WANG

VS-7010 COMPUTER SYSTEM
SPECIAL FIELD SUPPORT

Customer Engineering
Product Maintenance Manual

PREFACE

This document is a Preliminary Product Maintenance Manual (PMM) for the Wang VS-7010 Computer System. The manual is organized in accordance with Customer Engineering Technical Documentation's approved PMM outline. The scope of this manual reflects the type of maintenance philosophy selected for this product.

The purpose of this manual is to provide the Wang-trained Customer Engineer (CE) with sufficient instructions to operate, troubleshoot, and repair the VS-7010 Computer System. The manual will be updated on a regular schedule or as necessary. Such updates will be published either as Publication Update Bulletins (PUBs) or as full revisions.

First Edition (October, 1987)

Use of the material in this document is authorized only for the purpose stated in the Preface, above.

WARNING

DO NOT OPEN THE SWITCHING POWER SUPPLY UNDER ANY CIR-
CUMSTANCE. EXTREMELY DANGEROUS VOLTAGE AND CURRENT
LEVELS, IN EXCESS OF 300 VOLTS DC AND UNLIMITED CURRENT,
ARE PRESENT WITHIN THE POWER SUPPLY.

DO NOT ATTEMPT TO REPAIR THE POWER SUPPLY; IT IS FIELD
REPLACEABLE ONLY.

AFTER POWERING THE UNIT DOWN AND DISCONNECTING THE AC
POWER PLUG FROM THE WALL OUTLET, ALLOW ONE MINUTE BEFORE
REMOVING THE POWER SUPPLY TO PROVIDE ADEQUATE TIME FOR
ANY RESIDUAL VOLTAGE TO DRAIN THROUGH THE BLEEDER RES-
ISTORS.

WARNING

THIS COMPUTER EQUIPMENT HAS BEEN VERIFIED AS FCC CLASS A.

IN ORDER TO MAINTAIN COMPLIANCE WITH FCC CLASS A
VERIFICATION, THE FOLLOWING CONDITIONS MUST BE
ADHERED TO DURING NORMAL OPERATION OF EQUIPMENT.

- ALL COVERS MUST BE ON THE SYSTEM AND SECURED IN THE PROPER MANNER.

- ALL INTERNAL CABLES MUST BE ROUTED IN THE ORIGINAL MANNER WITHIN THE CABLE CLAMPS PROVIDED FOR THAT PURPOSE.

- ALL EXTERNAL CABLES MUST BE SECURED AND THE PROPER CABLE USED TO ENSURE THAT CABLE SHIELDING IS PROPERLY GROUNDED TO THE CABLE CLAMPS PROVIDED.

- ALL HARDWARE MUST BE PROPERLY SECURED.

SECTION 1   INTRODUCTION

SECTION 2   IDENTIFICATION

SECTION 3   CONTROLS AND INDICATORS

Page

Section 3 is not included in the preliminary manual.

SECTION 4   OPERATION

SECTION 5   PREVENTIVE MAINTENANCE

SECTION 6   TROUBLESHOOTING

SECTION 7   REPAIR

SECTION 8   ADJUSTMENTS

Page

SECTION 9   UNPACKING AND SETUP

Page

SECTION 10   FUNCTIONAL DESCRIPTION

Page

Section 10 is not included in the preliminary manual.

SECTION 11   SPECIFICATIONS

SECTION 12   ILLUSTRATED PARTS

SECTION
1
INTRODUCTION

SECTION 1

INTRODUCTION

1.1   Scope And Purpose

This manual contains installation, op-
eration, troubleshooting, and repair infor-
mation for the VS-7010 Computer System, a
full function VS system with multi-user DP
and WP capabilities. This manual also
contains a functional description of the
VS-7010 and an illustrated breakdown of
replaceable parts.

The purpose of the manual is to provide
Customer Engineering personnel with the
information necessary to install, troub-
leshoot, and repair any model of the
VS-7010 in the field. Familiarity with
large VS systems (7110, 7120 and 7150) is
recommended for effective use of this
manual.

1.2   Organization And Layout

This manual is divided into 12 sections numbered 1 through 12. Each section describes a separate maintenance subject and is arranged to minimize references to other sections. Referencing to other frames is made by means of an arrow (→) followed by the section number(s) being referenced.

All or most information pertaining to a specific task is located on a single and/or double frame. Each frame contains illustrations, numbered steps, and/or text describing the individual steps required to accomplish each task. The steps within a frame are numbered in sequence in a clockwise direction around the various illustrations. Each section is preceded by the section number and a section table of contents. The sections and corresponding frames are arranged in numerical sequence from left-to-right and from top-to-bottom on the individual fiche cards.

1.3   Related Documentation

Document	Part Number
Professional Computer	741-1190
PM-004L Monochrome Monitor	741-1647
VS Test On-Line Test Package	741-1767
VS-300 Diagnostic Handbook	741-1742
VS-300 Service Handbook	741-1711
VS-7100 Computer System	741-1721

1.4   Abbreviations And Symbols Used In This Manual (Sheet 1 of 2)

ABBREVIATION/ SYMBOL	DEFINITION
A/D	Analog-to-Digital
AC	Alternating current
AGU	Address Generation Unit
ATU	Address Translation Unit
ANSI	American National Standards Institute
APA	Active Port Assembly
ASSY	Assembly
BIT	Built In Test
BPI	Bits Per Inch
CBL	Cable
CC	Cable Concentrator
CM	Control Mode
CMD	Cartridge Module Drive
CP	Central Processor
CPU	Central Processing Unit
DC	Direct Current
DCS	Diagnostic Control System
DIP	Dual In-line Package
DISKEX	Disk Exerciser
DOS	Disk Operating System
DRAM	Data Random Access Memory
DVM	Digital Voltmeter
EAPA	Electrically Active Port Assembly
ECC	Error Correction Code
EIA	Electronic Industries Association
EOT	End Of Tape
FCC	Federal Communications Commission
FMD	Fixed Module Drive
FRU	Field-Replaceable Unit
GATC	Gate Array Telecommunications
HEX	Hexidecimal Notation (H)
I/O	Input/Output
IOC	Input/Output Controller
IOP	Input/Output Processor
IOSW	Input/Output Status Word
IPB	Illustrated Parts Breakdown
IPC	Interprocessor Communications
IPL	Initial Program Load
KG	Kilogram
LED	Light-Emitting Diode
M	Mega, (Million)
MBPS	Megabits Per Second
MCU	Memory Control Unit
MLTC	Multiline Telecommunications
MM	Main Memory
MODEM	Modulator/Demodulator
NEMA	National Electrical Manufacturers Association

1.4   Abbreviations And Symbols Used In This Manual (Sheet 2 of 2)

ABBREVIATION/ SYMBOL	DEFINITION
NRZI	Nonreturn to Zero
OS	Operating System
P-BAND	Peripheral Band
P/N	Part Number
PC (SCU)	Professional Computer (Support Control Unit)
PCA	Printed Circuit Assembly
PDA	Physical Device Address
PDU	Power Distribution Unit
PE	Phase Encode
PF	Program Function
PM	Preventive Maintenance
PREX	Printer Exerciser
RAM	Random Access Memory
RF	Radio Frequency
RSAF	Remote System Administrative Facility
RSD	Removable Storage Drive
SBI	System Bus Interface
SCU (PC)	Support Control Unit (Professional Computer)
SCUI	Support Control Unit Interface
SMD	Storage Module Drive
SPB	Support Packet Bus
SPS	Switching Power Supply
SQB	Status Qualifier Byte
SVC	Supervisor Call
SW	Switch
SYSGEN	System Generation
TAC	Technical Assistance Center
TC	Telecommunications
TP	Test Point
TPEX	Tape Exerciser
V	Volts
VS	Virtual Storage
VTOC	Volume Table Of Contents
WS	Workstation
WLI P/N	Wang Laboratories, Inc. Part Number
WSEX	Workstation Exerciser

SECTION
2
IDENTIFICATION

SECTION 2

IDENTIFICATION

2.1   Major Assemblies

2.1.1   System Components

VS-7010 Computer
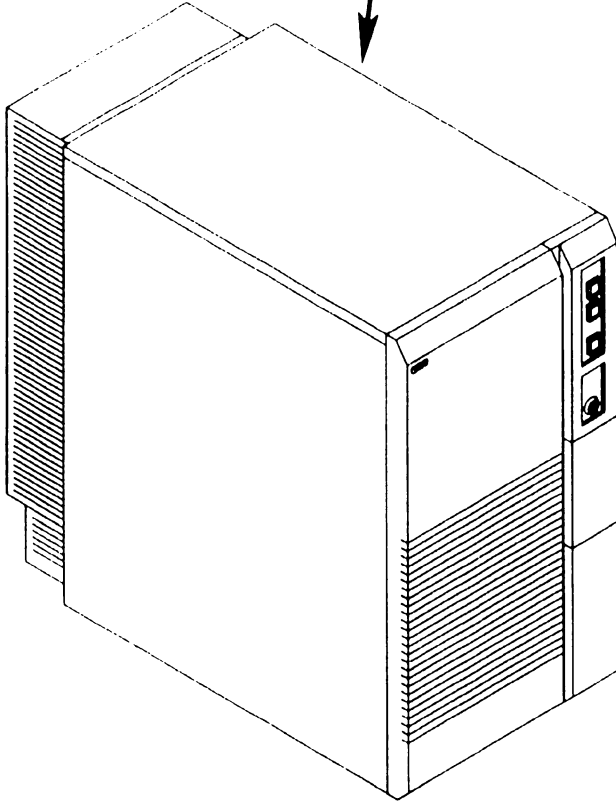
SCU (PM-004L) Monitor
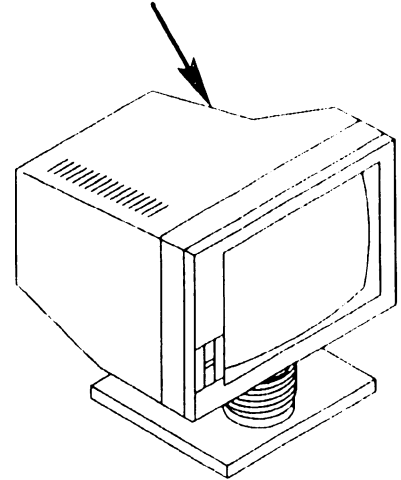
Support Control Unit
(Professional Computer)
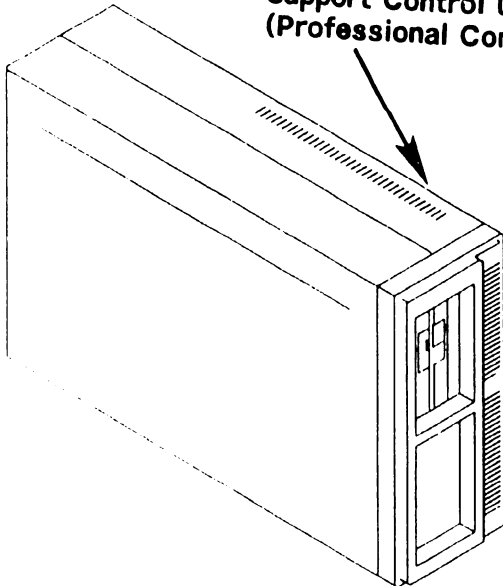
SCU (720) Keyboard
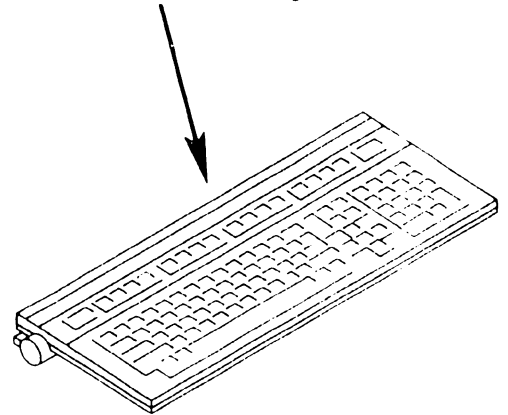
2.2   VS-7010 Computer Major Parts (Front View)

Cable Rack

Card Cage

Fan Shroud Assembly

DC Power Distribution Unit

DC Fans

Power Controller Board

Multioutput Power Supply

Front Fan Housing

Control Panel Assembly

Power Supply Access Plate
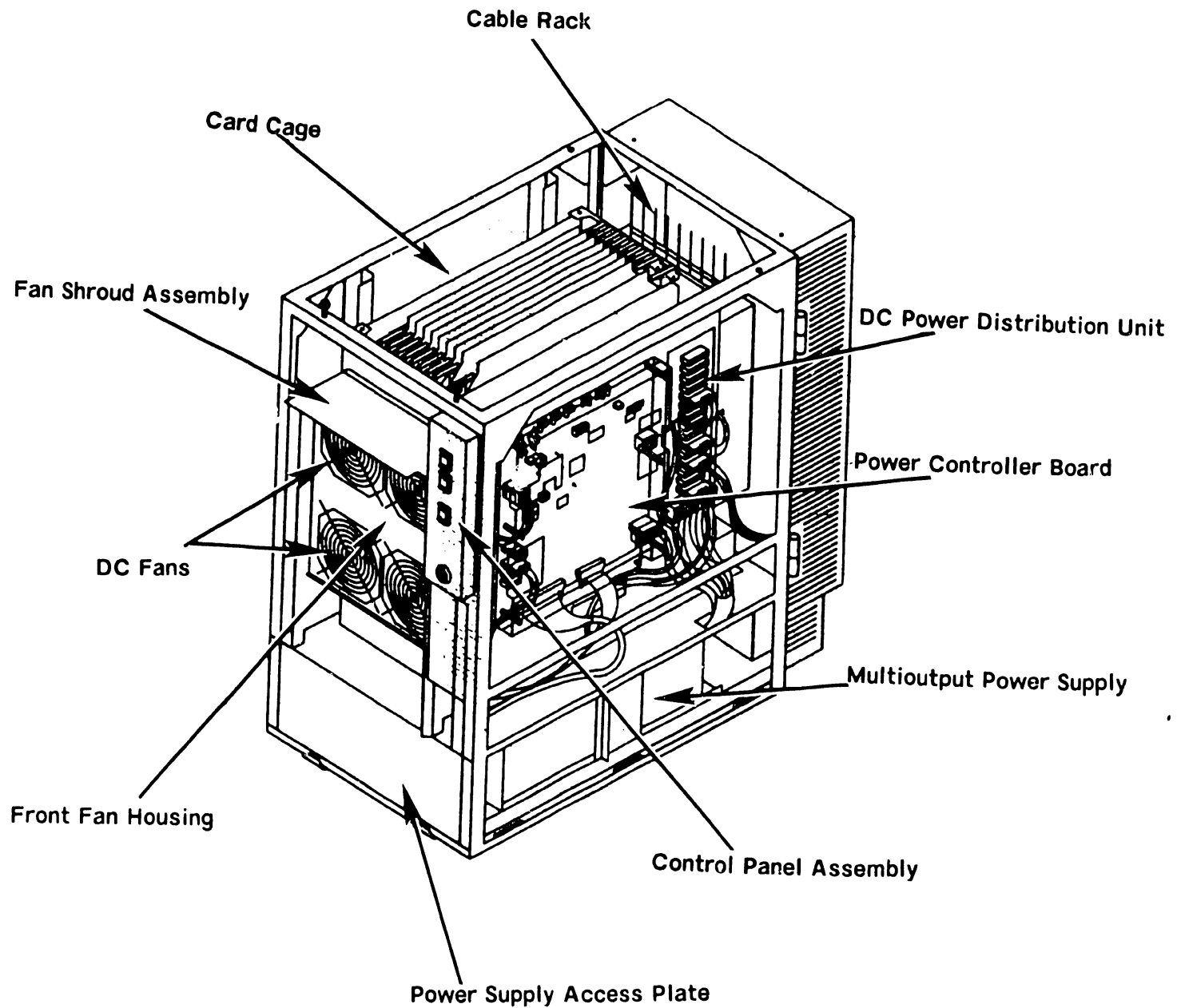
2.3   VS-7010 Computer Major Parts (Rear View)

Card Cage Cover

EAPA

Rear Door

SMD Panel

AC Power Cable

AC Power Distribution Unit

Rear Fan Housing

DC Fans

Bus Bar Shield
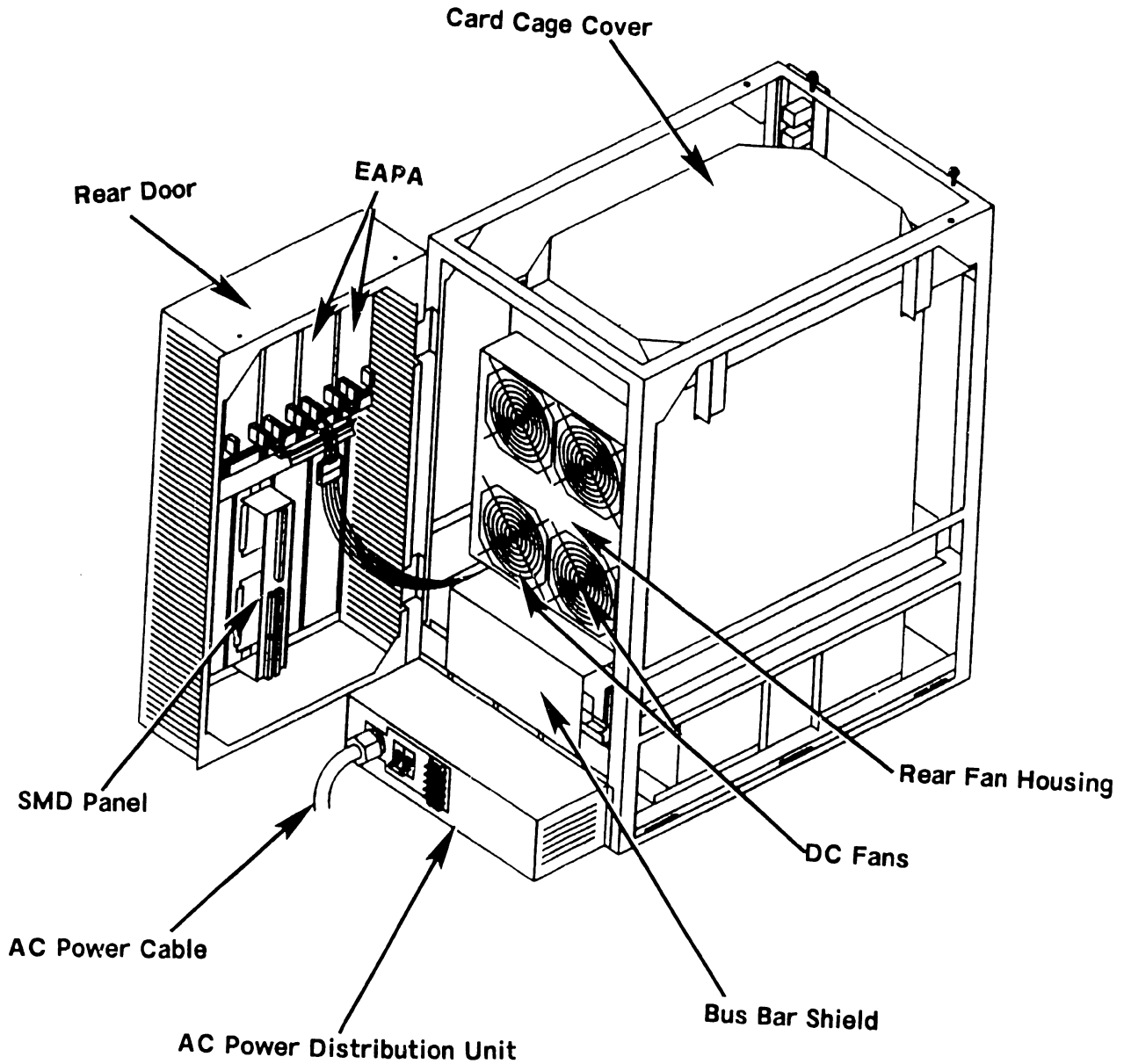
2.4   VS-7010 Card Cage Major Parts
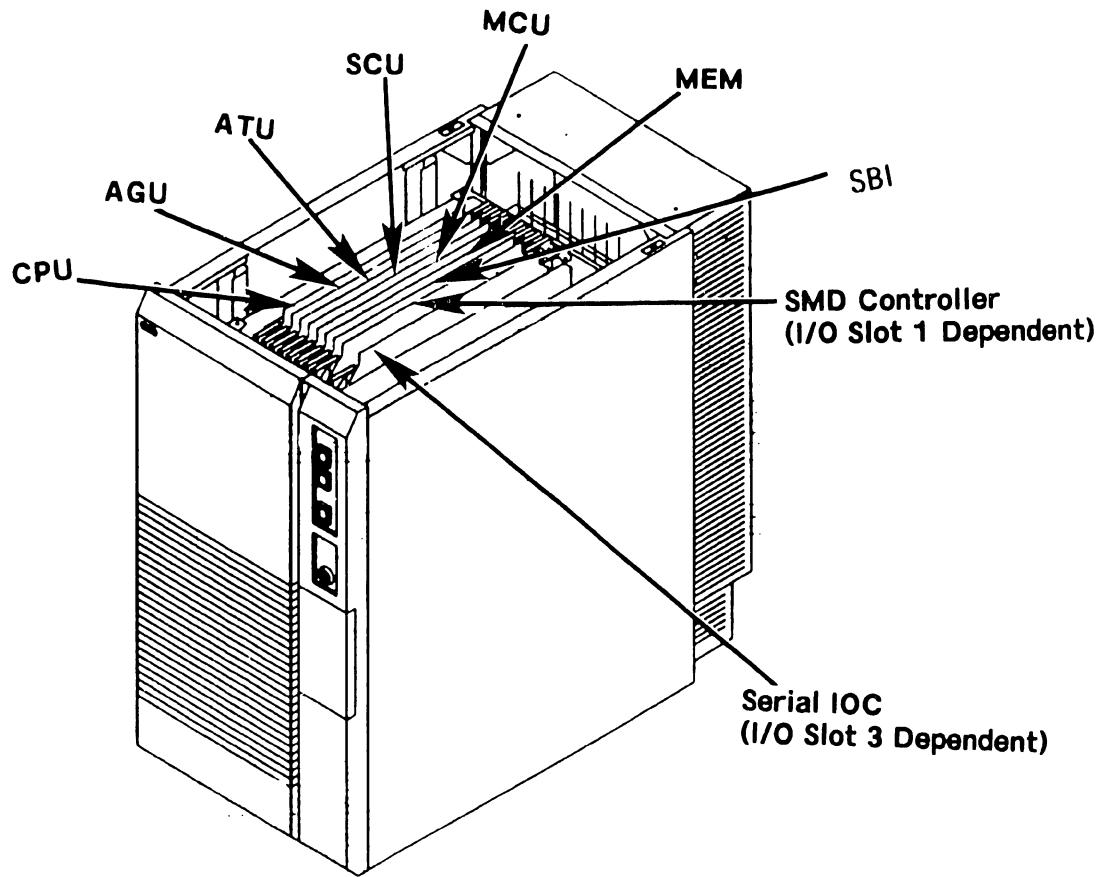
2.5   Support Control Unit (PC) Major Parts (Front View)

360KB Floppy Drive

20MB Winchester
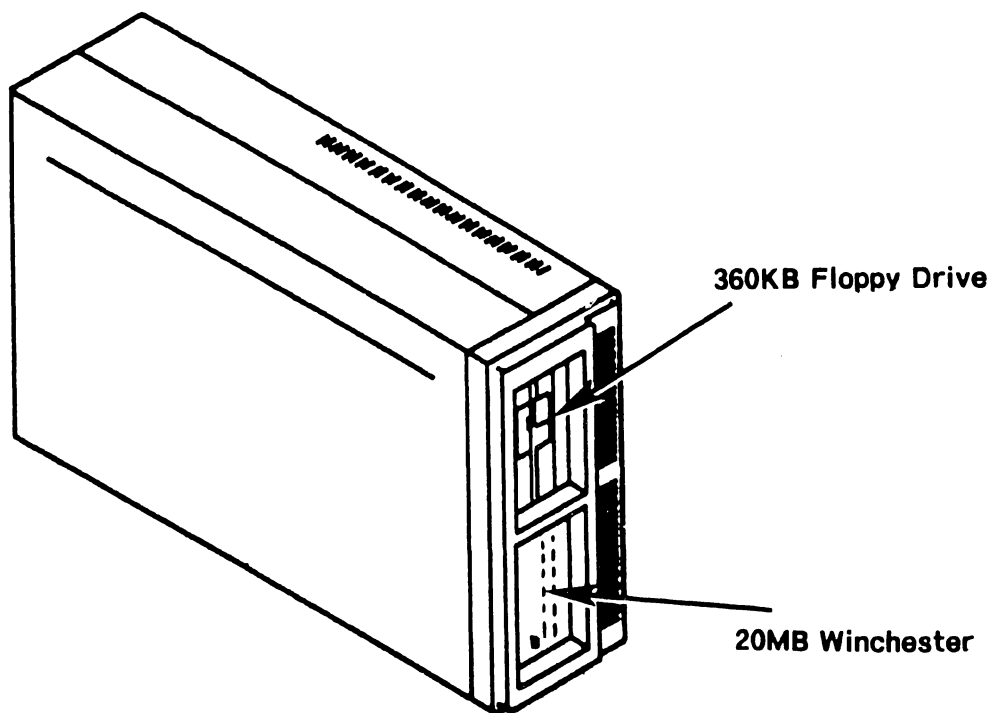
2.6   Support Control Unit (PC) Major Parts (Rear View)

Monochrome Monitor Board

PCI (PC to SCU Interface)
(VS-7010 Unique)

Single Board Local
Communications Controller

SCU Interface Cable

Winchester Controller

CPU/System Board
With 512KB Memory (VS-7010 Unique)
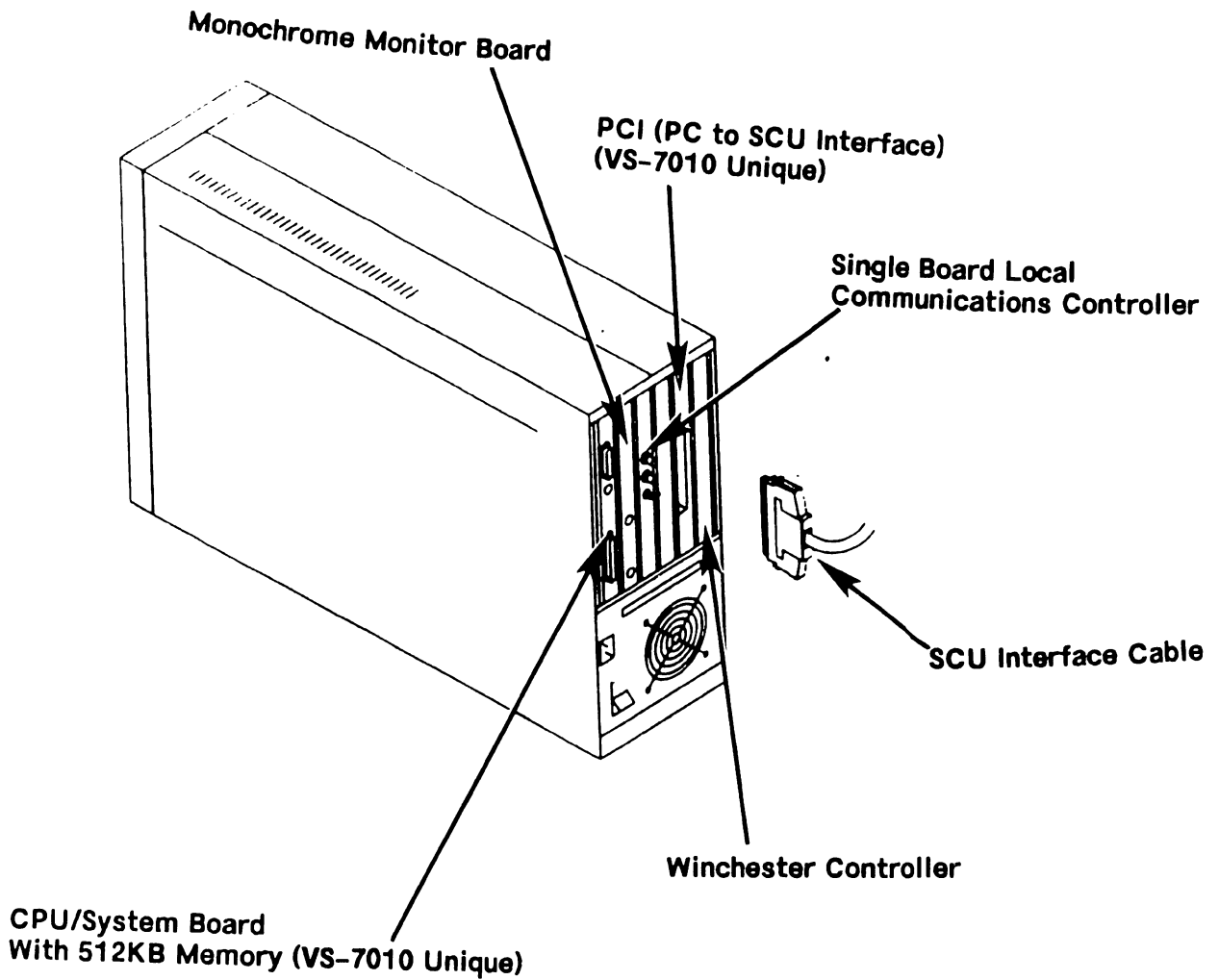
SECTION
3
CONTROLS AND
INDICATORS

SECTION 3

CONTROLS AND INDICATORS

This section is not included in the Preliminary VS-7010 Computer System manual.

SECTION
4
OPERATION

SECTION 4

OPERATION

COMPANY CONFIDENTIAL

4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 1 of 14)

CAUTION

Improper power-on procedure may damage
disk and tape drives Volume Table Of
Contents (VTOC). Perform power-on
procedures as follows.

---

1) Power-on all workstations and
    printers.

2) Position all external drives ac
    On/Off circuit breakers to the On
    position.

3) Position mainframe ac On/Off
    circuit breaker to the On position.

ON
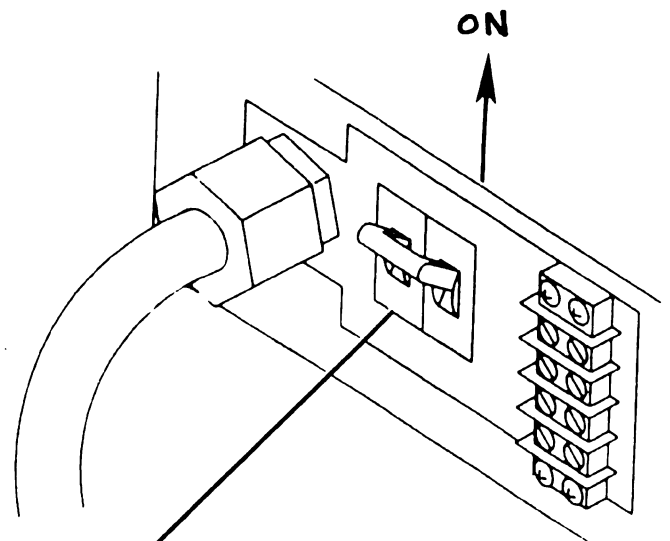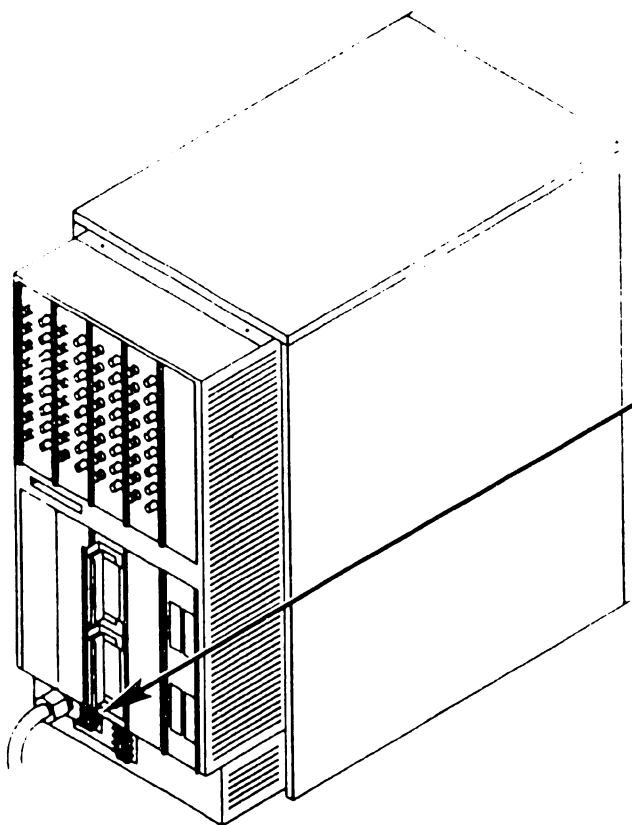
4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 2 of 14)

4)   Position control panel keyswitch to
     'Normal Control' position.

5)   Power-on   mainframe   by   pressing
     control panel ON pushbutton.
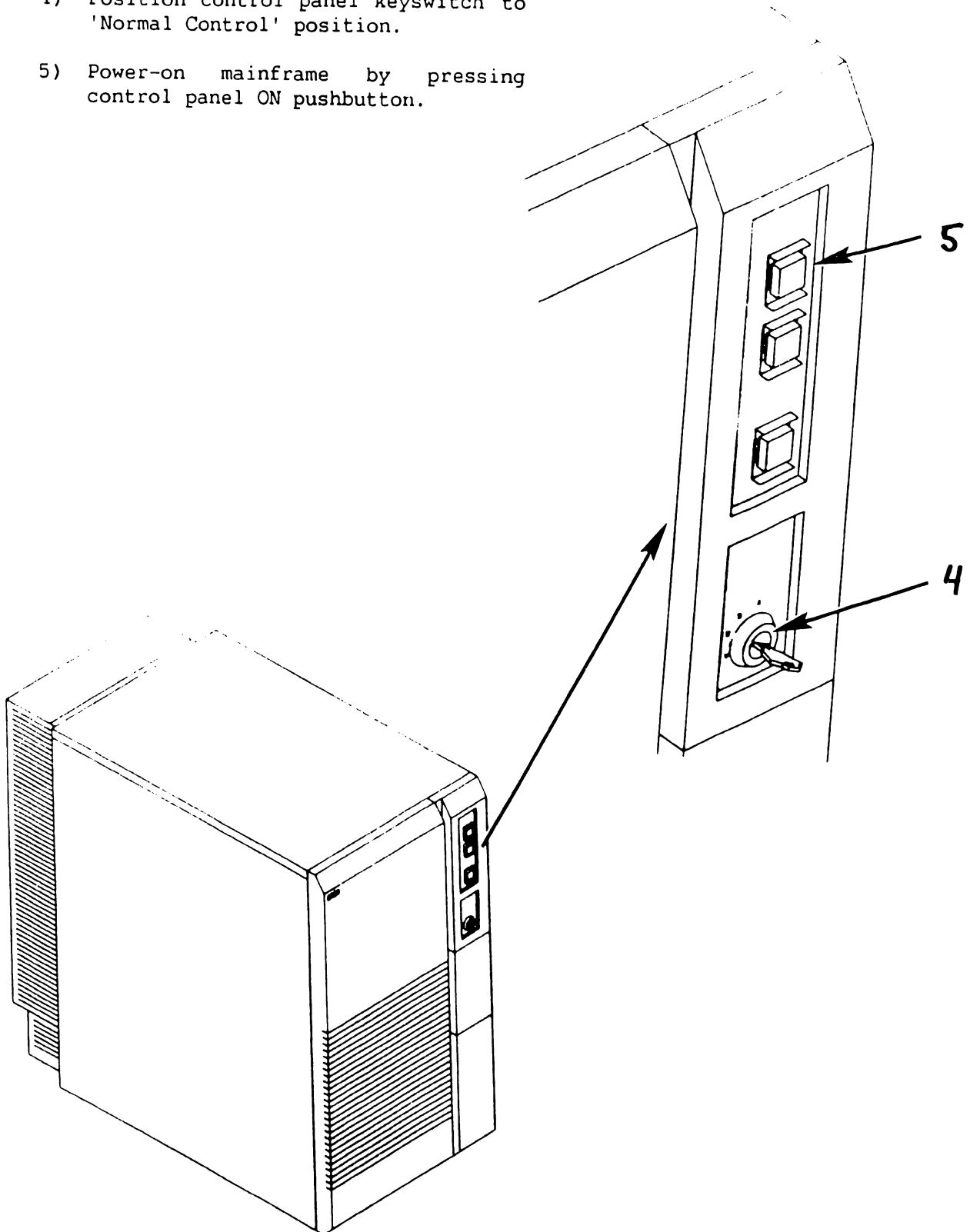
4.1   Power–on and B.I.T. Diagnostic Procedure (Sheet 3 of 14)

6) Power-on SCU (PC) by pressing ac
    On/Off power switch to the On (1)
    position.

7) 'READY' external disk drives.
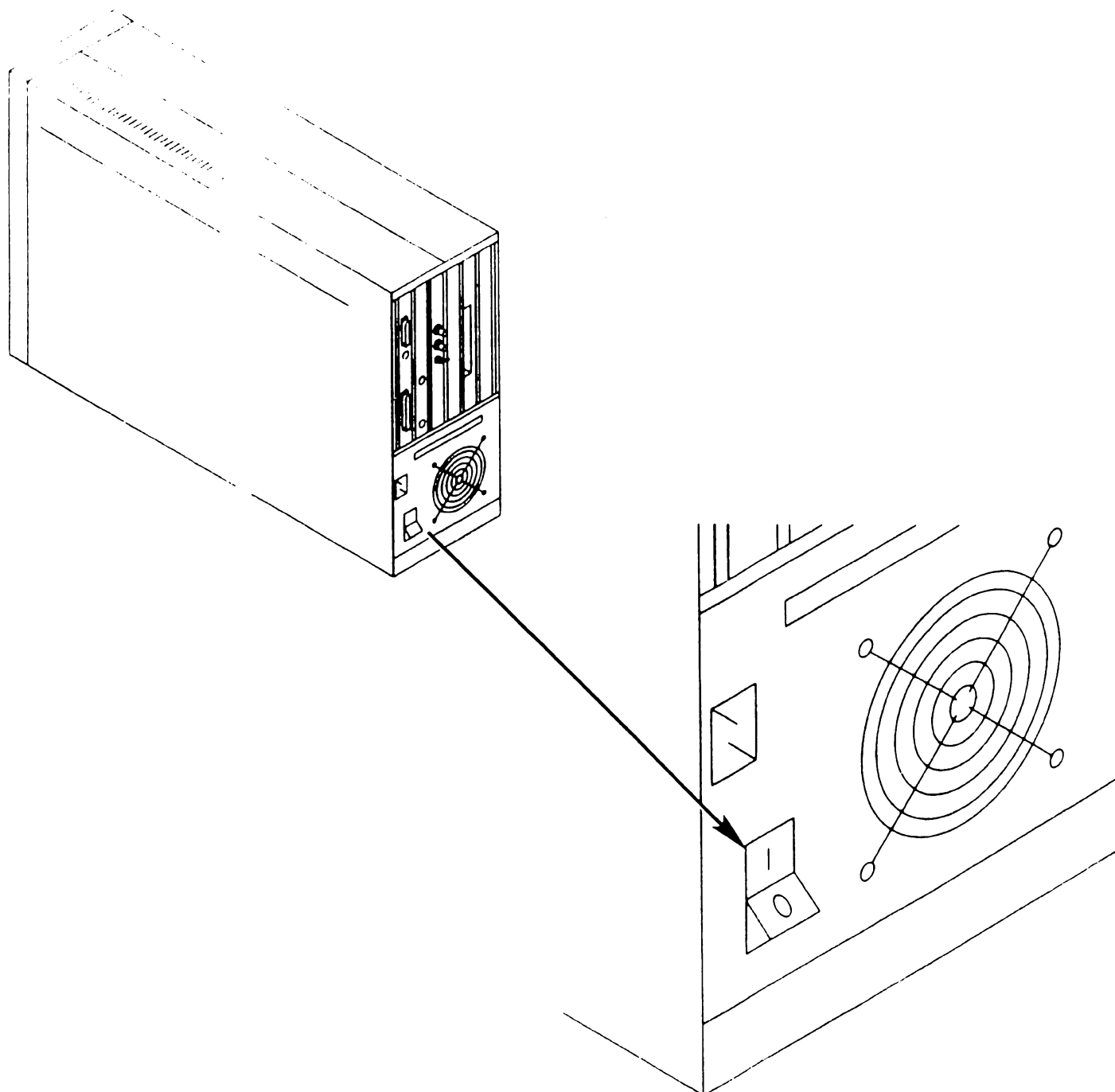
4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 4 of 14)

8) Press   mainframe   System   Reset
     pushbutton.
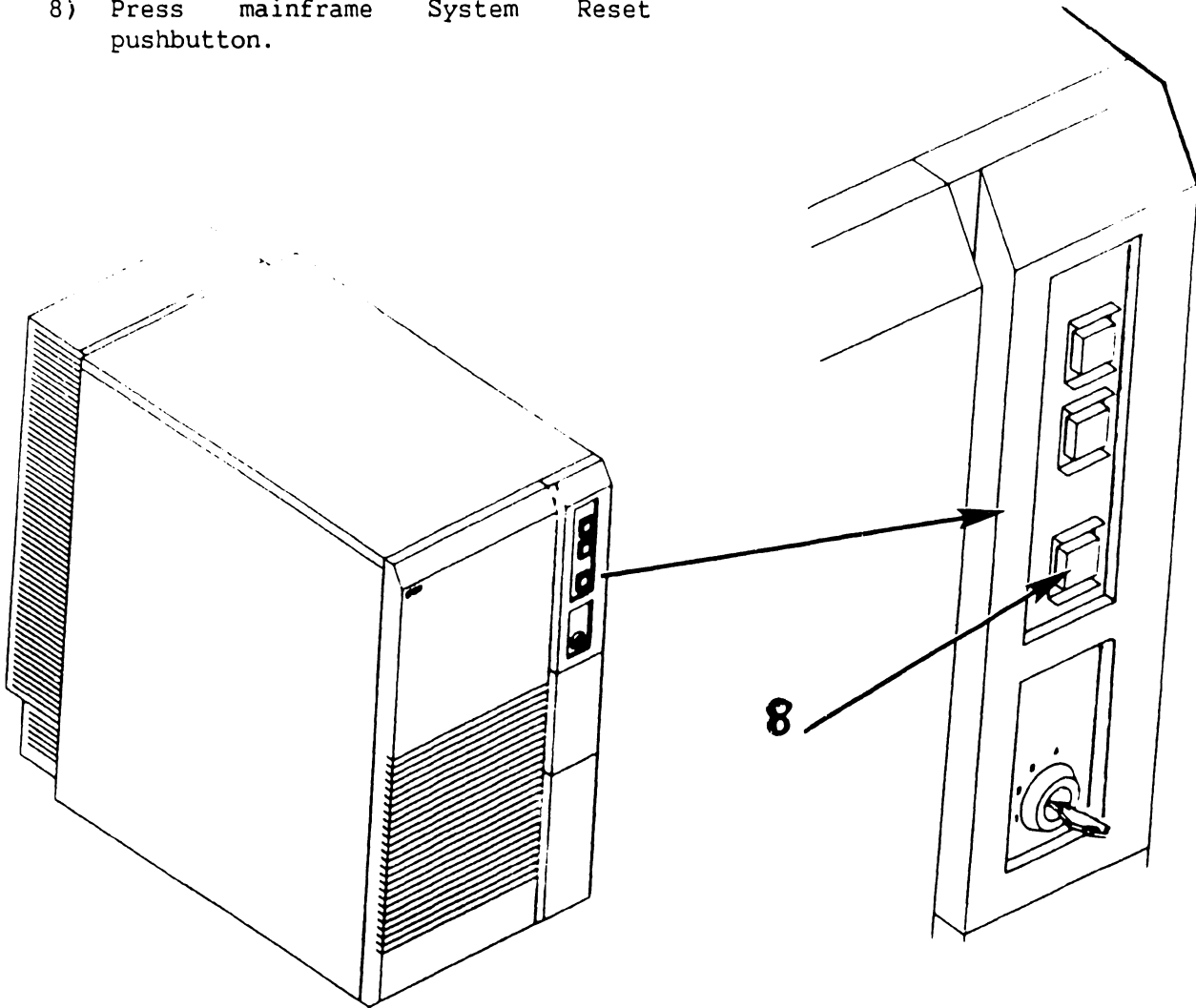
9) The SCU Start-Up screen is invoked
     and the following Start-Up message
     is displayed on the SCU screen.

WANG SUPPORT CONTROL UNIT REV. x.x.x
01 Start From Winchester

4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 5 of 14)

10) In a few seconds, the following is
    displayed on the SCU screen.

```
Wang Support Control Unit - BIOS x.x.x
MS-DOS Version x.x.x


                          WANG

                    System Console

          Copyright Wang Laboratories, Inc., 1987
```

4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 6 of 14)

11) The Console Processor Menu screen
    is then displayed.

NOTE

High-Lighted functions are functions
allowed by the selected keyswitch
position.

```
            <<<   System in Control Mode   >>>

            ***   Wang VS System Console   ***

SYSCON version x.x.x          11:03 AM          Monday, October 5, 1987

          Press (HELP) for online system console information.


          Use the function keys to select a command.

     (1) ENTER Workstation Emulation      (8) Easy IPL And Dump
     (2) ENTER CP Control                 (9) Display Slot Contents


     (5) AUTO IPL                        (12) Set Console Defaults
     (6) RSAF Functions                  (13) Set Time and Date
```

NOTE

System IPL can be accomplished in three
ways: PF5 (AUTO IPL), PF8 (Easy IPL and
Dump), and PF2 (Enter CP Control)
(¬9.7.2). The following IPL sequence is
performed using selection PF5 (AUTO IPL).

4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 7 of 14)

12) Press   PF5   (AUTO   IPL).   The
    following message is displayed

WARNING!! This function resets the system, **RETURN** to proceed or
PF16 to abort"

13) Press 'RETURN'.   The Workstation
    Initialization screen is displayed.

NOTE

If console defaults are incorrect or if
CPU code has not been loaded, a CPU
error or IPL Error will be displayed
(⁻6.x.x). Select 'Set Console Defaults
(PF12)' from the VS System Console
Default screen to correct defaults and
to load system microcode (⁻9.7.2).

Wang
VS
Workstation Emulation
Version x.xx

Initialization in Progress - Please Wait

4.1   **Power-on and B.I.T. Diagnostic Procedure (Sheet 8 of 14)**

14) Within a few seconds, the SYSGEN
    Configuration screen is displayed.

NOTE

If a configuration file has not been
created, the system should be IPL'ed as
one workstation and one disk (PF1 key)
to allow system configuration file
creation using GENEDIT (→9.7.3).
Default values @CONFIG@ and @SYSTEM@
are used for configuration file and
system library, respectively.

```
      ***   MESSAGE M001 BY SYSGEN

             INFORMATION REQUIRED BY PROGRAM @SYSGEN@

                Active Subprogram is @SYSGEN@

           Copyright, Wang Laboratories, INC. 1985

    Specify the name of the system configuration file and press (ENTER)
                              - or -
         Press (1) to use one workstation and one disk.

                    SYSFILE = @CONFIG@
                    SYSLIB  = @SYSTEM@

    Specify the communications configuration file to be used, if any

                    COMMFILE = ■■■■■■■
                    COMMLIB  = @SYSTEM@

    Inhibit logons at all workstations?              LOGONS = NO□
          Load Microcode to all Devices?             LMCODE = NO□
       Inhibit Dumping Continuable Halts?            CNDUMP = NO□
```

4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 9 of 14)

15) The SYSGEN screen displays the name
of the configuration file last used
(SYSFILE Field). Enter a valid
configuration file name in the
field 'SYSFILE'. If the system is
using communications, specify the
communications configuration file
name and library.

16) Respond to prompts as follows:

'Inhibit Logons at all workstations? Logons = NO□':
This prompt offers the option to
inhibit logon operations for all
workstations. If YES is answered,
all workstations except SCU (PC)
will be inhibited from logon
operations. Default value is NO.

'Load Microcode to all Devices? LMCODE = NO□':
This prompt allows optional loading
of microcode to all devices on the
system with loadable microcode,
including remote workstations.
(Note that most devices load
microcode when the device is first
powered-on). If YES is selected,
the system loads microcode to all
microcode loadable devices, thus
slowing down the IPL process
significantly. Default value is NO.

'Inhibit Dumping Continuable Halts? CNDUMP = NO□':
This prompt enables or disables
continuable dumps. If YES is
selected, the system does not run
continuable dumps, the error remains
and system operation may be
affected. Default value is NO.

4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 10 of 14)

17) Press 'RETURN'. The Initial Program
    Load (IPL) screen is displayed.

```
  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
 *                                                                     *
  *   WWWW       WWWW       AAA      NNN         NNN      GGGGG        *
   *    WW       WW         AA AA    NNN          NN     GG    GG     *
  *     WW       WW        AA   AA   NN  N        NN    GG        GG   *
  *     WW  WW   WW        AA   AA   NN     N     NN    GG             *
  *     WW  WW   WW       AAAAAAAAAA NN        N  NN    GG      GGGG    *
  *      WW WWWW WW        AA    AA  NN        N  NN    GG        GG   *
   *      WWWW  WWWW       AA    AA  NN           NNN   GG        GG    *
    *      WW    WW       AAAA   AAAA NNN         NNN     GGGGG       *
     *                                                                *
  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
```

© Copyright Wang Laboratories, Inc. 1985

O.S. xx.xx.xx   **System Generation In Progress**   CP: xx.xx.xx

```
        VVVV     VVVV              SSSSSS
         VV       VV            SSS      SSS
         VV       VV            SSS
         VV       VV             SSSSS
          VV     VV                 SSSSS
           VV   VV                     SSS
            VVVV               SSS      SSS
             VV                   SSSSSS
```

18) The system checks critical operating
    system components for compatibility.
    If no problems are detected, the IPL
    continues.   The   message   'System
    Generation In Progress' is displayed
    in the center of the screen.

NOTE

If an incompatibility exists, the IPL
sequence is stopped and a warning
message is displayed by @SYSGEN@.

4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 11 of 14)

19) Once system generation has completed
    successfully, the following message
    is displayed.

I/O Subsystem Load in Progress

NOTE

The Date and Time screen will only
appear if the SCU real time clock data
is not useable or if N(o) is selected
from the VS System Console Defaults
menu (→ 9.7.2).

---

20) In about one minute, the Time and
    Date screen is displayed.

```
***   MESSAGE WN3 BY IPL

              INFORMATION REQUIRED BY PROGRAM @SYSGEN@

SET DATE AND TIME

YEAR = YY            MONTH  = MM         DAY    = DD
HOUR = HH            MINUTE = MM         SECOND = SS

Memory Size = 08192 K
```

21) Enter the date in the YY/MM/DD
    format. Enter the current time
    using the 24-hour clock format and
    press ENTER.

4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 12 of 14)

22) The following message is displayed:

> System Initialization In Progress

23) When system initialization completes
    successfully,   the   Operator's
    Console screen is displayed.

```
              ***  Wang VS Operator's Console  ***
         10:12 AM          Friday        October 30, 1987

Position to (*) and Press (ENTER) to Provide Immediate Operator Service:

*MSG from QVR: Queue Verification Routine Complete  . . . . .  10:12

                 Press (1) to Return to User Mode
                            - or -
                 Use the Function Keys to Manage:

         2)  PRINT Queue              9)  PRINTERs
         3)  PROCEDURE Queue         10)  DISKs
         4)  TRANSMIT Queue          11)  TAPEs
         5)  RETRIEVE Queue          12)  TELECOMMUNICATIONs
                                     13)  WORKSTATIONs
         6)  INTERACTIVE Tasks
         7)  NON-INTERACTIVE Tasks   14)  SYSTEM Options

   Press (HELP) at Any Time to Return to the Operator Console Menu
```

24) When the message 'Queue Verification
    Routine   Complete'   appears,
    acknowledge   the   message   by
    positioning the cursor next to the
    message and press RETURN.

4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 13 of 14)

25) Press PF1 to enter user mode. The
    VS Logon screen is displayed.

```
                        ***   Wang VS Logon   ***

        Workstation 0              10:13 AM         Friday  October 30, 1987

                            Hello new user
                           Welcome to Wang VS

        Please identify yourself by supplying the following information

                            Your userid   = ███
                            Your password =

                        and press (ENTER) to logon

                  or press (PF11) to enter operator mode immediately
```

26) Enter the default three-letter user
    ID, CSG. No password is required.
    Press ENTER.

4.1   Power-on and B.I.T. Diagnostic Procedure (Sheet 14 of 14)

NOTE

Command Processor screen commands dis-
played are the commands enabled by the
GENEDIT configuration file used to bring
up the system (i.e. if WP is not enabled,
PF(9) ENTER Word Processing will not be
displayed).

---

27) The Command Processor screen is now
    displayed and the system is in user
    mode.   This   screen   denotes   the
    system has powered-up successfully.

```
            ***  WANG VS COMMAND PROCESSOR  ***
            Copyright, Wang Laboratories, INC.  1985
   Workstation 0 Ready          10:15 AM          Friday October 30, 1987

                            Hello
                   Welcome to the Wang VS

        Press (HELP) at any time to interrupt your program or to stop
                     processing of current command.

        Use function keys to select a command:

      (1)  RUN Program or Procedure
      (2)  Set USAGE Constraints          (11)  Enter OPERATOR Mode
      (3)  Show PROGRAM Completion Report  (12)  Submit PROCEDURE

      (4)  Manage QUEUES                   (13)  Send MESSAGE to Operator
      (5)  Manage FILES/Libraries          (15)  PRINT Command Screen
      (6)  Manage DEVICES                  (16)  LOGOFF
```

4.2   Power-down Procedure (Sheet 1 of 5)

CAUTION

Powering down of system and/or any
external disk or tape drive improperly
may result in damage to Volume Table Of
Contents (VTOC).

---

1) From Operators Console menu, press
   PF13 to verify all users have logged
   off system.

2) From Operators Console menu, press
   PF7 (Non-interactive Tasks) to check
   background tasks on system. Identify
   any user running a background task
   and advise user to suspend or
   terminate.

3) From Operators Console menu, press
   PF9 (Printers) and idle all printers.

4) Log off from the SCU.

5) Exit workstation emulation by pressing
   keyboard keys 'CONTROL', then 'SHIFT'
   and 'CANCEL' simultaneously. The
   Workstation Emulation menu is
   displayed.

```
                    Wang Professional Computer
           D I S K   O P E R A T I N G   S Y S T E M
                            VS
                    Workstation Emulation
                       Version x.xx

        Select an Item and Proceed

                          ‿  Return to Emulation
                          ‿  Suspend Emulation
                          ■  Terminate Emulation
                          ‿  Restart Emulation

                               SPACE – Item Select
                               EXEC  – Proceed
```

4.2   Power-down Procedure (Sheet 2 of 5)

6) Select 'Terminate Emulation' and press EXECUTE. The Console Processor screen is displayed.

```
              <<<   System in Control Mode   >>>

              ***   Wang VS System Console   ***

SYSCON version x.x.x        11:03 AM        Monday, October 5, 1987

        Press (HELP) for online system console information.


            Use the function keys to select a command.

     (1) ENTER Workstation Emulation     (8) Easy IPL and Dump
     (2) ENTER CP Control                (9) Display Slot Contents


     (5) AUTO IPL                        (12) Set Console Defaults
     (6) RSAF Functions                  (13) Set Time and Date
```

7) Press PF2, Enter CP Control. The VS Central Processor Control screen is displayed.

```
                    VS Central Processor Control

     Select a PF Key to perform the indicated function


     CPID  |  Current Status
       0   |  Running



     _____

     (1) CP(0) Control Mode                    (8) Reset System
                                               (10) Load CP Code

                                               (16) Exit
```
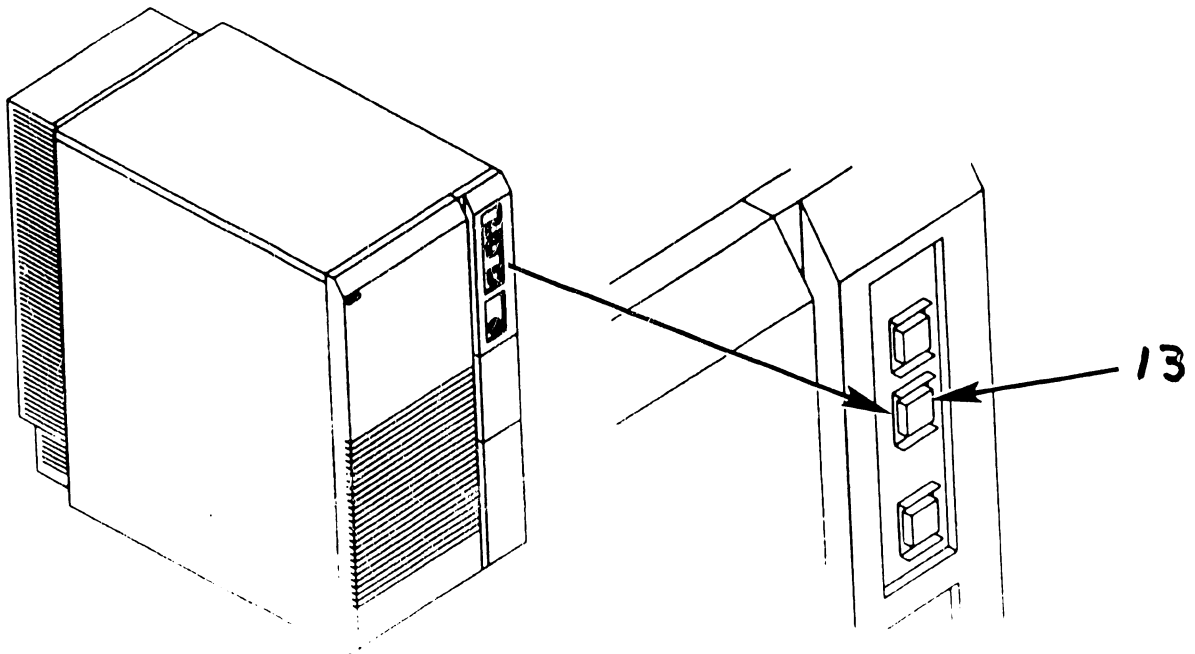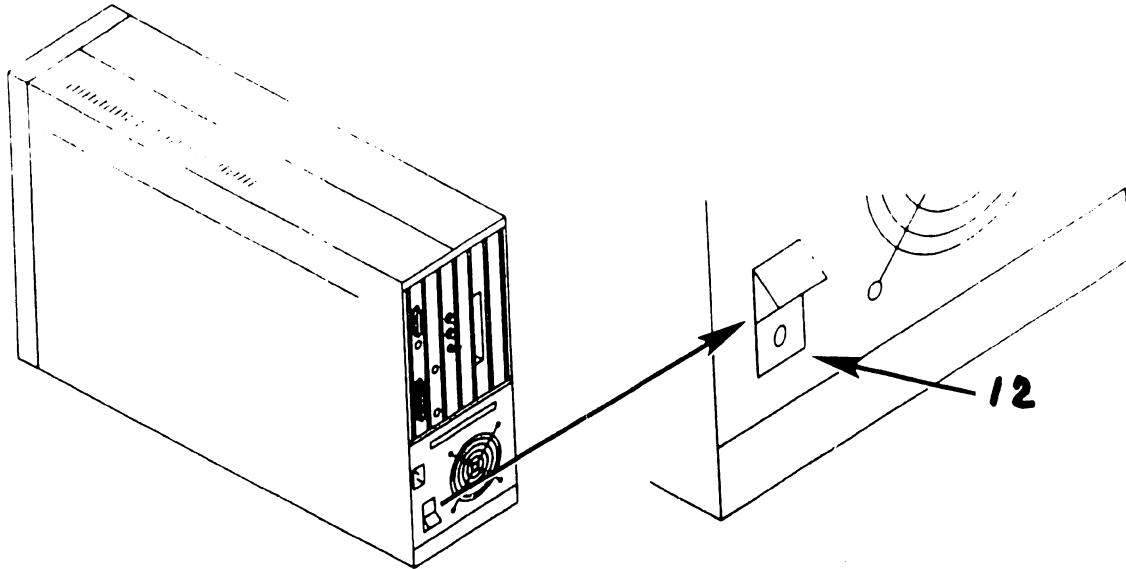
4.2   Power-down Procedure (Sheet 3 of 5)

8) Press PF8 (Reset System). Then press
    PF1 (CP (0) Control Mode). The VS
    Central Processor Control screen
    current status field changes as
    follows:

                    VS Central Processor Control

Select a PF Key to perform the indicated function

CPID	Current Status
0	Control Mode (IPL Requested)

---

(1) CP(0) Control Mode   (8) Reset System
                                                (10) Load CP Code

                                                (16) Exit

9) The mainframe is now in Control Mode.
    Power down all workstations.

10) 'Unready' external disk drives.
    Allow drive heads to return to home
   position.

11) Unload tape drives (if any).

4.2   Power-down Procedure (Sheet 4 of 5)

12) Power-down SCU by positioning the ac
    On/Off switch to the Off position.

13) Power-down mainframe by pressing
    power Off (red) pushbutton.

4.2   Power-down Procedure (Sheet 5 of 5)

14) Position mainframe ac On/Off circuit
    breaker to the Off position.

15) Remove mainframe ac power cord from
    ac power receptacle.
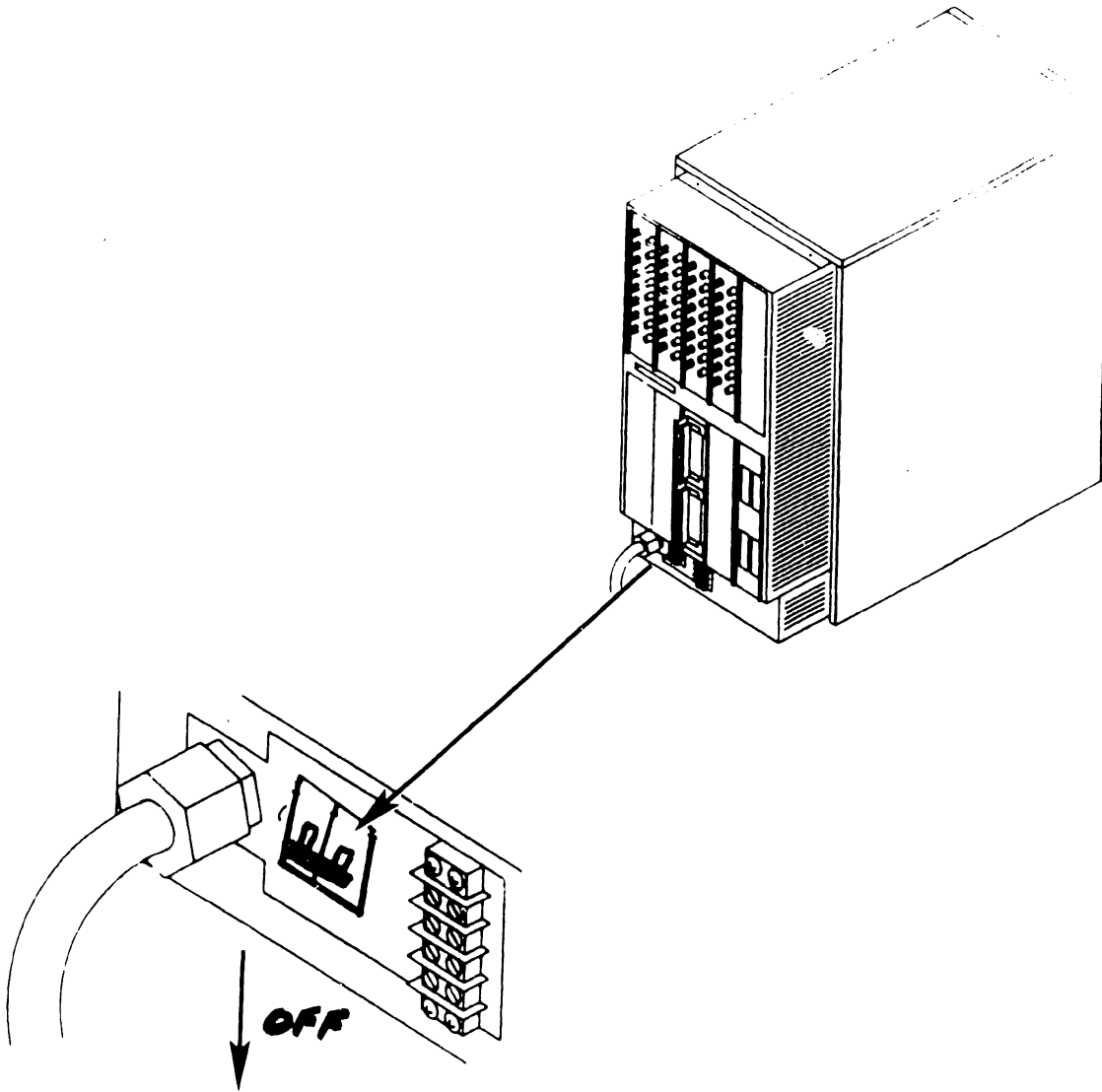
SECTION
5
PREVENTIVE
MAINTENANCE

SECTION 5

PREVENTIVE MAINTENANCE

5.1   Materials Required

The CE tool kit is required for preventive
maintenance (PM) on the VS-7010 Computer
System.

5.2   PM Schedules

The VS-7010 Computer System does not req-
uire any preventive maintenance. However,
the service technician should perform the
following while at the site during service
calls.

Action	Section
Operational Check (IPL)	5.3
Clean Exterior	5.4
Clean Interior	5.4
Inspect	5.5
Adjust	5.6
Diagnostic Check	6.2

5.3   Operational Check

An equipment operational check is rec-
ommended after every service call. This
test consists of running power-up diag-
nostics and checking the SCU display
screen for possible error codes. This
test is activated when the system is
initially powered-up or when the control
panel System Reset pushbutton is pressed.

Additional diagnostics tests may be
performed; Off-Line diagnostics (→ 6.3.1)
and On-Line diagnostics (→ 6.3.2) if
required.

5.4   Cleaning

Exterior:

1) Remove foam air filter (→7.2.36) and clean.

2) Remove dust from exterior with cloth and vacuum.

3) Wipe case clean with soft cloth.

Interior:

1) Power-down system (→ 4.2) and remove top cover, front panel, side covers, and card cage cover (→7.2.1, 7.2.2, 7.2.3, 7.2.4) and vacuum interior.

2) Clean fan blades with cloth.

5.5   Inspection

1)   Check for loose or damaged parts.

2)   Check PCA and cable circuitry.

3)   Check fan operation.

5.6   Adjustments

Mechanical:

1) None required.

Electrical:

1) Power Supply Adjustment:
   (¬8.2)

SECTION
6
TROUBLESHOOTING

S E C T I O N 6

T R O U B L E S H O O T I N G

6.1   Tools and Equipment

Tools and equipment required to trouble-
shoot the VS-7010 Computer system consists
of a standard CE tool kit and two types of
diagnostic routines, Off-line diagnostics
and On-line diagnostics.

6.1   Tools and Equipment

6.1.1   Special Tools and Equipment

Description	Part Number
RS232 Loopback Plug	421-0025
RS232/366 Loopback Plug	420-1041
RS449 Loopback Plug	270-3193
X.21 Loopback Plug	421-0010
20 dB Loopback Pad (2 each)	336-2002
Coax Cable (1 foot)	220-0314
Cable Simulator (optional)	190-0744
Power Supply Test Jumper	220-2342

6.2   Off-Line Diagnostics

NOTE

The customer cannot use the system while
off-line diagnostics are running.

The VS-7010 off-line diagnostics are
contained in an application program
called Diagnostic Control System (DCS),
which runs under MSDOS in the Support
Control Unit (SCU). DCS is a
collection of Central Processor (CP),
Memory, and IOC diagnostics that
resides on the Winchester fixed disk
within the Professional Computer (PC)
section of the SCU. DCS diagnostics
may be run from the SCU, which consists
of the PC and the SCU interface board,
even when the VS system is not
functioning.

6.2   Off-Line Diagnostics

6.2.1   Power-Up Diagnostics

At power-up (or control panel System Reset), DCS automatically invokes the Confidence Diagnostics. The Confidence Diagnostics determines whether the system will IPL and run. Confidence diagnostics consists of CPU Unit Diagnostics and I/O Built-In Test (BIT) monitor.

CPU Unit Diagnostic contain a partial test of the central processor, targeting primarily the interboard signals. I/O BIT Monitor tests all the IOCs installed in the system, including the board's controller and device adapter sections.

If an error occurs during the Confident Diagnostic, the diagnostic halts and an error message is displayed on the SCU console. This message includes the error code, and the most likely failing Field-Replacable Unit (FRU).

6.2   Off-Line Diagnostics

6.2.2   Accessing DCS Diagnostics (Sheet 1 of 6)

DCS diagnostics are accessed from the
Wang VS System Console menu. This
screen appears at power-up after the
SCU software is loaded and can be
reached by suspending workstation
emulation from the SCU.

NOTE

To access off-line diagnostics, the
control panel keyswitch must be in
'Remote Service' position. Position of
the control panel keyswitch determines
which of the menu items are available.
Available items will be highlighted.

```
                    *** Wang VS System Console ***


    SYSCON Version x.x.x              2:42 PM         Monday  October 19, 1987


          Press (HELP) for online system console information.


          Use the function keys to select a command:


    (1) ENTER Workstation Emulation         (8) IPL System
    (2) ENTER Control Mode                  (9) RESET Console


    (5) AUTO IPL                            (12) SET Console Defaults
    (6) RSAF Functions                      (13) SET Time and Date
```

6.2   Off-Line Diagnostics

6.2.2   Accessing DCS Diagnostics (Sheet 2 of 6)

Perform the following to access DCS
diagnostics from the VS Operator's
Console, VS Command Processor menu, or
VS Logon screen.

1)   Press 'CONTROL', then 'SHIFT' +
     'CANCEL'   simultaneously.   The
     Workstation Emulation Menu screen
     is displayed.

```
                       Wang Professional Computer
                  D I S K   O P E R A T I N G   S Y S T E M
                                   VS
                         Workstation Emulation
                           Version x.xx

         Select an Item and Proceed



                         ⌐ Return to Emulation
                         ■ Suspend Emulation
                         ⌐ Terminate Emulation
                         ⌐ Restart Emulation


                                                SPACE – Item Select
                                                EXEC  – Proceed
```

2.   Space down to "Suspend Emulation"
     and press 'EXECUTE'. The Wang VS
     System Console Menu screen appears.

6.2   Off-Line Diagnostics

6.2.2   Accessing DCS Diagnostics (Sheet 3 of 6)

Certain elements of the System Console Menu are password-protected to prevent unauthorized use of some SYSCON facilities. These elements are not immediately displayed. They include (3) ENTER Service Log Mode and (4) ENTER Off-line Diagnostics. To enable these and other menu picks, perform the following:

NOTE

The control panel keyswitch must be in 'Remote Service' position.

From System Console Menu screen, enter the password:

> CSG + current time (four digits as displayed on the System Console screen). (Example: If time is 9:30 (am or pm), enter 0930.)

NOTE

While entering the password, the keyboard beeper will sound as each key is pressed. This is normal and intended to discourage unauthorized personnel from enabling the full System Console menu.

The System Console is now in the 'service mode' and the full System Console menu is displayed.

6.2   Off-Line Diagnostics

6.2.2   Accessing DCS Diagnostics (Sheet 4 of 6)

NOTE

Service mode can be terminated by pressing PF10 or by positioning the keyswitch to another position (i.e. Normal Control).

```
                    *** Wang VS System Console ***


   SYSCON Version x.x.x              2:44 PM          Monday  October 19, 1987


               Press (HELP) for online system console information.


                    Use the function keys to select a command:


        (1) ENTER Workstation Emulation      (8) IPL System
        (2) ENTER Control Mode               (9) RESET Console
        (3) ENTER Service Log Mode          (10) Terminate Service Mode
        (4) ENTER Offline Diagnostics       (11) SHOW Error Log
        (5) AUTO IPL                         (12) SET Console Defaults
        (6) RSAF Functions                   (13) SET Time and Date
       (29) Install Software                 (32) Wang PC Emulation
```

Press PF4 (Enter Offline Diagnostics) from the System Console Menu. The Diagnostics Disclaimer screen appears.

6.2   Off–Line Diagnostics

6.2.2   Accessing DCS Diagnostics (Sheet 5 of 6)

```
                              Wang VS Diagnostic Control System
                Rev xxxx          (c) Copr. Wang Laboratories, Inc. 1986



           --------------------------N O T I C E-- -----------------------------

        This diagnostic package is the property of Wang Laboratories, Inc. and
        is provided for System diagnostic use only. Improper use may cause loss
        or damage to programs and/or data. This package and related materials
        may not be disclosed or otherwise made available to third parties with-
        out the prior permission of Wang.

        In no event shall Wang Laboratories, Inc. or its subsidiaries be liable
        for incidental or consequential damages in connection with or arising
        from the use of the diagnostic package, the accompanying manual, or any
        related materials.

        ------------------------------------------------------------------------




                          Press EXEC to continue, CANCEL to exit
```

From the Diagnostics Disclaimer screen,
press 'EXEC' to display the DCS
Diagnostic Selection Menu.

6.2   Off-Line Diagnostics

6.2.2   Accessing DCS Diagnostics (Sheet 6 of 6)

```
                        Wang VS Diagnostic Control System           hh/mm
            Rev xxxx          (c) Copr. Wang Laboratories, Inc. 1986

    01 PCI Test
       ⌐ SCUI Test
       ⌐ CP8 Static Test
       ⌐ CP8 Self Test
       ⌐ AGU, ESU Test
       ⌐ ATU Test
       ⌐ SCU / Memory Test
       ⌐ CPU / Memory Test
       ⌐ SBI Test
       ⌐ I/O BIT Monitor
       ⌐ CPU Unit Test
       ⌐ FPU Test

       ⌐ SuperBal
       ⌐ VS Environment


                                            SPACE   - item position
                                            INSERT - select
                                            DELETE - deselect
                                            SHIFT+INSERT - hex #
                                            EXEC    - proceed


       HELP is available
```

NOTES

It is possible that DCS may not find
the SuperBal test file on disk. Before
running offline diagnostics, it will be
necessary to change the source of the
CPU Microcode File (→9.9).

The ACU diagnostics require DCS Rev
2695 or higher.

FPU diagnostics are not supported on
the VS-7010.

6.2   Off-Line Diagnostics

6.2.3   Running DCS Diagnostics

Choose a particular diagnostic from the DCS Menu by position the cursor next to the desired diagnostic using the SPACEBAR. Press 'INSERT' to select the diagnostic.

NOTES

SHIFT+INSERT allows selection of elements to be tested when multiple elements, such as dual CPUs, are in the system. This feature is for the VS-7300 series. The default selection for SHIFT+INSERT is 01. Use the default selection for VS-7010 mainframe.

For best results, run the diagnostics in the order in which they are listed on the menu.

Press 'EXEC' to run the diagnostic. More than one diagnostic or all diagnostics may be selected at one time.

To deselect a single diagnostic, go to the DCS Menu, position the cursor next to the diagnostic to be deselected, and press DELETE. The diagnostic will be dehicnlighted on the DCS Menu and will not execute until it is reselected. To deselect all selected diagnostics, press CANCEL. To terminate a diagnostic, press SHIFT + CANCEL. SHIFT + CANCEL is also used to exit the DCS program from the selection menu.

6.2   Off-Line Diagnostics

6.2.3.1 HELP Menu

DCS HELP Menu is an operator aid that
allows the user to display the DCS help
text file, display the currently
executing diagnostic's help text file,
display the DCS log file, and employ
the VS Interface Utility. HELP is
accessed by pressing the HELP key or
SHIFT + HELP keys at any time.
Function keys have no effect during the
help feature but, their state can be
changed.

```
                Wang VS Diagnostic Control System          hh/mm
         Rev XXXX        (c) Copr. Wang Laboratories, Inc. 1986

                       H E L P   M E N U

           ■ Display DCS help file
           _ Display current diagnostic's help file
           _ Display log
           _ VS Interface Utility

                                        SPACE  – item select
                                        EXEC   – proceed
                                        CANCEL – exit menu

        DCS rev XXXX
```

6.2   Off–Line Diagnostics

6.2.3.2 DCS Test Screens (Sheet 1 of #)

Once a diagnostic is selected and EXEC is pressed, a screen specific to that diagnostic is displayed. These screens provide information including: sequence number, diagnostic revision number and name, the error count, the currently executing diagnostic or test, and the DCS status.

Most of the DCS diagnostic screens are similar with the exception of the VS Environment Diagnostic and the I/O BIT Monitor. Some diagnostics contain menus of their own which allow the user to select or deselect one or more tests within the diagnostic. Tests on these menus are selected and deselected the same way that diagnostics are selected and deselected from the DCS Selection menu. A possible diagnostic screen is illustrated as follows:

```
                 Wang VS Diagnostic Control System           hh/mm
         Rev XXXX      (c) Copr. Wang Laboratories, Inc. 1986
                       □□□□ ■□□□ □□□□ □□□□

     Sequence: 1                                        Error Cnt: 1
  Diagnostic: R1560 CP8 Diagnostics
        Test: Part Two
  Error Code: 201033
  Failing Unit: (1) ATU0 (2) AGU0 (3) CPU0

 | DCS Status: Reporting Diagnostic Error                              |

  Error detected by diagnostic

      CPU halted at MIA = 07D3



                         Press PF6 key to continue from error
  HELP is available
```

6.2   Off-Line Diagnostics

6.2.3.2   DCS Test Screens (Sheet 2 of #)

The row of boxes indicates which optional functions (if any) are enabled. The boxes correspond to function keys 1 thru 16. Each function key acts as an on/off switch to enable or disable the particular action that the key controls. A filled box indicates the function is enabled; an empty box indicates the function is disabled. Table 6-1 below lists the controlling function keys, the function name, and a description of each function.

Table 6-1. Special Diagnostic Functions

PF KEY	Function	Description
2	Loop on Error	When an error is reported, the DCS will instruct the diagnostic to loop on the error. The DCS will also count and display the number of times the loop is executed.
3	Loop on Test	The DCS instructs the diagnostic to loop on the just completed test. The DCS counts and displays the number of times the loop is executed.
4	Loop on Diagnostic	The DCS instructs the diagnostic to loop on itself. The DCS counts and displays the number of times the loop is executed.
5	Stop on Error	When an error is reported, the DCS stops and waits for the user to press PF key 6 before continuing the diagnostic.
6	Step - from	This key is used to continue from a stop on error, to disable the current looping function without using the loop function key, and to continue from a pause state without turning off the pause function.

6.2   Off–Line Diagnostics

Table 6-1. Special Diagnostic Functions (Cont'd)

PF KEY	Function	Description
7	Log Screen	Enters current screen into the log.
8	Pause	The DCS will pause on requests (calls) from the diagnostic to the DCS before the requested function is performed. PF key 6 can be used to continue or the function can be disabled.
9	Not used	
10	Not used	
11	Not used	
12	Not used	
13	Not used	
14	Not used	
15	Not used	
16	Next Diagnostic	Abort the currently executing diagnostic and load and execute the next diagnostic in the sequence.

SECTION
7
REPAIR

SECTION 7

REPAIR

7.1   Tools And Test Equipment

No special tools or test equipment are
required to repair the VS-7010 Computer
system. All necessary repair can be
accomplished using the Wang CE tool kit
(WLI# 726-9401).

WARNING

THIS COMPUTER EQUIPMENT HAS BEEN VERIFIED AS FCC CLASS A.

IN ORDER TO MAINTAIN COMPLIANCE WITH FCC CLASS A VERIFICATION,
THE FOLLOWING CONDITIONS MUST BE ADHERED TO DURING NORMAL
OPERATION OF EQUIPMENT.

- ALL COVERS MUST BE ON THE SYSTEM AND SECURED IN THE PROPER MANNER.

- ALL INTERNAL CABLES MUST BE ROUTED IN THE ORIGINAL MANNER WITHIN THE
  CABLE CLAMPS PROVIDED FOR THAT PURPOSE.

- ALL EXTERNAL CABLES MUST BE SECURED AND THE PROPER CABLE USED TO ENSURE
  THAT CABLE SHIELDING IS PROPERLY GROUNDED TO THE CABLE CLAMPS PROVIDED.

- ALL HARDWARE IS PROPERLY SECURED.

7.2   Removal Procedures

7.2.1   Top Cover Removal

1) Power off mainframe and disconnect
    ac power. (→4.2)

2) Remove two screws from rear of top
    cover.

3) Lift rear of top cover up two inches
    and slide top cover towards the rear
    of unit and remove.
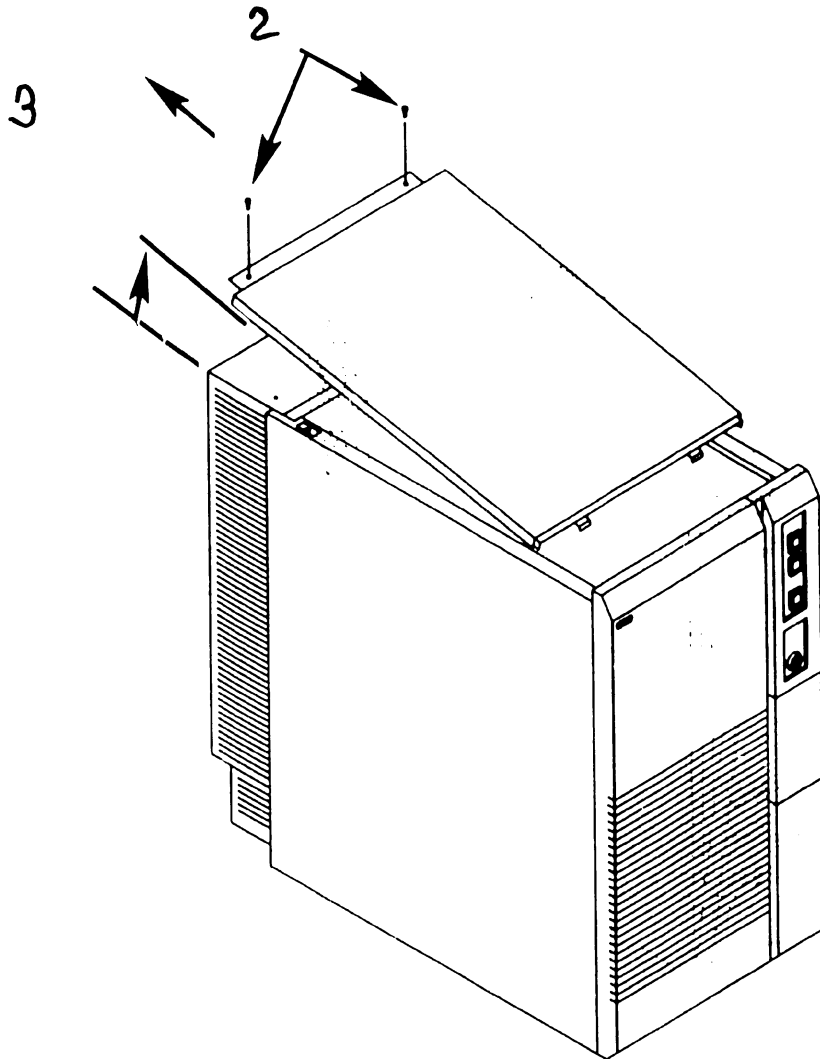
7.2   Removal Procedures

7.2.2   Front Cover Removal

1) Power off mainframe and disconnect
   ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Loosen two screws securing front
   cover to chassis.

4) Tilt front cover forward enough to
   clear screws and lift cover off.
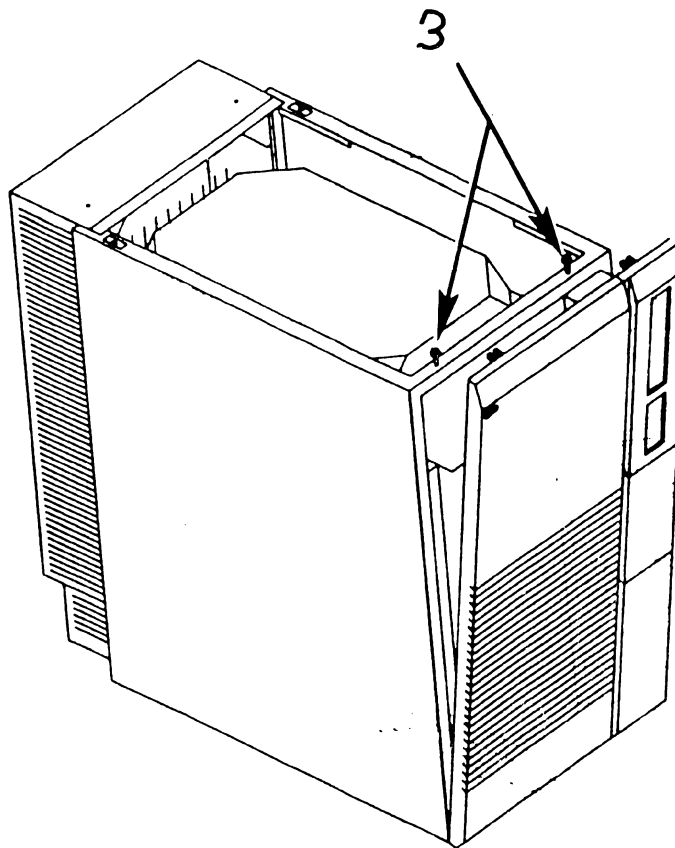
7.2   Removal Procedures

7.2.3   Side Cover Removal

1) Power off mainframe and disconnect
   ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove front cover. (→7.2.2)

4) Lift side covers upward two inches
   to disengage cover tabs and remove.
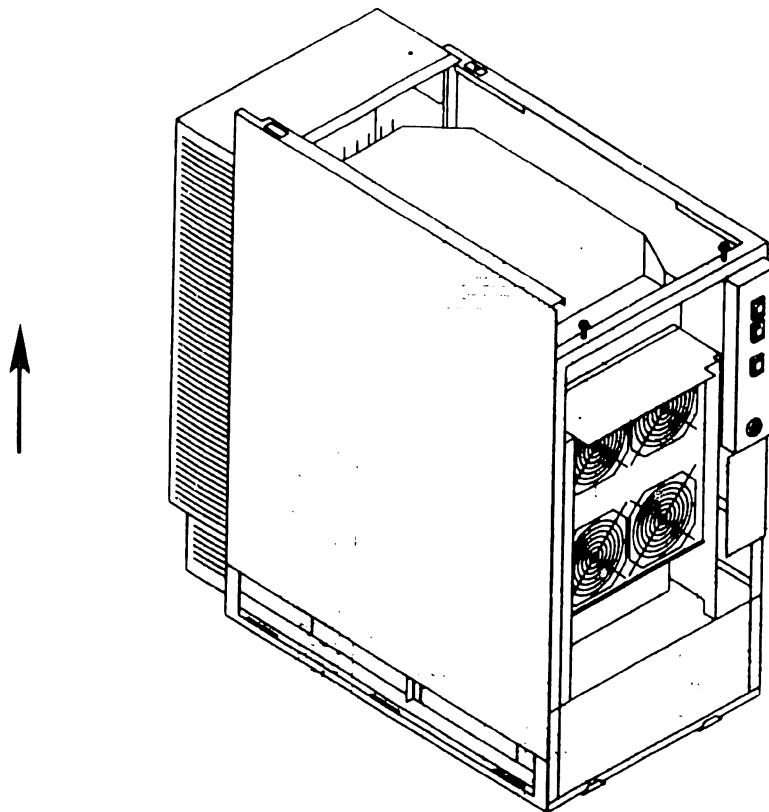
7.2   Removal Procedures

7.2.4   Card Cage Cover Removal

1) Power off mainframe and disconnect
    ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove four screws securing card
    cage cover to card cage.

4) Remove card cage cover.
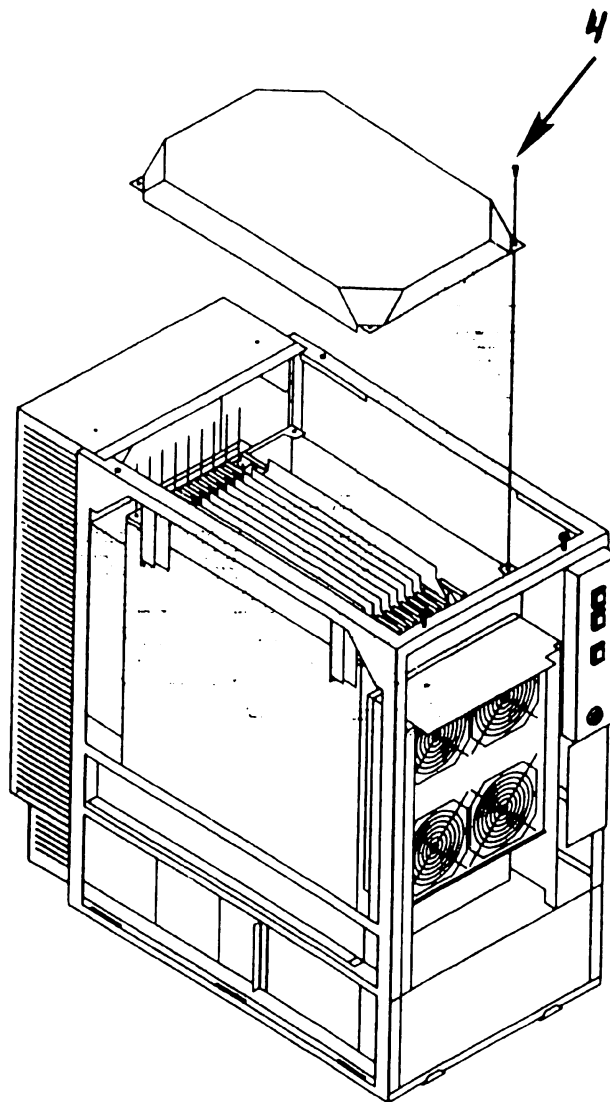
7.2   Removal Procedures

7.2.5   General PCB Removal (Sheet 1 of 2)

NOTE

General PCB removal procedures are procedures common to all PCBs within the card cage. Procedures specific to PCBs are found under the associated PCB heading. These procedures should be followed when removing PCBs from the card cage.
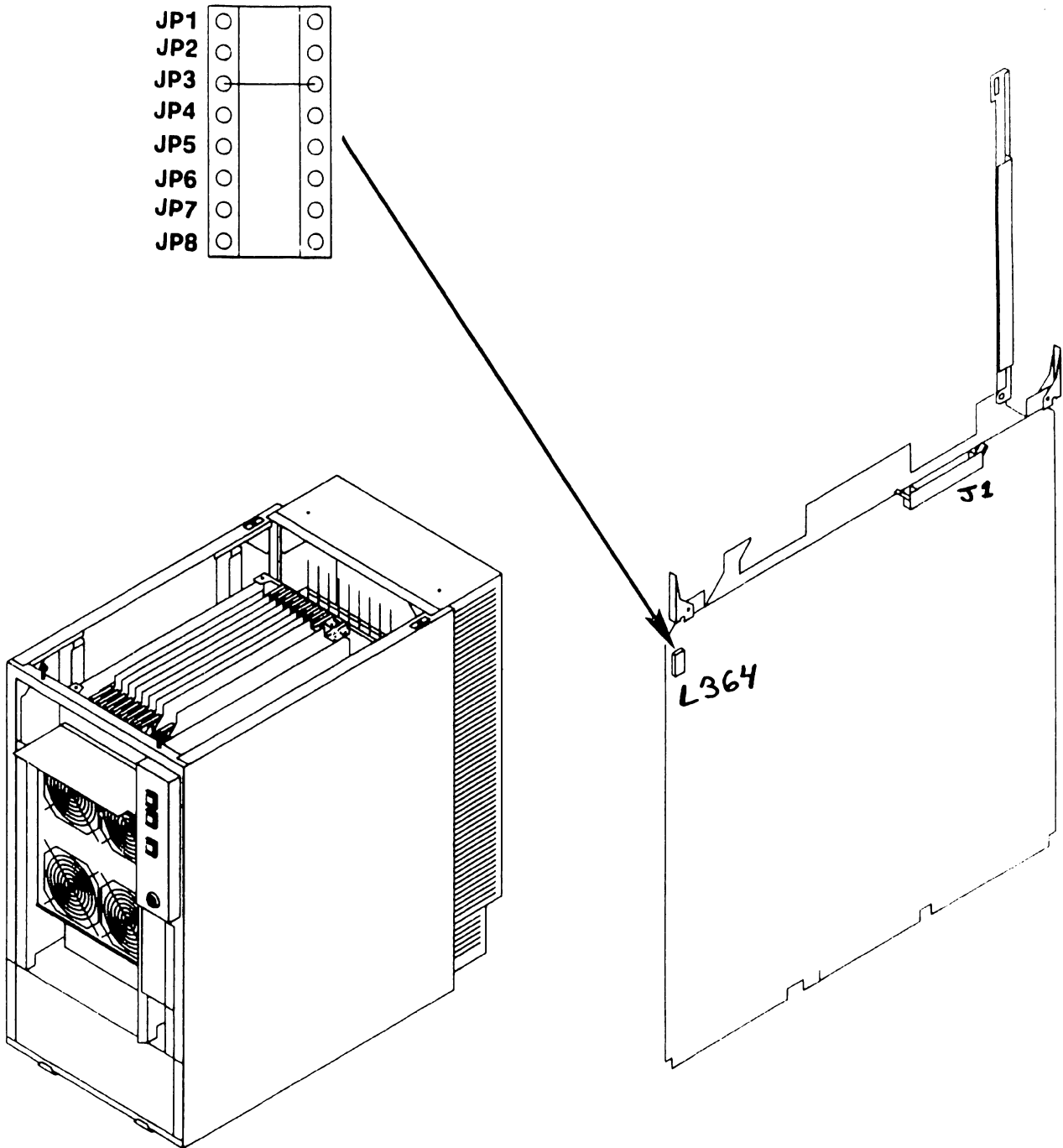
1) Power off mainframe and disconnect ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove card cage cover (→7.2.4)

4) Note cable routing and location and remove cables from PCB connectors.

5) Note PCB location. A board locator label is mounted on the fan shroud assembly. PCBs must be installed in the correct backplane slot.
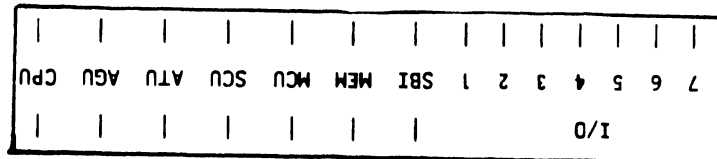
NOTE

Option PCBs SMD Controller IOC and Serial IOC are option slot dependant as follows:

- First SMD must be installed in I/O slot 1.

- First Serial IOC (supporting SCU) must be installed in I/O slot 3.
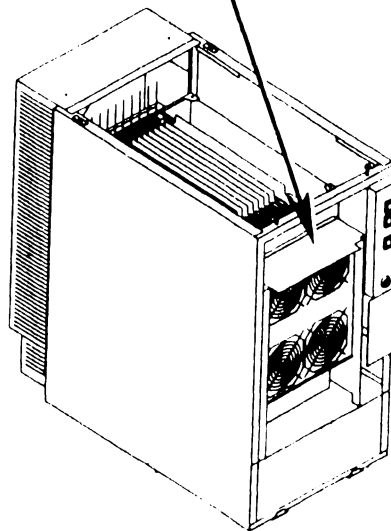
7.2   Removal Procedures

7.2.5   General PCB Removal (Sheet 2 of 2)

6) Position PCB lever clamps to open position by pulling clamp away from PCB, thus freeing PCB from card cage connectors.

CAUTION

Be careful when removing and handling the large flexible VS-7010 boards.

---

7) Pull PCB out of card cage by sliding on associated card cage guides.

Snap-Lock Fastener

Rail
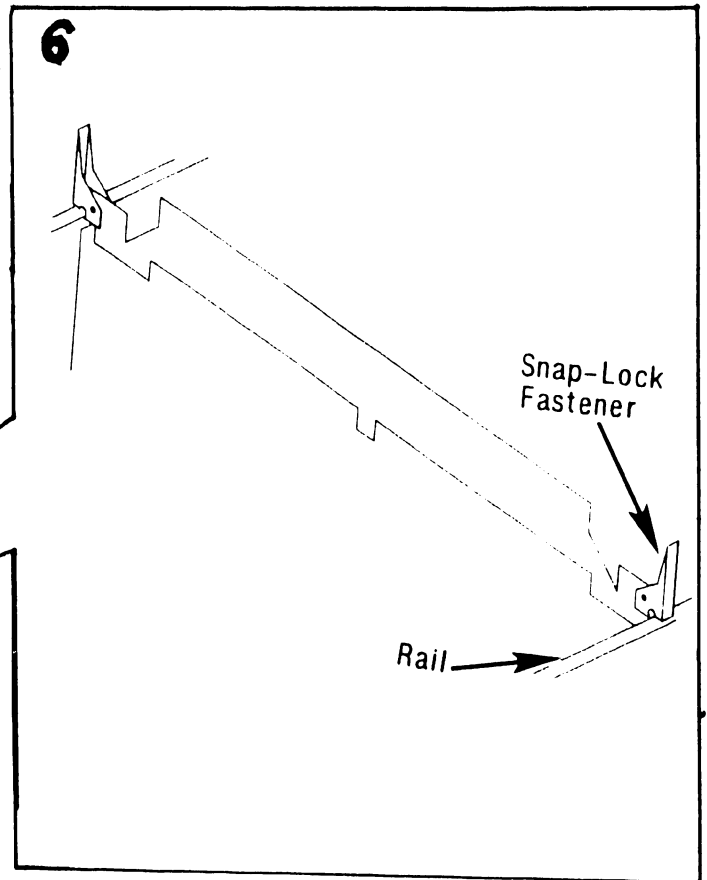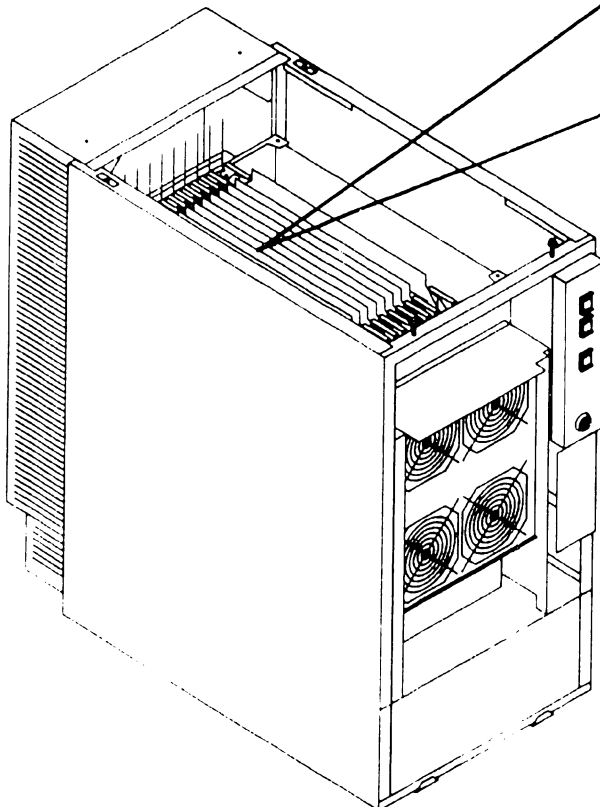
7.2　　Removal Procedures

7.2.6　　Central Processing Unit (CPU) Removal (Sheet 1 of 2)

1) Power off mainframe and disconnect ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove card cage cover (→7.2.4)

4) Note cable position and remove 50-pin cable from connector J1 (CPU J1 to AGU J1).

5) Remove PCB from backplane. (→ 7.2.5)

7.2   Removal Procedures

7.2.6   Central P)cessing Unit (CPU) Removal (Sheet 2 of 2)

6) Verify proper jumper positions of CPU Clock jumpers at locatio L50.

7) Verify proper jumper positions of Support Packet Bus (SPB) Target ID jumpers at location L172.
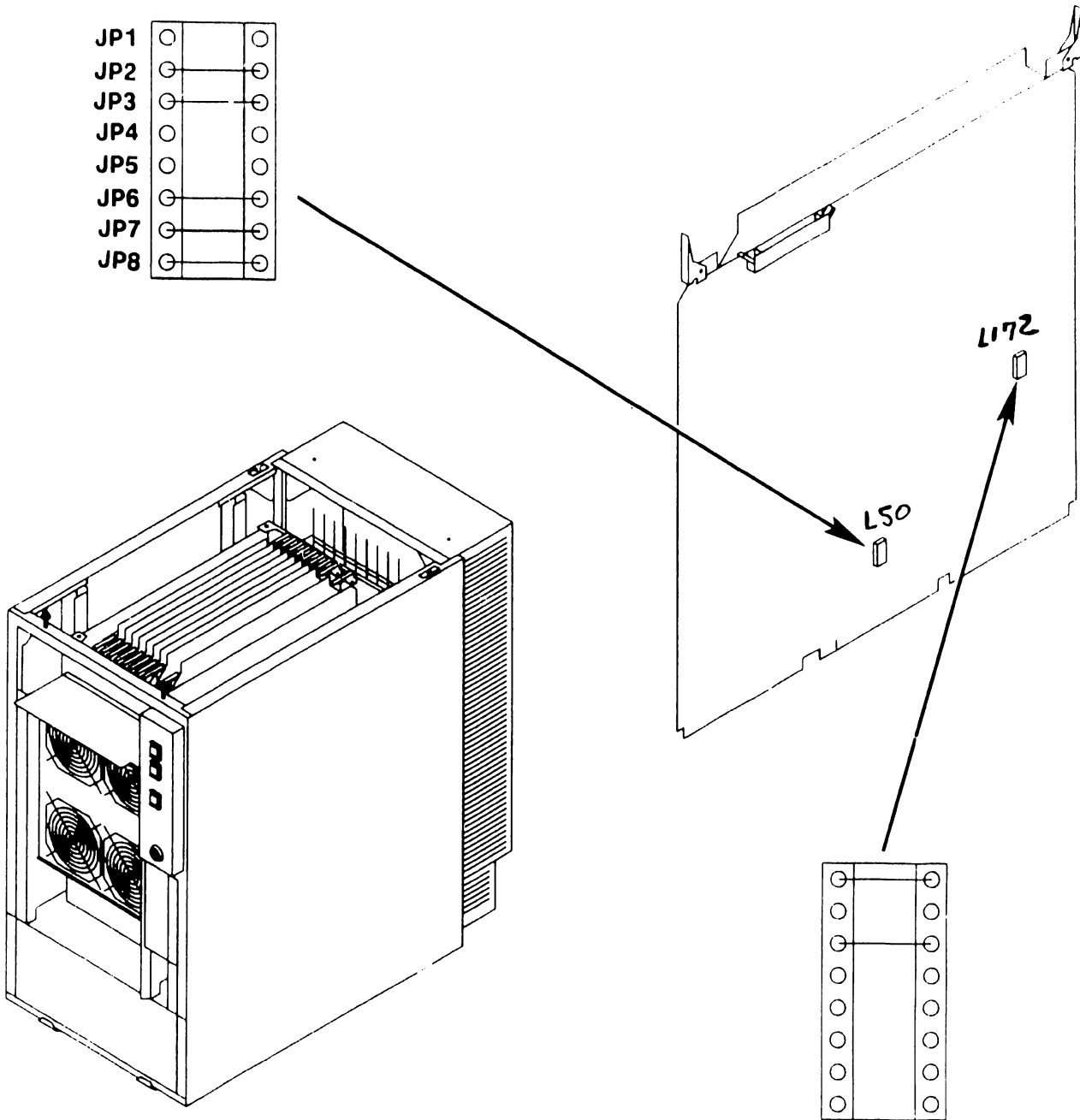
7.2   Removal Procedures

7.2.7   Address Generation Unit (AGU) Removal (Sheet 1 of 2)

1) Power off mainframe and disconnect
   ac power. (⁻4.2)

2) Remove top cover. (⁻7.2.1)

3) Remove card cage cover (⁻7.2.4)

4) Open cable clamp to the right. Note
   cable position and remove 50-pin
   cable from connector J1 (AGU J1 to
   CPU J1) and connector J2 (AGU J2 to
   ATU J1).

5) Remove PCB from backplane. (⁻ 7.2.5)
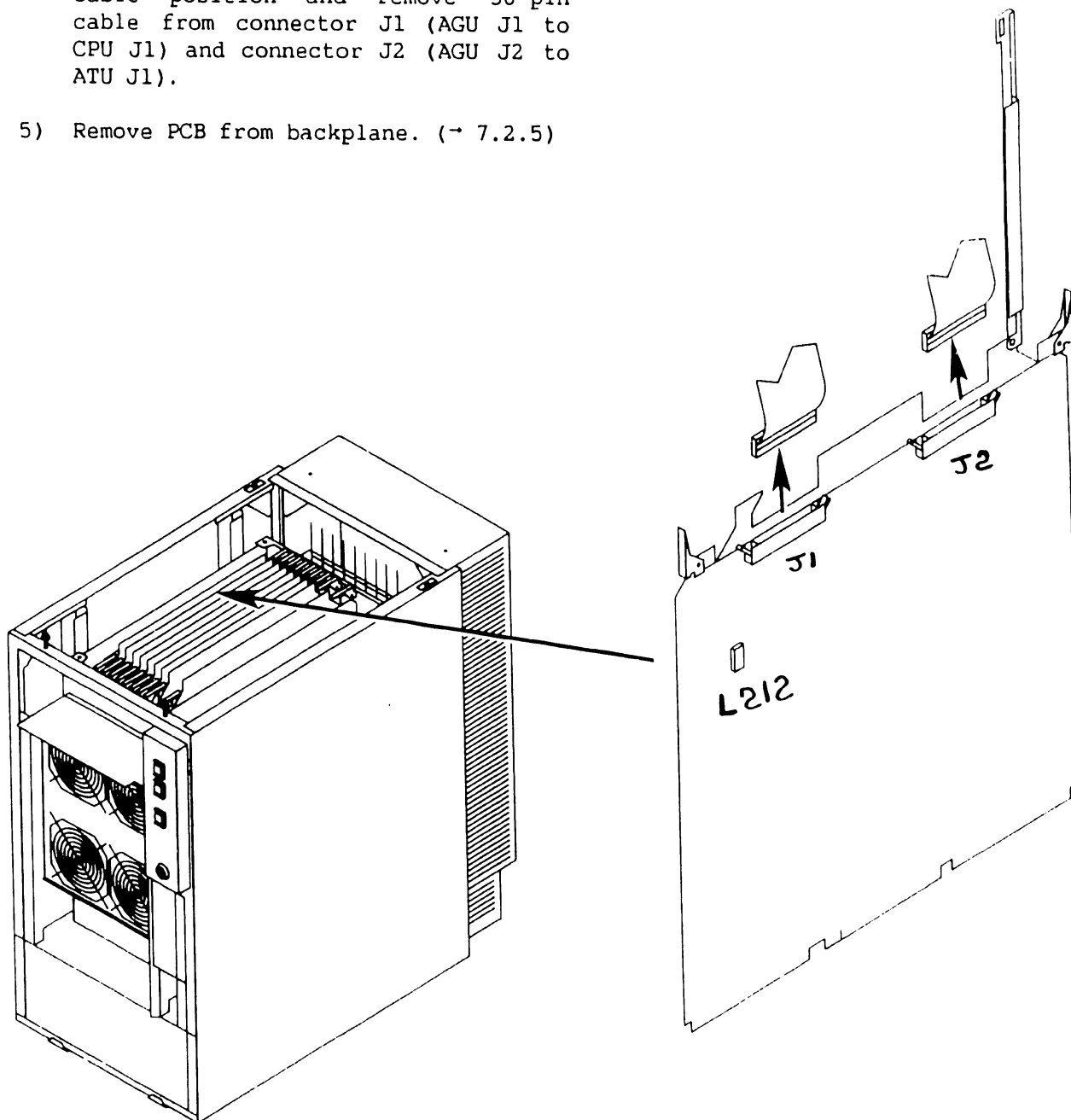
7.2   Removal Procedures

7.2.7   Address Generation Unit (AGU) Removal (Sheet 2 of 2)

6) Verify proper jumper positions of
    Oscillator jumpers at location L212.
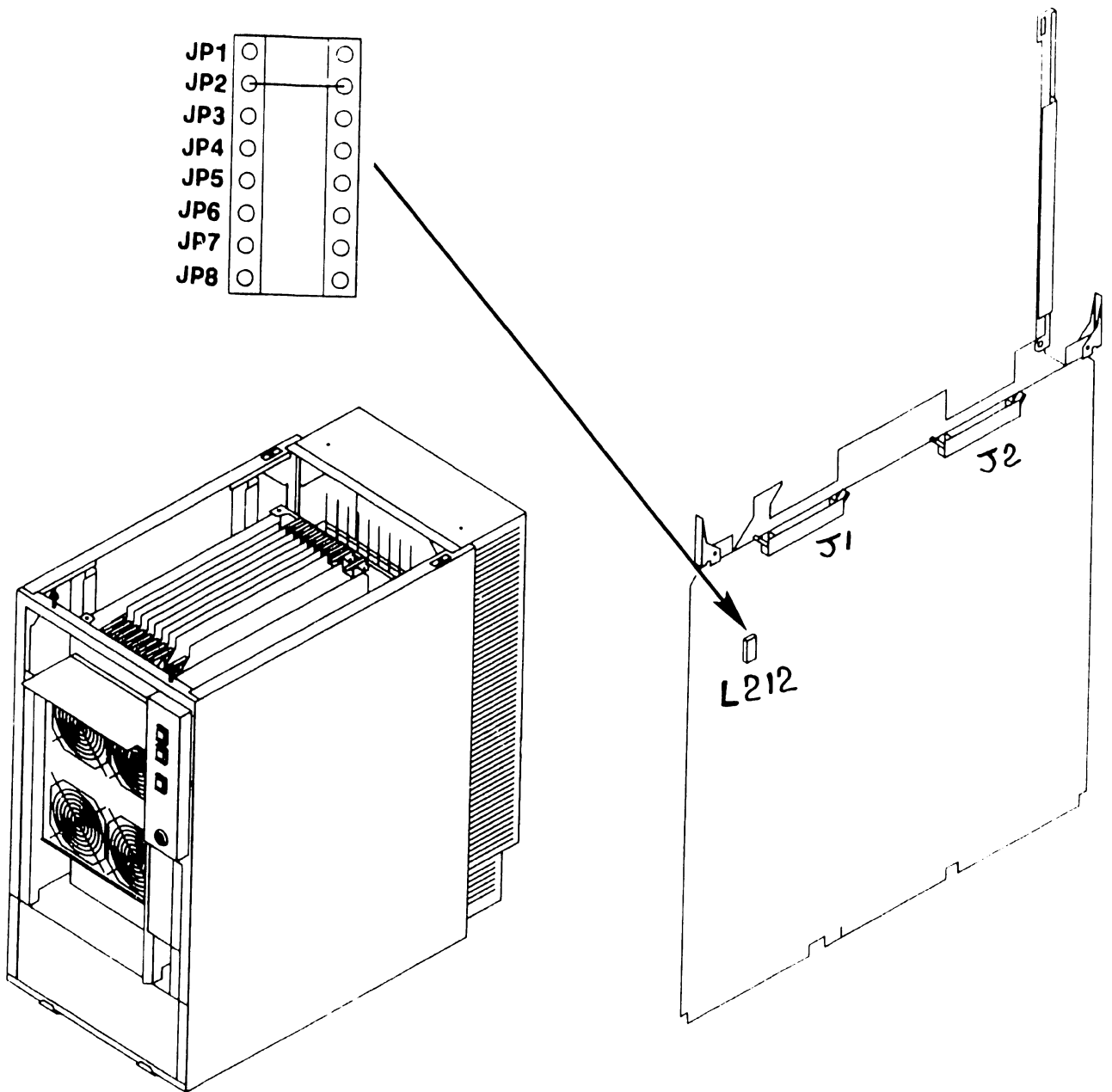
7.2   Removal Procedures

7.2.8   Address Translation Unit (ATU) Removal (Sheet 1 of 2)

1) Power off mainframe and disconnect
    ac power. (⁻4.2)

2) Remove top cover. (⁻7.2.1)

3) Remove card cage cover (⁻7.2.4)

4) Open cable clamp to the right. Note
    cable position and remove 50-pin
    cable from connector J1 (ATU J1 to
    AGU J2).

5) Remove PCB from backplane. (⁻ 7.2.5)
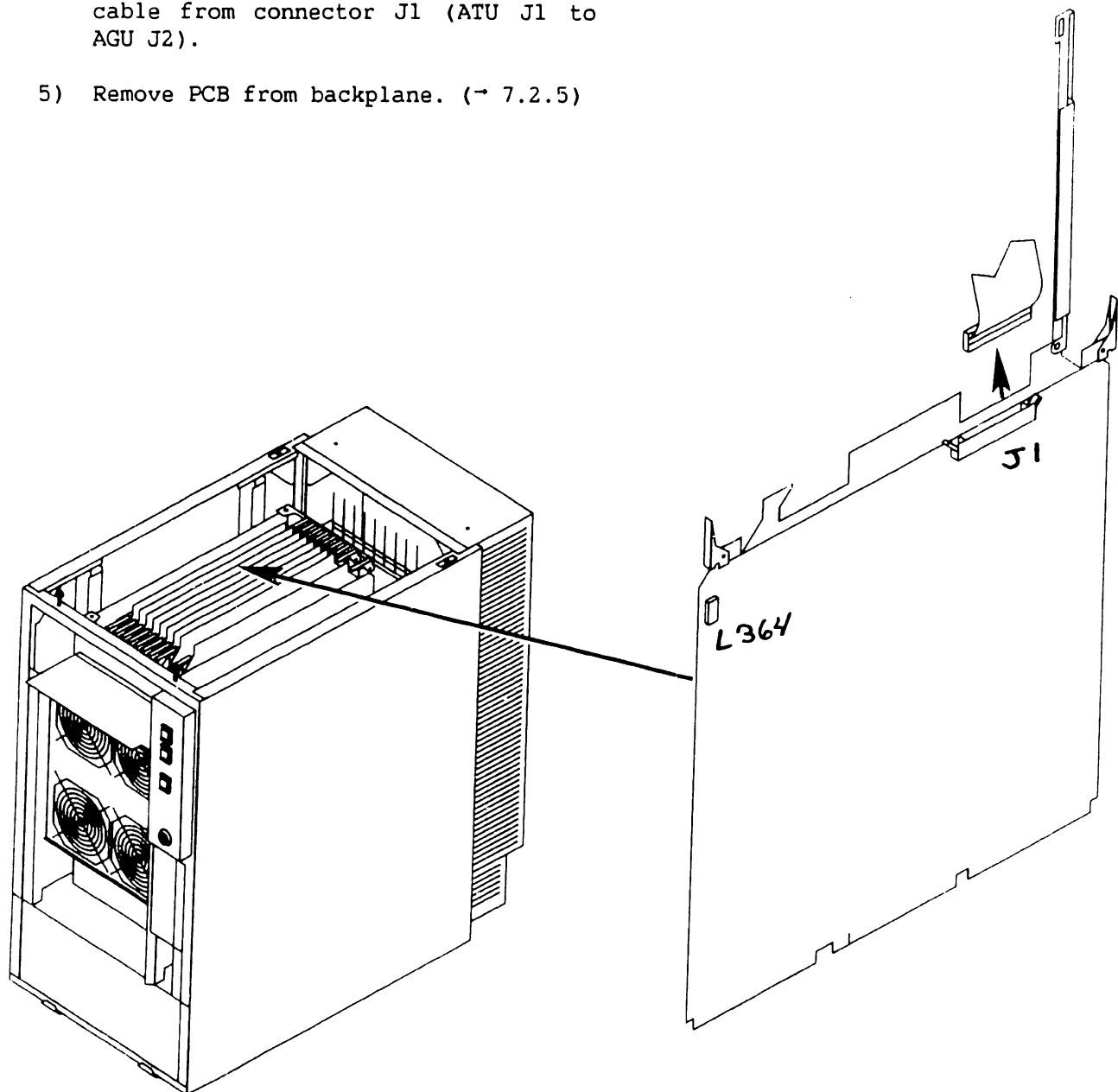
7.2   Removal Procedures

7.2.8   Address Generation Unit (AGU) Removal (Sheet 2 of 2)

6) Verify proper jumper positions of
    IPC Destination Processor jumpers at
    location L364.

7.2   Removal Procedures

7.2.9   Support Control Unit (SCU) Removal

1) Power off mainframe and disconnect
    ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove card cage cover (→7.2.4)

NOTE

The Support Control Unit does not contain
any jumpers, switches or cables.

---

4) Remove PCB from backplane. (→ 7.2.5)
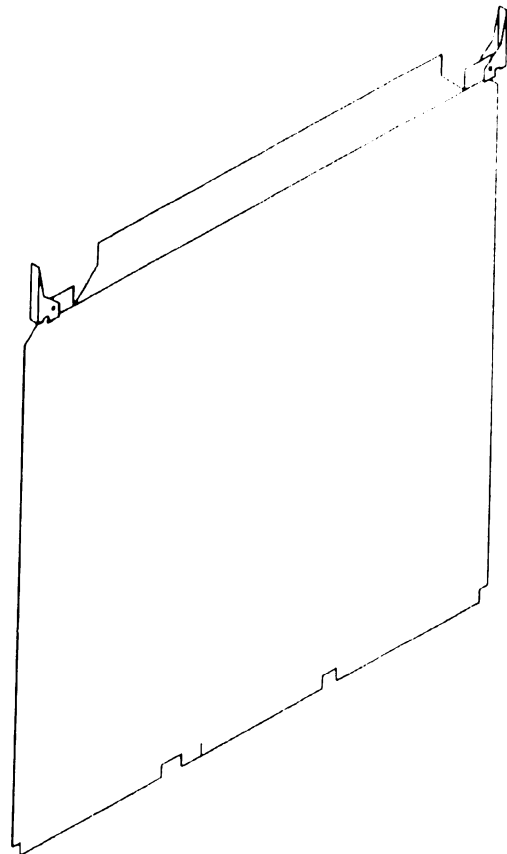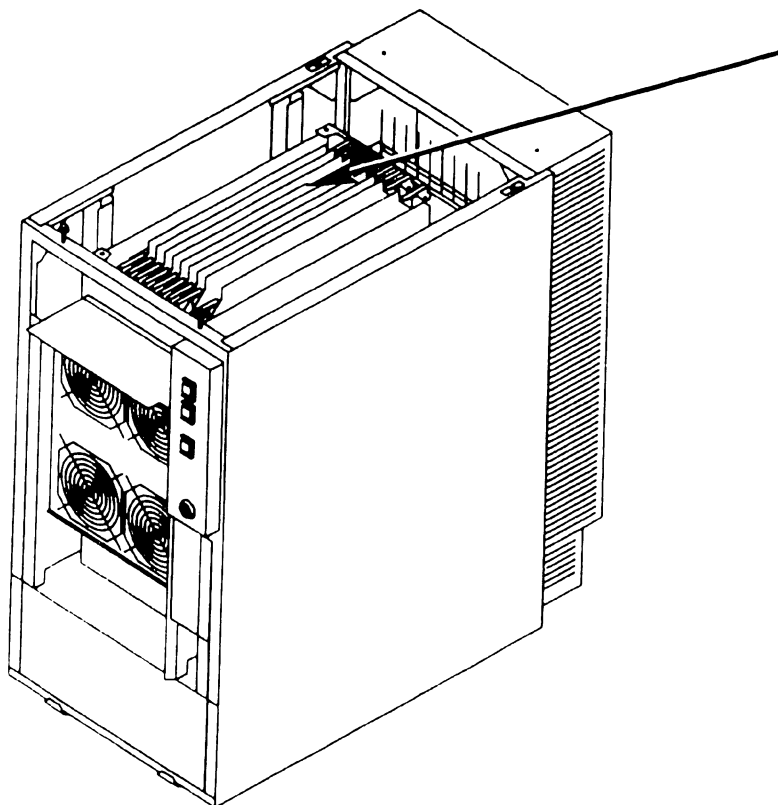
7.2   Removal Procedures

7.2.10   Memory Control Unit (MCU) Removal (Sheet 1 of 2)

1) Power off mainframe and disconnect
   ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove card cage cover (→7.2.4)
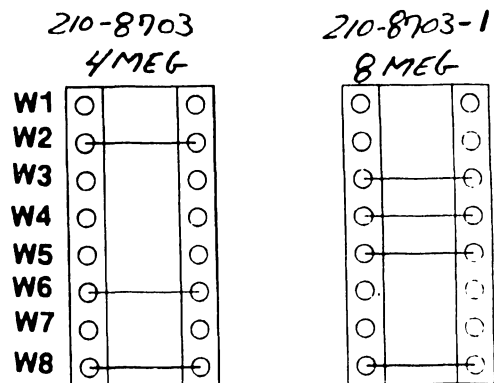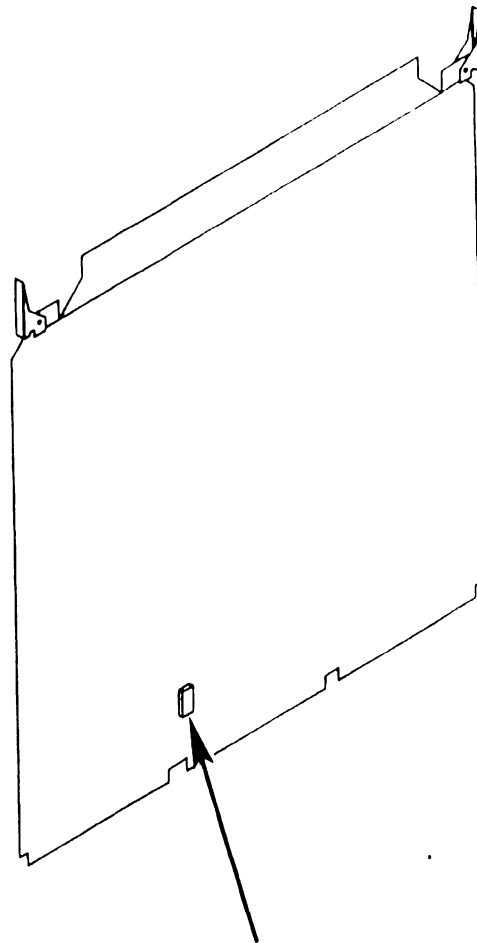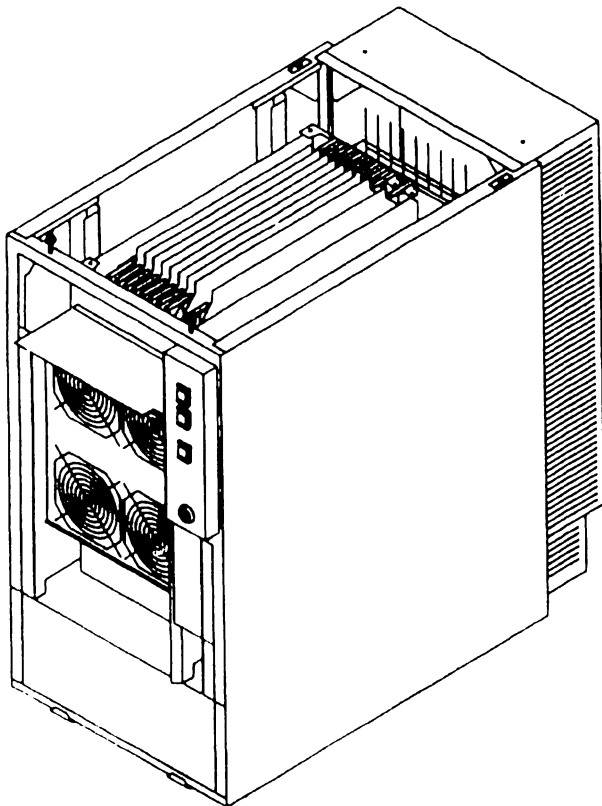
4) Remove PCB from backplane. (→ 7.2.5)

L133

L67
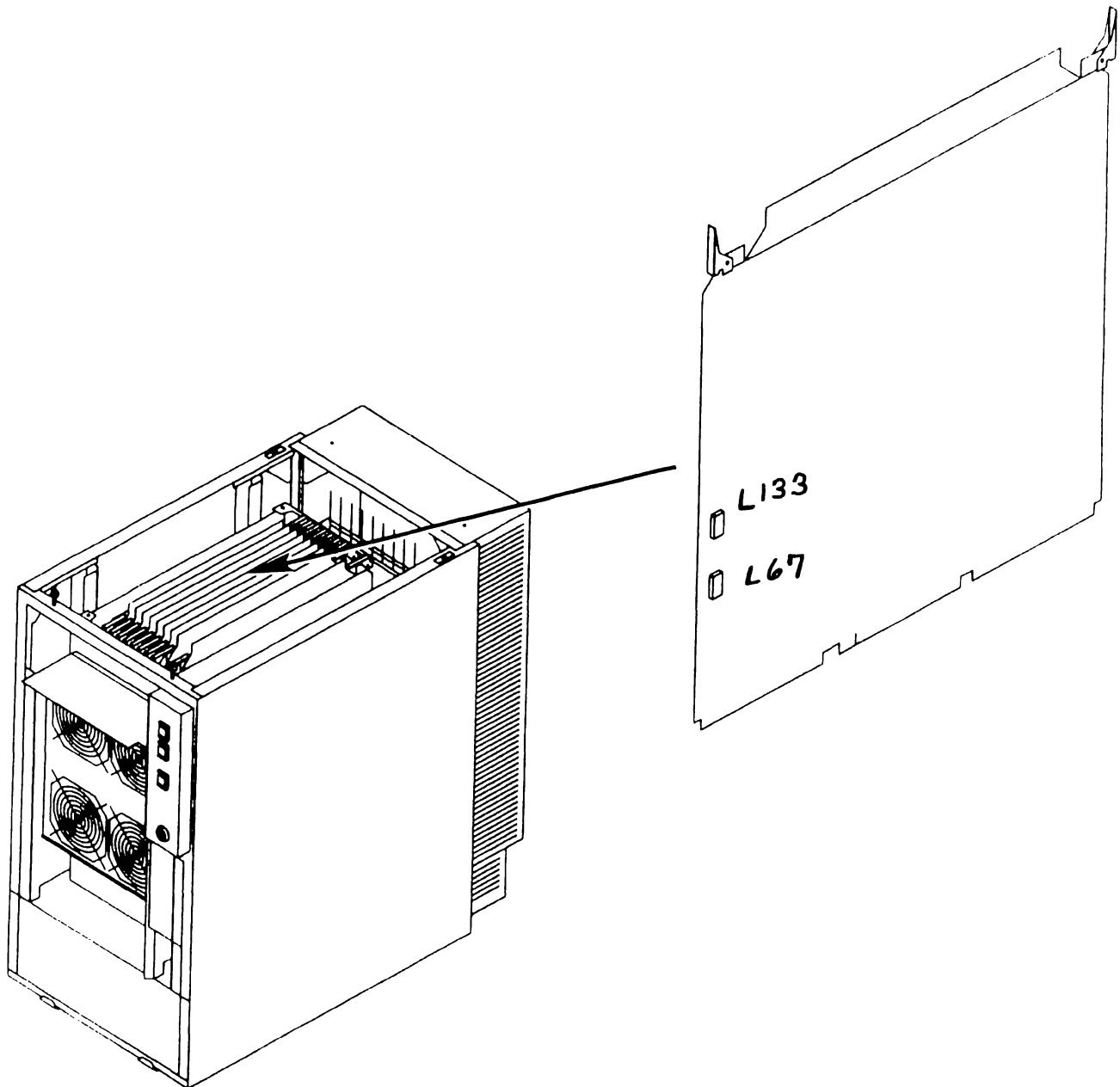
7.2   Removal Procedures

7.2.10   Memory Control Unit (MCU) Removal (Sheet 2 of 2)

5)   Verify   proper   jumper   positions   of
     MCU   System   Address   ID   jumpers   at
     location L67.

NOTE

MCU   Main   Memory   Size   Selection   jumpers
setting   must   correspond   to   the   Main
Memory board memory configuration.
(→ 7.2.11, 7.2.12)

---

6)   Verify   proper   jumper   positions   of
     MCU   Support   Packet   Bus   ID   jumpers
     (JP1   -   JP3)   and   Main   Memory   Size
     Selection   jumpers   (JP4   -   JP8)   at
     location L133.
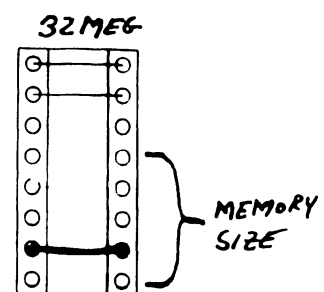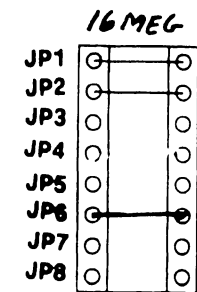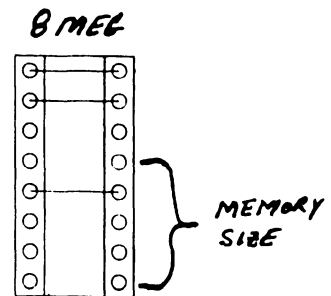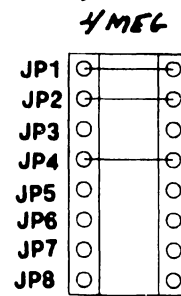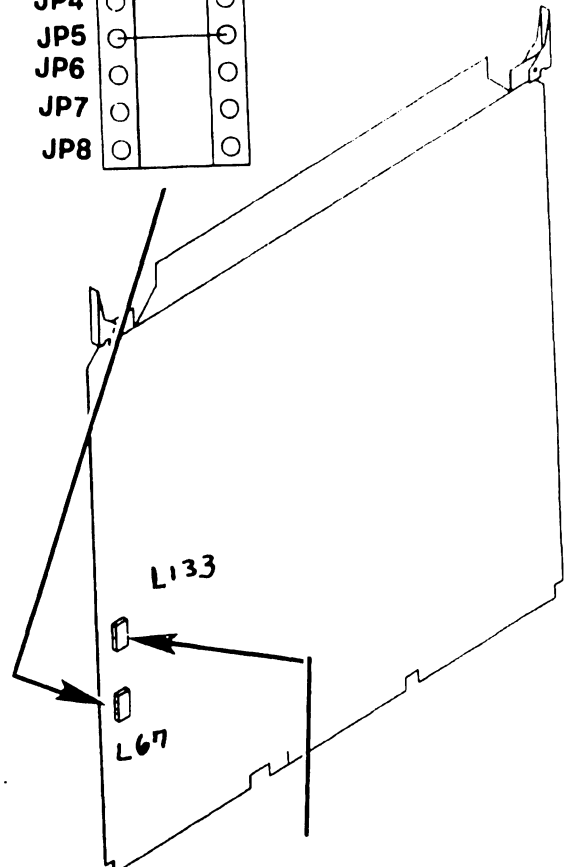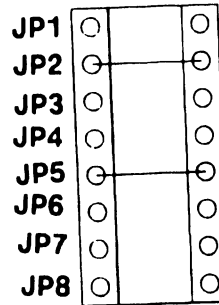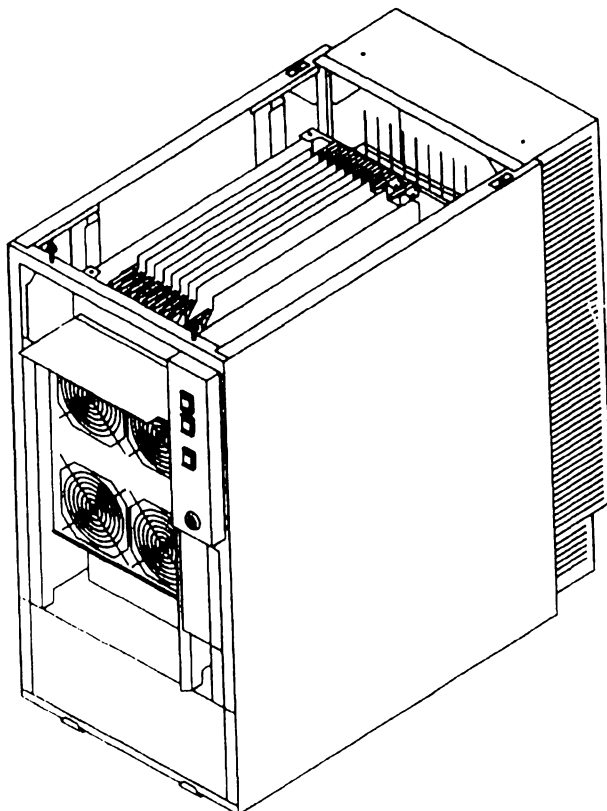
7.2   Removal Procedures

7.2.11   Main Memory (MEM) Board (210-8703/-1) Removal (Sheet 1 of 2)

1) Power off mainframe and disconnect
    ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove card cage cover (→7.2.4)
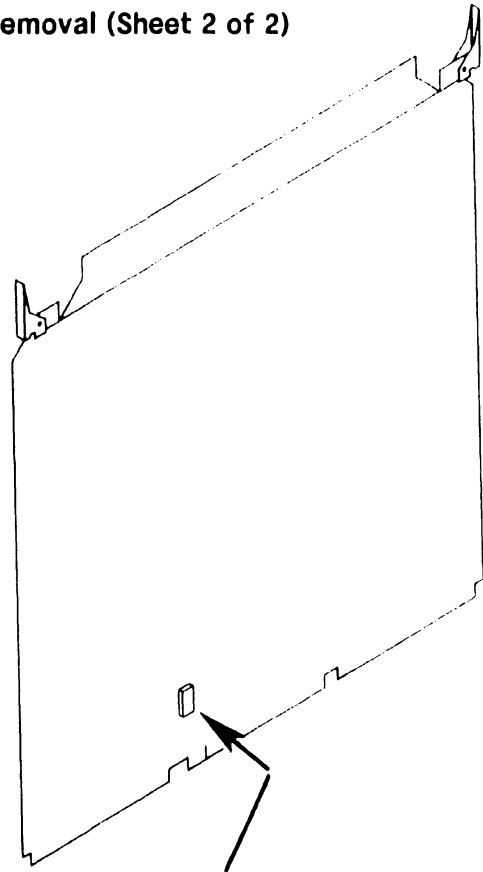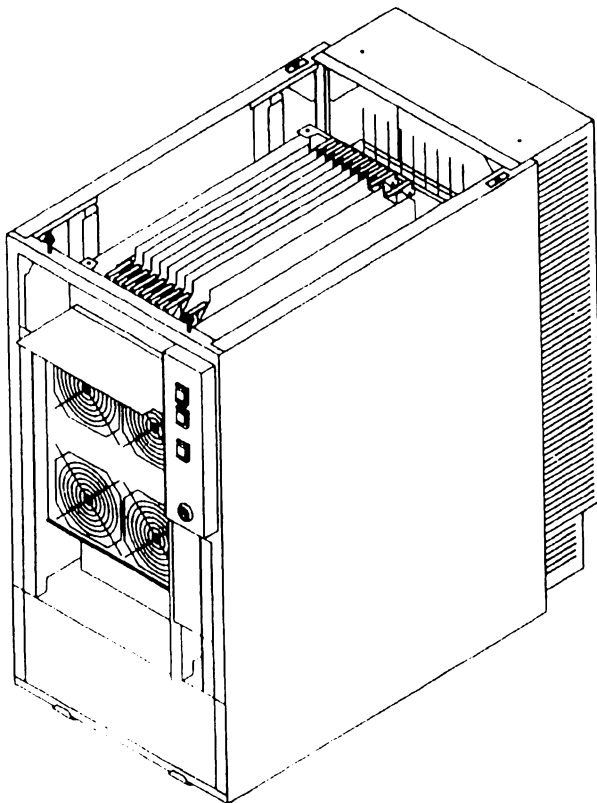
4) Remove PCB from backplane. (→ 7.2.5)
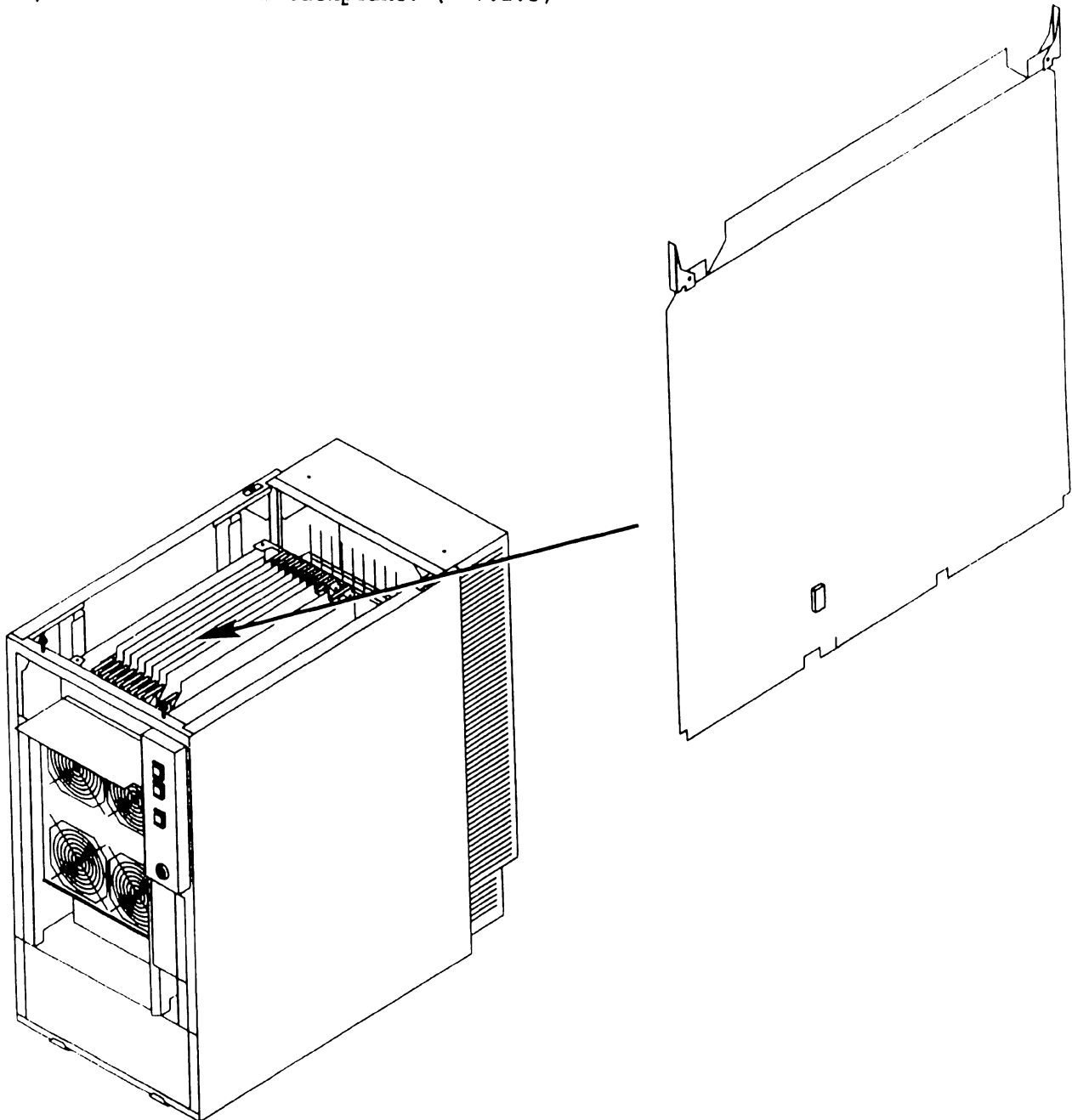
7.2   Removal Procedures

7.2.11   Main Memory (MEM) Board (210-8703/-1) Removal (Sheet 2 of 2)
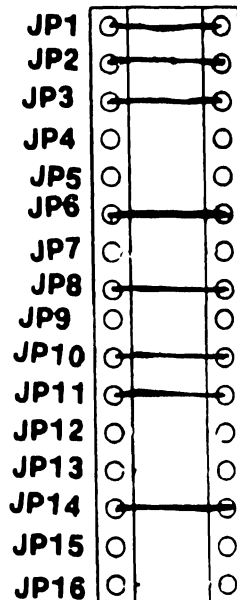

NOTE

Main Memory board DRAM loading jumper configuration must correspond to the Memory Control Unit Memory Size jumper setting. (→ 7.2.10)

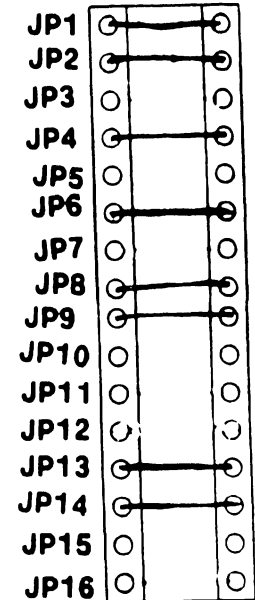5) Verify proper jumper positions of Main Memory DRAM loading jumpers.

210-8703
4MEG

210-8703-1
8MEG

W1
W2
W3
W4
W5
W6
W7
W8

7.2   Removal Procedures

7.2.12   Main Memory (MEM) Board (210-9874/-1) Removal (Sheet 1 of 2)
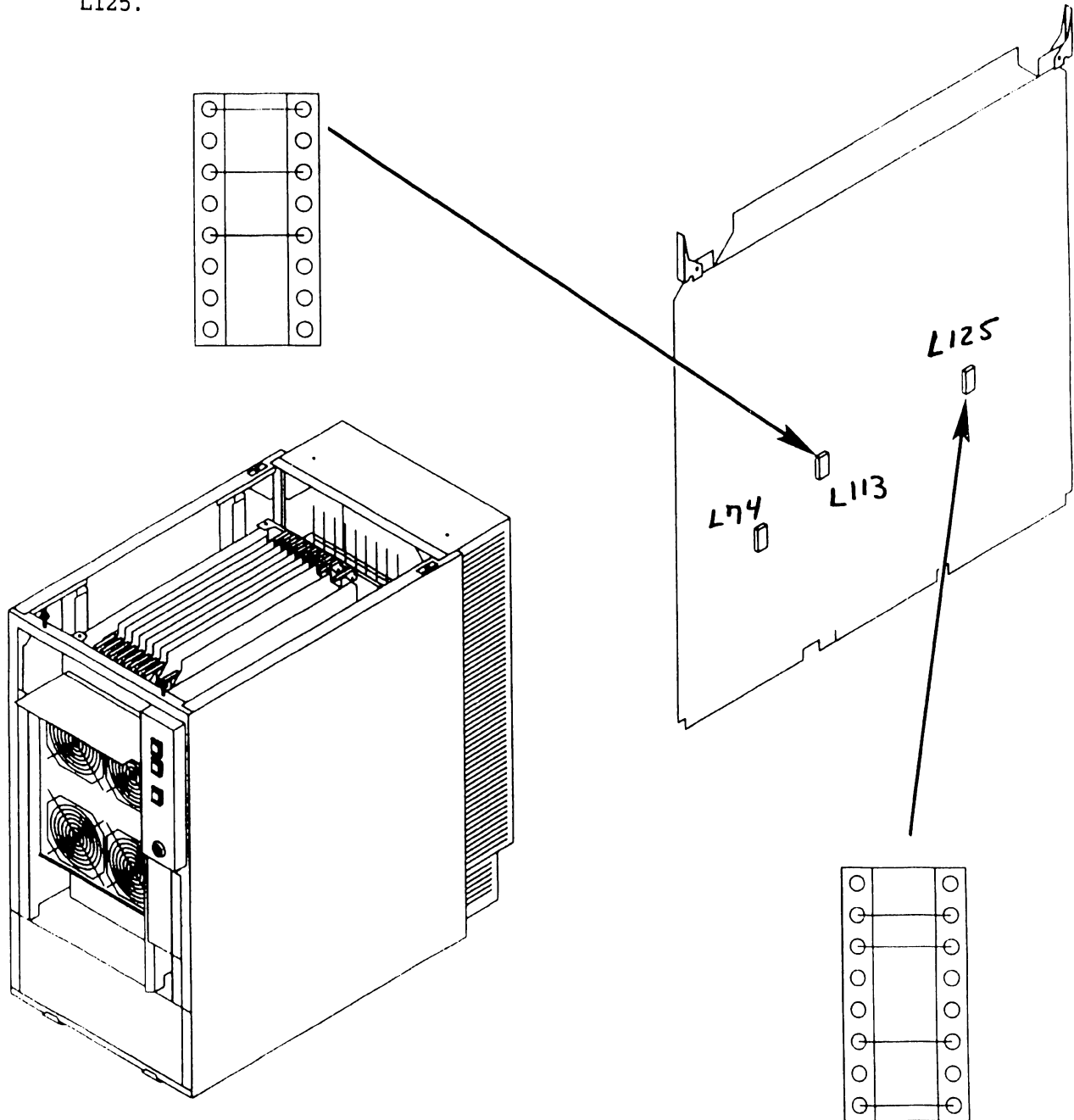
1) Power off mainframe and disconnect
    ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove card cage cover (→7.2.4)

4) Remove PCB from backplane. (→ 7.2.5)
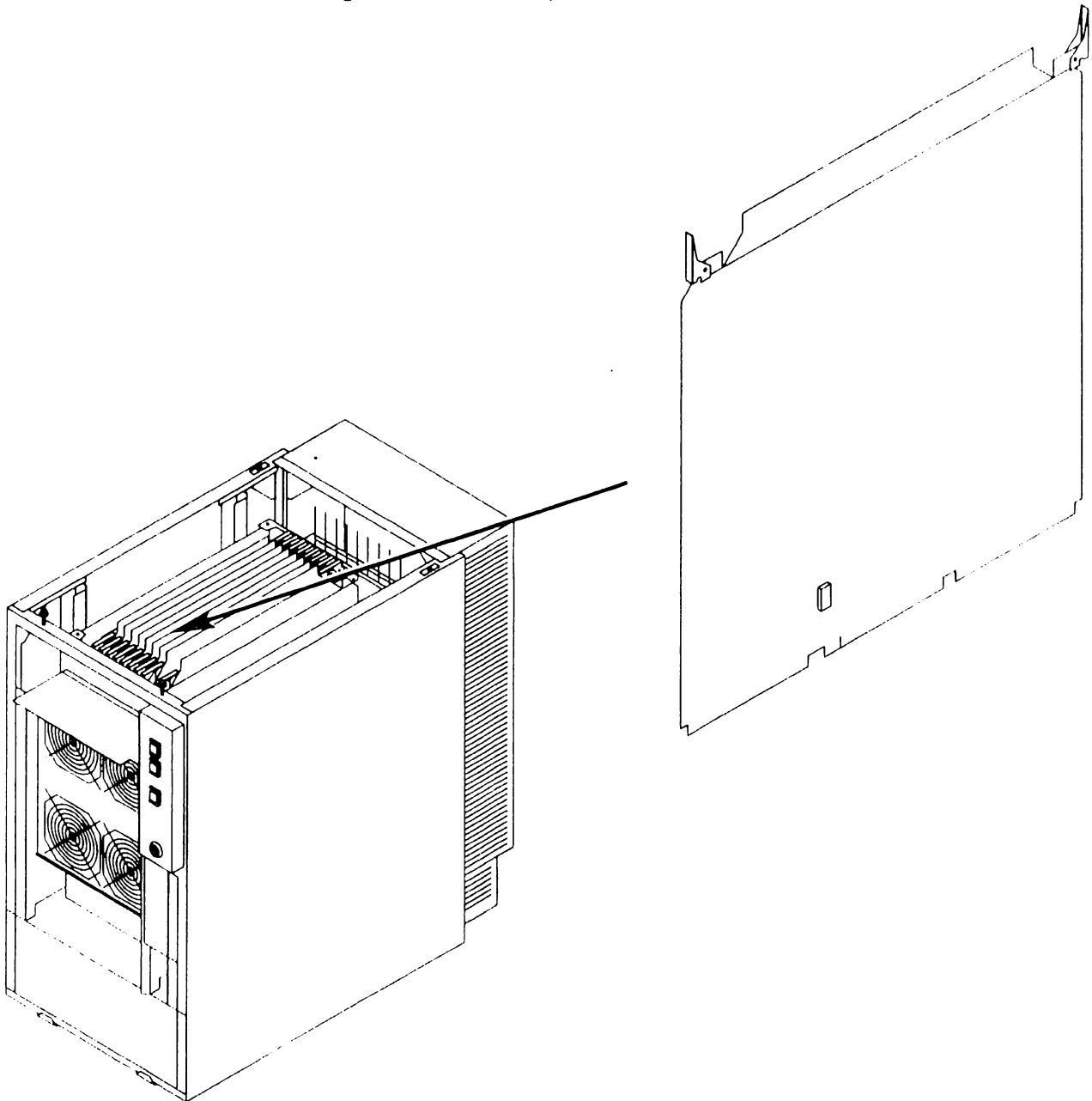
7.2   Removal Procedures

7.2.12   Main Memory (MEM) Board (210-9874/-1) Removal (Sheet 2 of 2)

NOTE

Main Memory board jumper configuration
must correspond to the Memory Control
Unit Memory Size jumper setting. (→
7.2.10)

---

5) Verify proper jumper positions of
Main Memory DRAM loading jumpers.

210-9874
16 MEG

JP1	
JP2	
JP3	
JP4	
JP5	
JP6	
JP7	
JP8	
JP9	
JP10	
JP11	
JP12	
JP13	
JP14	
JP15	
JP16	

210-9874-1
32 MEG

JP1	
JP2	
JP3	
JP4	
JP5	
JP6	
JP7	
JP8	
JP9	
JP10	
JP11	
JP12	
JP13	
JP14	
JP15	
JP16	

7.2   Removal Procedures

7.2.13   System Bus Interface (SBI) Removal (Sheet 1 of 2)

1) Power off mainframe and disconnect
   ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove card cage cover (→7.2.4)

4) Remove PCB from backplane. (→ 7.2.5)

5) Verify proper jumper positions of
   SBI ID jumpers at location L74.
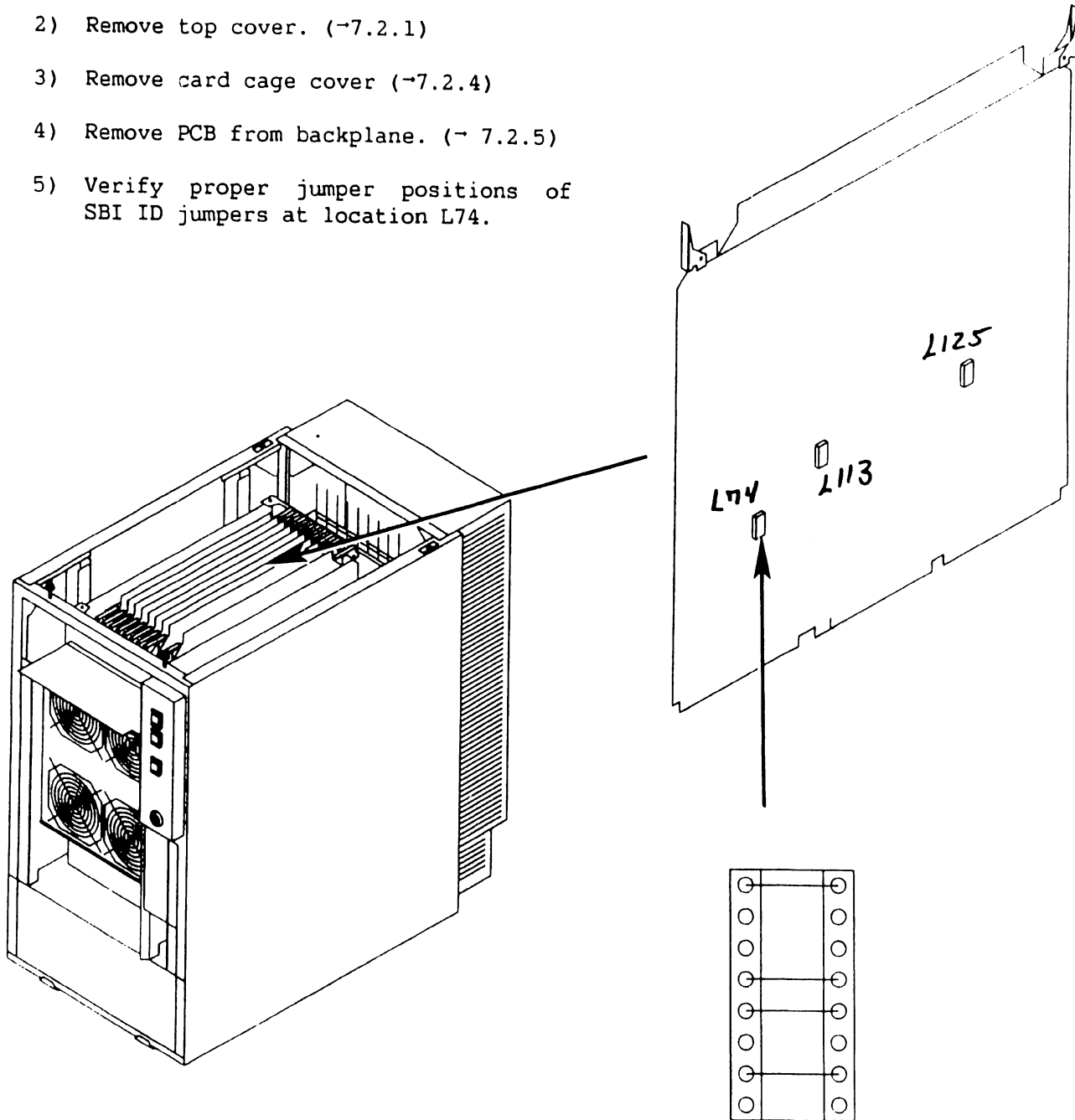
7.2   Removal Procedures

7.2.13   System Bus Interface (SBI) Removal (Sheet 2 of 2)

6) Verify proper jumper positions of
    SPB Target ID jumpers at location
    L113.

7) Verify proper jumper positions of
    I/O Clock Speed jumpers at location
   L125.

7.2   Removal Procedures

7.2.14   SMD Controller (23V98-4) IOC Removal (Sheet 1 of 3)

1) Power off mainframe and disconnect
    ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove card cage cover (→7.2.4)

4) Note cable positions and remove 'A'
    cable from connector J5 and 'B'
    cables from connectors J4, J3, J2,
    and J1 (if installed).

NOTE

The first SMD IOC <u>Must Be</u> installed in
I/O Slot 1. A second SMD Controller IOC
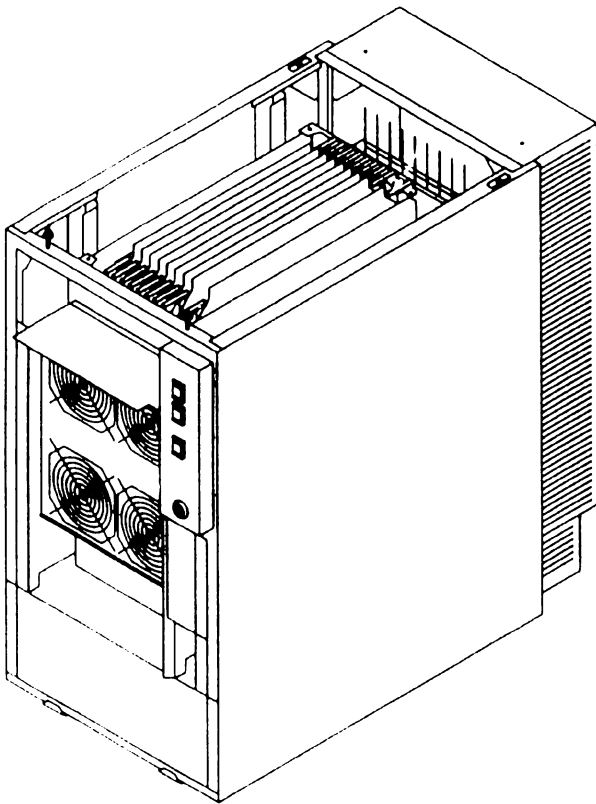(if used) should be installed in I/O
Slot 2.

---

5) Remove PCB from backplane. (→ 7.2.5)
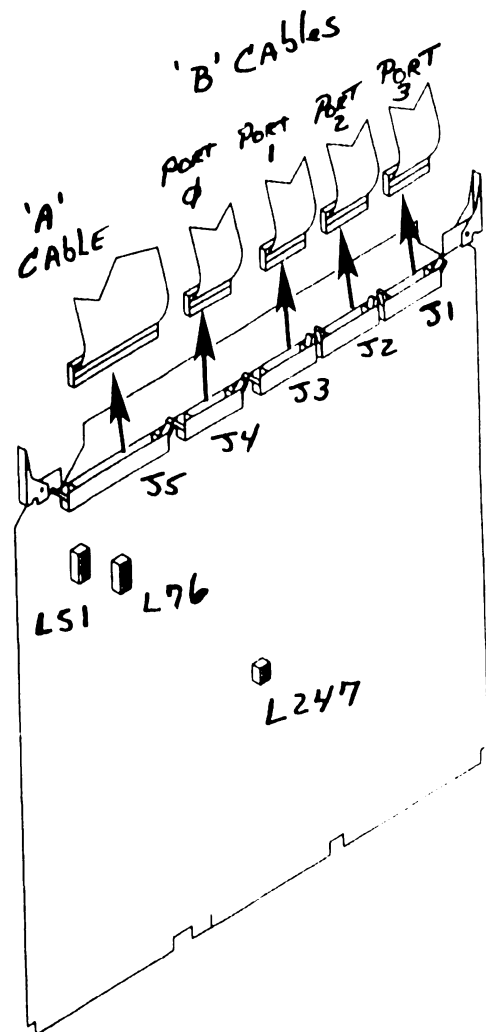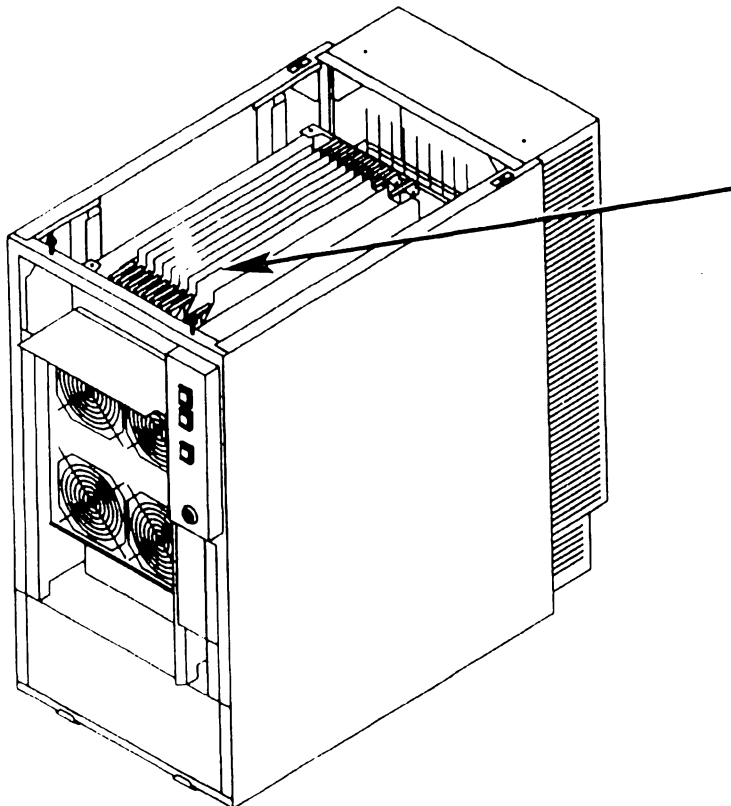
7.2   Removal Procedures

7.2.14   SMD (23V98-4) IOC Removal (Sheet 2 of 3)

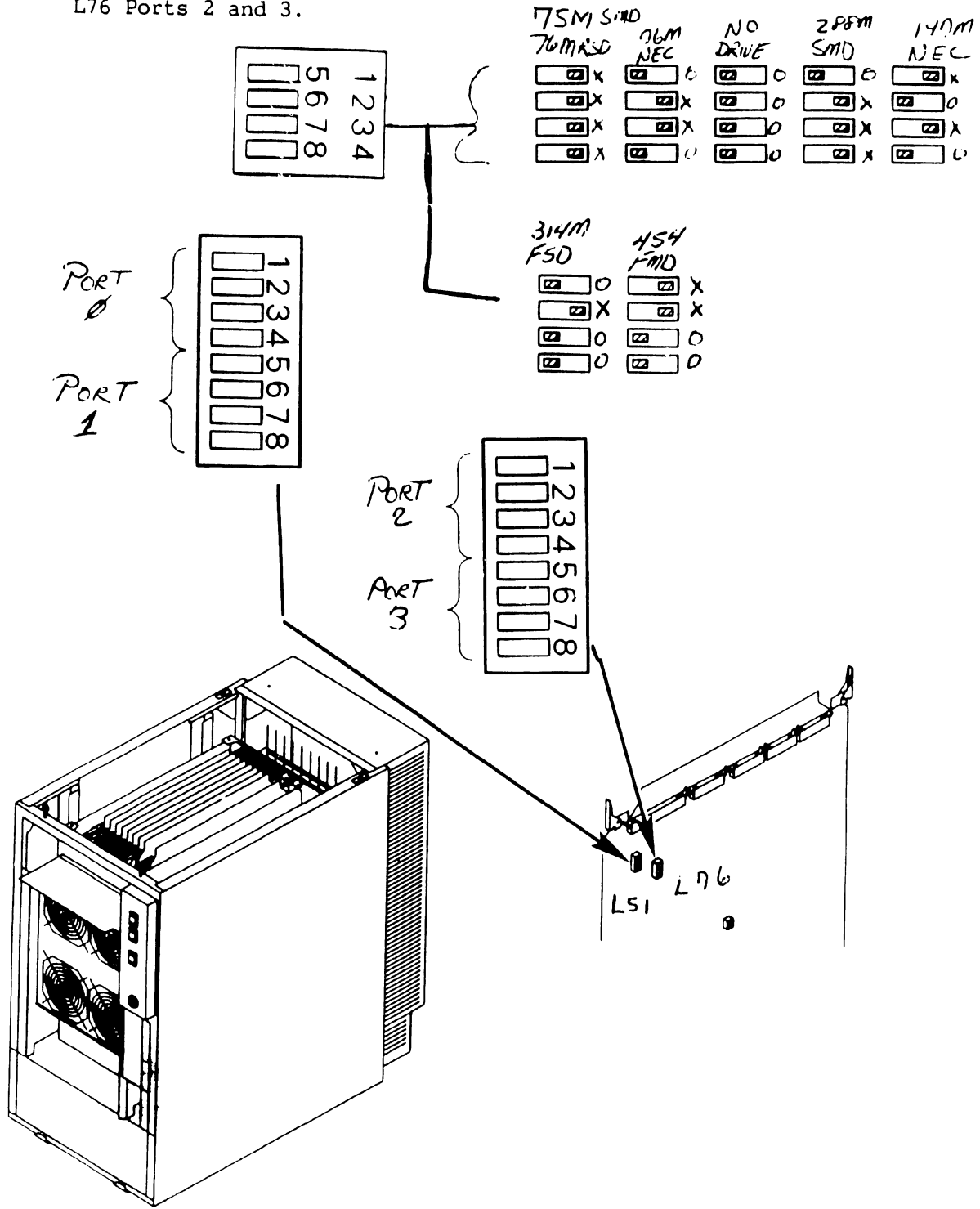6) Verify proper switch positions of
    Diagnostic switch at location L274.
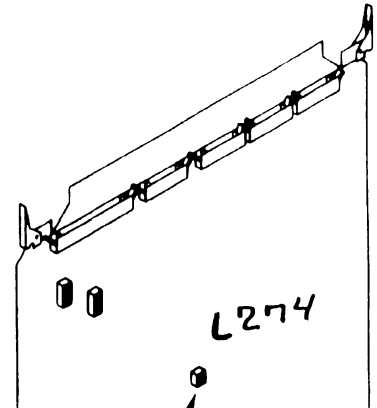
□ = Switch Position
O = Open Contacts
X = Closed Contacts

7.2   Removal Procedures

7.2.14   SMD (23V98–4) IOC Removal (Sheet 3 of 3)

7) Verify proper switch settings for
    drive-types (or no drive) installed
    on each port; L51 Ports 0 and 1, and
    L76 Ports 2 and 3.

7.2   Removal Procedures

7.2.15   Serial (23V67) IOC Removal (Sheet 1 of 2)

1) Power off mainframe and disconnect ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove card cage cover (→7.2.4)

NOTE

Serial IOC Connector J1 is reserved for P-Band. No other type of device should be attached.

P-Band Modem must be installed in the cable concentrator due to rear panel bulkhead restrictions.

---

4) Note cable positions and remove 34-pin APA cable from connector J2 and 34-pin P-Band Modem cable from connector 12 (if installed).

NOTE

The first Serial IOC (supporting the SCU (port 0)) <u>Must Be</u> installed in I/O Slot 3. Additional Serial IOCs can be installed in any available I/O slot.
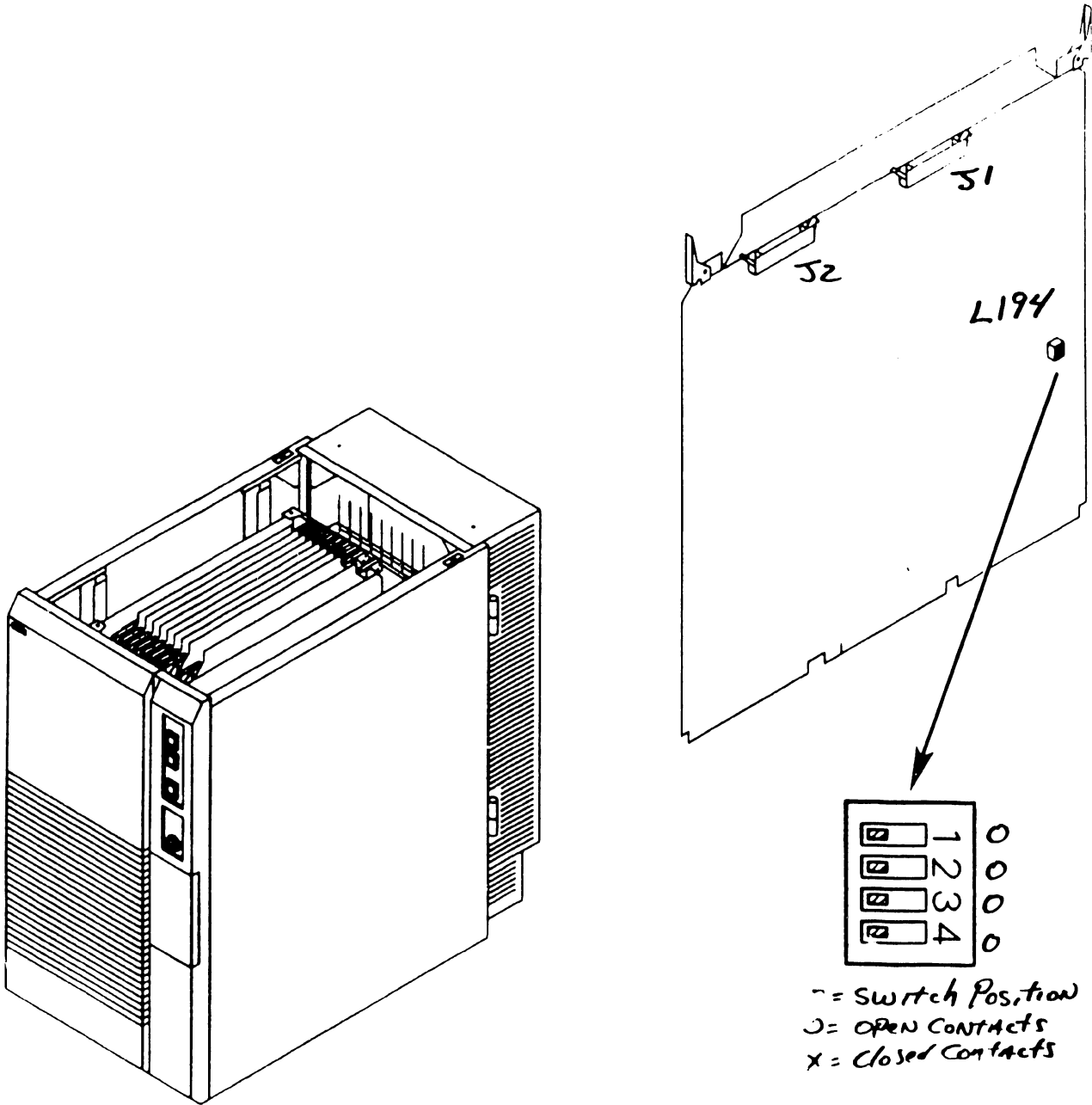
---

5) Remove PCB from backplane. (→ 7.2.5)
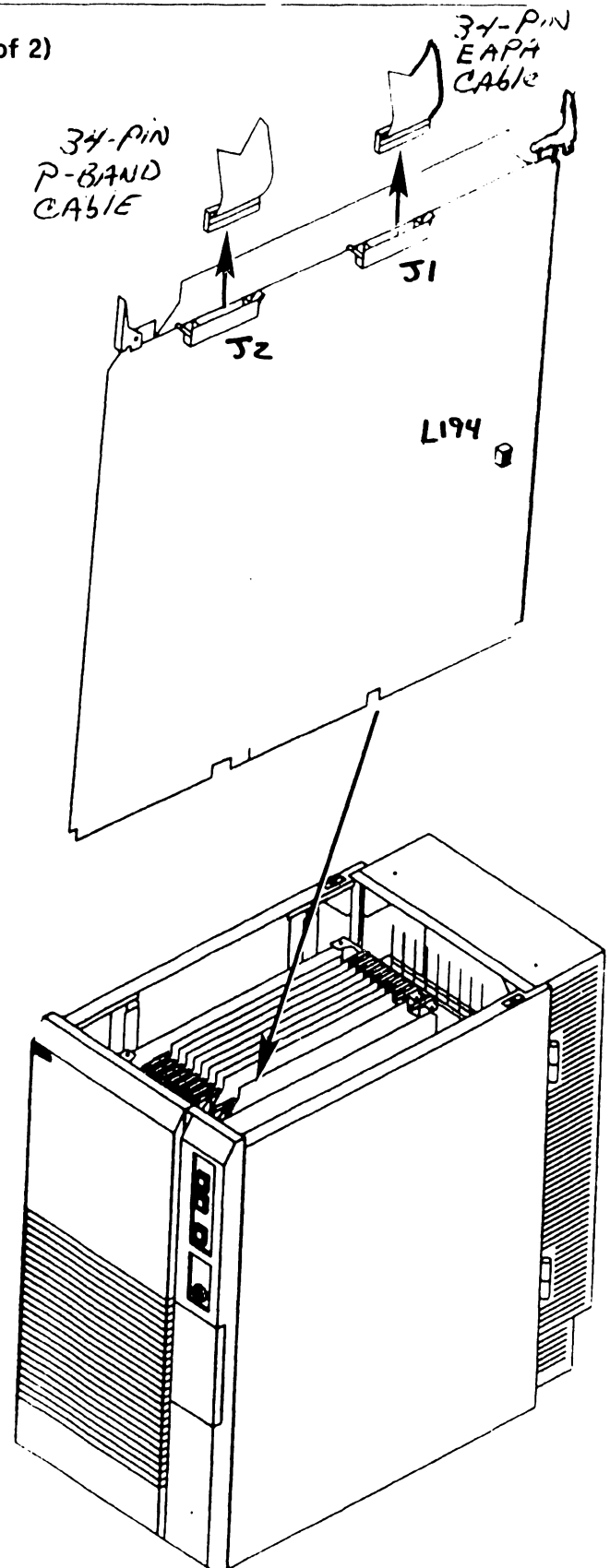
7.2   Removal Procedures

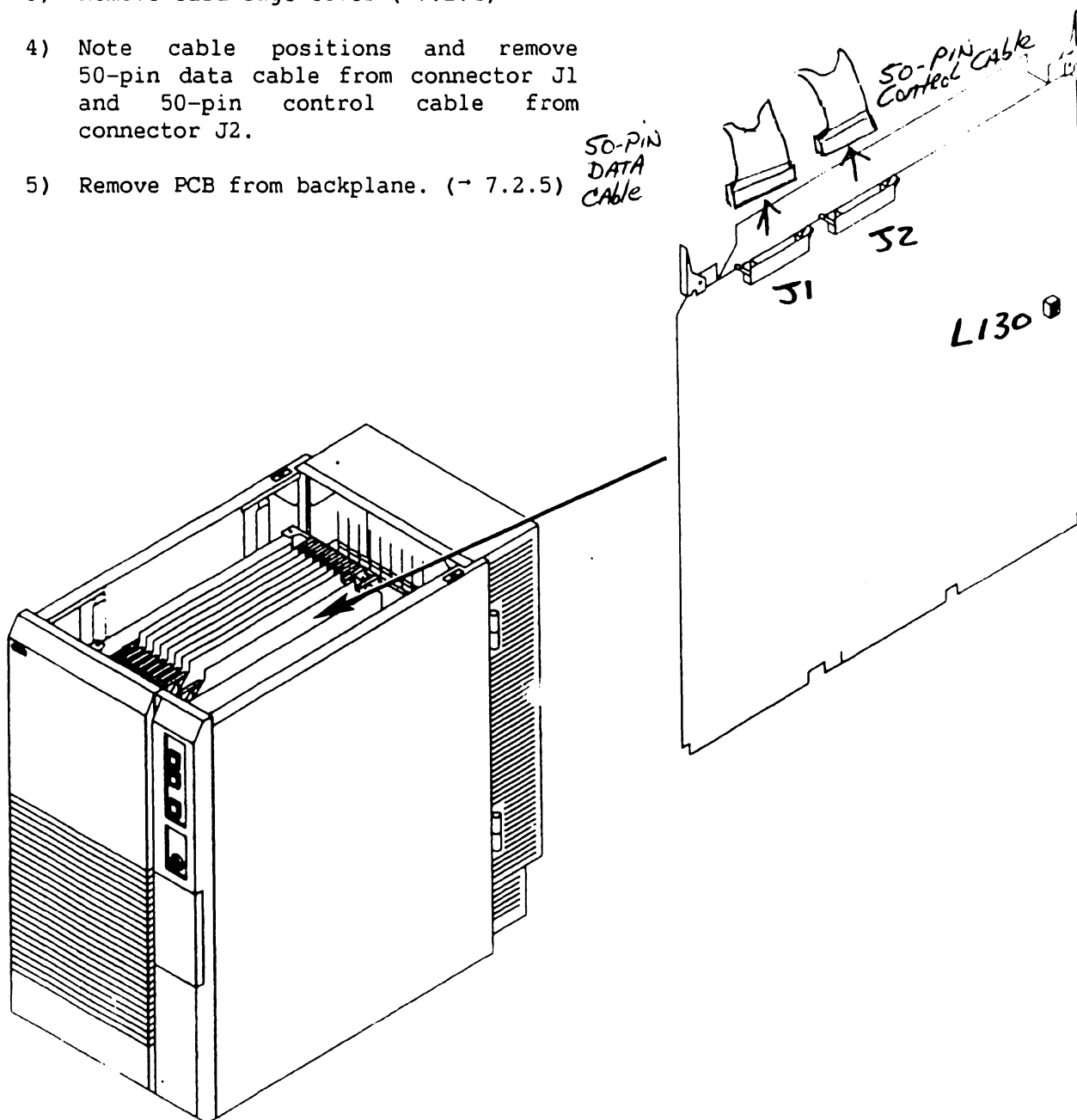### 7.2.15   Serial (23V67) IOC Removal (Sheet 2 of 2)

6) Verify proper switch positions of
    diagnostic switch at location L194.

⌐ = Switch Position
⌐ = Open Contacts
x = Closed Contacts

7.2   Removal Procedures

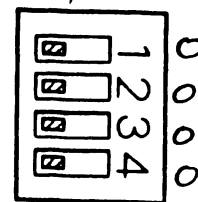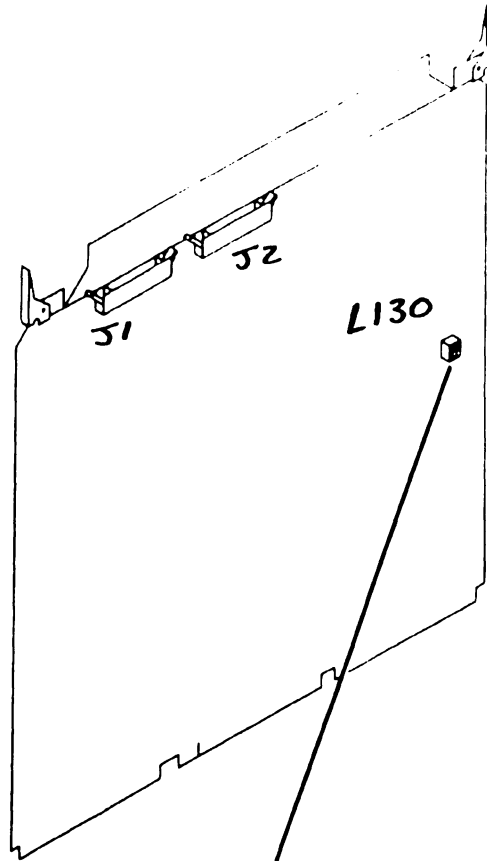### 7.2.16   Kennedy Tape (23V95–1) IOC Removal (Sheet 1 of 2)

1) Power off mainframe and disconnect
   ac power. (⁻4.2)

2) Remove top cover. (⁻7.2.1)

3) Remove card cage cover (⁻7.2.4)

4) Note cable positions and remove
   50–pin data cable from connector J1
   and 50–pin control cable from
   connector J2.

5) Remove PCB from backplane. (⁻ 7.2.5)

7.2   Removal Procedures

7.2.16   Kennedy Tape (23V95-1) IOC Removal (Sheet 2 of 2)

6) Verify proper switch positions of
    diagnostic switch at location L130.

$\boxtimes$= Switch Position
O= Open Contacts
X= Closed Contacts

7.2   Removal Procedures

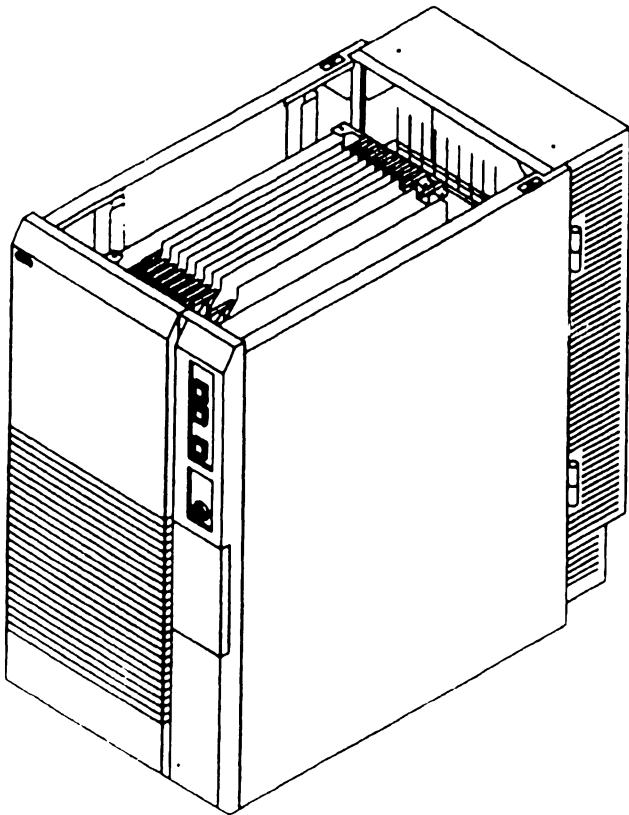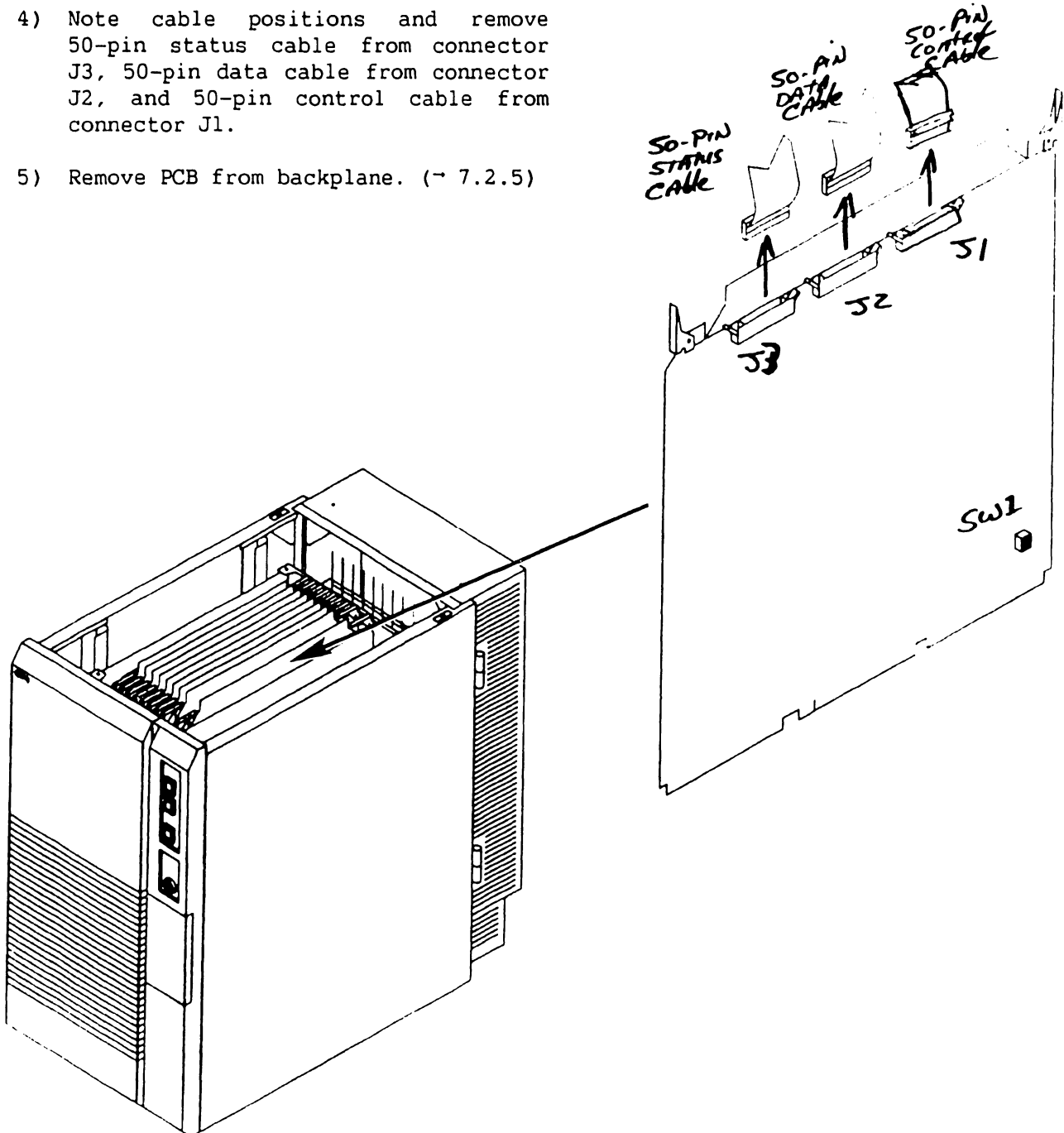### 7.2.17   Telex Tape (23V95-2) IOC Removal (Sheet 1 of 2)

1) Power off mainframe and disconnect ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove card cage cover (→7.2.4)

4) Note cable positions and remove 50-pin status cable from connector J3, 50-pin data cable from connector J2, and 50-pin control cable from connector J1.

5) Remove PCB from backplane. (→ 7.2.5)

7.2   Removal Procedures

7.2.17   Telex Tape (23V95-2) IOC Removal (Sheet 2 of 2)

6) Verify proper switch positions of diagnostic switch at location SW1.

☒ = Switch Position
O = Open Contacts
X = Closed Contacts

7.2   Removal Procedures

7.2.18   Multiline TC (23V86/96) IOC Removal (Sheet 1 of 2)
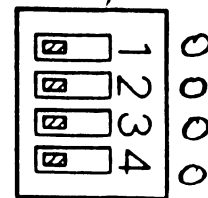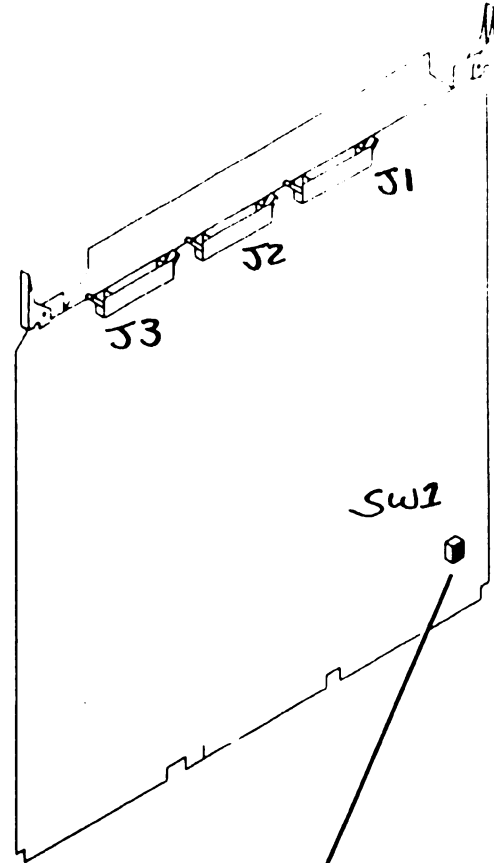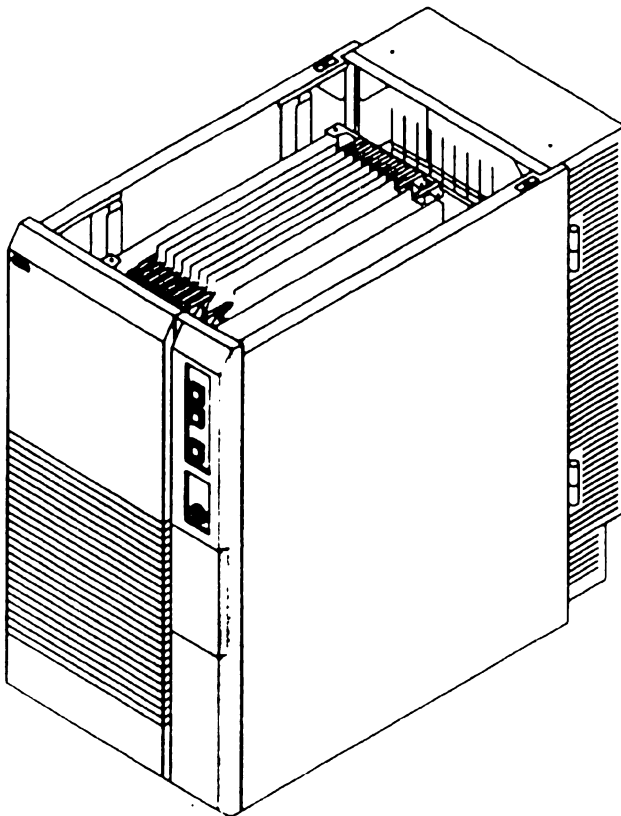
1) Power off mainframe and disconnect
   ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove card cage cover (→7.2.4)

4) Note cable positions and remove
   50-pin Port 0-3 cable from connector
   J1, 50-pin Port 4-7 cable from
   connector J2, 50-pin Port 8-11 cable
   from connector J3, and 50-pin Port
   12-15 cable from connector J4 (if
   installed).

5) Remove PCB from backplane. (→ 7.2.5)

7.2   Removal Procedures

7.2.18   Multiline TC (23V86/96) IOC Removal (Sheet 2 of 2)

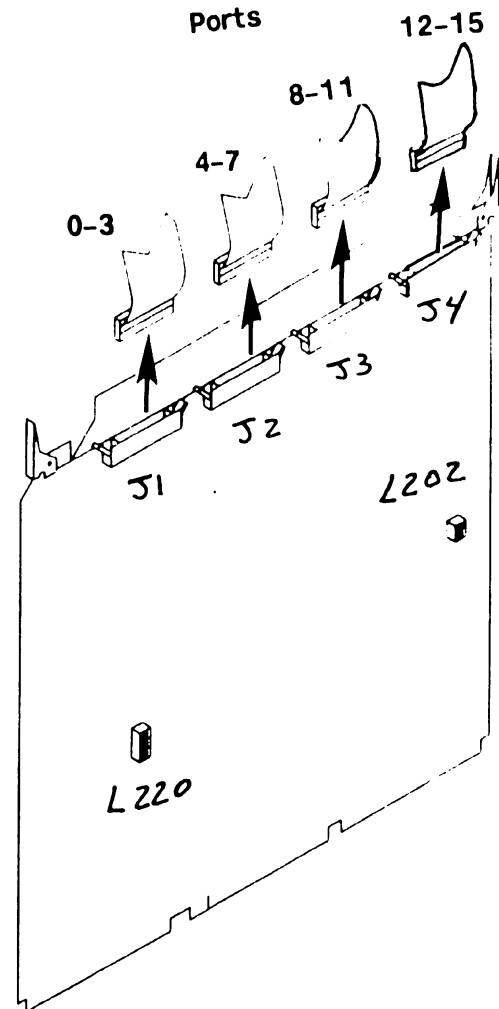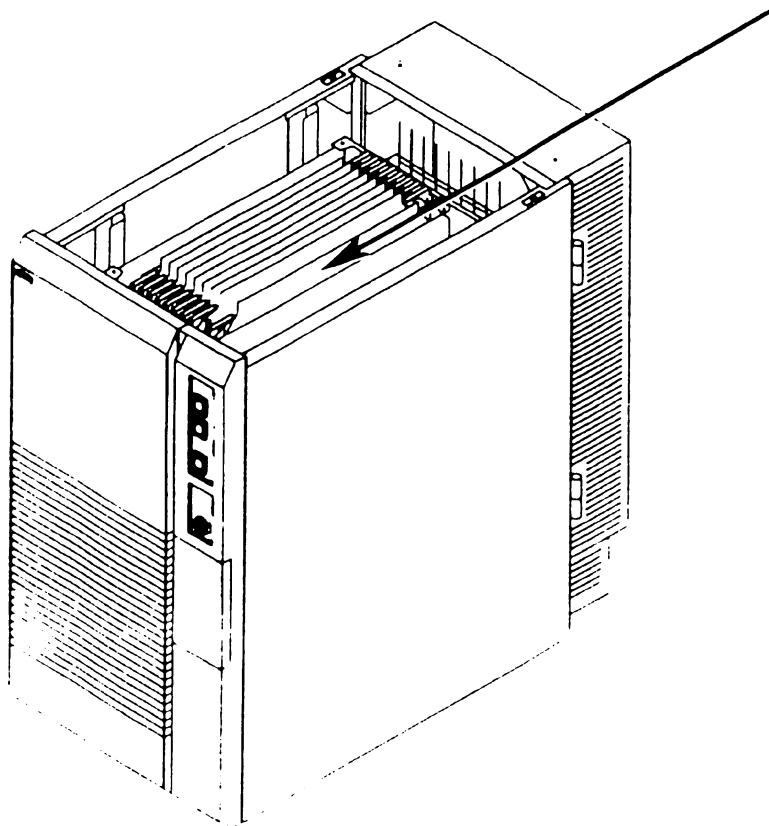6) Verify proper switch positions of diagnostic switch at location L202.

7) Verify proper switch positions of diagnostic port select switch at location L220.

☑ = Switch Position
O = Open Contacts
X = Closed Contacts
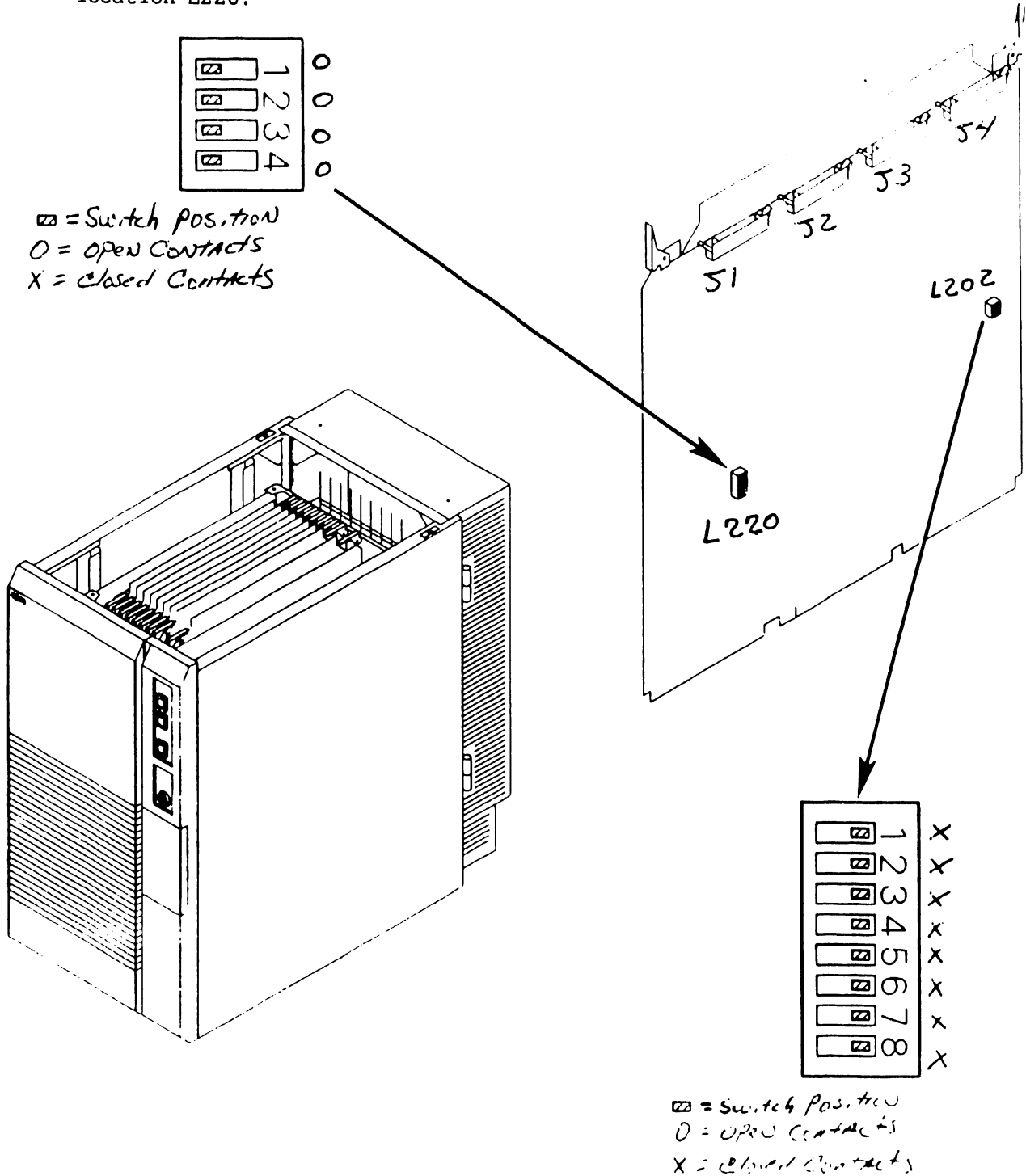
7.2   Removal Procedures

7.2.19   Power Supply Controller Board Removal (Sheet 1 of 3)

1) Power off mainframe and disconnect
    ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove front cover. (→7.2.2)

4) Remove right side cover. (→7.2.3)

5) Remove 9-pin cable from connector J1,
    4-pin cable from connector J3, 60-pin
    cable from connector J6, 20-pin cable
    from connector J7, and 5-pin cable
    from connector J9.
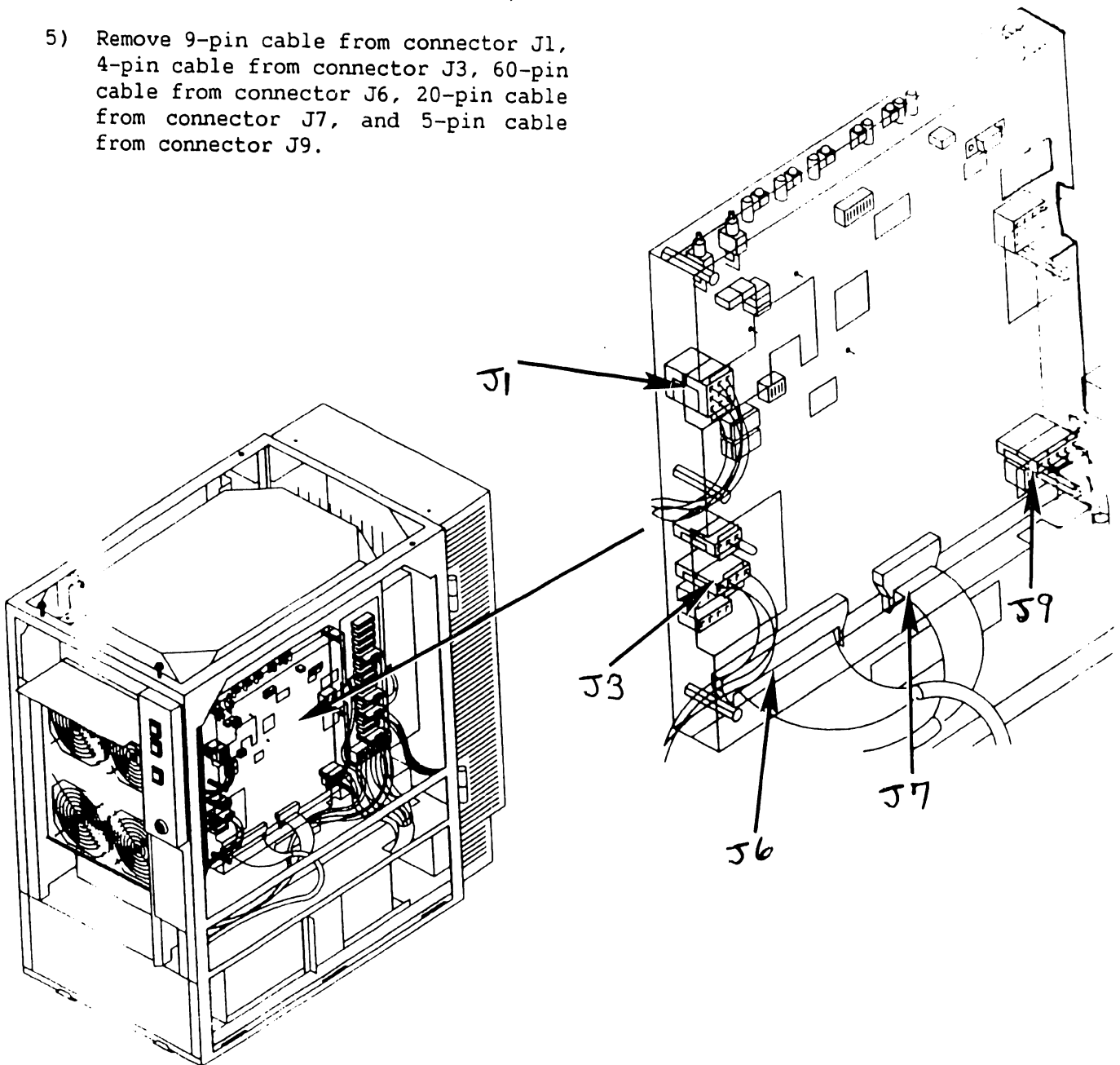
7.2   Removal Procedures

7.2.19   Power Supply Controller Board Removal (Sheet 2 of 3)

6) Remove six screws securing power supply controller board shield in place.

7.2   Removal Procedures

7.2.19   Power Supply Controller Board Removal (Sheet 3 of 3)

7) Remove six threaded stand-offs securing power supply controller board to card cage.

8) Remove Power Supply Controller board.

NOTE

Power Supply Controller Board contains two switch banks; SW3 and SW4.

Switch SW3 A/D Convertor Voltage Address switch will be set to the last A/D Convertor voltage address adjusted. (→8.2.2)

Switch SW4 is not used. Disregard any switch settings.

7
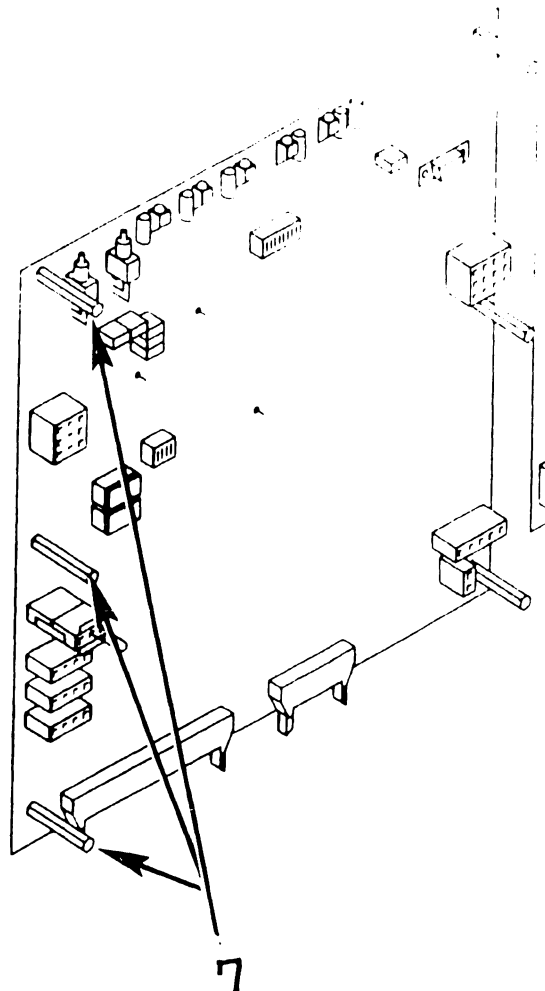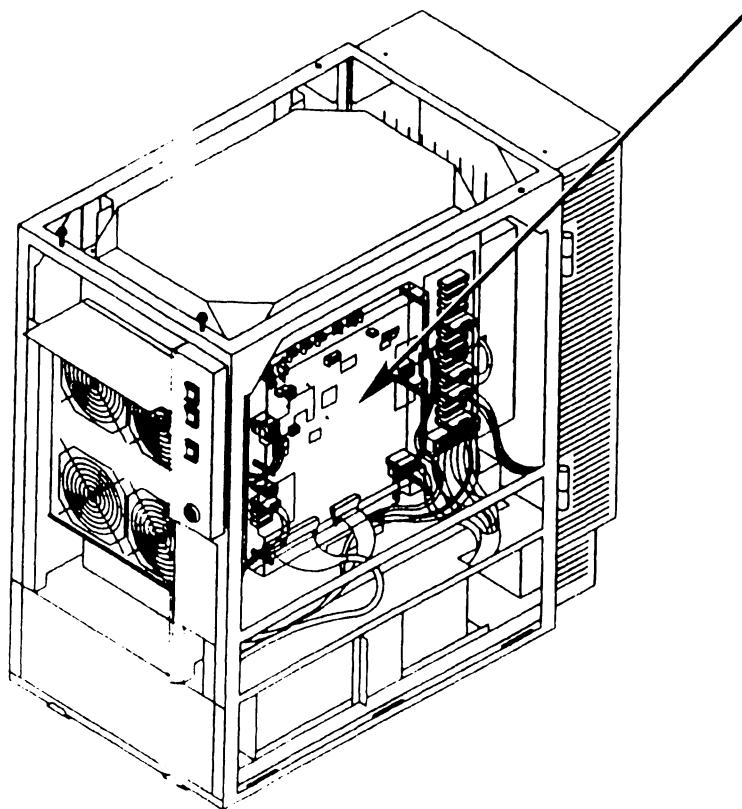
7.2   Removal Procedures

7.2.20   DC Power Distribution Unit (DC PDU) Removal (Sheet 1 of 3)
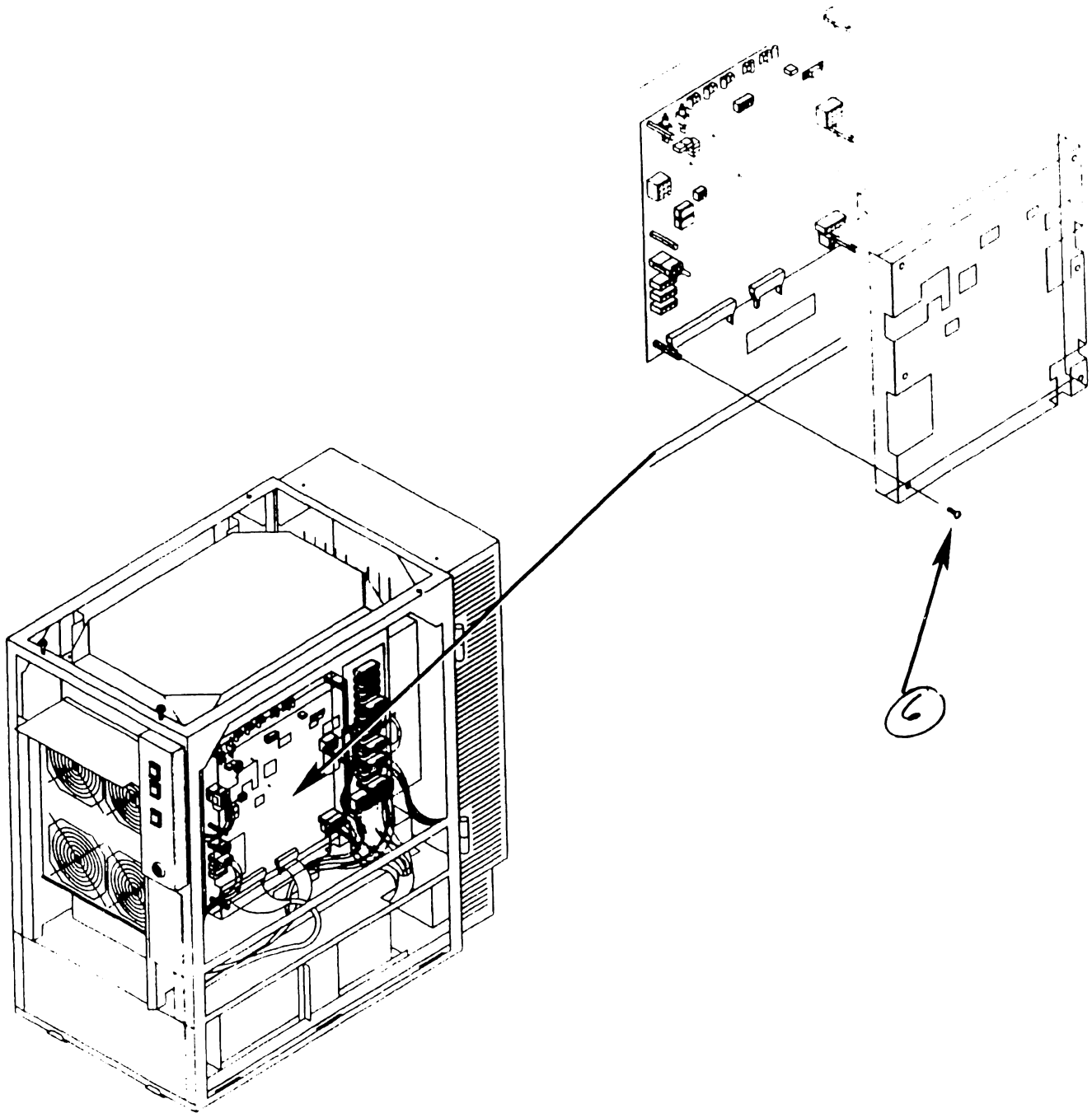
1) Power off mainframe and disconnect ac power. (→4.2)

2) Remove top cover. (→7.2.1)

3) Remove front cover. (→7.2.2)

4) Remove right side cover. (→7.2.3)
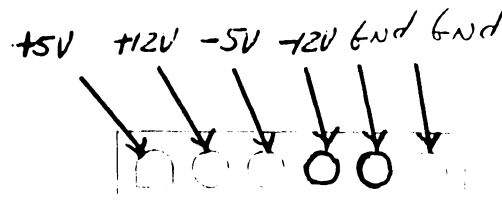
NOTE

DC PDU connectors J1 – J15 are in parallel. DC power cables can be installed in any available connector location.

---

5) Remove all cables from DC PDU connectors (i.e. front fan assembly cable, rear fan assembly cable, option half-panel cables).
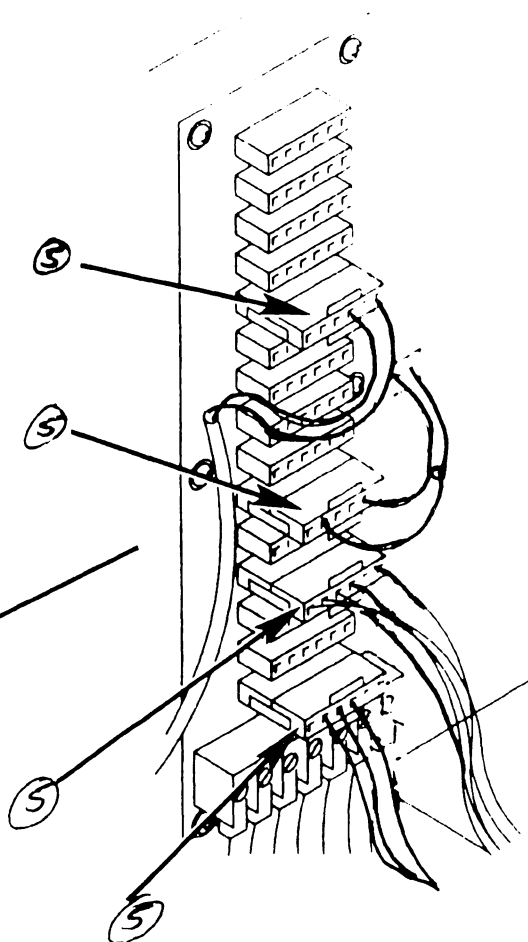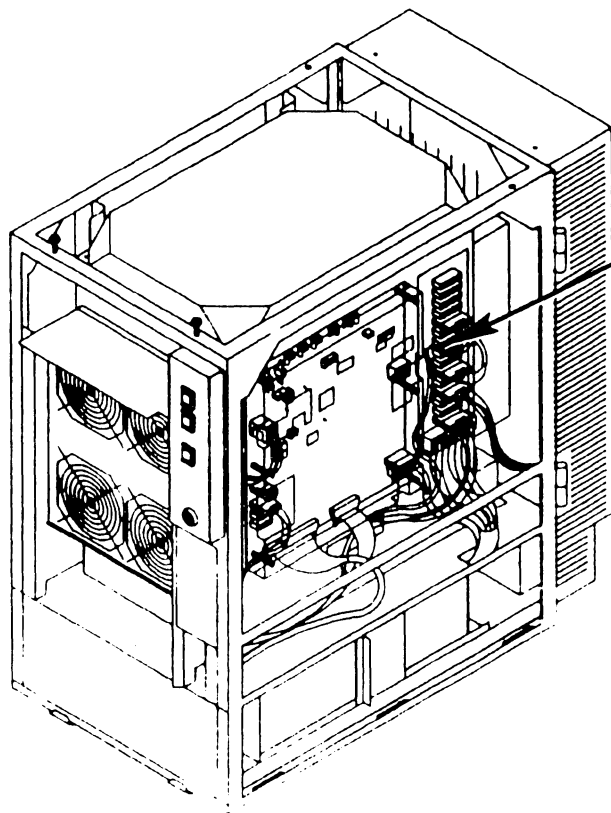
7.2   Removal Procedures

7.2.20   DC Power Distribution Unit (DC PDU) Removal (Sheet 2 of 3)

6) Note wire locations and color code and remove DC Power harness assembly from DC PDU 7-connector terminal block.

+5V   +5V   +12V   −5V   −12V   ±0V   ±0V
Red   Red   Blue   White Violet Black Black
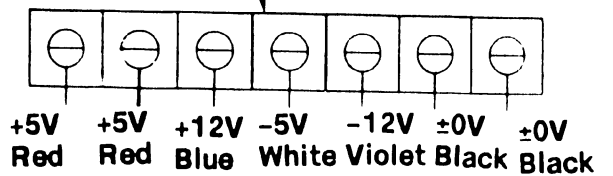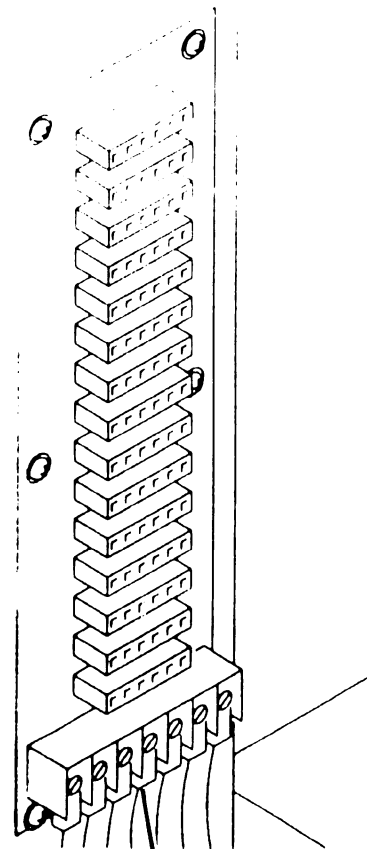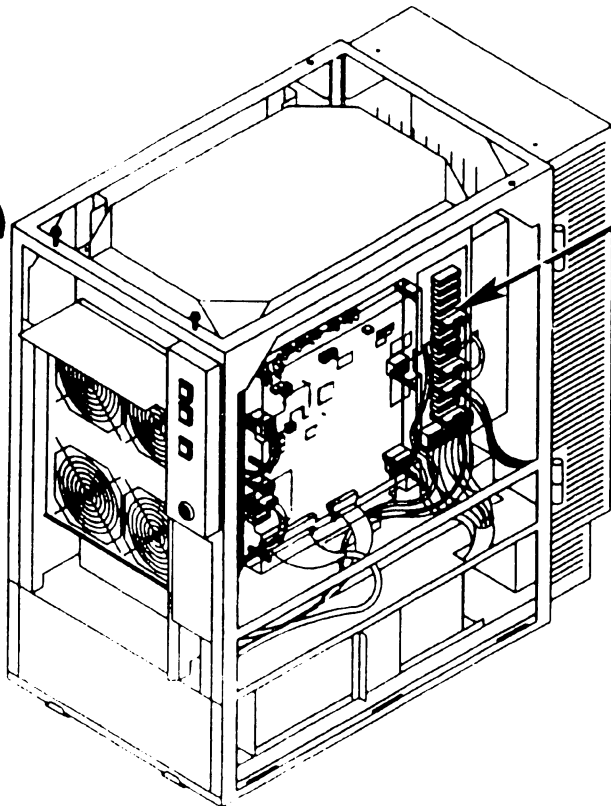
7.2   Removal Procedures

7.2.20   DC Power Distribution Unit (DC PDU) Removal (Sheet 3 of 3)

7) Remove six screws securing DC PDU to
    card cage.

8) Remove DC PDU.
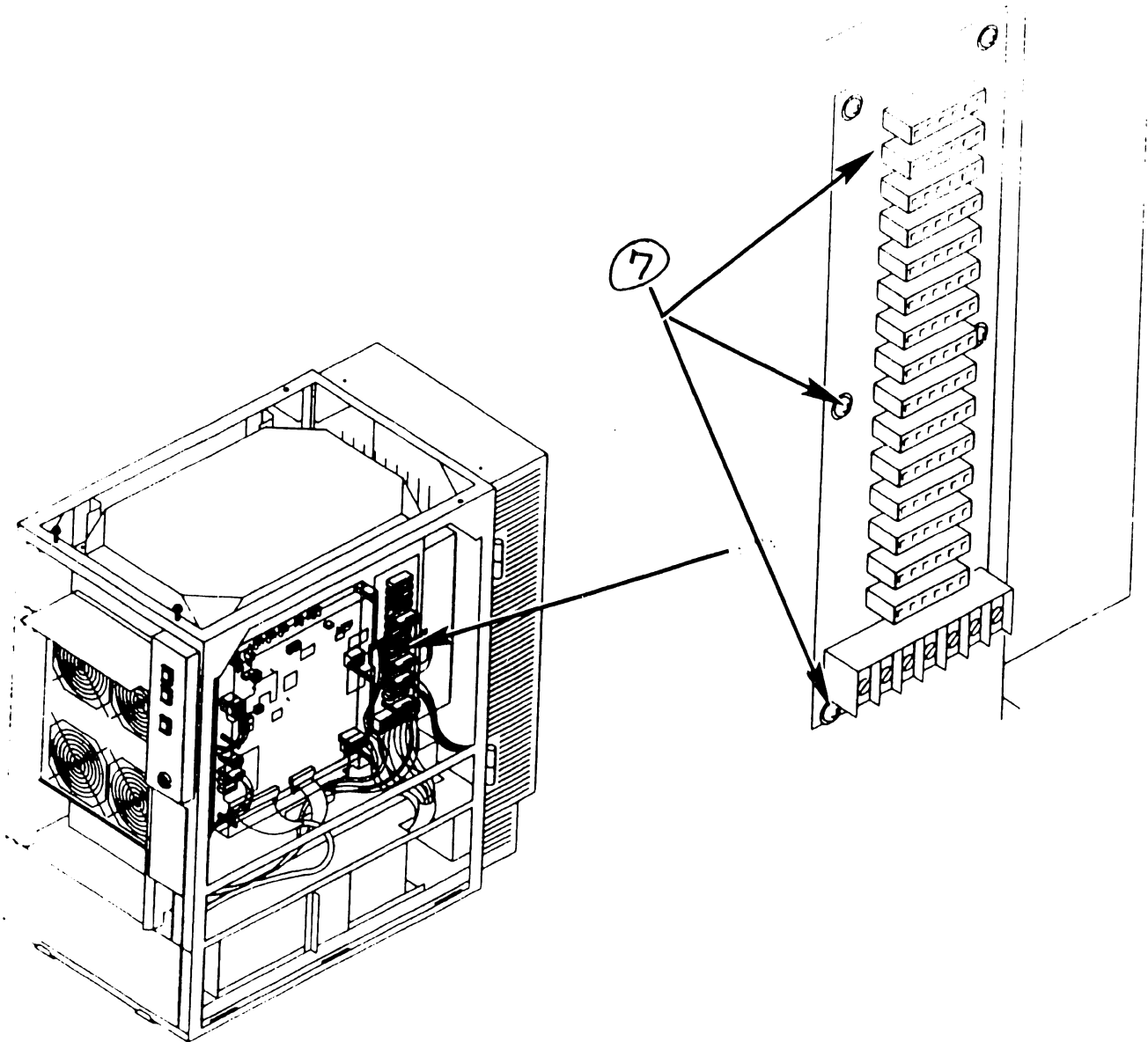
SECTION
8
ADJUSTMENTS

SECTION 8

ADJUSTMENTS

8.1   Tools And Equipment

8.1.1   Special Tools

All adjustments can be accomplished
using a standard Wang CE tool kit
which includes:

- Small flat blade plastic screwdriver

- Digital multimeter

One special tool is required for power
supply testing:

- Power supply test plug 220-2342

8.2   Electrical Adjustments

8.2.1   Multioutput Power Supply Voltage Adjustments (sheet 1 of 4)

WARNING

DO NOT OPEN SWITCHING POWER SUPPLY UNDER ANY CIRCUMSTANCE. EXTREMELY DANGEROUS VOLTAGE AND CURRENT LEVELS, IN EXCESS OF 300 VOLTS DC AND UNLIMITED CURRENT, ARE PRESENT WITHIN POWER SUPPLY. DO NOT ATTEMPT TO REPAIR POWER SUPPLY; IT IS FIELD REPLACEABLE ONLY.

1)   Power down mainframe. (→ 4.2)

2)   Remove top cover. (→ 7.2.1)

3)   Remove front cover. (→ 7.2.2)

4)   Remove left side cover. (→7.2.3)

5)   Remove AC PDU from chassis and swing it to the left as far as the cables allow. (→7.2.23)

6)   Power-on mainframe using power supply controller board switch S1 (or control panel ON pushbutton).

7)   Verify control panel ON lamp and power supply controller board voltage sensing LEDs are lit. If lit, perform power supply adjustment procedures as detailed in step 9.

NOTE

If the LEDs are not lit or go out after a few seconds, a multioutput power supply or power supply controller board problem exists. Voltage adjustments can not be performed until problem is corrected. Perform procedures in step 8 to verify multioutput power supply is operational.
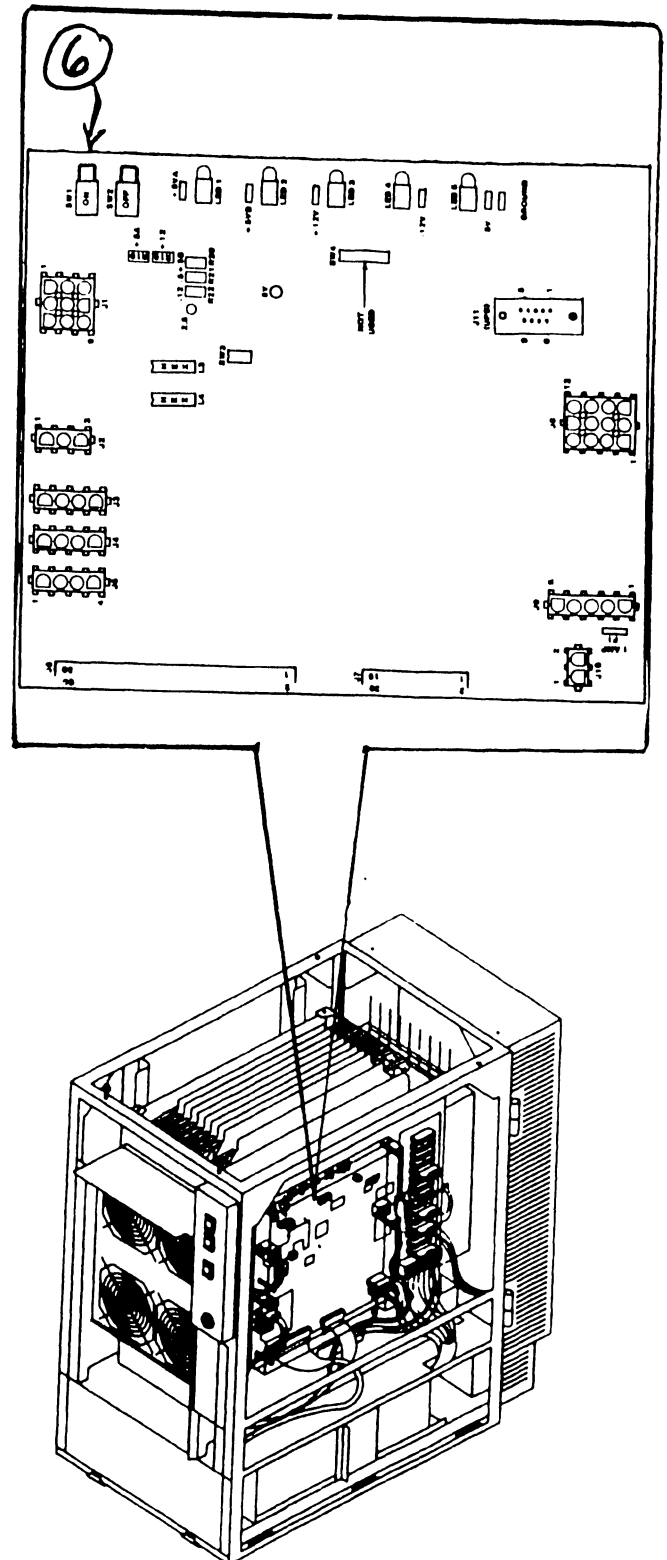
8.2   Electrical Adjustments

8.2.1   Multioutput Power Supply Voltage Adjustments (sheet 2 of 4)

8) To verify multioutput power supply perform the following:

a) Remove 4-pin power control cable plug from power supply controller board connector J3.

WARNING

Inserting power supply test plug into power control cable (step b) will immediately turn on the multioutput power supply if the ac On/Off circuit breaker is in the ON position.

---

b) Insert power supply test plug into P3 of the power supply control cable.

c) If the power supply comes up and stays up, the power supply is good. A problem exists on the power supply controller board. ($\rightarrow$6.x.x)

d) If the power supply does not come up, the power supply is defective and must be replaced. ($\rightarrow$7.2.24)
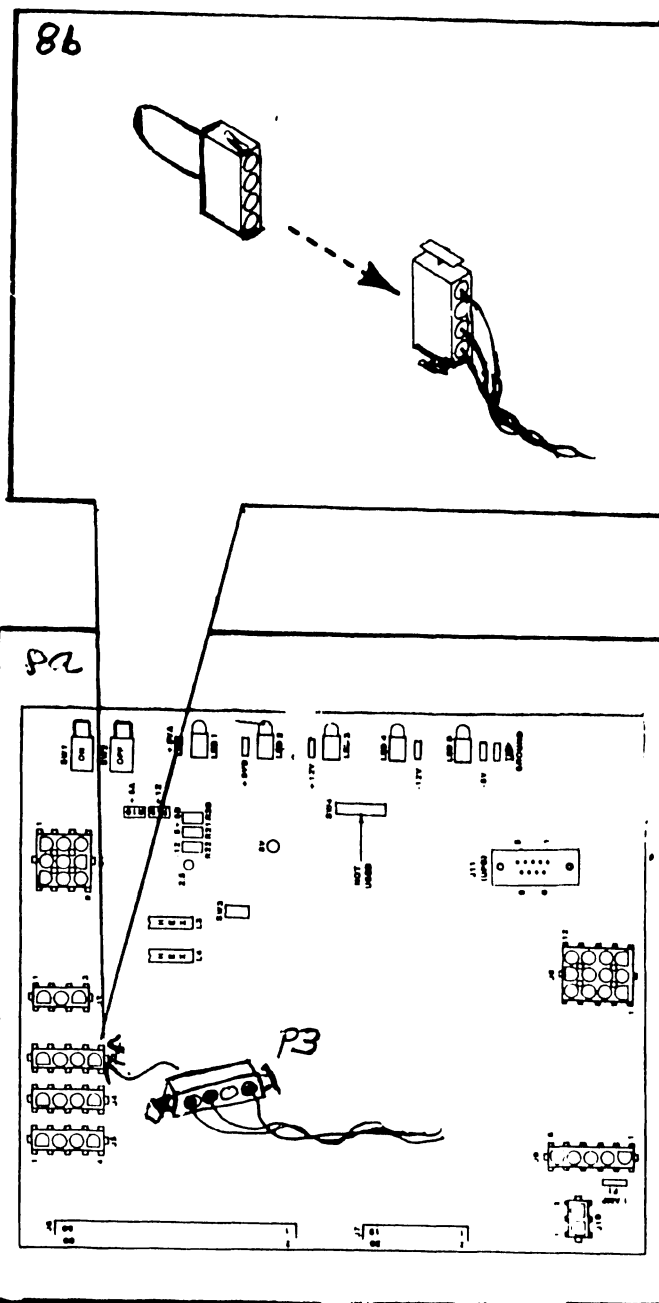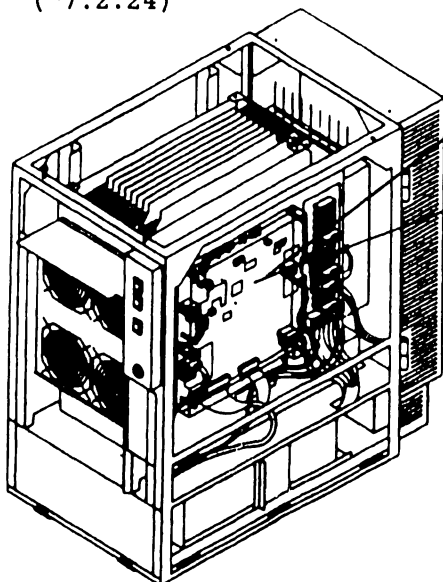
8.2   Electrical Adjustments

8.2.1   Multioutput Power Supply Voltage Adjustments (sheet 3 of 4)

9) Locate power supply controller board test points.

10) Connect common lead of DVM to TP ±0V (Ground).

NOTE

Voltage +5VB is not used by the system. LED2 should light indicating voltage is present at TP+5VB but voltage level should be disregarded.

---

11) Connect DVM lead to power supply controller board test points (TP+5VA, TP+12V, TP-5V, and TP-12V) to verify dc voltage limits.

TP	Voltage	Limits (VDC)
TP+5VA	+5.0A	+4.96V to +5.04V
TP+12V	+12.0	+11.96V to +12.04V
TP-5V	-5.0	-4.96V to -5.04V
TP-12V	-12.0	-11.96V to -12.04V
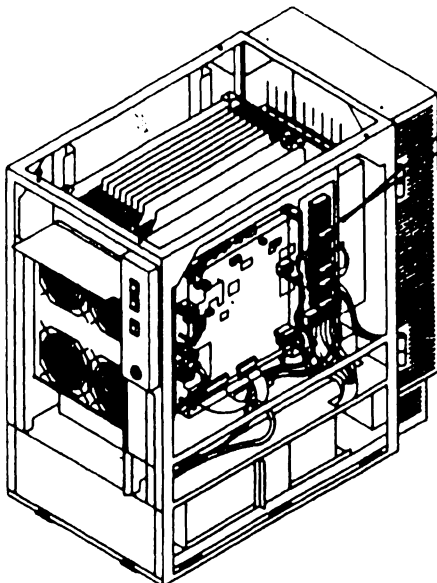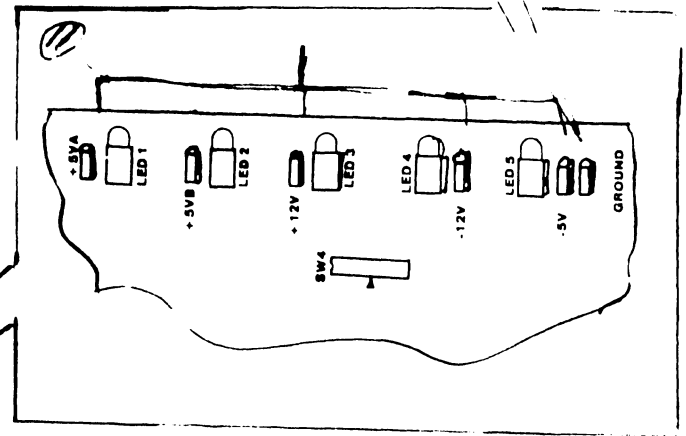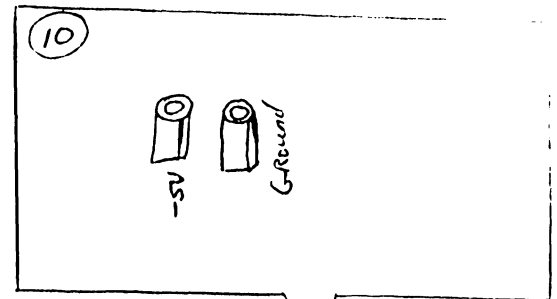
8.2   Electrical Adjustments

8.2.1   Multioutput Power Supply Voltage Adjustments (sheet 4 of 4)

NOTE

Adjust +5.0A voltage (V1) more towards the maximum voltage limit (+5.04V).

12) Adjust V1 (+5VA) to acceptable voltage level.

13) Adjust V2 (+12V) to acceptable voltage level.

14) Adjust V3 (-5V) to acceptable voltage level.

15) Adjust V4 (-12V) to acceptable voltage level.

V1
(+5A)

V2
(+12V)

V3
(-5V)

V4
(-12V)
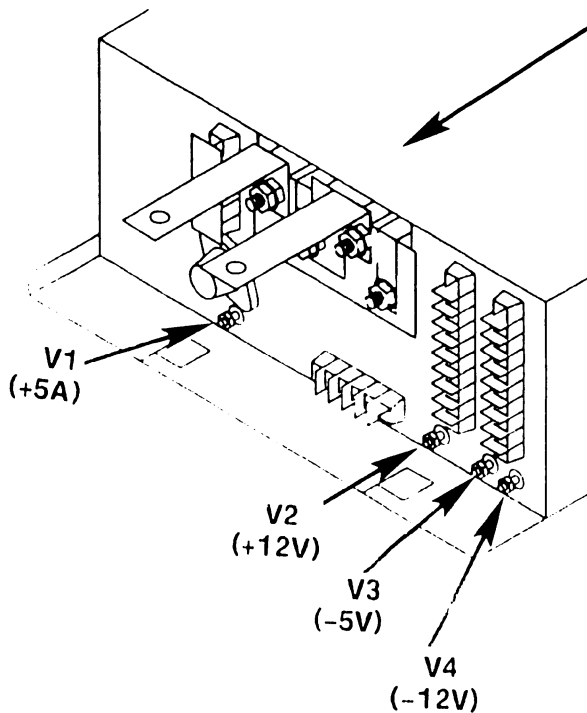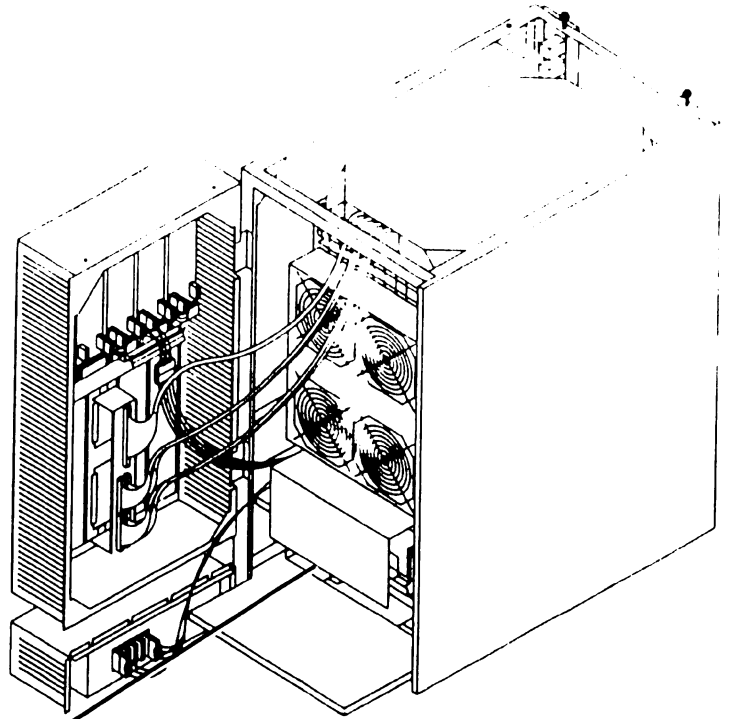
8.2   Electrical Adjustments

8.2.2   Power Supply Controller Adjustments (sheet 1 of 9)

1) Verify power supply controller board calibration voltages are present on power supply controller board.

   a) Connect common lead of DVM to TP ±0V (Ground).

   b) Connect DVM lead to power supply controller board test points (TP8 – 8 volts, TP2 – 2.5 volts) to verify calibration voltages.
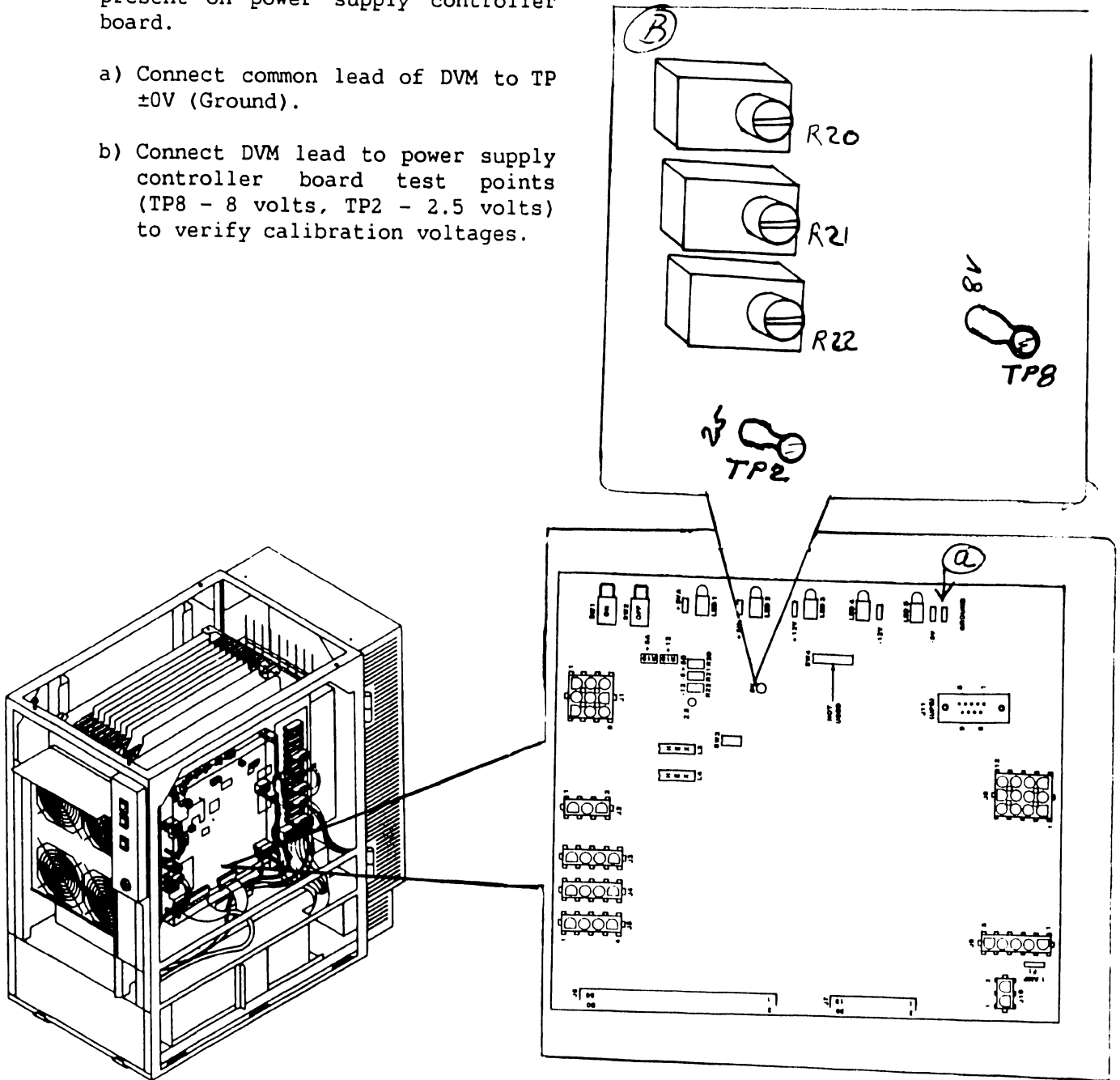
8.2   Electrical Adjustments

8.2.2   Power Supply Controller Adjustments (sheet 2 of 9)

+5.0AV Calibration

2) Set 4-bit Voltage address switch SW3 to +5.0AV A/D calibration address.

3) While viewing the two hex displays (L4 high digit and L3 low digit), Adjust R19 to hex display values:

	Hex Value	
Minimum	Exact	Maximum
7 E	8 0	8 2
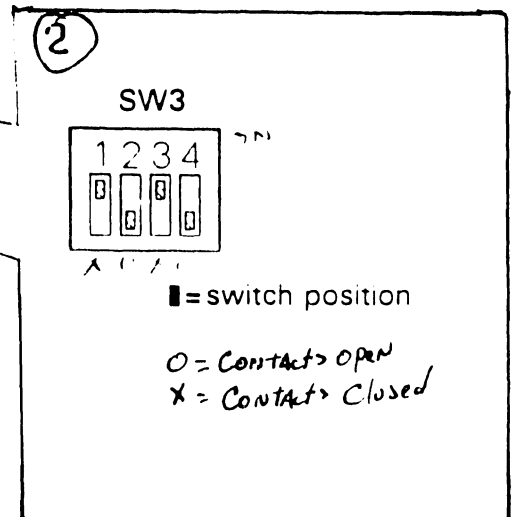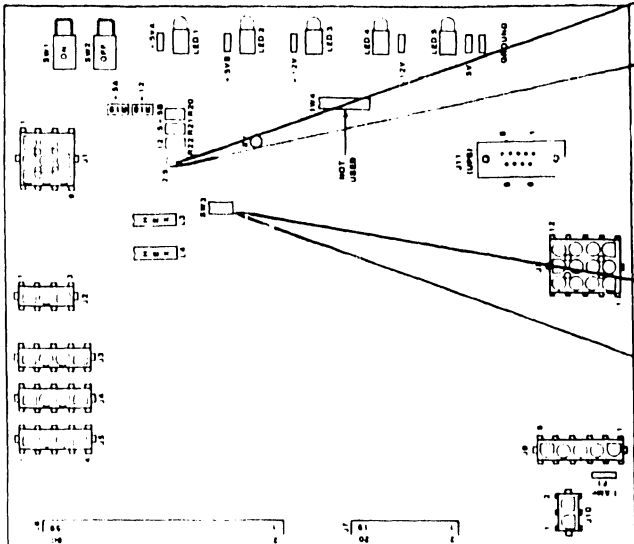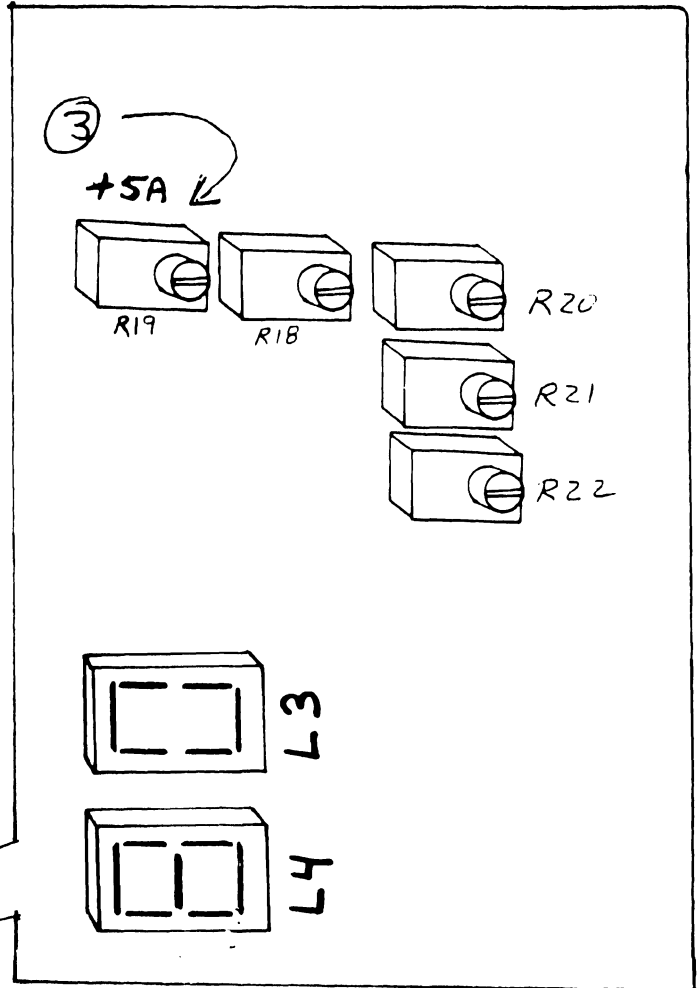
8.2   Electrical Adjustments

8.2.2   Power Supply Controller Adjustments (sheet 3 of 9)

+12.0V Calibration

4)   Set 4-bit Voltage address switch SW3 to +12.0V A/D calibration address.

5)   While viewing the two hex displays (L4 high digit and L3 low digit), Adjust R18 to hex display values:

	Hex Value	
Minimum	Exact	Maximum
7 E	8 0	8 2
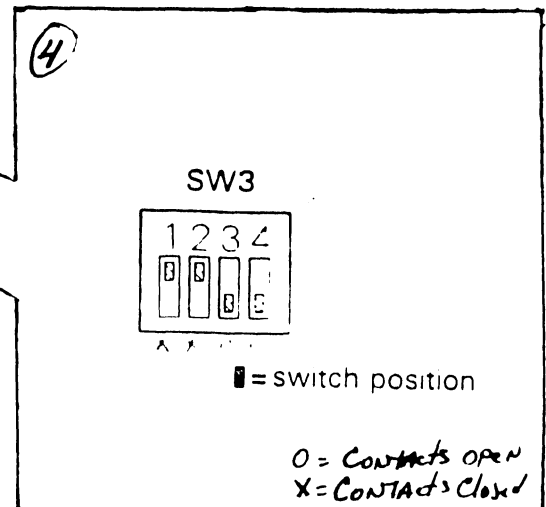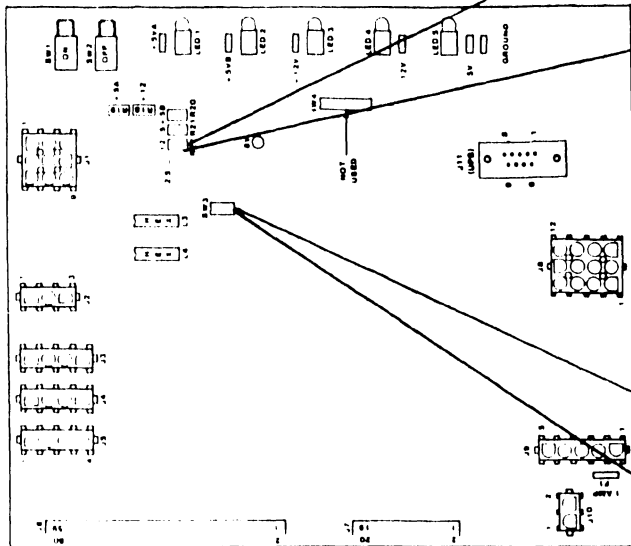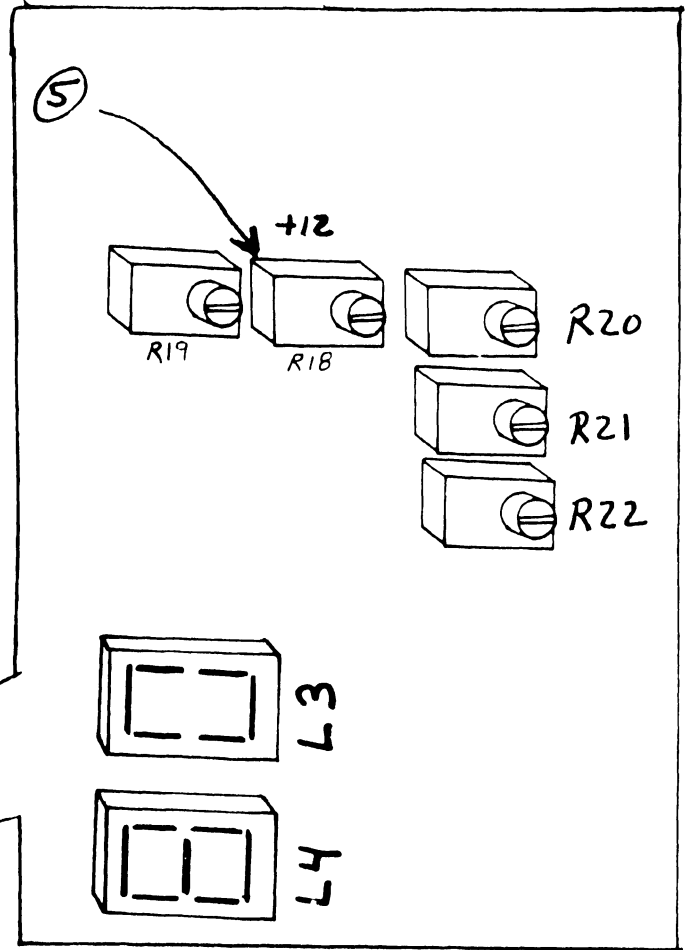
8.2   Electrical Adjustments

8.2.2   Power Supply Controller Adjustments (sheet 4 of 9)

-12.0V Calibration

6) Set 4-bit Voltage address switch SW3 to -12.0V A/D calibration address.

7) While viewing the two hex displays (L4 high digit and L3 low digit), Adjust R22 to hex display values:

| | Hex Value | |
Minimum	Exact	Maximum
7 E	8 0	8 2
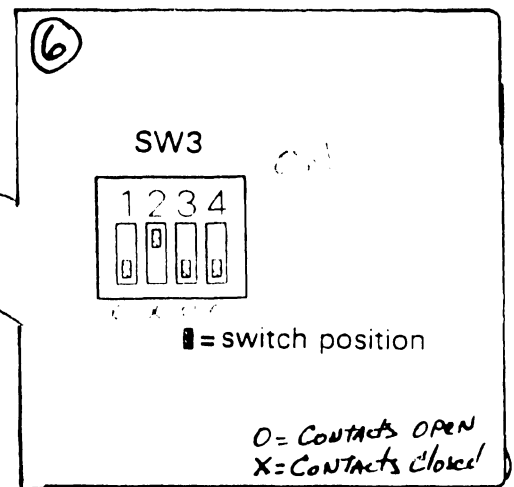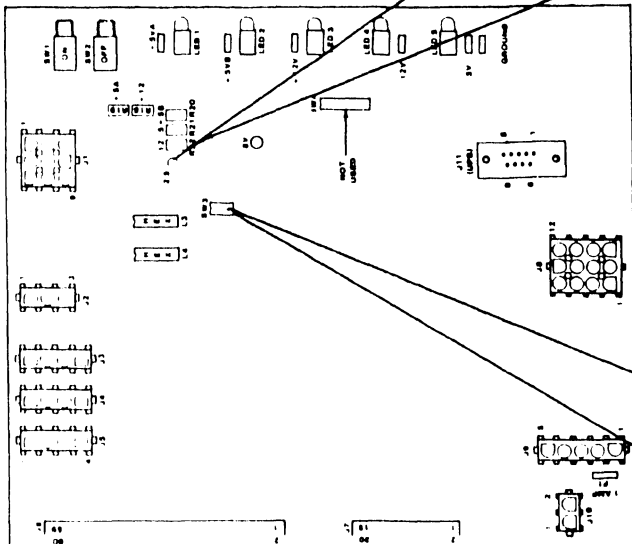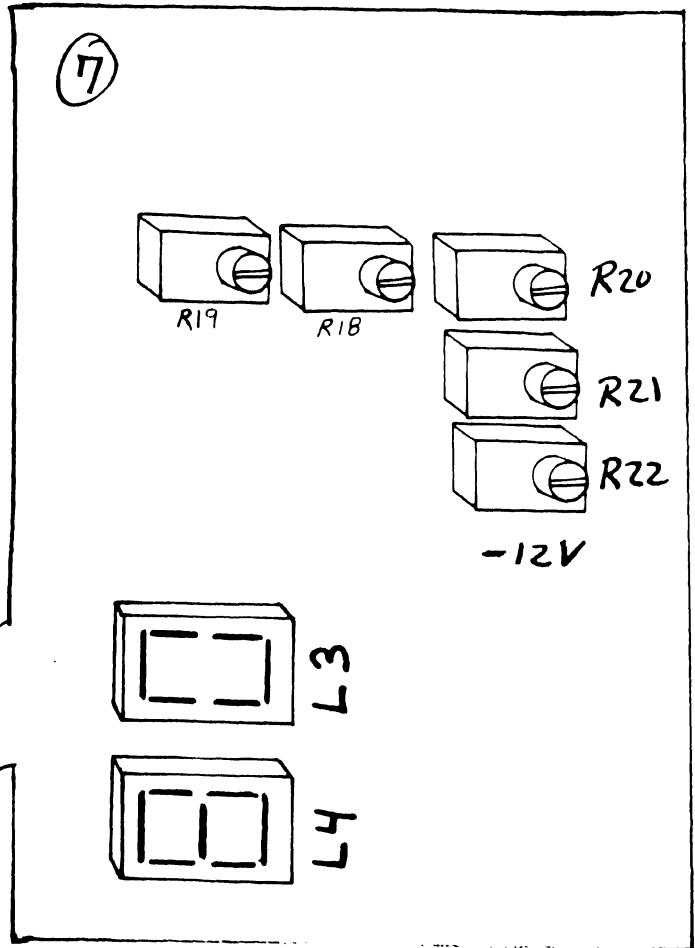
8.2   Electrical Adjustments

8.2.2   Power Supply Controller Adjustments (sheet 5 of 9)

-5.0V Calibration

8)   Set 4-bit Voltage address switch SW3 to -5.0V A/D calibration address.

9)   While viewing the two hex displays (L4 high digit and L3 low digit), Adjust R21 to hex display values:

	Hex Value	
Minimum	Exact	Maximum
7 E	8 0	8 2
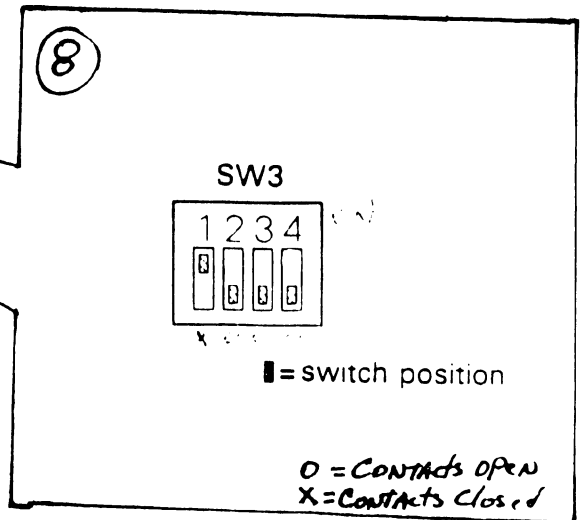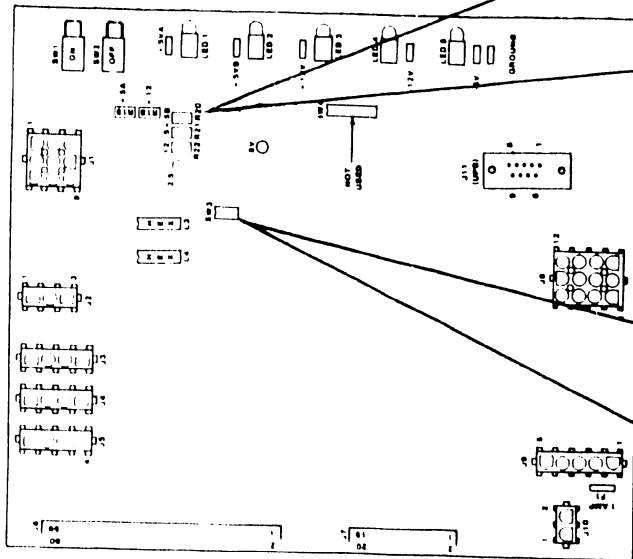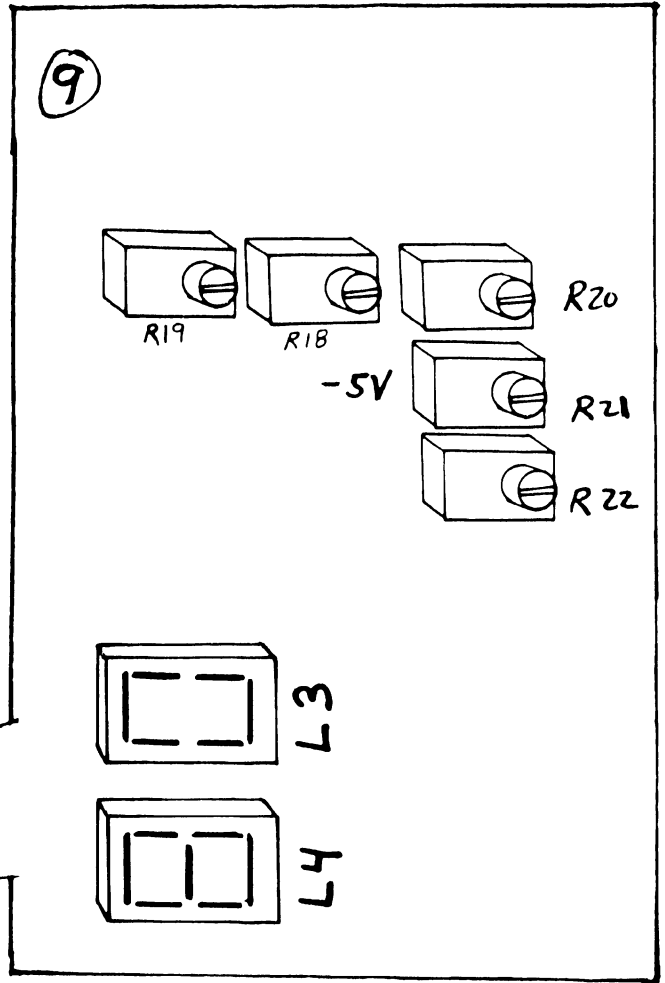
8.2   Electrical Adjustments

8.2.2   Power Supply Controller Adjustments (sheet 6 of 9)

10) Using the the system console, go to
    the System Console Menu screen.
    (⁻6.x.x)

11) Ensure the key switch is in 'Remote
    Service' position. (⁻6.x.x)

12) Enter the password 'CSG + current
    time' (four digits displayed on the
    System Console screen).

NOTE

While entering the password, the key-
board beeper will sound as each key is
pressed. This is normal and is intended
to discourage unauthorized personnel
from enabling the full System Console
Menu.

---

13) The system console is now in
    'service mode' and the System
    Console Menu will be displayed.

```
*** Wang VS System Console ***


SYSCON Version X.X.X            2:44 PM        Monday   January 5, 1987


        Press (HELP) for online system console information.


        Use the function keys to select a command:


    (1) ENTER Workstation Emulation       (8) IPL System
    (2) ENTER Control Mode                (9) RESET Console
    (3) ENTER Service Log Mode           (10) Terminate Service Mode
    (4) ENTER Offline Diagnostics        (11) SHOW Error Log
    (5) AUTO IPL                         (12) SET Console Defaults
    (6) RSAF Functions                   (13) SET Time and Date
   (29) Install Software                 (32) Wang PC Emulation
```

8.2   Electrical Adjustments

8.2.2   Power Supply Controller Adjustments (sheet 7 of 9)

14) Press   PF4   to   enter   Offline
    Diagnostics.   The   Diagnostics
    Disclaimer screen appears. (⁻6.x.x)
    Press 'EXECUTE' to display the DCS
    Diagnostic Selection Menu.

```
                   Wang VS Diagnostic Control System          hh/mm
           Rev XXXX         (c) Copr. Wang Laboratories, Inc. 1986

 01 PCI Test
  ⌐ SCUI Test
  ⌐ CP8 Static Test
  ⌐ CP8 Self Test
  ⌐ AGU, ESU Test
  ⌐ ATU Test
  ⌐ SCU / Memory Test
  ⌐ CPU / Memory Test
  ⌐ SBI Test
  ⌐ I/O BIT Monitor
  ⌐ CPU Unit Test
  ⌐ FPU Test

  ⌐ SuperBal
  ⌐ VS Environment

                                         SPACE  - item position
                                         INSERT - select
                                         DELETE - deselect
                                         SHIFT+INSERT - hex #
                                         EXEC   - proceed

      HELP is available
```

8.2   Electrical Adjustments

8.2.2   Power Supply Controller Adjustments (sheet 8 of 9)

15) Position cursor next to 'VS Environment'. Press 'INSERT' to select diagnostic.

16) Press 'EXECUTE' to run the diagnostic. The Environment Test Screen will be displayed.

NOTE

The Environment Test Screen is only a monitor for the voltages on the power supply controller board. Do not adjust voltages and/or A/D outputs using this screen.

```
                 Wang VS Diagnostic Control System          09:15:32
    Rev xxxx       (c) Copr. Wang Laboratories, Inc. 1986
                   ▢▢▢▢ ■▢▢▢ ▢▢▢▢ ▢▢▢▢

       Sequence:  1                                     Error Cnt:  0
    Diagnostic:  R16C4 Large VS Environment
          Test:  Display

   |DCS Status:  Diagnostic Executing                                    |

   Voltage Readings = +5.000    +5.000    -5.000    +12.00    -12.00

   SCU Control Registers = 4700   78FF       SCU Status Registers = 86C0   1000

   CPU SCR = 0800            MCU SCR = 0800        MCU ELog = 8063 E007 0707

   SBIO SCR = 0048           SBI Status = 0000    SBIO ELog = 0000 00B8 0023

   Front Panel key switch is set to REMOTE DIAGNOSTIC

   PSI Register = EF11     System reset pressed          AC power cycled
```

8.2 Electrical Adjustments

8.2.2   Power Supply Controller Adjustments (sheet 9 of 9)

17) Read the voltages displayed on the
    Environment Screen. From left to
    right, voltage readings represented
    are:

    +5VA, +5VB, -5V, +12V, -12V

18) Power-down mainframe. (→4.2)

19) Replace AC PDU.

20) Replace system covers.

SECTION
9
UNPACKING
AND
SETUP

SECTION 9

UNPACKING AND SETUP

COMPANY CONFIDENTIAL

9.1   Installation Site Check

Proper equipment location ans site preparation are important for reliable operation of the VS-7010 Computer System. The Customer Engineer is responsible for installation of all models of the VS-7010 Computer System and peripherals. The following conditions must be meet:

• All site plans should have been approved by both the customer and a Customer Service Representative.

• All building alterations must have been completed and inspected.

• All electrical wiring, air con- ditioning, and telecommunications (TC) modifications must have been installed and tested. (The following TC equipment should have been ordered for remote maintenance support, if option is elected:)

   a. Telephone line. (Dedicated line is not required.)
   b. Telephone.

NOTE

RF11W flush mount wall phone jack can be used with the "T" connector and a desk top phone, but a wall mounted phone cannot be used.

   c. One of the following modular con- necting blocks for the telephone:

      1. RJ11C for desk top telephone.
      2. RF11W for flush mount wall telephone.

Pre-installation inspection is to be performed two weeks prior to delivery of equipment. At this time, the service representative will check the site for compliance with VS site specifications. The service representative will bring any unsatisfactory conditions noted to the attention of the customer for correction.

9.2   Tools and Equipment

- Standard CE tool kit WLI# 726-9401.

- Digital Multimeter.

9.3   Unpacking Procedures

9.3.1   Unpacking and Inspecting VS-7010 Computer System (Sheet 1 of 2)

WARNING

The VS-7010 Computer System weighs ap-
proximately 220 pounds (100. Kg).   Be
sure adequate help is available to
perform any cabinet movement required.

1)   Check packing slips to make sure the
     proper equipment has been delivered.
     Refer to model number information in
     the following table. After checking
     packing   slips,   inspect   shipping
     containers for damage. If damage is
     noted, notify your manager.

VS-7010 Models

Model Number	WLI/P/N	Description
VS-7010-4	157/177-7537	VS-7010, 4MB main memory

NOTES

Part number prefix 157 = 50Hz ac line
frequency mainframes.

Part number prefix 177 = 60Hz ac line
frequency mainframes.

VS-7010 Upgrades

Model Number	WLI/P/N	Description
7MEM4	289-1291	4MB Memory Upgrade
7MEM8	289-1292	8MB Memory Upgrade
7MEM16	289-	16MB Memory Upgrade
7MEM32	289-	32MB Memory Upgrade

9.3   Unpacking Procedures

9.3.1   Unpacking and Inspecting VS-7010 Computer System (Sheet 2 of 2)

2)   Remove shipping carton from VS-7010
     computer.

3)   Roll (and slide) VS-7010 computer
     off the pallet.

4)   Visually inspect unit for external
     damage.

PALLET
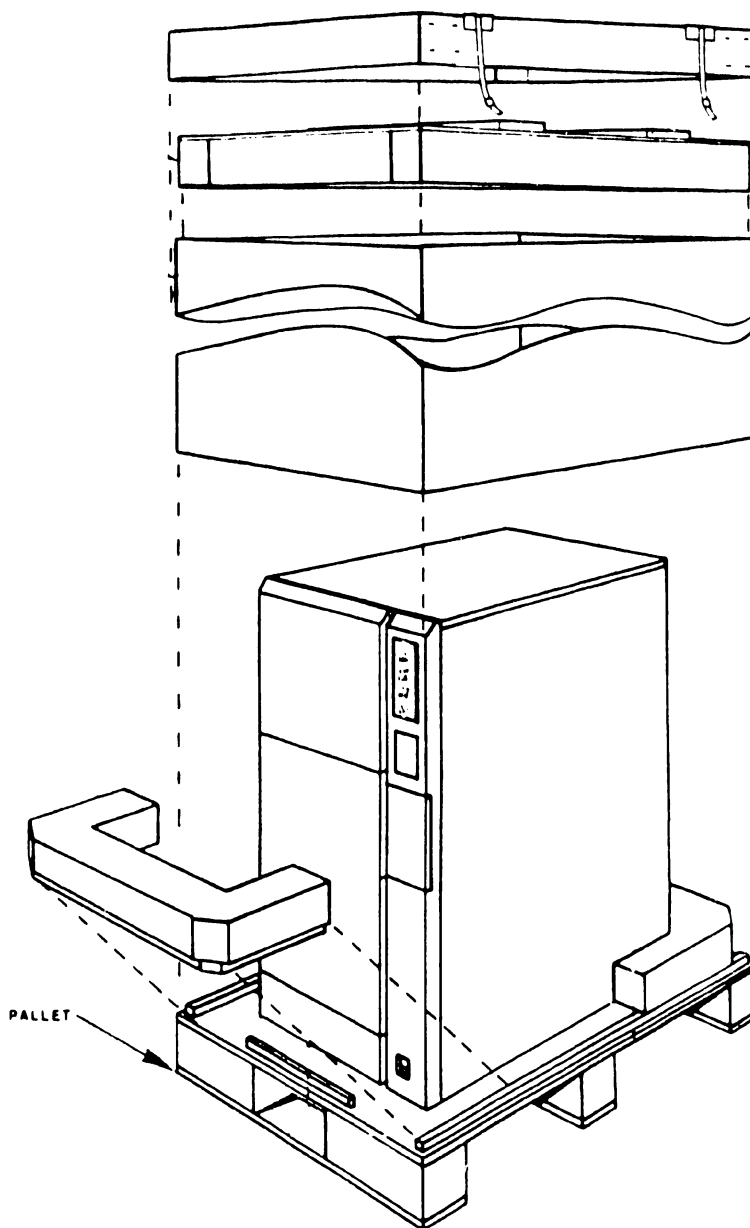
9.3   Unpacking Procedures

9.3.2   Unpacking and Inspecting SCU Professional Computer

1)   Remove Professional Computer from
     shipping carton.

2)   Visually inspect unit for external
     damage.
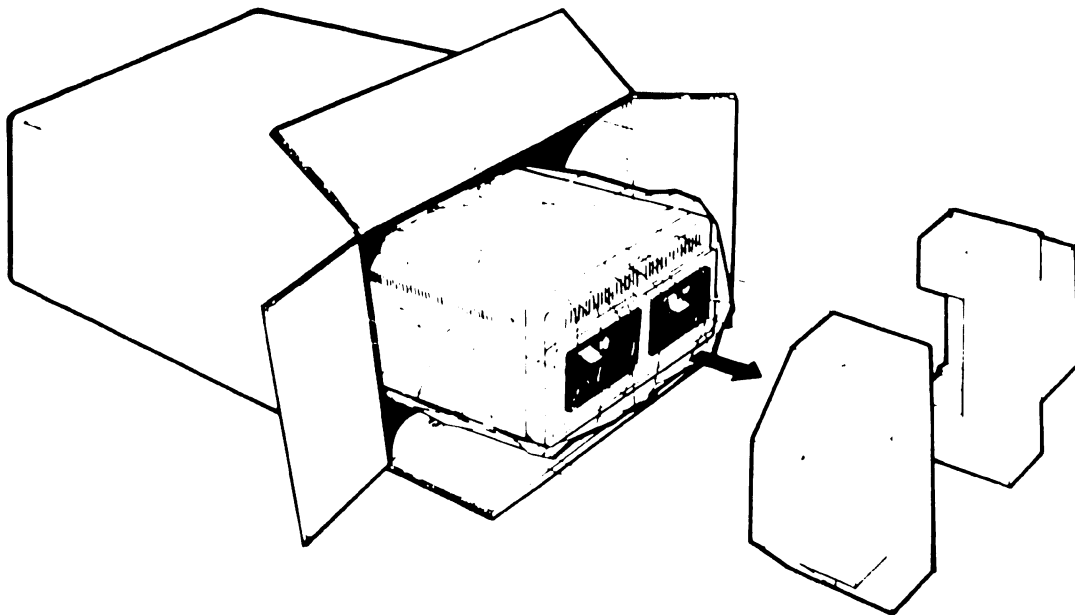
9.3   Unpacking Procedures

9.3.3   Unpacking and Inspecting SCU (PM-004L) Monitor

1)   Remove monitor from shipping carton.

2)   Visually inspect unit for external damage.
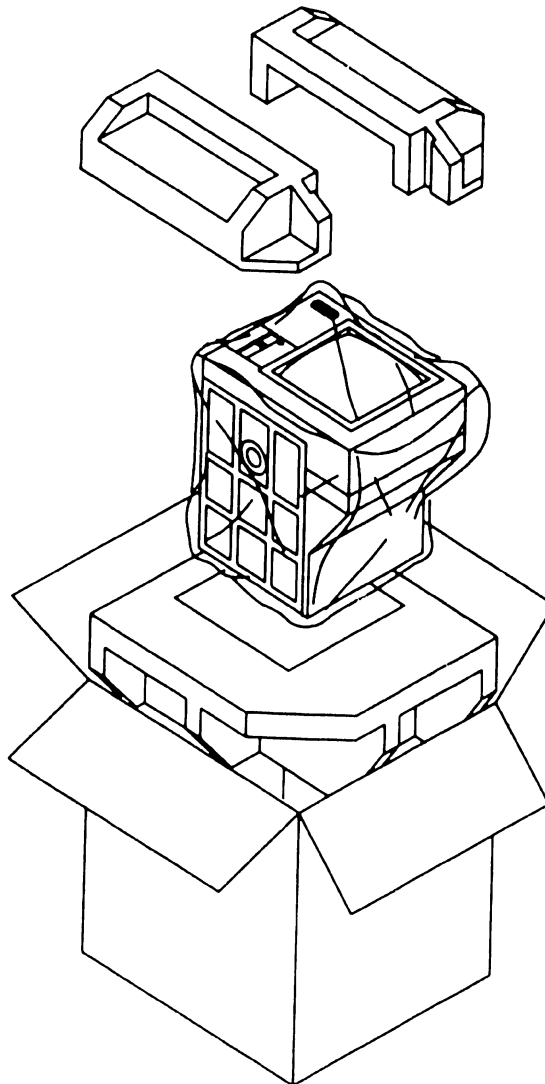
9.3   Unpacking Procedures

9.3.4   Unpacking and Inspecting SCU (720) Keyboard

1) Remove keyboard from shipping carton.

2) Visually inspect unit for external damage.
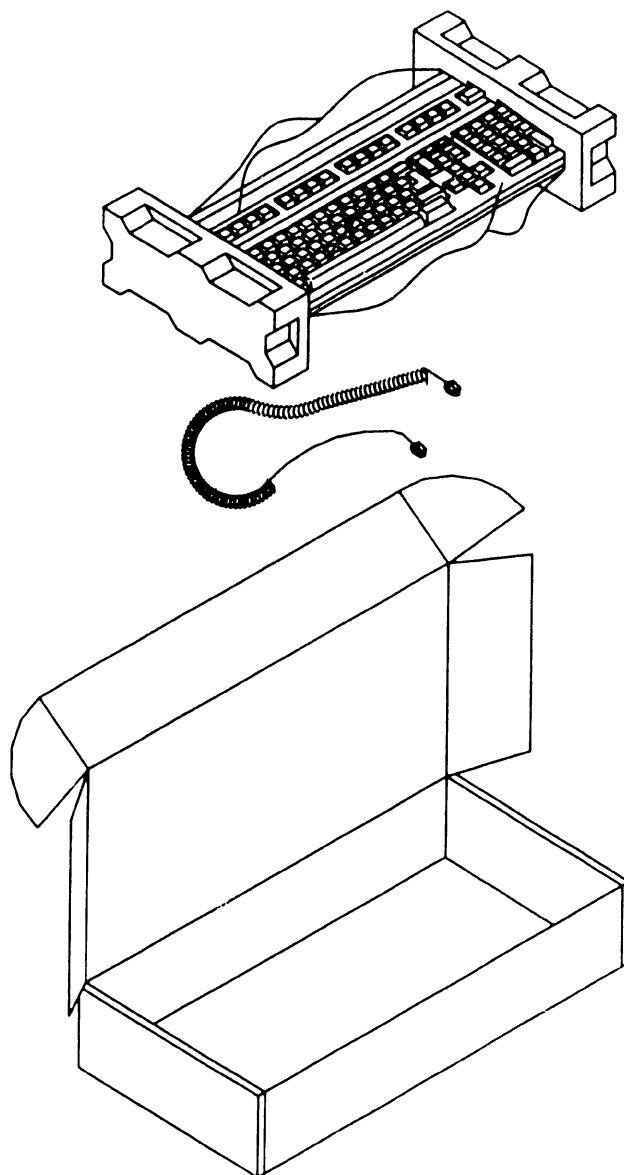
9.3   Unpacking Procedures

9.3.5   Unpacking and Inspecting Peripherals

1) Unpack all peripherals according to the procedures outlined in the applicable maintenance manuals. As each unit is unpacked, check it for any obvious shipping damage. If damage is noted, notify your manager.

9.3   Unpacking Procedures

9.3.6   Claims Information

If damage is discovered during unpacking
or   inspection,   notify   your   service
manager.

9.3   Unpacking Procedures

9.3.7   Initial Set-Up

1) Move the cabinet to its permanent location.

2) Once cabinet is in place, check service clearances to be at least:

Service Clearance	Inches	Centimeters
Front	36	91.4
Rear	36	91.4
Left	24	60.9
Right	36	91.4
Top	36	91.4

CAUTION

THIS COMPUTER EQUIPMENT HAS BEEN VERIFIED AS FCC CLASS A.
IN ORDER TO MAINTAIN COMPLIANCE WITH FCC CLASS A VERIFICATION, THE FOLLOWING CONDITIONS MUST BE ADHERED TO DURING NORMAL OPERATION OF EQUIPMENT.

- ALL COVERS MUST BE ON THE SYSTEM AND SECURED IN THE PROPER MANNER.

- ALL INTERNAL CABLES MUST BE ROUTED IN THE ORIGINAL MANNER WITHIN THE CABLE CLAMPS PROVIDED FOR THAT PURPOSE.

- ALL EXTERNAL CABLES MUST BE SECURED AND THE PROPER CABLE USED TO ENSURE THAT CABLE SHIELDING IS PROPERLY GROUNDED TO THE CABLE CLAMPS PROVIDED.

- ALL HARDWARE IS PROPERLY SECURED.

9.4   Inspection

9.4.1   VS-7010 Mainframe Inspection (Sheet 1 of 2)

NOTE

Quality assurance procedures and tests
have shown that VS mainframes arriving
on customer's premises require only
visual inspection, voltage checks, soft-
ware loading, and cabling. Therefore,
the following inspection and
installation procedures for all VS
mainframe products are in effect.

DO NOT REMOVE PRINTED CIRCUIT BOARD FOR INSPECTION

DO NOT CLEAN PRINTED CIRCUIT BOARD CONTACTS WITH AN ERASER

INSPECT CPU MAINFRAME VISUALLY

**REPORT INSTALLATION PROBLEMS ON THE INSTALLATION
REPORT AND STATE SPECIFIC CAUSES OF FAILURE**

1) Remove top cover. (→ 7.2.1)

2) Remove front cover (→ 7.2.2) and
   side covers. (→ 7.2.3)

3) Remove card cage cover. (→ 7.2.4)

4) Inspect the interior of mainframe
   for packing material and shipping
   damage such as broken connectors and
   loose fastening hardware.

9.4   Inspection

9.4.1   VS-7010 Mainframe Inspection (Sheet 2 of 2)

5) Refer to the shipping list to make sure that the correct circuit boards have been shipped.

6) Make sure all circuit boards are properly seated in the backplane.

7) Inspect the power supply for damage and loose connections. At this time make sure all power supply connections are tight.

8) If necessary, vacuum clean the unit. (→ 5.4)

9) Do not reassemble the mainframe at this time.

10) If damage is discovered at any time during the inspection, follow the reporting procedure (→9.3.6).

9.4   Inspection

9.4.2   Peripheral Inspection

Inspect each peripheral according to procedures outlined in the applicable maintenance manuals. If damage is discovered at any time during the peripheral inspection, follow the reporting procedure (¬9.3.6).

9.4   Inspection

9.4.3   VS-7010 Power Service Requirements (Domestic) (Sheet 1 of 2)

Inspection and electrical checks are required to make sure the power source and receptacle meet all specified requirements before proceeding with the mainframe and peripheral installation.

NOTE

The following procedures are for domestic 208/240 Vac, 60 Hz installations. Installations outside the continental USA, requiring other configurations and voltages, must be dealt with on a site by site basis.

LINE NO.1   (RED)

LINE NO.2   (BLACK)

NEUTRAL   (WHITE)

GROUND   (GREEN)

EARTH GROUND   COMPUTER ROOM
                    CIRCUIT BREAKER
                    30 AMPS

**THE NEUTRAL AND GROUND
LEADS MUST BE CONNECTED
TOGETHER AND TO EARTH
GROUND AT THE BUILDING
MAIN INPUT POWER PANEL
OR BUILDING SUBSTATION**

**GROUND LEAD MUST BE
SAME OR HEAVIER GAUGE
THAN EITHER HOT LEAD**
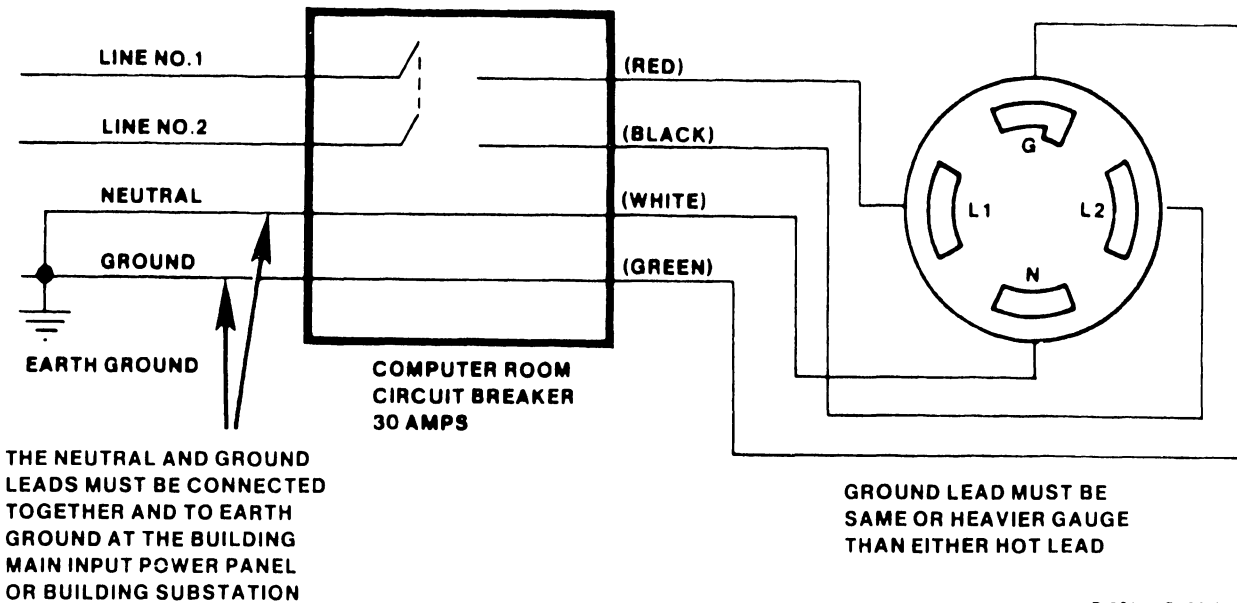
B-03141-FY86-2

	Receptacle Body	Matching Connector
NEMA Configuration	L14-30IGR	L14-30P
Hubbel Part Number	IG2710	2711

9.4   Inspection

9.4.3   VS-7010 Power Service Requirements (Domestic) (Sheet 2 of 2)

CAUTION

Failure to verify input power service can result in serious damage to the mainframe circuits and to connected peripherals.

1) Using a digital voltmeter, perform ac receptacle input voltage checks as outlined in the following table:
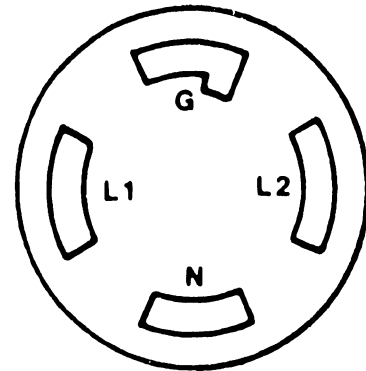
NEMA L14-30IGR
(Hubbel IG2710)

Test Points	Voltage Measurements
AC Hot (L1) to Ground (G)	120 Vac (± 10%)
AC Hot (L2) to Ground (G)	120 Vac (± 10%)
AC Hot (L1) to AC Hot (L2)	208/240 Vac (± 10%)

SECTION
10
FUNCTIONAL
DESCRIPTION

SECTION 10

FUNCTIONAL DESCRIPTION

This section is not included in the Preliminary
VS-7010 Computer System manual.

SECTION
11
SPECIFICATIONS

SECTION 11

SPECIFICATIONS

11.1   Hardware

11.1.1   VS-7010 Mainframe

Computer System Dimensions:

```
Depth:   31.0 inches   (78.74 cm)
Width:   15.3 inches   (39.0 cm)
Height:  30.5 inches   (77.5 cm)
```

Computer System Weight:

220 pounds (100 Kg) Maximum Configuration

Installation Requirements:

```
Front Clearance:   36 inches   (91.4 cm)
Rear Clearance:    36 inches   (91.4 cm)
Left Side Clearance:   24 inches   (60.9 cm)
Right Side Clearance:  36 inches   (91.4 cm)
Top Clearance:     36 inches   (91.4 cm)
Position:  Upright Only
```

Power Requirements:

```
Dedicated circuit, 30 Amps Breaker
208 - 240 Vac (208 Vac nominal)
60 Hz ± 0.5 (60 Hz nominal) (Domestic)
50 Hz ± 0.5 (50 Hz nominal) (International)
Start-Up - 12.0 Amps RMS @ 208 Vac (2496 volt-amps)

NEMA Receptacle L14-30IGR
NEMA Plug L14-30P
Hubbel Receptacle IG2710
Hubbel Plug  2711
```

Environmental Requirements:

```
Relative Humidity:
   20% - 80% non-condensing
Ambient Temperature:
   60° - 90°F (15.5° - 32° C)
Max Temp Gradient:
   12°F/Hr   (4°C/Hr)
Max Wet Bulb Temp:
   75°F (24°C)
Max Altitude:
   10,000 Ft   (3048 Km)
Heat Dissipation:
   6304 BTU/Hr, (1554 KCal/Hr)
```

11.1   Hardware

11.1.2   VS-7010 Architecture

Memory Cycle Time:

240 nSeconds Instruction Execution (Typical)
420 nSecond Memory Access (8-byte read)
540 nSecond Memory Access (16-byte read)
900 nSecond Memory Access (32-byte read)
120 nSecond Memory Access (8-byte write)

Memory Size:

4, 8, 16, or 32 MB
Cache Memory 32KB

Virtual Address Space/User   8MB
Virtual Address Space/Process   8MB

System Data Path:

CPU   32-bit
I/O   32-bit
Main Memory   64-bit
Word Length   32-bit

Bandwidth:

System Bus   66.6 MB/second
I/O Bus   33.3 MB/second

Number of Users:

 96 Concurrent Serial Workstations
128 Concurrent Serial Workstations and Printers

Number of Processes

Concurrent   255
Background   63

Maximum Drives/Tapes:

Maximum Disk Storage   5.4 GB

12 Disk Drives @ 1.8 MB/second Data Rate

11.1   Hardware

11.1.3   Multioutput Power Supply Specifications

Output Voltages:

+5 Vdc:

    Adjustment Range: 4.96 to 5.04 Volts
    Output Current: 275 Amps
    AC Ripple: 35mV RMS (50mV Pk-Pk)

+12 Vdc:

    Adjustment Range: 11.96 to 12.04 Volts
    Output Current: 20 Amps
    AC Ripple: 35mV RMS (50mV Pk-Pk)

-5 Vdc:

    Adjustment Range: -4.96 to -5.04 Volts
    Output Current: 10 Amps
    AC Ripple: 35mV RMS (50mV Pk-Pk)

-12 Vdc:

    Adjustment Range: -11.96 to -12.04 Volts
    Output Current: 10 Amps (5 Amps)
    AC Ripple: 35mV RMS (50mV Pk-Pk)

Power Dissipation:

Steady State:
    1850 Watts, 6304 BTU/Hr

11.2   Operating System Software

Software	Version	Comments	WLI P/N
Operating System	7.14		195-xxxx-x
VS-7010 SCU	1.05.02	Contains CP8 CPU ucode and DCS package	195-4682-9

11.3   Diagnostics

11.3.1   VS-7010 Built-In-Test (BIT) Programs

Diagnostic Name	PROM	Rev.	Package P/N	PROM Location/Part Number
928 Serial IOC	5684	1	295-4721-D	
SMD Disk IOC	56A4	2	295-4724-D	
Kennedy Tape IOC	5684	1	295-4730-D	
Telex Tape IOC	5684	1	295-4731-D	
Multiline TC IOC	5724		295-4729-DC	

NOTES

1) Complete 295 package part numbers include PROMS
   and documentation.

11.3　　Diagnostics

11.3.2　Diagnostic Tests

Diagnostic Name	Release	Package P/N
Uniboot (Boot Loader)	846C	295-2479-3
FTU Off-Line	6385	295-2759-3
VOLCOPY	8181	702-0122-A
TCTESTER	6660	295-5181-5

NOTES

1) Complete 295 package part numbers include diskettes and documentation.
2) Diskette only part numbers (702 prefix) are shown if no package part numbers are available.

SECTION 12
ILLUSTRATED PARTS

SECTION 12

ILLUSTRATED PARTS

12.1   Major Assemblies

Item	Part Number	Description
1	177-7537	VS-7010 Computer System, 4MB Main Memory
2	279-0659	SCU PM004L Monochrome Monitor
3*	725-3099-US	SCU Keyboard, Universal Low Profile
4	187-7536	SCU Professional Computer

* = Field Replaceable Item
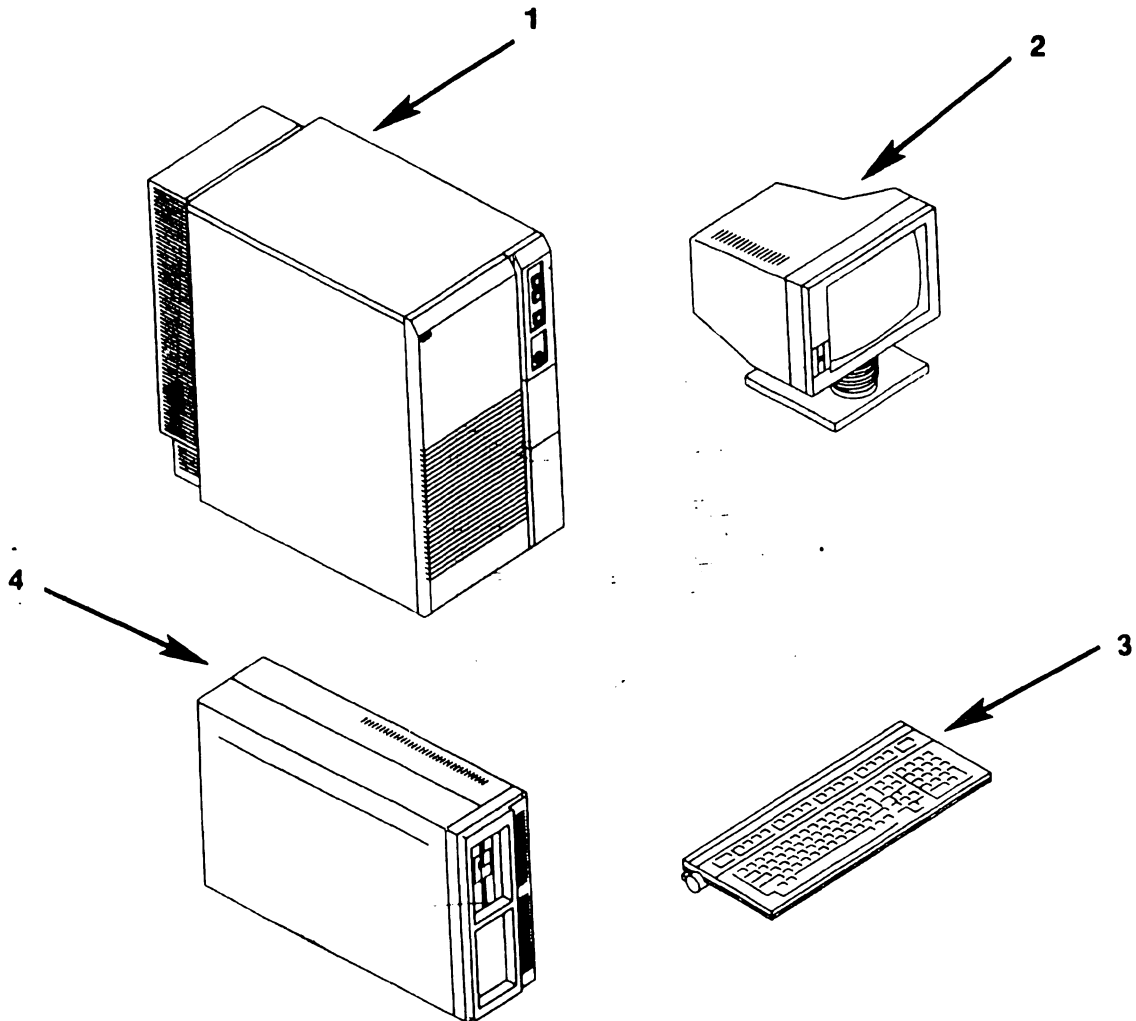
12.2   VS-7010 Subassemblies

12.2.1   VS-7010 Computer System Covers (Sheet 1 of 2)

Item	Part Number	Description
1	458-3971	Cover, Top
2	458-3293	Panel, Right Side
3	270-1104	Front Panel Assembly
4	458-3827	Frame Weldment
5	655-0061	Casters, Swivel
6	655-0060	Casters, Rigid
7	458-3294	Panel, Left Side
8*	660-1107	Air Filter, Foam

* = Field Replaceable Item

12.2   VS-7010 Subassemblies

12.2.1   VS-7010 Computer System Covers (Sheet 2 of 2)
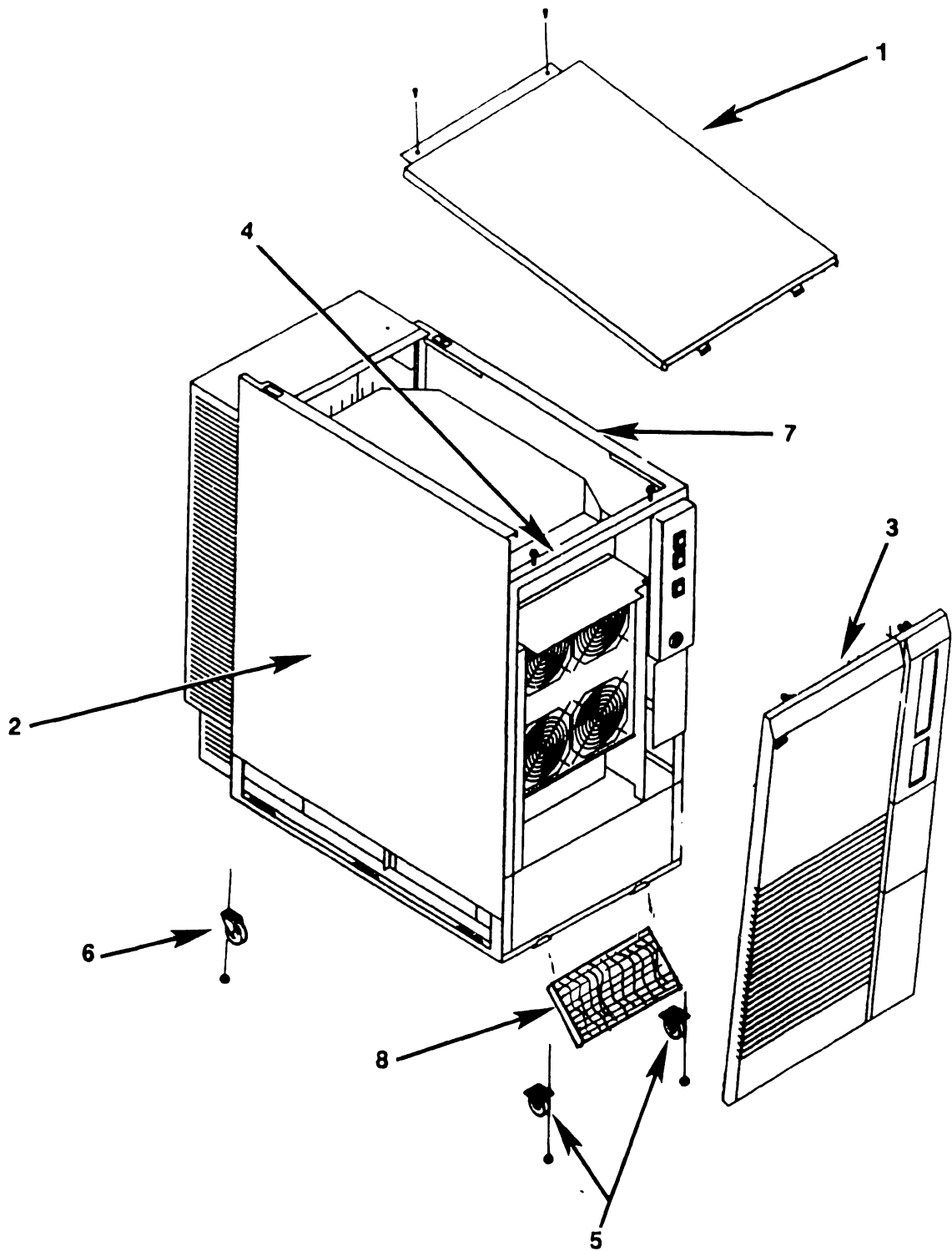
12.2   VS-7010 Subassemblies

12.2.2   VS-7010 Computer Chassis (Sheet 1 of 2)

Item	Part Number	Description
1*	270-1099	Control Panel Assembly
	220-3538	Cable, Control Panel; 26-position Soc
	325-1037	Keylock, Rotary 4-position
	325-2261	Pushbutton Switch; 12V Lamp, Red Lens
	325-2262	Pushbutton Switch; 12V Lamp, Green Lens
	325-2264	Pushbutton Switch; 12V Lamp, Yellow Lens
	* 370-0088	Lamp, 12V, Pushbutton Switch
2	452-4749	Shield, Power Supply Controller
3	458-3636	Guide, Cable
4*	210-8816	DC Power Distribution Unit (DC PDU)
5*	270-1100	Multioutput Power Supply Assembly
	725-3308-1	Multioutput Power Supply
	* 270-3450	DC Power Harness
	* 220-2643	Cable, Control Board Multiple Output
	* 220-2296	Cable, AC PDU to Power Supply
	458-1991	Bus Bar, Lower Positive
	458-1992	Bus Bar, Lower Ground
	451-5593	Bracket, Power Supply Mounting
6*	210-8809	Power Supply Controller Board
7	458-3831	Panel, Bottom Dress, PS Access
8*	270-1103	Backplane Assembly
	210-9847	Motherboard
	458-1989	Bus Bar, Upper Ground
	458-1990	Bus Bar, Upper Positive

* = Field Replaceable Item

12.2   VS-7010 Subassemblies

12.2.2   VS-7010 Computer Chassis (Sheet 2 of 2)
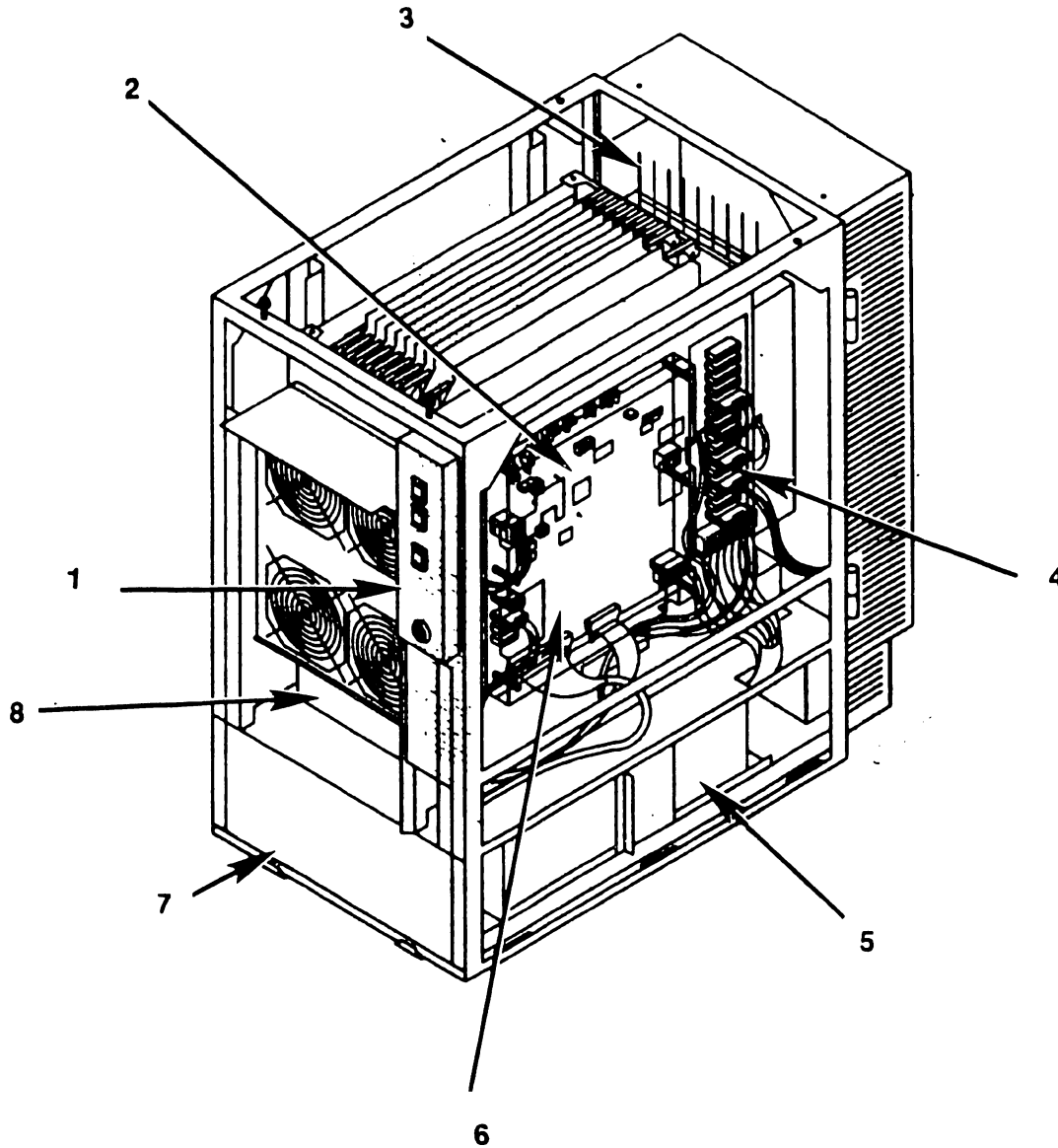
12.2   VS-7010 Subassemblies

12.2.3   VS-7010 Computer Card Cage (Sheet 1 of 2)

Item	Part Number	Description
1*	210-9838-A	Central Processing Unit (CPU)
2*	210-9832-A	Address Generation Unit (AGU)
3*	210-9833-A	Address Translation Unit (ATU)
4*	210-9834	Memory Control Unit (MCU)
5*	210-8703	Main Memory, 4 MB
	210-8703-1	Main Memory, 8 MB
	210-9874	Main Memory, 16 MB
	210-9874-1	Main Memory, 32 MB
6*	210-9836-1	System Bus Interface (SBI)
7*	210-8785-D	SMD IOC (23V98-1)
8*	210-9809-A	Serial IOC (23V67)
9*	210-8835	Support Control Unit (SCU)
10*		Optional Controller Boards
	210-8790-A	Kennedy Tape IOC (23V95-1)
	210-8491-A	Multiline TC Controller IOC (23V96)
	210-8789-A	Telex Tape IOC (23V95-2)
11	449-1467	Cover, Card Cage

* = Field Replaceable Item

12.2   VS-7010 Subassemblies

12.2.3   VS-7010 Computer Card Cage (Sheet 2 of 2)
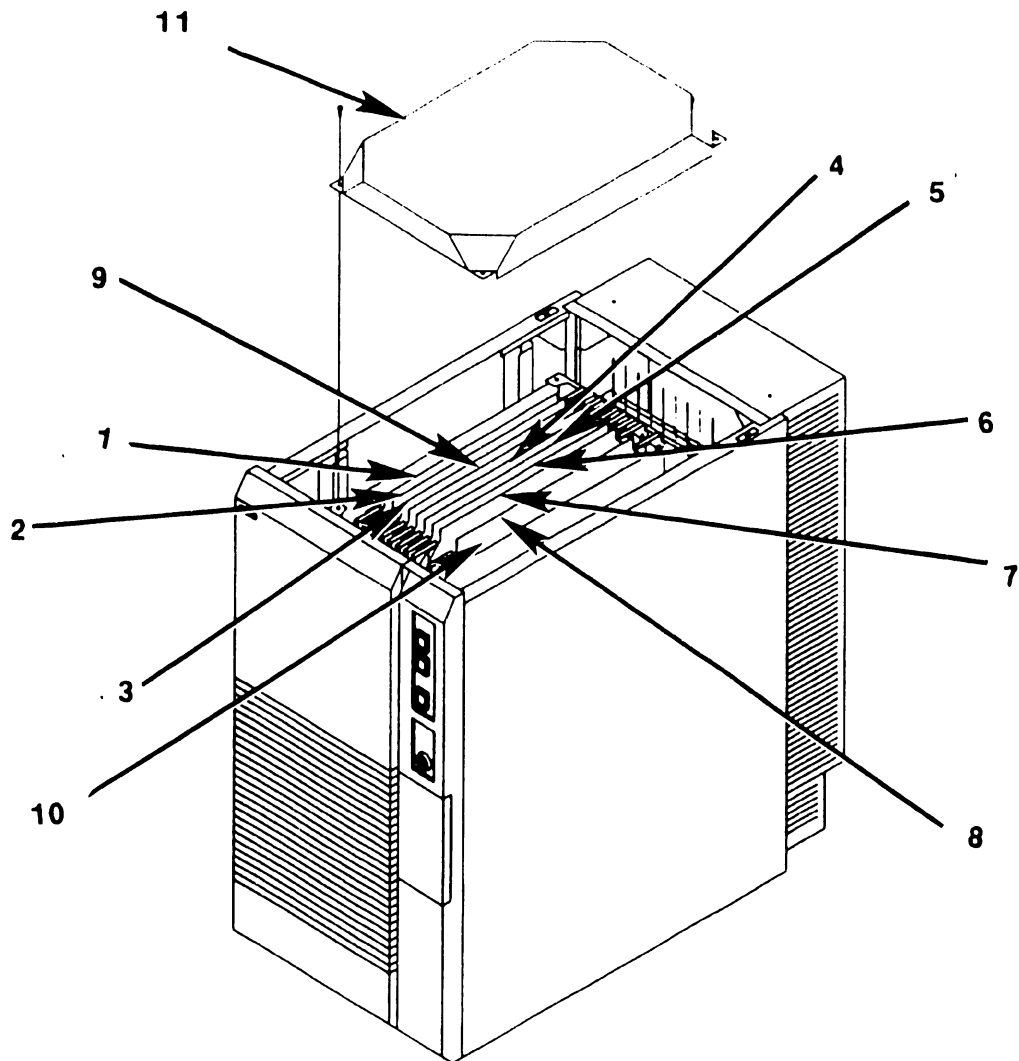
12.2   VS-7010 Subassemblies

12.2.4   VS-7010 Rear Panel Assembly (Sheet 1 of 2)

Item	Part Number	Description
1*	270-0975	Electrical APA, 4 each
2*	270-3451	DC Fans, 4 each
	* 220-2644	Cable, DC PDU to Rear Housing Terminal Block
3	449-1467	Cover, Card Cage
4	270-1102	Card Cage Assembly
5	447-0018	Shield, Bus Bar
6	270-1011	AC PDU Assembly
7		Optional Half Panels
	478-1202	Blank Half Panel
	452-4880	Panel, Cable Concentrator
	270-1005	Kennedy
	270-1007	Telex Tape
	* 270-1016	Gate Array TC Panel
	* 270-1004	Multiline TC Mounting Panel And SCL PCA
	(Requires Interface Modules;)	
	* 270-1093	RS232 Interface Module, 4 each or
	* 270-1011	RS366 Interface Module, 4 each or
	* 270-1012	RS449 Interface Module, 4 each or
	* 270-1013	X.21 Interface Module, 4 each
8	270-1006	SMD Panel
	220-3544	'B' Cable (2 each)
	220-3545	'B' Cable (2 each)
	220-3546	'A' Cable

12.2   VS-7010 Subassemblies

12.2.4   VS-7010 Rear Panel Assembly (Sheet 2 of 2)
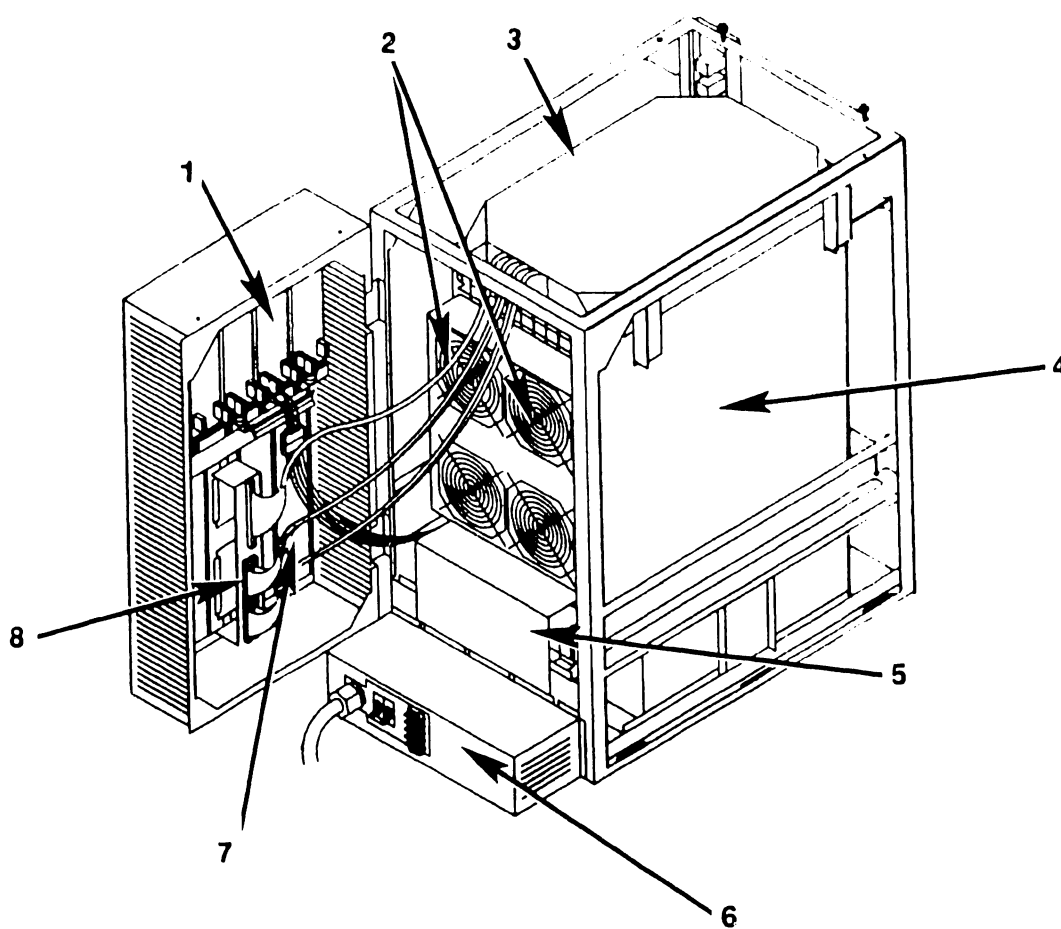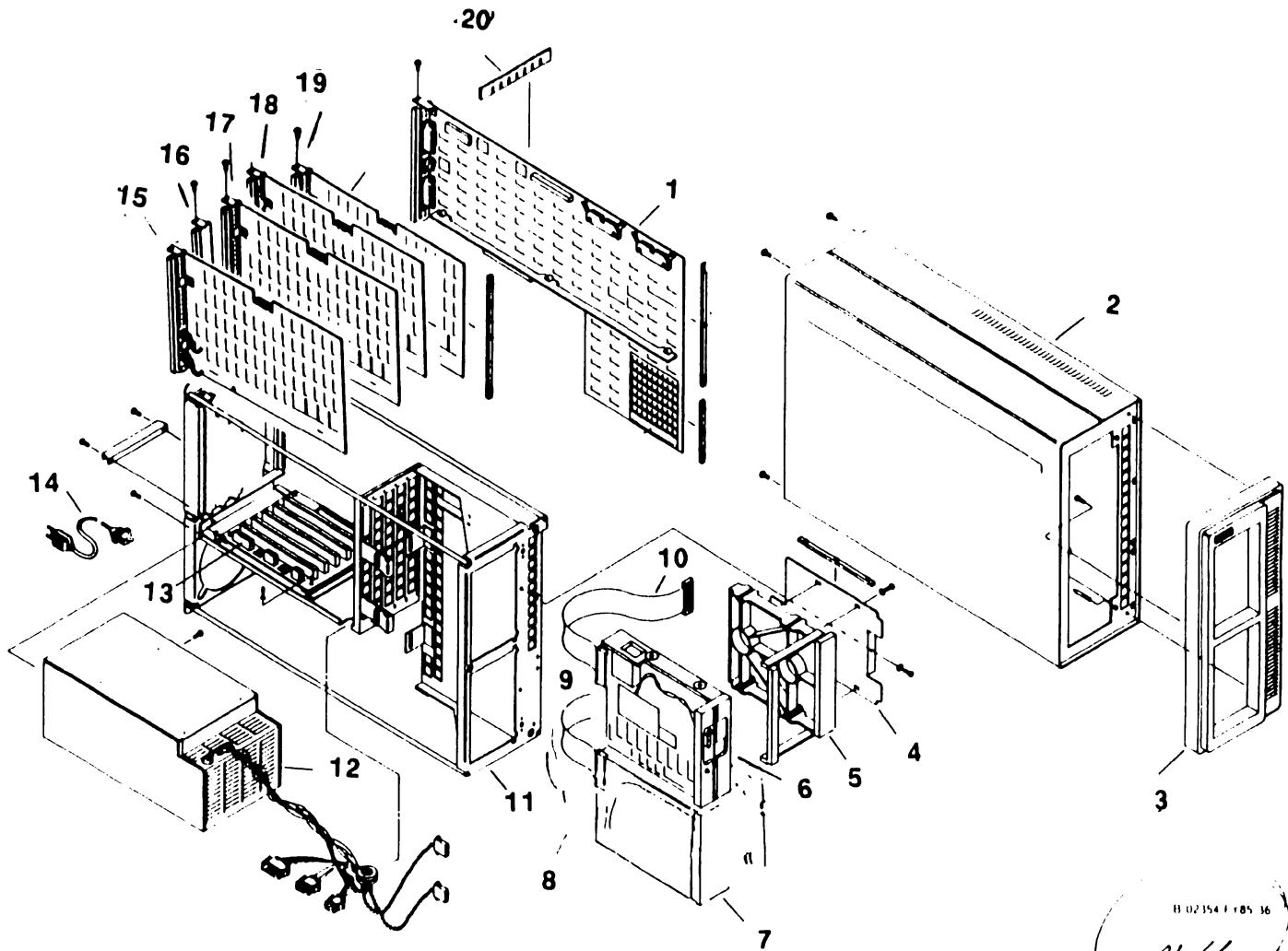
12.3   Support Control Unit Subassemblies

12.3.1   SCU Professional Computer (Sheet 1 of 2)

Item	Part Number	Description
1*	210-9521-2C	CPU/System Board (512K), VS-7010 Unique
2	458-3299	Enclosure, CPU
3	449-0748	Bezel, CPU
4	452-0342	Plate, Drive Mounting
5	449-0837	Adapter, Half Height Drive
6*	725-0142	Diskette Drive, 360KB Half Height
7*	278-4062	Winchester Disk, 20MB
8*	220-3240	Cable, Winchester 'A' Data
9*	220-3328	Cable, Winchester 'B' Control
10*	220-3239	Cable, Floppy Drive
11	458-3329	Chassis, CPU
12*	270-1033	Power Supply, SPS200
13*	210-9237	Motherboard
14	420-2040	AC Power Cord
15*	210-9025-A	Winchester Controller
16	458-3835	Shield, RF
17*	210-8310-A	Single Board Local Communications Controller
18*	210-9848	External PCI Controller
19*	210-9443-A	PC Emulator (Display Controller)
20	449-0753	Holddown, PCA

* = Field Replaceable Item

12.3　Support Control Unit Subassemblies

12.3.1　SCU Professional Computer (Sheet 2 of 2)

12.3   Support Control Unit Subassemblies

12.3.1   SCU PM004L Monitor [279-0659] (Sheet 1 of 2)

Item	Part Number	Description
1	449-1065	Cover, PM004L Monitor
2	220-2311	Cable Assembly, Grounding
3	340-0115	Tube, C/R 12 inch
4	449-1064	Bezel, Monitor
5	650-9081	Screw, 1/4-28 x 1-1/2 inch hex head
6	449-1066	Actuator, Slide
7	449-0952	Bellow, Sleeve
8	449-0626	Collar, Ball Joint
9	478-0805	Ball Joint
10	449-1067	Base, Monitor
11	449-0625	Cap, Spring
12	652-0064	Stop Nut, 1/4-28
13	220-0491	Cable Assembly, 4 feet 4 inch
	220-0495	Cable Assembly, 8 feet 8 inch
14*	210-8514	PCB, Monitor Electronics
15	320-0132	Yoke Assembly (Less Magnets)

* = Field Replaceable Item

12.3   Support Control Unit Subassemblies

12.3.2   SCU PM004L Monitor [279-0659] (Sheet 2 of 2)

741-1786   12.2.3

12.4   VS-7010 Power Interconnect

A = 220-2339 (Inline EAPA Power Cable)
B = 220-2348 (3 Pos Plug-Plug)
C = 220-3319 (34 Pos SDC-SDC)
D = 220-3419 (34 Pos SDC-SDC)
E = 220-2374 (DC Power Option Cable)

Rear Door

220-3419 (EAPA Signal Cable)
220-2374 (DC Option Cable)
220-3544 ('B' Cable Port 0 & 1)
220-3545 ('B' Cable Port 2 & 3)
220-3546 ('A' Cable)
220-3659 (Telex & Kennedy Cables)
220-3610 (MLTC Signal Cable)
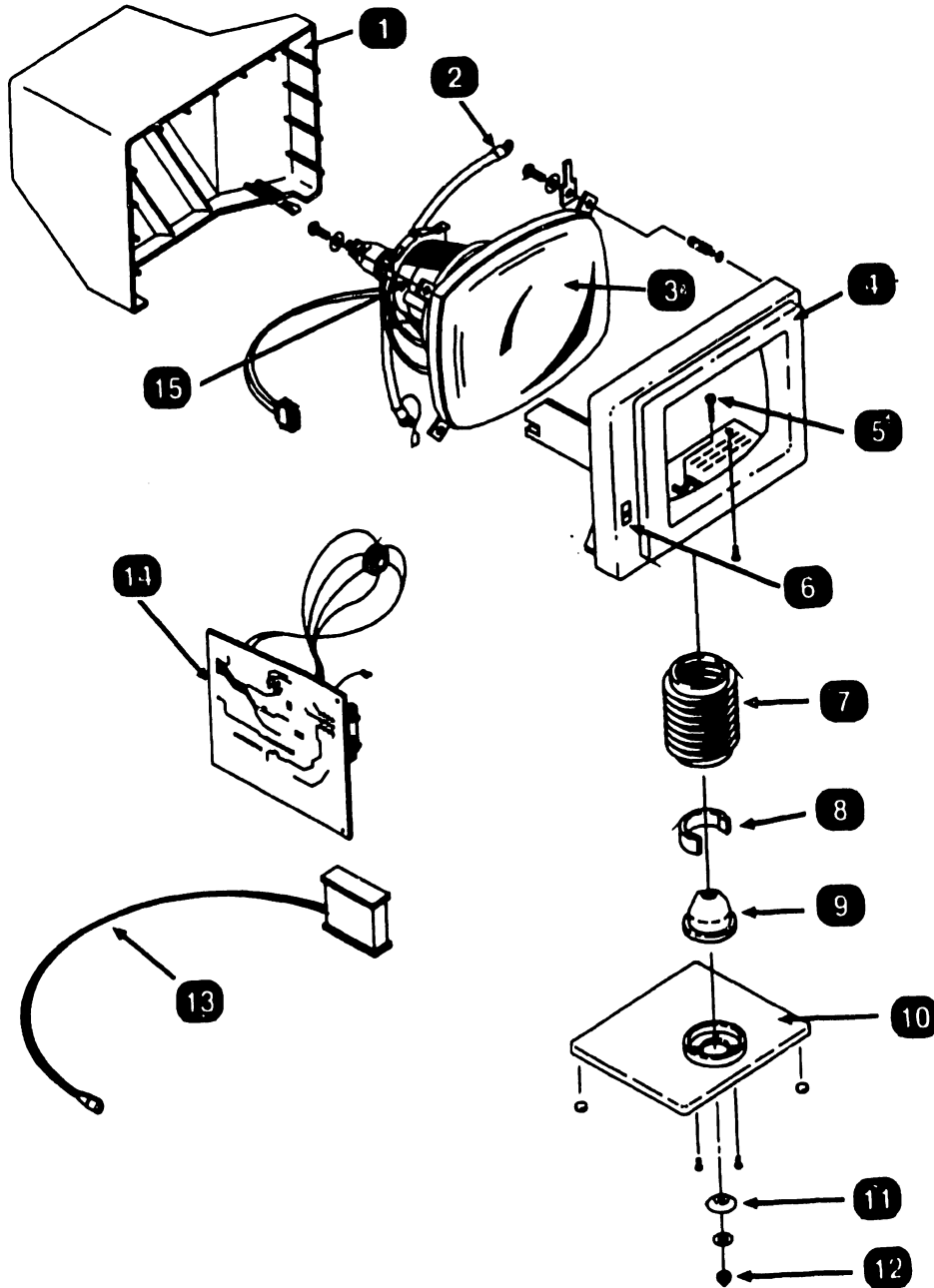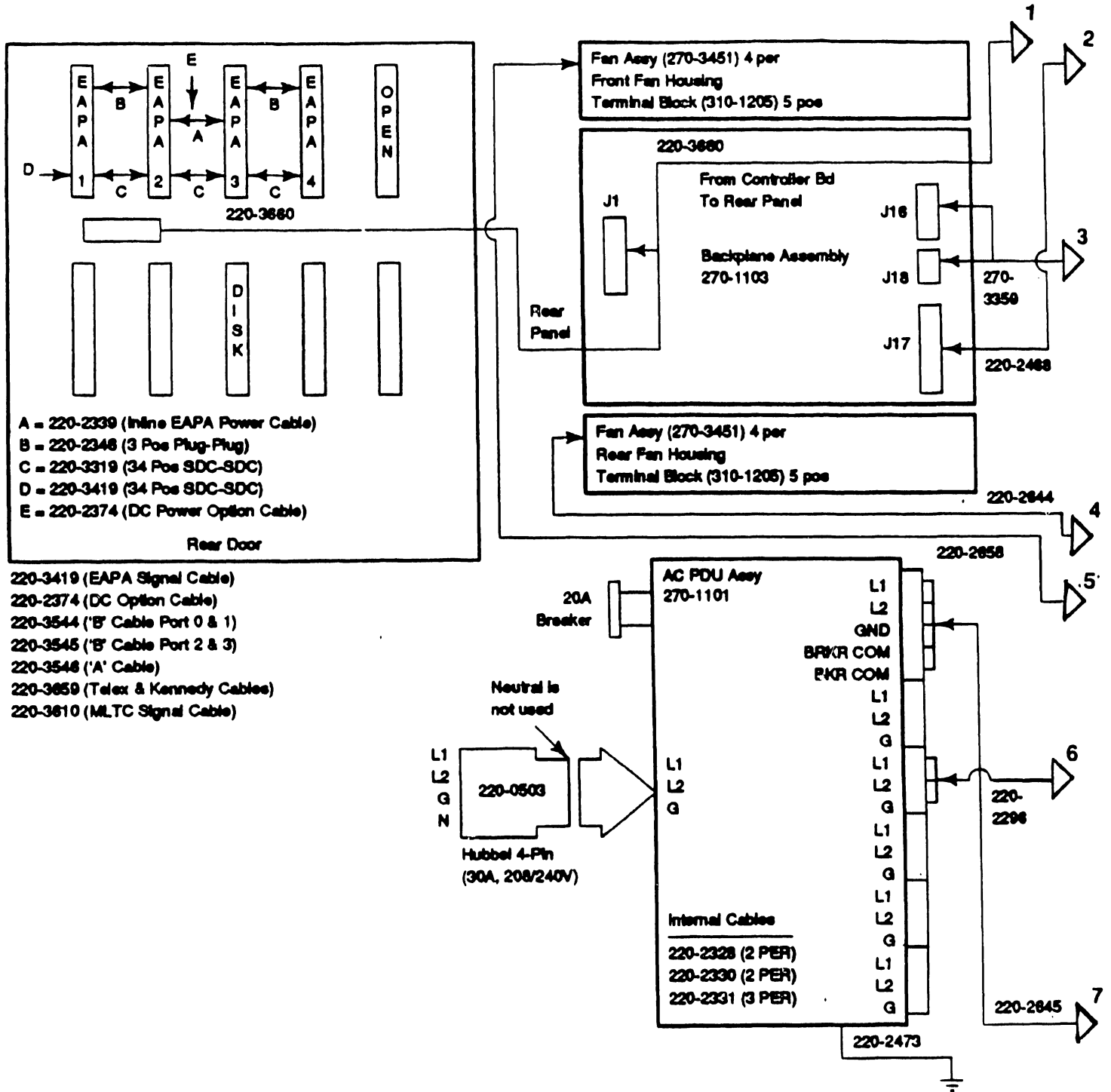
12.4　　VS-7010 Power Interconnect
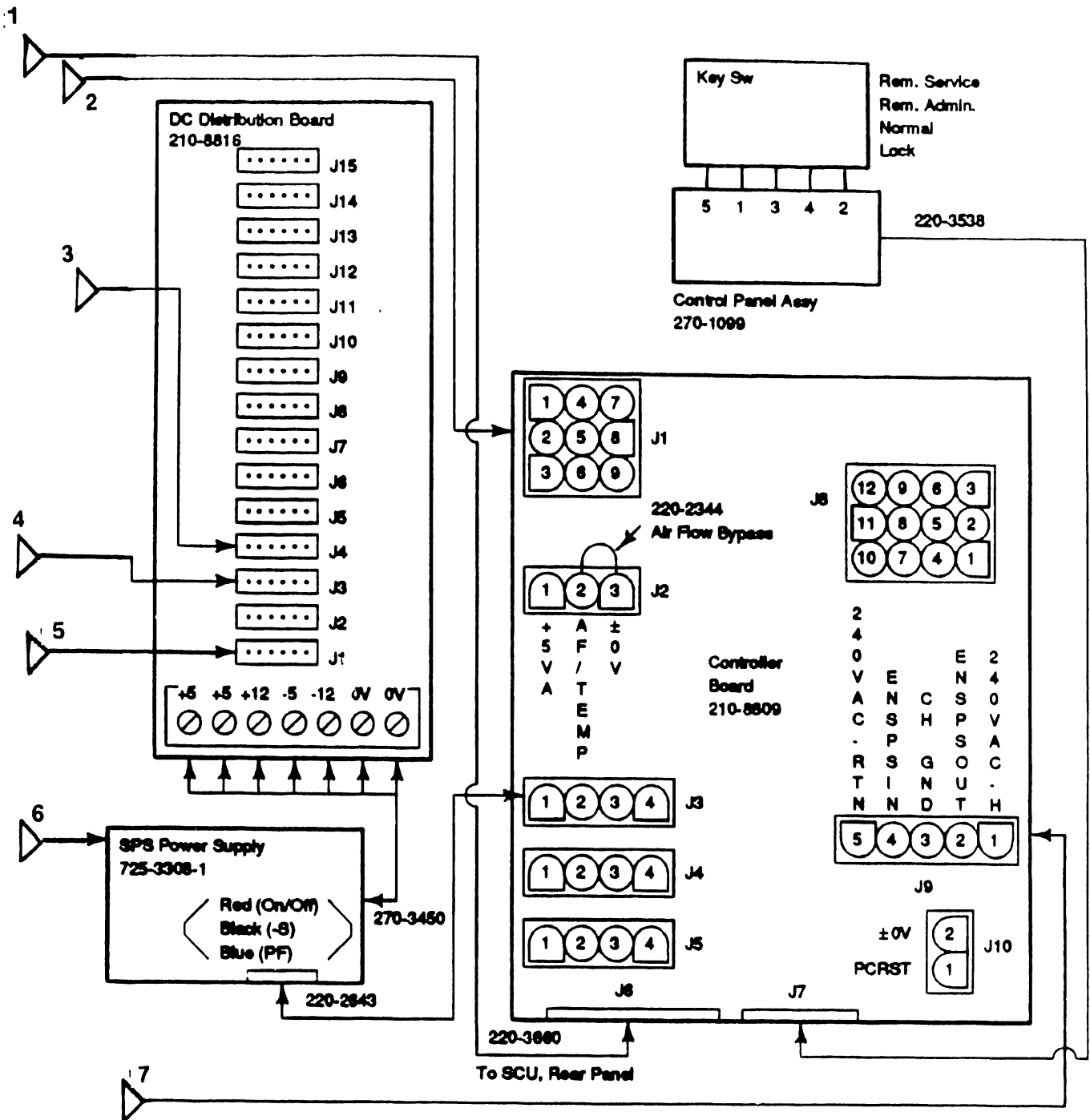
12.5   Cable Assemblies

12.5.1   Standard Cable Assemblies

Cable P/N	Source	Destination
220-0503	208/240V AC Power Receptacle	Mainframe AC PDU
220-2296	AC PDU Connector	Power Supply
220-2339	In-Line EAPA Power 'Y'	EAPA Power Connectors
220-2346	EAPA Power Connector	Adjacent EAPA Power Connector
220-2374	DC PDU Connector	Rear Door Option Panels
220-2468	Motherboard	Power Supply Controller Board J1
220-2473	AC PDU Ground	Chassis Ground Stud
220-2643	Power Supply (On/Off)	Power Supply Controller Board J3
220-2644	DC PDU Connector	Rear Fan Housing Terminal Block
220-2645	AC PDU Connector	Power Supply Controller Board J9
220-2658	DC PDU Connector	Front Fan Housing Terminal Block
220-3319	EAPA Signal Connector	Adjacent EAPA Signal Connector
220-3419	Serial IOC Connector J2	First EAPA Signal Connector
220-3472	IOC 50-Pin Connector (CPU-to-AGU, AGU-to-ATU)	Adjacent IOC 50-Pin Connector
220-3538	Control Panel Assembly (Part of Assembly 270-1099)	Power Supply Controller Board J9
220-3660	Power Supply Controller J6	Motherboard/Rear Panel SCU Port
270-3359	DC PDU Connector	Motherboard Connector
270-3450	Power Supply DC Harness	DC PDU Terminal Block
220-2344	Power Supply Controller J3 (Included as part of Power Supply Controller Board)	
420-2040	120V AC Power Receptacle	SCU (PC) Power Supply
220-0606	Mainframe SCU Interface Port (Standard cable 10 ft, or optional 25 ft cable P/N 220-0607)	SCU (PC) SCU Interface Board

12.5   Cable Assemblies

12.5.2   Optional Cable Assemblies

Cable P/N	Source	Destination
220-3546	SMD IOC Connector J5	SMD Panel Data 'A' Cable
220-3544	SMD IOC Connector J4	SMD Panel Control Port 0 'B' Cable
220-3544	SMD IOC Connector J3	SMD Panel Control Port 1 'B' Cable
220-3545	SMD IOC Connector J2	SMD Panel Control Port 2 'B' Cable
220-3545	SMD IOC Connector J1	SMD Panel Control Port 3 'B' Cable
220-3659	Telex/Kennedy IOC (50-Pin Cable Soc-Soc)	Kennedy/Telex Panels
220-3610	Multline TC IOC Connectors J1 - J4	Multiline Half Panel SCL

END