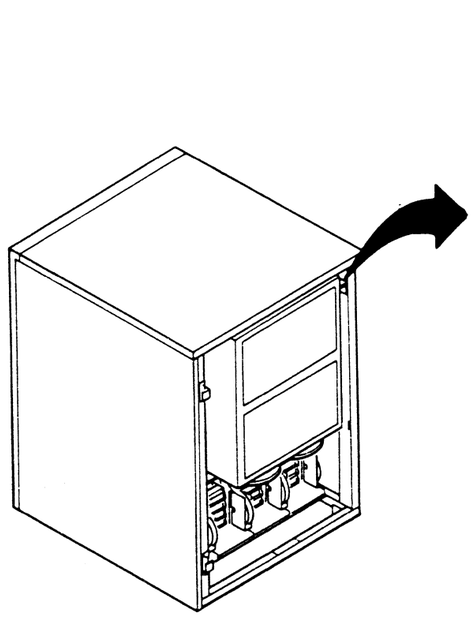
Replacing the Drive-Adapter Card

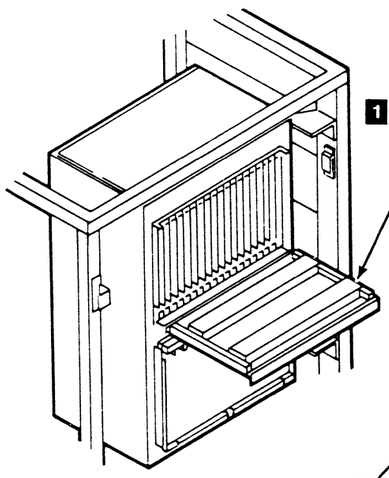
Warning: Before installing the drive-adapter card, check the logic board for any bent or damaged pins.

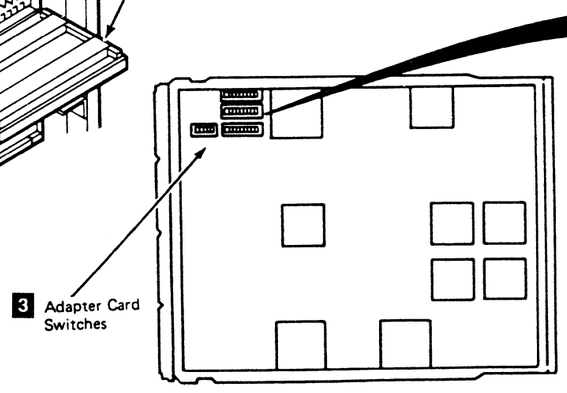
1. Verify that the drive-adapter card switches **3** are set correctly. Use the information saved from the removal (CARR-CU 1180) and the information on CARR-CU 1188 and CARR-CU 1189 to verify the switch settings.
2. Install the drive-adapter card in the card holder.
3. Install the drive-adapter card in location 01A-A1Q2.
4. Install the top card connectors on 01A-A1P5 and 01A-A1Q5 (see LOC 1).
5. Install the top and bottom logic card retainers.
   a. Slide the retainers **2** into the logic gate.
   b. Install the two retaining screws into each retainer.
6. Close the logic board cover **1** .
7. Install the rear safety cover and close the rear cover (see CARR-CU 2-2 or 2-4).
8. Go to CARR-CU 6 for the procedure to restore **dc power** to the control unit.

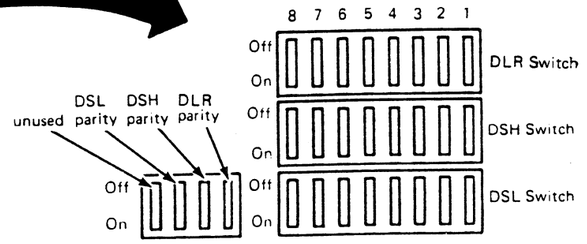












Note: Press the rocker arm switch "On" side, down for On. Press the rocker arm switch "Off" side, down for Off. Ignore any dots on the switches.

FRU118 Drive-Adapter Card Replacement Procedure

When replacing the drive-adapter card, or at installation time it may be necessary to set the switches on the drive adapter card. These switches contain the control unit serial number, the model designation, the language feature setting, the EC level, and the parity bits.

Switch Setting Procedures

1. Convert the decimal serial number of the control unit to hexadecimal as follows:

   a. Write down the decimal serial number.

   b. Locate the largest decimal value in Table 1 that will fit into the decimal number to be converted (the control unit serial number).

   c. Write the hex equivalent of this number in the 'Hexadecimal Equivalent' position labeled the same as the column in Table 1 (where you found the the hex number).

      For Example: If your largest decimal value in Table 1 was 1536; you would write a '6' (the hex equivalent) in the 'Hexadecimal Equivalent' position labeled '2' (from Hexadecimal Column labeled '2').

      Note: Ensure that the hex equivalent digits from Table 1 are put into positions labeled the same as the columns they came from.

   d. Find the decimal remainder.

   e. Repeat this process to this and subsequent remainders to find any remaining hex digits.

   See the example. The example shows that the decimal serial number of 10133 converts to the hexadecimal number of 2795.

      Note: As four digits are required, add leading zero.

   For Example If your Hexadecimal Equivalent number is 4A5, add a leading zero to make the number 04A5.

2. Convert the hexadecimal serial number to its binary equivalent.

   a. Convert each number to its binary equivalent and enter this information in the box below each digit.

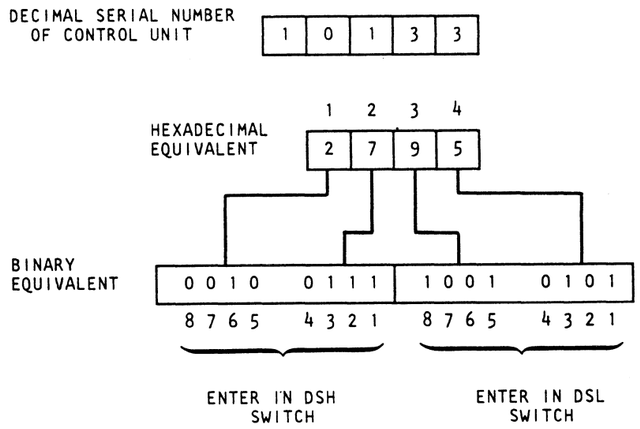
See the example. The example shows that the hexadecimal number of 2795 converts to the binary number of 0010 0111 1001 0101.

3. Now that you have the binary equivalent of the control unit serial number, see CARR-CU 1189 for instructions on how to set the Device Serial High (DSH), Device Serial Low (DSL), and Device Level Register (DLR) switches to match this number.

Note: For additional information on decimal to hexadecimal conversion refer to *System/370 Reference Summary,* GX20-1850.

HEXADECIMAL COLUMNS							
1		2		3		4	
Hex	Dec	Hex	Dec	Hex	Dec	Hex	Dec
0	0	0	0	0	0	0	0
1	4,096	1	256	1	16	1	1
2	8,192	2	512	2	32	2	2
3	12,288	3	768	3	48	3	3
4	16,384	4	1,024	4	64	4	4
5	20,480	5	1,280	5	80	5	5
6	24,576	6	1,536	6	96	6	6
7	28,672	7	1,792	7	112	7	7
8	32,768	8	2,048	8	128	8	8
9	36,864	9	2,304	9	144	9	9
A	40,960	A	2,560	A	160	A	10
B	45,056	B	2,816	B	176	B	11
C	49,152	C	3,072	C	192	C	12
D	53,248	D	3,328	D	208	D	13
E	57,344	E	3,584	E	224	E	14
F	61,440	F	3,840	F	240	F	15

Table 1



Example of Decimal to Binary

Control Unit CARR-CU 1188

When replacing the drive-adapter card, or at installation time it may be necessary to set the switches on the drive adapter card. These switches contain the control unit serial number, the model designation, the language feature setting. the EC level, and the parity bits.

Switch Setting Procedures

1. Convert the decimal serial number of the control unit to hexadecimal as follows:

   a. Write down the decimal serial number.

   b. Locate the largest decimal value in Table 1 that will fit into the decimal number to be converted (the control unit serial number).

   c. Write the hex equivalent of this number in the 'Hexadecimal Equivalent' position labeled the same as the column in Table 1 (where you found the hex number).

   For Example: If your largest decimal value in Table 1 was 1536; you would write a '6' (the hex equivalent) in the 'Hexadecimal Equivalent' position labeled '2' (from Hexadecimal Column labeled '2').

   Note: Ensure that the hex equivalent digits from Table 1 are put into positions labeled the same as the columns they came from.

   d. Find the decimal remainder.

   e. Repeat this process to this and subsequent remainders to find any remaining hex digits.

   See the example. The example shows that the decimal serial number of 10133 converts to the hexadecimal number of 2795.

   Note: As four digits are required, add leading zero.

   For Example If your Hexadecimal Equivalent number is 4A5, add a leading zero to make the number 04A5.

2. Convert the hexadecimal serial number to its binary equivalent.

   a. Convert each number to its binary equivalent and enter this information in the box below each digit.

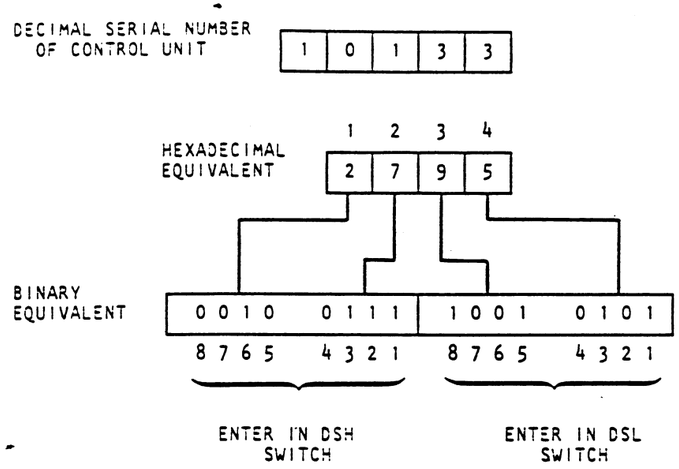
See the example. The example shows that the hexadecimal number of 2795 converts to the binary number of 0010 0111 1001 0101.

3. Now that you have the binary equivalent of the control unit serial number. see CARR-CU 1189 for instructions on how to set the Device Serial High (DSH). Device Serial Low (DSL). and switches to match this number.

   Note: For additional information on decimal to hexadecimal conversion refer to *System/370 Reference Summary*, GX20-1850.

HEXADECIMAL COLUMNS							
1		2		3		4	
Hex	Dec	Hex	Dec	Hex	Dec	Hex	Dec
0	0	0	0	0	0	0	0
1	4,096	1	256	1	16	1	1
2	8,192	2	512	2	32	2	2
3	12,288	3	768	3	48	3	3
4	16,384	4	1,024	4	64	4	4
5	20,480	5	1,280	5	80	5	5
6	24,576	6	1,536	6	96	6	6
7	28,672	7	1,792	7	112	7	7
8	32,768	8	2,048	8	128	8	8
9	36,864	9	2,304	9	144	9	9
A	40,960	A	2,560	A	160	A	10
B	45,056	B	2,816	B	176	B	11
C	49,152	C	3,072	C	192	C	12
D	53,248	D	3,328	D	208	D	13
E	57,344	E	3,584	E	224	E	14
F	61,440	F	3,840	F	240	F	15

TABLE 1



Example of Decimal to Binary

0 0 0 0 0 0 0 0 0 0

FRU118 Drive-Adapter Card Replacement Procedure

Warning: Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See CARR-CU 1-9 for "Instructions For Working With ESD-Sensitive Parts."

When replacing the drive-adapter card, or at installation time, it may be necessary to set the switches on the drive-adapter card. These switches contain the control unit serial number, the model designation, the language feature setting, the EC level, and the parity bits.

Switch Setting Procedures

The following procedures are used to set all of the switches on the drive-adapter card.

1. Convert the decimal serial number to hexadecimal serial number (see CARR-CU 1188).
2. Convert the hexadecimal number to binary serial number (see CARR-CU 1188).
3. Position the drive-adapter card (01A-A1Q2) with the switches in the upper left corner (see illustration).

   Note: The numbers and lettering on the card will now be upside down.
4. Set the Device Serial High (DSH) and Device Serial Low (DSL) switches to match the binary serial number (see CARR-CU 1188).
5. Set switch Device Level Register (DLR), positions 1-3, for the desired language (see 'Message Language Setting' chart).
6. Set DLR switch position 4 On.
7. Set DLR switch position 5 On.
8. See the DLR switch position assignments for setting switch position 6.
9. See the DLR switch position assignments for setting switch position 7.
10. Set DLR switch position 8 Off.

    Note: When setting 'odd' parity, there should be an 'odd' number of switches set to the 'On' position for each group (DLR, DSH, and DSL). If not, set the parity switch to 'On' to create 'odd' parity.
11. Use the DLR parity switch to produce odd parity of the DLR switches. Odd parity is an odd number of switches set On.
12. Use the DSH parity switch to produce odd parity of the DSH switches. Odd parity is an odd number of switches set On.
13. Use the DSL parity switch to produce odd parity of the DSL switches. Odd parity is an odd number of switches set On.

Switch Position Assignments

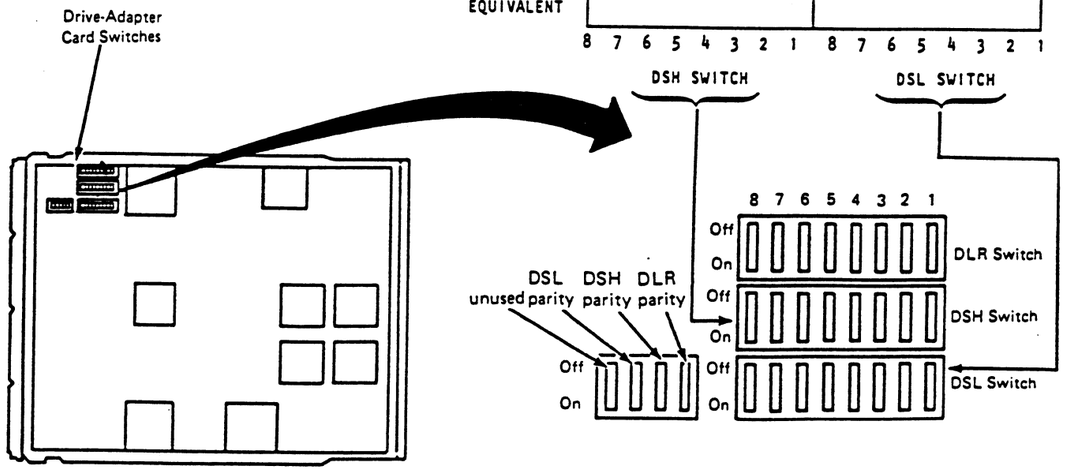
Position assignments of the drive-adapter card switches are as follows:

1. DLR
   - Switch position 8 (Reserved). Set switch position 8 to 0 (Off).
   - Switch position 7 (3480 Designator). If this is a 3480 subsystem, set switch position 7 to 1 (On). Set switch position 7 to 0 (Off) if this is not a 3480 subsystem.
   - Switch position 6 (Model Designator). If this is a Model A22 control unit, set switch position 6 to 1 (On). If this is a Model A11 control unit, set switch position 6 to 0 (Off).
   - Switch position 5 (Reserved). Set switch position 5 to 1 (On).
   - Switch position 4 (Reserved). Set switch position 4 to 1 (On).
   - Switch position 1—3 (Message Language Setting). Set by using the message language setting table on this page.
2. DSH
   - Switch positions 5-8 - Digit 1 of the machine serial number (in binary form).
   - Switch positions 1-4 - Digit 2 of the machine serial number (in binary form).
3. DSL
   - Switch positions 5-8 - Digit 3 of the machine serial number (in binary form).
   - Switch positions 1-4 - Digit 4 of the machine serial number (in binary form).

Message Language Setting

Language Desired	DLR Switch Positions			Binary Value
	3	2	1	
English	Off	Off	Off	000
French	Off	Off	On	001
German	Off	On	Off	010
Spanish	Off	On	On	011
Italian	On	Off	On	101

Note: Press the rocker arm switch "On" side, down for On. Press the rocker arm switch "Off" side, down for Off. Ignore any dots on the switches.



Note: Press the rocker arm switch "On" side, down for On. Press the rocker arm switch "Off" side, down for Off. Ignore any dots on the switches.

FRU120 Buffer Adapter Card (01A-A1K2) Replacement Procedure

This page contains the steps needed to remove and replace the buffer adapter card in the control unit. It is not necessary to power off the control unit; however, the dc voltage must be removed from the control unit.

Warning: Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See CARR-CU 1-9 for "Instructions For Working With ESD-Sensitive Parts."

Removing the Buffer Adapter Card

1. Go to CARR-CU 6 for the procedure to remove dc power.
2. Open the control unit rear cover and remove the rear safety cover. See CARR-CU 2-1 or 2-3.
3. Open the A1 logic board cover **1**.
4. Remove the card retainers **2**.
   a. There are two mounting screws in each card retainer.
   b. Pull the retainer out of the logic gate.
5. Remove the top card connectors from 01A-A1K2 through K5, and 01A-A1L2 through L5 (see LOC 1).
6. Remove the buffer adapter card by pulling straight out from the logic board. The buffer adapter card is in location 01A-A1K2.
7. Remove the buffer adapter card from the card holder. Save the card holder for use in the Replacement procedure.

Note: There are two different types of buffer adapter cards. One type has a row of eight switches that need to be set before installation. The other type has no switches.

8. If the card you are replacing has switches continue with step 9; otherwise, go to the buffer adapter card replacement procedure.
9. Place the buffer adapter card so that the switches **3** are positioned at the bottom of the card as shown. Write down the switch settings for later reference.

Replacing the Buffer Adapter Card

Warning: Before installing the buffer adapter card, check the logic board for any bent or damaged pins.

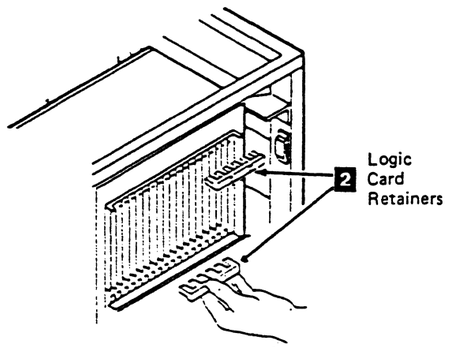
1. If you have a buffer adapter card with switches, verify that the switches are set correctly. Use the information saved from the removal procedure, and the information in the switch position assignments to verify the switch settings. If no switches are present, continue with step 2.
2. Install the buffer adapter card in the card holder.
3. Install the buffer adapter card in location 01A-A1K2.
4. Install four top card connectors on 01A-A1K2 to L2, 01A-A1K3 to L3, 01A-A1K4 to L4, and 01A-A1K5 to L5.
5. Install the top and bottom logic card retainers.
   a. Slide the retainers **2** into the logic gate.
   b. Install the two retaining screws into each retainer.
6. Close the logic board cover **1**.
7. Install the rear safety cover and close the rear cover (see CARR-CU 2-2 or 2-4).
8. Go to CARR-CU 6 for the procedure to restore dc power to the control unit.

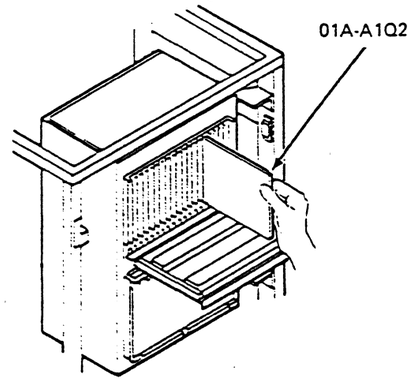
Switch Position Assignments

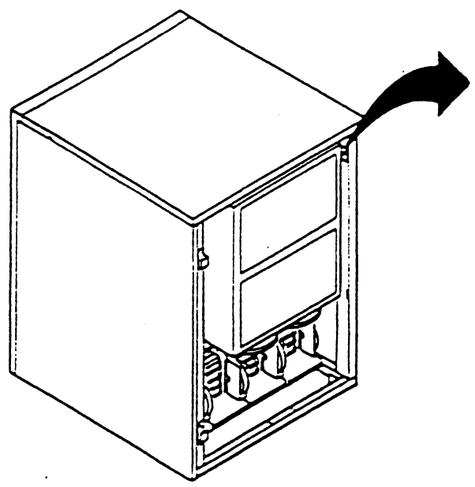
1. **Switch Position 1 (EC Level 0), turn this switch on.**
2. **Switch Position 2 (EC Level 1), turn this switch on.**
3. **Switch Position 3 (Feature Bit), turn this switch off.**
4. Switch Position 4 (4.5 Mb/s Channel A Capability). If a 4.5 megabyte bus and tag shoe card is installed in Channel A, turn this bit on. If it is not installed, turn this bit off.

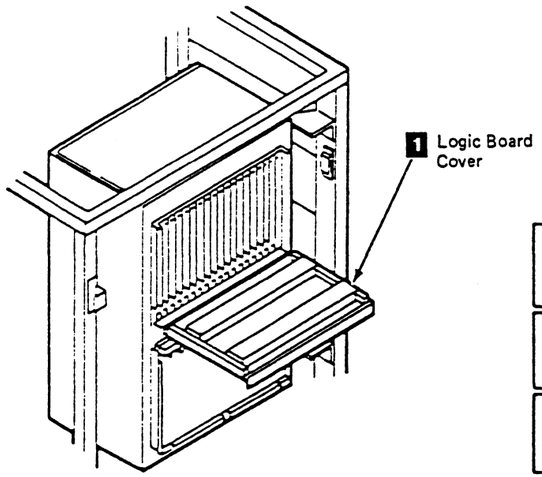
   Note: See LOC 1 "I/O Tailgate Connector Assembly" for location of information about 4.5 Mb/s tailgate.

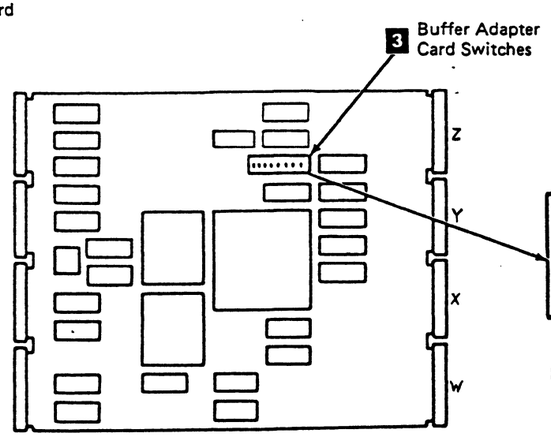
5. Switch Position 5 (4.5 Mb/s Channel B Capability). If a 4.5 megabyte bus and tag shoe card is installed in Channel B, turn this bit on. If it is not installed, turn this bit off.
6. Switch Position 6 (4.5 Mb/s Channel C Capability). If a 4.5 megabyte bus and tag shoe card is installed in Channel C, turn this bit on. If it is not installed, turn this bit off.
7. Switch Position 7 (4.5 Mb/s Channel D Capability). If a 4.5 megabyte bus and tag shoe card is installed in Channel D, turn this bit on. If it is not installed, turn this bit off.
8. Switch Position 8 (Parity). Use this switch to produce odd parity. Odd parity is an odd number of switches set on.

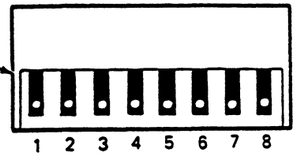












NOTE: Lift the switch up for OFF.
Press the switch down for ON.

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This page contains the steps needed to remove and replace the buffer adapter card in the control unit. It is not necessary to power off the control unit; however, the dc voltage must be removed from the control unit.

Warning: Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See CARR-CU 1-9 for "Instructions For Working With ESD-Sensitive Parts."

Removing the Buffer Adapter Card

1. Go to CARR-CU 6 for the procedure to remove dc power.
2. Open the control unit rear cover and remove the rear safety cover. See CARR-CU 2-1 or 2-3 .
3. Open the A1 logic board cover **1**.
4. Remove the card retainers **2**.
   a. There are two mounting screws in each card retainer.
   b. Pull the retainer out of the logic gate.
5. Remove the top card connectors from 01A-A1K2 through K5, and 01A-A1L2 through L5 (see LOC 1).
6. Remove the buffer adapter card by pulling straight out from the logic board. The buffer adapter card is in location 01A-A1K2.
7. Remove the buffer adapter card from the card holder. Save the card holder for use in the Replacement procedure.
   Note: There are two different types of buffer adapter cards. One type has a row of eight switches that need to be set before installation. The other type has no switches.
8. If the card you are replacing has switches continue with step 9; otherwise, go to the buffer adapter card replacement procedure.
9. Place the buffer adapter card so that the switches **3** are positioned on the card as shown. Write down the switch settings for later reference.

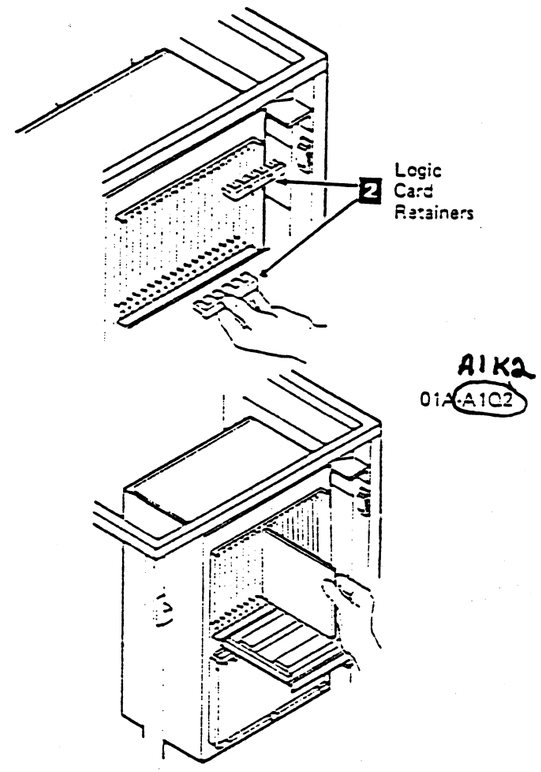
Replacing the Buffer Adapter Card

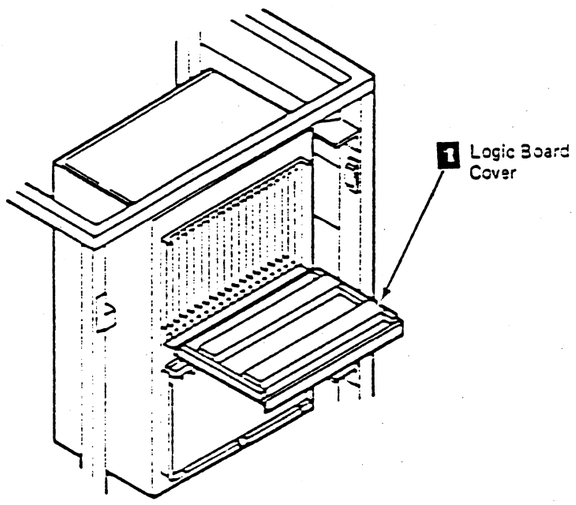
Warning: Before installing the buffer adapter card, check the logic board for any bent or damaged pins.

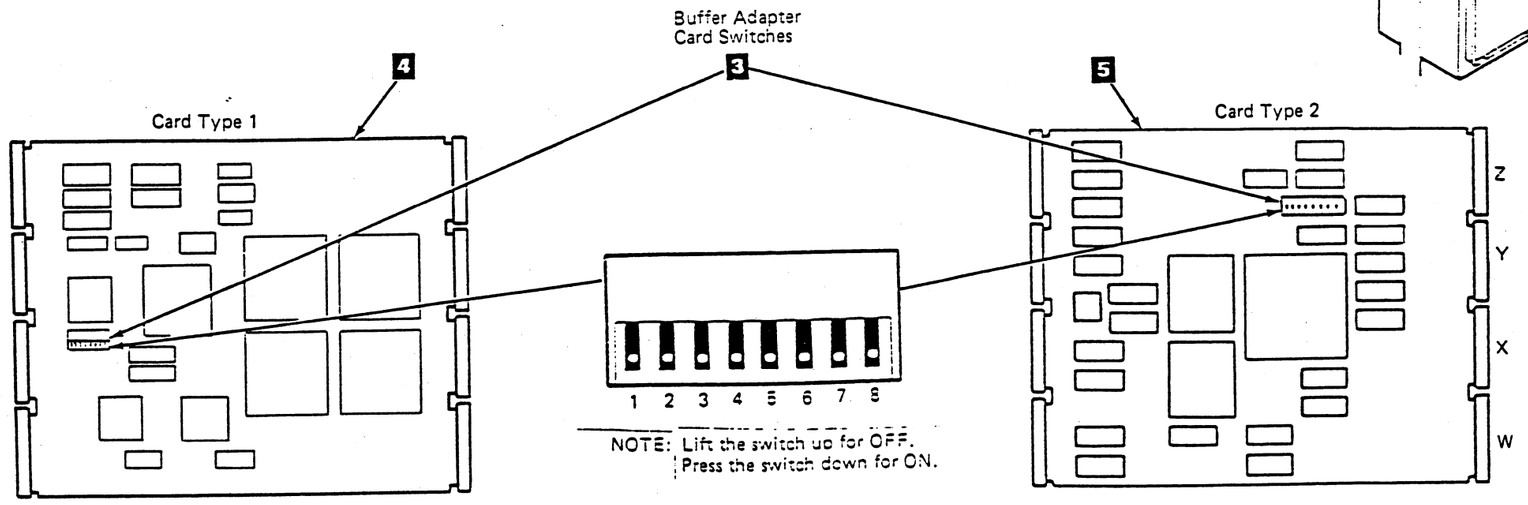
1. Verify that the switches on the buffer adapter card are set correctly. Use the information saved from the removal procedure, and the information in the switch position assignments to verify the switch settings. If no switches are present, continue with step 2.
2. Install the buffer adapter card in the card holder.
3. Install the buffer adapter card in location 01A-A1K2.
4. Install four top card connectors on 01A-A1K2 to L2, 01A-A1K3 to L3, 01A-A1K4 to L4, and 01A-A1K5 to L5.
5. Install the top and bottom logic card retainers.
   a. Slide the retainers **2**. into the logic gate.
   b. Install the two retaining screws into each retainer.
6. Close the logic board cover **1**.
7. Install the rear safety cover and close the rear cover (see CARR-CU 2-2 or 2-4) .
8. Go to CARR-CU 6 for the procedure to restore dc power to the control unit.

Switch Position Assignments

1. Switch Position 1 (EC Level 0). If you have card type 1 **4**, set this switch off. If you have card type 2 **5**, set this switch on.
2. Switch Position 2 (EC Level 1). If you have card type 1 **4**, set this switch off. If you have card type 2 **5**, set this switch on.
3. Switch Position 3 (Feature Bit). – Improved Data Recording Capability Allowed - If you have card type 1 **4** and data compaction is allowed, set this switch on. On all others, turn this switch off. Compaction must be allowed on both control units of a dual control unit subsystem.
4. Switch Position 4 - 4.5 Mb/s Channel A Capability - If a 4.5 megabyte bus tag shoe card is installed in channel A, turn this bit on. If it is not installed, turn this bit off. See note.
5. Switch Position 5 - 4.5 Mb/s Channel B Capability - If a 4.5 megabyte bus and tag shoe card is installed in Channel B, turn this switch on. If it is not installed, turn this switch off. See note.
6. Switch Position 6 - 4.5 Mb/s Channel C Capability - If a 4.5 megabyte bus and tag shoe card is installed in Channel C, and tag shoe card is installed in Channel C, turn this switch on. If it is not installed, turn this switch off. See note.
7. Switch Position 7 - 4.5 Mb/s Channel D Capability - If a 4.5 megabyte bus and tag shoe card is installed in Channel C, and tag shoe card is installed in Channel D, turn this switch on. If it is not installed, turn this switch off. See note.
   Note: There is a bus tag interposer cable on the 4.5 megabyte/second channel shoe cards. See LOC 1 "I/O Tailgate Connector Assembly" for location of information about the 4.5 megabyte/second attachment feature.
8. Switch Position 8 - Parity - Use this switch to produce odd parity. Odd parity is an odd number of switches set on.







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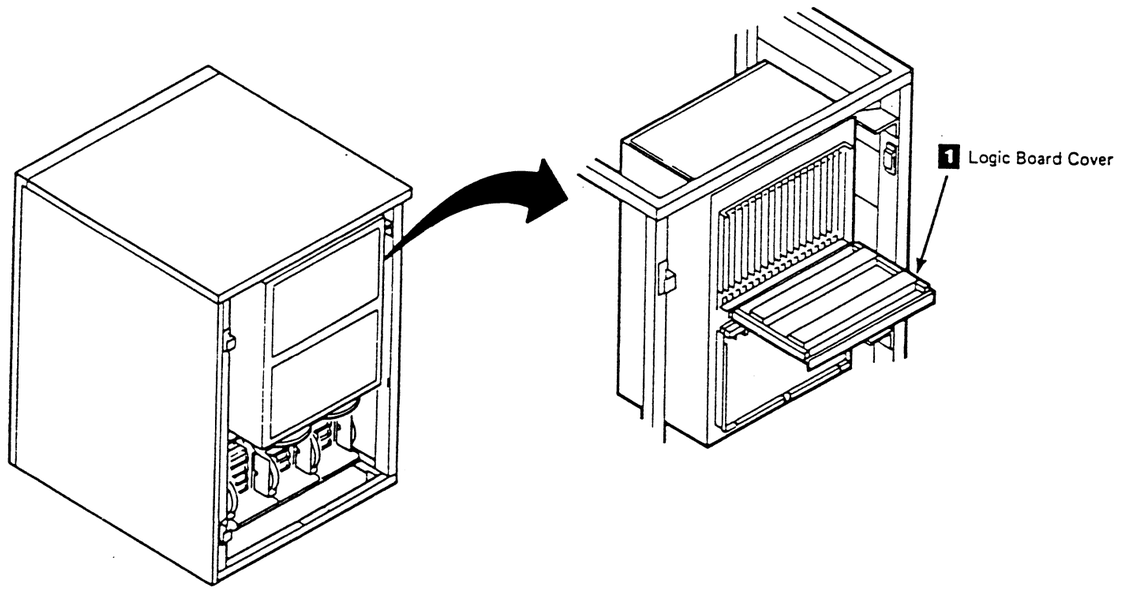
FRU126 or 138 - Power/POR (01A-A2H4) or Voltage Regulator (01A-A1T2) Card Removal and Replacement Procedure

This page contains the steps needed to remove and replace either the Power/POR card (01A-A2H4) or the Voltage Regulator card (01A-A1T2) in the control unit

Warning: Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See CARR-CU 1-9 for "Instructions For Working With ESD-Sensitive Parts."

Removing the Power/POR or Voltage Regulator Card

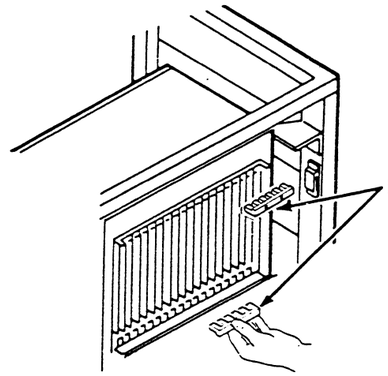
1. Go to CARR-CU 6 for the procedure to remove ***ac power*** from the control unit.
2. Open the control unit rear cover and remove the rear safety cover and ground connector (see CARR-CU 2-1 or 2-3).
3. Open the logic board cover **1** .
4. Remove the logic card retainers **2** .
   a. Remove the two screws holding each retainer.
   b. Pull the retainer out of the logic gate.
5. Remove the Power/POR card or the Voltage Regulator card by pulling the card straight out from the logic board. The Power/POR card is in location 01A-A2H4. The Voltage Regulator Card is in location 01A-A1T2.
6. Remove the Power/POR card or the Voltage Regulator card from the card holder.
7. Save the card holder for the replacement procedure.

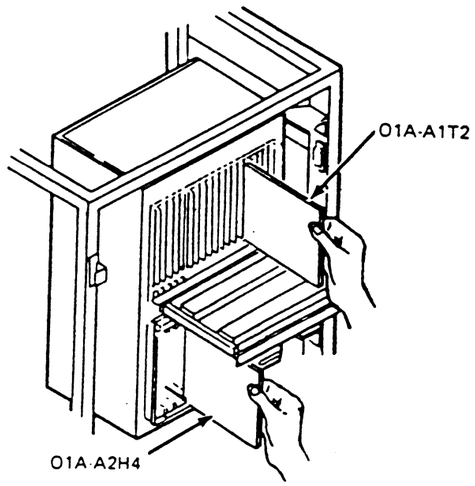


Replacing the Power/POR or Voltage Regulator Card

Warning: Before installing the Power/POR card or the Voltage Regulator card, check the logic board for any bent or damaged pins.

1. Install the Power/POR card or the Voltage Regulator card into the card holder saved from the removal procedure.
2. Install the Power/POR card in location 01A-A2H4. Install the Voltage Regulator card in location 01A-A1T2.
3. Install the top and bottom card retainers.
   a. Slide the logic card retainers **2** into the logic gate.
   b. Install the two retaining screws into each retainer.





4. Close the logic board cover **1** .
5. Install the rear safety cover and ground connector (if present) and close the rear cover (see CARR-CU 2-2 or 2-4).
6. Go to CARR-CU 6 for the procedure to restore ***ac power*** to the control unit.

FRU136, 137, 233-238 Shoe Card Removal and Replacement Procedure

This page contains the steps needed to remove and replace the bus or tag shoe cards in the control unit. These cards are logically located in the channels; therefore, it is necessary to either stop the operating system or have the channels available for service.

It is not necessary to power off the control unit; however, dc voltage must be removed from the control unit.

The illustrations are for the tag shoe card, but also apply to the bus shoe card. See LOC 1 for the card locations.

Warning: Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See CARR-CU 1-9 for "Instructions For Working With ESD-Sensitive parts."

Disconnecting the Tag and Bus Cables

1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the rear safety cover and ground connector, if present (see CARR-CU 2-1 or 2-3).
3. If the control unit has the vertical style I/O connectors, remove the drip-screen guard. See CARR-CU 2-1 for the control unit cover removal procedures.
4. Press STOP on the host processor, or vary the channel offline to the operating system.

   Notes:

   a. There are four different styles of I/O connectors used in the control units. Compare the I/O connector(s) in your control unit with the figures (see CARR-CU 1361) to determine which style you are working with.

   b. Your control unit may have more than one I/O connector. Be sure you disconnect the correct one.

5. ***If you have the movable rail style I/O connector,*** open the I/O connector, lift the handle **1** up and toward the front of the control unit as far as it will go. Go to step 7.
6. ***If you have the horizontal or vertical style I/O connector,*** unscrew the cables (or terminators). Go to step 8.
7. Lift the cables (or terminators) up and out of the I/O connector.
8. Attach the two bus cables, or the bus cable and bus terminator together.
9. Attach the two tag cables, or the tag cable and tag terminator together.
10. Press START on the host processor or vary the channel online to the operating system.

Removing the Shoe Card

1. If you have the movable rail style I/O connector, go to step 6.
2. If you have the horizontal style I/O connector, go to step 4.
3. If you have the vertical style I/O connector, remove the screw and hold down bracket that go across the top of the I/O connector. Go to step 5.
4. Remove the three screws and the strap that go across the top of the I/O connectors. Go to step 6.
5. If you have the 4.5 Mb/s channel shoe cards **6**, remove the interposer cable at P **7**.
6. Lift the two connectors (Bus In/Bus Out or Tag Out/Tag In) up and out of their mounting assembly as a unit.
7. Remove the cable at J for the 4.5 Mb/s channel, or at P for all others.
8. Release the end cable retainer **4** and remove the cable from Z.
9. Move the top I/O serpent connector up and out of the way.
10. Release the center cable retainer **2** and remove the cables **3** from W and X.
11. Remove the card by pulling it away from the I/O connector.
12. If you are removing the tag shoe card, note the setting of the high/low priority plug. It will be needed for the replacement procedure.

Replacing the Shoe Cards

1. Push the card into the I/O connector **5** as far as it will go.
2. Install the cables **3** at W and X. If you are installing the tag shoe card, also install the high/low priority plug in the same position as it was on the shoe card that you removed.

   Note: If the high/low priority plug is installed with the word 'high' facing up, the control unit is plugged for high priority. If the word 'low' is facing up, the control unit is plugged for low priority.

3. Move the top I/O serpent connector toward the Z connector and close the center cable retainer **2**.
4. Install the cable at Z. Close the end cable retainer **4**. Make sure the retainer goes under the flat cable.
5. Install the cable at J for the 4.5 Mb/s channel, or at P for all others.
6. Place the two I/O connectors as a unit into their mounting assembly.
7. If you have the 4.5 Mb/s channel shoe cards **6**, install the interposer cable at P **7**.
8. If you have the horizontal style I/O connector assembly, place the top strap in position and install the three retaining screws.
9. If you have the vertical style I/O connector assembly, place the top hold down bracket in position and install the retaining screw.

Connecting the Bus and Tag Cables

1. Press STOP on the host processor, or vary the channel offline to the operating system.
2. Separate the two bus cables, or the bus cable and the bus terminator.
3. Separate the two tag cables, or the tag cable and the tag terminator.

   Note: There are four different styles of I/O connectors used in the control units. Compare the I/O connector(s) in your control unit with the figures (see CARR-CU 1361) to determine which style you are working with.

4. ***For the movable rail style I/O connectors.*** Install the channel cables or terminators in the I/O connector assembly.

   a. Slide the 'bus out' cable or bus terminator into the I/O connector.

   b. Slide the 'bus in' cable into the I/O connector.

   c. Slide the 'tag out' cable or tag terminator into the I/O connector.

   d. Slide the 'tag in' cable into the I/O connector.

   e. Go to step 6.

5. ***For the horizontal or vertical style I/O connectors.*** Install the channel cables or terminators in the I/O connector assembly.

   a. Screw the 'bus out' cable or bus terminator into the I/O connector.

   b. Screw the 'bus in' cable into the I/O connector.

   c. Screw the 'tag out' cable or tag terminator into the I/O connector.

   d. Screw the 'tag in' cable into the I/O connector.

   e. Go to step 7.

6. Close the I/O connector assembly.

   Note: To close the I/O connector, pull the handle **1** toward the rear of the machine and down as far as it will go.

7. Press START on the host processor, or vary the channel online to the operating system.
8. If the control unit has the vertical style I/O connectors, install the drip-screen guard. See CARR-CU 2-2 for the control unit cover replacement procedures.
9. Install the rear safety cover and ground connector (if present) and close the rear cover (see CARR-CU 2-2 or 2-4).
10. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.

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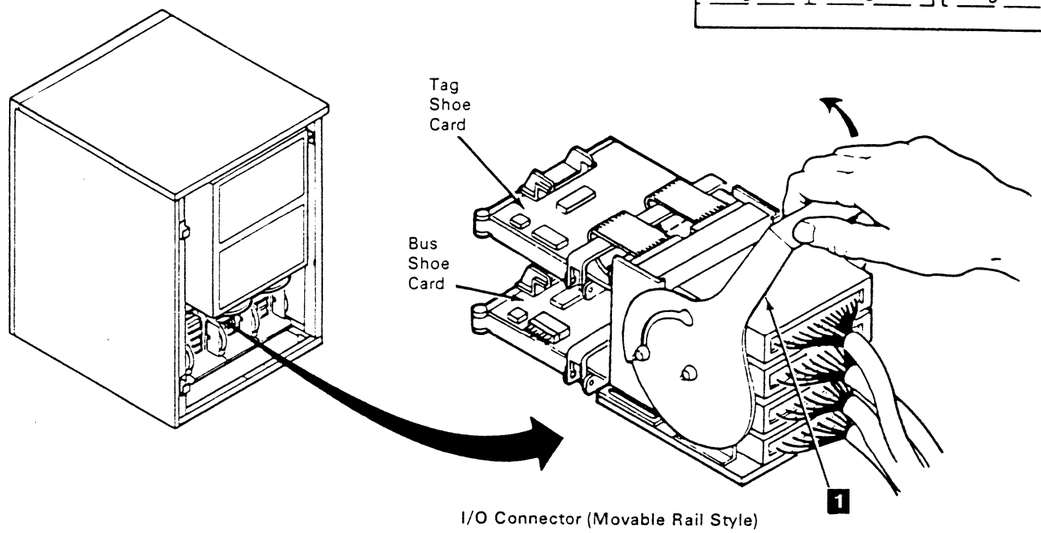
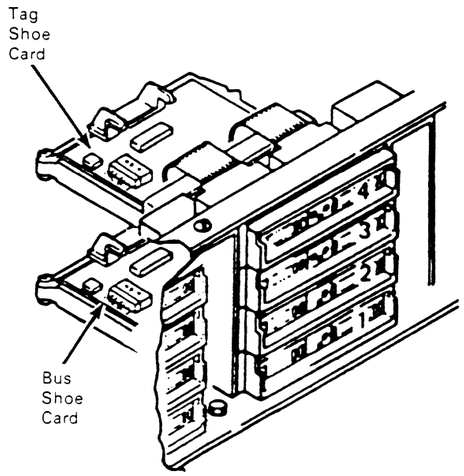
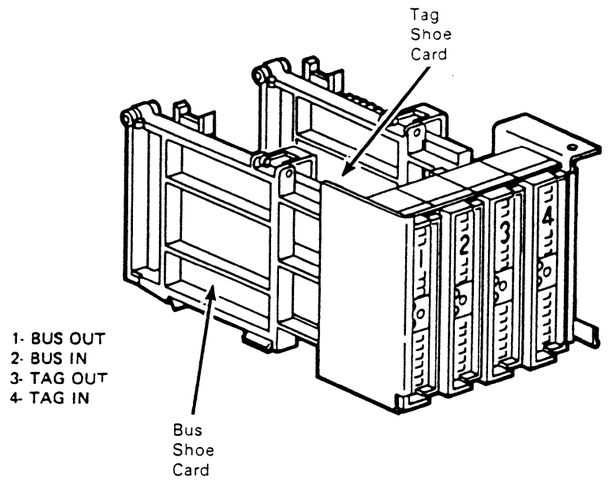
I/O Tailgate Connector Assembly	Bus Shoe Card	I/O Tailgate Connector Assembly	Tag Shoe Card
A	T1A1	A	T1A3
B	T1B1	B	T1B3
C	T1C1	C	T1C3
D	T1D1	D	T1D3



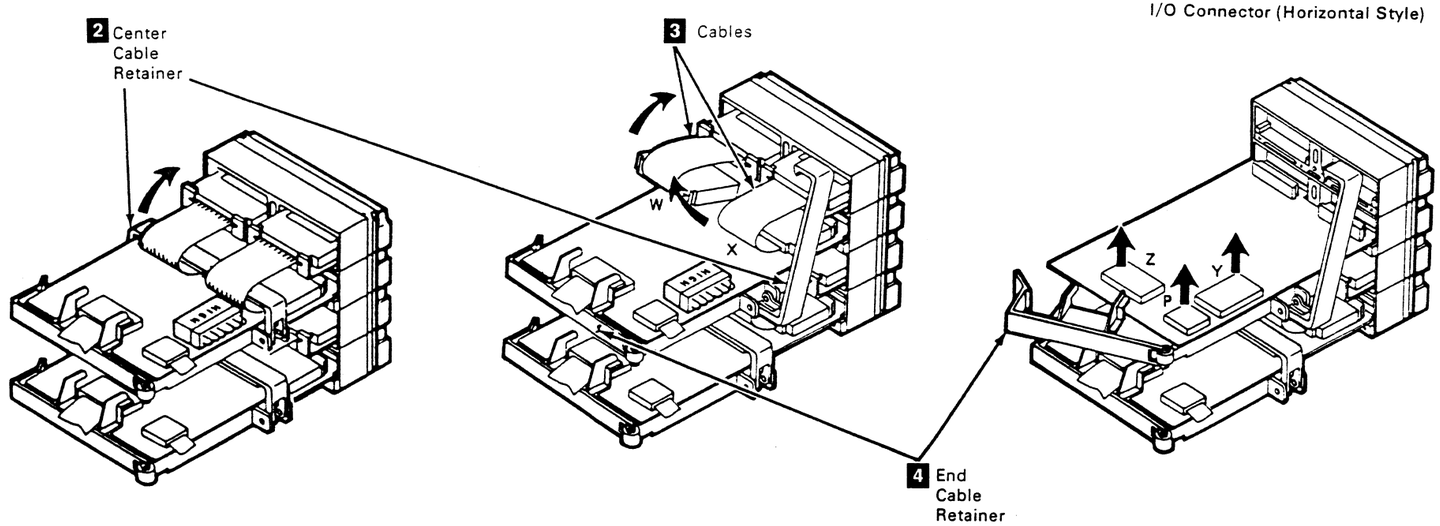
I/O Connector (Movable Rail Style)

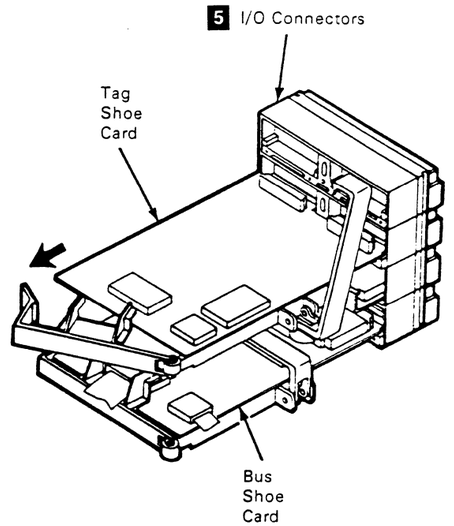


I/O Connector (Horizontal Style)



I/O Connector (Vertical Style)





FRU139 Control Unit Logic Board (01A-A1) Removal and Replacement Procedure

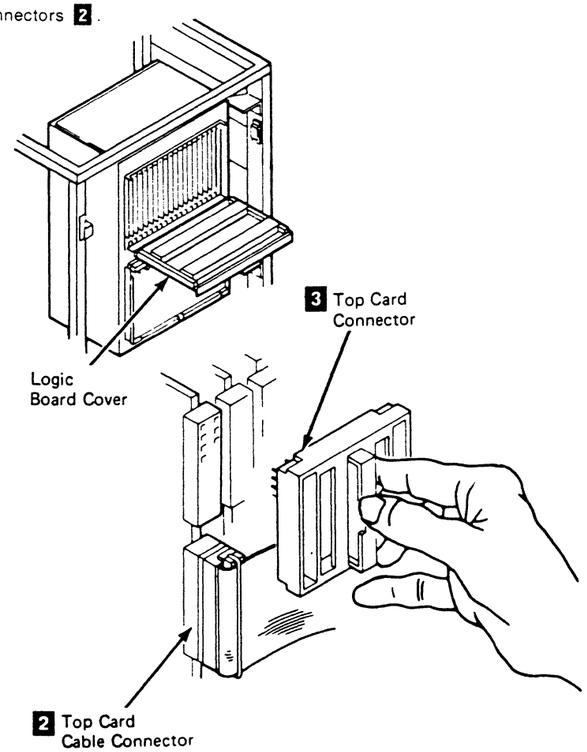
The page contains the steps needed to remove and replace the A1 logic board in the control unit. It is not necessary to power off the subsystem to remove the logic board; however, the dc voltage must be removed from the control unit.

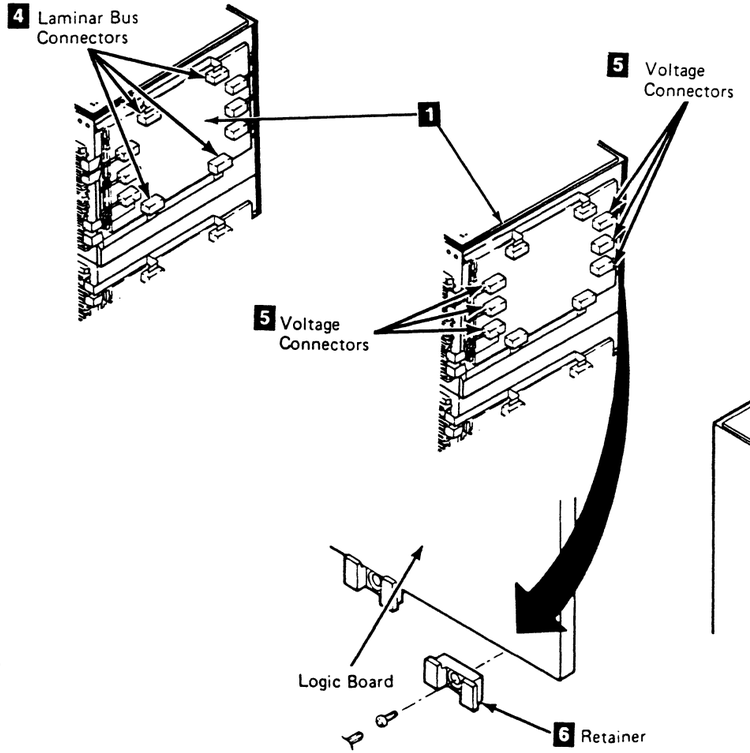
Warning: Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See CARR-CU 1-9 for "Instructions For Working With ESD-Sensitive Parts."

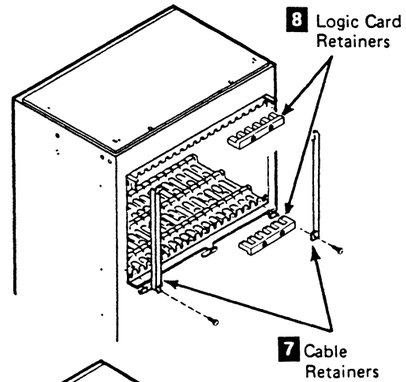
Removing the A1 Logic Board

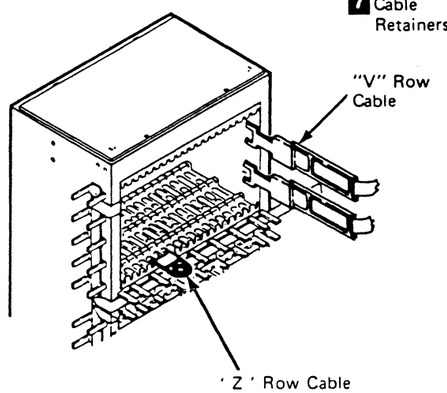
1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the rear safety cover and ground connector, if present (see CARR-CU 2-1 or 2-3).
3. Open the A1 logic card cover.
4. Remove the top card connectors (TCC) **3** by pulling them straight off the logic cards.
5. Remove the top card cable connectors **2** .
6. Remove all of the logic card retainers **8** . There are two mounting screws in each card retainer.
7. Remove the cable retention hardware **7** .
8. Remove the logic cards from the logic board.
9. Disconnect the cables from the Y and Z rows.
10. Disconnect the cables from the A and V columns.
11. Open the logic gate, and remove from the pin side of the logic board the laminar bus connectors **4** from locations Y5, Y2, Z5 and Z2.
12. Disconnect the voltage connections from locations 01A-A1T2G06, M06, and S06.
13. Disconnect the six dc voltage minibus connectors **5** from locations 01A-A1U2E14, U3E14, U4E14, B2A14, B3A14, and B4A14.
14. Remove the twelve logic board mounting screws and board retainers **6** , then remove the logic board **1** from the control unit.

    Note: Be sure to save the mounting hardware for the logic board replacement procedure.









Replacing the A1 Logic Board

1. Open the logic gate.
2. From the pin side of the logic gate, turn the logic board **1** so the letters on the board can be read correctly, then place the board into position against the logic gate.
3. Install the twelve logic board retainers **6** and mounting screws.
4. Connect the six dc voltage minibus connectors **5** to locations 01A-A1U2E14, U3E14, U4E14, B2A14, B3A14, and B4A14.
5. Connect the three dc voltage connectors to locations 01A-A1T1G06, M06, and S06.
6. Connect the laminar bus connectors **4** to locations 01A-A1Y2, Y5, Z2, and Z5.
7. Close the logic gate.
8. On the card side of the logic board, connect the cables to the Y and Z rows.
9. On the card side of the logic board, connect the cables to the A and V columns.
10. Install the cable retention hardware **7** .
11. Inspect the logic pins for damage, then install the logic cards.

    Note: The card locations are shown on LOC 1.

12. Install the logic card retainers **8** .

    Note: The top card connectors and the top card cable locations are shown on LOC 1.

13. Install the top card connectors (TCC) **3** .
14. Install the top card cable connectors **2** .
15. Close the logic card cover.
16. Install the control unit rear safety cover and ground connector (if present) and close the control unit rear cover (see CARR-CU 2-2 or 2-4).
17. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.

FRU140 Control Unit Logic Board (01A-A2) Removal and Replacement Procedure

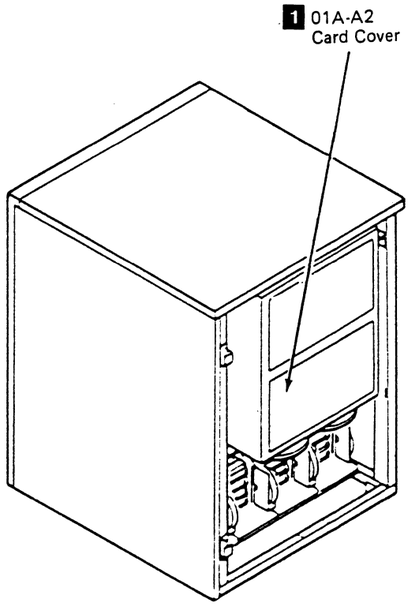
The page contains the steps needed to remove and replace the A2 logic board in the control unit. It is not necessary to power off the subsystem to remove the logic board; however, the dc voltage must be removed from the control unit.

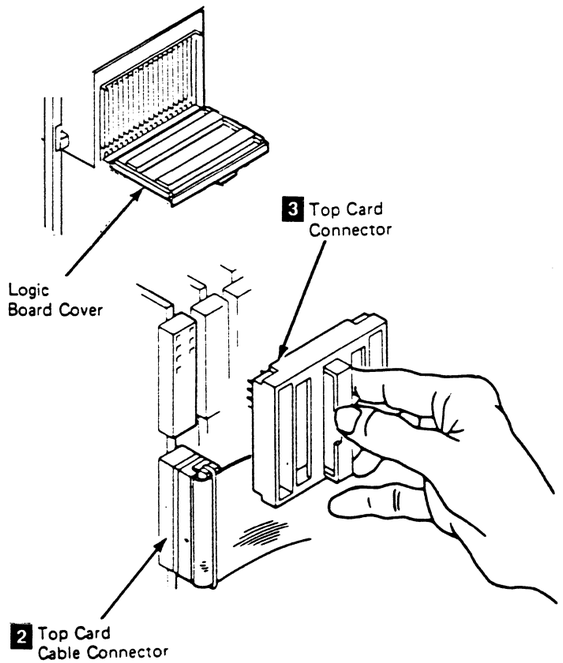
Warning: Some parts handled during this procedure are sensitive to electrostatic discharge (ESD). See CARR-CU 1-9 for "Instructions For Working With ESD-Sensitive Parts."

Removing the A2 Logic Board

1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the rear safety cover and ground connector, if present (see CARR-CU 2-1 or 2-3).
3. Open the A2 logic board cover.
4. Remove the top card connectors (TCC) **3** by pulling them straight off the logic cards.
5. Remove the top card cable connectors **2** .
6. Remove all of the logic card retainers **8** . There are two mounting screws in each card retainer.
7. Remove the cable retention hardware **7** .
8. Remove the logic cards from the logic board.
9. Disconnect the cables from the Y and Z rows.
10. Disconnect the cables from the A and V columns.
11. Open the logic gate, and remove from the pin side of the logic board the laminar bus connectors **4** from locations Y5, Y2, Z5 and Z2.
12. Disconnect the voltage connections from locations 01A-A2T2G06, M06, and S06.
13. Disconnect the six dc voltage minibus connectors **5** from locations 01A-A2U2E14, U3E14, U4E14, B2A24, B3A24, and B4A24.
14. Remove the twelve logic board mounting screws and board retainers **6** , then remove the logic board **1** from the control unit.

    Note: Be sure to save the mounting hardware for the logic board replacement procedure.



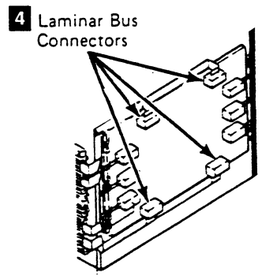


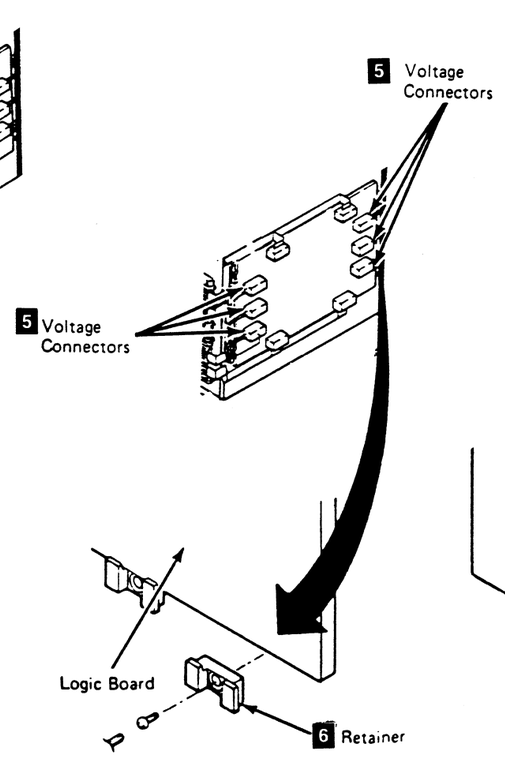
Replacing the A2 Logic Board

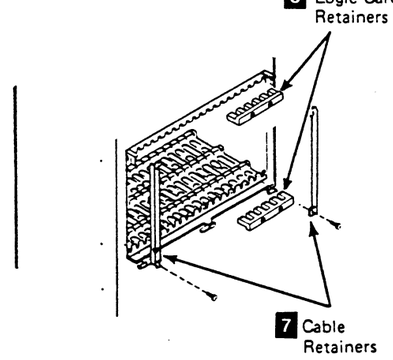
1. Open the logic gate.
2. From the pin side of the logic gate, turn the logic board **1** so the letters on the board can be read correctly, then place the board into position against the logic gate.
3. Install the twelve logic board retainers **6** and mounting screws.
4. Connect the six dc voltage minibus connectors **5** to locations 01A-A2U2E14, U3E14, U4E14, B2A24, B3A24, and B4A24.
5. Connect the three dc voltage connectors to locations 01A-A2T1G06, M06, and S06.
6. Connect the laminar bus connectors **4** to locations 01A-A2Y2, Y5, Z2, and Z5.
7. Close the logic gate.
8. On the card side of the logic board, connect the cables to Y and Z rows.
9. On the card side of the logic board, connect the cables to the A and V columns.
10. Install the cable retention hardware **7** .
11. Inspect the logic pins for damage, then install the logic cards.

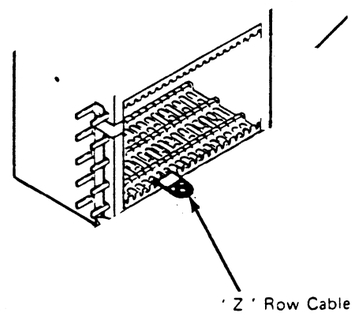
    Note: The card locations are shown on LOC 1.
12. Install the logic card retainers **8** .

    Note: The top card connectors and the top card cable locations are shown on LOC 1.
13. Install the top card connectors (TCC) **3** .
14. Install the top card cable connectors **2** .
15. Close the logic board cover.
16. Install the control unit rear safety cover and ground connector (if present) and close the control unit rear cover (see CARR-CU 2-2 or 2-4).
17. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.









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FRU141 Control Unit Switch Panel Printed Circuit Board Removal and Replacement Procedure

This page contains the steps needed to remove and replace the control unit switch panel circuit board.

All drives attached to the control unit must be available for service.

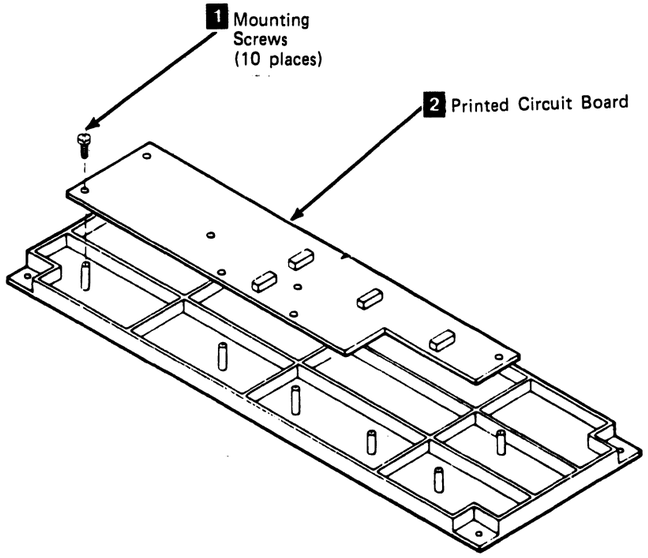
Note: This FRU can be removed and replaced in the control unit without affecting the attached drives by removing dc power from the control unit with the dc service switch.

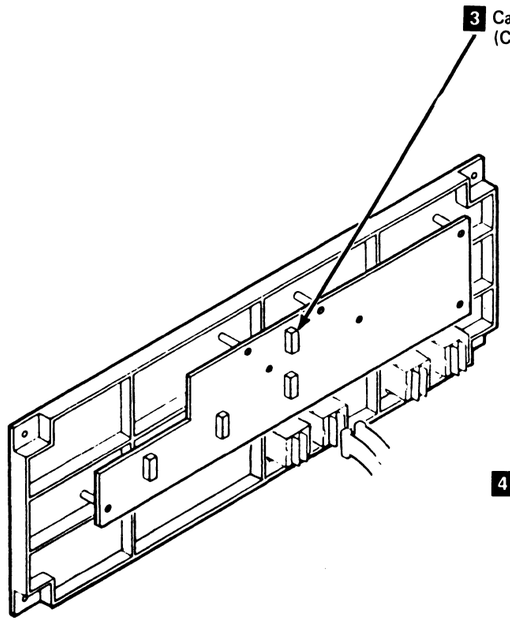
Removing the Control Unit Switch Panel Printed Circuit Board

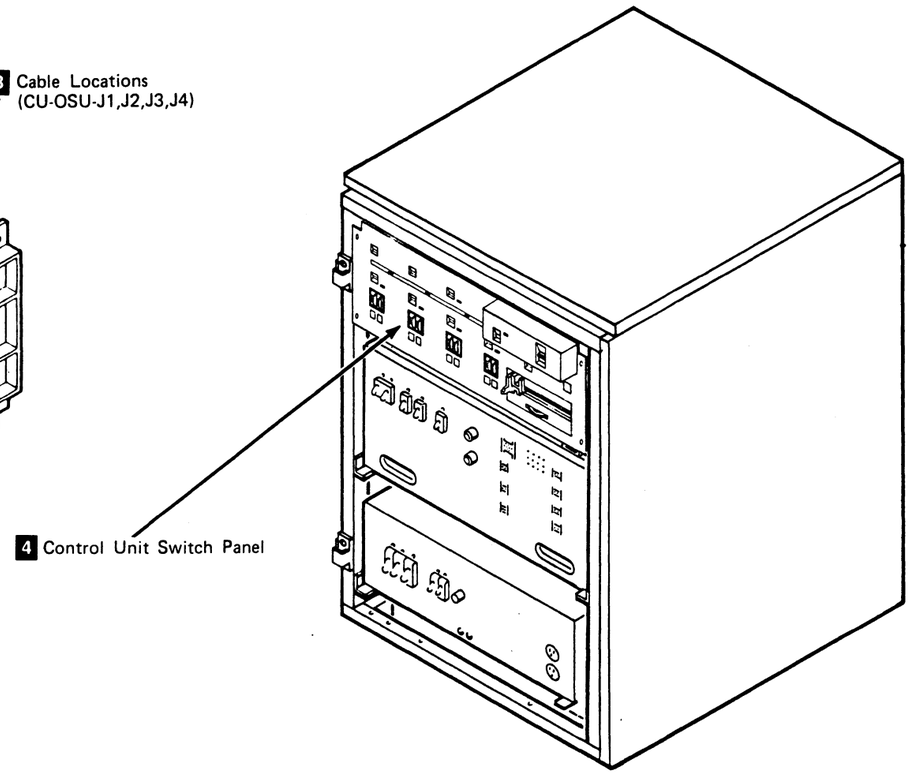
1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the top cover (see CARR-CU 2-1 or 2-3).
3. Remove the four cables **3** (CU-OSU-J1, J2, J3, and J4) from the rear of the printed circuit board **2**.
4. Remove the ten mounting screws **1** from the rear of the of the control unit switch panel **4** and remove the printed circuit board **2** from the switch panel.
5. Save all mounting screws for the replacement procedure.

Replacing the Control Unit Switch Panel Printed Circuit Board

1. Place the printed circuit board **2** on the control unit switch panel **4** and install the ten mounting screws **1**.
2. Connect the four cables **3** (CU-OSU-J1, J2, J3, and J4) to the rear of the printed circuit board **2**.
3. Replace the control unit top cover (see CARR-CU 2-2 or 2-4) and close the rear cover.
4. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.







FRU142 Operator Panel Printed Circuit Board Removal and Replacement Procedure

This page contains the steps needed to remove and replace the printed circuit board on the operator panel. All drives must be available for service.

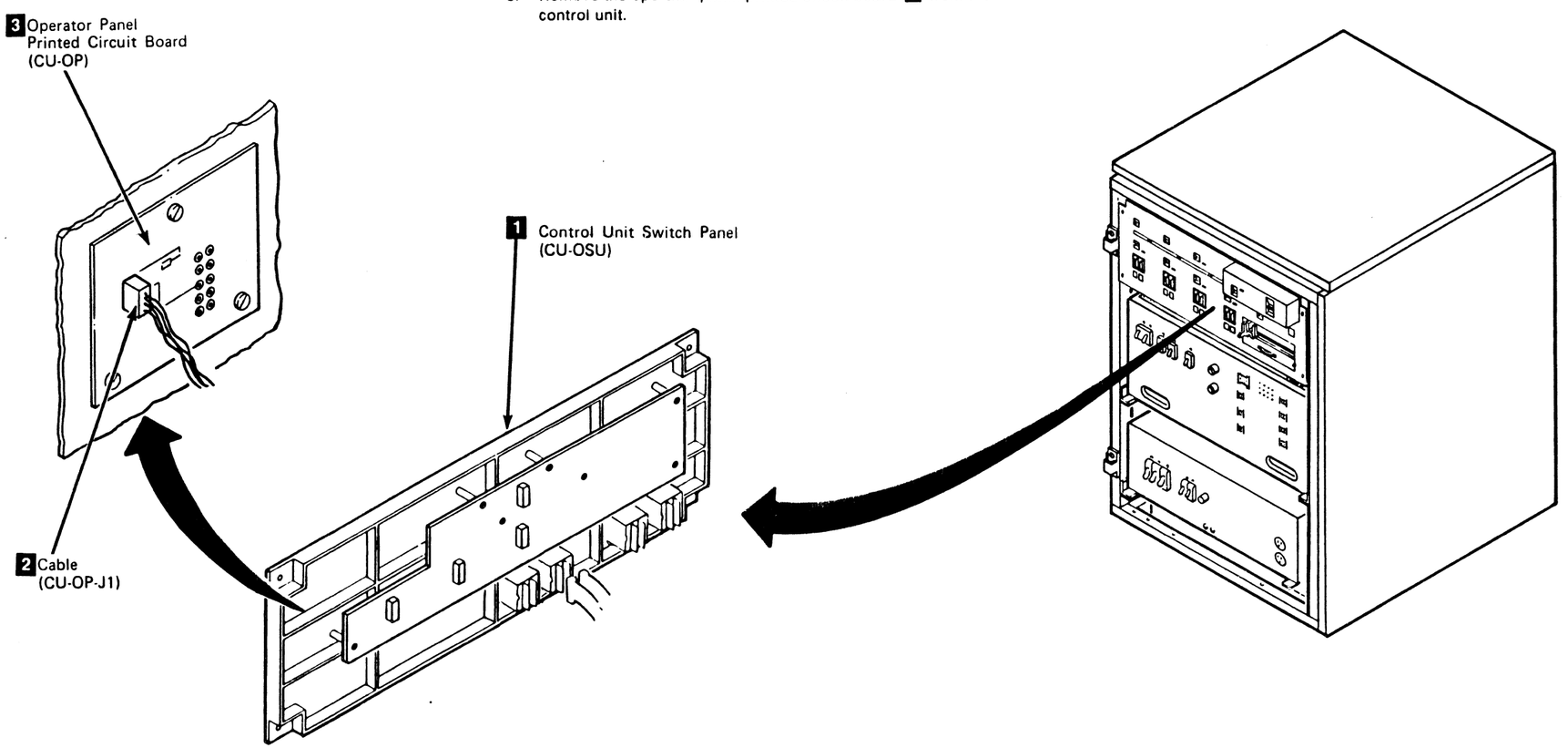
Note: *This FRU can be removed and replaced in the control unit without affecting the attached tape units by removing dc power from the control unit with the service switch.*

Removing the Operator Panel Printed Circuit Board

1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the top cover (see CARR-CU 2-1 or 2-3).
3. Disconnect the cable **2** (CU-OP-J1) from the operator panel printed circuit board.
4. Remove the three mounting screws that hold the operator panel printed circuit board (CU-OP) **3** to the control unit switch panel (CU-OSU) **1**.
5. Remove the operator panel printed circuit board **3** from the control unit.

Replacing the Operator Panel Printed Circuit Board

1. Place the operator panel printed circuit board **3** on the control unit switch panel **1** and install the three mounting screws.
2. Connect the cable **2** (CU-OP-J1) to the rear of the operator panel printed circuit board.
3. Install the control unit top cover and close the rear cover (see CARR-CU 2-2 or 2-4).
4. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.



FRU143 Control Unit Lower Thermal Switch Removal and Replacement Procedure

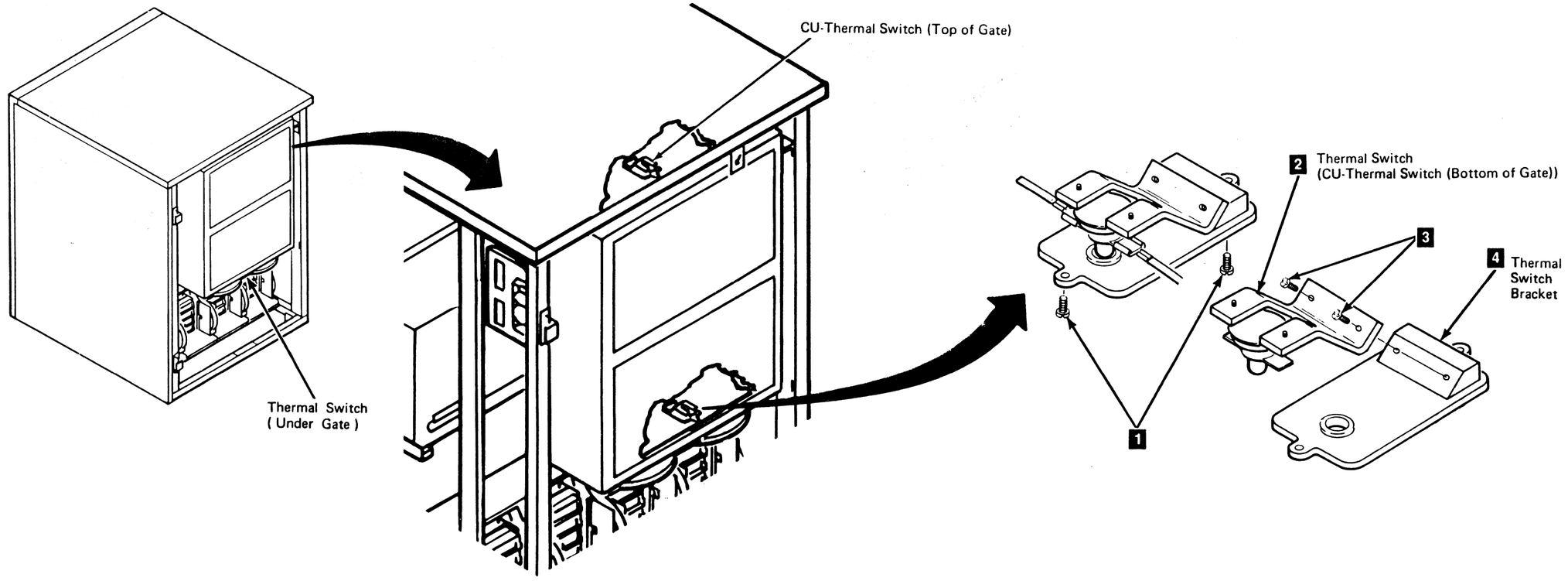
This page contains the steps needed to remove and replace the lower thermal switch in the control unit logic gate.

Removing the Control Unit Thermal Switch

1. Open the rear cover and remove the rear safety cover (see CARR-CU 2-1 or 2-3).
2. Remove the two mounting screws **1** holding the thermal switch assembly to the logic gate.
3. Disconnect the two wires from the thermal switch.
4. Remove the thermal switch assembly from the control unit.
5. Remove the thermal switch **2** from the thermal switch bracket **4** by removing the two mounting screws **3**.

Replacing the Control Unit Thermal Switch

1. Place the thermal switch **2** on the thermal switch bracket **4** and install the two mounting screws **3**.
2. Place the thermal switch in position on the logic gate and install the two wires to the thermal switch.
3. Install the two mounting screws **1**, holding the thermal switch assembly to the logic gate.
4. Install the rear safety cover and close the rear cover (see CARR-CU 2-2 or 2-4).
5. Go to CARR-CU 6 for the procedure to restore ***ac power*** to the control unit.



Notes

FRU144 AC Power Supply Removal and Replacement Procedure

This page contains the steps needed to remove and replace the ac power supply in the control unit. Since ac power is being removed from the control unit, all drives attached to the control unit must be available for service.

Removing the AC Power Supply

Note: *Have the customer turn off the circuit breaker for the control unit ac power source.*

1. Go to CARR-CU 6 for the procedure to remove ***ac power*** from the control unit.
2. Disconnect the ac line cord from the power source.
3. Remove the control unit front cover (see CARR-CU 2-1 or 2-3).
4. Remove connector J1 (CU-PS01-J1) from the right side of the ac power supply.
5. Open the control unit rear cover and remove the control unit rear safety cover, if present (see CARR-CU 2-1 or 2-3).
6. Disconnect all of the cables from the rear of the ac power supply.
7. Remove the cable clamp that holds the ac input cable to the control unit frame.
8. Remove the mounting bolts **1** from the front of the ac power supply.
9. Slide the ac power supply (CU-PS01) forward to get access to the input filter cover screws.
10. Remove the cover screws **8** from the input filter cover plate **7** and remove the plate.
11. Disconnect the wires from the three filter capacitors in the input filter **4**.

    Note: *If you are removing a 50 Hz (except Japan) ac power supply; remove the wire from the neutral filter capacitor* **6**.
12. Remove the braided ground wire **5** from inside the input filter.
13. Remove the green/yellow ground wire **2** from the rear of the ac power supply.
14. Loosen and remove the mounting ring **3** from the line cord stress clamp. Be sure to save the mounting ring for later use.
15. Remove the two screws holding the line cord stress clamp. Remove the stress clamp and the line cord.

CAUTION
The ac power supply weighs about 21 kilograms (45 pounds). Two service representatives should lift the control unit ac power supply.

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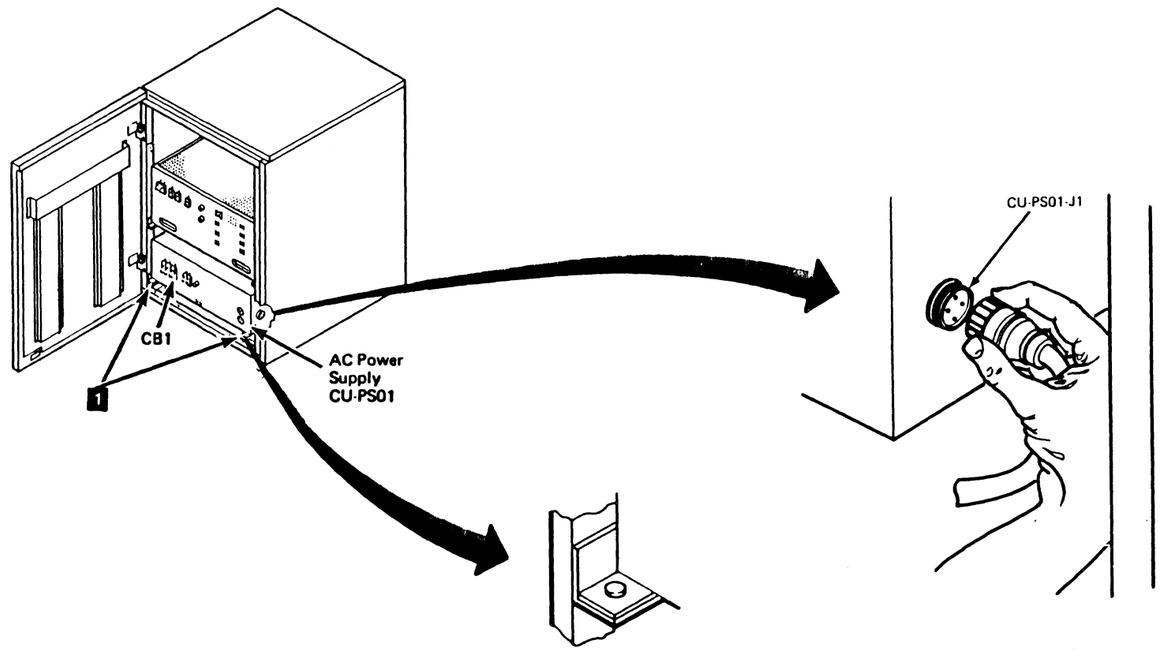
16. Slide the ac power supply forward to remove it from the control unit.

Replacing the AC Power Supply

1. Slide the control unit ac power supply (CU-PS01) into the front of the control unit. It will be necessary to get access to the input filter by removing the cover plate **7**.
2. Install the line cord and stress clamp and install the mounting ring **3**. Use the mounting ring removed from the old power supply.
3. Connect the yellow/green ground wire **2** to the outside rear of the power supply. Be sure to use a star washer between the lug on the wire and the power supply.
4. Connect the braided wire **5** to the ground point inside the input filter. Be sure to use a star washer between the lug on the wire and the input filter.
5. Connect one wire to each of the filter capacitors **4** in the input filter.



6. If you are installing a 50 Hz (except Japan) ac power supply, connect the neutral wire to the neutral capacitor **6**.
7. If you are installing a 50 Hz (except Japan) ac power supply, install the Delta/Wye jumper. See "Voltage Jumper Installation" for 50 Hz (except Japan) on this page.
8. Install the input filter cover plate **7** and replace the cover screws **8**.
9. Slide the ac power supply to the rear of the control unit as far as it will go and install and tighten the two mounting bolts **1**.
10. Install the cable clamp that holds the ac input cable to the control unit frame.
11. Connect all of the cables to the rear of the ac power supply.
12. Connect the J1 cable (CU-PS01-J1) to the right side of the ac power supply.

    DANGER
    Electric shock. Hazardous voltages can be present in the ac line cord connectors.

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13. Connect the ac line cord to the power source.
14. Have the customer turn on the circuit breaker for the control unit ac power source.

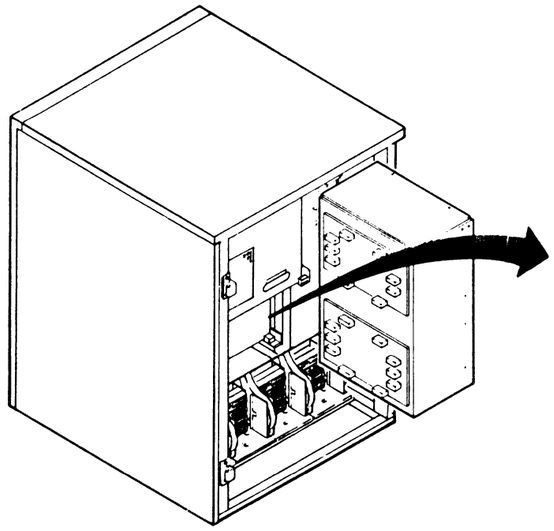
Voltage Jumper Installation

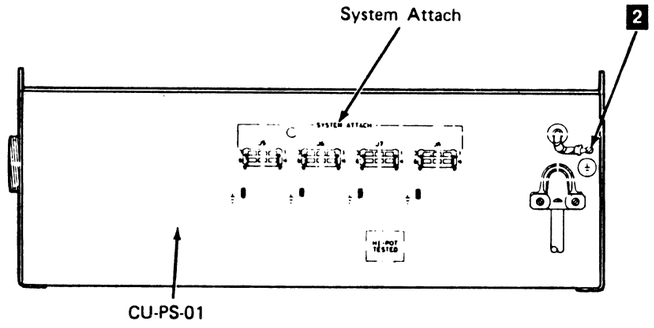
60 Hz (and 50 Hz Japan)

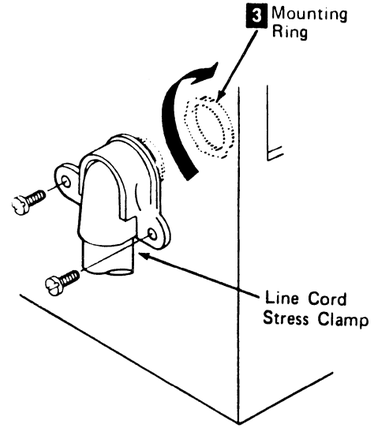
1. Set the convenience outlet voltage.
   - To set the convenience outlet voltage to 100 V ac, insert the jumper plug **10** in CU-PS01-J12.
   - To set the convenience outlet voltage to 120 V ac, insert the jumper plug **10** in CU-PS01-J13.
2. Set the input voltage.
   - If the ac input voltage is 200 or 208 V ac, plug the voltage jumper **11** in CU-PS01-J9.
   - If the ac input voltage is 220 V ac, plug the voltage jumper **11** in CU-PS01-J10.
   - If the ac input voltage is 230 or 240 V ac, plug the voltage jumper **11** in CU-PS01-J11.

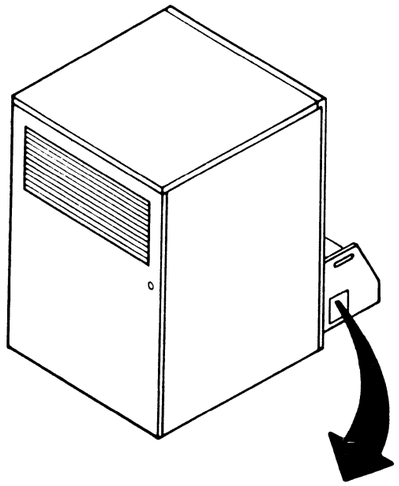
   50 Hz (except Japan)
   - If the ac input voltage is 200 V ac, plug the Delta/Wye jumper in CU-PS01-J9 and the voltage jumpers **9** in CU-PS01-J11 and J13.
   - If the ac input voltage is 220 V ac, plug the Delta/Wye jumper in CU-PS01-J9 and the voltage jumpers **9** in CU-PS01-J11 and J14.
   - If the ac input voltage is 230 or 240 V ac, plug the Delta/Wye jumper in CU-PS01-J9 and the voltage jumpers **9** in CU-PS01-J11 and J15.
   - If the ac input voltage is 380 V ac, plug the Delta/Wye jumper in CU-PS01-J10 and the voltage jumpers **9** in CU-PS01-J12 and J14.
   - If the ac input voltage is 400 or 415 V ac, plug the Delta/Wye jumper in CU-PS01-J10 and the voltage jumpers **9** in CU-PS01-J12 and J15.

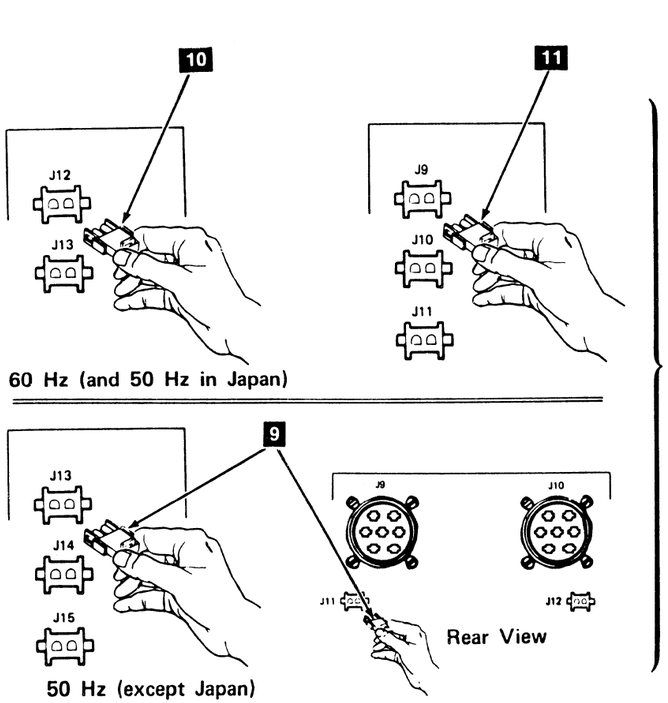
   Note: *Should the Delta/Wye jumper (J9-J10) have to be changed, replug the cap in the empty socket.*
3. Install the control unit rear safety cover and ground connector, if present and close the control unit rear cover (see CARR-CU 2-2 or 2-4).
4. Install the control unit front cover (see CARR-DU 2-1 or 2-3).
5. Go to CARR-CU 6 for the procedure to restore ***ac power*** to the control unit.

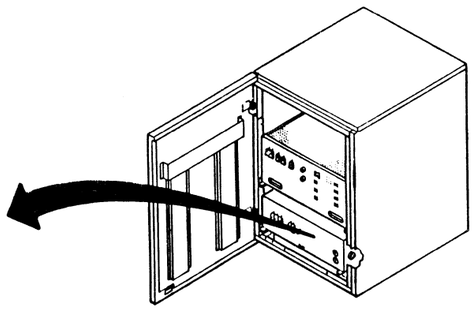


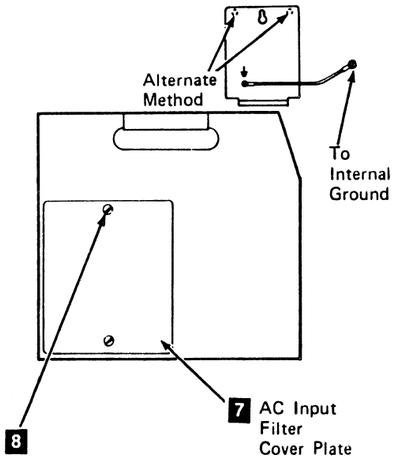


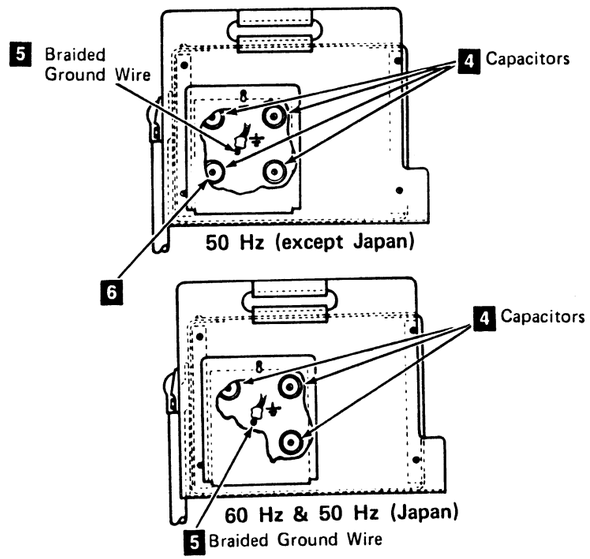












FRU145 Control Unit DC Power Supply Removal and Replacement Procedure

This page contains the steps needed to remove and replace the dc power supply in the control unit. Because ac power must be turned off, all of the drives attached to the control unit must be available for service.

Removing the Control Unit DC Power Supply

1. Go to CARR-CU 6 for the procedure to remove ***ac power*** from the control unit.
2. Open the control unit rear and remove the rear safety cover and ground connector, if present (see CARR-CU 2-1 or 2-3).
3. Open the logic gate.
4. Disconnect all of the cables from the top rear of the dc power supply **1** (CU-PS02).
5. Remove the control unit front cover (see CARR-CU 2-1 or 2-3).
6. Remove the two mounting bolts **2** from the control unit dc power supply.

   CAUTION
   The dc power supply weighs about 50 kilograms (110 pounds). Two service representatives should lift the control unit dc power supply.

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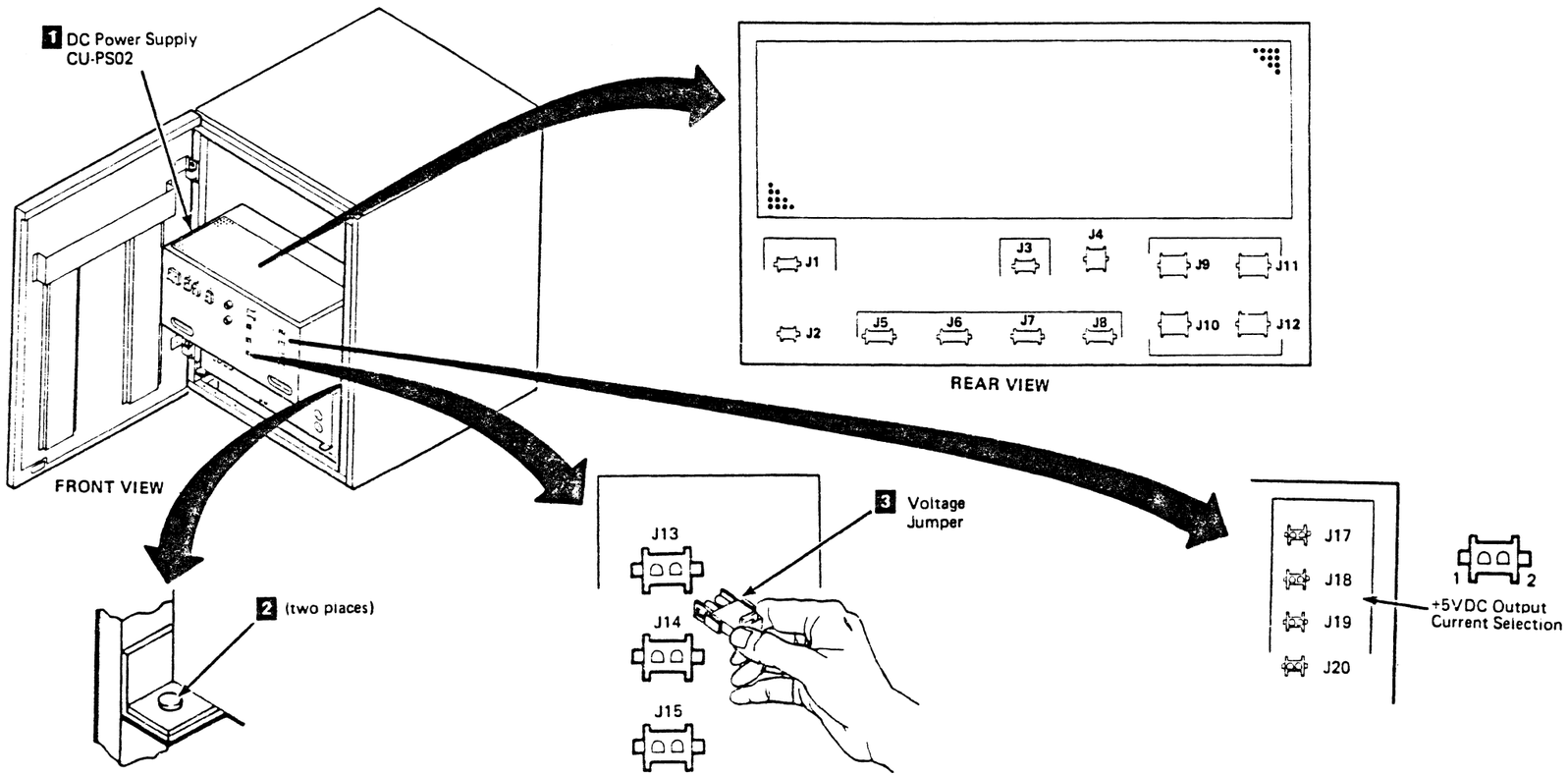
   . . . . . .
7. Remove the control unit dc power supply by sliding it out the front of the control unit.

Replacing the Control Unit DC Power Supply

1. Slide the control unit dc power supply (CU-PS02) into the front of the control unit as far as it will go.
2. Align the two screw holes in the front on each side and install the two mounting bolts **2**.
3. Install the cables into the top rear of the power supply **1**.
4. Close the logic gate.
5. Install the rear safety cover and close the rear cover (see CARR-CU 2-2).



Installing the Power Supply Jumpers

- If the input voltage is 200 or 208 V ac, plug the voltage jumper **3** in CU-PS02-J13.
- If the input voltage is 220 V ac, plug the voltage jumper **3** in CU-PS02-J14.
- If the input voltage is 230 V ac, plug the voltage jumper **3** in CU-PS02-J15.
- If the input voltage is 380 V ac (50 Hz only), plug the voltage jumper **3** in CU-PS02-J14.
- If the input voltage is 400 or 415 V ac (50 Hz only), plug the voltage jumper **3** in CU-PS02-J15.

Channel Adapters Installed

- If the control unit has one channel adapter (channel A) installed, plug the +5 V dc jumper in CU-PS02-J17.
- If the control unit has tow channel adapters (channel A and B) installed, plug the +5 V dc jumper in CU-PS02-J18.
- If the control unit has three channel adapters (channel A, B, and C) installed, plug the +5 V dc jumper in CU-PS02-J19.
- If the control unit has four channel adapters (channel A, B, C and D) installed, plug the +5 V dc jumper in CU-PS02-J20.
- Install the control unit rear safety cover and ground connector, if present and close the control unit rear cover (see CARR-CU 2-2 or 2-4).
- Install the control unit front cover (see CARR-CU 2-2 or 2-4).
- Go to CARR-CU 6 for the procedure to restore ***ac power*** to the control unit.

Notes

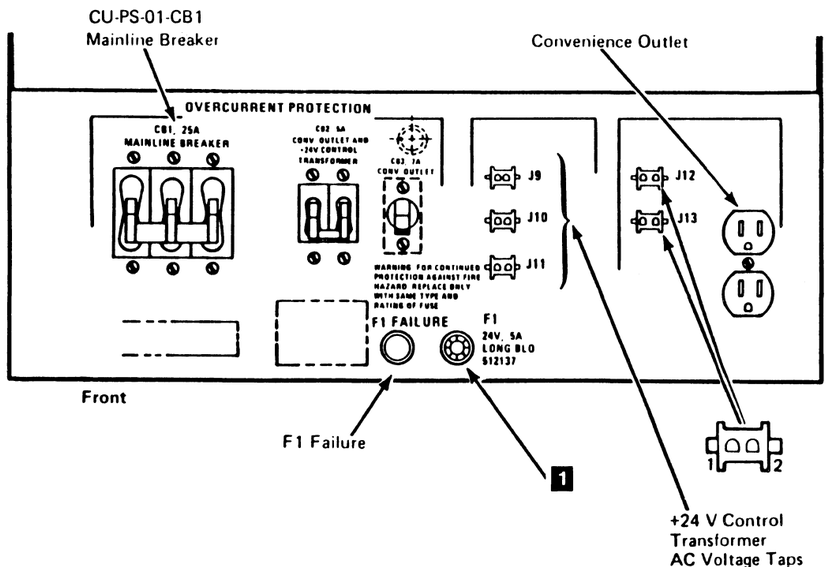
FRU146 AC Fuse Removal and Replacement Procedure

This page contains the steps needed to remove and replace the ac fuses in the control unit ac power supply (CU-PS01).

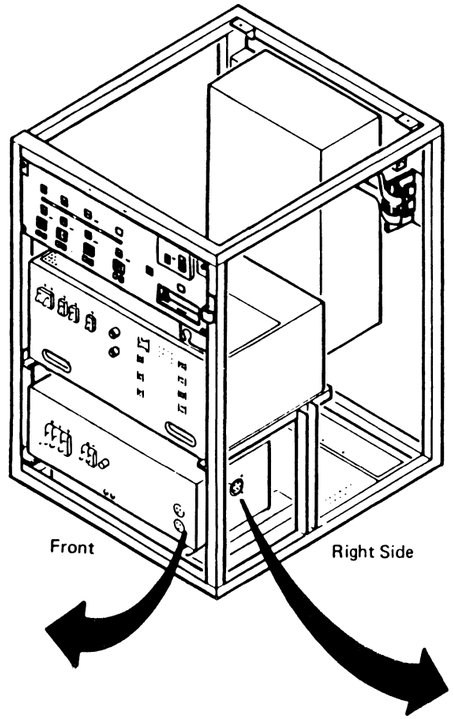
Since ac power is being removed from the control unit, all of the drives attached to the control unit must be available for service.

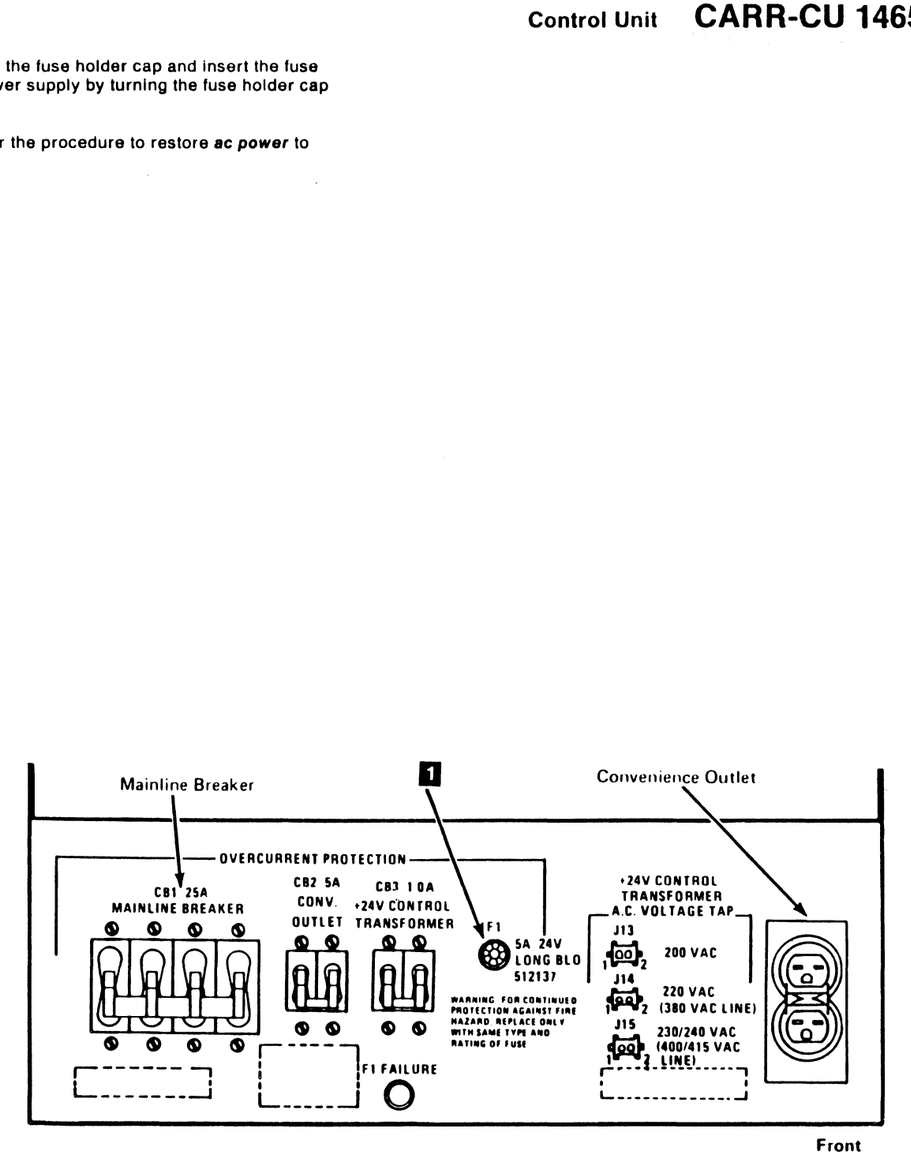
Fuse Removal and Replacement - AC Power Supply

1. Go to CARR-CU 6 for the procedure to remove ***ac power*** from the control unit.
2. Remove fuse F1 **1** by turning the fuse holder cap counterclockwise.
3. Place a good fuse in the fuse holder cap and insert the fuse and cap into the power supply by turning the fuse holder cap clockwise.
4. Go to CARR-CU 6 for the procedure to restore ***ac power*** to the control unit.



CU-PSO1 Control Unit AC Power Supply 60 Hz, and 50 Hz Japan





CU-PSO1 Control Unit AC Power Supply 50 Hz, Except Japan

FRU147, 148 DC Fuse Removal and Replacement Procedure

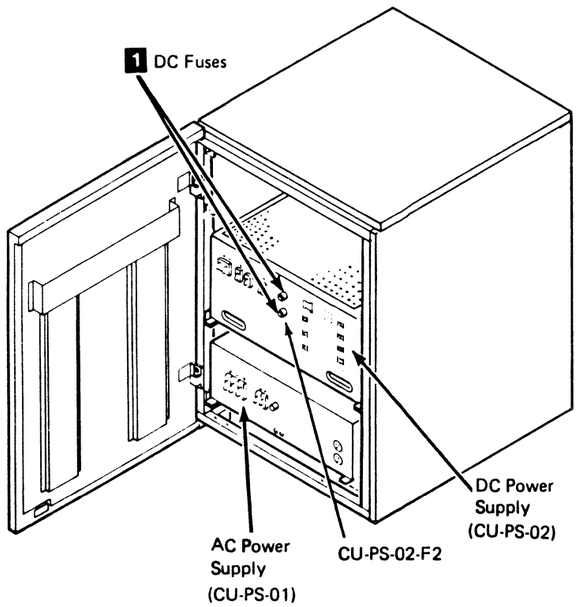
This page contains the steps needed to remove and replace either of the dc fuses [1] in the control unit dc power supply (CU-PS02). Removing either of the fuses will not cause the power to be removed from the drives attached to the control unit.

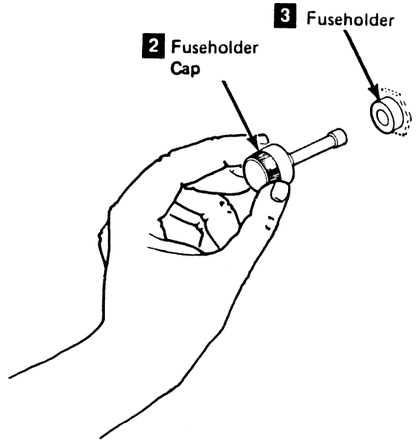
Removing the DC Fuses

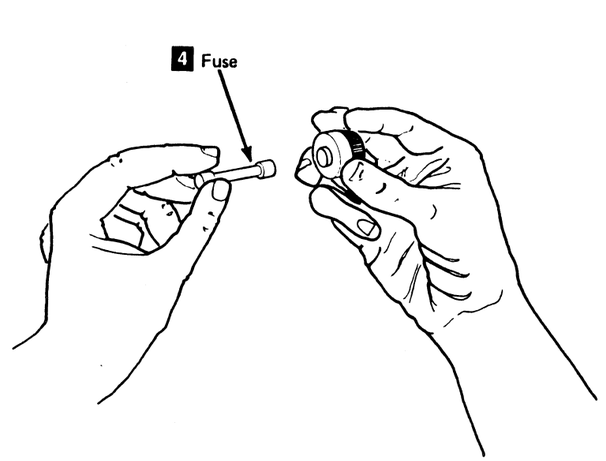
1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Remove the fuse holder cap [2] from the fuse holder [3] by pushing in and turning counterclockwise until it stops. Pull the fuse holder cap and the fuse out of the fuse holder.
3. Remove the defective fuse [4] from the fuse holder cap.

Replacing the DC Fuses

1. Insert the replacement fuse [4] into the fuse holder cap [2].
2. Insert the fuse holder cap and fuse into the fuse holder [3].
3. Push in on the fuse holder cap and at the same time turn clockwise until it stops.
4. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.







FRU149 AC Line Cord Removal and Replacement Procedure

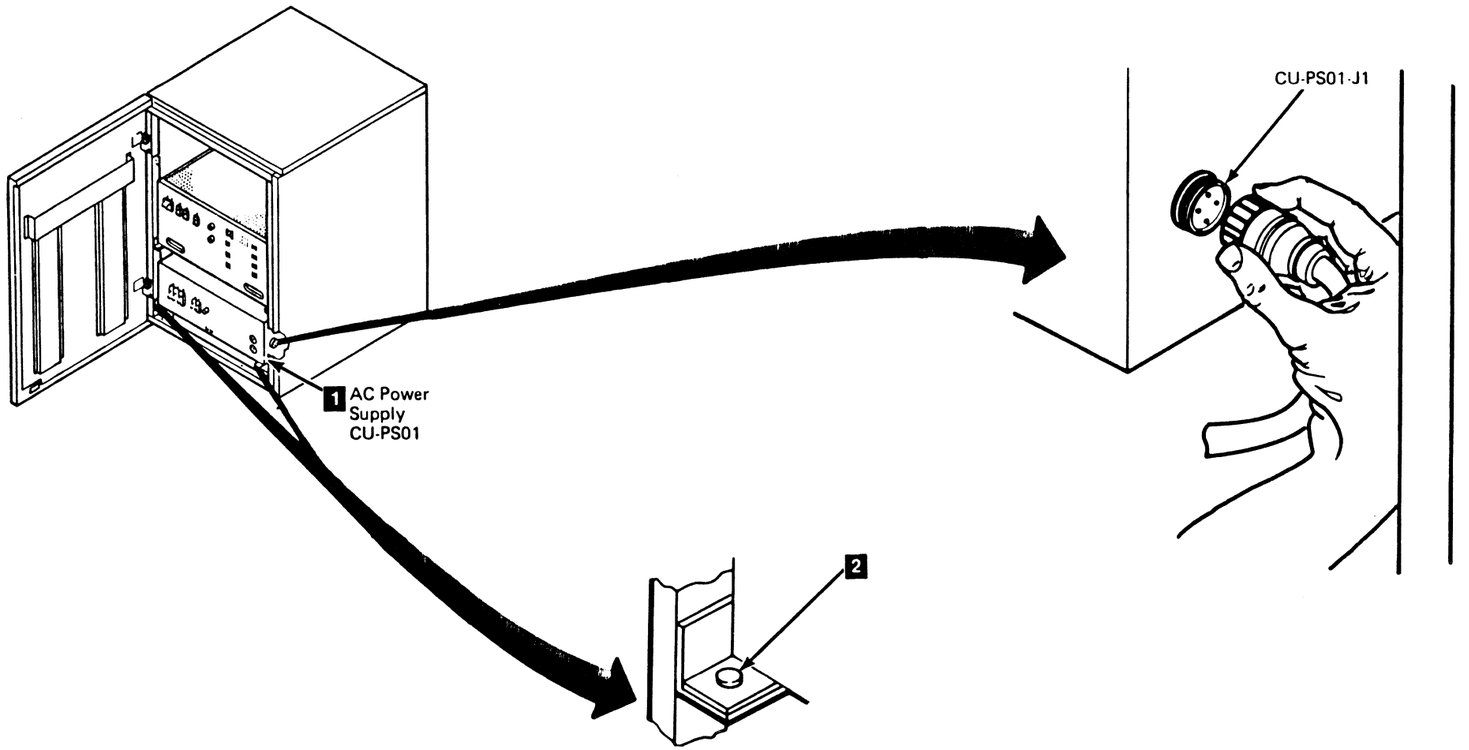
This page contains the steps needed to remove and replace the ac line cord in the control unit. Since ac power is being removed from the control unit, all drives attached to the control unit must be available for service.

Removing The AC Line Cord

Note: *Have the customer turn off the circuit breaker for the control unit ac power source.*

1. Go to CARR-CU 6 for the procedure to remove ***ac power*** from the control unit.
2. Disconnect the ac line cord from the power source.
3. Remove the control unit front cover (see CARR-CU 2-1 or 2-3).
4. Remove connector J1 (CU-PS01-J1) from the right side of the ac power supply (CU-PS01).
5. Open the control unit rear cover and remove the control unit rear safety cover and ground connector, if present (see CARR-CU 2-1or 2-3).
6. Remove the cable clamp which holds the ac input cable to the control unit frame.
7. Disconnect all of the cables from the rear of the ac power supply.
8. Remove the mounting bolts 2 from the front of the ac power supply.
9. Slide the ac power supply 1 forward to gain access to the input filter cover screw.
10. Remove the screw 9 from the input filter cover plate 8 and remove the plate.
11. Disconnect the wires from the three filter capacitors 5 in the input filter.

    Note: *If you are removing a 50 Hz, except Japan, ac line cord; remove the wire from the filter capacitor* 7.
12. Remove the braided ground wire 6 from inside the input filter.
13. Remove the green/yellow ground wire 3 from the rear of the ac power supply.
14. Loosen and remove the mounting ring 4 from the line cord stress clamp. Be sure to save the mounting ring for later use.
15. Remove the two screws and remove the line cord stress clamp 10 from the line cord.
16. Remove the ac line cord.



Replacing The AC Line Cord

Use the stress clamp removed from the previous line cord for the next step.

1. Install the line cord stress clamp 10. Tighten the two stress clamp screws.
2. Install the line cord and stress clamp into the input filter and install the mounting ring 4. Use the the mounting ring removed from the old line cord.
3. Connect the green/yellow ground wire 3 to the outside rear of the power supply. Be sure to use a star washer between the lug on the wire and the power supply.
4. Connect the braided ground wire 6 to the ground point inside the input filter. Be sure to use a star washer between the lug on the wire and the input filter.
5. Connect the one wire to each of the filter capacitors 5 in the input filter.

   Note: *If you are installing a 50 Hz (except Japan) ac line cord, connect the wire to the filter capacitor* 7.
6. Install the input filter cover plate 8 and screw 9.
7. Slide the ac power supply to the rear of the control unit as far as it will go and install the two mounting bolts 2.

   Note: *There may not be any system cables to attach in the next step.*
8. Install the cable clamp that holds the ac input cable to the control unit frame.
9. Connect all of the cables to the rear of the ac power supply 1.
10. Connect the J1 (CU-PS01-J1) cable on the right side of the ac power supply.

    DANGER
    Electrical shock. Hazardous voltages can be present in the ac line cord connectors.

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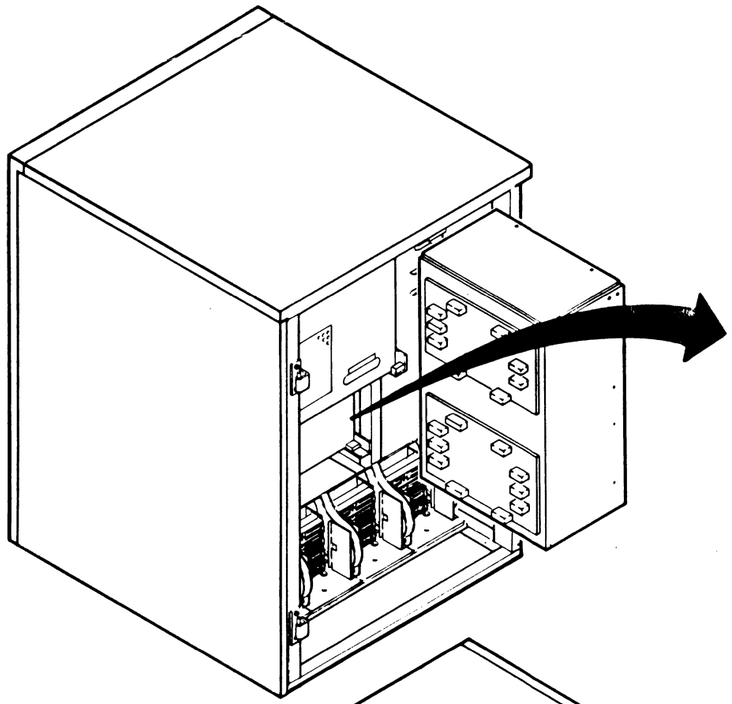
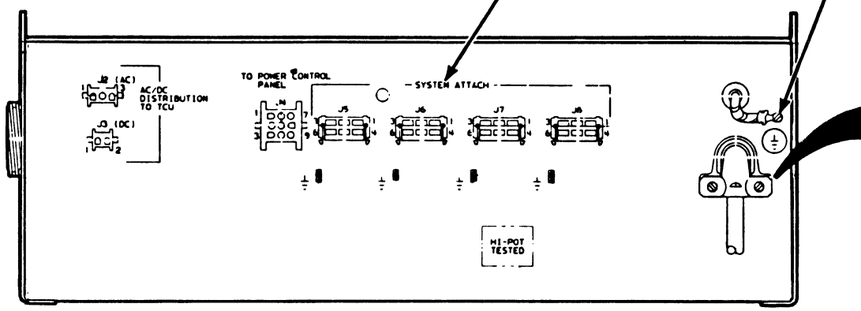
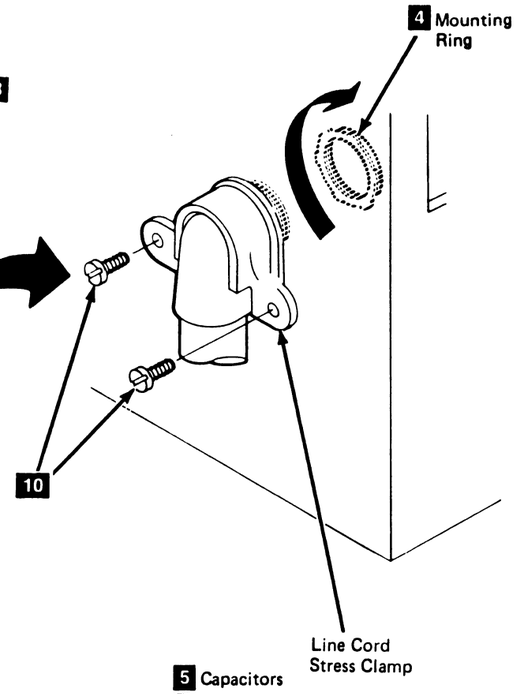
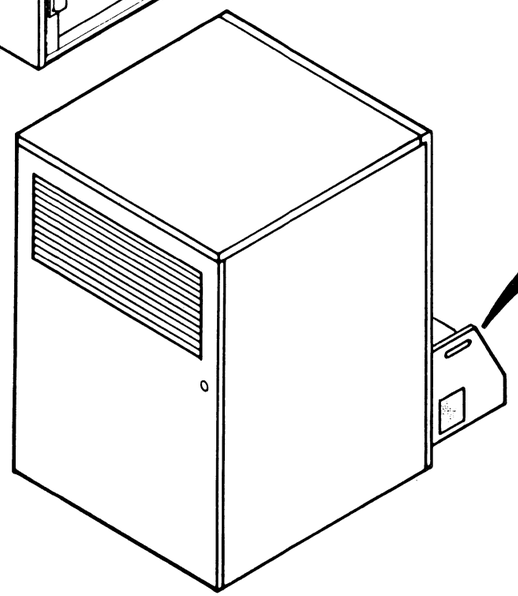
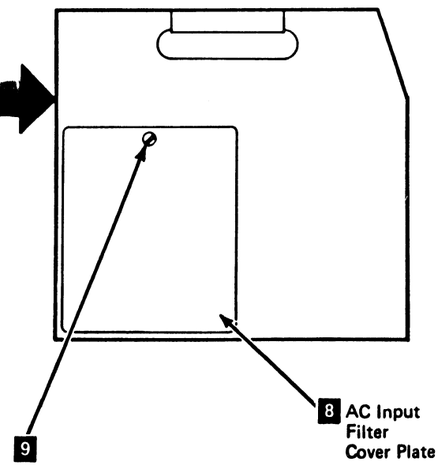
11. Connect the ac line cord to the power source.
12. Have the customer turn on the circuit breaker for the control unit ac power source.
13. Install the control unit rear safety cover and ground connector, if present and close the control unit rear cover (see CARR-CU 2-2 or 2-4).
14. Install the control unit front cover (see CARR-CU 2-1 or 2-3).
15. Go to CARR-CU 6 for the procedure to restore ***ac power*** to the control unit.

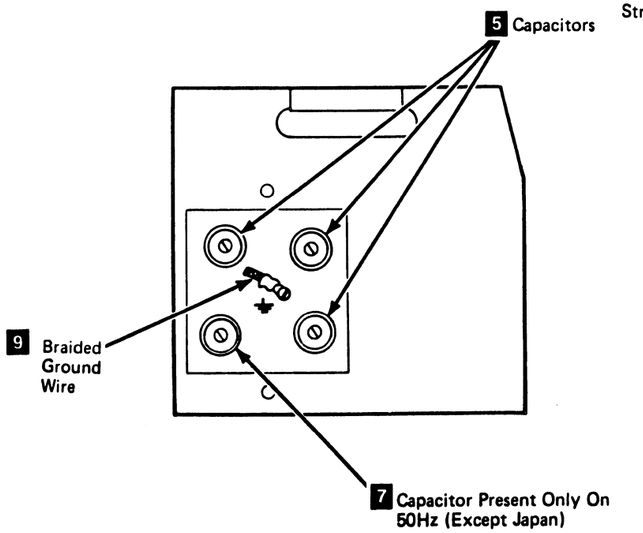












FRU150 and 151 Blower Assembly Removal and Replacement Procedure

This page contains the steps needed to remove and replace either of the blower assemblies in the control unit logic gate. It is not necessary to remove the ac power from the control unit to remove either of the blower assemblies.

Removing the Blower Assembly

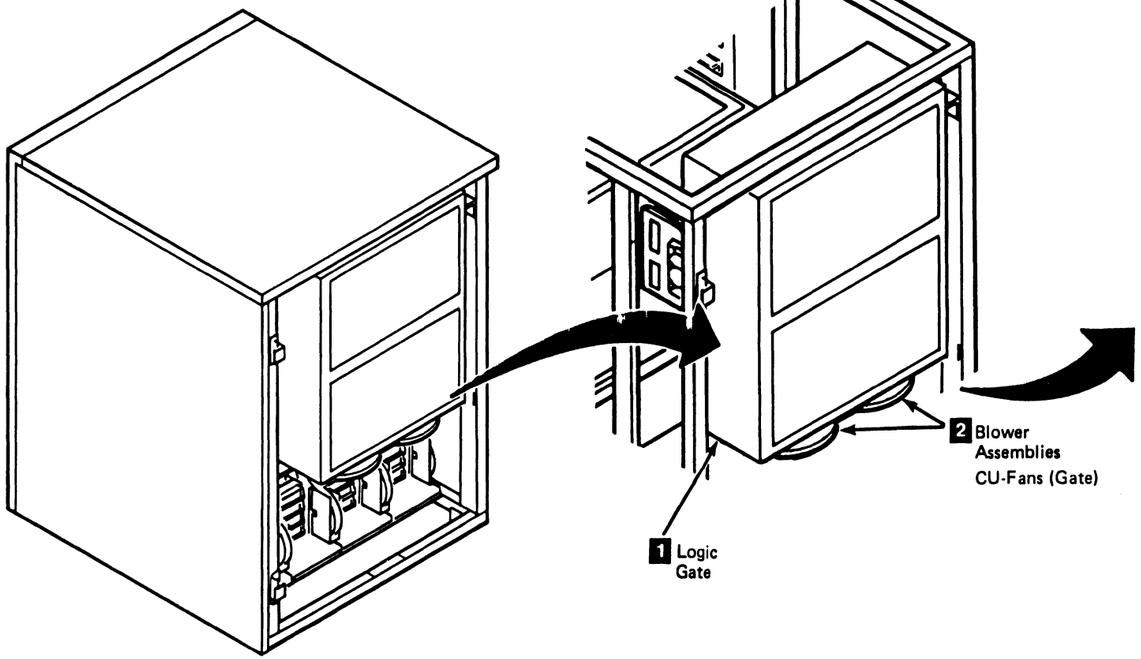
1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the rear safety cover and ground connector, if present (see CARR-CU 2-1 or 2-3).
3. Open the control unit logic gate 1 and find which of the two blowers 2 you want to replace.
4. Unplug the ac power plug 7 from the blower assembly 8.
5. Remove the green/yellow ground connector 4 wire by removing the screw 5 and lockwasher 6.
6. Remove the blower mounting screws 3 and at the same time, support the blower to keep it from falling.
7. Lift the blower assembly 8 away from the control unit.
8. Remove the finger guard mounting screw 9 from the blower assembly. Be careful not to lose the lockwashers 11 and nuts 12. Remove the finger guard 10.

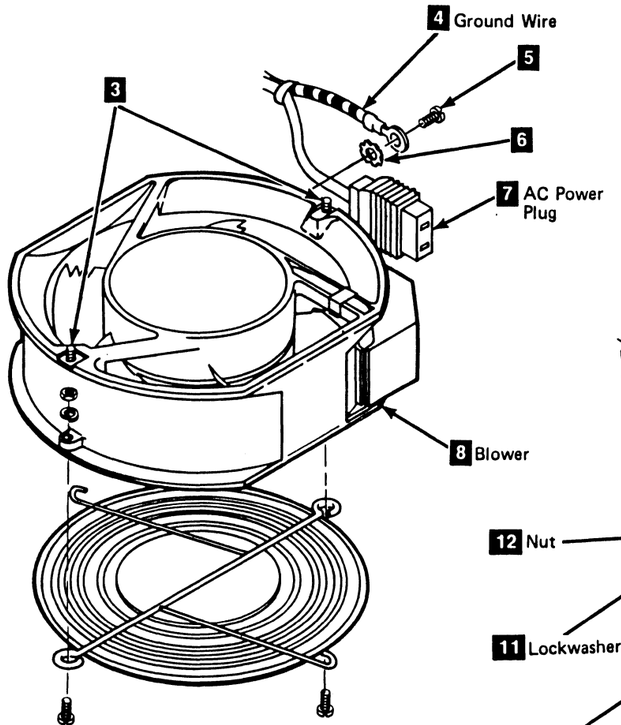
   Save the finger guard for use with the replacement blower.

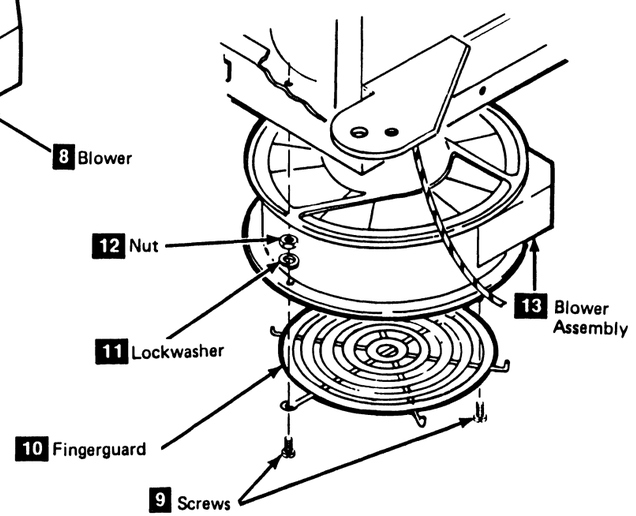
Replacing the Blower Assembly

1. Place the finger guard 10 on the blower assembly 8 and install the mounting screws 9, lockwashers 11 and nuts 12.
2. Place the blower assembly 8 in position against the control unit logic gate 1 and install the mounting screws 3.
3. Install the green/yellow ground connector 4, the lockwasher 6 and the mounting screw 5 to the blower assembly 8.
4. Connect the blower ac power plug 7 to the blower assembly.

   Make sure the blower plug is seated correctly on the blower.
5. Install the rear safety cover and ground connector, if present and close the rear cover (see CARR-CU 2-2 or 2-4).
6. Go to CARR-DR 6 for the procedure to restore ***dc power*** to the control unit.







FRU157 Top Card Connector Removal and Replacement Procedure

This page contains the steps needed to remove and replace any of the top card connectors (TCC) in the control unit.

It is not necessary to power off the control unit, however dc voltage must be removed from the control unit.

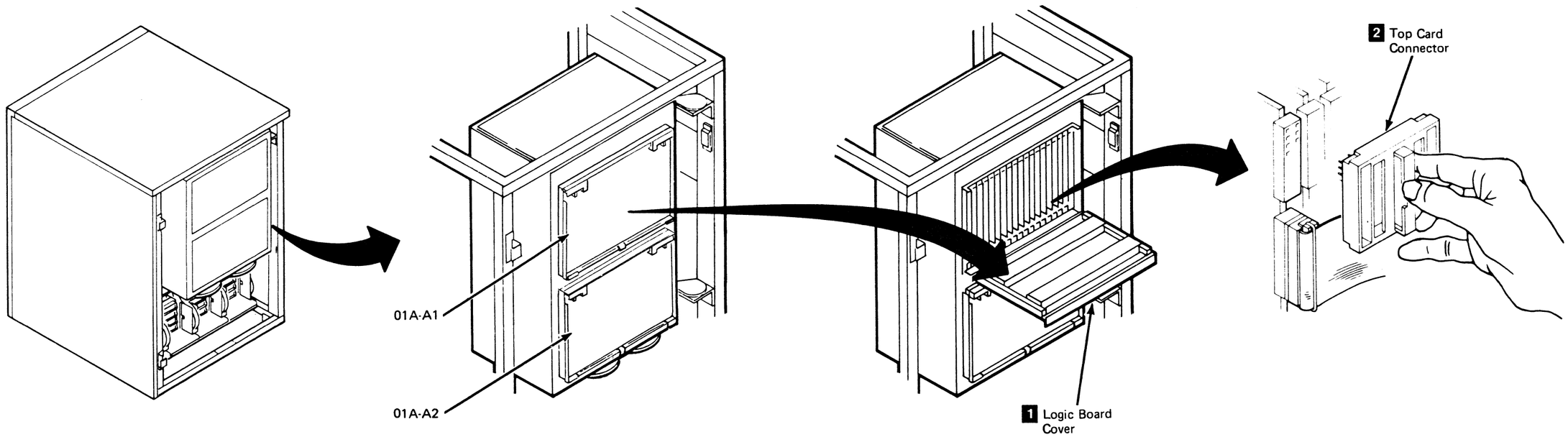
Removing the Top Card Connectors (TCC)

1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the rear safety cover and ground connector, if present (see CARR-CU 2-1 or 2-3).
3. Open the logic board cover **1** needed to remove the TCC.
4. Remove the TCC **2** from the logic card by pulling it straight away from the card.

Replacing the Top Card Connectors (TCC)

Note: For the logic card locations see LOC 1. For the top card connector and top card cable locations see LOC 1.

1. Insert the TCC **2** onto the logic card. Push the top card connector straight toward the logic card.
2. Close the logic board cover **1**.
3. Install the rear safety cover and ground connector, if present and close the rear cover (see CARR-CU 2-2 or 2-4).
4. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.



FRU160 DC Power Supply to Gate TB Cable Removal and Replacement Procedure

This page contains the steps needed to remove and replace the dc power supply to gate TB cable in the control unit. Since it is necessary to remove the ac power, all of the drives attached to the control unit should be available for service.

Removing the DC Power Supply to Gate TB Cable

1. Go to CARR-CU 6 for the procedure to remove ***ac power*** from the control unit.
2. Open the rear cover and remove the rear safety cover (see and ground connector, if present (see CARR-CU 2-1 or 2-3).
3. Open the logic gate **1**.
4. Unplug connectors CU-PS02-P4, P9, P11, P10 and P12 **6**.
5. Remove the cable retention hardware as you remove the cable to the logic gate.
6. Remove the plastic safety covers **2** from the three terminal blocks (TBs), setting the covers to the side.

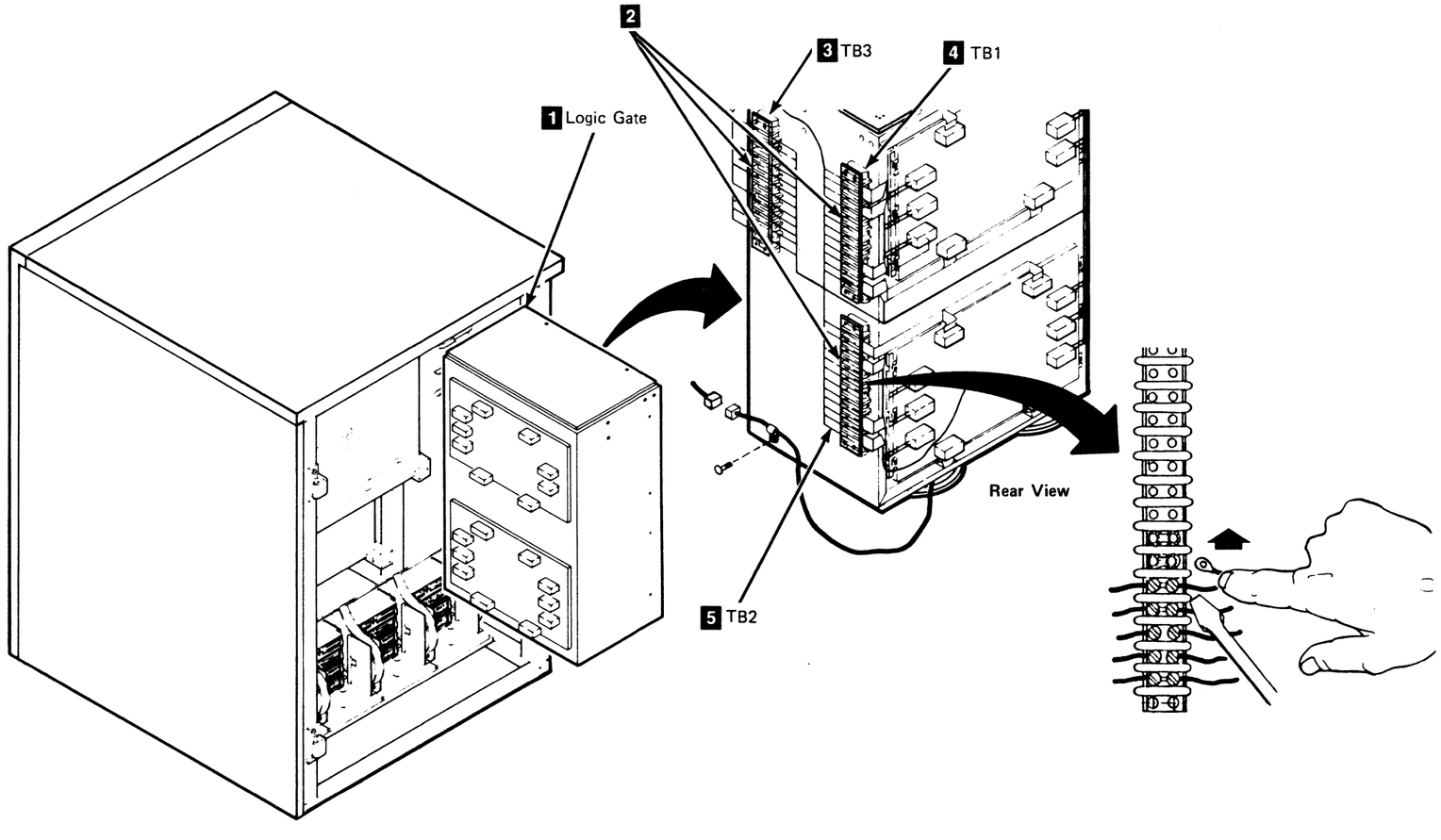
   Note: It is not necessary to label each wire before removal because the wires on the new cable are laced to line up with the TB screws.

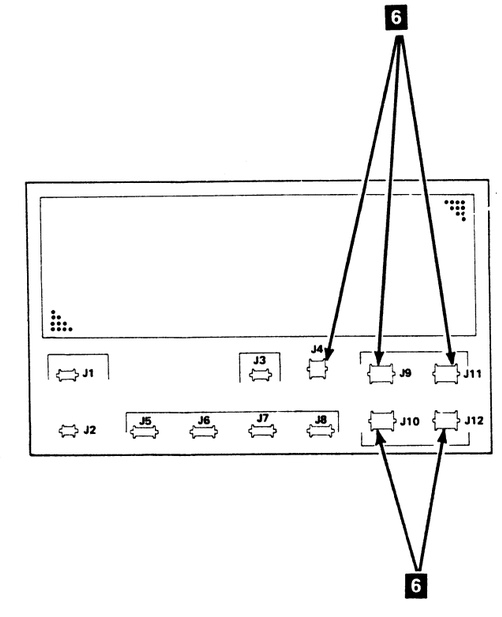
7. Remove the wires from TB2 **5** (CU-A1-TB2) and set the screws to the side for later use.
8. Remove the wires from TB1 **4** (CU-A1-TB1) and set the screws to the side for later use.
9. Remove the wires from TB3 **3** (CU-A1-TB3) and set the screws to the side for later use.
10. Remove the cable from the control unit.

Replacing the DC Power Supply to Gate TB Cable

Note: The cable is laced so that the wires line up with the TB screws.

1. Install the wires and screws to TB3 **3** (CU-A1-TB3). There are no wires connected to TB3-2, TB3-3, TB3-7, and TB3-14.
2. Install the wires and screws to TB1 **4** (CU-A1-TB1).
3. Install the wires and screws to TB2 **5** (CU-A1-TB2).
4. Place the cable in the same position as the cable removed and install the cable retention hardware.
5. Install the connectors at the top rear of the dc power supply. The connectors are installed at CU-PS02-J12, J10, J11, J9 and J4 **6**.
6. Install the three plastic safety covers **2** onto the three TBs.
7. Close the logic gate **1**.
8. Install the rear safety cover and ground connector, if present and close the rear cover (see CARR-CU 2-2 or 2-4).
9. Go to CARR-CU 6 for the procedure to restore ***ac power*** to the control unit.





FRU162 Service Switch Assembly Removal and Replacement Procedure

This page contains the steps needed to remove and replace the service switch assembly from the control unit. It is necessary to remove the ac voltage from the control unit. All drives attached to the control unit must be available for service.

Removing the Service Switch Assembly.

1. Go to CARR-CU 6 for the procedure to remove ac power from the control unit.
2. Open the rear cover of the control unit and remove the safety cover and ground connector, if present (see CARR-CU 2-1 or 2-3).
3. Swing out the logic gate and locate TB3 (see LOC 1).
4. Remove the plastic cover from TB3.
5. Open the 01A logic board cover and remove the bottom screw from the right cable retention bar. Loosen the top screw from the right cable retention bar. (This step is necessary to provide space to remove the switch assembly wires.)
6. Disconnect the wires from TB3 positions 5A, 12A, 13A, and 14A.
7. Note the wire routing, then remove the wires from any retention hardware.
8. Loosen the two screws **2** that hold the top cover on the gate by turning the fasteners one-quarter turn counterclockwise.
9. If the thermal switch is mounted on the top cover, lift the cover up far enough to disconnect the two thermal wires **1**.
10. Lift the cover off.
11. While holding onto the service switch assembly **3**, remove the mounting nut, lock washer **6** and the guard bracket **5**, if it is removable, from the outside of the logic gate. Remove the switch assembly from inside the gate, being careful not to lose the lock washer **4**.
12. Save the mounting nut and washers for the service switch assembly replacement procedure.

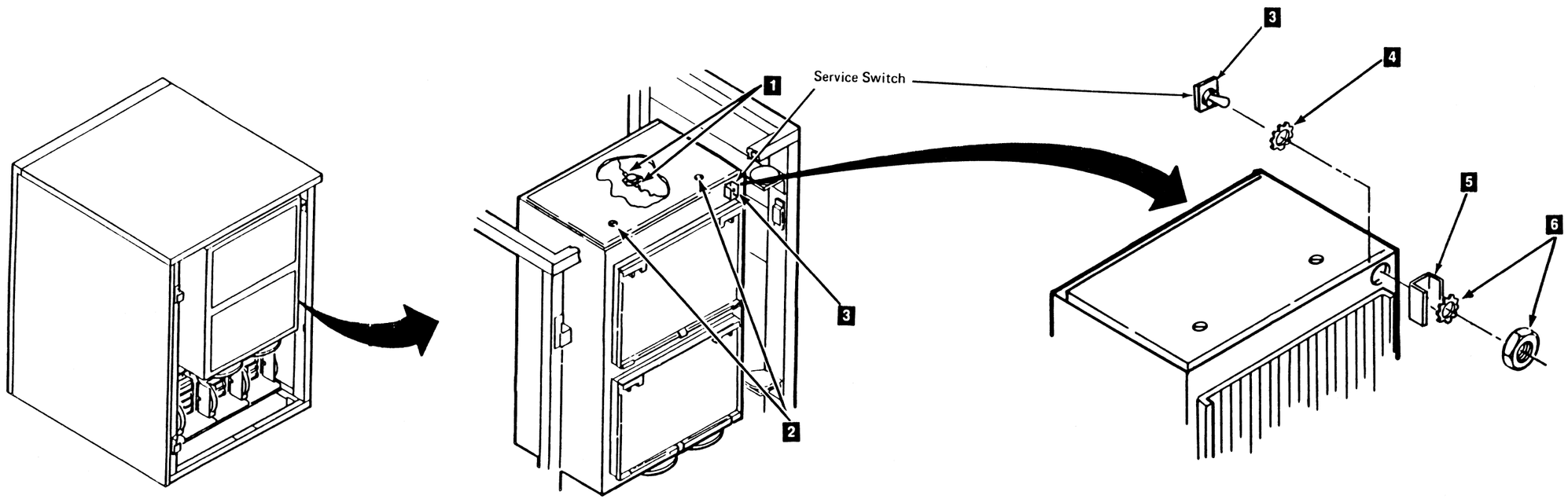
Replacing the Service Switch and Cable Assembly

1. Route the four-lead branch of the switch assembly along the same path as the old switch assembly and out the card side of the gate to TB3. Ensure the cable is routed under the 01A board right cable retention bar. This will prevent the cable being pinched when the board cover is closed.
2. Place a lock-washer **4** on the front of the service switch assembly, and with the key-way up mount it on the rear of the logic gate with the operating toggle through the gate mounting hole.
3. If removed previously, install the guard bracket **5** (with the ON label up), lock-washer, and nut **6** on the outside of the logic gate.
4. Tighten the nut to hold the assembly in place.
5. Connect the four wires to TB3 positions 5A, 12A, 13A, and 14A.

6. Place the logic gate top cover into position.
7. If you removed them previously, connect the two slip-on connectors **1** to the thermal switch.
8. Close the top logic gate cover and then tighten by turning the fasteners **2** one-quarter turn clockwise.
9. Replace the plastic cover on TB3.
10. Replace the bottom screw for the right cable retention bar for 01A logic board.

    Note: *Ensure all cable retentions are under the cable retention bar before doing the next step.*

11. Tighten the top screw for the right cable retention bar, then close the 01A logic board cover.
12. Ensure that the service switch is in the On position, then close the logic gate.
13. Replace the rear safety cover and ground connector, if present, and close the rear control unit cover (see CARR-CU 2-2 ro 2-4).
14. Go to CARR-CU 6 for the procedure to restore ac power to the control unit.



FRU165 Gate Fan Cable Removal and Replacement Procedure

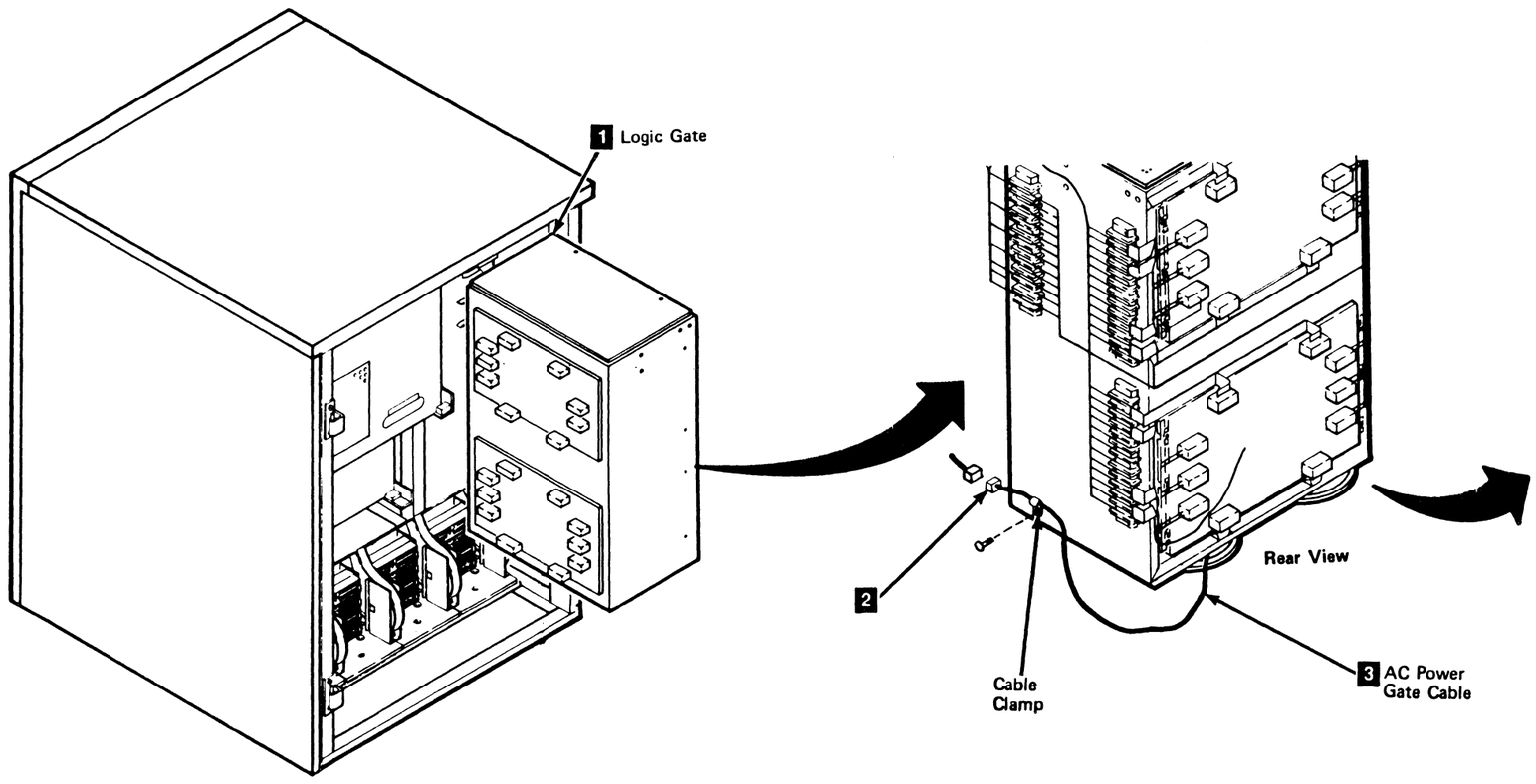
This page contains the steps needed to remove and replace the gate fan cable from the control unit logic gate. It is not necessary to remove ac power to remove this cable.

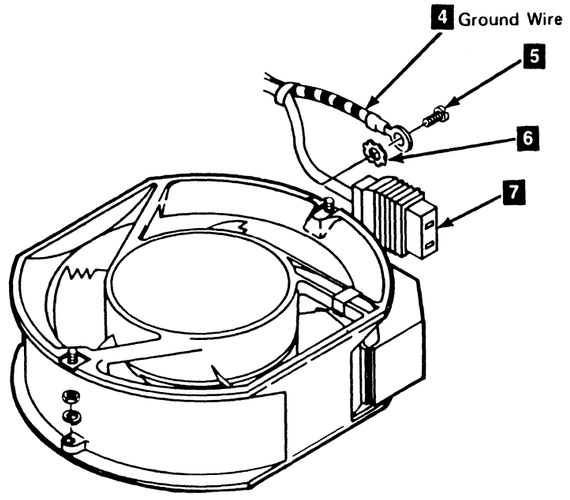
Removing the Gate Fan Cable

1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the rear safety cover and ground connector (see CARR-CU 2-1).
3. Open the control unit logic gate **1** and find the gate fan cable **3** at the bottom of the logic gate.
4. Unplug the connector **2** (CU-A1-P1) near the bottom hinge.
5. Unplug the connectors **7** from each of the blowers.
6. Remove the green/yellow ground wire **4**, the star washer **6** and the mounting screw **5** from each of the blowers.
7. Remove the cable clamp and remove the cable from the logic gate.

Replacing the Gate Fan Cable

1. Place the gate fan cable **3** in position on the bottom of the logic gate and plug each connector **7** onto the blower assemblies.
2. Install the green/yellow ground wire **4** and mounting screw **5** to each of the blowers. Be sure to use the star washer **6** on each blower.
3. Install the cable clamp to the logic gate.
4. Plug the connector **2** (CU-A1-P1) into the cable near the bottom hinge of the logic gate.
5. Close the logic gate **1**.
6. Install the rear safety cover and close the rear cover (see CARR-CU 2-2).
7. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.





FRU177 AC Power to Gate Cable Removal and Replacement Procedure

This page contains the steps needed to remove and replace the ac power to gate cable from the control unit. The ac power does not need to be removed from the control unit to remove the gate fan cable.

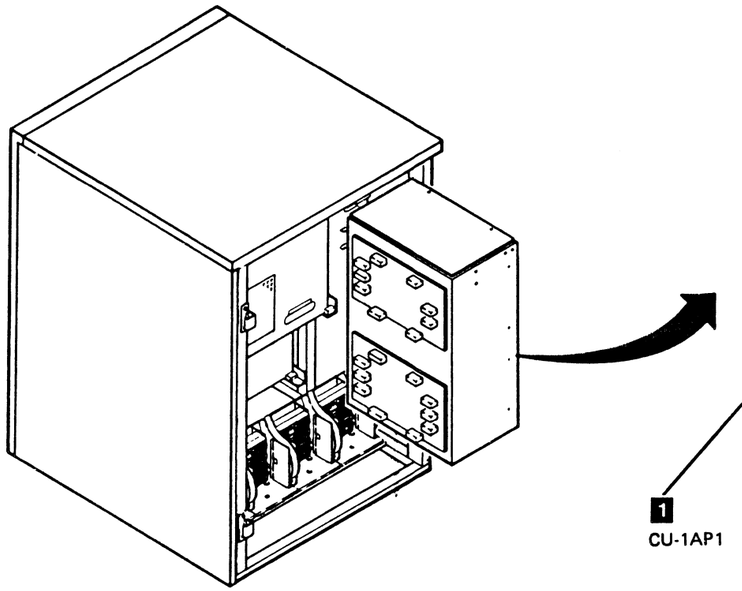
Removing the AC Power to Gate Cable

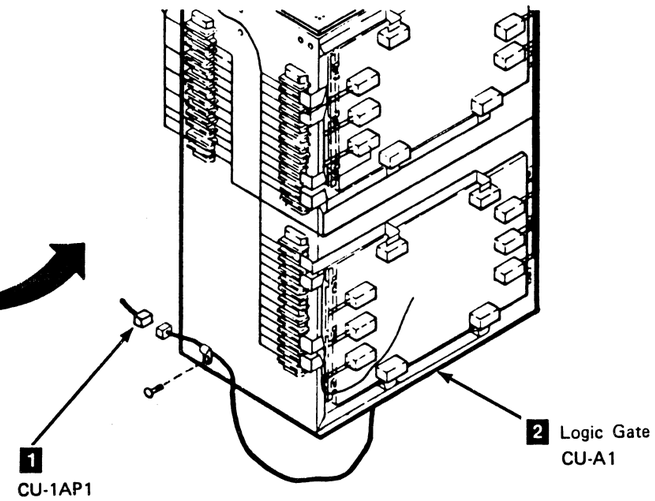
1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the rear safety cover and ground connector, if present (see CARR-CU 2-1 or 2-3).
3. Open the logic gate.

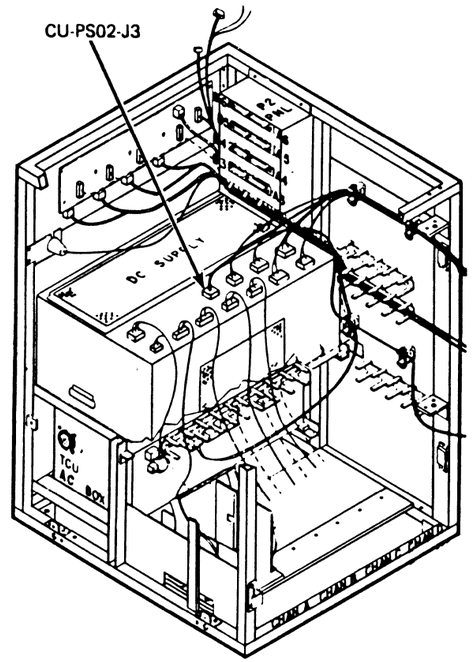
   The ac power to gate cable is located near the bottom hinge of the logic gate and travels to the top rear of the dc power supply.
4. Unplug the connector from CU-PS02-J3.
5. Remove the cable retainers as you remove the cable from the control unit.
6. Disconnect the cable plug at the connector **1** (CU-A1-P1) near the bottom hinge of the logic gate **2**.
7. Remove the cable from the control unit.

Replacing the AC Power to Gate Cable

1. Connect the cable plug to the connector **1** (CU-A1-P1) located near the bottom hinge of the logic gate **2**.
2. Place the cable in the path shown and install the cable retention hardware as you install the cable.
3. Connect the cable to CU-PS02-J3.
4. Close the logic gate.
5. Install the rear safety cover and ground connector, if present and close the rear cover (see CARR-CU 2-2 or 2-4).
6. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.







FRU197 Channel Address Switch Removal and Replacement Procedure

This page contains the steps needed to remove and replace any of the channel address switches 1 from the control unit operator setup panel 2.

All of the drives attached to the control unit must be available for service.

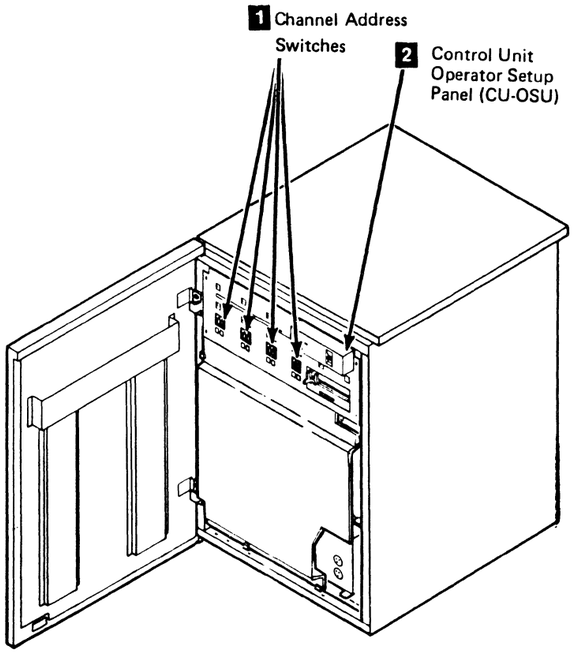
Note: *This FRU can be removed and replaced without affecting the attached tape units by removing dc power from the control unit with the service switch.*

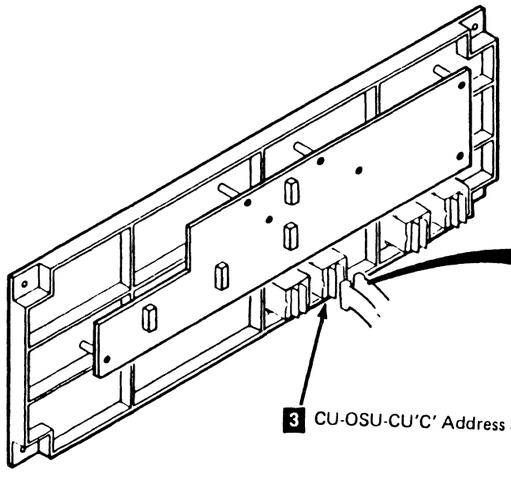
Removing the Channel Address Switch

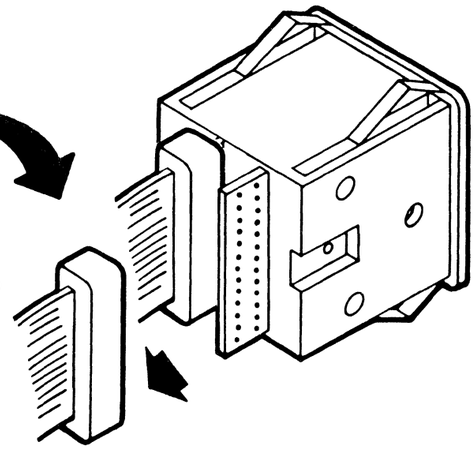
1. Go to CARR-CU 6 for the procedure to remove ***dc power*** from the control unit.
2. Open the control unit rear cover and remove the top cover (see CARR-CU 2-1 or 2-3).
3. Remove the two cables 3 (CU-OSU-J12 and J13) from the rear of the channel address switch you are replacing.
4. Push the channel address switch 1, 4 out from the rear of the control unit operator setup panel 2 by squeezing the retaining tabs 5 and 6 together, and at the same time pushing the switch toward the front of the control unit.

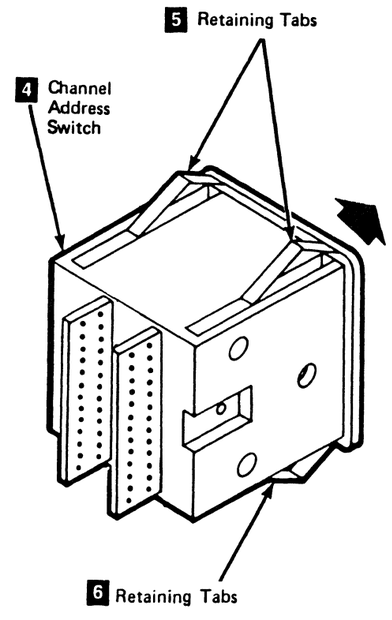
Replacing the Channel Address Switch

1. Place the channel address switch 1, 4 in the proper position so the numbers can be read correctly. Push the switch into the control unit operator setup panel 2 as far as it will go.
2. Connect the two cables 3 (CU-OSU-J12 and J13) to the switch.
3. Replace the control unit top cover and close the rear cover (see CARR-CU 2-2 or 2-4).
4. Go to CARR-CU 6 for the procedure to restore ***dc power*** to the control unit.









FRU198 UEPO Switch Removal and Replacement Procedure

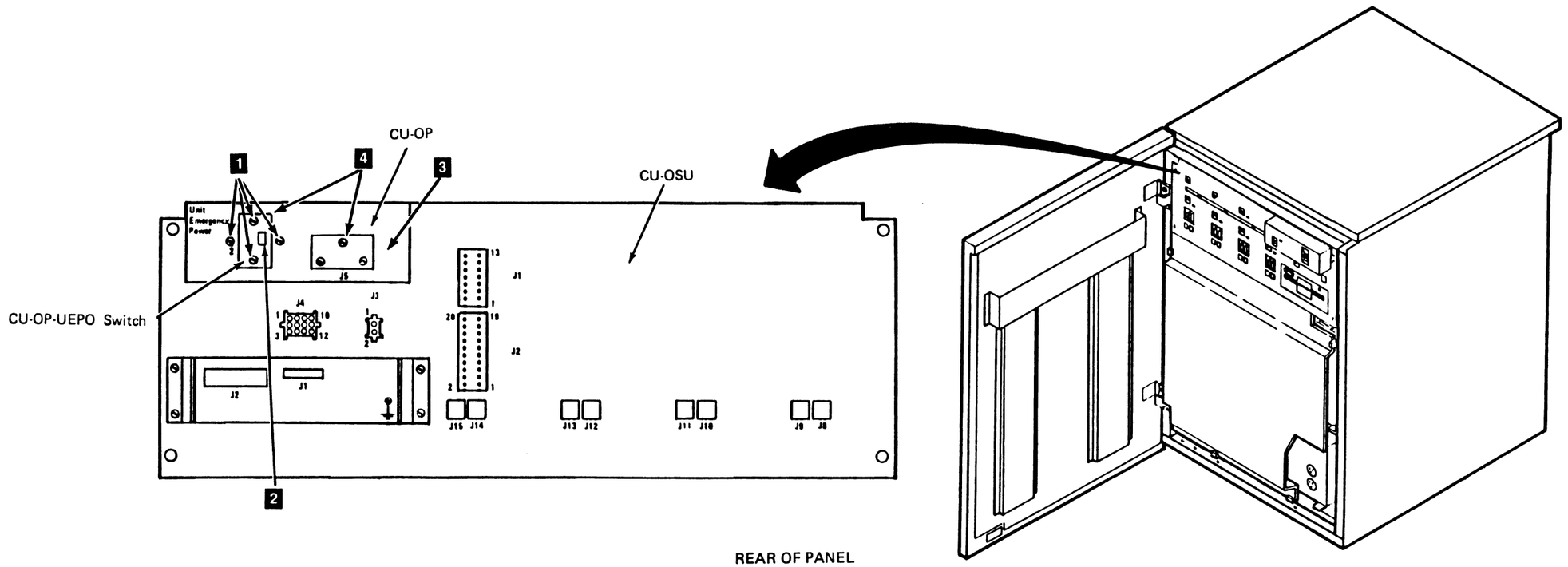
This page contains the steps needed to remove and replace the UEPO switch from the control unit operator panel. Because ac power must be switched off, it is necessary to have all drives attached to the control unit available for service.

Removing the UEPO Switch

1. Go to CARR-CU 6 for the procedure to remove ***ac power*** from the control unit.
2. Open the control unit rear cover and remove the top cover (see CARR-CU 2-1 or 2-3).
3. Remove the EPO switch cable **2**.
4. Remove the four mounting screws **1** holding UEPO switch switch **4** and remove the switch from the control unit switch panel **3** (CU-OP).

Replacing the UEPO Switch

1. Place the UEPO switch **4** into position on the control unit switch panel **3** (CU-OP), and install the four mounting screws **1**.
2. Attach the UEPO switch cable **2** to the connector on the rear of the UEPO switch.
3. Replace the control unit top cover and close the rear cover (see CARR-CU 2-2 or 2-4).
4. Go to CARR-CU 6 for the procedure to restore ***ac power*** to the control unit.



FRU199, 248, 264, and 265 Write Bus Terminator Removal and Replacement Procedure

Control Unit Without BM 6460460 (see CARR-CU 9)

This page contains the steps needed to remove and replace the write bus terminators. Depending on the subsystem configuration, the terminators can be in the control unit, or the end drive attached to the control unit. See LOC 1 for control unit location. The MD will direct you to the proper location. It is not necessary to remove ac or dc power from the control unit to change the terminators, however, it is necessary to have all drives attached to the control unit available for service.

Removing the Write Bus Terminators

1. Find the terminator to be removed.

   There is one 'local' Bus terminator **2** and one 'remote' Bus terminator **3** for each control unit. These terminators will be either in the control unit, or the end tape unit attached to the control unit, depending on your subsystem configuration. The MD will direct you to the proper location.

   - If the terminators are in the end tape unit, open the right cover (see CARR-DR 2-3) on the end tape unit (TU-P2 panel). The terminators are in the upper right corner.
   - If the terminators are in the control unit, open the right cover (see CARR-CU 2-3). The terminators are in the upper right corner.

2. Unsnap the terminator card retainer **1** and swing it out of the way.

3. Remove the terminator card by pulling it straight out.

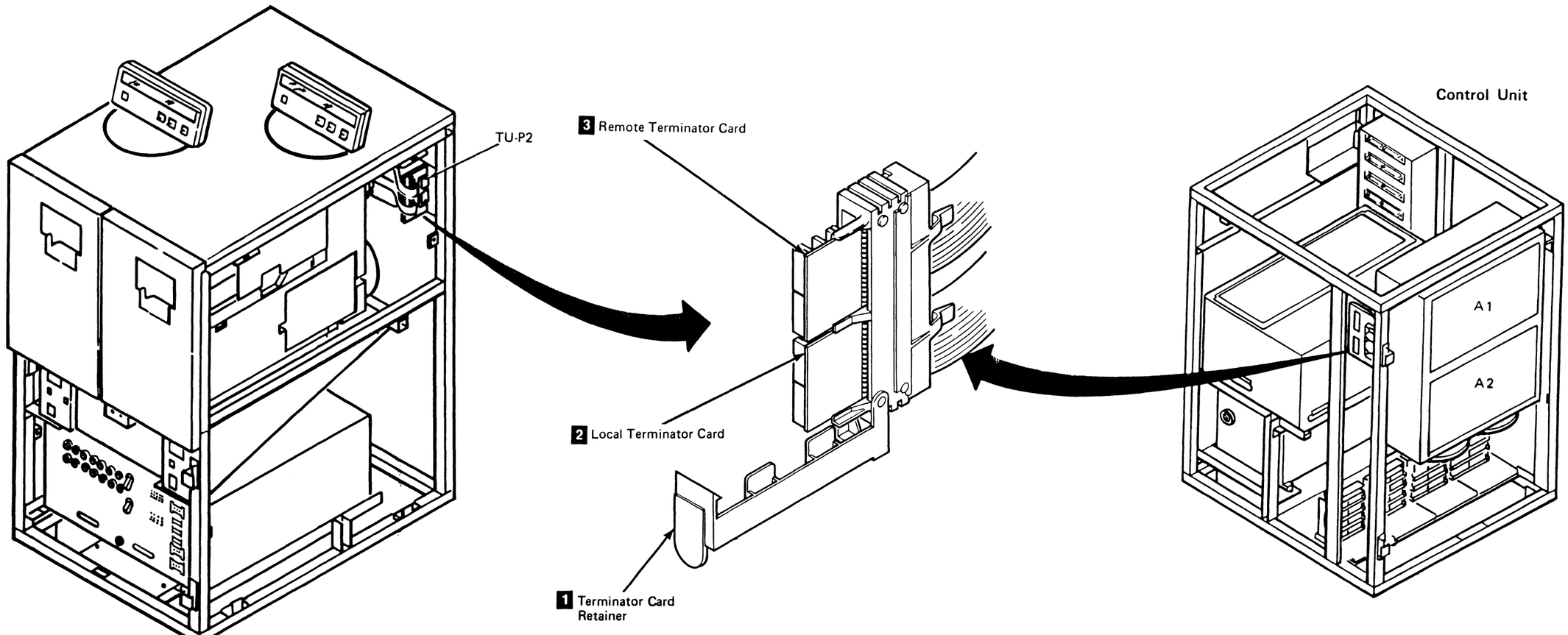
Replacing the Write Bus Terminators

See LOC 1 for control unit location.

1. Insert the 'local' bus terminator card **2** or the 'remote' bus terminator card **3** as shown.

2. Swing the terminator card retainer **1** into position and snap into place.

3. Close all covers on the control unit (see CARR-CU 2-4) and tape drives (see CARR-DR 2-4).



FRU 199, 248, 264, and 265 Write Terminator Removal and Replacement Procedure

Control Unit With BM 6460460 (see CARR-CU 9)

This page contains the steps needed to remove and replace the write bus terminator. Depending on the subsystem configuration, the terminator can be in the control unit, or in the end drive attached to the control unit. The MD will direct you to the proper location. It is not necessary to remove the ac or dc power from the control unit to exchange the terminator, however it is necessary to have all the drives attached to the control unit available for service.

Removing the Write Bus Terminator

1. Find the terminator to be removed.

   There is one write bus terminator **3** for each control unit. This terminator will be either in the control unit or the end tape unit attached to the control unit, depending on your subsystem configuration. The MD will direct you to the proper location.

   If the terminator is in the end tape unit, open the right cover (see CARR-DR 2-1) on the end tape unit. The terminator is located in the interframe connector panel **1** (attached to the right-front of the plenum assembly **2**).

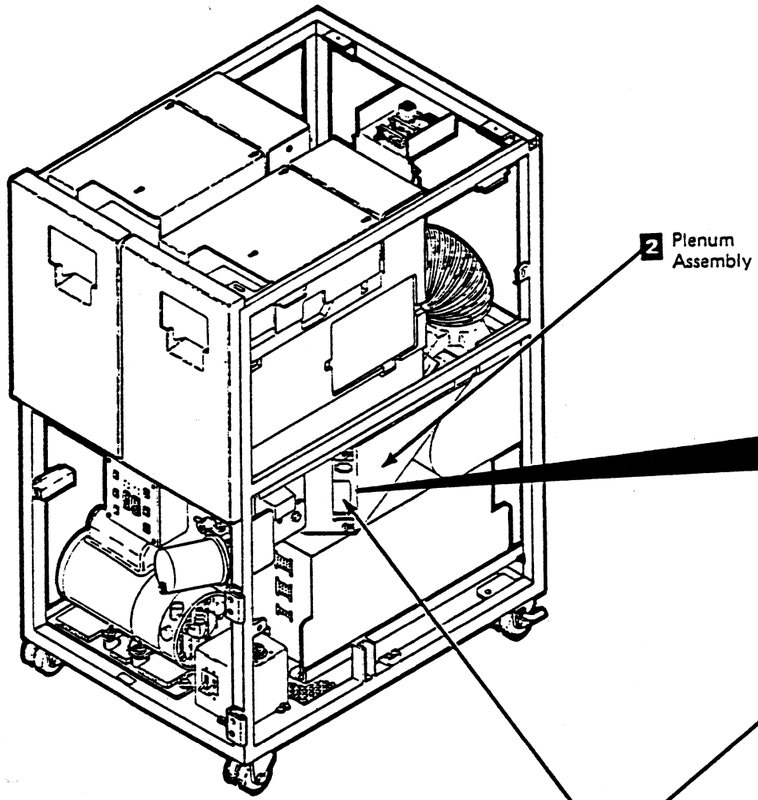
2. If the terminator is in the control unit, open the right cover (see CARR-CU 2-1). The terminator is located in the CU-P1 panel **4**.

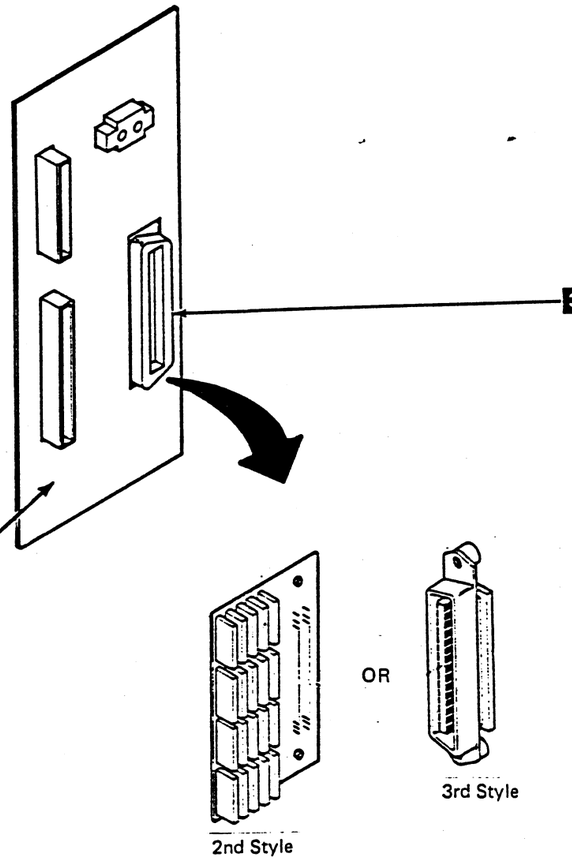
3. Remove the terminator by removing the two mounting screws and pulling the terminator straight out of the connector.

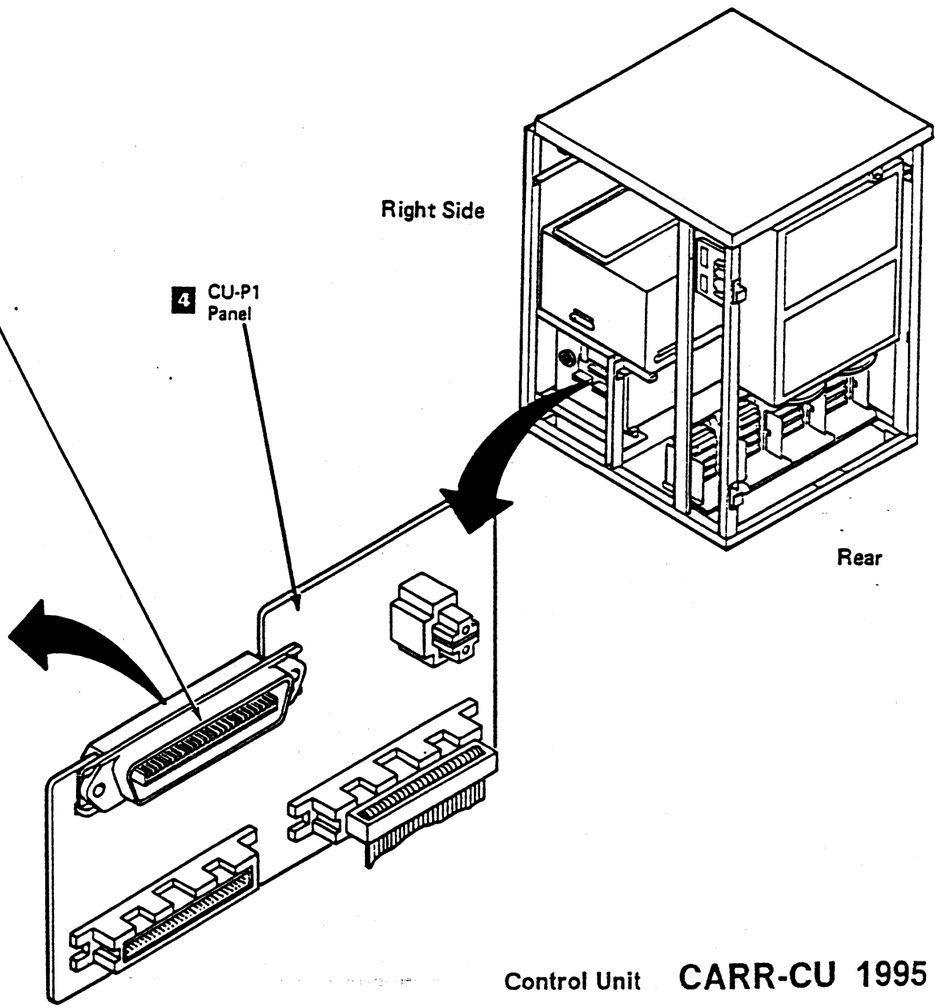
Replacing the Write Bus Terminator

1. Replace the write bus terminator **3** by pushing it straight into the connector (in the control unit or tape unit, depending on your subsystem configuration) and then replace the two mounting screws.

2. Close all covers on the control unit (see CARR-DU 2-2) and tape units (see CARR-DR 2-2).







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FRU 199, 248, 264, and 265 Write Terminator Removal and Replacement Procedure

Control Unit With BM 6460460 (see CARR-CU 9)

This page contains the steps needed to remove and replace the write bus terminator. Depending on the subsystem configuration, the terminator can be in the control unit, or in the end drive attached to the control unit. The MD will direct you to the proper location. It is not necessary to remove the ac or dc power from the control unit to exchange the terminator, however it is necessary to have all the drives attached to the control unit available for service.

Removing the Write Bus Terminator

1. Find the terminator to be removed.

   There is one write bus terminator 3 for each control unit. This terminator will be either in the control unit or the end tape unit attached to the control unit, depending on your subsystem configuration. The MD will direct you to the proper location.

   If the terminator is in the end tape unit, open the right cover (see CARR-DR 2-1) on the end tape unit. The terminator is located in the interframe connector panel 1 (attached to the right-front of the plenum assembly 2).

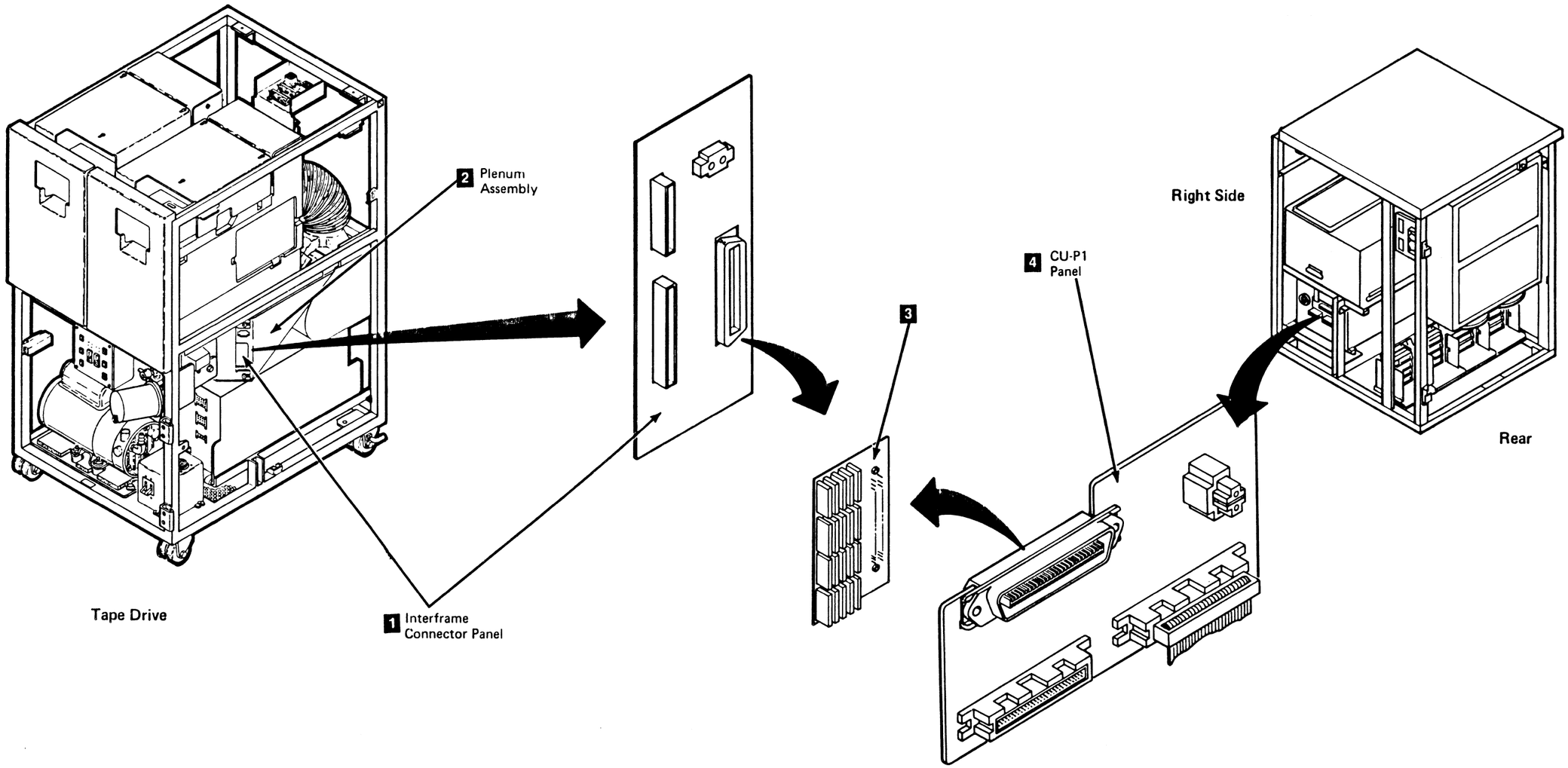
2. If the terminator is in the control unit, open the right cover (see CARR-CU 2-1). The terminator is located in the CU-P1 panel 4.

3. Remove the terminator by removing the two mounting screws and pulling the terminator straight out of the connector.

Replacing the Write Bus Terminator

1. Replace the write bus terminator 3 by pushing it straight into the connector (in the control unit or tape unit, depending on your subsystem configuration) and then replace the two mounting screws.

2. Close all covers on the control unit (see CARR-DU 2-2) and tape units (see CARR-DR 2-2).



FRU224 Control Unit Gate Upper Thermal Switch Removal and Replacement Procedure

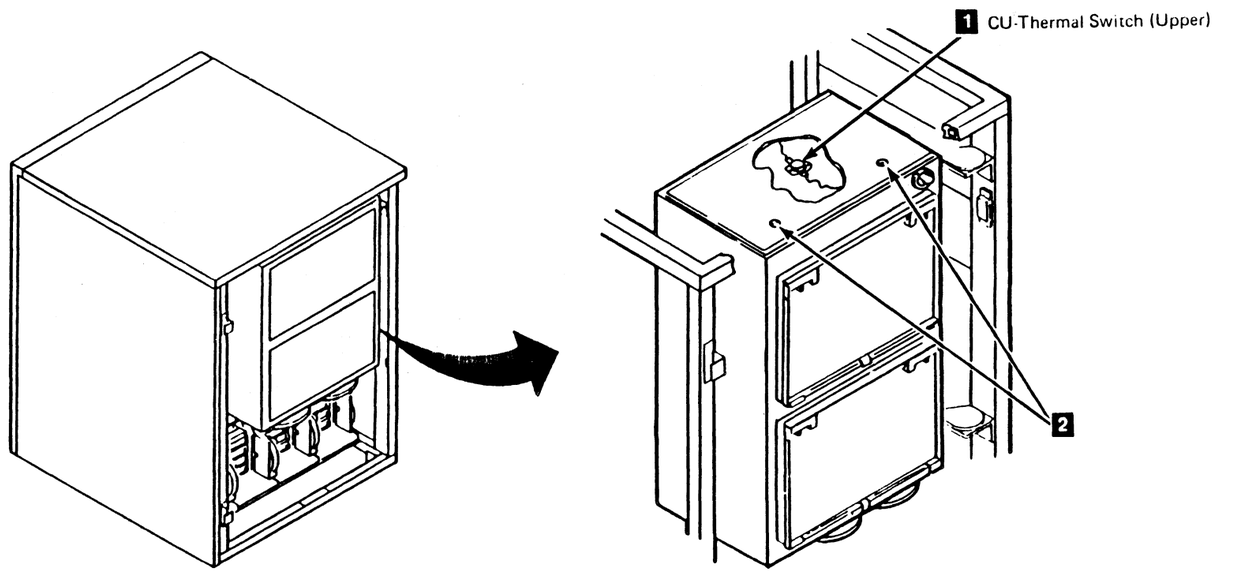
The page contains the steps needed to remove and replace the upper thermal switch in the control unit logic gate. It is necessary to remove the ac voltage from the control unit. All drives attached to the control unit must be available for service.

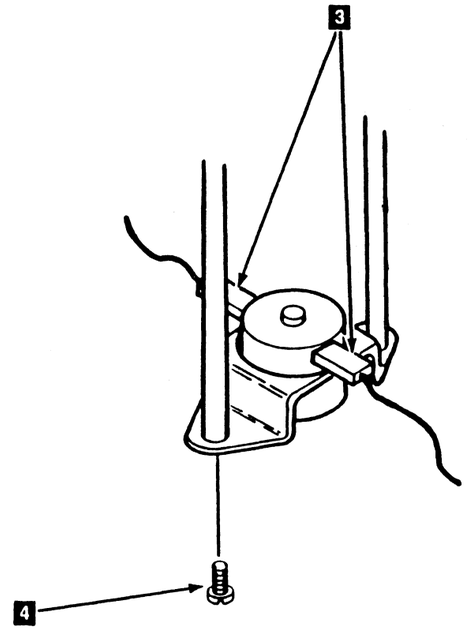
Removing the Control Unit Gate Upper Thermal Switch

1. Go to CARR-CU 6 for the procedure to remove ***ac power*** from the control unit.
2. Open the rear cover of the control unit and remove the safety cover (see CARR-CU 2-1 or 2-3).
3. Swing out the logic gate and locate the two top cover mounting screws **2**, loosen the screws.
4. Raise the cover and disconnect the two wires **3** on the thermal switch, then remove the cover.
5. Remove the two thermal switch mounting bracket screws **4**, and remove the thermal switch **1**. Save the mounting bracket hardware for the replacement procedure.

Replacing the Control Unit Gate Upper Thermal Switch

1. Place the thermal switch **1** in the mounting bracket and attach it to the gate top cover with the two mounting screws **4**.
2. Connect the two wires **3** to the thermal switch.
3. Place the cover on top of the logic gate, and tighten the two mounting screws **2**.
4. Close the gate, replace the rear safety cover, and close the rear control unit door (see CARR-CU 2-2 or 2-4).
5. Go to CARR-CU 6 for the procedure to restore ***ac power*** to the control unit.





FRU258 IML Diskette

About the Initial Program Load (IML Diskette)

The IML diskette is a 5.25" or 3.5" diskette that is used to load the microcode into the control unit for the 3480 subsystem.

Note: The IML diskette has a serial number written on it and on it's label.

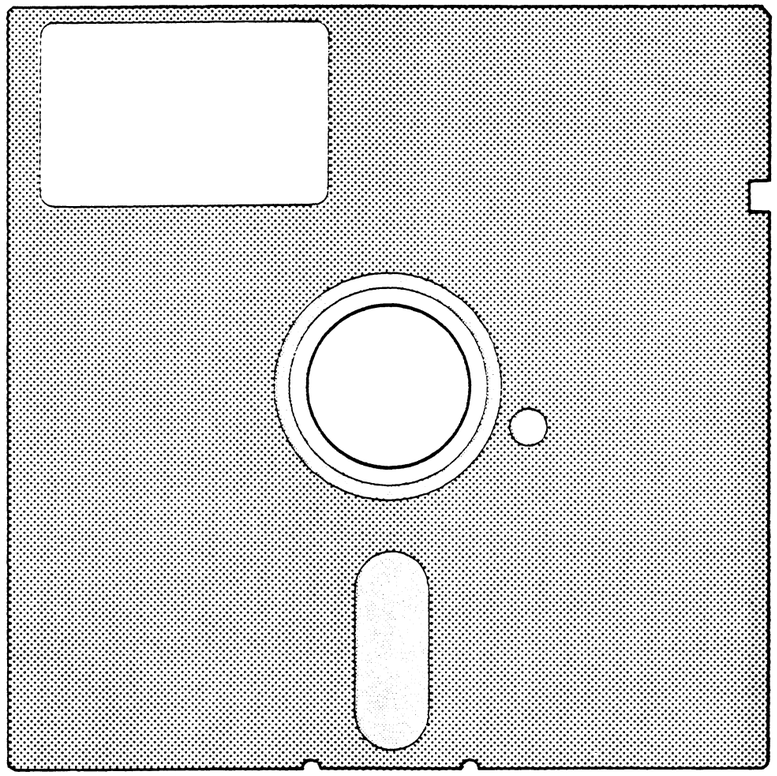
If an IML diskette problem is suspected, use the backup IML diskette for that control unit.

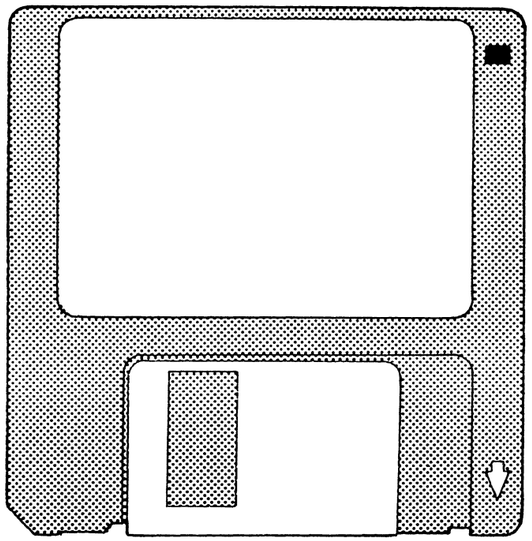
A defective IML diskette cannot be repaired. If the IML backup diskette is used, a new one at the correct EC level must be ordered to replace it.

When the new IML diskette is received, it must be IML'ed in the control unit that does not have a backup IML diskette. See PANEL 7 for IML'ing the 3480. Using the IML diskette causes the control unit serial number to be written on the diskette.

Once the serial number is written on the IML diskette:

1. Remove it from the control unit.
2. Write the control unit's serial number on the new IML diskette label using a felt-tip pen.
3. Save the new IML diskette to use as a backup for that control unit.





FRU279 DC Load Box Removal and Replacement Procedure

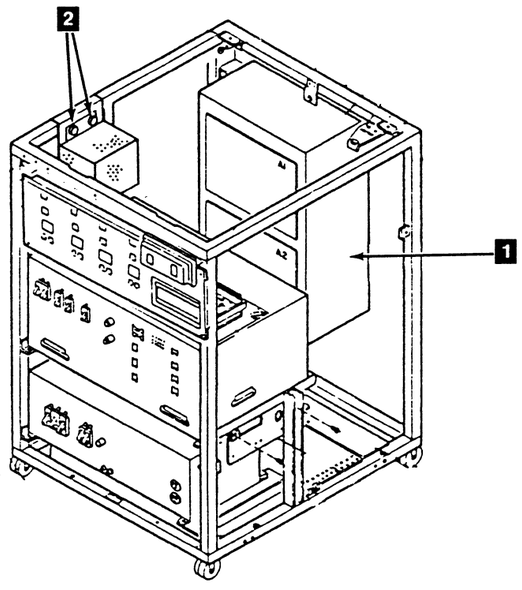
This page contains the steps needed to remove and replace the Load Box in the control unit. It is not necessary to power off the subsystem to remove the load box, however, the dc voltage must be removed from the control unit.

Removing the Load Box

1. Go to CARR-CU 6 for the procedure to remove dc power from the control unit.
2. Open the control unit rear cover and remove the rear safety cover and ground connector, if present (see CARR-CU 2-1).
3. Remove the control unit top cover (see CARR-CU 2-1).
4. Open the logic gate **1**.
5. Disconnect the load box cable from TB1 and TB3 (see ZT010 and ZT020).
6. Remove the two screws **2** from the load box.
7. Lift the load box up and out of the control unit.

Replacing the Load Box

1. Set the load box over the top side rail on the control unit.
2. Install the two screws **2**.
3. Install the load box cable on TB1 and TB3 (see ZT010 and ZT020).
4. Close the logic gate.
5. Install the control unit top cover (see CARR-CU 2-2).
6. Install the rear safety cover and ground connector, if present and close the control unit rear cover (see CARR-CU 2-2).
7. Go to CARR-CU 6 for the procedure to restore dc power to the control unit.



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