**WANG**

# VS-7100 COMPUTER SYSTEM

## Models:

### VS-7110
### VS-7120
### VS-7150

**Customer Engineering**
**Product Maintenance Manual**            **741-1721-A**

## COMPANY CONFIDENTIAL

# PREFACE

This document is the Product Maintenance Manual (PMM) for the Wang VS-7100 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-7100 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.

The first edition of this manual was published under the title of "VS-150 Computer System", part number 741-1721.

## Second Edition (May, 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          *
*    CIRCUMSTANCE.  EXTREMELY DANGEROUS VOLTAGE AND            *
*    CURRENT LEVELS (IN EXCESS OF 300 VOLTS DC AND UN-         *
*    LIMITED CURRENT) ARE PRESENT WITHIN THE POWER SUPPLY.     *
*                                                             *
*    DO NOT ATTEMPT TO REPAIR THE SWITCHING POWER             *
*    SUPPLY; IT IS FIELD REPLACEABLE ONLY.                    *
*                                                             *
*    AFTER POWERING THE UNIT DOWN AND DISCONNECTING THE AC    *
*    POWER CONNECTOR FROM THE POWER SOURCE RECEPTACLE,        *
*    ALLOW ONE MINUTE BEFORE REMOVING THE POWER SUPPLY TO     *
*    PROVIDE ADEQUATE TIME FOR ANY RESIDUAL VOLTAGE TO        *
*    DRAIN THROUGH THE BLEEDER RESISTORS.                     *
*                                                             *
***************************************************************
```

# 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 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 CABLING 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.

The last page before the back cover is a comment sheet.
Please take the time to fill out the comment sheet and return it,
via the Home Office mail pouch, addressed to:

Wang Laboratories, Inc.
Customer Engineering Technical Documentation
M/S 082-370
437 South Union Street
Lawrence, Mass.
01843-9984

# TABLE OF CONTENTS

# TABLE OF CONTENTS (CONT)

## SECTION 7    REPAIR

## SECTION 8    ADJUSTMENTS

# TABLE OF CONTENTS (CONT)

## SECTION 9    UNPACKING AND SETUP

## SECTION 10    FUNCTIONAL DESCRIPTION

# TABLE OF CONTENTS (CONT)

## SECTION 11 SPECIFICATIONS

## SECTION 12 ILLUSTRATED PARTS

## APPENDIX A

# LIST OF ILLUSTRATIONS

## LIST OF ILLUSTRATIONS (CONT)

# LIST OF TABLES

# LIST OF TABLES (CONT)

# SECTION
# 1
# INTRODUCTION

# TABLE OF CONTENTS

**SECTION 1    INTRODUCTION**                                                    <u>Page</u>

# SECTION 1

# INTRODUCTION

## 1.1 SCOPE AND PURPOSE

This manual contains detailed information for the installation, mainten-
ance, and repair of the Wang VS-7100 Computer System. It provides procedures
for unpacking and setup, adjustment, and removal/replacement of field-replace-
able assemblies. An Illustrated Parts Breakdown (IPB) section provides a list
of field-replaceable units (FRUs) by part number for ordering replaceable
parts.

The purpose of this manual is to provide the field engineer with the in-
formation necessary to install, maintain, and repair the VS-7100 in the field.
Familiarity with large VS systems is recommended for the effective use of this
manual.

## 1.2 ORGANIZATION AND LAYOUT

The manual is organized into twelve sections based on the Illustrated
Manual outline. Some sections may not apply because of the nature of this
particular product. In this case, a brief statement of explanation is provided
on the section title page. Each section of this manual covers a different
topic and attempts to cover the topic as completely as possible based on the
information available at the time. Wherever possible, illustrations, consist-
ing of line art with callouts, are used to support and clarify the text.

## 1.3 ABBREVIATIONS AND SYMBOLS USED IN THIS MANUAL

| ABBREVIATION/SYMBOL | DEFINITION |
|---|---|
| A/D | Analog-to-Digital |
| AC | Alternating current |
| AGU | Address Generation Unit |
| ANSI | American National Standards Institute |
| APA | Active Port Assembly |
| ASSY | Assembly |
| ATU | Address Translation Unit |
| BIT | Built In Test |
| BPI | Bits Per Inch |
| CC | Cable Concentrator |
| CIU BLANC | Cable Interface Unit Broadband Local Area Network |
| CIU CAB | Cable Interface Unit Contention Access Based |
| CM | Control Mode |
| CMD | Cartridge Module Drive |
| CP | Central Processor |
| CPU | Central Processing Unit |
| DC | Direct current |
| DCS | Diagnostic Control System |

# INTRODUCTION

| ABBREVIATION/SYMBOL | DEFINITION |
|---|---|
| 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 |
| FPU | Floating Point Unit |
| FRU | Field-replaceable unit |
| FTU | Field Test Unit |
| GATC | Gate Array Telecommunications |
| 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 |
| MBPS | Megabits Per Second |
| MCU | Memory Control Unit |
| MLTC | Multiline Telecommunications |
| MM | Main Memory |
| MODEM | Modulator/Demodulator |
| NEMA | National Electrical Manufacturers Association |
| 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 |
| PCW | Program Control Word |
| PDA | Physical Device Address |
| PDU | Power Distribution Unit |
| PE | Phase Encoded |
| PF | Program Function |
| PM | Preventive maintenance |
| PREX | Printer Exerciser |
| RAM | Random Access Memory |
| RF | Radio Frequency |
| RSD | Removable Storage Drive |
| SBI | System Bus Interface |
| SCL | Serial Communications Link |
| SCU (PC) | Support Control Unit (Professional Computer) |
| SIOC | Serial Input/Output Controller |
| SMD | Storage Module Drive |
| SPB | Support Packet Bus |

| ABBREVIATION/SYMBOL | DEFINITION |
|---|---|
| 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 |
| W/S | Workstation |
| WLI P/N | Wang Laboratories, Inc. Part Number |
| WSEX | Workstation Exerciser |

# SECTION
# 2
# IDENTIFICATION

# TABLE OF CONTENTS

SECTION 2    IDENTIFICATION               **Page**

# LIST OF ILLUSTRATIONS

<u>**Figure**</u>    <u>**Title**</u>               **Page**

# SECTION 2

# IDENTIFICATION

## 2.1  SYSTEM COMPONENTS
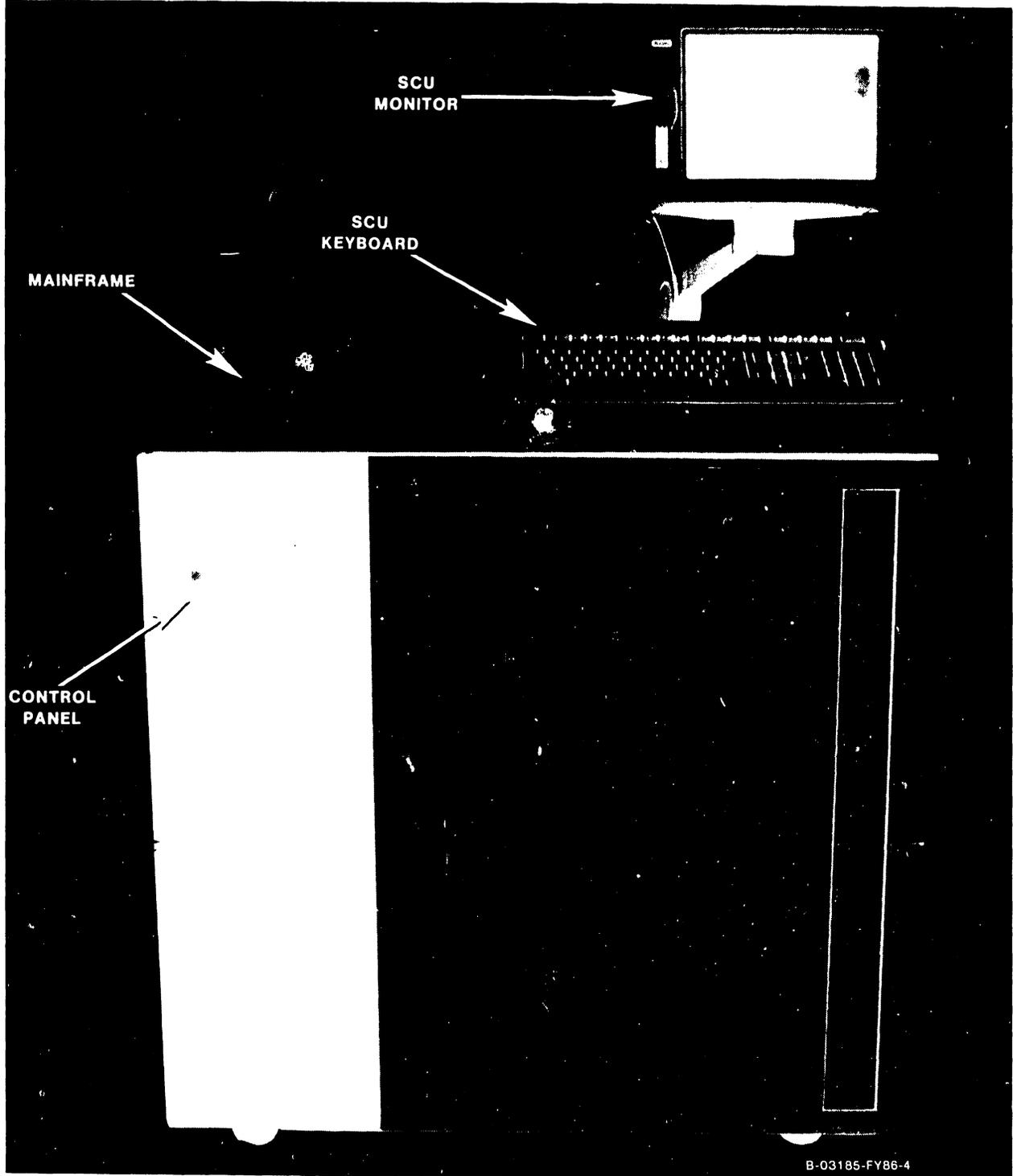


Figure 2-1.  System Components

## 2.2  MAJOR MAINFRAME ASSEMBLIES
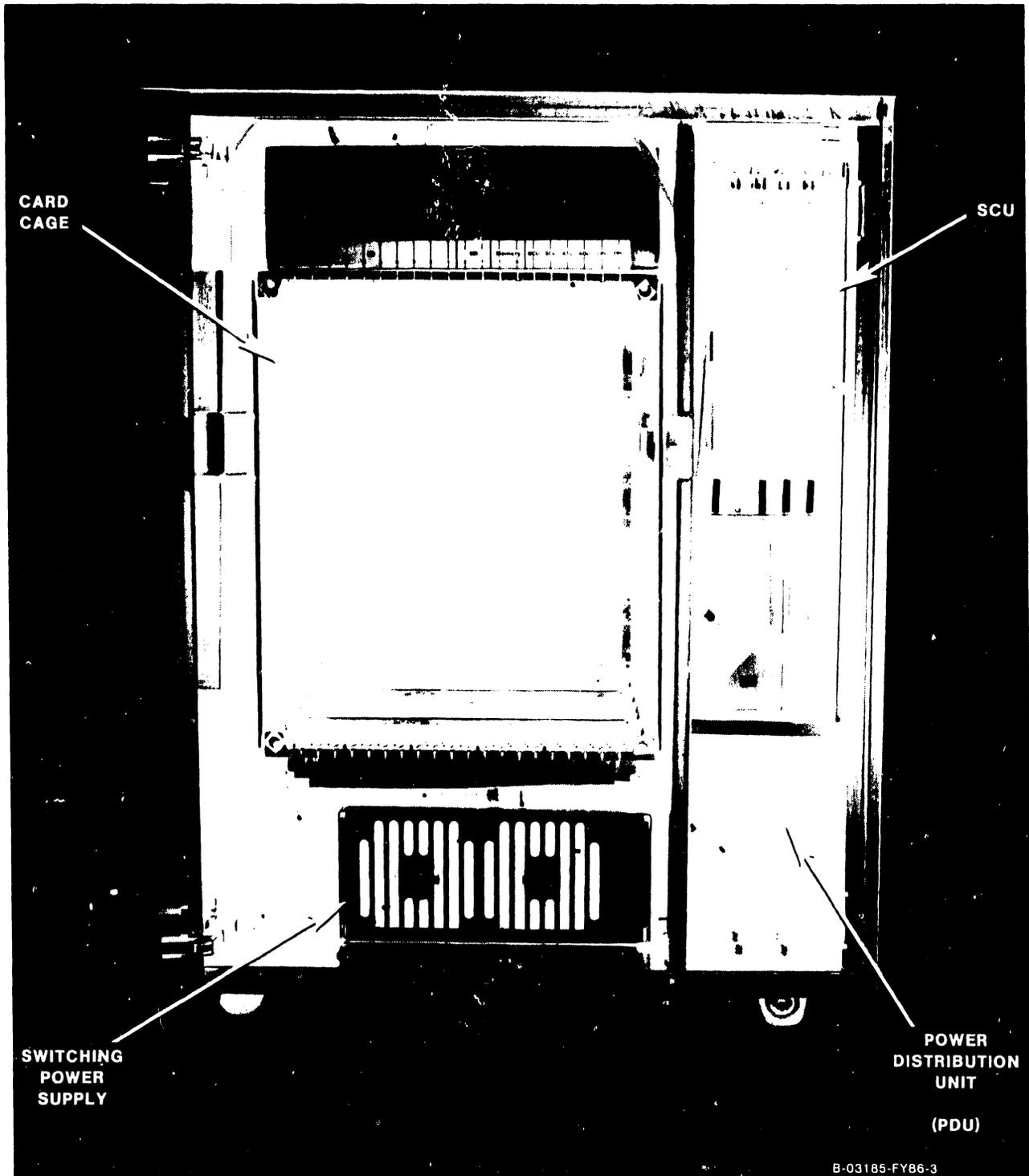


Figure 2-2.  Major Mainframe Assemblies (Front View)

## 2.2 MAJOR MAINFRAME ASSEMBLIES
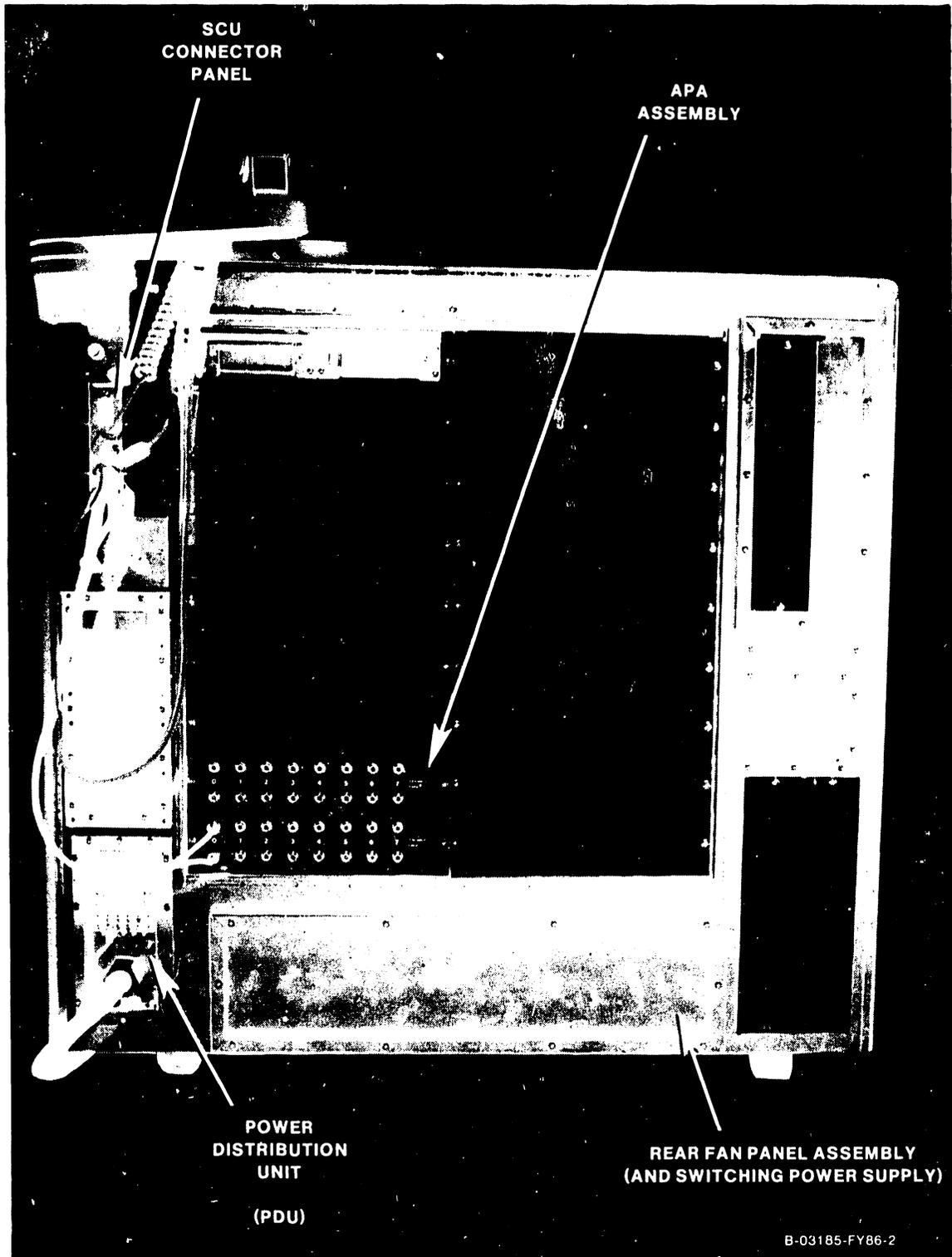


Figure 2-3. Major Mainframe Assemblies (Rear View)

## 2.2  MAJOR MAINFRAME ASSEMBLIES
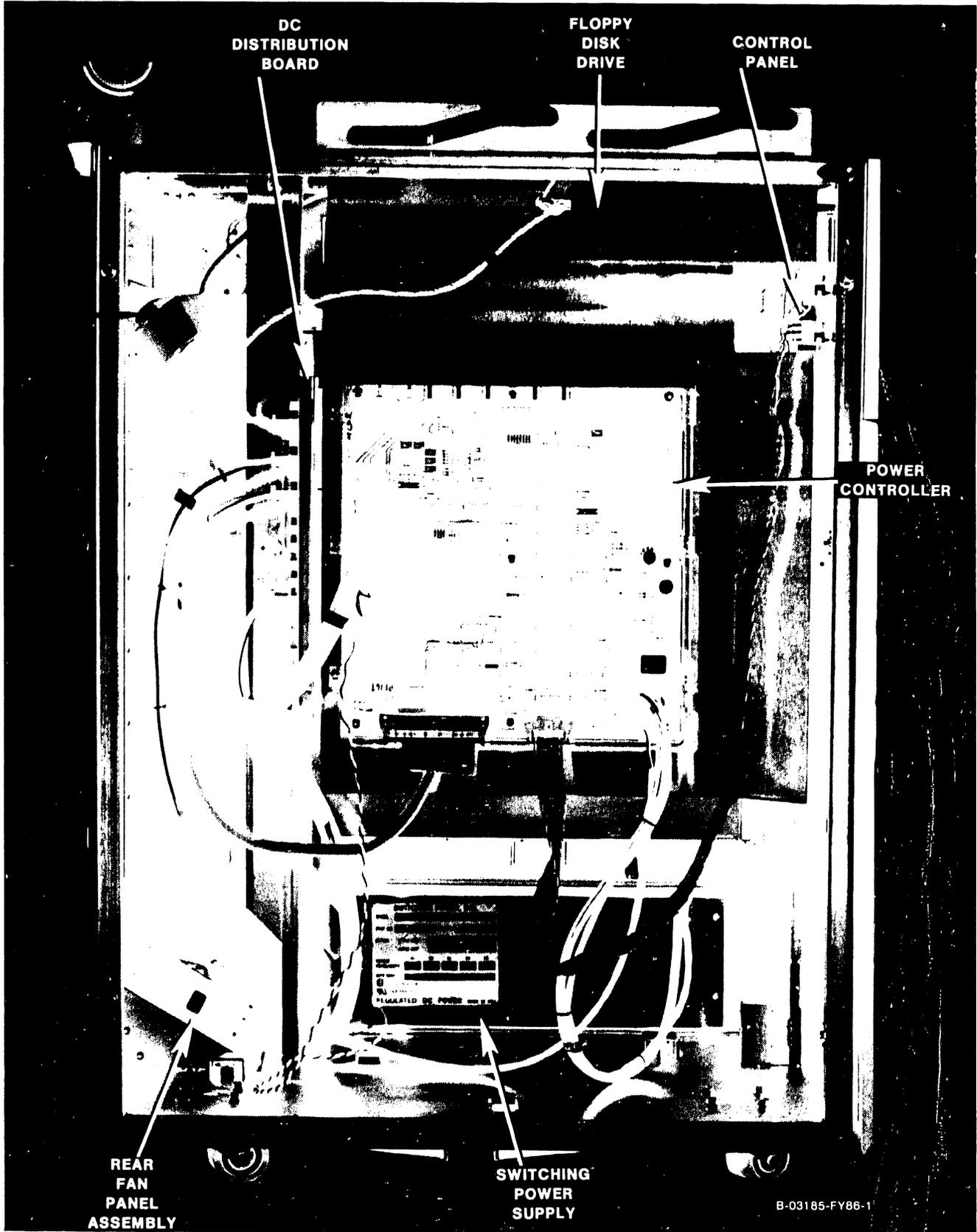


Figure 2-4.  Major Mainframe Assemblies (Left Side View)

## 2.2  MAJOR MAINFRAME ASSEMBLIES
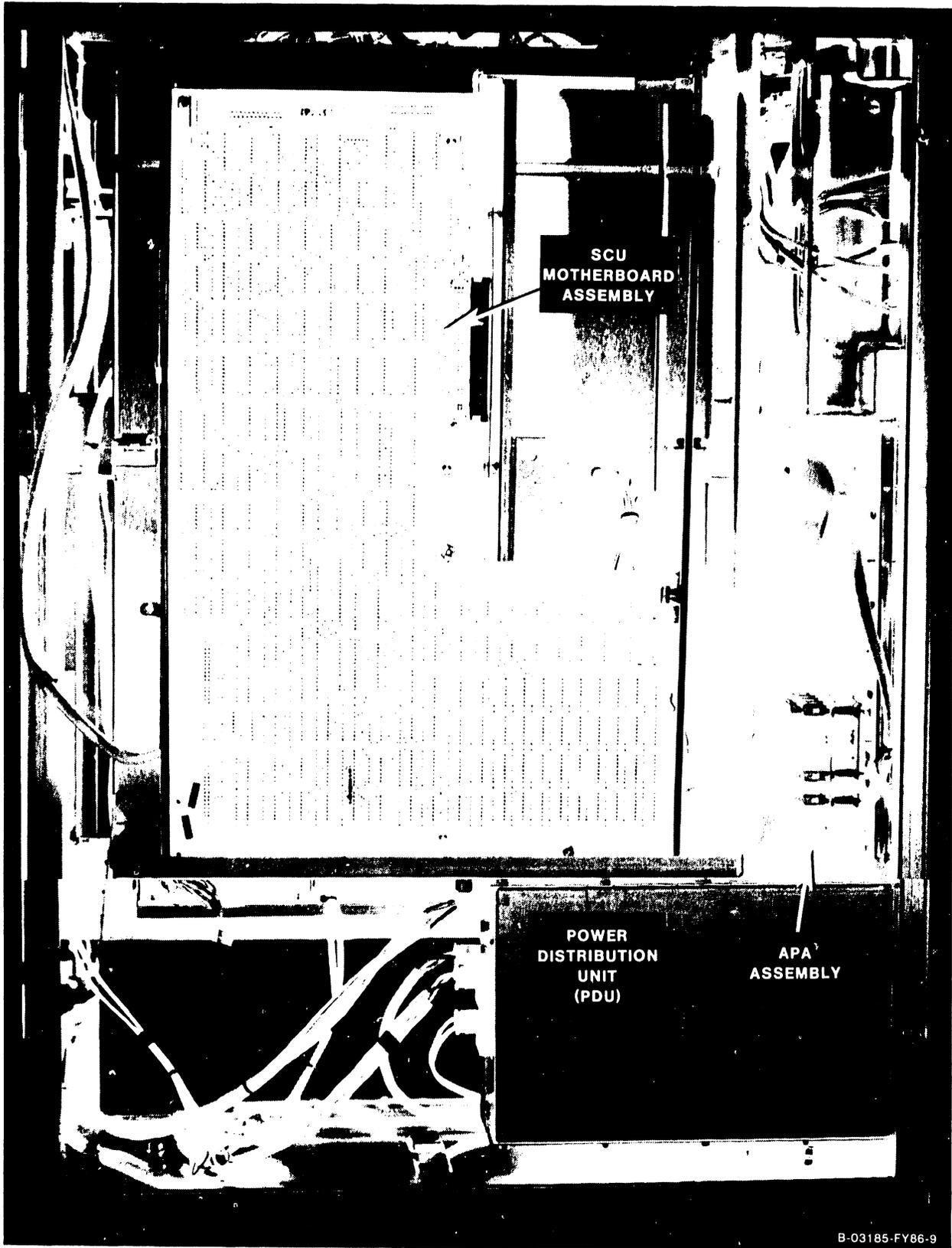


Figure 2-5.  Major Mainframe Assemblies (Right Side View)

## 2.3  MAJOR SCU ASSEMBLIES



SCU
CARD
CAGE
ASSEMBLY

SCU
10/20 MEGABYTE
WINCHESTER
DISK
DRIVE

SCU
CARD
CAGE
FAN

B-03185-FY86-8
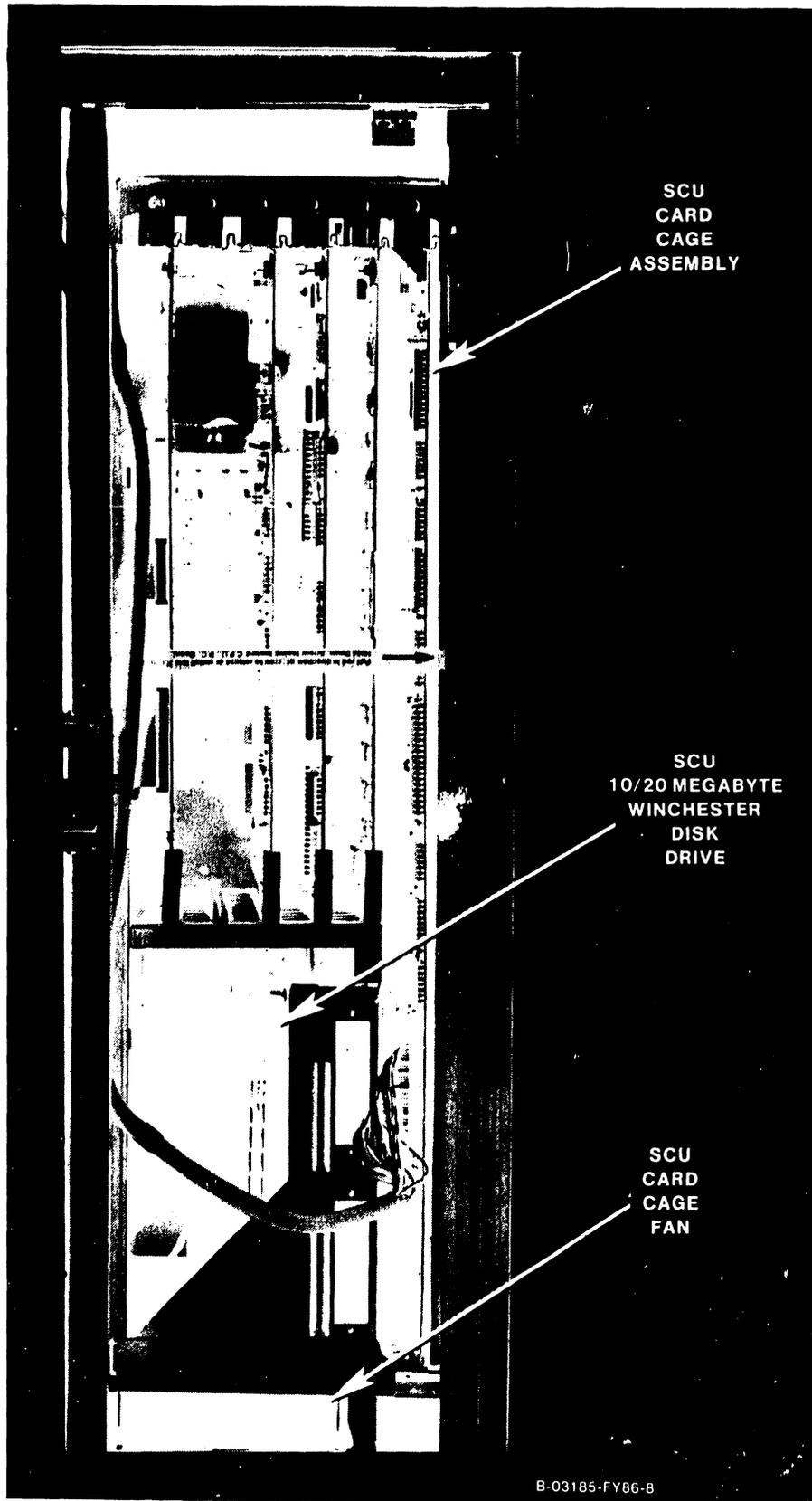
Figure 2-6.  Major SCU Assemblies

# SECTION
# 3
# CONTROLS
# AND
# INDICATORS

# TABLE OF CONTENTS

## LIST OF ILLUSTRATIONS

## LIST OF TABLES

# SECTION 3

# CONTROLS AND INDICATORS

## 3.1  GENERAL

This section provides information on the controls and indicators used on the VS-7100, including power control and main memory size selection.

## 3.2  CONTROLS

Table 3-1 below lists the controls, their location, type, and function.

**Table 3-1.  VS-7100 Controls**

| Control Name And Type | Location | Purpose | Normal Position |
|---|---|---|---|
| Ac On/Off (Circuit breaker) | Power Distribution Unit | Provides ac power to power supplies, Power Supply Controller board, and mainframe fans. | On (1) |
| Power On (Lighted pushbutton) | Control Panel | Turns dc power on. | Open (not active) |
| Power Off (Lighted pushbutton) | Control Panel | Turns dc power off. | Open (not active) |
| System Reset (Pushbutton) | Control Panel | Resets system, clears main memory, enters Control Mode. | Open (not active) |
| Operator Console Reset (Pushbutton) | Control Panel | Resets SCU (PC) only. | Open (not active) |
| 1. Remote Service 2. Remote Admin. 3. Normal Control | Control Panel | Remote diagnostics. RSAF operation. All Cntrl Panel controls function when power on. | Normal Control |
| 4. Control Lock (Key switch) | | Disables power on. | |

Table 3-1. VS-7100 Controls (Cont'd)

| Control Name And Type | Location | Purpose | Normal Position |
|---|---|---|---|
| V1 (+5A), V2 (+12) V3 (-5) V4 (-12) (Adjustment pots) | Multioutput SPS | Adjusts power supply voltages up or down as needed. | Various (Section 8) |
| SW1 (Power On) (Pushbutton) | Power Supply Controller | Turns dc power on. Parallel to Control Panel On pushbutton. | Open (not active) |
| SW2 (Power Off) (Pushbutton) | Power Supply Controller | Turns dc power off. Parallel to Control Panel Off pushbutton. | Open (not active) |
| SW3 - Voltage Address (DIP switch) | Power Supply Controller | Addresses hex displays that are used to zero A/D converter. | Various |
| R18 through R22 (Five adjustment pots) | Power Supply Controller | Calibrate A/D (Analog/ Digital) converter for individual dc voltages. | Various (Section 8) |
| Local/Remote (Toggle switch) | SCU (PC) Local Comm Data Link board | Selects PC IPL operation (Local) or workstation operation (Remote) | Local |
| IOC Diagnostic Switch (DIP switch) | All IOCs | Permits IOC diagnostic functions. | All Off (open) (Section 7) |
| Disk Drive Device Type (DIP switch) | Disk Drive IOC | Selects disk drive types connected to system. | Various (Section 7) |
| Port Select (DIP switch) | Multiline TC (MLTC) IOC | Selects TC ports on MLTC for loopback test. | All Closed (On) |
| Gate Array Clear (Pushbutton) | Gate Array TC Connector Assembly | ReIPL CPU/Gate Array (210-8714 board) | Open (not active) |
| Gate Array Switch (DIP switch) | CPU/Gate Array (210-8714) board | Memory configuration and loopback test selection. | 5,6 closed, rest open |
| CIU IOC Functions (DIP switch) | BLANC IOC | Selects configuration, diagnostics, and re- pair functions. | All Open (Off)) (Section 7) |

## 3.3 INDICATORS

Tables 3-2 through 3-9 lists the indicators found on the VS-7100 followed by a brief description of their purpose. Locations of the indicators are shown in figures 3-1 through 3-8. There are no indicators on any of the circuit boards comprising the VS-7100 mainframe PCB chassis. Any errors are displayed on the SCU screen.

### Table 3-2. VS-7100 Indicators

| Indicator Name And Type | Location | Purpose | Normal Indication |
|---|---|---|---|
| Power On lamp (Power On pushbutton) | Control Panel | Shows dc power is on. | On |
| Power Off lamp (Power Off pushbutton) | Control Panel | Shows dc power is off. | Off |
| LED1 - LED5 (Five voltage sensing LEDs) | Power Supply Controller | Shows dc voltages are on. Does not show accuracy. | On (LED 2 [+5VB] comes on but is not used.) |
| L3, L4 (Two Hex displays) | Power Supply Controller | Used to zero A/D converters. | Hex 7E (Minus) Hex 80 (Zero) Hex 82 (Plus) |
| Diskette Activity LED | Front of SCU minidiskette drive | Shows drive in use (head loaded)/ not in use. | On (in use) Off (not in use) |
| TC Displays (Up to 4 LED displays) | MLTC Connector Assembly | Shows interchange signals between modem and controller. | Refer to Tables 3-3 thru 3-6. |
| TC Display (One display with 8 LEDs) | Gate Array TC Back Panel | Shows interchange signals between modem and controller. | Refer to Tables 3-7 thru 3-9. |

## NOTES

1. Tables 3-3 to 3-6 show EIA (Electronic Industries Association) interchange signals between the modem and the MLTC controller.
2. For the MLTC, all LEDs are normally on or blinking during the BIT (Built In Test). If the BIT fails, the software controlled LED will go off.

**Table 3-3. Multiline TC Back Panel Displays (RS-232 Operation)**

| Indicator Name And Type | Purpose |
| --- | --- |
| LED1 | Data Set Ready |
| LED2 | Data Terminal Ready |
| LED3 | Carrier Detect |
| LED4 | Software Controlled |
| LED5 | Transmitted Data |
| LED6 | Request-to-Send |
| LED7 | Clear-to-Send |
| LED8 | Received Data |

**Table 3-4. Multiline TC Back Panel Displays (RS-366 Operation)**

| Indicator Name And Type | Purpose |
| --- | --- |
| LED1 | Data Line Occupied |
| LED2 | Call Origination Status |
| LED3 | Present Next Digit |
| LED4 | Abandon Call and Retry |
| LED5 | Digit Present |
| LED6 | Call Request Present |
| LED7 | Software Controlled |

**Table 3-5. Multiline TC Back Panel Displays (X.21 Operation)**

| Indicator Name And Type | Purpose |
| --- | --- |
| LED1 | Transmitted data |
| LED2 | Data Terminal Ready |
| LED3 | Received Data |
| LED4 | Indication |
| LED5 | Software Controlled |

**Table 3-6. Multiline TC Back Panel Displays (RS-449 Operation)**

| Indicator Name And Type | Purpose |
| --- | --- |
| LED1 | Carrier Detect |
| LED2 | Clear-to-Send |

**NOTE**

Tables 3-7 to 3-9 show EIA (Electronic Industries Association) interchange signals between the modem and the Gate Array controller. Read the Gate Array LEDs from left to right.

**Table 3-7. Gate Array Back Panel Displays (3270 Operation)**

| Indicator Name And Type | Purpose |
| --- | --- |
| LED1 | Received Data |
| LED2 | Transmitted Data |
| LED3 | Clear-to-Send |
| LED4 | Request-to-Send |
| LED5 | Data Carrier Detect |
| LED6 | Data Terminal Detected |
| LED7 | Data Set Ready |
| LED8 | Power Indicator |

**Table 3-8. Gate Array Back Panel Displays (Remote WangNet [WSN] Point to Point and Multipoint Operation)**

| Indicator Name And Type | Purpose |
| --- | --- |
| LED1 | System Activity |
| LED2 | Received Valid Data |
| LED3 | Transmitter Active |
| LED4 | Data Carrier Detected |
| LED5 | Virtual Circuit Active |
| LED6 | Activity to VS |
| LED7 | TC Controller Refusing New Traffic |
| LED8 | Diagnostic Mode |

### Table 3-9. Gate Array Back Panel Displays
### (Teletex Operation)

| Indicator Name And Type | Purpose |
| --- | --- |
| LED1 | Document Received |
| LED2 | Receive Memory Full |
| LED5 | Transmitting Document |
| LED6 | Receiving Document |
| LED7 (Note 1) | O.S. Code Active |
| LED8 (Note 2) | Normal Operation |

### NOTES

1. Blinks at a 3-second rate when Operating System code is active.
2. On for normal operation. Blinks for a hardware problem or fatal software error.

## 3.4  POWER DISTRIBUTION ASSEMBLY AND CONTROLS

Ac input power to the VS-7100 is 208/240 volts ac, split (single) phase. Ac neutral is not used in domestic mainframes. (Refer to Section 9.) The ac is supplied to the mainframe through the Power Distribution Unit (PDU) assembly, figure 3-1. The assembly is mounted on the lower right rear of the mainframe and contains a 20 amp mainframe ac On/Off circuit breaker, the ac line filter, and the ac voltage distribution terminal board. The DC Voltage Distribution board is mounted behind the air plenum, next to the Power Supply Controller, on the left side of the mainframe.

Moving the ac On/Off circuit breaker to the right (1) turns on 12 card cage fans and four back panel fans, and supplies ac to the Power Supply Controller board and to the dc switching power supply. However, the power supplies are not activated.

Ac power is removed from the mainframe by moving the ac On/Off circuit breaker to the left (0).
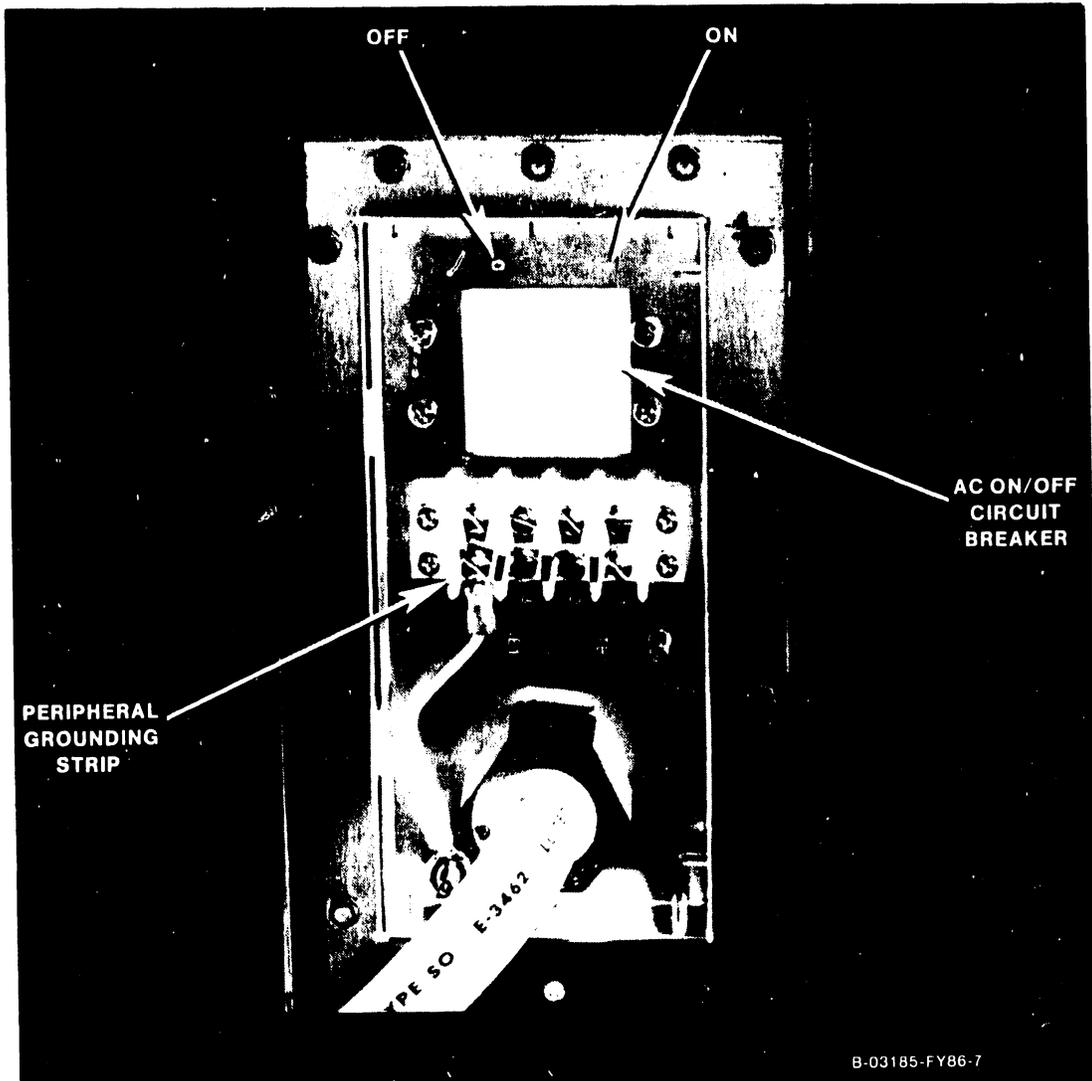


Figure 3-1.  Power Distribution Unit

## 3.5  POWER SUPPLIES AND CONTROLS

The VS-7100 contains one switching power supply, figure 3-2. The supply is a multioutput 1800 watt supply generating +5 V at 300 amps, -5 V at 10 amps, +12 V at 20 amps, and -12 V at 5 amps. Each voltage is adjusted and regulated at the power supply.
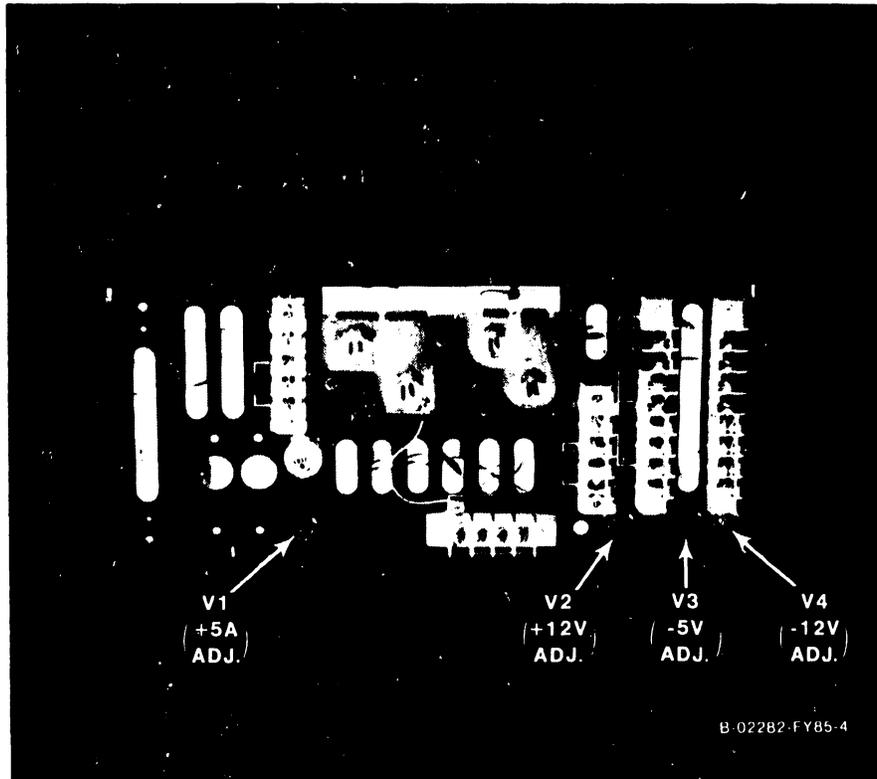


Figure 3-2.  Multioutput Power Supply
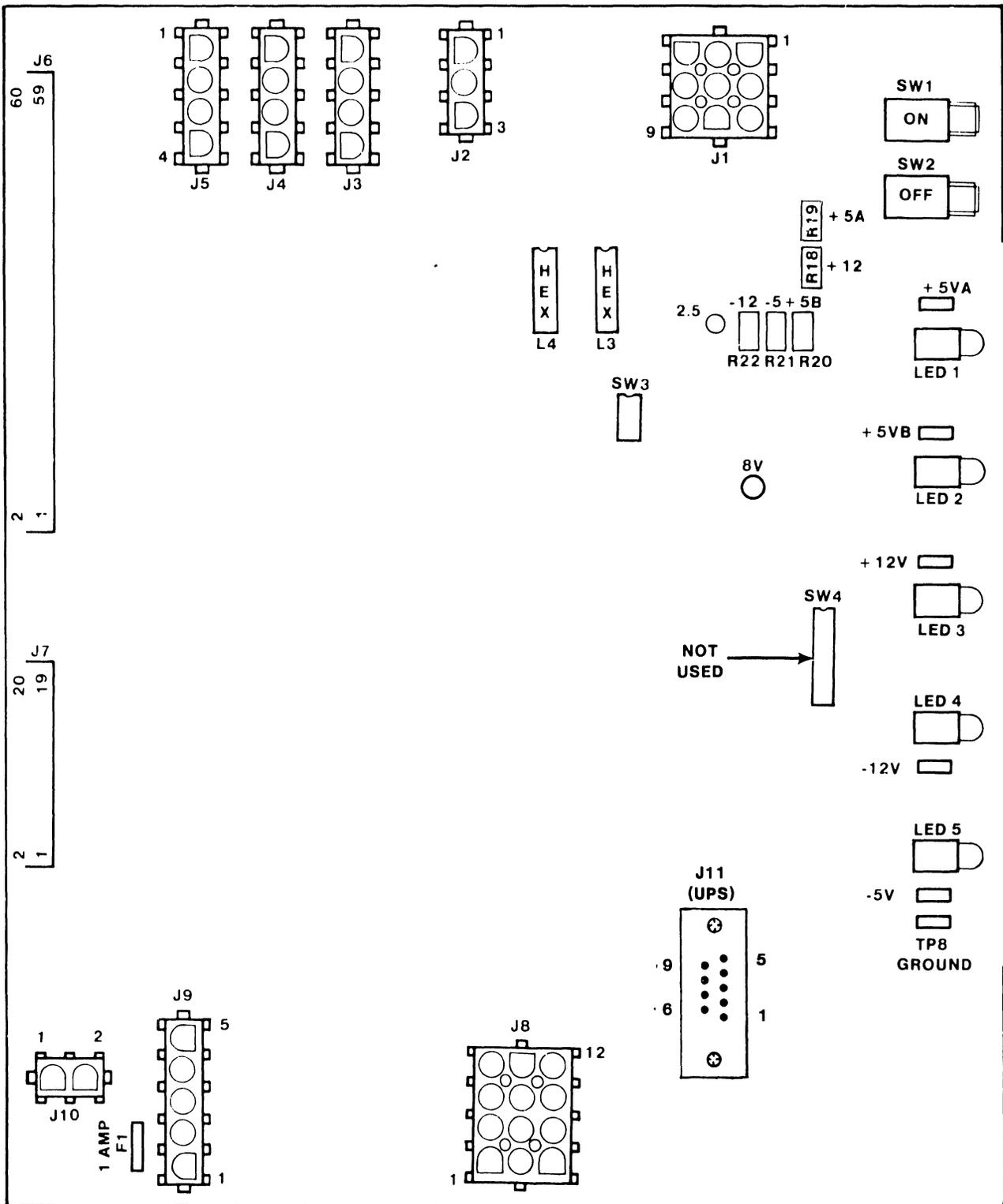
Figure 3-3. Power Supply Controller Board

## 3.6  CONTROL PANEL

Located in the top left corner of the mainframe, the Control Panel, figure 3-4, contains four buttons and one key switch as follows: Power Off pushbutton; Power On pushbutton; System Reset pushbutton; Operator Console Reset pushbutton, and Remote Service/Remote Admin./Normal Control/Control Lock switch.

### 3.6.1  POWER ON/OFF PUSHBUTTONS

Pressing the Power On pushbutton causes the Power Supply Controller to energize the switching power supplies. Pressing the Power Off pushbutton causes the Power Supply Controller to deenergize the switching power supplies.

### 3.6.2  SYSTEM RESET PUSHBUTTON

The System Reset pushbutton, when pressed, resets the system, clearing main memory and entering Control Mode.

### 3.6.3  OPERATOR CONSOLE RESET PUSHBUTTON

The Operator Console Reset pushbutton, when pressed, resets only the SCU, clearing SCU memory. It does not affect the CPU mainframe. It also resets the Z80 CPU on the SCU Local Comm. Processor. The Z80 then starts executing from memory location 0000.

### 3.6.4  KEY SWITCH

The 4-position Control Panel key switch controls the following functions:

a.  Remote Service position permits running remote diagnostics, running off-line DCS diagnostics, viewing the SCU error log, and other service mode functions.

b.  Remote Admin. position permits the Remote System Administrator Facility features to be run. Other users can log on and run any available VS functions. It also allows entry into offline diagnostics.

c.  Normal Control permits all Control Panel controls to function once power is applied. All SCU functions can be run, as well as all Operator Console functions. Users can log on and run any available VS functions.

d.  Control Lock disables Power On when the system is powered off. No SCU tasks can be run from the Operator's Console, but system activity can be monitored. Other workstation users can log on and run any available VS functions. The key can be inserted and removed in this position only.
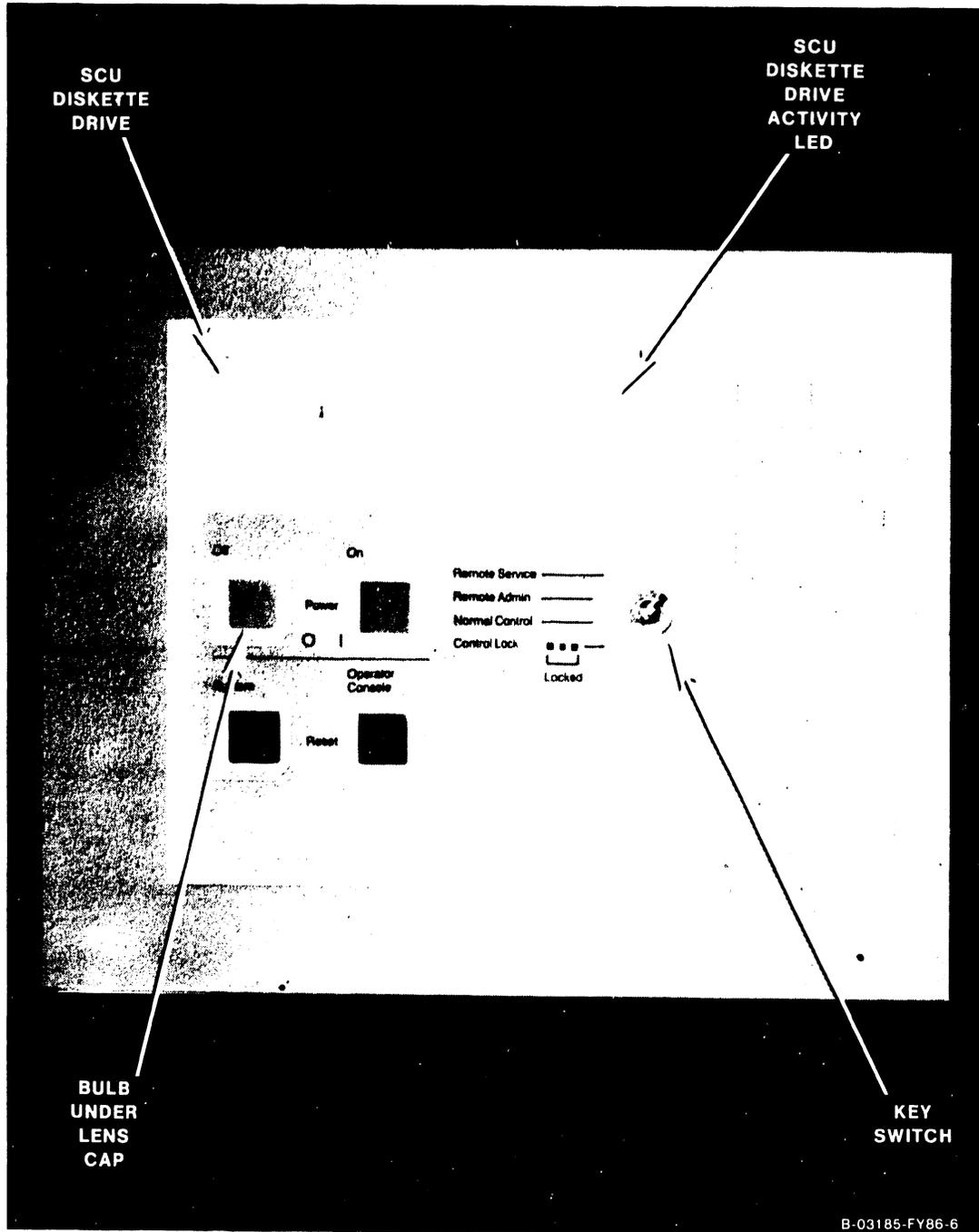
Figure 3-4.  Control Panel And Diskette Drive

B-03185-FY86-5
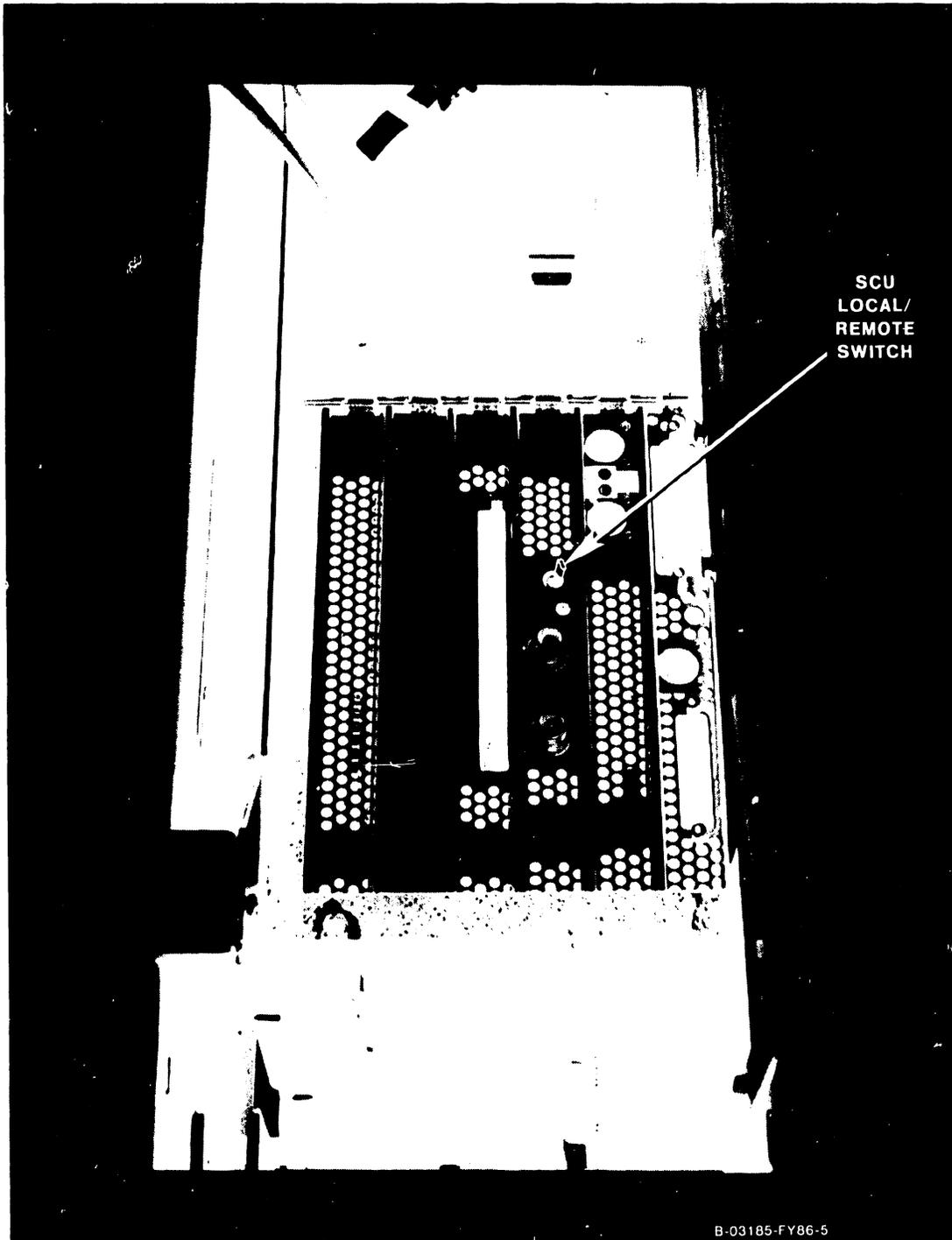
Figure 3-5.  SCU Local/Remote Switch

## 3.7 MAIN MEMORY SIZE

Memory can range in size from a minimum of 4 megabytes to a maximum of 16 megabytes, using 256K byte x 1-bit RAM chips. Each main memory board contains either 4 megabytes half-loaded (210-8703), or 8-megabytes fully loaded (210-8703-1).

### 3.7.1 MAIN MEMORY SIZE SELECTION

The Memory Control Unit (MCU) board has an 8-position jumper block, of which five positions are used to determine the maximum size of main memory. Refer to Section 7 for the jumper locations and configurations. Incorrect altering of the jumpers, or altering of the jumpers without adding the correct number of memory boards, can result in CP hang-ups and loss of data. Adding a board without altering the jumpers results in no change in apparent memory size to the CP.

Each main memory board also contains a 8-position jumper block used to determine whether the board is half-loaded or fully loaded with 256K byte x 1-bit RAM chips. Refer to Section 7 for the jumper locations and configurations.

## 3.8 IOC SWITCHES

The IOCs do not have the Bus Adapter and I/O slot selection DIP switches that are used on the VS-85/VS-100. Each IOC has an Identification (ID) Register that is set by the position of the IOC in the backplane. The CPU reads the ID Register to determine the type and position of the IOC.

The only switch common to each IOC is a 4-position diagnostic DIP switch. Refer to Section 7 for the normal switch settings and Section 6 for the switch functions and test positions.

The 23V98 Disk Drive IOC does have two 8-position disk device type DIP switches; the 23V96 Multiline TC IOC has an 8-position port select DIP switch for loopback tests; and the 23V79 CIU BLANC IOC has an 8-position CIU Functions DIP switch. Refer to Section 7 for the switch settings.

BALANCE ADJUSTMENT POT

LEVEL ADJUSTMENT POT

TEST POINT

FO INTRUSION ALARM
RELAY CONNECTOR

FO INTRUSION ALARM
SENSITIVITY SLIDE SWITCH

CARRIER DETECT
LED INDICATOR
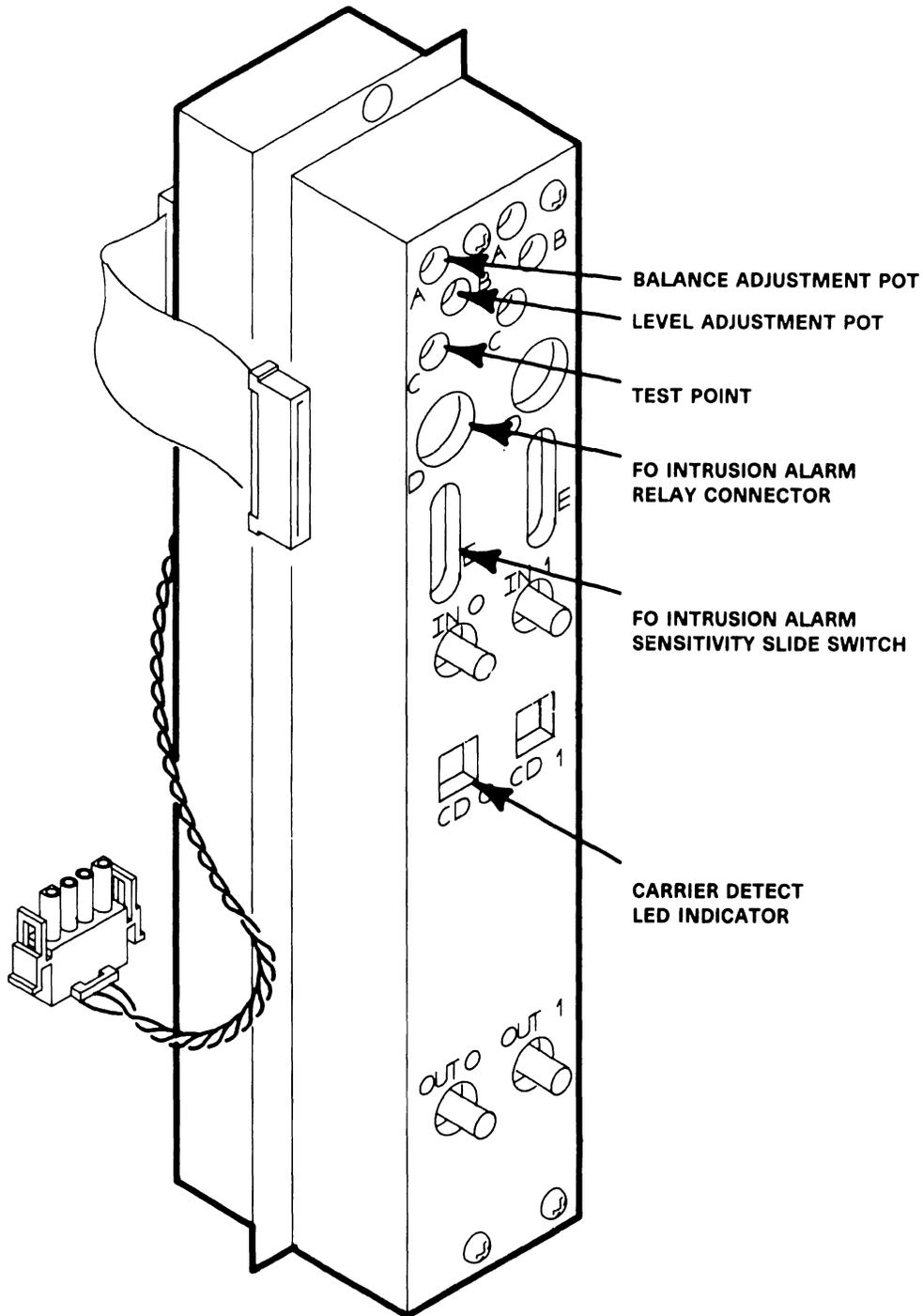
B-03713-FY87-1

**NOTE**

For an explaination of controls and indicators
for the FiberWay Active Port Assembly, refer to
the Remote Cluster Switch and Fiber Optic Active
Port Assembly Product Maintenance Manual.

**Figure 3-6. FiberWay Active Port Assembly Controls and Indicators**
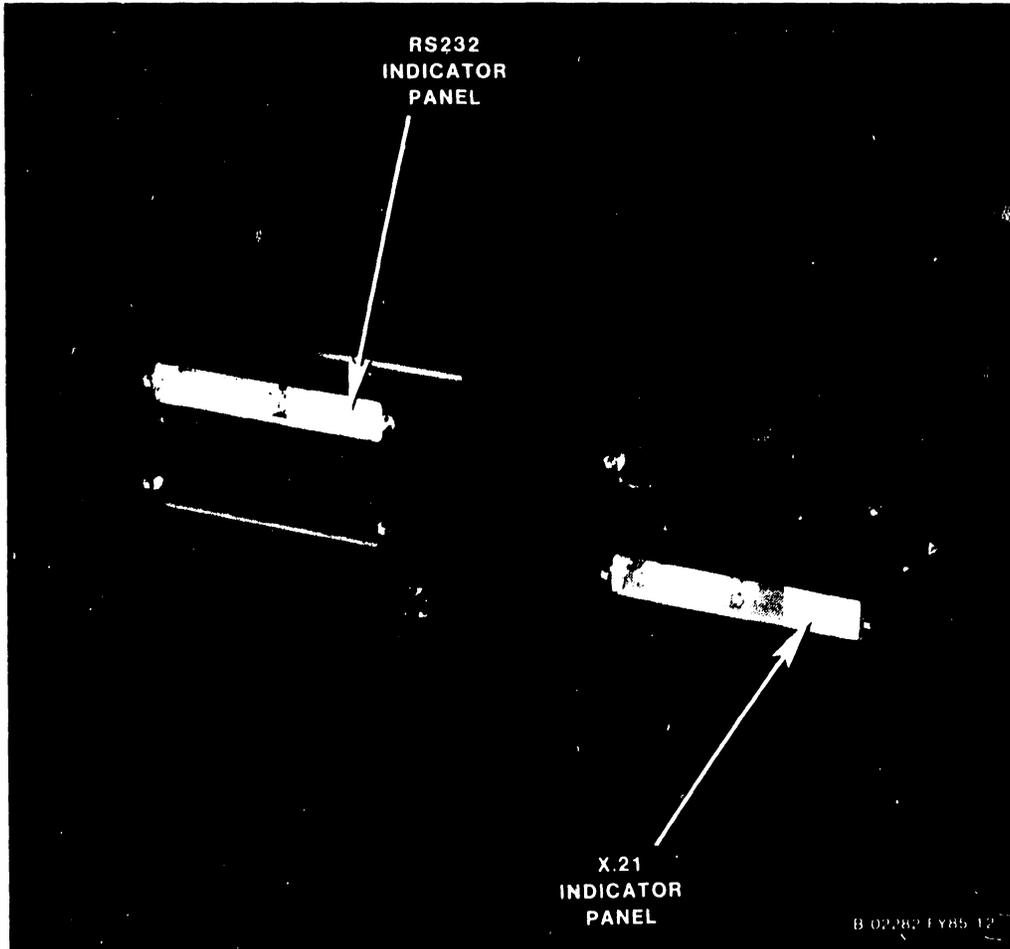
Figure 3-7. Multiline TC Back Panel Indicators
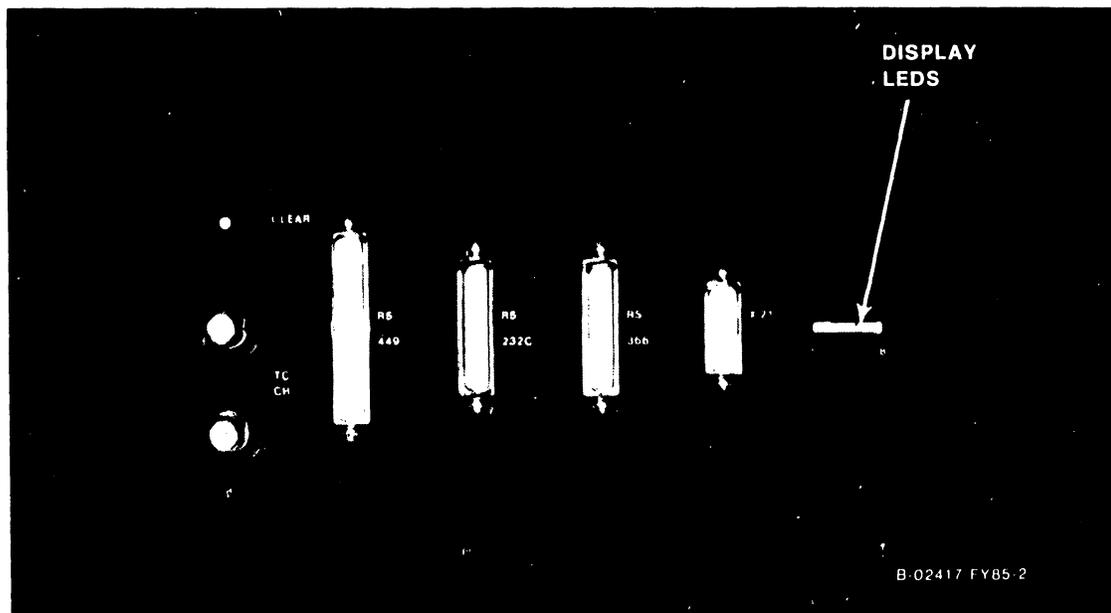
Figure 3-8.  6550 Gate Array TC Back Panel Indicators

# SECTION
# 4
# OPERATION

# TABLE OF CONTENTS

**SECTION 4    OPERATION**                                                                **Page**

# LIST OF ILLUSTRATIONS

**Figure**      **Title**                                                                **Page**

# SECTION 4

# OPERATION

## 4.1 GENERAL

This section details the power-up, IPL, and power-down procedures for the VS-7100.

## 4.2 IMPORTANCE OF FOLLOWING POWER UP OR DOWN PROCEDURES

The following summary describes general rules that must be followed when powering a VS-7100 system up or down:

- Always power the mainframe up before powering up disk drives and tape drives. Always power the mainframe down after powering down the disk drives and tape drives. Failure to follow this procedure can result in disk or tape VTOC damage or data loss.

- When powering down, the system must be in Control Mode.

The Volume Table of Contents (VTOC) resides at the beginning of each disk pack. If the VTOC is damaged, two conditions may occur: I/O errors occur upon IPL and the VS Workstation Emulation - Initialization In Progress screen remains displayed. Although many of the original files may remain intact, the VTOC is inaccessible.

### NOTE

Crash-tolerant or media-tolerant volumes can help protect VTOC integrity.

In addition to this VTOC integrity problem, other conditions may cause the writing of random blocks of data to the disk. These conditions include power failures, surges, or fluctuations, or a possible hardware malfunction.

## 4.3 POWER-UP PROCEDURES

1.  Power up all workstations and printers.

2.  Turn ON the mainframe ac On/Off circuit breaker.

3.  Make sure the Control Panel key switch is in Normal Control position.

4.  Power up the mainframe and the SCU by pressing the Control Panel On pushbutton, located above the diskette drive door.

5.  Power up the disk drives.

## 4.4  IPL PROCEDURES

1.  Press the System Reset pushbutton and then press the Operator Console Reset pushbutton.

2.  After a pause, the SCU start-up sequence is invoked and start-up messages appear on the SCU screen:

    **"WANG SUPPORT CONTROL UNIT REV. X.XX"**
    **"01 Start From Winchester"**

3.  Followed by:

    **"Wang Support Control Unit - BIOS X.XX"**
    **"MS-DOS Version X.XX"**

```
┌─────────────────────────────────────────────────┐
│                                                   │
│                     WANG                          │
│                                                   │
│                System Console                     │
│                                                   │
│        Copyright Wang Laboratories, Inc., 1987    │
│                                                   │
└─────────────────────────────────────────────────┘
```

4.  The Console Processor Menu screen then appears.

```
┌──────────────────────────────────────────────────────────────┐
│                                                                │
│               <<< System in Control Mode >>>                   │
│                                                                │
│               *** Wang VS System Console ***                   │
│                                                                │
│   SYSCON Jersion X.XX        11:06 AM        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   │
│                                                                │
│                                                                │
│   (5)  AUTO IPL                           (12) SET Console Defaults
│   (6)  RSAF Functions                     (13) SET Time and Date
│                                                                │
└──────────────────────────────────────────────────────────────┘
```
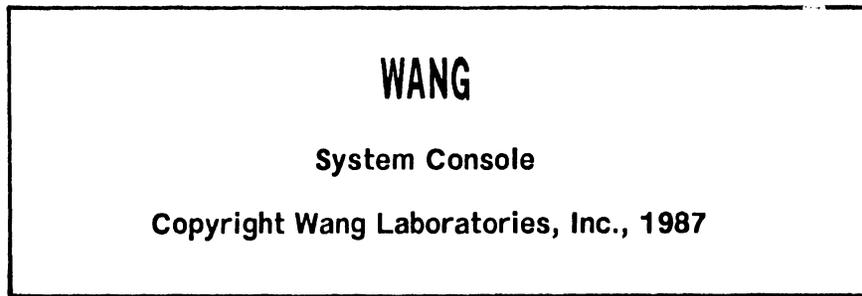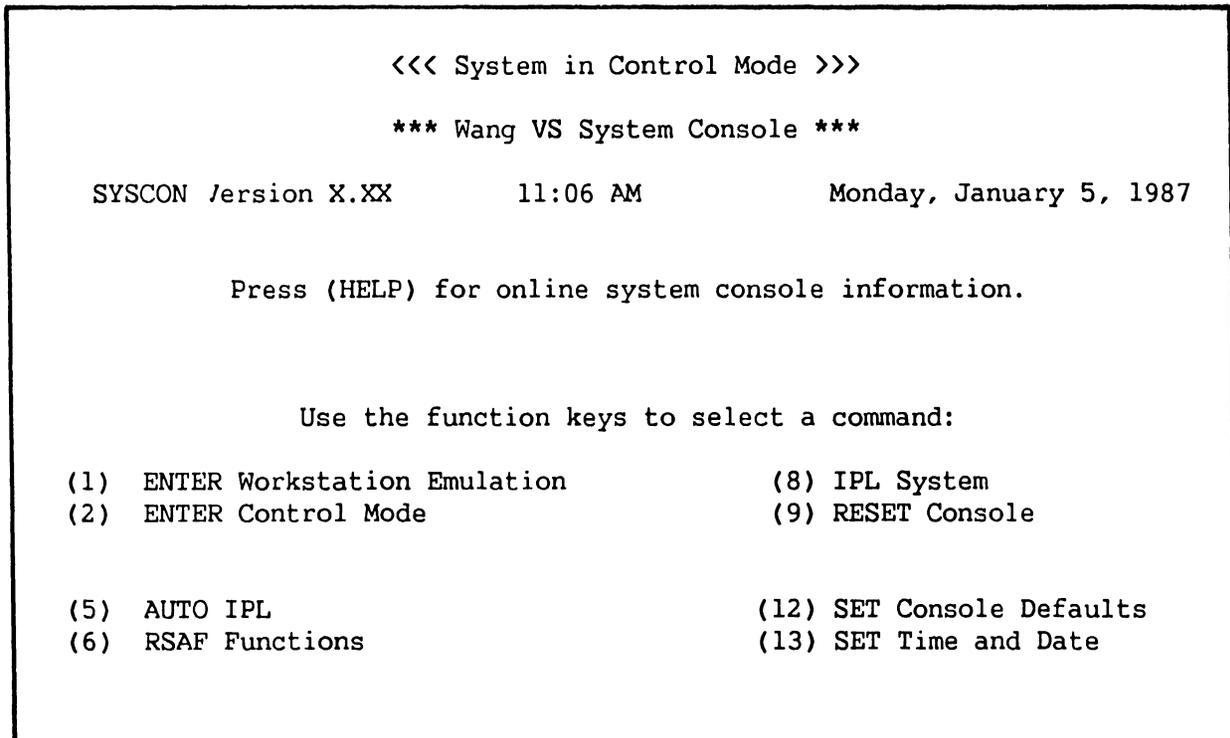
Figure 4-1.  Console Processor Menu Screen

NOTE

The functions that the key switch allows in any
one of the four key switch positions are high-
lighted on the Console Processor Menu screen.

5.    If necessary, press HELP for an explanation of the PF key functions.

6.    a.   Press PF5 (AUTO IPL). This message appears:

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

b.   Press RETURN. (If the console defaults need modifying, or if the
     CPU code has not been loaded, a CPU or IPL error may appear. Go
     to step 7. If there are no changes necessary, or no CPU or IPL
     errors appear, go to step 11.)

7.    Press PF12 (SET Console Defaults). The System Console Default screen
      appears.

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

                   *** VS System Console Defaults ***


   Select a PF key to perform the indicated function:


   _____


   Auto IPL device                 IPLDEV   = R 0100
   CPU microcode filename          CPUCODE  = /SCU/OBJ87159.CP8
   FPU microcode filename          FPUCODE  = /SCU/FPUMCA59.MEM
   Soft-Boot microcode filename    SBCODE   =
   WS emulator options             WSOPTION = -PC
   Pass console Date/Time to VSOS  TIMEDATE = Y
   Warning message before a reset  WARNING  = Y
   Main memory dump support        MMDUMP   = N


   _____


   (9) Modify Defaults     (10) Load System Microcode        (16) Exit
```

Figure 4-2.  System Console Default Screen

a. If defaults are incorrect, press PF9 (Modify Defaults), make corrections as shown in figure 4-2, press RETURN, and/or:

## NOTES

1. For CPU microcode file without FPU support, enter /SCU/OBJ87059.CP8

2. For CPU microcode file with FPU support, enter /SCU/OBJ87159.CP8

3. For FPU microcode file, enter /SCU/FPUMCA59.MEM

b. Whether defaults were corrected or not, press PF10 (Load System Microcode).

8. Press PF16 (Exit), and the Console Processor Menu screen (figure 4-1) reappears.

9. Press PF5 (AUTO IPL). This message appears:

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

10. Press RETURN.

11. The Workstation Initialization screen, figure 4-3, appears.

```
                              Wang
                               VS
                        Workstation Emulation
                          Version X.XX

                  Initialization in Progress - Please Wait
```
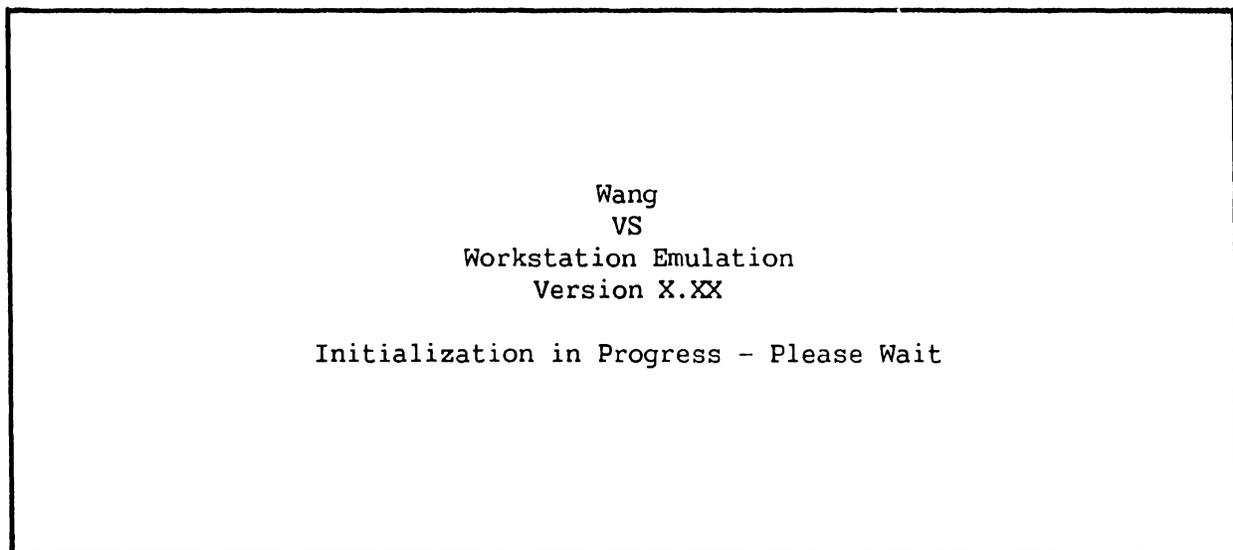
**Figure 4-3. Workstation Initialization Screen**

12. The SYSGEN Configuration File screen appears.

```
***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 use, if any

                   COMMFILE = ********
                   COMMLIB  = @SYSTEM@

Inhibit logons at all workstations?           LOGONS = NO■
    Load Micro Code to all devices?           LMCODE = NO■
Inhibit dumping continuable halts?            CMDUMP = NO■
```

**Figure 4-4. SYSGEN Configuration File Screen**

**NOTE**

If the IPL was unsuccessful and an "IPL failed"
message is received, refer to paragraph 9.9.3,
IPL Errors

13.  a.  On the SYSGEN Configuration File screen, enter the names of the
         configuration files and the system library to be used. The field
         for the communications configuration file is blank. Fill in the
         communications configuration file field only if communications
         are going to be used. To change one of these values, move the
         cursor to the appropriate field and enter in the new information.
         Then, press RETURN.

**NOTE**

If the system is being IPLed for the first time,
the default values of @CONFIG@ and @SYSTEM@ are
used for the configuration file and system li-
brary, respectively. After IPLing for the first
time, configuration files can be created using
GENEDIT. Refer to the VS Software Bulletin Re-
lease 7.12.

b.  After the values have been entered, the VS-7100 stores them in a start-up file. At the next IPL, the system displays the stored values and allows them to be changed.

c.  The prompt "Inhibit logons at all workstations?" allows workstation logons to be inhibited. If "YES" is entered, only the SCU user can log on. The default value is "NO", which allows logons at all workstations, which were enabled before this IPL.

d.  The prompt "Load Micro Code to all devices" lets microcode be loaded to each workstation (including remote workstations) as part of the IPL procedure. If "Yes" is entered, microcode is loaded to each workstation and the IPL process is significantly slower. This option is used when a workstation is hung up or when the workstation configuration has been changed. The default value is "No".

e.  The prompt "Inhibit dumping continuable halts" allows disabling of the Continuable Dump for errors that do not require reIPL. If "Yes" is entered, Continuable Dumps which do not reIPL the system are not performed and system processing continues with the system error in effect. If "No" is entered, all Continuable Dumps occur. The default value is No. Refer to Section 6 for more information on the Continuable Dump.

14. Press RETURN when finished with the SYSGEN Configuration File screen. (Or, to bring up a minimum configuration of one workstation [W/S0] and one disk, without changing the default values, just press PF1.)

**NOTE**

The IPL procedure automatically activates any remote workstations that have been configured via the remote workstation parameters in the GENEDIT procedure.

15. After pressing RETURN from the SYSGEN Configuration File screen, the VS-7100 checks to determine if any of the critical operating system components are obsolete or incompatible. If no problems are detected, the IPL continues and the message **"System Generation in Progress"** appears on the SCU screen.

a.  If incompatibilities exist that can cause problems, the IPL is stopped and a warning message is displayed by @SYSGEN@.

16. The message **"I/O Subsystem Load in Progress"** appears on the SCU screen.

17. a.  If the SCU real time clock is not usable, the date and time screen appears. Enter the correct date and time and press RETURN.

b.  This screen also allows changing the amount of memory available for use. The default value is the total amount of physical memory for the system. To change the value, move the cursor to the field, enter the new value, and press RETURN.

18. The message **"System Initialization in Progress"** appears on the SCU screen.

### NOTE

In the event of an IPL/Sysinit error that does not appear on the IPL screen (e.g. the system does not complete the IPL and hangs), enter Enhanced Control Mode (figure 6-18) and check low memory location Hex F00. Additional IPL error messages will be displayed in ASCII code at this location. (This applies to OS 7.1X.XX, or higher.)

The VS-7100 is now initialized and ready for operation. VS workstation emulation is running on the SCU and the Operator's screen is displayed. To log on from the SCU;

1. Press PF1 and the VS Logon screen appears.

2. Enter the User ID and Password. (As this is the first time that the system has been IPLed and logged onto, use "CSG" for the User ID and leave the Password field blank.)

3. Press RETURN. The User screen is displayed.

## 4.5  STANDARD POWER-DOWN PROCEDURE

The VS-7100 can be either partially or completely powered down.

### CAUTION

It is essential to power the mainframe down after powering down disk drives and tape drives. Failure to power the system down correctly may result in disk and tape information loss.

### NOTE

Always power down all workstations before powering down the mainframe. The 4200 Series workstations cause Error 7203 (read and test data error)if they are not powered down before the mainframe. Power down the workstations and continue with the system power-down procedure.

To completely power down the system, perform the following from Workstation 0, the SCU:

1. Inhibit further logons by pressing PF6 (INTERACTIVE Tasks) or PF13 (WORKSTATIONs) from the Operator's Console Menu.

2. Notify all users to log off the system by pressing PF14 (SYSTEM Options - Broadcast SYSTEM MESSAGE). Use PF6 from the Operator's Console to verify that all users have done so.

3. Inhibit the execution of any pending background procedures by pressing PF3 (PROCEDURE Queue) on the Operator's Console Menu.

4. Press PF9 (PRINTERs) on the Operator's Console Menu to idle all printers by changing their status.

5. Press PF7 to deactivate the background task through the Control Proc Initiation command (NON-INTERACTIVE Tasks) on the Operator's Console Menu.

6. Log off from the SCU.

7. Press CONTROL, then press SHIFT and CANCEL simultaneously to exit workstation emulation. The Workstation Emulation Menu appears. Use the space bar to select "Suspend Emulation" and press EXEC.

8. The Console Processor screen appears. Press PF2, ENTER Control Mode.

9. Power down all workstations.

10. Unload the cartridge tape drive, if any, by pressing the On-line pushbutton on the front of the drive.

11. Unload the nine-track tape drives, if any, by pressing the On-line and then the Rewind pushbuttons. When the nine-track tape drive has reached its load point, press the Rewind pushbutton again and wait until it is rewound. Once rewound, finish powering down tape drives by pressing the Power pushbutton on each drive.

12. Power down all disk drives.

13. Power down the mainframe and SCU by pressing the Power Off pushbutton.

If a partial power-down procedure is being performed, the system can be left in Control Mode without powering down every device. For a partial power-down of the system, perform steps 7 and 8, and 10 through 13.

To bring a system up from a complete power-down state, follow the complete standard procedure in paragraph 4.3 for powering up the system. To bring a system up from a partial power-down state, follow the power-up procedure described in paragraph 4.3, starting with step 4.

## 4.6  POWER FAILURE PROCEDURE

Once power is restored, bring the VS-7100 back up by pressing the On pushbutton and reIPL. Follow the IPL procedure in paragraph 4.4.

# SECTION
# 5
# PREVENTIVE
# MAINTENANCE

# TABLE OF CONTENTS

## SECTION 5    PREVENTIVE MAINTENANCE

# SECTION 5

# PREVENTIVE MAINTENANCE

## 5.1 GENERAL

This section contains information on preventive maintenance for the VS-7100 including a PM schedule and test equipment required.

## 5.2 TEST EQUIPMENT

| Description | WLI P/N |
|---|---|
| Power Supply Test Jumper | 220-2342 |

## 5.3 MATERIALS

No special materials are necessary to perform mainframe PM.

## 5.4 PREVENTIVE MAINTENANCE SCHEDULE

PM for the mainframe should be performed at six month intervals, (in conjunction with a service call if no PM has been performed within six months), and is as follows:

| Item | Procedure | Notes |
|---|---|---|
| 1. Mainframe interior | Inspect | Look for dust & loose hardware. Clean. |
| 2. Air inlet panel filter | Clean | Vacuum and/or wash |
| 3. SCU (PC) diskette read/ write heads | Inspect/clean | Refer to Professional Computer manual |
| 4. SCU (PC) fan, power supply fan, card cage fans, & rear panel fans | Inspect | Replace damaged or defective fan(s). Replace power supply if fan damaged or defective. (Section 7) |
| 5. Power supply voltages | Check/adjust | Paragraph 8.3.1 |
| 6. Mainframe & peripherals | Run diagnostics | Refer to Section 6 or applicable maintenance manuals |

## 5.5 PERIPHERAL PREVENTIVE MAINTENANCE

Refer to the appropriate documents for PM procedures for all VS-7100 associated peripherals.

# SECTION
# 6
# TROUBLESHOOTING

# TABLE OF CONTENTS

## LIST OF ILLUSTRATIONS

# LIST OF TABLES

# SECTION 6

# TROUBLESHOOTING

## 6.1 GENERAL

This section provides information on diagnostics, memory dumps, power fault isolation, error log, and the service log. With these troubleshooting tools, most of the problems that occur in the system can be located and re paired. Two types of diagnostics are available in the VS-7100: off-line diag nostics which are used to test the central processor (CP), memory, and input/-output controllers (IOCs) at power-up or Control Panel reset prior to initial program load (IPL) or after board replacement; and on-line diagnostics which provide general purpose utilities and exercisers for peripherals. All diagnostics should be run before turning the system over to the customer at installation or whenever system integrity is questionable.

### 6.1.1 TEST EQUIPMENT

| Description | WLI P/N |
| --- | --- |
| 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 |

## 6.2 OFF-LINE DIAGNOSTICS

The VS-7100 off-line diagnostics are contained in an application program called the Diagnostic Control System (DCS), which runs under MSDOS in the Support Control Unit (SCU). The 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.

### NOTE

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

## 6.2.1  POWER-UP DIAGNOSTICS

At power-up (or Control Panel reset), the DCS automatically invokes the Confidence Diagnostic, which determines, to a high degree of certainty, whether the system will IPL and run. The Confidence Diagnostic consists of the CPU Unit Diagnostic and the I/O Built-in Test (BIT) Monitor.

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

If an error occurs at any point in the Confidence Diagnostic, the diagnostic halts and an error message is displayed on the SCU console, including the error code and the most likely failing field-replaceable unit (FRU).

## 6.2.2  ACCESSING DCS DIAGNOSTICS

The DCS diagnostics are accessed from the Wang VS System Console Menu. See figure 6-1. The System Console Menu screen appears at power-up after the SCU software is loaded.

```
                    *** 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


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

Figure 6-1.  System Console Menu Screen

**NOTE**

> The position of the Control Panel key switch de-
> termines which of the items in the above menu are
> available. Available items will be highlighted. To
> access off-line diagnostics, the key must be in
> the "Remote Service" position.

The System Console Menu may also be reached by the following method:

1.  Press CONTROL then SHIFT + CANCEL simultaneously from the VS Opera-
    tor's Console, VS Command Processor Menu, or the VS Logon screen to
    exit workstation emulation.

2.  The Workstation Emulation Menu screen appears. (See figure 6-2).

3.  Space down to "Suspend Emulation" and press EXEC.

4.  The Wang VS System Console Menu screen appears.

```
                        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
```
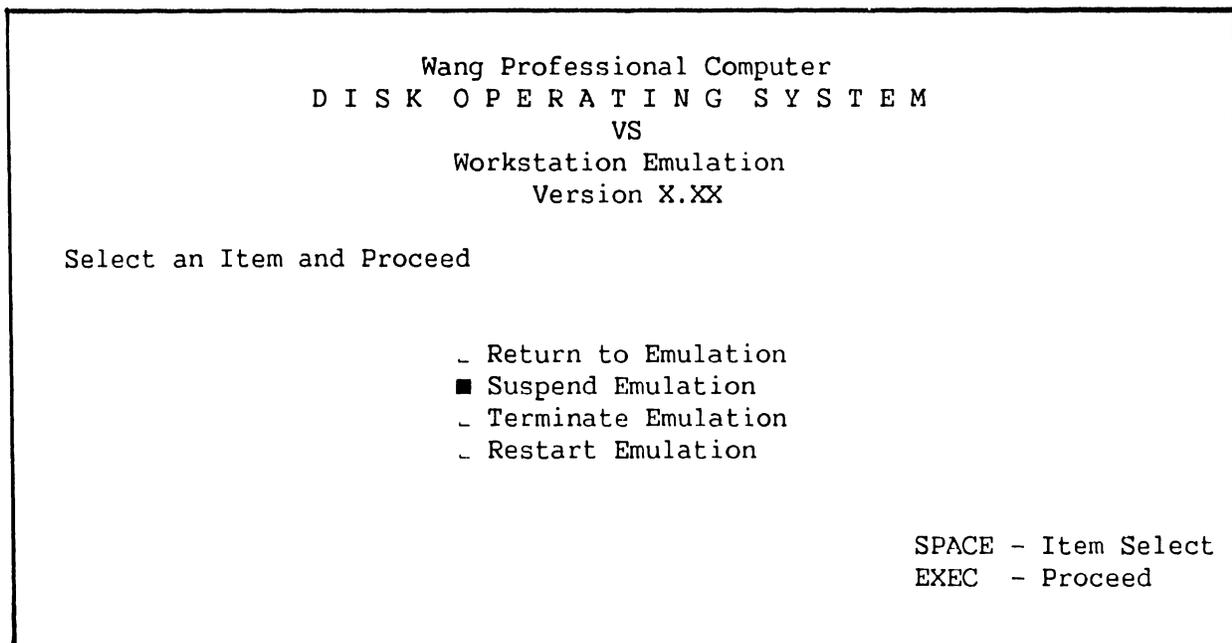
Figure 6-2. Workstation Emulation Menu Screen

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 fol-
lowing steps:

1.  Go to the System Console Menu screen.

2.  Ensure that the key switch is in the "Remote Service" position.

3.  Enter the following 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. It is intended to discourage unauthorized personnel from enabling the full System Console Menu.

4.  Several previously undisplayed menu picks will appear. See figure 6-3. The System Console is now in the "service mode." (The service mode can be terminated by pressing PF key 10 or turning the key switch out of the "Remote Service" position.)

```
                    *** 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
```

**Figure 6-3.  System Console Menu Screen in Service Mode**

**NOTE**

It is possible that the DCS may not find the Super-Bal test file on disk. Before running the offline diagnostics, it will be necessary to change the source of the CPU Microcode File. Press PF12 (SET

Console Defaults). The System Console Default screen appears. (Figure 9-15). Press PF9 (Modify Defaults). Change the CPU Microcode File from OBJVSE.CP8 to C:/SCU/OBJVSE.CP8, and press RETURN. Press PF10 (Load System Microcode), and Press PF16 (Exit) to get back to the Console Processor screen.

5. Press PF key 4 from the System Console Menu and the Diagnostics Disclaimer screen appears. See figure 6-4.

```
┌─────────────────────────────────────────────────────────────────────┐
│                                                                       │
│                                                                       │
│                    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 without 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                 │
│                                                                       │
│                                                                       │
└─────────────────────────────────────────────────────────────────────┘
```

Figure 6-4. Diagnostics Disclaimer Screen

6. From the Diagnostics Disclaimer screen, press EXEC to bring up the DCS Diagnostic Selection Menu. See figure 6-5.

**NOTE**

The AGU and FPU diagnostics require DCS Rev 2695 or higher.

```
┌────────────────────────────────────────────────────────────────────────────┐
│                                                                              │
│                  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                                                                 │
│   ⌐ VSXXX Environment                                                        │
│                                                                              │
│                                                                              │
│                                           SPACE  - item position             │
│                                           INSERT - select                    │
│                                           DELETE - deselect                  │
│                                           SHIFT+INSERT - hex #               │
│                                           EXEC   - proceed                   │
│                                                                              │
│   HELP is available                                                          │
│                                                                              │
└────────────────────────────────────────────────────────────────────────────┘
```
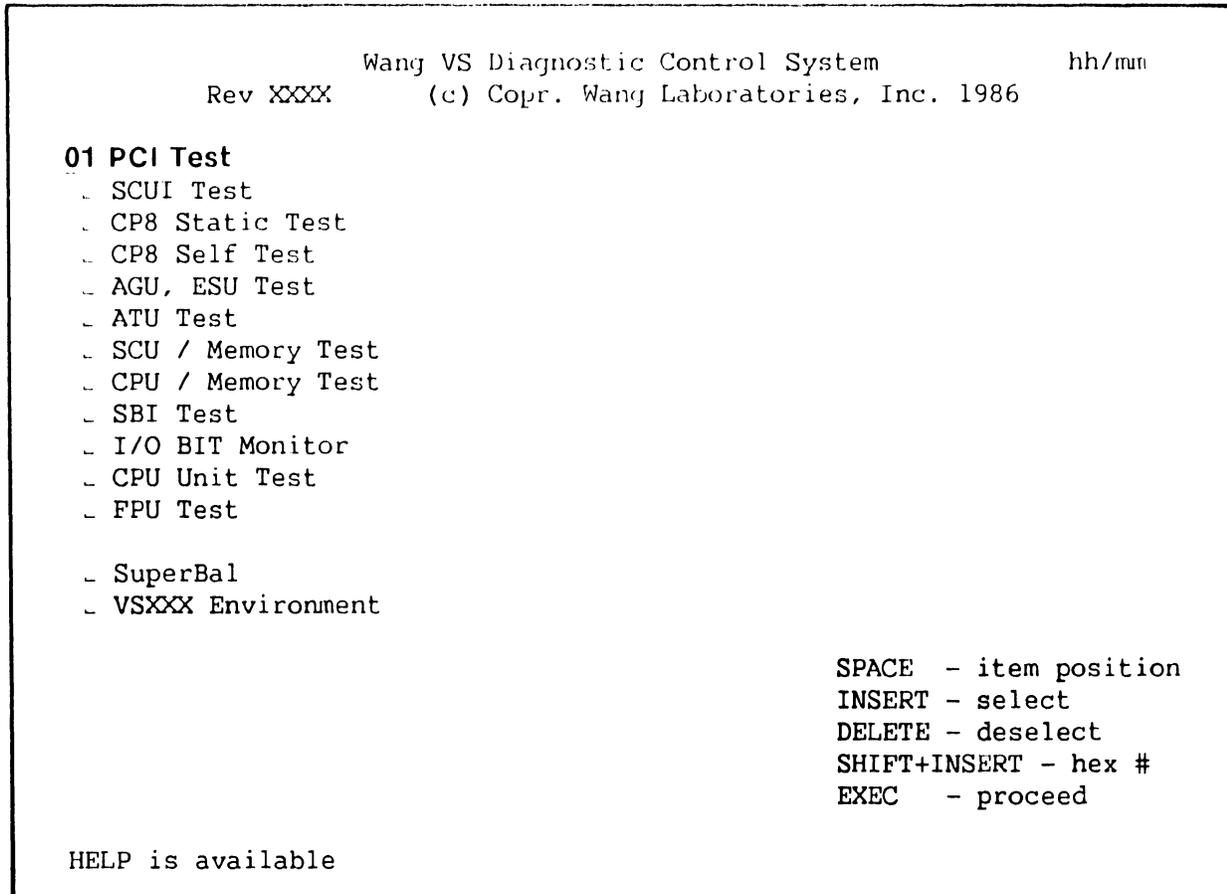
**Figure 6-5. DCS Diagnostic Selection Menu Screen**

## 6.2.3 RUNNING DCS DIAGNOSTICS

### NOTES

1. 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 the VS-7100 series.
2. For best results, run the diagnostics in the order in which they are listed on the menu.

To choose a particular diagnostic from the DCS Menu (figure 6-5 above), position the cursor next to the desired diagnostic using the SPACEBAR, press SHIFT+INSERT to select the diagnostic and to enter the element value. (Both will be highlighted).

Press EXEC t) run the diagnostic. More than one diagnostic or all diag
nostics 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 dehighlighted 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. Also use SHIFT + CANCEL to exit the DCS program from the
selection menu.

### 6.2.3.1 HELP Menu

The DCS HELP Menu (figure 6-6 below) is an operator aid that allows the
user to display the DCS help text file, display the currently executing diag-
nostic'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. The 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
```

Figure 6-6. DCS HELP Menu Screen

### 6.2.3.2 DCS Test Screens

Once a diagnostic is selected and EXEC is pressed, a screen specific to
that diagnostic is displayed. This screen provides information including the
sequence number, the diagnostic rev 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 Selec-
tion menu. A possible diagnostic screen is shown below in figure 6-7.

```
┌─────────────────────────────────────────────────────────────────────┐
│                                                                       │
│              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                                                   │
└─────────────────────────────────────────────────────────────────────┘
```

**Figure 6-7. Possible DCS Diagnostic Screen**

The row of boxes on the third line of the screen 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. |

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

| PF KEY | Function | Description |
| --- | --- | --- |
| 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. |
| 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. |

### 6.2.3.3 IOC Diagnostic Switch Settings

Each VS-7100 IOC board is equipped with a 4-position diagnostic DIP switch which is used in conjunction with the I/O Built-in Test (BIT) Monitor. The switch settings and functions are shown below in figure 6-8.

NOTE

For normal BIT operation, all switch positions
should be OFF (left).

NO READ
HALT ON ERROR
NOT USED
NOT USED

READ BANK
LOOP ON ERROR
NOT USED
NOT USED
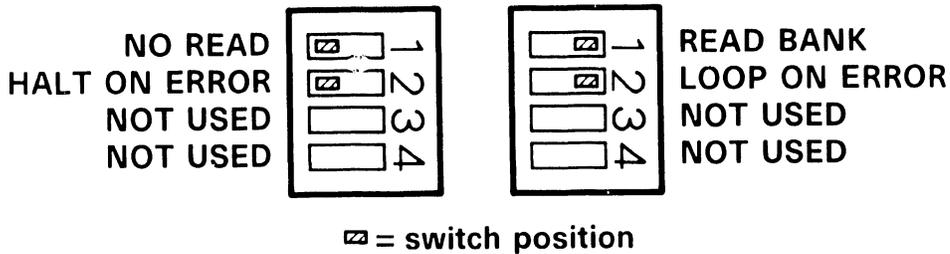
▨ = switch position

B 03063 1 86 1

**Figure 6-8. IOC 4-Position Diagnostic Switch Settings**

### 6.2.3.3.1 Multiline TC IOC Diagnostic Switch Settings

The Multiline Telecommunications (MLTC) board contains an 8-position
switch (in addition to the 4-position diagnostic switch) which is used in
conjunction with the BIT. All positions of the 8-position switch must be clos-
ed (ON) to execute normal BIT routines. See figure 6-9.

Two modes of operation for the Multiline BIT are selectable via the 8-pos-
ition switch: Single Channel Mode and Burn In Mode.

Single Channel Mode allows the testing of one channel at a time. This mode
requires that the correct loopback connector plug be installed on the channel
being tested: RS-232 Loopback Connector - WLI P/N 421-0025, RS-366 (ACU) Loop-
back Connector - WLI P/N 420-1104, or X.21 Loopback Connector - WLI P/N
421-0010.

The pin-out for Loopback Plug WLI P/N 421-0025 is as follows:

| From Pin | To/From Pin | To/From Pin | To/From Pin |
|----------|-------------|-------------|-------------|
| 2 | 3 | | |
| 4 | 5 | 22 | |
| 6 | 8 | 20 | |
| 11 | 15 | 17 | 24 |
| 12 | 13 | 19 | |
| 14 | 16 | | |

Burn-In Mode repeatedly executes the BIT tests until an error is encount-
ered or the BIT is terminated by the user. To select Burn-In Mode, open switch
position 8 and close all other switch positions. This mode requires 16 chan-
nels (any type) with loopback plugs installed in each channel.

| SW8 | SW7 | SW6 | SW5 | SW4 | SW3 | SW2 | SW1 | | |
|-----|-----|-----|-----|-----|-----|-----|-----|---|---|
| | | | | Closed | Closed | Closed | Closed | Select Port 0 | (If 5 Open) |
| | | | | Closed | Closed | Closed | Open | Select Port 1 | ( " ) |
| | | | | Closed | Closed | Open | Closed | Select Port 2 | ( " ) |
| | | | | Closed | Closed | Open | Open | Select Port 3 | ( " ) |
| | | | | Closed | Open | Closed | Closed | Select Port 4 | ( " ) |
| | | | | Closed | Open | Closed | Open | Select Port 5 | ( " ) |
| | | | | Closed | Open | Open | Closed | Select Port 6 | ( " ) |
| | | | | Closed | Open | Open | Open | Select Port 7 | ( " ) |
| | | | | Open | Closed | Closed | Closed | Select Port 8 | ( " ) |
| | | | | Open | Closed | Closed | Open | Select Port 9 | ( " ) |
| | | | | Open | Closed | Open | Closed | Select Port 10 | ( " ) |
| | | | | Open | Closed | Open | Open | Select Port 11 | ( " ) |
| | | | | Open | Open | Closed | Closed | Select Port 12 | ( " ) |
| | | | | Open | Open | Closed | Open | Select Port 13 | ( " ) |
| | | | | Open | Open | Open | Closed | Select Port 14 | ( " ) |
| | | | | Open | Open | Open | Open | Select Port 15 | ( " ) |

Closed ——————————————————————— Deselects single
                                channel mode.
Open ——————————————————————————— Selects single chan. mode
                                (Sws. 1 → 4 select chan.)

———————————————————————————————— Not used

Closed ————————————————————————————— Deselects burn-in
Open ——————————————————————————————— Selects burn-in

**Figure 6-9. Multiline TC IOC 8-Position Diagnostic Switch**

### 6.2.3.3.2  Gate Array TC Controller Loopback Test Switch Settings

**CAUTION**

Do NOT run the X.21 loopback test with the RS-449
loopback connector in place. Do NOT run the RS-449
loopback test with the X.21 loopback connector in
place. Failure to observe this caution may result
in severe damage to the board.

SW1, an 8-position DIP switch on the Gate Array Telecommunications (GATC) controller, is used to enable loopback testing and to select the interface(s) to be used for loopback testing. Refer to table 6-2 for appropriate switch settings.

### Table 6-2. GATC Loopback Diagnostic Switch Settings

| SWITCH POSITION | | | | | | | | FUNCTION |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | RS-232-C external loopback |
| 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | RS-232-C/RS-366 external loopback |
| 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | RS-449 external loopback |
| 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | RS-232-C/RS-366/RS-449 external loopback |
| 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | X.21 external loopback |
| 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | RS-232-C/RS-366/X.21 external loopback |

1 = switch closed; 0 = switch open

### NOTE

1.  If loopback test is selected (switch 8 in "1" closed position), ensure that appropriate loopback connectors are installed.

2.  When performing external RS-232-C loopback test, shunt P1 on the 210-8712 board (R1) must be in the NULL/LOOPBACK position. If it is not, the test will fail. For R0 boards, the CLK0 pin must be reconnected with a short jumper wire. Refer to schematics.

Use only the following loopback connectors for the GATC:

-   RS-232-C (WLI P/N 420-1041)
-   RS-232-C/RS-366 (WLI P/N 420-1041)
-   RS-449 (WLI P/N 270-3193)
-   X.21 (WLI P/N 421-0010)

### NOTE

An option for external loopback testing on powerup can be exercised provided that SW1 switch settings are correct and loopback connectors are installed prior to power-up or system reset.

### 6.2.3.3.3 CIU BLANC IOC Switch Settings

For normal power-up BIT switch settings, refer to Section 7.

a. Off-line BLANC IOC testing - set the switch at L272 on the 210-8392-A BLANC board as shown in figure 6-10 and execute the I/O Bit Monitor from the DCS Diagnostic Selection Menu, figure 6-5. The monitor will display the CIU slot location. Error codes are given in table 6-4.
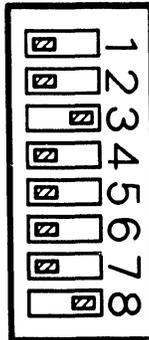


**▨** = switch position

**Figure 6-10. Switch L272 Settings For CIU BLANC IOC Off-line Test**

b. Off-Line CAB IOC testing - set SW1 on the BLANC IOC as shown in figure 6-11 and execute the I/O Bit Monitor. This will test the BLANC, CAB, and the 8-bit bidirectional bus between the boards.
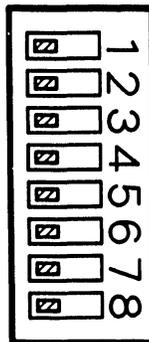


**▨** = switch position

**Figure 6-11. Switch L272 Settings For CIU CAB IOC Off-line Test**

c. Off-Line Modem testing - set SW1 on the BLANC IOC (figure 6-12). Connect either a 40 db loopback test pad, consisting of two 20 db pads (WLI P/N 336-2002) and one 1-ft cable (WLI P/N 220-0314), or a cable simulator (WLI P/N 190-0744) to the transmit and receive connectors of the modem. Execute the I/O Bit Monitor and let the monitor to run for at least three complete passes. Error codes are given in table 6-4.

**CAUTION**

Do NOT run the external loopback test with live WangNet cables connected to the modem. The test will cause the WangNet contention fields to drop out of synchronization.
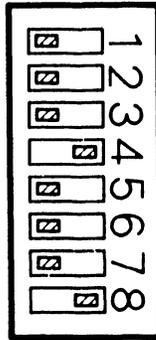
⊠ = switch position

B 03063 1 Y86 2

**Figure 6-12. Switch L272 Settings For External Loopback Test**

## 6.2.4  OFF-LINE DIAGNOSTICS ERROR MANAGEMENT

When an error occurs while the off-line diagnostics are running, the DCS displays the following additional information on the diagnostic screen:

• Error Code – a six-character code (3 bytes) consisting of the diagnostic number, the test number, and the error code.

• Failing Unit – the three most likely defective field-replaceable units (FRUs), listed in descending order of probability.

• Detailed Error Message

In addition, the DCS log will be updated and the error count will be incremented (unless DCS is looping on error). If Stop on Error is selected, the DCS will stop and wait until PF key 6 (continue) is pressed. When the DCS continues, it will check to see if Loop on Error is selected. If so, the error loop count will be adjusted and control returned to the diagnostic indicating loop on error. The appropriate status messages will be displayed by the DCS.

### 6.2.4.1  Intermittent Error Looping

When a diagnostic comes to the end of a test, the DCS will check to see if the diagnostic was looping on error (an error occurred and Loop on Error is set). If so, this indicates that the error did not occur again. The DCS will then initiate the Loop on Test function, display an Intermittent Loop status, and indicate to the diagnostic to loop on test. When looping on an intermittent error, the test loop count and the error loop count will be affected.

### 6.2.4.2  I/O BIT Monitor Errors

I/O BIT Monitor Diagnostic errors are indicated on the diagnostic screen by an error code and the word "fail" next to the IOC slot number. An error code which may be encountered from time to time is FFFF. This code indicates that the IOC did not respond.

When the I/O BIT Monitor does not recognize an IOC, N/A (not available) will be displayed on the I/O BIT Monitor Diagnostic screen next to the I/O slot number. If an IOC board is physically present in a slot and N/A is displayed next to its slot number, the 8086 (or associated circuitry) on the board is bad and the IOC must be replaced. Some IOC failures put garbage on the I/O bus thus causing other IOCs to fail the BIT diagnostic. The bad IOC in this case will have "N/A" next to its slot number.

### 6.2.4.2.1 MLTC IOC Loopback Test Error Codes

The following table explains error codes XX51 thru XX55, which may be encountered during the IOC loopback test. The first two digits of the error code identify the interface port number and half-panel. The table uses error code XX52 (failure in RS-232 tests) as an example.

**Table 6-3. MLTC IOC Loopback Test Error Codes**

| Error Code | Port Number | Half-panel Number |
|------------|-------------|-------------------|
| 0152 | 0 | 1 |
| 0252 | 1 | 1 |
| 0352 | 2 | 1 |
| 0452 | 3 | 1 |
| 0552 | 0 | 2 |
| 0652 | 1 | 2 |
| 0752 | 2 | 2 |
| 0852 | 3 | 2 |
| 0952 | 0 | 3 |
| 1052 | 1 | 3 |
| 1152 | 2 | 3 |
| 1252 | 3 | 3 |
| 1352 | 0 | 4 |
| 1452 | 1 | 4 |
| 1552 | 2 | 4 |
| 1652 | 3 | 4 |

### 6.2.4.2.2 GATC Control Panel LED BIT Error Display

### NOTE

If switch 8 of SW1 is ON (closed), the loop on program function is enabled, allowing for continuous looping through all of the tests in the diagnostic PROM. Run time is approximately 30 seconds. Successful completion of each loop is indicated by LED 7 ON and LED 8 flashing. LED 7 will be turned OFF after the memory tests have been completed on each consecutive loop.

**TROUBLESHOOTING**

The GATC controller assembly contains an eight-LED display that indicates the pass/fail status of the GATC BIT. The following LED display indicates a successful BIT execution:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| OFF | OFF | OFF | OFF | OFF | OFF | ON | FLASHING |

If any other combination is displayed, the BIT has failed. When an error occurs, the operating system (OS) cannot access the GATC.

### 6.2.4.2.3 CIU I/O Monitor Error Codes

**Table 6-4. CIU I/O Bit Monitor Error Codes**

| Error Code | Failing Unit |
|------------|--------------|
| X0XX | BLANC |
| X1XX | CAB |
| X2XX | Modem |

**NOTES**

1. Third digit indicates failing component.
2. X equals don't care.

### 6.2.4.3 DCS Log

The DCS log, accessed through the DCS HELP Menu, is used to keep a record of errors that occur while running the diagnostics. Two types of log entry formats are possible. The first format consists of what will automatically be logged at the occurrence of an error, including: the current time, the diagnostic name, test, error code, failing unit, and a condensed copy of what was displayed in the message area. The second format is a picture of the DCS screen at the time the error occurred. This screen will be logged when the PF 7 key is pressed.

## 6.3 ON-LINE DIAGNOSTICS

In addition to the off-line and stand-alone diagnostics described above, the VS-7100 contains several on-line programs that may be executed while the customer is running. These programs are a series of four exercisers that test the following peripherals: workstations, disk drives, tape drives, and printers. The diagnostics, along with a monitor program, are part of a VS on-line test package called "VSTEST" located in library @SYSTST@.

### 6.3.1 VS ON-LINE VSTEST MONITOR

The VS On-line Monitor is the user interface for VSTEST. The monitor runs under the control of Operating System (OS) Release 6.20 and later releases. With releases prior to Release 7.20.00, however, the monitor cannot be used to do the following:

- Test workstations and printers unless they are first released via the operator's console.

- Test the disk ECC function.

- Do seek tests on disks in shared use.

The monitor allows the user to test in either of two modes:

- Noninteractive – no user intervention is required. Once started, tests run to completion automatically.

- Interactive – user intervention required to control and monitor tests.

The advantage of the noninteractive mode is its ease of use. The advantage of the interactive mode is its list of options; it allows the user to test individual device functions. The noninteractive mode is used to test workstations, disk drives, tape drives, and printers. The interactive mode is used to test only workstations, disk drives, and tape drives. Help screens displayed while the monitor is in a particular mode relate only to that mode.

The VS On-line Monitor provides a series of screens which allows the user to initiate, control, and monitor the testing process. These screens include:

- Main Screen
- Log Program Output Screen
- Device Class Selection Screen
- System Configuration Screens
- Message Screen

### 6.3.1.1 Main Screen

The Main Screen is displayed whenever the user enters the Monitor. From it the user can go to the Log Program Output Screen, the Device Class Selection Screen, or the Message Screen. These three screens give the user access to any feature offered by the Monitor.

### 6.3.1.2 Log Program Output Screen

This screen allows the user to select options for logging messages received by the Monitor from VSTEST diagnostic programs during the testing process. From this screen the user can return to the Main Screen.

### 6.3.1.3 Device Class Selection Screen

This screen allows the user to deal with all devices at a time in one or more device classes. Options include: (1) initiate noninteractive testing, (2) cancel testing, or (3) select the class of devices for which to view the System Configuration Screens. From the Device Class Selection Screen, the user can go to the System Configuration Screens, the Message Screen, or back to the Main Screen.

### 6.3.1.4 System Configuration Screens

These screens allow the user to deal with one or more devices at a time in a single device class. Options include: (1) initiate noninteractive testing, (2) cancel testing, or (3) initiate interactive testing on one device at a time. From the System Configuration Screens the user can go to the Message Screen or back to the Device Class Selection Screen.

The following messages (table 6-5) may appear in the status columns of the System Configuration Screens. These messages provide information about the device or the test program associated with the device.

**Table 6-5. System Configuration Screen Status Messages**

| Status Message | Definition |
|---|---|
| AL | Standard ANSI-type labels (tape only). |
| CNCLNG | The program which has been testing the device is being cancelled. |
| DT | The device is detached. |
| ERR004 | The volume on which the requested test program file resides is not mounted. |
| ERR008 | The volume on which the requested test program file resides is being used exclusively by another task. |
| ERR012 | The Monitor is unable to initiate the requested test program. |
| ERR016 | The library in which the requested test program file resides cannot be found. |
| ERR020 | The requested test program file cannot be found. |
| ERR024 | Not used. |
| ERR028 | Not used. |

## Table 6-5. System Configuration Screen Status Messages (Cont'd)

| Status Message | Definition |
| --- | --- |
| ERR032 | A disk VTOC error has occurred on the volume on which the test program file resides. FDX1 and FDX2 do not agree. |
| ERR036 | A disk VTOC error has occurred on the volume on which the test program file resides. FDX2 and FDR do not agree. |
| ERR040 | The name of the file, library, or volume associated with the requested test program has been incorrectly specified. |
| ERR044 | The VTOC for the volume on which the requested program file resides is unreliable. |
| ERR048 | An attempt to scratch a procedure that spawned a test program requested at an earlier time has failed. |
| ERR052 | The requested test program is already in progress. |
| EX | Exclusive use (tape or disk). The volume may be accessed (read or written to) and dismounted by the mounting user only. This program is not the mounting user. |
| F | Fixed disk. |
| IL | Standard IBM-type labels (tape only). |
| LOADING | The requested test program is being loaded (initiated). |
| NL | No labels are present on the volume (disk or tape). |
| NM | Not mounted (disk or tape). |
| PR | Protected use (disk only). The volume may be read by any user but updated and dismounted by the mounting user only. This program is not the mounting user. |
| PRTTSK | The device (printer only) is under the control of the system printer task. It can not be determined if the device is idle, waiting for a print file, or printing. |
| R | Removable disk. |
| RLSD | The device (workstation or printer) is released from operating system control and may be acquired by any task. |
| RR | Restricted removal (disk only). The volume may be accessed (read or written to) by any user but dismounted by the mounting user only. This program is not the mounting user. |
| SH | Shared access (disk and tape). The volume may be accessed (read and written to) and dismounted by any user. |
| SL | Standard Wang VS labels (disk only). |
| SYSTEM | The device (printer only) is under the control of an unknown system task. |
| TESTING | The device is now being tested by a program initiated by this monitor. |
| TSKMGR | The device (workstation only) is under the control of the system task manager. |
| WP | The device (printer only) is under the control of the word processor printer task. |

### 6.3.1.5 Message Screen

This screen displays the messages received by the Monitor from the tes, programs. From this screen the user can return to the last screen viewed.

## 6.3.2 VS ON-LINE WORKSTATION EXERCISER (WSEX)

The VS On-line Workstation Exerciser (WSEX) is a test program that verifies proper operation of workstations by exercising workstation functions. WSEX tests both the controller and the workstation.

### 6.3.2.1 Hardware Tested

All devices which have a device class equal to "WORKSTATION" and which support normal WS I/O are supported by this program.

### 6.3.2.2 Running WSEX

WSEX operates under the control of the VS On-line Monitor, and all user interface is through the Monitor. To run WSEX, select WORKSTATIONS from the On-line Monitor Device Class Selection screen and press RETURN. Position the cursor next to the workstation(s) you wish to test on the System Configuration screen, press PF1 (Select), type a nonblank character, and press RETURN. Normally the test program requires no user interaction other than initiating the tests. However, by pressing the HELP key at the workstation under test, options are made available to terminate testing, continue with automatic testing, or enter the interactive mode which requires user intervention. See figure 6-13.

```
+---------------------------------------------------------------------+
|                                                                     |
|                  WSEX/WORKSTATION EXERCISER INTERRUPTED              |
|                                                                     |
|    PLEASE SELECT ONE OF THE FOLLOWING:                              |
|                                                                     |
|         PF1/INDENT - TO CONTINUE AUTOMATIC DISPLAY TESTS.           |
|                                                                     |
|         PF4/FORMAT - TO SELECT INTERACTIVE TESTS.                   |
|                                                                     |
|         PF16/GO TO PAGE - TO TERMINATE TESTING OF THIS WORKSTATION. |
|                                                                     |
|                                                                     |
|         THIS WORKSTATION IS CURRENTLY BEING TESTED. IF YOU WISH TO USE |
|    THIS WORKSTATION NORMALLY THEN PLEASE PRESS THE PF16 OR THE GO TO |
|    PAGE KEY. IF YOU WANT THE AUTOMATIC TESTING TO RESUME THEN PRESS THE |
|    PF1 OR THE INDENT KEY. TO TEST THE KEYBOARD AND RUN OTHER NONAUTO- |
|    MATIC TESTS THEN PRESS PF4 OR THE FORMAT KEY.                    |
|                                                                     |
+---------------------------------------------------------------------+
```

Figure 6-13. Workstation Interrupted by HELP Screen

The tests are divided into two parts: automatic tests consisting of screen display and functional tests, and interactive tests including keystroke verification and visual attribute displays.

### 6.3.2.3  WSEX Automatic Tests

1.  Screen Display Tests

    a.  Even Parity Bit Cell Test – verifies ability of every location of display memory to hold even parity data patterns.

    b.  Odd Parity Bit Cell Test – verifies ability of every location of display memory to hold odd parity data patterns.

    c.  Row Count Test – verifies that each can hold data different from another row.

    d.  Column Count Test – verifies that each column can hold data different from another column.

2.  Display Control Tests

    a.  Write and Read Tab Stops – verifies that the correct maximum number of tab stops can be programmed and that tab stops are reset correctly when reprogrammed.

    b.  Write and Read Field Attribute Characters – verifies that fields, written with various attributes and then read, are set correctly.

    c.  Write with Roll Down – verifies the ability of the workstation to correctly roll down rows and to not alter the rows above the roll down row.

    d.  Write with Erase Modifiable Field to Pseudoblanks – ensures that modifiable fields can be erased to pseudoblanks by command.

    e.  Write with Erase and Protect Rest of Screen – ensures that rows below the designated row are erased and protected by the Erase and Protect command.

    f.  Read Altered with Selected Fields – verifies that selected and only selected fields can be read with the Read Altered command.

    g.  Read and Read Altered with Blinking Fields – ensures that the link attribute changes to normal when the screen is read.

    h.  Read and Read Altered with Pseudoblanks – verifies that when modifiable fields are read, all pseudoblanks within the fields are changed to blanks.

    i.  Write Selected – ensures that data, written into selected fields in first and last rows, are changed.

     j.   Rotating Character Test – verifies that all locations of the display can hold all possible patterns of data.

### 6.3.2.4 WSEX Interactive Tests

These tests are invoked either by selecting I/A Tests from the On-line Monitor Device Class screen or by pressing the HELP key on the workstation under test and pressing either PF4 or the FORMAT key from the WSEX INTERRUPTED screen. All of the automatic tests are available from the interactive test screen in addition to the three interactive tests described below. The difference is that the user now has the choice of selecting one, several, or all of the automatic tests. Several options are also made available to the user including: loop on test, halt on error, continue on error, pause, etc. The three tests that require user intervention are:

1.   Data Entry Into Selected Attribute Test – validates data entry into fields with various attributes. The test verifies that protected fields have not been changed, upper-case only fields contain only upper case, and numeric only fields contain only numbers, "+" and/or ".".

2.   Keystroke Verification/Selected Fields Modification Test – verifies the correct recognition of function keys, confirmation of changes to field, and positioning to tab stops.

3.   Cursor Positioning Test – ensures that the cursor is correctly positioned under program control.

### 6.3.2.5 WSEX Error Codes

WSEX error codes (tables 6-6 thru 6-9) are four characters long and are divided into two subfields. The first character defines the subtest that was active at the time the error occurred, the second character defines the error type, and the last two characters are type qualifiers.

```
Error Code                      Definition of Field
    S T Q Q
    | | | |_____ Type qualifier characters
    | |_____ Type or class of error
    |_____ Active subtest
```
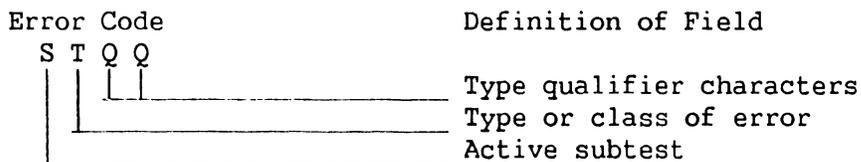
### Table 6-6. WSEX Subtest Codes

| Subtest Code | Test Name | Run Sequence |
|---|---|---|
| A | Write/Read Field Attribute Test | 6 |
| B | Write with Erase to Pseudoblanks Test | 9 |
| C | Cursor Position Test (I) | 18 |
| D | Data Entry into Selected Fields Test (I) | 16 |

Table 6-6. WSEX Subtest Codes (Cont'd)

| Subtest Code | Test Name | Run Sequence |
|---|---|---|
| E | Even Parity Display Test | 1 |
| F | Read Altered with Selected Fields Test | 11 |
| G | Read/Read Altered with Blink Test | 12 |
| H | Read/Read Altered with Pseudoblank Test | 13 |
| I | Column Count Test | 4 |
| J | Row Count Test | 3 |
| K | Keystroke Verification Test (I) | 17 |
| O | Odd Parity Display Test | 2 |
| P | Write with Erase and Protect Test | 10 |
| R | Rotating Character Test | 15 |
| S | Initial Setup Code | |
| T | Tab Stop Write/Read Test | 5 |
| U | Write with Roll Down Test | 7 |
| V | Write with Roll Up Test | 8 |
| W | Write Selected Test | 14 |

Table 6-7. WSEX Error Type Codes

| Type Code | Definition |
|---|---|
| V | System service (cannot acquire resource or inconsistent) |
| S | IOSW soft status (corrected error) |
| T | XIO check timeout error after 10 seconds |
| H | IOSW hard status (noncorrected error) |
| F | IOSW fatal status (hard error - cannot continue) |
| X | XIO return code error |
| C | Missing XIO check (never received check on XIO) |
| D | Data miscompare |

The following error codes apply to all WSEX tests. Replace the asterisk with one of the subtest codes from table 6-6.

Table 6-8. WSEX Error Codes For All Tests

| Error Code | Definition |
|---|---|
| *D00 | Data Miscompare (read after write) |
| *F00 | Fatal IOSW Error (cannot continue) |
| *H00 | Hard IOSW Error |
| *S00 | Soft IOSW Error |
| *T00 | XIO Timed out after 20 seconds |
| *X?? | XIO Return Code Error (??=decimal ret code) |

## Table 6-9. Additional WSEX Error Codes

| Error Code | Definition |
|---|---|
| CD80 | Cursor position test; cursor in wrong position |
| DD10 | Data entry test; lower-case entry in upper case field |
| DD20 | Data entry test; nonnumeric entry in numeric field |

System-related Error Codes

| | |
|---|---|
| SV00 | Get heap memory SVC failed |
| SV01 | Get heap memory SVC failed |
| SV02 | Get heap memory SVC failed |
| SV03 | Get heap memory SVC failed |
| SV04 | Get heap memory SVC failed |
| SV08 | Not a workstation at specified address |
| SV09 | Not a supported workstation at specified address |
| SV10 | Cannot reserve a workstation |
| SV20 | Device address > 255 |
| SV30 | Cannot create message port (SYSTEM getheap problem) |

### 6.3.2.6  WSEX Error Messages

WSEX error messages consist of lines of up to six fields. These fields
are: unit under test address, program identifier code, error code, program
title/function, routine or subtest that was active at the time of failure, and
error description. See the sample below in figure 6-14.

```
    UNIT ADDRESS              PROGRAM TITLE
    /    PROGRAM IDENTIFIER   /                    ACTIVE SUBTEST
    /    /    ERROR CODE      /                    /              ERROR DESCRIPTION
    /    /    /               /                    /              /
0065 WSX0 RH00 WSEX/Workstation Test, Rotating Characters, Hard Error
```

Figure 6-14.  WSEX Error Message Format

### 6.3.3  VS ON-LINE DISK EXERCISER (DISKEX)

The VS On-line Disk Exerciser (DISKEX) is a test program that verifies
proper disk operation by exercising disk drive functions. DISKEX tests both
the controller and the drive.

### 6.3.3.1  Hardware Tested

All devices which have a device class equal to "DISK" are supported by
this program. For a device with a removable volume, DISKEX will attempt to
mount a volume on that drive. If no volume is physically present, no testing
is done. Only volumes which have a standard label and which allow read/write

access to the exerciser are tested. If a device contains both a fixed and a removable volume, each is treated as a separate device.

### 6.3.3.2 Running DISKEX

DISKEX operates under the control of the VSTEST On-line Monitor, and all user interface is through the Monitor. To run DISKEX, select DISKS from the On-line Monitor Device Class Selection screen and press RETURN. Position the cursor next to the disk(s) you wish to test on the System Configuration screen, press PF1 (Select), type a nonblank character, and press RETURN. No user interaction is required once the tests have been initiated.

### 6.3.3.3 DISKEX Tests

The following tests are currently supported by the DISKEX program:

1. Seek Max/Min Test – ensures that the OS, microcode, controller, and drive support positioning of the heads on the first and last cylinders of the disk. This test also ensures that seeks to a cylinder which does not exist are detected and inhibited.

**NOTE**

Under the current implementation, this test is performed only if the volume can be remounted Bypass Label Processing.

2. Command Test – verifies data transfer commands by ensuring that the correct block and length was written and read.

3. Cylinder Address Test – performs a butterfly pattern cylinder address test (convergent/divergent) that checks the mechanical positioning hardware, the analog controlling circuits, and the digital seek circuits.

**NOTE**

Under the current implementation, this test is performed only if the volume can be remounted Bypass Label Processing.

4. Random Data Test – consists of three subtests which ensure that all blocks within the file can hold unique data, check the write/verify and read commands, and ensure correctness of randomly written and generated data by reading it and comparing it to the original data.

### 6.3.3.4 DISKEX Error Codes

DISKEX error codes (tables 6-10 thru 6-16) are four characters long and are divided into two subfields. The first character defines the subtest that was active at the time the error occurred, the second character defines the error type, and the last two characters are type qualifiers.

**Error Code**                    **Definition of Field**

S T Q Q
│ │ │ │_____ Type qualifier characters
│ │ │_____ Type or class of error
│ │_____ Active subtest
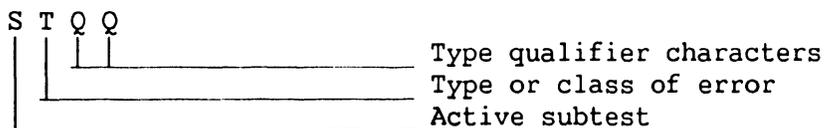
**Table 6-10.  DISKEX Subtest Codes**

| Subtest Code | Test Name |
| --- | --- |
| I | Command Test |
| D | Data Test |
| E | ECC Test |
| M | Seek to Max/Min Test |
| C | Cylinder Address Test |
| S | Initial Set Up Code |

**Table 6-11.  DISKEX Error Type Codes**

| Type Code | Definition |
| --- | --- |
| V | System service (cannot acquire resource or inconsistent) |
| S | IOSW soft status (corrected error) |
| H | IOSW hard status (noncorrected error) |
| F | IOSW fatal status (hard error – cannot continue) |
| X | XIO return code error |
| Z | XIO return code error (expected code is not 12) |
| C | Missing XIO check (never received check on XIO) |
| D | Data transfer incorrect |
| R | Rea: VTOC error |
| M | Volume remount return code error |

**Table 6-12.  DISKEX Cylinder Address Test Error Codes**

| Error Code | Definition |
| --- | --- |
| CC00 | XIO complete is missing |
| CF00 | Fatal IOSW error (intervention required) |

Table 6-12. DISKEX Cylinder Address Test Error Codes (Cont'd)

| Error Code | Definition |
| --- | --- |
| CH00 | Hard IOSW error |
| CS00 | Soft IOSW error |
| CX?? | XIO return code error (VOL XIO) |
| CM?? | Volume remount error (EXIT vol IO) |

Table 6-13. DISKEX Data Test Error Codes

| Error Code | Definition |
| --- | --- |
| DC00 | XIO complete is missing |
| DD00 | Data miscompare (read data which was not written) |
| DF00 | Fatal IOSW error (intervention required) |
| DH00 | Hard IOSW error |
| DS00 | Soft IOSW error |
| DX?? | XIO return code error (FILE XIO) |

Table 6-14. DISKEX Command ั st Error Codes

| Error Code | Definition |
| --- | --- |
| IC00 | XIO complete is missing |
| ID00 | Data miscompare (read data which was not written) |
| ID80 | Read of 1 BLK modified more than 1 BLK of memory |
| ID90 | Wrote 1 BLK but modified more than 1 file BLK |
| IF00 | Fatal IOSW error (intervention required) |
| IH00 | Hard IOSW error |
| IS00 | Soft IOSW error |
| IR?? | VTOC return code error |
| IX?? | XIO return code error (FILE XIO) |

Table 6-15. DISKEX Seek Max/Min Test Error Codes

| Error Code | Definition |
| --- | --- |
| MC00 | XIO complete is missing |
| MF00 | Fatal IOSW error (intervention required) |
| MH00 | Hard IOSW error |
| MS00 | Soft IOSW error |
| MZ?? | XIO return code should be 12, but is not |
| MX?? | XIO return code error (VOL XIO) |
| MM?? | Volume remount error (EXIT vol IO) |

Table 6-16. DISKEX System Error Codes

| Error Code | Definition |
|------------|------------|
| SV00 | Get Heap memory SVC failed (buffer 0) |
| SV01 | Get Heap memory SVC failed (buffer 1) |
| SV02 | Get Heap memory SVC failed (buffer 2) |
| SV08 | Not a disk device at specified address |
| SV20 | Device address greater than 255 |
| SV30 | Cannot create message port (SYSTEM getheap problem) |

### 6.3.3.5 DISKEX Error Messages

DISKEX error messages consist of lines of up to six fields. These fields are: unit under test address, program identifier code, error code, program title/function, routine or subtest that was active at the time of failure, and error description. See the sample below in figure 6-15.

```
     UNIT ADDRESS               PROGRAM TITLE
      /    PROGRAM IDENTIFIER   /                     ACTIVE SUBTEST
      /    /    ERROR CODE      /                     /           ERROR DESCRIPTION
      /    /    /               /                     /           /
     0065 DKX0 ID00 DISKEX/Disk Exerciser, Command Test, Data Miscompare Error
```

Figure 6-15. DISKEX Error Message Format

### 6.3.4 VS ON-LINE PRINTER EXERCISER (PREX)

The VS On-line Printer Exerciser (PREX) is a test program that verifies proper printer operation by exercising printer functions. PREX tests all daisy wheel, matrix, band, and chain train printers currently recognizable by the operating system. It also attempts to support experimental printers.

The printer exerciser program requires that at least one printer recognizable to the operating system be attached to the system. The program also requires that the status of the printer to be tested is RELEASED. Beginning with OS Release 7.3 this will be done by PREX. With prior releases, the user can release a printer from either the Command Processor Menu or the Operator's Console Menu.

### 6.3.4.1  Hardware Tested

The following printers are currently supported by PREX:

| | | | |
|---|---|---|---|
| 2221V | 2281V | 5533K | 5577 |
| 2231V2 | 2281WR | 5535 | 5581WD |
| 2233 | 2281WCR | 5535K | 6581W |
| 2233K | 5521 | 5570 | 6581WC |
| 2235 | 5521I | 5571 | DWOS20 |
| 2235K | 5521IK | 5573 | DWOS55 |
| 2263V1 | 5521K | 5573-1 | OK555 |
| 2263V2 | 55312 | 5574 | TPI1 |
| 2263V3 | 55312K | 5574-1 | XPRTW |
| 2273V1 | 5533 | 5575 | XPPRT |

The following printers are NOT supported by PREX:

| | | |
|---|---|---|
| LPS12 | IP41D | 5590 |

### 6.3.4.2  Running PREX

PREX operates under the control of the VSTEST On-line Monitor, and all user interface is through the Monitor. To run PREX, select PRINTERS from the On-line Monitor Device Class Selection screen and press RETURN. Position the cursor next to the unit number of the printer you wish to test on the System Configuration screen, press PF1 (Select), type a nonblank character, and press RETURN. No user interaction is required once the tests have been initiated.

The program produces hard copy output on the printer under test. This output should be checked and verified by the CE. The standard format for the output is as follows:

- Three blank lines
- Underscored test name
- Two blank lines
- Test header line(s) describing what will be done
- Test output
- One blank line
- Test trailer line(s) providing information on how to evaluate test output

### 6.3.4.3  PREX Tests

The VS On-line Printer Exerciser consists of the following tests:

1. HOF (Channel 1) Test – checks the ability of a printer to respond correctly to print control bytes that specify vertical format spacing to head of form.

2. Data Bus Test – checks the output of the serial interface unit and the integrity of the parallel data bus. All bit positions are tested

in both the ON and OFF positions. Compare test output with the bit specifications in the test headers.

3.  Character Set Test – prints the entire character set of the printer and the corresponding hexadecimal values (00 thru 7F) of the characters in a four column format with appropriate header lines. Compare the output against the specifications in the appropriate printer user manual.

4.  Spiral Pattern Test – prints the entire character set in consecutive print positions on a line. Succeeding lines are printed with each character shifted by one print position to produce a spiral or diagonal effect until all characters are printed in every print position. Inspect the output for alignment, bad print positions, and any other apparent abnormality.

5.  Overstrike Test – prints three full lines, each line consisting of a different pair of dissimilar characters in the same print position. This test also verifies the ability of the printer to correctly respond to print control bytes which specify vertical movement of zero lines. Inspect the output for proper registration of the overstruck characters from one end of the line to the other.

6.  Carriage Width Test – demonstrates the carriage width of the printer by printing a series of increasing length test records which are less than, equal to, or greater than the actual carriage width. The test pattern consists of repeating groups of the characters "123456789-." Count the complete groups and add the partial groups on the right (if any) to find the actual printable line length.

7.  Vertical Format Test – checks the ability of the printer to respond correctly to print control bytes that specify spacing to a vertical tab position (channel 5). Vertical tab positions occur every six lines from top of form.

## NOTE

If the printer being tested is equipped with a Vertical Format Unit (VFU), correct results from this test depend upon having the Wang-supplied Vertical Format Tape mounted (the paper must be properly aligned). The use of any nonstandard Vertical Format Tape will produce ambiguous results.

8.  Print Quality Test – prints series of full-width "M" and full-height "Z" characters to aid the user in determining if the print quality adjustments are set correctly. The test informs the user about what specific faults to look for in each part of the test.

9.  Matrix Pattern Test – prints a pattern consisting of 5 x 5 character blocks on matrix printers. Characters are chosen so that all elements of the dot matrix are activated.

10. Worst Case Pattern Test – prints a series of lines consisting of a character pattern chosen to maximize print wheel rotation on daisy wheel printers.

11. Expanded Print Test – checks the ability of most matrix printers to correctly respond to print control bytes which specify double-width characters.

### 6.3.4.4 PREX Error Codes

PREX error codes (table 6-17) consist of four characters. The first two characters define the area of the program in which the error occurred:

- IN – error occurred during program startup (initialization).

- OP – error occurred in the routine that sets up the User File Block and opens the printer file.

- XP – error occurred in the routine that performs I/O to the printer.

- RP – error occurred in the routine that builds print records.

The last two characters are sequence designators and have no special significance. The most likely type of errors to occur will be I/O errors, especially error code XP05.

### Table 6-17. PREX Error Codes

| Error Code | Definition |
|---|---|
| IN00 | The monitor has specified an invalid device address at task creation time. (The text portion of the error message will display the invalid device address as received from the monitor in the parameter passing area.) |
| IN01 | The program is not able to reserve the device to be tested. The UNITRES SVC has failed for some reason. (The text portion of the error message will include the return code.) |
| IN02 | The program is not able to create a port for the receipt of messages from the monitor. The CREATE SVC has failed for some reason other than the specification of a port name which already exists on the system. If a duplicate port name is specified, the program will retry the CREATE with other port names until successful. |
| IN03 | The program is not able to obtain memory space required for a print buffer. The GETHEAP SVC has failed for some reason. (The text portion of the error message will include the return code.) |
| OP00 | The device specified by the monitor for testing is not a printer. |
| OP01 | The User File Block for the printer to be tested indicates that the file is open when it should be closed. |

**Table 6-17. PREX Error Codes (Cont'd)**

| Error Code | Definition |
|---|---|
| OP02 | The program is unable to open the file for the printer. The OPEN SVC has failed for some reason. (The text portion of the error message will include the UFB file status bytes which are analyzed for some values in order to provide additional information.) |
| XP00 | The program has determined that the file is not open or the User File Block is bad. |
| XP01 | The data length specified for the call to XIO is negative. |
| XP02 | The data length specified for the call to XIO is greater than 2048 bytes. |
| XP03 | The call to XIO was unsuccessful. The XIO SVC has failed for some reason. (The text portion of the error message will include the return code which is analyzed for some values in order to provide additional information. |
| XP04 | I/O completion did not occur within the time limit. |
| XP05 | Unexpected IOSW bit(s) set. (The IOSW is analyzed bit by bit in order to present additional text information in the message.) |
| RP00 | Attempt to move text string into work buffer was unsuccessful. |
| RP01 | Attempt to build a print record in the print buffer was unsuccessful. |

## 6.3.4.5  PREX Error Messages

PREX error messages consist of lines of up to five fields. These fields are: error code, program identifier code, program title/function, area of the program where the error occurred, and error description. See the sample error message below in figure 6-16.

```
     ERROR CODE                 PROGRAM TITLE
       /       PROGRAM IDENTIFIER /                       PROGRAM AREA
      /      /                    /                      /             ERROR DESCRIPTION
     /      /                     /                     /             /
    IN00   PRX0   PREX/Printer Exerciser, Program Startup, Parameter Error
```

**Figure 6-16. PREX Error Message Format**

## 6.3.5  VS ON-LINE TAPE EXERCISER (TPEX)

The VS On-line Tape Exerciser (TPEX) is a test program that verifies proper operation of tape drives by exercising tape drive functions. TPEX tests the tape drive, the formatter, and the VS tape Input/Output Controller (IOC).

### 6.3.5.1  Hardware Tested

TPEX tests all Kennedy and Telex tape drives configured in the VS-7100 Computer System.

### 6.3.5.2  Running TPEX

TPEX operates under the control of the VSTEST On-line Monitor, and all user interface is through the monitor. To run TPEX, select TAPES from the On-line Monitor Device Class Selection screen and press RETURN. Position the cursor next to the unit number of the tape drive you wish to test on the System Configuration screen, press PF1 (Select), type a nonblank character, and press RETURN.

### NOTE

To decrease the time it takes to run this program,
use a tape reel with 600 feet of tape.

Normally no user interaction is required once the tests have been initiated. However, TPEX may also be run in the interactive mode. In this mode, a Test Selection screen allows the selection of one or more tests.

### 6.3.5.3  TPEX Tests

1. Basic Command Code Test – performs a comprehensive check of command decode and execution circuitry and a limited check of the data transfer circuitry of the tape unit and IOC.

2. Tape Movement Test – executes all of the tape movement commands to verify that they are working. This test verifies that the tape drive is able to sense the Tape Mark character and position itself anywhere on tape.

3. Variable Data Length Test – writes and reads variable length data patterns (18 bytes to 30K bytes) to ensure that the tape drive can position the tape head and read the data correctly.

4. Tape Creep Test – exercises the ability of the tape to properly position the tape at records. Functions checked include the tape capstan servo circuitry and areas of the mechanical feed path. This test is divided into two subtests:

   • The first subtest checks for record overlap when a number of Backspace/Write commands are issued.

   • The second subtest checks the start/stop timing between records.

5. Random Operations Test – verifies correct operation of the tape subsystem using a series of commands, data, and data length values. Functions tested include Write, Read, spacing commands, random data

values (0 - 65536), and random data count values (0 - 32512).

6.  Rewind Test – verifies proper rewind of the tape after End of Tape (EOT) has been sensed.

7.  Write at High Density and Read at Low Density – tests the Kennedy dual density tape drive by writing at high density (1600 bpi PE mode for nine track and 800 bpi NRZI for seven track) and reading at low density (800 bpi NRZI for nine track and 556 bpi NRZI for seven track).

8.  Write at Low Density and Read at High Density – tests the Kennedy dual density tape drive by writing at low density (800 bpi NRZI for nine track and 556 bpi NRZI for seven track) and reading at high density (1600 bpi PE mode for nine track and 800 bpi NRZI for seven track).

### 6.3.5.4 TPEX Error Codes

TPEX error codes (tables 6-18 thru 6-25) are four characters long and are divided into the following three categories:

*   0000 – All characters numeric. The first character is the test number, the second character is the routine number, and the third and fourth characters are the number of the error in that routine. Most of the error codes are of this type.

*   S000 – Character "S" indicates a Supervisor Call (SVC), the normal interface between user programs and and supervisory routines. The second and third characters indicate the number of the supervisor call and the last character indicates the number of the error in that supervisor call.

*   DV00 – "DV" indicates a device error. The last two characters are the error number.

**Table 6-18. TPEX Initialization Error Codes**

| Error Code | Definition |
| --- | --- |
| DV00 | Device address given by user is beyond range for devices. |
| S000 | Tried to open the tape drive and received an error indication from the Open SVC00. |
| S280 | Device given by the user is not a tape. |
| S300 | Tried to mount the tape drive and received an error indication from the mount SVC30. |
| S360 | Program is unable to find a message port that is not in use. |
| S361 | Create macro tried to create a port but received a getmem error. |

### Table 6-19. Test 0 Command Test Error Codes

| Error Code | Definition |
| --- | --- |

**Subtest 0 – Write, Read, and Rewind Verification**

| | |
| --- | --- |
| 0000 | Rewind to load point and check for load point bit in the Input/Output Status Word (IOSW). If bit not set, additional message is displayed. |
| 0001 | Write of 2048 bytes to the tape drive using the data 0000 was attempted but a tape I/O error occurred. |
| 0002 | Write of 2048 bytes to the tape drive using the data A95B was attempted but a tape I/O error occurred. |
| 0003 | Write of 2048 bytes to the tape drive using the data FF00 was attempted but a tape I/O error occurred. |
| 0004 | Rewind to load point and check the load point bit in the Input Output Status Word (IOSW). |
| 0005 | Read of 2048 bytes from the tape drive expecting data 0000 was attempted. A tape I/O error or data compare error occurred. |
| 0006 | Read of 2048 bytes from the tape drive expecting data A95B was attempted. A tape I/O error or data compare error occurred. |
| 0007 | Read of 2048 bytes from the tape drive expecting data FF00 was attempted. A tape I/O error or data compare error occurred. |

**Subtest 1 – Erase Command Test**

| | |
| --- | --- |
| 0100 | Rewind to load point and check for load point bit in the Input/Output Status Word (IOSW). If bit not set, additional message is displayed. |
| 0101 | Write of 2048 bytes to the tape drive using the data 3A3A was attempted. A tape I/O error or data compare error occurred. |
| 0102 | Erase Tape Command was issued to attempt to write an erase gap on tape but a tape I/O error occurred. |
| 0103 | Write of 2048 bytes to the tape drive using the data FFFF was attempted but a tape I/O error occurred. |
| 0104 | Write of 2048 bytes to the tape drive using the data 5B5B was attempted but a tape I/O error occurred. |
| 0105 | Erase Tape Command was issued to attempt to write an erase gap on tape but a tape I/O error occurred. |

### Table 6-19. Test 0 Command Test Error Codes (Cont'd)

| Error Code | Definition |
|---|---|
| 0106 | Write of 2048 bytes to the tape drive using data C5C5 was attempted but a tape I/O error occurred. |
| 0107 | Read of 2048 bytes from the tape drive expecting data 3A3A was attempted. A tape I/O error or data compare error occurred. |
| 0108 | Read of 2048 bytes from the tape drive expecting data FFFF was attempted. A tape I/O error or data compare error occurred. |
| 0109 | Read of 2048 bytes from the tape drive expecting data 5B5B was attempted. A tape I/O error or data compare error occurred. |
| 010A | Read of 2048 bytes from the tape drive expecting data C5C5 was attempted. A tape I/O error or data compare error occurred. |

Subtest 2 - Back Space Block Test

| | |
|---|---|
| 0200 | Rewind to load point and check for load point bit in the Input/Output Status Word (IOSW). If bit not set, additional message is displayed. |
| 0201 | Write of 2048 bytes to the tape drive using the data FFFF was attempted but a tape I/O error occurred. |
| 0202 | Write of 2048 bytes to the tape drive using the data 0000 was attempted but a tape I/O error occurred. |
| 0203 | Write of 2048 bytes to the tape drive using the data A95B was attempted but a tape I/O error occurred. |
| 0204 | Back Space Block Command was attempted but a tape I/O error occurred or read of 2048 bytes from the tape drive expecting A95B was attempted and a tape I/O or data compare error occurred. |
| 0205 | Back Space Block Command was attempted twice but a tape I/O error occurred or a read of 2048 bytes was attempted twice. The first read expected data 0000 and the second read expected data A95B. A tape I/O error or a data compare error was detected. |
| 0206 | Back Space Block Command was attempted three times but a tape I/O error occurred or a read of 2048 bytes was attempted three times. The first read expected data FFFF, the second expected data 0000, and the third expected data A95B. A tape I/O error or a data compare error occurred. |

## Table 6-19. Test 0 Command Test Error Codes (Cont'd)

| Error Code | Definition |
|---|---|
| | Subtest 3 - Forward Space Block Test |
| 0300 | Rewind to load point and check for load point bit in the Input/Output Status Word (IOSW). If bit not set, additional message is displayed. |
| 0301 | Read of 2048 bytes from the tape drive expecting data FFFF was attempted. A tape I/O error or a data compare error occurred. |
| 0302 | Forward Space Block Command gave a tape I/O error when executed. |
| 0303 | Read of 2048 bytes from the tape drive expecting data A95B was attempted. A tape I/O error or data compare error occurred. |
| | Subtest 4 - Write Tape Mark Test |
| 0400 | Rewind to load point and check for load point bit in the Input/Output Status Word (IOSW). If bit not set, additional message is displayed. |
| 0401 | Write of three records of 2048 bytes each using the data patterns FF00, 0000, and 5BA9 was attempted but a tape I/O error occurred. |
| 0402 | Indicates a rewind and read of two records. A tape I/O error or data compare error occurred. |
| 0403 | Write Tape Mark Command was attempted at record three but a tape I/O error occurred. |
| 0404 | Tape was rewound to load point and the first two records were read expecting data FF00 and 0000. Third record, written over by the tape mark, was read and the read buffer was checked to see if data was transferred. The command in error is displayed. |
| | Subtest 5 - Forward Space File Command Test |
| 0500 | Rewind to load point and check for load point bit in the Input/Output Status Word (IOSW). If bit not set, additional message is displayed. |
| 0501 | Write of 2048 bytes to the tape drive using the data A95B was attempted but a tape I/O error occurred. |
| 0502 | Write Tape Mark Command was attempted at record three but a tape I/O error occurred. |

## Table 6-19. Test 0 Command Test Error Codes (Cont'd)

| Error Code | Definition |
| --- | --- |
| 0503 | Write of 2048 bytes to the tape drive using the data 00FF was attempted but a tape I/O error occurred. |
| 0504 | Rewind to load point and forward space to file mark was attempted but a tape I/O error occurred or the load point status bit was not as expected. |
| 0505 | Read of 2048 bytes from the tape drive expecting data 00FF was attempted. A tape I/O error or data compare error occurred. |

Subtest 6 - Back Space File Command Test

| | |
| --- | --- |
| 0600 | Rewind to load point and check for load point bit in the Input/Output Status Word (IOSW). If bit not set, additional message is displayed. |
| 0600 | Rewind to load point and check load point bit in IOSW. |
| 0601 | Write of 2048 bytes to the tape drive using data FFFF or Write Tape Mark Command was attempted but a tape I/O error occurred. |
| 0602 | Write of 2048 bytes to the tape drive using data 0000 or Write Tape Mark Command was attempted but a tape I/O error occurred. |
| 0603 | Write of 2048 bytes to the tape drive using data A9A9 or Write Tape Mark Command was attempted but a tape I/O error occurred. |
| 0604 | Tape I/O error occurred after the Back Space File Command was issued or the tape mark bit in the IOSW is not set. |
| 0605 | Read Tape Mark and checked to see if Tape Mark bit in IOSW was set. Read record three expecting data A9A9, performed two Back Space Files, and sensed the Tape Mark. Tape Mark status bit not as expected or incorrect length status bit not as expected. |
| 0606 | Read Tape Mark and checked to see if Tape Mark bit in the IOSW was set. Read record 2 expecting data 0000. Tape Mark status bit not as expected or incorrect length status bit not as expected. |
| 0607 | Back Space File command executed until load point sensed. If load point not sensed, additional error message displayed. |

Table 6-20. Test 1 Tape Movement Test Error Codes

| Error Code | Definition |
|---|---|
| Subtest 0 – Write Two Files for Testing | |
| 1000 | Rewind to load point was attempted to start Tape Movement Test and failed because of rewind command error or load point bit in IOSW was not sensed. |
| 1001 | Attempted to write a file (File 1) of two 2048 byte records and a Tape Mark, for the Tape Movement Test. |
| 1002 | Attempted to write file a (File 2) of two 2048 byte records, a Tape Mark, an Erase gap, two more records, and two Tape Marks. |
| 1003 | Attempted to read a 2K block from File 1 and checked to see if data was correct. |
| 1004 | Attempted to back space to load point and sense the load point bit in the IOSW but a tape I/O error occurred. If load point bit not set, additional message is displayed. |
| 1005 | Attempted to position the tape at the first tape mark by issuing the Forward Space Block Command twice, but a tape I/O error occurred. |
| 1006 | Attempted to read a tape mark and checked to see if any data was transferred. Then a Back Space File to Tape mark was executed. A tape I/O error occurred after executing one of these commands. |
| 1007 | Attempted to read and check record 2 of File 1 by issuing the Back Space Block Command or the Read Command. A tape I/O error resulted. |
| 1008 | Attempted to Forward Space file to the next Tape Mark but a tape I/O error occurred. |
| 1009 | Attempted to read and check record 1 of File 1 but a tape I/O error occurred. |
| 100A | Attempted to Forward Space File to the first Tape Mark of File 2 but a tape I/O error occurred. |
| 100B | Attempted to sense a Tape Mark after forward spacing but a tape I/O error occurred. |
| 100C | Attempted to sense a Tape Mark after back spacing but a tape I/O error occurred. |
| 100D | Attempted to place the tape at the first Tape Mark of File 2 by issuing the Back Space File Command but a tape I/O error occurred. |

### Table 6-20.  Test 1 Tape Movement Test Error Codes (Cont'd)

| Error Code | Definition |
|---|---|
| 100E | Attempted to read record 1 of File 2 after a Back Space Block and a Forward Space File to position the tape. |
| 100F | Attempted to rewind to load point, write a record, read the record, and sense the Phase Encode (PE) ID Burst on the tape. If the ID Burst is sensed, then the PE bit in the IOSW will be set. (Only for Telex tape drives.) |
| 1010 | Attempted to rewind to load point, write a record, read the record, and sense the Phase Encode (PE) ID Burst on the tape. If the ID Burst is sensed, then the PE bit in the IOSW will be set. (Only for Kennedy tape drives.) |

### Table 6-21.  Test 2 Variable Data Length Test Error Codes

| Error Code | Definition |
|---|---|
| Subtest 0 - Write and Read Various Data Lengths | |
| 2000 | In an attempt to write and read variable length records, a tape I/O error occurred while executing a Write, Back Space Block, or Read command. |
| 2100 | In an attempt to write a 2048 byte record and read it with a data length of 256 bytes, a tape I/O error occurred while executing a Write, Back Space Block, or Read command. If the Illegal Length (IL) bit in the IOSW is not set after the read, an additional message is displayed. |

### Table 6-22.  Test 3 Tape Creep Test Error Codes

| Error Code | Definition |
|---|---|
| Subtest 0 - Capstan Servo Circuitry Check | |
| 3000<br>3001<br>3002 | Attempted to write and read records with different data lengths of 2048, 4096, 8192, and 16384 bytes. A tape I/O error occurred while executing a Write, Back Space Block, or a Read command. |
| Subtest 1 - Mechanical Feed Path Check | |
| 3100<br>3101 | Attempted to write and read records with different data lengths of 2048, 4096, 8192, and 16384 bytes. A tape I/O error occurred while executing a Write, Back Space |

Table 6-22.  Test 3 Tape Creep Test Error Codes (Cont'd)

| Error Code | Definition |
| --- | --- |
| 3102 | Block, or a Read command. |

Table 6-23.  Test 4 Random Operations Test Error Codes

| Error Code | Definition |
| --- | --- |
| Subtest 0 - Random Writes and Reads | |
| 4000 | Attempted to write and read records of random data lengths |
| 4001 | and random data until end of tape was sensed. A tape I/O |
| 4002 | error occurred while executing a Write, Back Space Block, or Read command. |

Table 6-24.  Test 5 Rewind Test Error Codes

| Error Code | Definition |
| --- | --- |
| Subtest 0 - Timed Rewind from End of Tape | |
| 5000 | Attempted to rewind the tape from end of tape to beginning of tape and checked to ensure that the time to do it did not exceed seven minutes. A tape I/O error occurred while executing the Rewind Command. If the rewind to load point exceeds seven minutes, an additional message is displayed. |

Table 6-25.  Test 6 Density Check Test Error Codes

| Error Code | Definition |
| --- | --- |
| Subtest 0 - Write at High Density and Read at Low Density | |
| 6000 | Attempted to write a 2048 byte record in high density and |
| 6001 | read it at low density. A tape I/O error occurred while |
| 6002 | executing the Write, Back Space Block, or Read Command. |
| Subtest 1 - Write at Low Density and Read at High Density | |
| 6100 | Attempted to write a 2048 byte record in low density and |
| 6101 | read it at high density. A tape I/O error occurred while |
| 6102 | executing the Write, Back Space Block, or Read Command. |

## 6.3.6 CIU ON-LINE TESTING

All WCS/CSN diagnostics under WSNMON, such as Connect, Sync, Thruput, and Propagation test, are supported between the Inboard CIU and the Outboard CIUs.

TCTESTER is also supported on the Inboard CIU. However, internal and remote loopback capabilities are not yet available. To run TCTESTER on any CIU, bring up the receiver on one system and the transmitter on another system. To run TCTESTER on an Outboard CIU, the microcode must be a revision level 2.05.11 or higher. Refer to TSB SWG-6107 for TCTESTER ordering procedures.

## 6.4 MEMORY DUMP PROCEDURES

In the VS-7100, there are three procedures for completing memory dumps:

- Control Mode Dump
- Continuable Dump
- Snapshot Dump

## 6.4.1 CONTROL MODE DUMP

Control Mode is a central processor state in which normal program execution is suspended and certain other facilities (mainly diagnostic and initialization) are made available to the user. The system automatically enters Control Mode when problems are encountered that prevent it from proceeding with normal operations. These problems may be either hardware or software related. The user may also force the system into Control Mode. Once in Control Mode, the VS-7100 uses the SCU (as Workstation 0) to communicate with the user. While in Control Mode, the user may initiate a Control Mode dump. After completing the Control Mode dump, the user must reIPL the system.

The Control Mode dump program copies the entire contents of main memory to another storage medium to capture the state of the system when a problem occurred. The VS-7100 can use magnetic tape (except cartridge tape, 25V29), floppy diskettes, or disks for the storage medium. An analyst will use this dump information to determine the cause of the system problem.

There are two conditions under which a Control Mode dump should be taken:

- The machine has experienced a fatal error and a message describing that error is displayed on Workstation 0.

- The system appears to be hung, to be looping, a task has been abnormally terminated, a dedicated system task is cancelled, or a situation has occurred where the system manager or Wang customer engineer determines a dump is necessary.

### NOTE

All required workstation operations must be performed from Workstation 0.

### 6.4.1.1  Errors Requiring Control Mode Dump

**NOTE**

For a list of Operating System errors that require a Control Mode dump, refer to Appendix A. If one of those errors occurs, follow the procedure in paragraph 6.4.1.2.

Table 6-26 below lists IPL and CP Initialization errors. The table lists the Program Control Words (PCWs) displayed on Workstation 0 as well as an explanation of each.

**Table 6-26.  IPL and CPINIT Errors**

| IPL Error # | PCW Display | IPL Error Message |
|---|---|---|
| 001 | 00FFFF02 40000000 | Not enough memory for IPL |
| 002 | 00FFFF04 40000000 | I/O error |
| 003 | 00FFFF06 40000000 | No system file on volume |
| 004 | 00FFFF08 40000000 | Bad VTOC on IPL'd volume |
| 005 | 00FFFF10 40000000 | O/S code spans > 9 extents |
| 006 | 00FFFF12 40000000 | SIO command rejected |
| 007 | 00FFFF14 40000000 | VS-7100 cannot load IOC microcode |
| 008 | 00FFFF16 40000000 | MVF - not root volume |

| CPINIT Error # | PCW Display | CPINIT Error Message |
|---|---|---|
| 001 | 00EEEE02 40000000 | System not built to CPU type |
| 002 | 00EEEE04 40000000 | CPU microcode version invalid |
| 003 | 00EEEE06 40000000 | Program Check |
| 004 | 00EEEE08 40000000 | Operating system linkage error |
| 005 | 00EEEE10 40000000 | IPLTEXT version invalid |

The following machine check error codes are defined for the VS-7100:

### Table 6-27. Machine Check Error Codes

| HEX Code | Reason |
|----------|--------|
| 01 | Main memory multiple bit ECC error. |
| 0F | Default trap taken. |
| 10 | AGU error received. Invalid state in instruction queue. |
| 20 | I/O interrupt line received with no active IOSW in the I/O processor status table. |
| 21 | Power fail interrupt received. |
| 22 | Spare control exception trap taken. |
| 41 | Translation buffer parity error. |
| 42 | Illegal state - external cache probe. |
| 44 | Illegal state - internal cache probe |
| 50 | System bus parity error. |

The following conditions result in the micromachine hanging (branch to self):

* Control store parity error (IC = FE1)

* Single step microinstruction trap (IC = FE2)

* Microinstruction address compare trap (IC = FE3Z)

### 6.4.1.2 Control Mode Dump Procedure

Throughout this procedure the following rules apply:

* Zeroes must be entered where indicated.

* When entering information defined in the procedure, begin at the current cursor position. Do not reposition the cursor.

* The asterisk (*) represents the value of a position and must not be changed during the process of preparing the dump.

* In any place in these procedures where an instruction says "enter 0000****0000", enter the zeroes and skip over the asterisks by using the cursor control keys.

Any data on the disk or tape will be overwritten by the dump. Make sure that data stored on the dump medium is no longer needed. If the system has been configured with an optional dump file by using the DISKINIT program, the dump may be placed onto a disk volume as a file. Use the dump file if possible. If the dump is to be written to a preallocated dump file, there's no need to be concerned about the other data stored on the medium. It won't be overwritten. However, data stored by a previous dump in a preallocated dump file will be overwritten. As standard procedure after performing the dump, copy the data from the preallocated dump file to another area on disk or to another magnetic tape, then run the PATCH utility on the preallocated dump file.

When the system experiences a fatal error and enters Control Mode, the screen freezes and the keyboard locks. The message "<<<Machine Check>>>" appears on the top line of the SCU screen.

**NOTE**

On W/S 0, a Control Mode dump procedure will be displayed below the "<<<Machine Check>>>" message. Ignore this procedure; it is not correct for the VS-7100.

1.  When the 4-letter error code appears at the top of the screen, write it down. Refer to Appendix A for an explanation of the error code. From the SCU, press CONTROL, then press SHIFT and CANCEL simultaneously to exit workstation emulation. The Workstation Emulation Menu appears. Press the SPACEBAR to select "Suspend Emulation." Press EXEC and the VS-7100 System Console Processor Menu appears. See figure 6-17.

```
                    *** 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


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

Figure 6-17. System Console Processor Menu

2.  From the System Console Processor Menu, press PF key 2 to select "ENTER Control Mode." The VS Central Processor Control screen appears

3.  Press PF key 1. The VS Enhanced Control Mode screen appears. (Figure 6-18.)

```
                         VS Enhanced Control Mode

<Enter Command>
:
                              CPU-ID: 00
PCW: 00000000 00000000   R0:   00000000 00000000  CR0:   00000000 00000000
                         R2:   00000000 00000000  CR2:   00000000 00000000
@PC: 00000000 00000000   R4:   00000000 00000000  CR4:   00000000 00000000
                         R6:   00000000 00000000  CR6:   00000000 00000000
FL0: 00000000 00000000   R8:   00000000 00000000  CR8:   00000000 00000000
FL2: 00000000 00000000   R10:  00000000 00000000  CR10:  00000000 00000000
FL4: 00000000 00000000   R12:  00000000 00000000  CR12:  00000000 00000000
FL6: 00000000 00000000   R14:  00000000 00000000  CR14:  00000000 00000000

              Physical Memory Display  Phys. adૹ = 00000000

00000000:  00000000 00000000 00000000 00000000    |................|
00000010:  00000000 00000000 00000000 00000000    |................|
00000020:  00000000 00000000 00000000 00000000    |................|
00000030:  00000000 00000000 00000000 00000000    |................|
00000040:  00000000 00000000 00000000 00000000    |................|
00000050:  00000000 00000000 00000000 00000000    |................|
00000060:  00000000 00000000 00000000 00000000    |................|
00000070:  00000000 00000000 00000000 00000000    |................|
```

Figure 6-18.  VS Enhanced Control Mode Screen

The cursor is on the command line, which is the colon below the message "<Enter Command>."

Enter M and press RETURN. Use the cursor control keys to move the cursor to the first digit of the second block of numbers that are directly next to the PCW prompt. For example, if the PCW number is 0000AAAA 40030000, move the cursor to the "4." Enter 0 (zero) and press RETURN.

The cursor automatically returns to the command line. Enter X and press RETURN.

4.  When the VS-7100 Console Processor Menu appears, press PF 1 to select "ENTER Workstation Emulation." Press EXEC.

5.  The message "DUMP TO PREALLOCATED FILE? YES/NO" appears on the screen. If a disk dump file, preallocated by the DISKINIT utility, is available and ready, enter YES. Otherwise, enter NO and go to Step 6.

**NOTE**

Ensure that the dump disk contains a dump file, that the dump file is large enough to hold the memory contents of the system, and that the disk is ready.

6.  If you responded YES to Step 4, this message appears: "PLEASE ENTER DISK LABEL." Enter the label of the disk with the preallocated dump file. If the label is good, the disk is ready, and the file is large enough, the program proceeds to Step 8.

7.  If you responded NO to the question in Step 4, the SCU displays a screen similar to the one shown in figure 6-19.

---

At this point, it is necessary to indicate the output device address for the dump program.

Use the default address or enter another one:   2C01

Press the ENTER key.

---
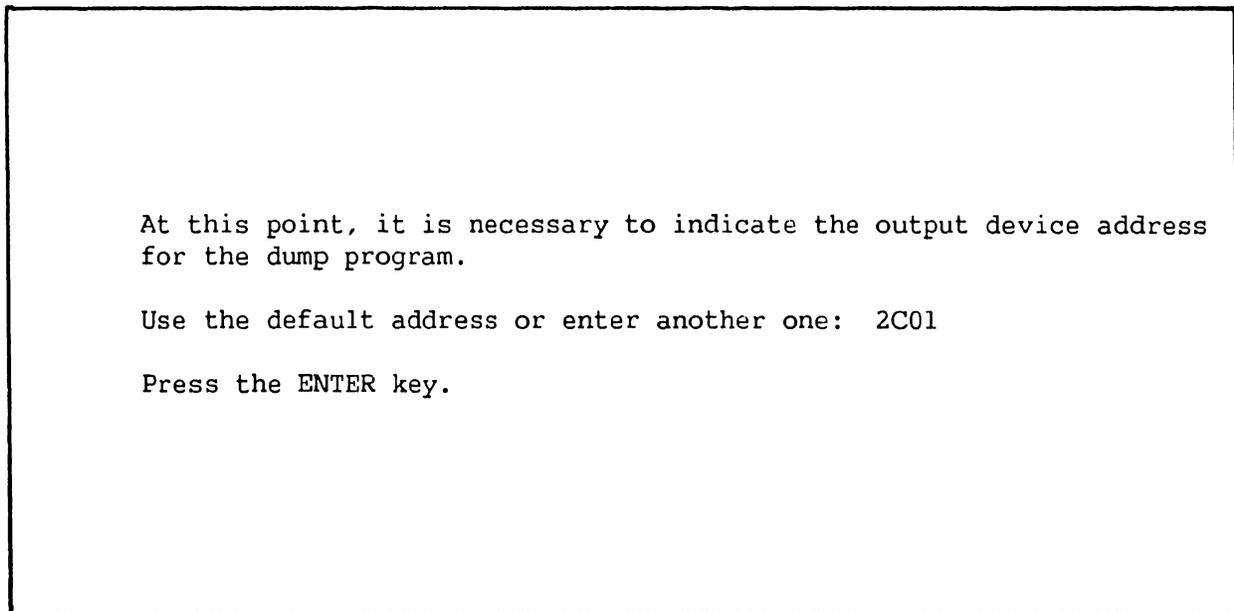
Figure 6-19.  Control Mode Dump Device Address Screen

Press RETURN to use the default dump address or change the Physical Device Address (PDA) and press RETURN. The VS-7100 has a default dump device set at IPL which is the lowest numbered tape. Calculate a new PDA as follows:

a.  Determine the IOC and write down the first six bits from the IOC list below.

| IOC | Binary Representation |
|-----|----------------------|
| IOC 1 | 0010 00 |
| IOC 2 | 0010 01 |
| IOC 3 | 0010 10 |
| IOC 4 | 0010 11 |
| IOC 5 | 0011 00 |
| IOC 6 | 0011 01 |
| IOC 7 | 0011 10 |

b.  Determine the device number and write down the last ten bits. Convert the binary number to a four-digit hexadecimal number. The result is the PDA. Refer to the example below.

If the IOC used is IOC 2 (binary 0010 01) and the device number is 1 (binary 00 0000 0001), the PDA is determined as follows:

| | IOC Number (high 6 bits) | Device Number (low 10 bits) |
|---|---|---|
| Binary | 0 0 1 0    0 1 0 0 | 0 0 0 0    0 0 0 1 |
| Hexadecimal | 2          4 | 0          1 |

The Physical Device Address = <u>2401</u>.

8.  The program displays the following message: "PLEASE MOUNT DUMP MEDIA." Physically mount the requested media.

9.  The Dump program begins execution when it detects that the device is ready. The Dump program displays a blinking message: "DUMP IN PRO-GRESS."

10. The Dump program continues to execute. It may stop for one of three reasons:

a.  The dump has successfully completed. This is indicated by the message: "DUMP COMPLETE -- PLEASE PRINT I/O ERROR LOG AFTER IPL." Dismount the dump volume and proceed to Step 10.

b.  An I/O error has occurred. This is indicated by the display: "I/O ERROR DUMP NOT POSSIBLE TO COMPLETE." The dump cannot con-tinue, but a partial dump has been completed. Dismount the dump volume and proceed to Step 10. If the dump device is tape and it is write protected, you must return to Step 1.

c.  The mounted volume is full. Another dump volume is required. This is indicated by the display: "PLEASE MOUNT ADDITIONAL DUMP MEDIA." Dismount the full volume and proceed to Step 7 to mount another volume.

11. ReIPL the system, and print the I/O Error Log.

12. Run the LISTVTOC utility to verify the VTOCs of all disk volumes that were on-line at the time of the system failure. Do not verify the dump disks.

13. If you used a preallocated dump file, run the PATCH utility on that file. The PATCH utility frees the dump file to be automatically over-written at the time of the next dump. To run the PATCH utility, follow these steps:

    a. From the VS Command Processor, press PF1, Run Program or Procedure. Specify PATCH in the PROGRAM field and press ENTER.

    b. On the first PATCH utility screen, enter the dump file filename, library, and volume. For the preallocated dump file, the filename is @CMDUMP@ and the library is @SYSDUMP. For the OPTION field, enter VERIFY. For the ADDRESS field, enter 0. Press ENTER.

    c. The data parameter field on the screen shows the hexadecimal code for the first 16 bytes of the file. Change the first eight digits to 0. For the OPTION field, enter REPLACE. Press ENTER.

    d. To exit from PATCH, enter QUIT at the OPTION field.

14. Call the local Wang software analyst and send the following information:

    • The dump in machine-readable form.

    • A task dump, if one was generated.

    • The error code you wrote down in Step 1.

    • A Software Problem Report Form (800-5104).

    • The I/O Error Log.

    • An explanation of what was happening at the time the system mal-functioned and the present status of hardware and software. If the dump was a partial one, indicate that on the dump report.

### 6.4.1.3  Forcing The System Into Control Mode for Dump

If the system appears to be hung or a Control Mode dump is required for some other reason, the system may be forced into Control Mode by using the following procedure:

1. Exit workstation emulation. Press CONTROL, then press SHIFT and CAN-CEL simultaneously. From the Workstation Emulation Menu, press the spacebar to select Suspend Emulation and press EXEC. From the VS-7100 Console Processor Menu, press PF key 2 (ENTER Control Mode). The VS Central Processor Control screen appears Press PF key 1. The VS En-hanced Control Mode screen appears.

2. Record the displayed PCW for future reference.

3.  Enter M 00000700 00000000 on the PCW line, and press RETURN. The starting address of the dump program is 0700.

4.  Type X and press RETURN to exit from Control Mode and begin execution of the dump program. To return to workstation emulation, select Work-station Emulation from the Console Mode Menu and press EXEC.

5.  Follow instructions in paragraph 6.4.1.2 from step 3.

### 6.4.1.4  Control Mode Dump Stops

If the system encounters a problem at some point in the Control Mode dump program, a Control Mode stop will occur. The system notifies the user by displaying the PCW in one of the following formats:

*   ******** SSSS**** where ** is valid PCW information and SSSS is a code that indicates the dump program status.

*   ****AAAA SSSS**** where ** and SSSS have the same meaning as above. AAAA is the resume PCW address and a pointer to a storage location. The user must modify this location in order for the dump program to continue.

### NOTE

There may be up to a thirty second delay between Control Mode stops.

The status codes are summarized below in table 6-28.

### Table 6-28.  Control Mode Stops

| PCW/Status Code | Description |
| --- | --- |
| 0000AAAA 40000000 | Dump completed successfully. |
| 0000AAAA 40010000 | Dump in progress; continue from here. |
| 0000AAAA 40020000 | Please mount additional dump media. |
| 0000AAAA 40030000 | Please mount dump media. |
| 0000AAAA 40040000 | Dump to preallocated file?  The options are YES and NO. |
| 0000AAAA 40050000 | Please enter disk label. |
| 0000AAAA 40060000 | Enter Dump Device PDA. |

Table 6-28.  Control Mode Stops (Cont'd)

| PCW/Status Code | Description |
|---|---|
| 0000AAAA 40070000 | Must enter YES or NO only. |
| 0000AAAA 40080000 | Volume Name must be alphanumeric. |
| 0000AAAA 400B0000 | Disk selected not found or not available. |
| 0000AAAA 400C0000 | Disk selected does not have Dump file. |
| 0000AAAA 400D0000 | Selected Disk Dump file is too small. |
| 0000AAAA 400F0000 | I/O error; dump not possible to complete. |

For more detailed information on Control Mode Stops and instructions on how to continue the dump after a stop has occurred, refer to the VS Field Guide.

## 6.4.2  CONTINUABLE AND SNAPSHOT DUMPS

A continuable dump is a type of memory dump that occurs automatically (if enabled) when certain system errors are encountered. The continuable dump provides information similar to that provided by the Control Mode dump but in less time. A continuable dump does not cause system operation to halt. Instead, system operation is suspended, the continuable dump is completed, and system operation continues. During most continuable dumps, users notice only a 15-second workstation freeze. Logging off is not necessary and reIPL is not required for most continuable dump errors. For those errors requiring reIPL, an automatic reIPL is performed at the end of the dump and all users must log on again.

The snapshot dump is a continuable dump that the user invokes manually when memory dump information is needed. VS-7100 operations are suspended, the dump is completed, and operations are automatically continued.

On the SYSGEN Configuration File screen of the IPL procedure (refer to paragraph 9.9.1), the prompt "Inhibit dumping continuable halts?" allows the user to enable or disable the continuable dump. If you answered NO, all continuable dumps proceed as described below. If you answered YES, continuable halts that do not require reIPL are not run. The error remains and system operations may be affected.

The continuable dump is invoked automatically when the system errors listed in Appendix A occur.

### 6.4.2.1  Requirements for Continuable and Snapshot Dumps

Both continuable and snapshot dumps require the allocation of a special file for storing the dump information. All continuable and snapshot dump

information must be dumped to disk. Run DISKINIT to set up the file @CMDUMP@ in library @SYSDUMP. This file must be available on at least one volume at all times to ensure that the continuable or snapshot dump can be completed. If the default dump file is on a number of available volumes, the dump information is stored in the first default file that the system finds.

### 6.4.2.2  Invoking The Snapshot Dump

The snapshot dump executes in a similar manner and provides the same information as the continuable dump. The difference between them is that the user invokes the snapshot dump manually.

To invoke the snapshot dump, perform the following procedure:

- From the VS Command Processor, press PF11 to enter Operator's Mode.

- From the Operator's Console Menu, press PF14 to enter System Options.

- From the System Options Menu, press PF10 to initiate the snapshot dump.

### 6.4.2.3  Running Continuable and Snapshot Dumps

Under most conditions, the continuable dump and the snapshot dump are completed without user intervention. After they are invoked, either automatically or manually, the screen in figure 6-20 appears on Workstation 0. All other workstations freeze for the duration of the dump.
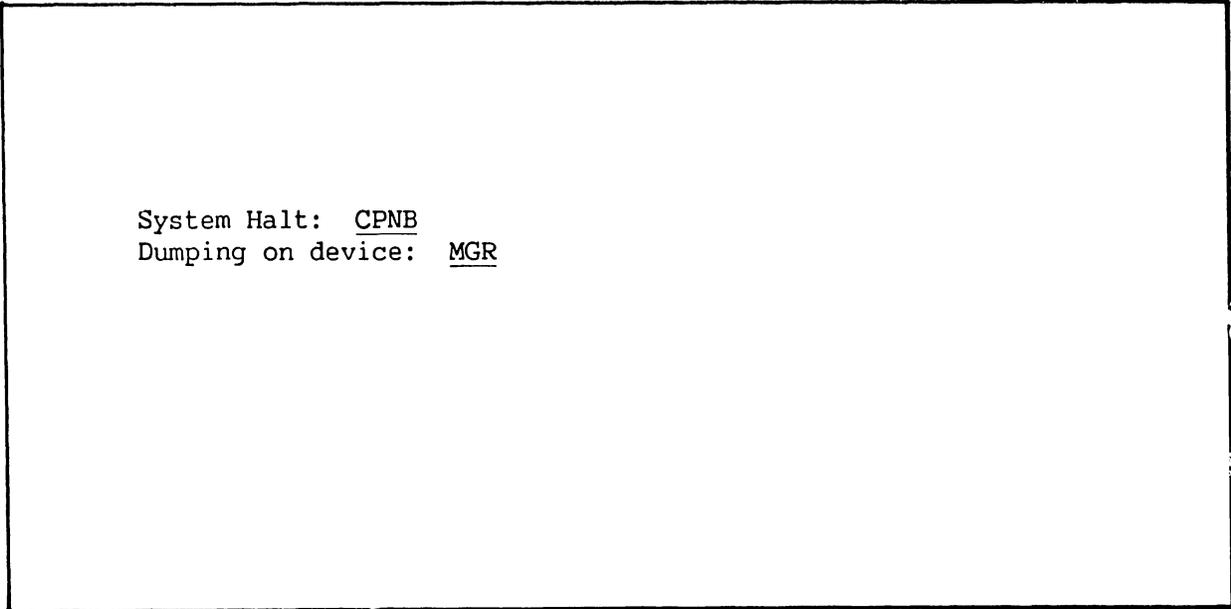
```
System Halt:  CPNB
Dumping on device:  MGR
```

Figure 6-20.  Sample Continuable    np Screen

When either dump is complete, the message "Dump Completed Successfully" appears on Workstation 0. Press HELP to return to the Operator's Console and the task that was running before the dump. Work can also continue as usual on other users' workstations when the dump is complete. All dump information is available through the @CMDUMP@ file on library @SYSDUMP. To save the information, run COPY from VS Command Processor PF1, Run Program. Send the dump file information to the local software analyst to report the system error.

To make the @CMDUMP@ file available for the next continuable or snapshot dump, run PATCH. This utility changes the first four bytes of a file to indicate that the file can be overwritten.

To run PATCH, follow these steps:

1.  From the VS Command Processor, press PF1, Run Program or Procedure. Specify PATCH in the PROGRAM field and press ENTER.

2.  On the first PATCH utility screen, enter the dump file name, library, and volume. If you used the preallocated dump file, the filename is @CMDUMP@ and the library is @SYSDUMP. For the OPTION field, enter VERIFY. For the ADDRESS field, enter 0. Press ENTER.

3.  The data parameter field on the screen shows the hexadecimal code for the first 16 bytes of the file. Change the first eight digits to 0. For the OPTION field, enter REPLACE. Press ENTER.

4.  To exit from PATCH, enter QUIT at the OPTION field.

If you do not run PATCH on @CMDUMP@, the next continuable or snapshot dump is interrupted. Before it can continue, you have to specify what is to be done with the dump information. Four options appear on the continuable (or snapshot) dump screen:

*   Press PF1 -- Ignore the current dump and continue processing.

*   Press PF3 -- Overwrite the previous dump information with the current information; the previous information would be lost.

*   Press PF16 -- Enter Control Mode.

*   Specify another device to send the dump information; it must have the @CMDUMP@ file already allocated on library @SYSDUMP.

Once you make a selection, the continuable or snapshot dump proceeds normally. After a continuable dump is completed, send the information to the software analyst. The analyst uses the dump information to determine what caused the error.

### 6.4.2.4  Continuable Dump and Automatic IPL

There are some system errors that require reIPL after the continuable dump. In those situations, the continuable dump proceeds as described in paragraph 6.4.2.3. At its completion, the dump automatically reIPLs the system.

During an automatic reIPL after a continuable dump, Workstation 0 displays the message "ReIPLing from device XXXXXX." This message remains on the screen until the Wang VS logon screen appears. Then, the standard information messages appear. The configuration files last specified on the SYSGEN configuration file screen are used and the date and time are automatically updated.

When the operator's console or logon screen appears, the system is ready for use again. All users are required to log on again.

## 6.5  SCU ERROR LOG

The SCU error log provides a means of tracking system errors and their frequency in the following areas: main memory (MM), central processor (CP), and power supply (PS). The error log is accessed from the System Console screen in the service mode. To enter the error log, perform the following:

**NOTE**

The system I/O error log is still available.

1.   Go to the System Console screen.

2.   Turn the key switch to the "Remote Service" position.

3.   Enter the following 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.
It is intended to discourage unauthorized person-
nel from enabling the full System Console Menu.

4.   Several previously undisplayed menu picks will appear. See figure 6-21. The System Console is now in the "service mode." (The service mode can be terminated by pressing PF key 10 or turning the key switch out of the "Remote Service" position.)

5.   Press PF key 11 to access the error log.

   The following screen appears:

```
          Main Memory Error Log              Page 1


Memory Operation   Level   Address     Time        Date     Count   Comments

Refresh            03      00000000   00:02:53   01-01-86    01     Multiple Bit



  (1) MM  error log      (5)    First page      (DELETE)  Delete entries
  (2) CP  error log      (6)    Last page       (8)       Set defaults
  (3) PS  error log      (PREV) Previous page   (9)       Exit
  (4) SBI error log      (NEXT) Next page
```

Figure 6-21.  SCU Error Log Screen

Use the PF keys indicated on the screen to access other error logs, set defaults, page through a particular error log, delete entries, or exit screen.

To set error log defaults, press PF key 8. The following screen appears.

```
                    Set Error Log Defaults

Memory Error Rate and Error Counts

MER = X error every XXX hours       MEC = XXX errors
PCR = X check every XXX hours       PEC = XXX errors

Voltage Ranges                            Interrupt Status

Power Supply     High      Low     Level    Element   Status

   +5VA         +X.XXX    +X.XXX     1        CPU      Enabled
   +5VB         +X.XXX    +X.XXX     1        MCU      Enabled
   -5V          -X.XXX    -X.XXX     1        SBI      Disabled
   +12V         +XX.XXX   +XX.XXX    1        SCU      Enabled
   -12V         -XX.XXX   -XX.XXX    1        PWR      Enabled
                                             SYSR     Enabled


(1) MM  error log (8)  Set defaults        (12) Enable/disable SBI (16) Exit
(2) CP  error log (9)  Modify defaults      (13) Enable/disable SCU
(3) PS  error log (10) Enable/disable CPU  (14) Enable/disable PWR
(4) SBI error log (11) Enable/disable MCU  (15) Enable/disable SYSR
```

Figure 6-22.  Set Error Log Defaults Screen

This screen displays the count of various types of memory errors, allows entering high and low power supply voltage values, and allows enabling/disabling various system elements.

## 6.6  SERVICE LOG

The VS-7100 provides a facility for documenting the system's hardware configuration, software configuration, and maintenance history. This facility is called the "Service Log." The Service Log contains an easily accessible and modifiable database, which can prove to be a valuable aid in tracking system problems.

### 6.6.1  ACCESSING THE SERVICE LOG

Because of the nature of the data contained in the Service Log, its access, along with several other System Console Menu picks, is password-protected to prevent entry by unauthorized personnel. To enter the Service Log, perform the following:

1.  Perform steps 1 thru 4 in paragraph 6.5.

2.  Press PF key 3 to bring up the Service Log Database Options screen. See figure 6-23.

```
Professional Computer Database                          Database Options


        Record Definitions
           View Definitions           Comment

        Hardware Config
           Hardware Config
        Software Config
           Software Config
        Maintenance History           Instructions Here
           Maintenance History        Instructions Here



    _____

    ■ Access Data          _ Create Record Definition
    _ Edit Definition      _ Create View Definition      REPLC - Change Database
    _ Delete Definition                                  EXECUTE - Select Option
                                                         CANCEL - Exit
```

Figure 6-23. Service Log Database Options Screen

## 6.6.2 DATABASE OPTIONS

The following database options (see figure 6-23) allow the user to re-trieve, modify, create, and delete service log definitions and data.

1.  Access Data - allows user to retrieve, create, update, and delete information pertaining to the system's hardware configuration, soft-ware configuration, and maintenance history. Press SPACEBAR to posi-tion acceptance block and cursor, and press EXEC. Press SPACEBAR to select View Definition and press EXEC. Page through multiple screen loads using the NORTH and SOUTH cursor movement keys. Use "Mainten-ance History" to record system problems and fixes.

2.  Edit Definition - allows user to modify record definitions and com-ments. Also allows user to create, update, and delete field name, data type, and record length. Press SPACEBAR to position acceptance block and cursor, and press EXEC.

3.  Delete Definition - allows user to erase record definitions. Press SPACEBAR to position acceptance block and cursor, and press EXEC.

4.  Create Record Definition - allows user to add new record definitions and comments, as well as field name, data type, and record length. Press SPACEBAR to position acceptance block and cursor, and press EXEC.

5.  Create View Definition - allows user to add new view definitions and comments, as well as field names. Press SPACEBAR to position accept-ance block and cursor, and press EXEC. Use INSERT to select record definition and press EXEC.

## 6.7 TROUBLESHOOTING PROCEDURES

This section provides procedures, in flow chart form (figure 6-24), for troubleshooting power problems in the VS-7100 Computer System. These flow charts are intended as a guide and not a comprehensive treatment of all pos-sible power troubleshooting techniques. Use figure 6-25 for ease in locating the various connectors on the Power Controller board. Heed the warnings that precede two of the steps in the flow charts.
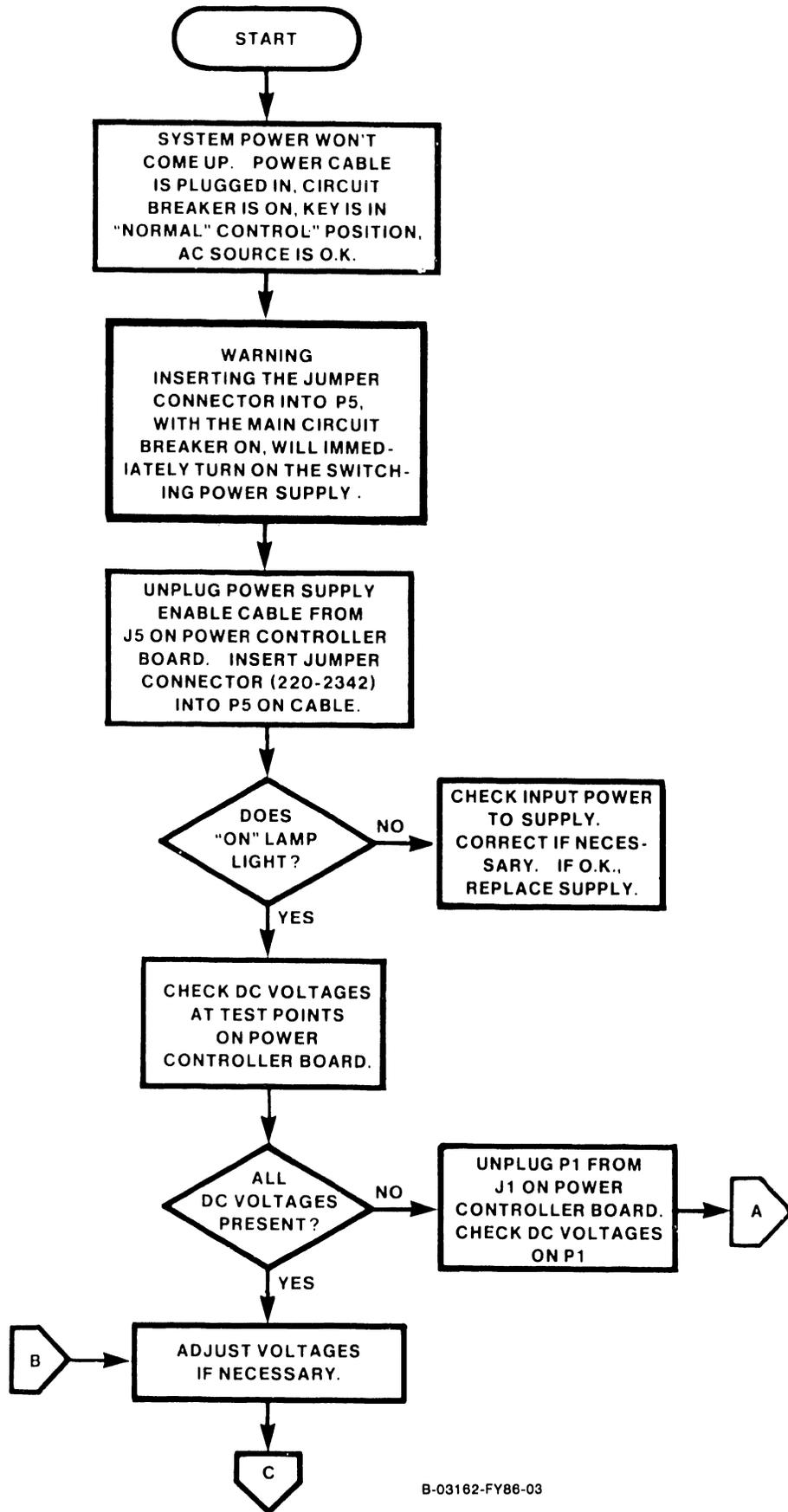
Figure 6-24. Power Troubleshooting Flow Chart (1 of 4)

Figure 6-24. Power Troubleshooting Flow Chart (2 of 4)

```
                    ┌───┐
                    │ C │
                    └─┬─┘
                      │
                      ▼
          ┌───────────────────────┐
          │    REMOVE JUMPER       │
          │    FROM  P5.           │
          │   RECONNECT CABLE      │
          │      TO  J5.           │
          └───────────┬───────────┘
                      │
                      ▼
          ┌───────────────────────┐
          │     UNPLUG P7          │
          │   & PRESS SW1 ON       │
          │  THE POWER CON-        │
          │  TROLLER BOARD.        │
          └───────────┬───────────┘
                      │
                      ▼
                  ╱────────╲          ┌──────────────────────┐
                 ╱  DOES     ╲   YES   │  REPLACE CONTROL     │
                ╱  "ON" LAMP  ╲───────▶│  PANEL AND/OR        │
                ╲   LIGHT?    ╱        │  RIBBON CABLE        │
                 ╲          ╱          │  (220-3464).         │
                  ╲────────╱           └──────────────────────┘
                      │ NO
                      ▼
          ┌───────────────────────────┐
          │  RECONNECT P7.  CHECK AIR- │
          │  FLOW BYPASS JUMPER (220-  │
          │  2344) AT J2 FOR GOOD      │
          │  CONNECTION AND CONTINUITY.│
          │  REPLACE IF NECESSARY.     │
          │  PRESS "ON" BUTTON.        │
          └───────────┬───────────────┘
                      │
                      ▼
                  ╱────────╲          ╭──────────╮
                 ╱  DOES     ╲   YES   │          │
                ╱  "ON" LAMP  ╲───────▶│   END    │
                ╲   LIGHT?    ╱        │          │
                 ╲          ╱          ╰──────────╯
                  ╲────────╱
                      │ NO
                      ▼
                    ┌───┐
                    │ D │
                    └───┘
```

B-03162-FY86-01

Figure 6-24. Power Troubleshooting Flow Chart (3 of 4)

```
                    ┌───┐
                    │ D │
                    └─┬─┘
                      │
                      ▼
    ┌─────────────────────────────────────┐
    │             WARNING                  │
    │      SHOCK HAZARD - HIGH             │
    │   VOLTAGE (220V AC).  BEFORE         │
    │   CHECKING CIRCUIT BREAKER           │
    │   CONTINUITY, ENSURE THAT            │
    │   THE CPU POWER CABLE IS             │
    │   UNPLUGGED FROM THE AC              │
    │        POWER SOURCE.                 │
    └──────────────────┬──────────────────┘
                       │
                       ▼
    ┌─────────────────────────────────────┐
    │   POWER DOWN THE CPU.   UNPLUG       │
    │      POWER CABLE.   UNPLUG           │
    │   P9 FROM J9.   CHECK CONTINUITY     │
    │   ON PINS 2 & 4 OF P9 W/CIRCUIT      │
    │   BREAKER ON & OFF.   ENSURE CON-    │
    │   TINUITY LOST IN "OFF" POSITION     │
    │   REGAINED IN "ON" POSITION.         │
    └──────────────────┬──────────────────┘
                       │
                       ▼
```



Figure 6-24. Power Troubleshooting Flow Chart (4 of 4)

B-03162-FY86-04

## J1

SYSID

| | | |
|---|---|---|
| +5VA – | 3 2 1 | – +12V |
| -12V – | 6 5 4 | – +5VB |
| -5V – | 9 8 7 | – ±0V |

## J2

| | |
|---|---|
| +5VA – | 1 |
| AF TEMP – | 2 |
| ±0V – | 3 |

## J3

| | |
|---|---|
| PWR-FL-3 – | 1 |
| ENSPS3 – | 2 |
| | 3 |
| | 4 |

## J4

| | |
|---|---|
| PWR-FL 2 – | 1 |
| ENSPS2 – | 2 |
| | 3 |
| | 4 |

## J5

| | |
|---|---|
| PWR-FL-1 – | 1 |
| ENSPS1 – | 2 |
| | 3 |
| | 4 |

## J6

| | | |
|---|---|---|
| ±0V – | 1 2 | – PAD15 |
| | 3 4 | – PAD14 |
| | 5 6 | – PAD13 |
| | 7 8 | – PAD12 |
| | 9 10 | – PAD11 |
| | 11 12 | – PAD10 |
| | 13 14 | – PAD9 |
| | 15 16 | – PAD8 |
| | 17 18 | – PAD7 |
| | 19 20 | – PAD6 |
| | 21 22 | – PAD5 |
| | 23 24 | – PAD4 |
| | 25 26 | – PAD3 |
| | 27 28 | – PAD2 |
| | 29 30 | – PAD1 |
| | 31 32 | – PAD0 |
| | 33 34 | – XDEN |
| | 35 36 | |
| | 37 38 | – XPBOP |
| | 39 40 | – XIOWR |
| | 41 42 | – XIORC |
| | 43 44 | – XDT R |
| | 45 46 | – XAS |
| | 47 48 | – PBINT |
| | 49 50 | – VSP(±0V) |
| | 51 52 | – XDATAEN |
| | 53 54 | – RICEN |
| | 55 56 | – INIT |
| | 57 58 | – PSPWRF |
| | 59 60 | |

## J7

| | | |
|---|---|---|
| LED COM (VP) – | 1 2 | – RST SW COM |
| LKSW COM(±0V) – | 3 4 | – ONLED |
| OFF LED – | 5 6 | – L62-10 |
| F.P. COM (±0V) – | 7 8 | – L62-12 |
| L-RA – | 9 10 | – CON-RST |
| L-NORM – | 11 12 | – ON |
| L-RS – | 13 14 | – LKOFF OFF |
| | 15 16 | – L-LK |
| | 17 18 | – L62-14 |
| | 19 20 | – SYS-RST |

## J9

| | |
|---|---|
| 240VAC – | 1 |
| ENSPSOUT – | 2 |
| CH GND – | 3 |
| ENSPSIN – | 4 |
| 240 VAC-RTN – | 5 |

## J10

| | |
|---|---|
| PCRST – | 1 |
| ±0V – | 2 |

B-03162-FY86-02

## J11

| | | |
|---|---|---|
| UPSATT1 – | 5 9 | – +0V |
| +0V – | 4 8 | |
| | 3 7 | – BATLOW1 |
| | 2 6 | – LOSSAC1 |
| +0V – | 1 | |

Figure 6–25. Power Controller Board Connectors

# SECTION
# 7
# REPAIR

# TABLE OF CONTENTS

## LIST OF ILLUSTRATIONS

# LIST OF ILLUSTRATIONS (CONT)

# LIST OF TABLES

# SECTION 7

# REPAIR

## 7.1 GENERAL

This section consists of removal and replacement procedures for field-replaceable components in the VS-7100 mainframe.

## 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 SYSTEM AND SECURED IN THE PROPER MANNER.

- ALL 'NTERNAL CABLES MUST BE ROUTED IN T' 'E ORIGINAL MANNER WITHIN THE CABLE CLAMPS PROVIDED FOR THAT PURPOSE.

- ALL EXTERNAL CABLING 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.

## 7.2 REMOVAL AND REPLACEMENT PROCEDURES

These paragraphs describe the steps involved in removing and replacing or reinstalling all major field-replaceable components in the VS-7100 mainframe.

## 7.2.1 TOP COVER REMOVAL AND REPLACEMENT

Remove the top cover as follows: (Figures 7-1, 7-2, and 7-3.)

### WARNING

The top cover is heavy. Be careful when perform-
ing the following steps.

1.   At the rear of the cabinet, three Phillips head bolts secure the top
     cover to the mainframe. Loosen and remove the bolts.
2.   Push on the cover until the cover starts to move forward. (Don't pry
     the cover with a screwdriver and don't let the cover become cocked.)
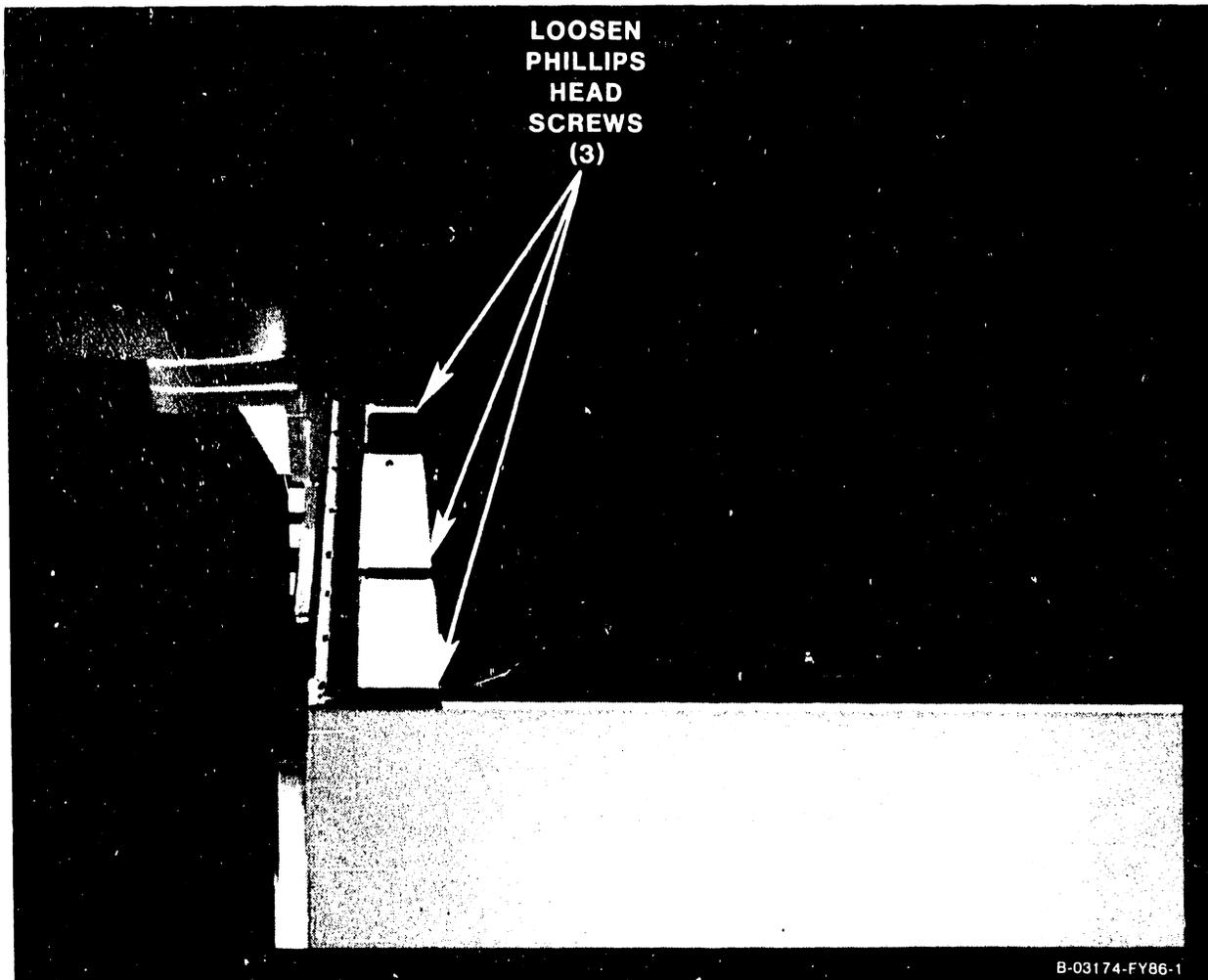


Figure 7-1. Top Cover Removal

3. From the front of the mainframe, grasp the front and rear of the cover and pull it forward about 6".



**3. PULL COVER FORWARD 6"**

**4. TIP UP REAR OF COVER**
**&**
**LIFT OFF**

B-03174-FY86-3
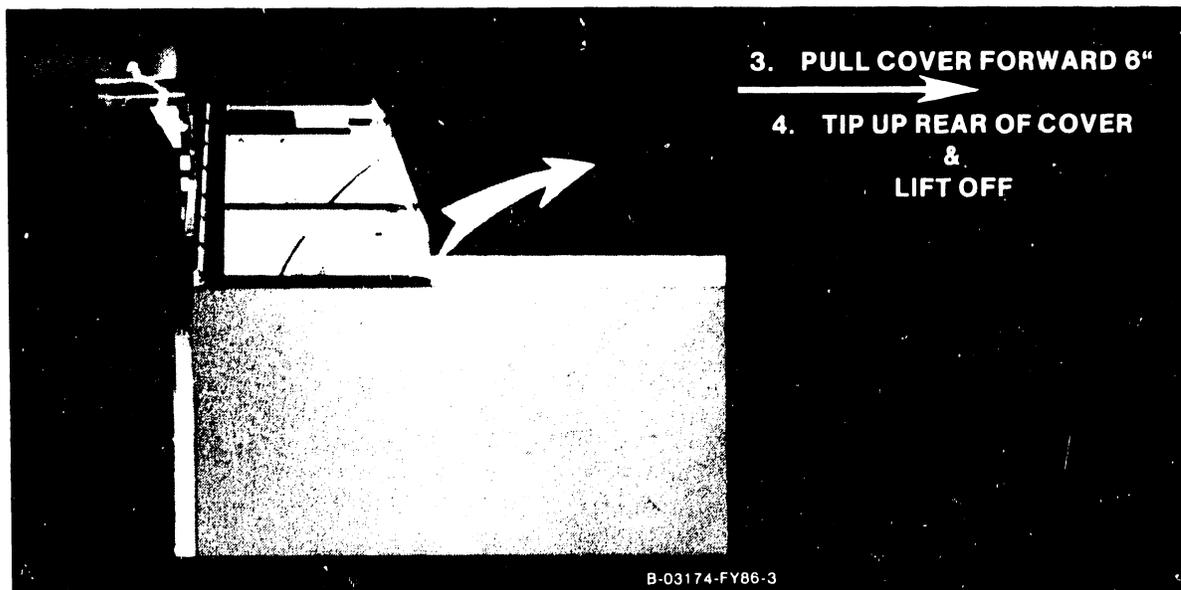
Figure 7-2. Top Cover Removal

4. As the cover moves forward, it will rise in the left and right cam brackets. When the cover is free of the cam brackets, tip it up, and carefully lift it off the mainframe.



**CAM BRACKET**

B-03174-FY86-4
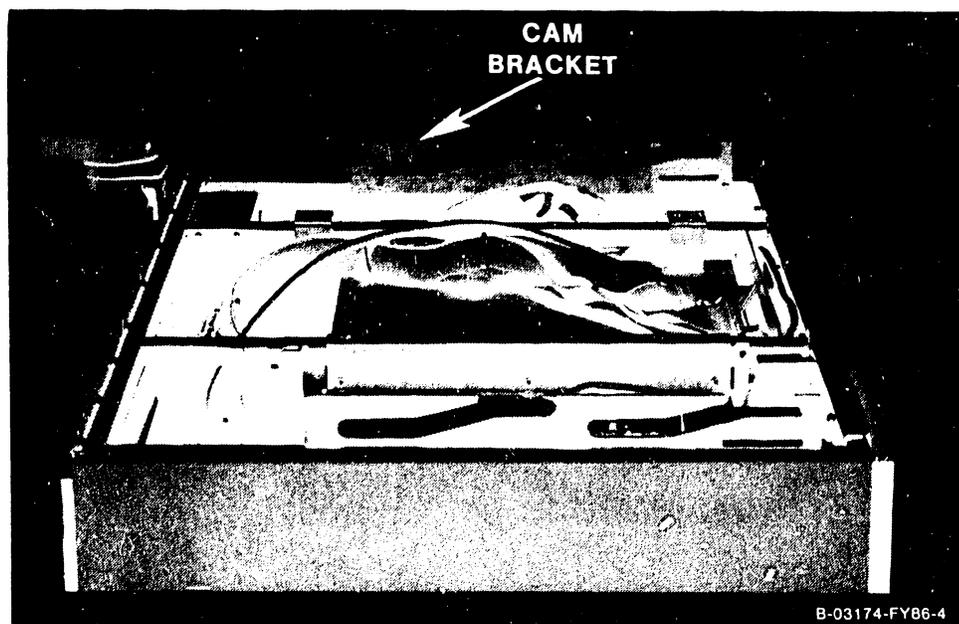
Figure 7-3. Top Cover Removal

Reinstall the top cover as follows:

1. Reinstall the top cover by reversing the removal procedure.
2. Carefully slide the top cover back into the cover cam brackets.
3. Alternately tighten the bolts. Don't let the cover become cocked.

## 7.2.2 LEFT FRONT AIR INLET PANEL REMOVAL AND REPLACEMENT

Remove the left front air inlet panel as follows: (Figure 7-4.)

1. The panel is mounted using two ball studs and two screws. Open the front hinged door and remove the two Air Inlet Panel mounting screws from the left hand support. Grasp the top left corner of the panel and pull it straight out, then lift off the panel.
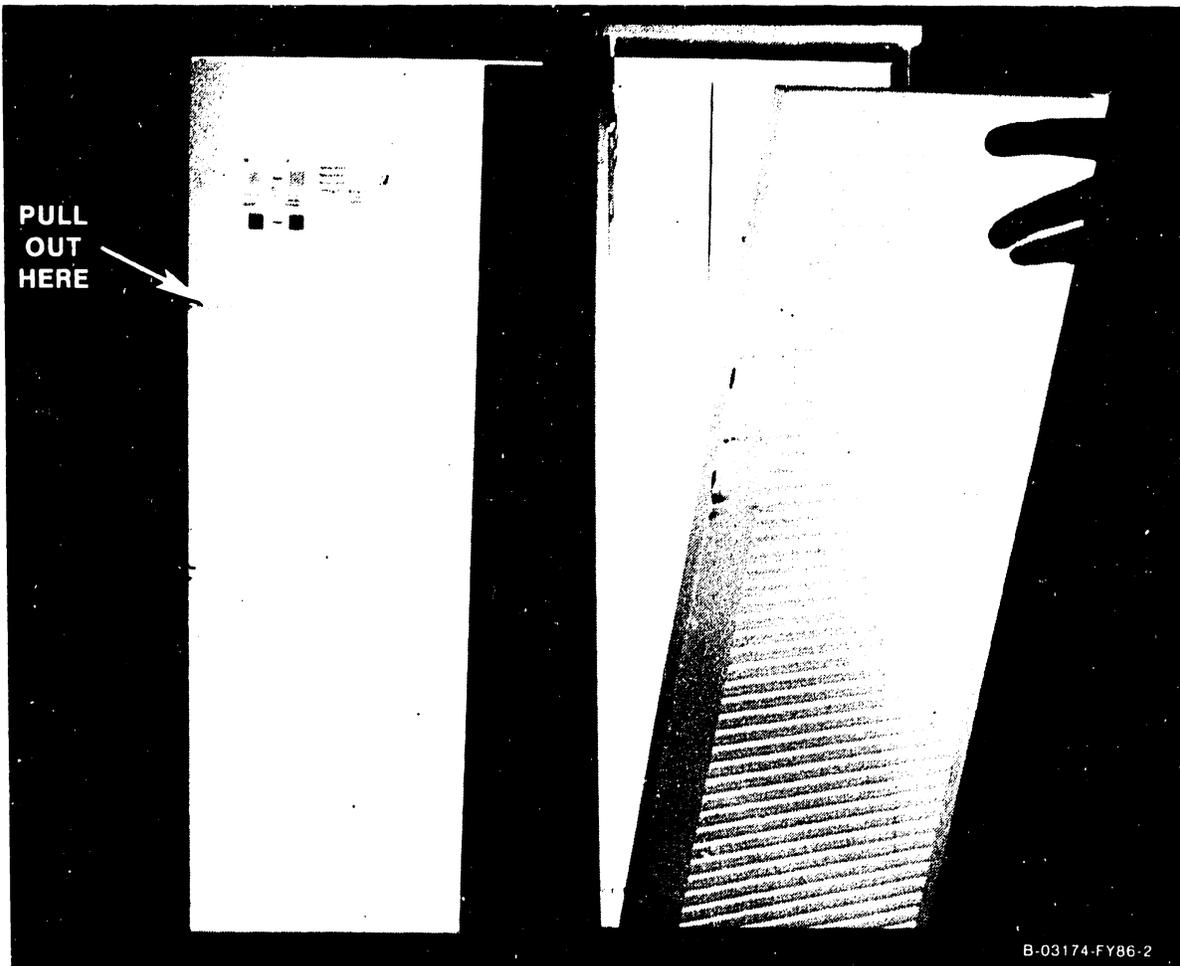


Figure 7-4. Left Front Air Inlet Panel Removal

2. Reinstall the left front panel by reversing the removal procedure.

## 7.2.3 LEFT AND RIGHT SIDE PANEL REMOVAL AND REPLACEMENT

Remove the left or right side panel as follows: (Figure 7-5.)

1.   Remove the top cover as described in paragraph 7.2.1.
2.   Each side panel rests on four latch buttons mounted on the frame. Lift the panel up slightly from the bottom until the latch buttons are centered in the latch button cutouts on the panel. Then pull out the panel.
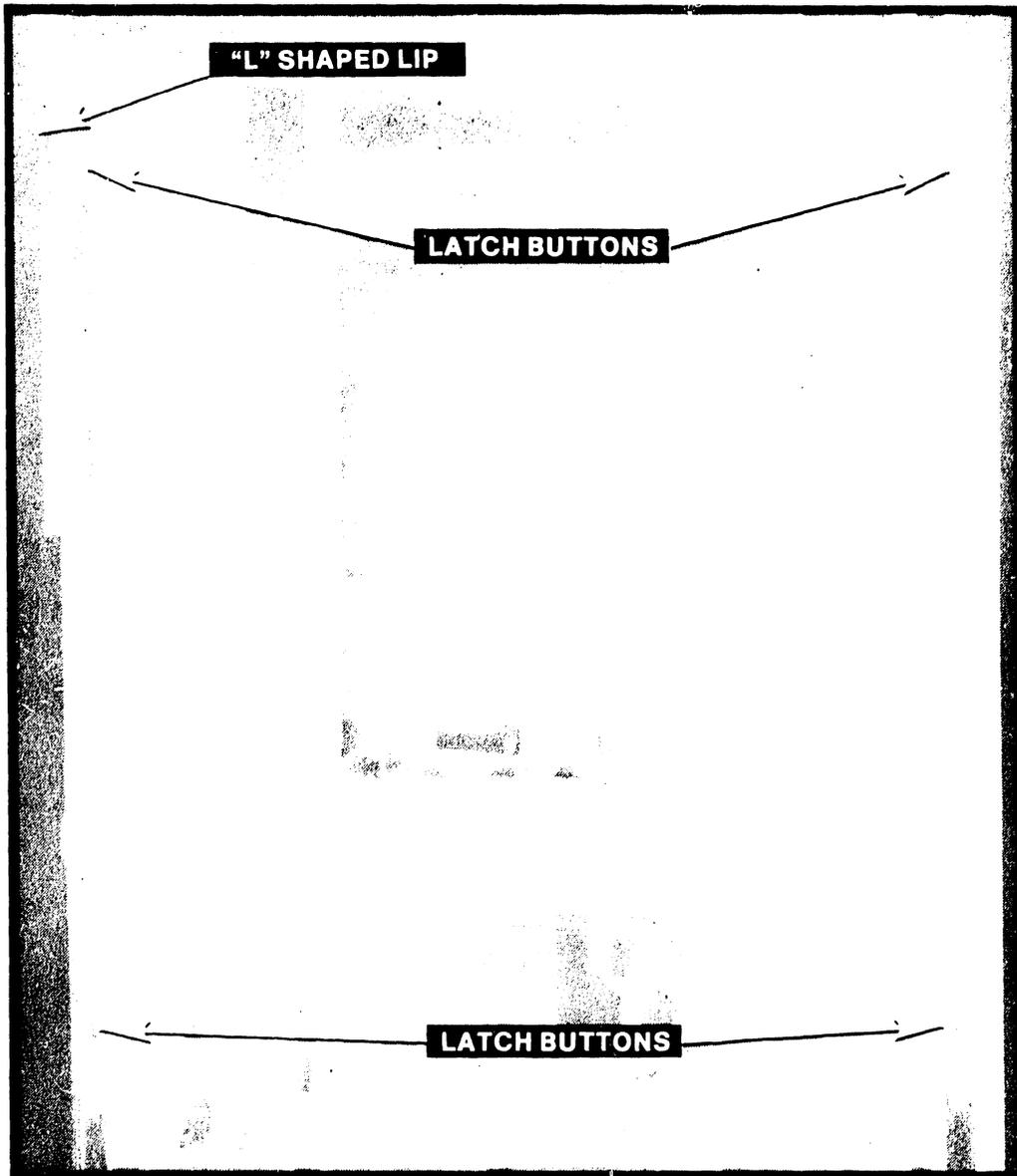


Figure 7-5.  Left and Right Side Panel Removal

Reinstall the side panels as follows:

1.   Reinstall the side panels by reversing the removal procedure.
2.   The panels must be reinstalled with the "L" shaped lip edge toward the rear of the mainframe.

## 7.2.4 CP CIRCUIT BOARD REMOVAL AND REPLACEMENT

There are eight different CP boards found in the VS-7100. The removal and replacement procedures for the different boards are given in the order in which they are found in the backplane (figure 7-7). A board locator label is mounted on the front of the card cage.

1.  Open the front hinged door by turning the top and bottom keyed latches (figure 7-6) counterclockwise, then unlock the slam latch, and remove the black card cage cover by turning the 1/2 turn fasteners.



SLAM LATCH

KEYED LATCHES

B-03174-FY86-5
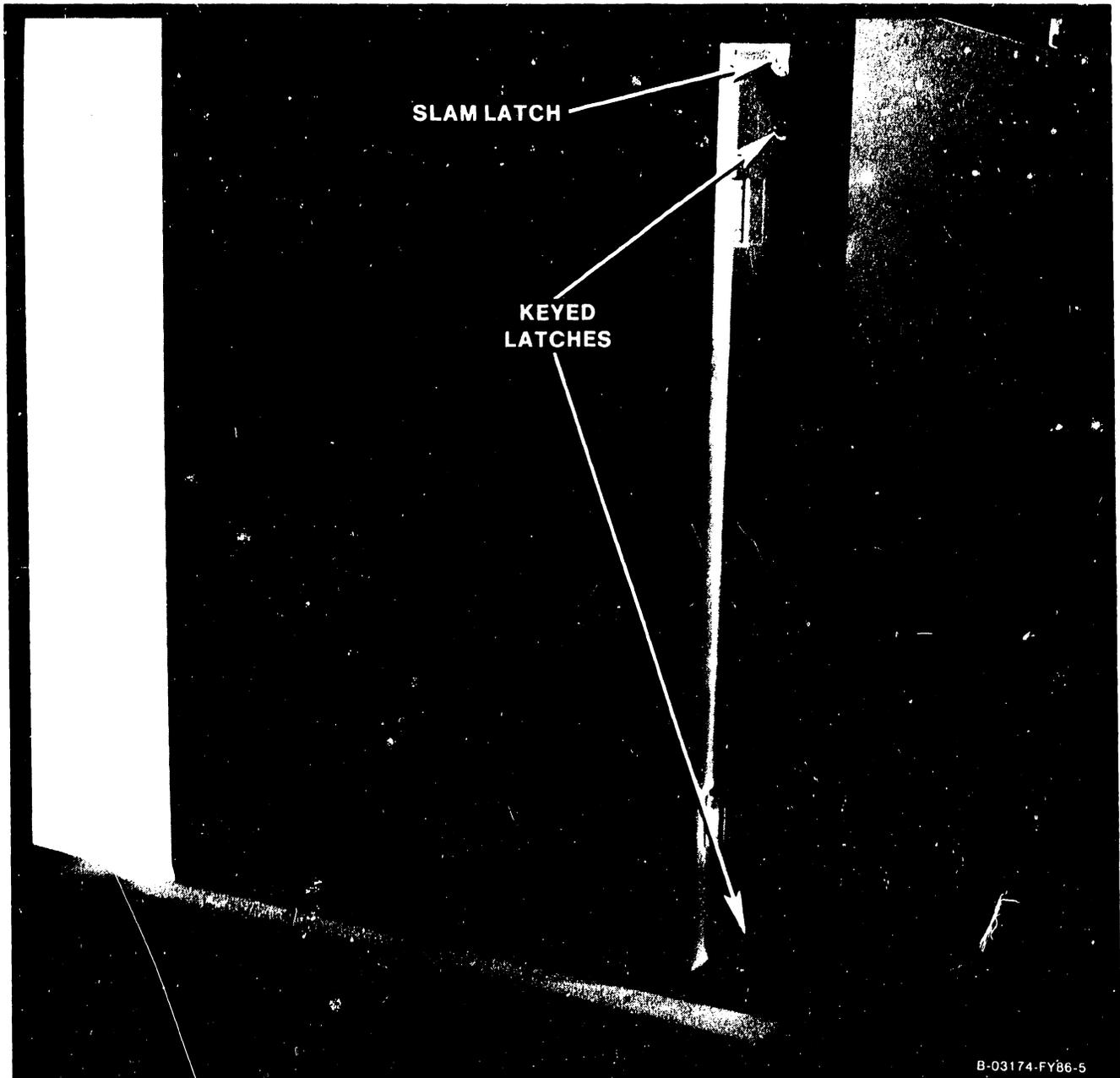
**Figure 7-6. VS-7100 Front Door**

COMPANY CONFIDENTIAL

## CAUTION

Be careful when replacing the large, flexible VS-7100 boards. Make sure that all boards are seated properly in the correct backplane slots. Don't damage the sockets when inserting the boards. Make sure all boards have their component sides facing to the left when viewed from the chassis front.

| I/O | S B I 0 | S B I 1 | M M 1 | M M 0 | M C U | S C U | A T U | A G U | C P U | F P U |
|---|---|---|---|---|---|---|---|---|---|---|

20  19  18  17  16  15  14  13  12  11  10  9  8  7  6  5  4  3  2  1
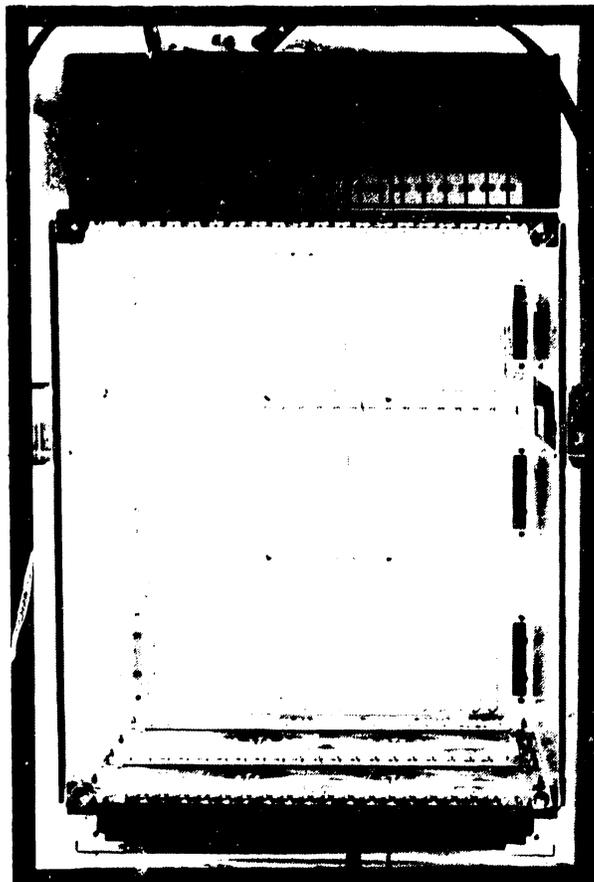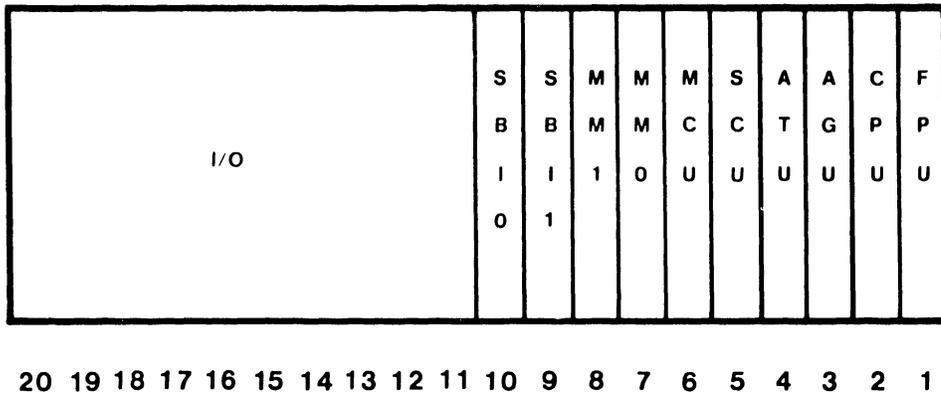
Figure 7-7.  VS-7100 Card Cage

### 7.2.4.1 210-9830 Floating Point Unit Removal and Replacement

1. The 210-9830 Floating Point Unit is used in the VS-7150 only.
2. Enter Control Mode from the Support Control Unit (SCU) Console Mode Menu, and power down the disk drives.
3. Power down the mainframe by pressing the Control Panel Power Off pushbutton (or SW2, Off, on the Power Supply Controller).
4. Open the front hinged door (paragraph 7.2.4).
5. Each circuit board is held in place by two snap locks. One snap lock tab fits under the edge of the top board guide plate and the second snap lock fits under the edge of the bottom board guide plate.
6. Remove the Floating Point Unit (FPU) (figure 7-8) from backplane slot #1 by lifting the snap locks to free the board from the card cage connectors. Once the board is free of the connectors, ease it forward in the board guides and out of the board cage.
7. Insert the new Floating Point Unit in the board guides and slide it back to the backplane.
8. Make sure the board edge connectors are lined up with the backplane connector slots and the snap lock tabs are under the guide plates.
9. Push back on the snap locks to seat the board in the backplane.
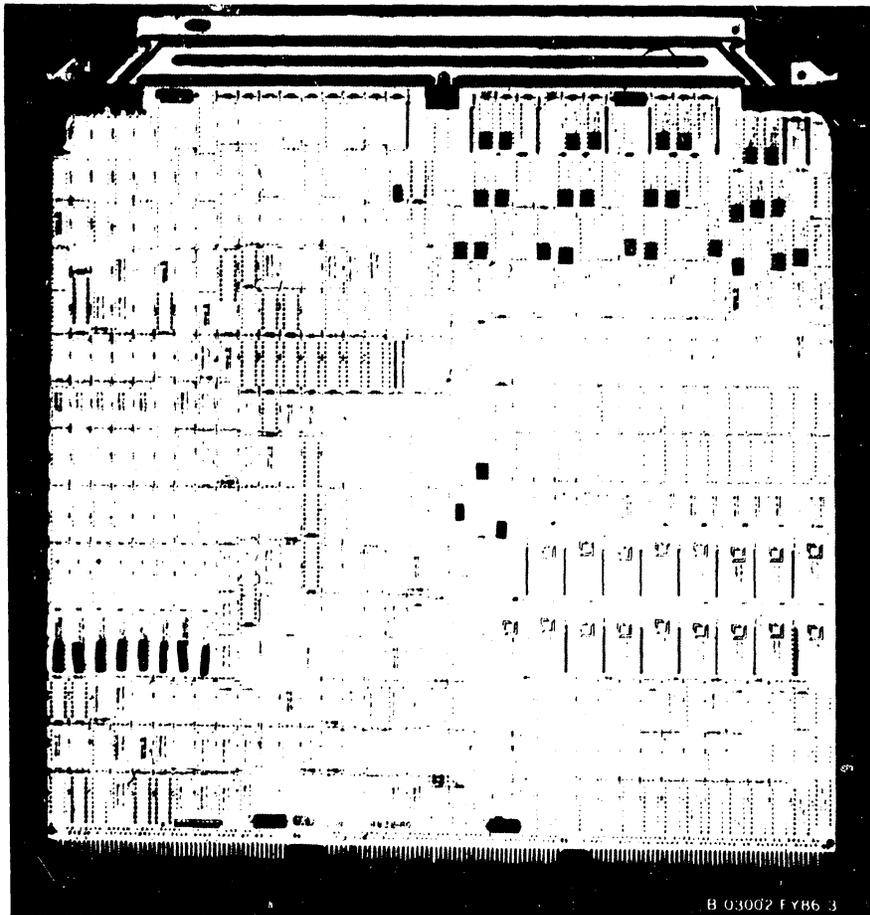


**Figure 7-8. 210-9830 Floating Point Unit**

### 7.2.4.2  210-8846 External Clock Board Removal and Replacement

1.  The External Clock board (figure 7-9) supplies system clock to maintain centralized system component synchronization. It is located on the rear of the backplane at slot #1 (FPU slot), connector B (J1-B).
2.  Power down the system as described in paragraph 7.2.4.1.
3.  Remove enough of the left I/O half panels to allow access to the backplane.
4.  Remove the External Clock board from J1-B by pushing open the snaplock tabs.
5.  Install the new External Clock board at J1-B (with pin 1 of J1 at the top of the board). Push in on the board until the snaplocks close and lock the board in place.



B-03719-FY87-5
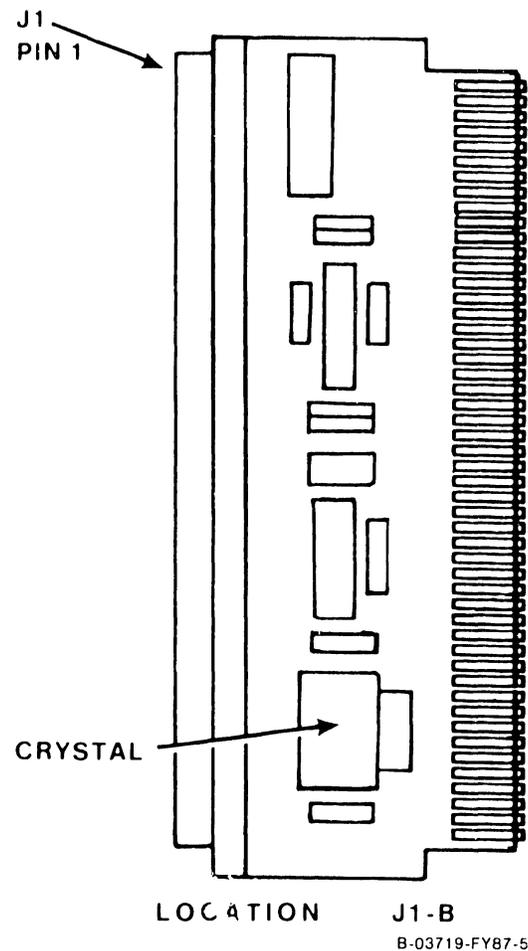
Figure 7-9.  210-8846 External Clock Board

### 7.2.4.3 210-9838/9839/9931 Central Processing Unit Removal and Replacement

1.  The Central Processing Units (CPU) used in the VS-7100 series are:
    a.  210-9838 (VS-7110)
    b.  210-9839 (VS-7120)
    c.  210-9931 (VS-7150)
2.  Before removing the CPU, figure 7-10, from backplane slot #2 disconnect the 50-pin cable from J1.
3.  Remove the CPU in the manner described in 7.2.4.1.
4.  After checking the CPU Clock jumpers at L50 and SPB (Support Packet Bus) Target ID jumpers at L172 (figure 7-10), install the new CPU.
5.  Reconnect the 50-pin cable to J1.
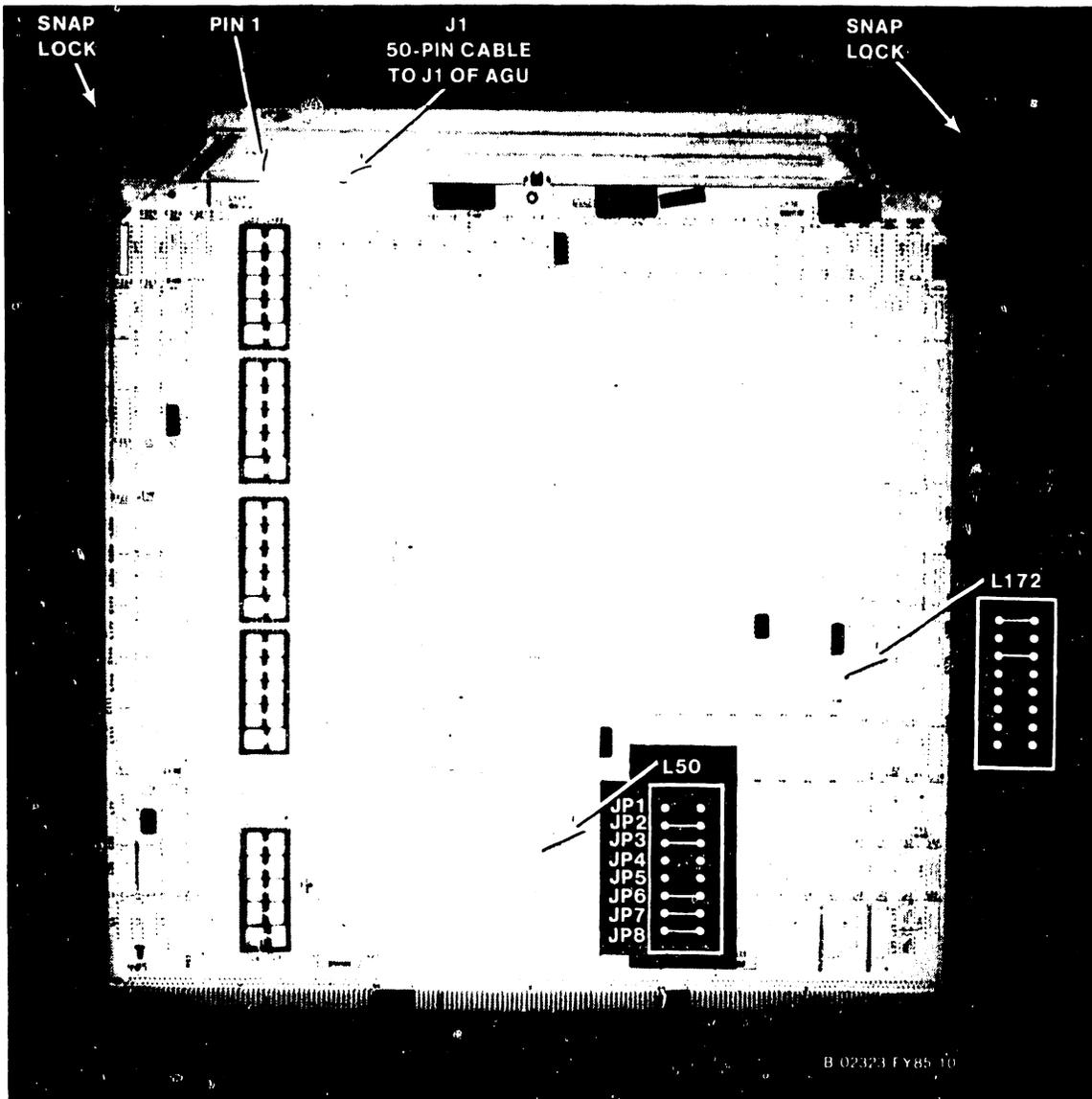


Figure 7-10. 210-9838/9839/9931 Central Processing Unit

### 7.2.4.4 210-9832 Address Generation Unit Removal and Replacement

1.  Before removing the Address Generation Unit (AGU), figure 7-11, from backplane slot #3 disconnect the 50-pin cables from J1 and J2.
2.  Remove the AGU in the manner described in 7.2.4.1.
3.  After checking the oscillator jumpers at L212 (figure 7-11), install the new AGU.
4.  Reconnect the 50-pin cables to J1 and J2.
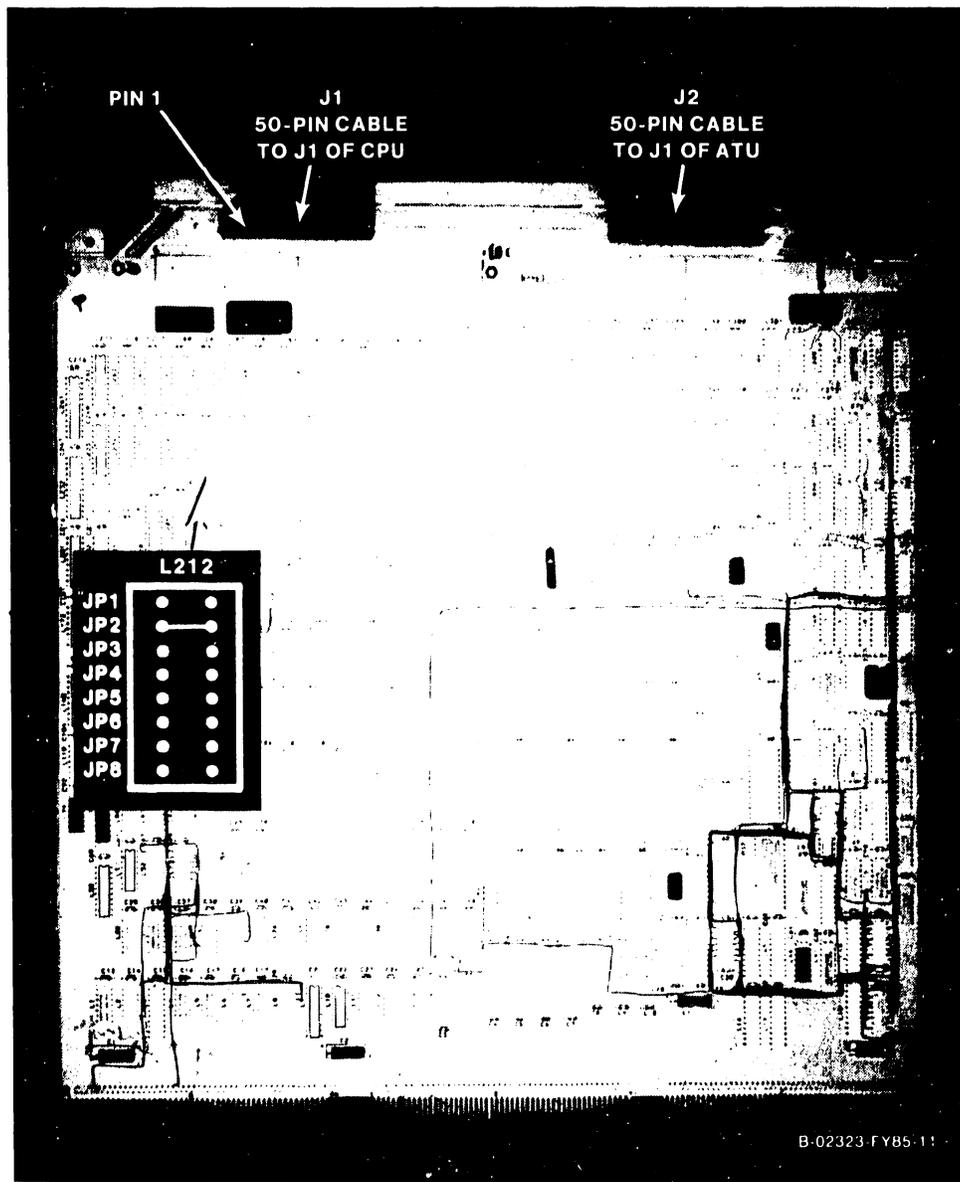


Figure 7-11. 210-9832 Address Generation Unit

### 7.2.4.5  210-9833 Address Translation Unit Removal and Replacement

1. Before removing the Address Translation Unit (ATU), figure 7-12, from backplane slot #4 disconnect the 50-pin cable from J1.
2. Remove the ATU in the manner described in 7.2.4.1.
3. After checking the IPC Destination Processor jumpers at L364 as shown in figure 7-12, install the new ATU.
4. Reconnect the 50-pin cable to J1.
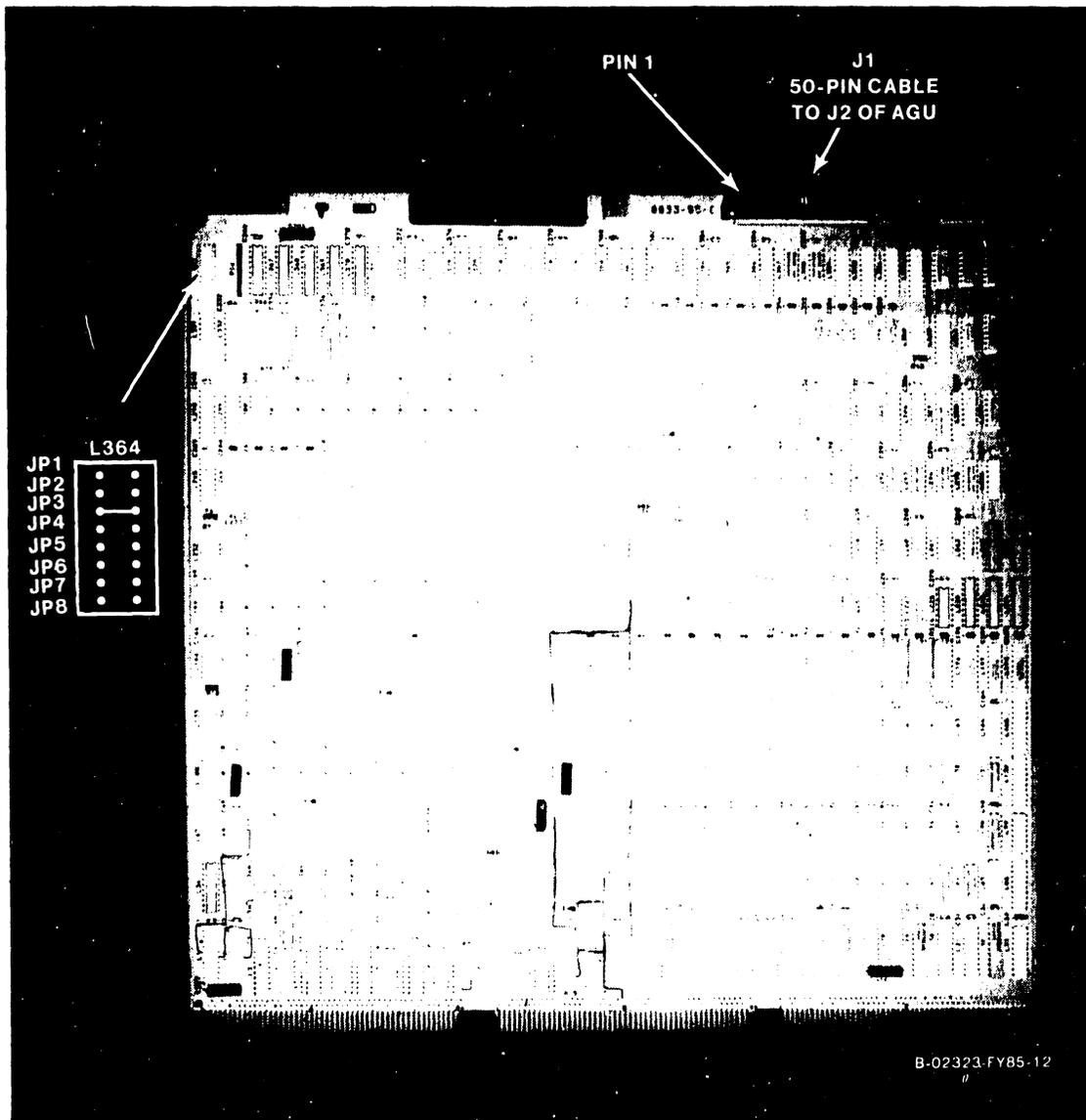


Figure 7-12.  210-9833 Address Translation Unit

### 7.2.4.6  210-8835 Support Control Unit Removal and Replacement

#### NOTE

The diagnostics refer to this board as the Support Control Unit Interface (SCUI).

1. Remove the Support Control Unit (SCU) (figure 7-13) from backplane slot #5 in the manner described in 7.2.4.1. There are no cables, switches, or jumpers on the SCU.
2. Install the new SCU.
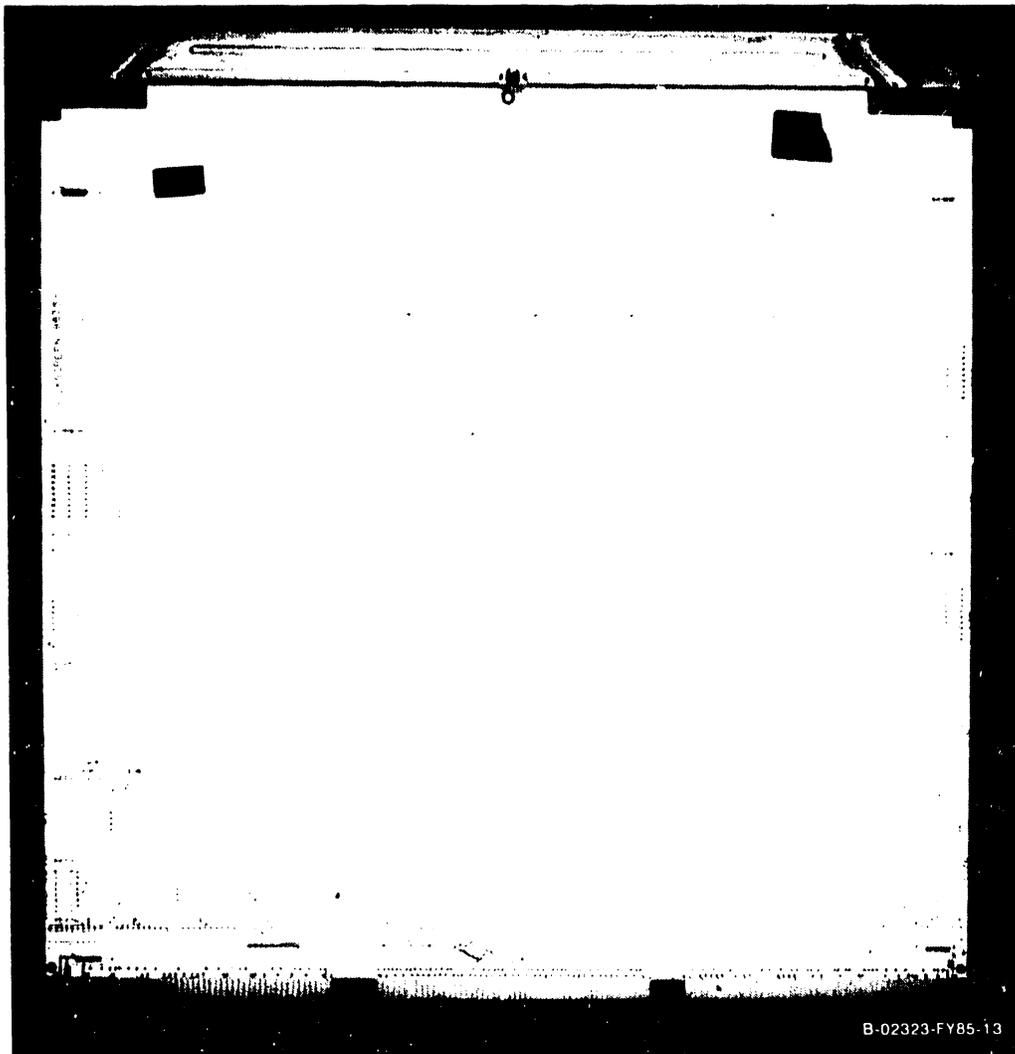


Figure 7-13.  210-8835 Support Control Unit

### 7.2.4.7 210-9834 Memory Control Unit Removal and Replacement

1. Remove the Memory Control Unit (MCU) (figure 7-14) from backplane slot #6 in the manner described in 7.2.4.1. No cables are on the MCU.
2. After checking the MCU System Address ID jumpers at L67, MCU Support Packet Bus ID jumpers at L133, and Main Memory Size Selection jumpers at L133 (figure 7-14 and table 7-1), install the new MCU.
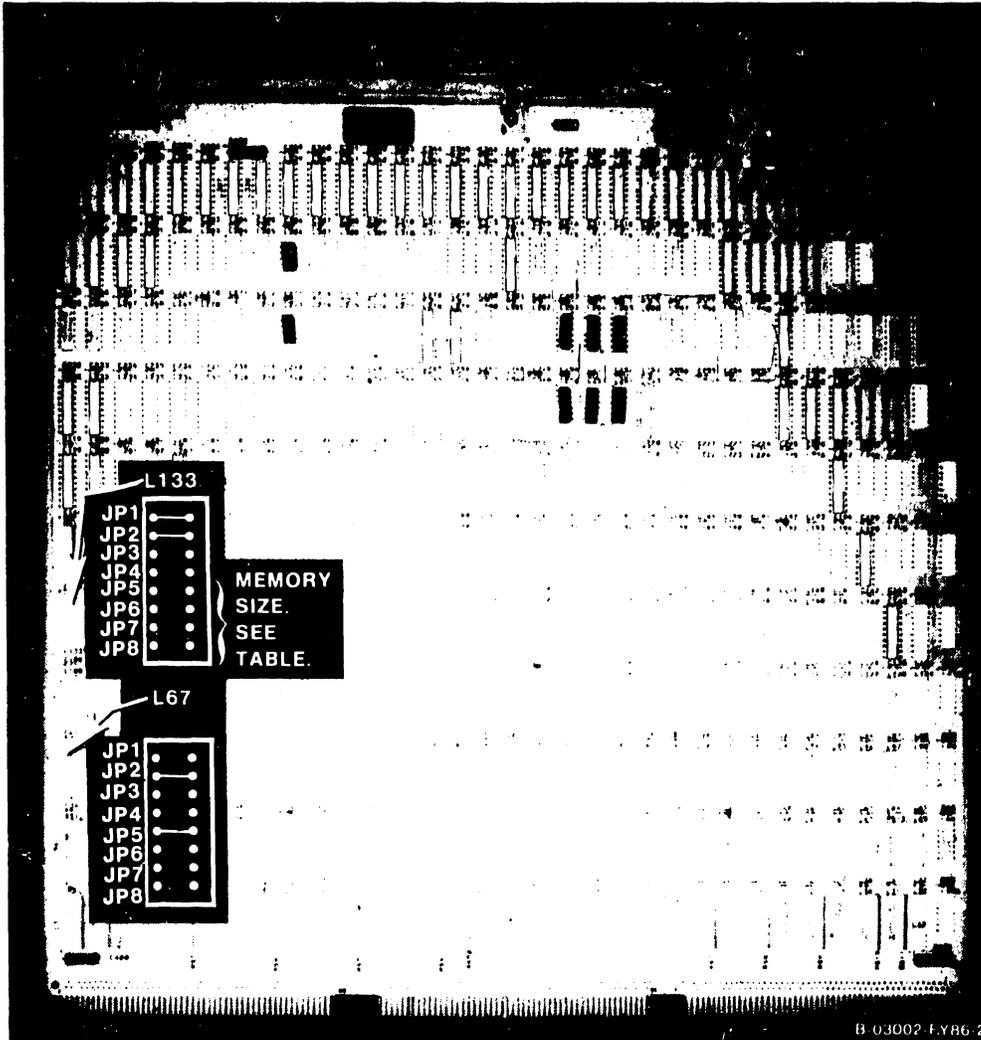


Figure 7-14. 210-9834 Memory Control Unit

Table 7-1. Main Memory Size Selection Jumpers (L133)
(Memory Size In Megabytes)

| Memory Size | 4 M | 8 M | 12 M | 16 M |
|---|---|---|---|---|
| Jumper JP4 | ■ | | ■ | |
| Jumper JP5 | | ■ | ■ | |
| Jumper JP6 | | | | ■ |
| Jumper JP7 | | | | |
| Jumper JP8 | | | | |

### 7.2.4.8  210-8703/210-8703-1 Main Memory Removal and Replacement

1.  Remove the Main Memory board(s) (figure 7-15) from memory slots #0 through #3 as described in 7.2.4.1.
2.  After checking the Memory Module DRAM Loading (table 7-2), install the new Main Memory board. (A 210-8703 board is half-loaded and contains 4 megabytes, while a 210-8703-1 is fully loaded and contains 8 megabytes.) Refer to tables 7-3a and 7-3b for installation examples.
3.  If installing a new board means the main memory capacity will change, refer to paragraph 7.2.4.6 for Main Memory Size Selection Jumpers.
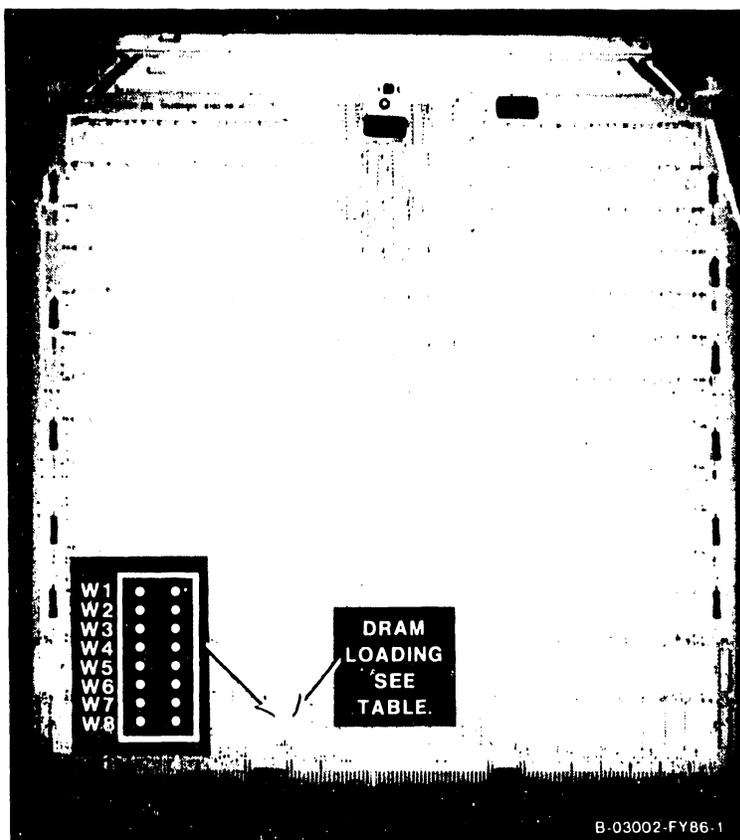


Figure 7-15.  210-8703 Main Memory

Table 7-2.  Main Memory Jumper Configurations

| Memory Module DRAM Loading | W1 | W2 | W3 | W4 | W5 | W6 | W7 | W8 | W9 | W10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 256K Full Load (8 Meg.) | | ■ | | | | ■ | | ■ | | |
| 256K Half Load (4 Meg.) | | | ■ | ■ | ■ | | | ■ | | |

NOTE

1.  ■ = Jumper in.

## NOTES

1. Table 7-3a shows how fully loaded main memory boards must be installed before (to the right of) half loaded main memory boards.
2. Table 7-3b **IS NOT** a legitimate configuration and is given only as an example of incorrect main memory board installation.

### Table 7-3a. Correct Main Memory Board Installation Example

| Board Location For 12 Megabytes | Main Memory Board Part Numbers |
|---|---|
| First board | 210-8703-1 (8 megabytes) |
| Second board | 210-8703 (4 megabytes) |

## CAUTION

The following table is used only as an example of an **INCORRECT** main memory board installation configuration. **DO NOT** install main memory boards in this type of configuration because main memory errors will occur.

### Table 7-3b. Incorrect Main Memory Board Installation Example

| Board Location For 12 Megabytes | Main Memory Board Part Numbers |
|---|---|
| First board | 210-8703 (4 megabytes) |
| Second board | 210-8703-1 (8 megabytes) |

## 7.2.4.9  210-9836 System Bus Interface Removal and Replacement

1.  Remove the System Bus Interface(s) (SBI) (figure 7-16) from SBI back-plane slot(s) #0 or #1 in the manner described in 7.2.4.1.
2.  After checking the I/O Clock Speed jumpers at L125, SBI Identification jumpers at L74, and SPB (Support Packet Bus) Target ID jumpers at L113 (figure 7-16), install the new SBI.
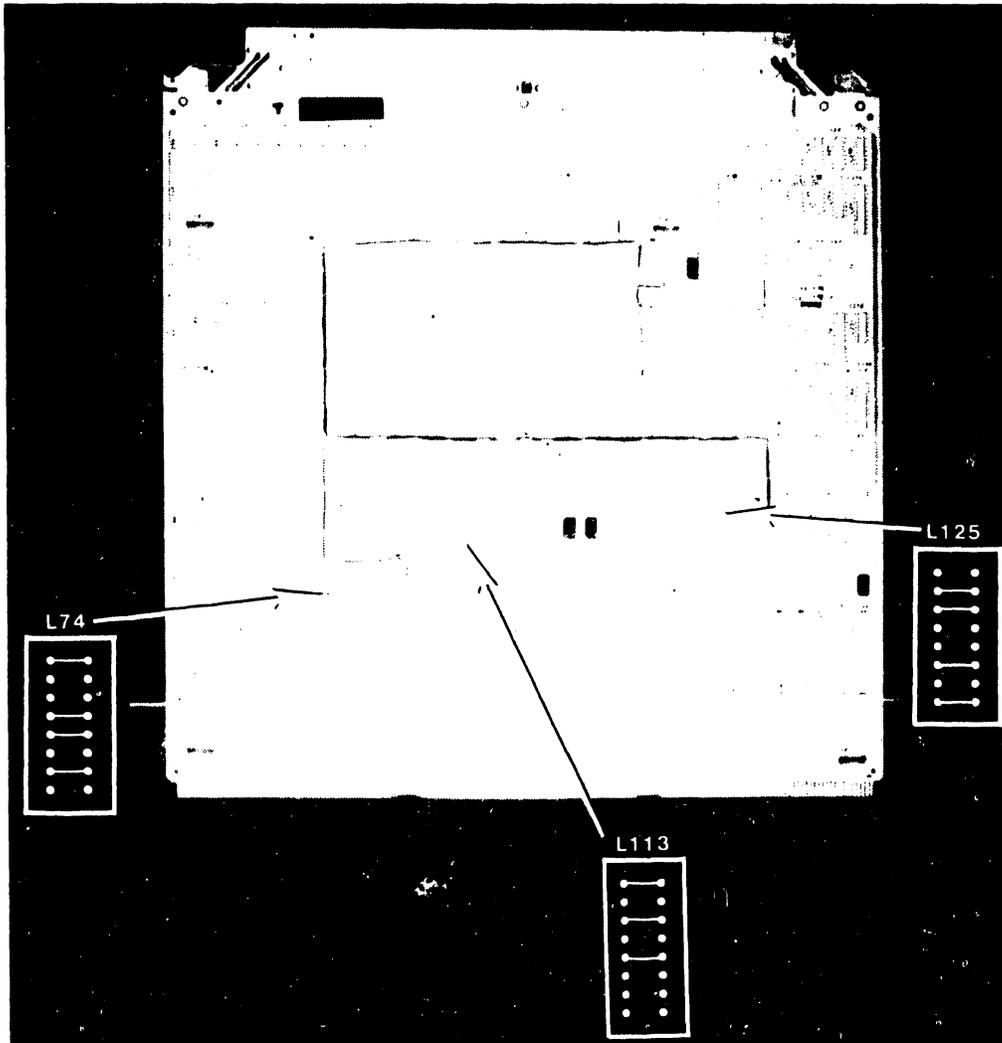


Figure 7-16.  210-9836 System Bus Interface

## 7.2.5 IOC CIRCUIT BOARD REMOVAL AND REPLACEMENT

There are six different IOC assemblies used in the VS-7100. The removal and replacement procedures for the different assemblies are given in the order in which they are found in the backplane, table 7-4.

### NOTE

In the VS-7100, convention requires that I/O slot #1 be reserved for a 23V98 Disk Drive IOC, and I/O slot #3 be reserved for a 23V67 Serial IOC.

### Table 7-4. IOC List

| IOC Type | WLI Part Number | IOC Priority | Physical Backplane Slot Number |
|----------|-----------------|--------------|-------------------------------|
| System Bus Interface | 210-9836 | | SBI #0 (SBI #1 for 2nd SBI) |
| SMD (23V98-1/2/3/4) | 210-8785 | 1 | I/O #1 |
| 32-Port Serial (23V67) | 210-9809 | 3 | I/O #3 |
| Kennedy Tape (23V95-1) | 210-8790 | | |
| Telex Tape (23V95-2) | 210-8789 | | |
| Multiline TC (23V86/96) | 210-8491A | | |
| CIU BLANC (23V79) | 210-8392A | | |
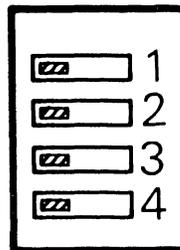


§=switch position

### NOTE

This switch is set the same for all IOCs except the 23V79 CIU BLANC IOC. See each IOC for the location of the switch.

**Figure 7-17. IOC Diagnostic Switch Setting For Power-Up (Except 23V79 [210-8392] CIU BLANC IOC)**

**7.2.5.1** <u>23V67 (210-9809-A)</u> Serial IOC Removal and Replacement

1. The 23V67 drives up to four Active Port Assemblies mounted on the rear panel or in the Cable Concentrator unit. Each APA drives up to eight serial device ports. The IOC also supports FiberWay, the 6550 Gate Array TC controller, and the P-Band WangNet modems, via the Cable Concentrator. Connector J1 on the IOC is always reserved for P-Band. No other type of devices should be connected to J1.
2. Disconnect all cables from the top of the 23V67 Serial IOC (figure 7-18). Note the position of all cables for later reassembly.
3. Remove the IOC as described in 7.2.4.1.
4. After checking the Diagnostic switch setting at L194 as shown in figure 7-17, install the new 23V67.
5. Reconnect all cables.
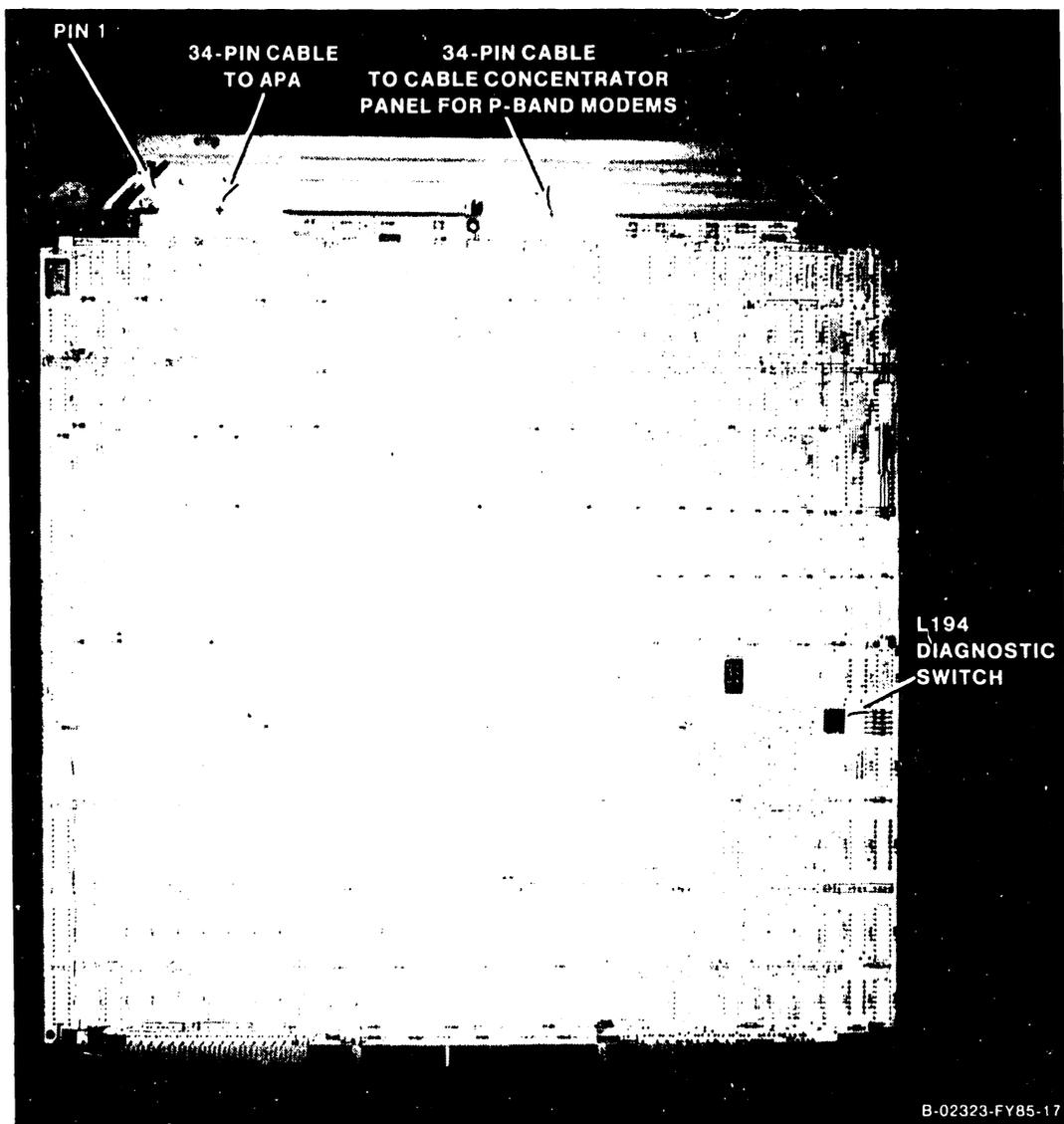


Figure 7-18. 23V67 Serial IOC

### 7.2.5.2 270-0975 Serial IOC APA

1. The 270-0975 Serial Active Port assembly (APA) consists of the 210-8504 APA board and the 210-8509 BNC/TNC board. The assembly is daisy chained to include up to four APA back panels.

2. Figure 7-19 shows one assembly and figure 7-20 shows four assemblies daisy chained. The last APA must be terminated at J2 with a 210-8503 terminator board.
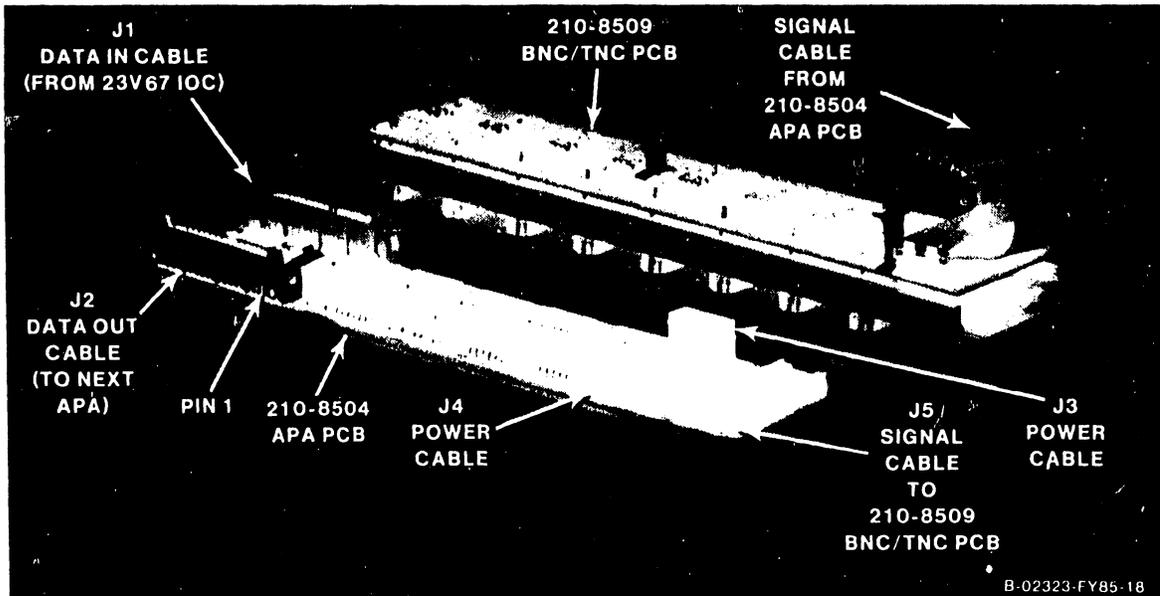


Figure 7-19. 270-0975 APA Assembly
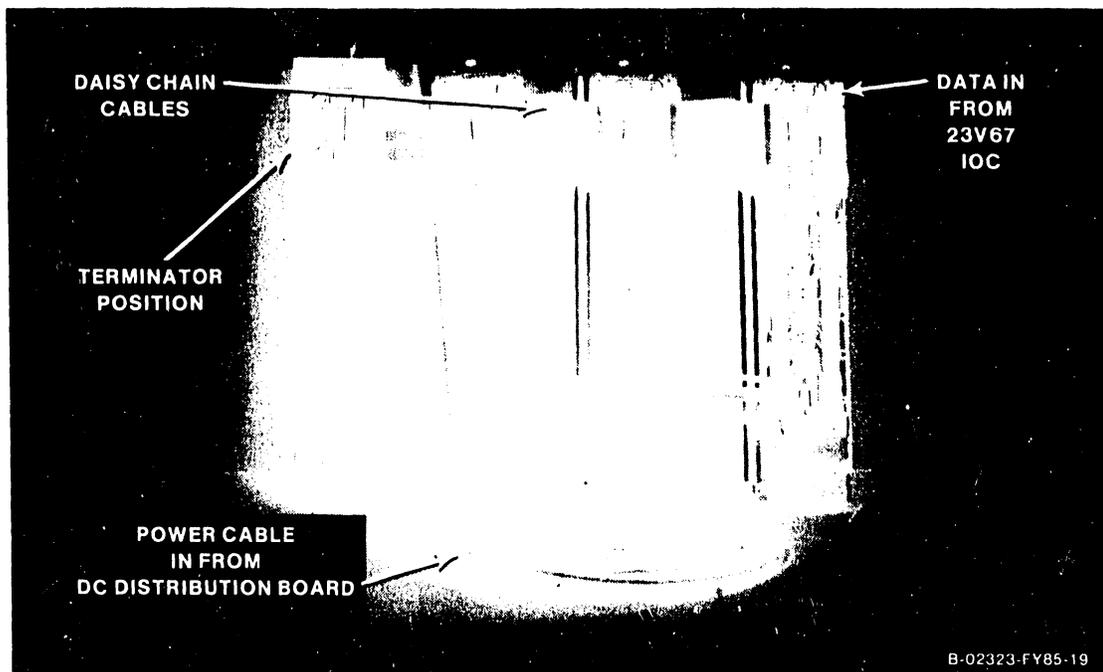


Figure 7-20. Daisy Chained APA Assemblies

### 7.2.5.3 FiberWay Active Port Assembly (FWAPA) Removal and Replacement

1. Disconnect the fiber-optic cables from the front of the FWAPA panel assembly.
2. Disconnect the power jumper cables and/or the FWAPA power cable from the FiberWay active port assembly (FWAPA) to be removed. See figure 7-21.
3. Disconnect the 220-3234 data jumper cables and/or the 220-3471 data ribbon cable from the FWAPA to be removed.
4. Remove the two Phillips head screws that secure the FWAPA to the front of the enclosure.
5. Remove the FWAPA.
6. To replace the FWAPA, reverse the removal procedure.
7. Make sure that a terminator board (210-850J) is installed in the last FWAPA in the group.
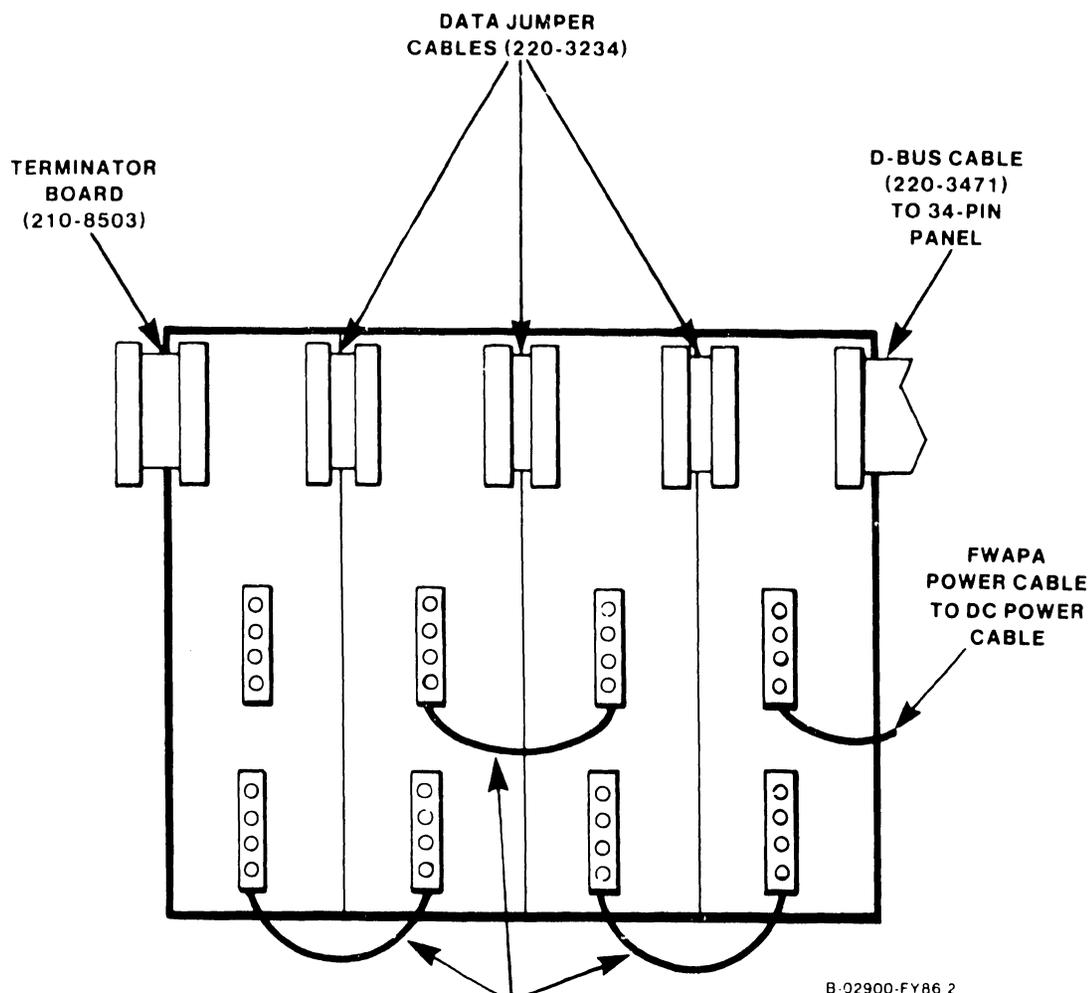


Figure 7-21. FiberWay Active Port Assembly Removal

### 7.2.5.4 6550 Gate Array TC Controller Panel Assembly Removal and Replacement

1.  The 6550 Gate Array TC panel assembly consists of one 210-8714 CPU/-Gate Array board, one 210-8713 Driver/Receiver board, and one 210-8712 Connect board. Order and replace the entire 6550 Gate Array assembly (WLI P/N 270-1016). Do not replace individual boards.

2.  Disconnect the coaxial cable from the BNC/TNC connectors, and the modem cables from the TC connectors of the GATC panel assembly. (Figure 7-22).

3.  Disconnect the power cable from J3 of the 210-8714 CPU/Gate Array board. (Figure 7-23).

4.  Remove the four Phillips head screws that secure the GATC panel assembly to the mainframe.

5.  Remove the GATC panel assembly.

6.  Before installing the new assembly, check the jumpers J1 and J2 on the 210-8713 Driver/Receiver board for X.21 protocol as shown in figure 7-24.

7.  On the 210-8714 CPU board, check the 8-position DIP switch at SW1, and the jumpers at J5 and J6 as shown in figure 7-25. (Switches 5 and 6 are On for support of 128K byte Gate Array without X.21 protocol; switches 5, 6, and 7 are On for support of 128K byte Gate Array with X.21 protocol; all other switches should be off.)

8.  Install the new Gate Array assembly and reconnect the cables.
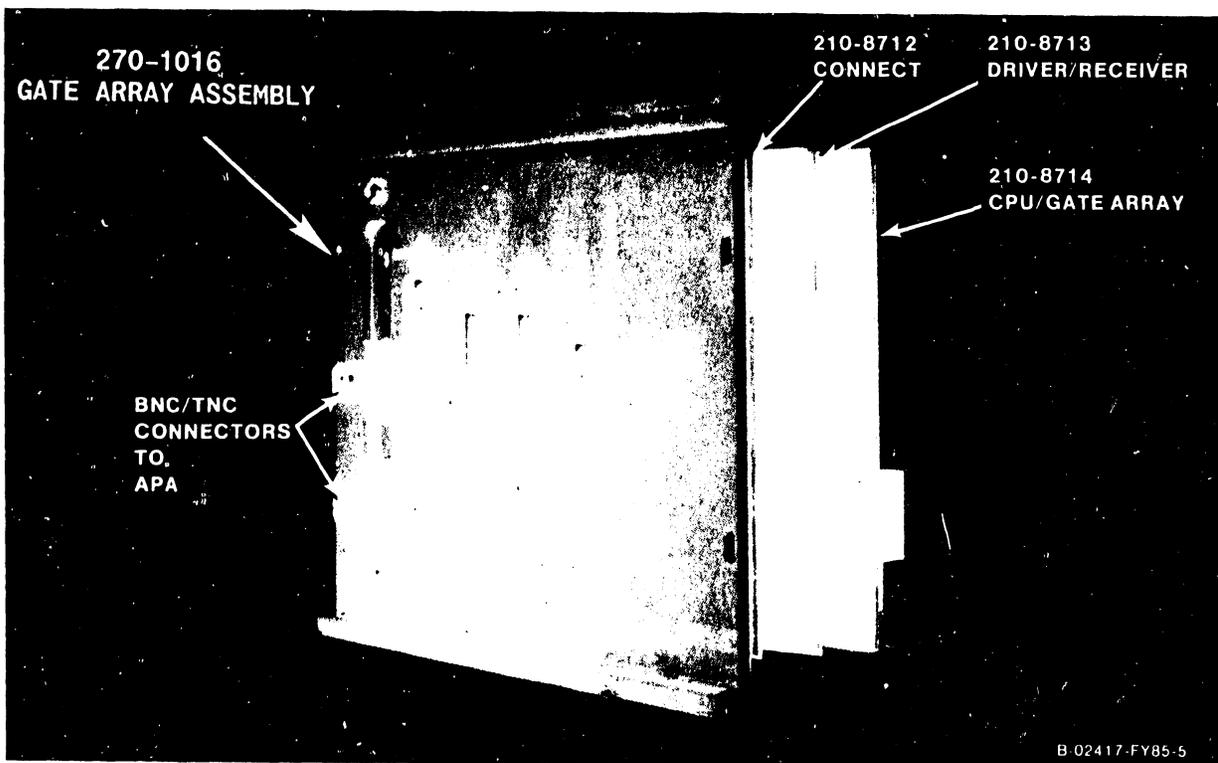


**Figure 7-22. 6550 Gate Array TC Panel Assembly**
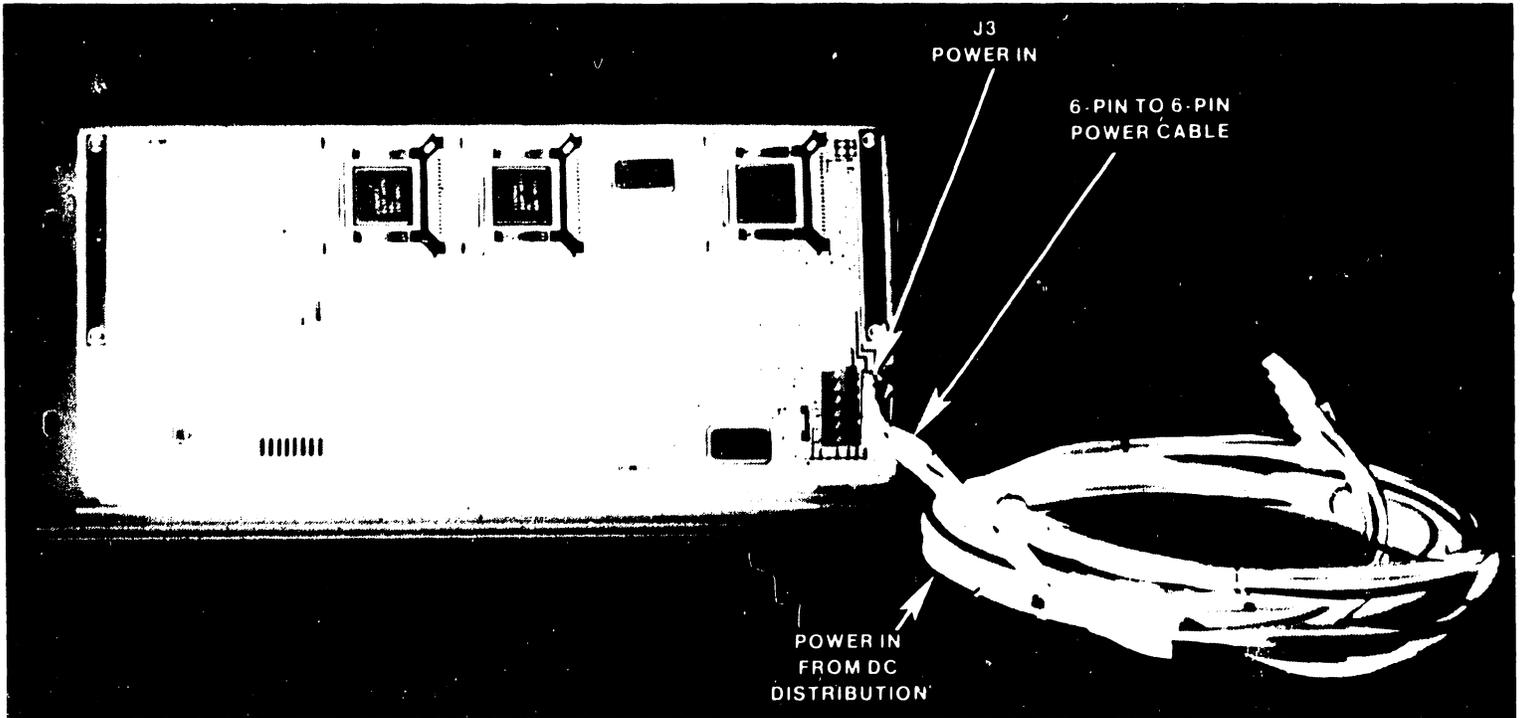
Figure 7-23.  210-8714 CPU/Gate Array Board with Cabling
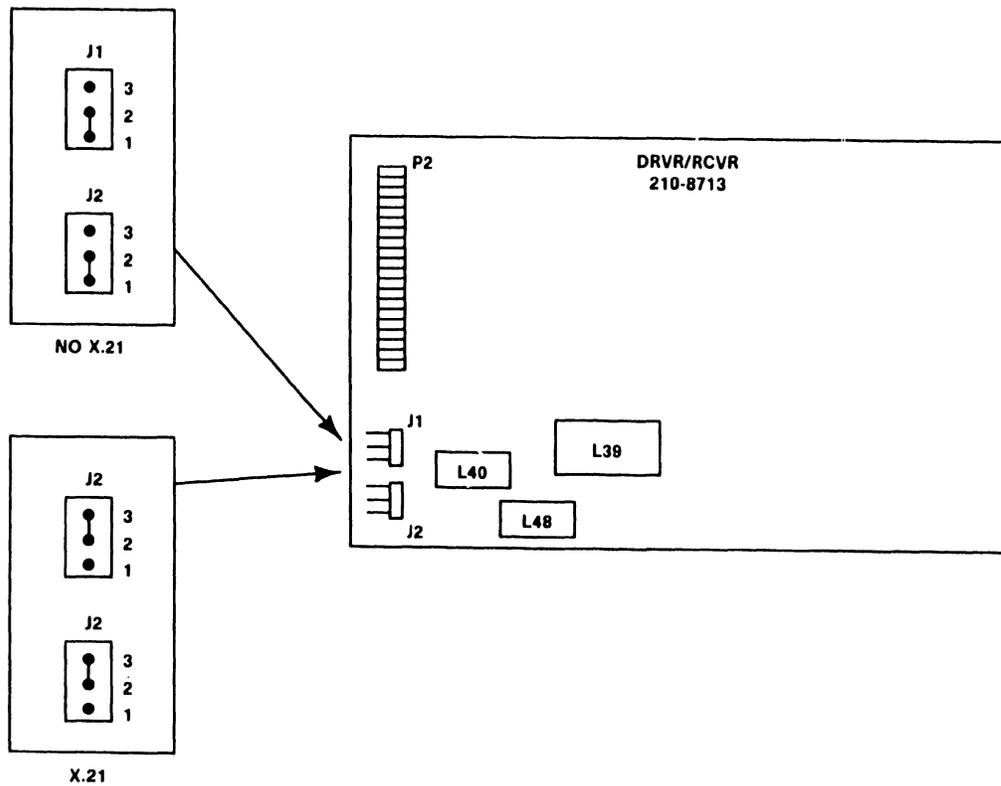


Figure 7-24.  210-8713 GATC Driver/Receiver Board
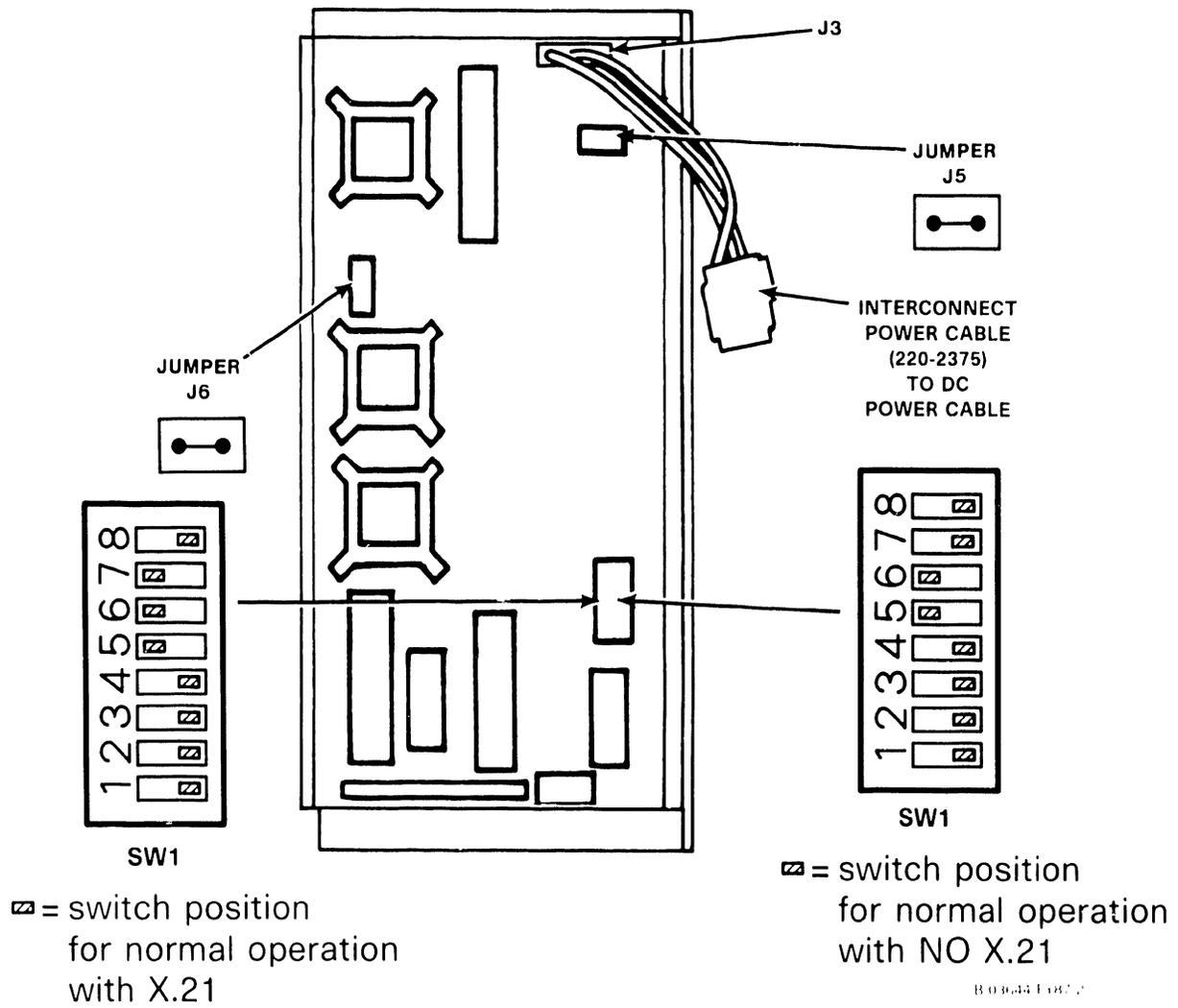
**Figure 7-25. 210-8714 CPU/Gate Array Board**

**NOTES**

a.  Existing 210-8712 E0/R0 board now provides a clock on RS-232 nonstandard interface pin 11. This board is compatible only with existing Wang 2228N Null Modems.

b.  Existing 210-8712 E0/R0 board is supported by the RS-232 Loopback Plug, WLI P/N 420-1040, and the RS-232/366 Loopback Plug, WLI P/N 420-1041.

### 7.2.5.5  <u>23V98-1/2/3/4 (210-8785-D/C/B/A)</u> Disk Drive IOC Removal and Replacement

1. Disconnect all cables from the top of the 23V98 Disk Drive IOC (figure 7-26). Note the position of all cables for later reassembly.
2. Remove the IOC as described in 7.2.4.1.
3. Check the device type switches (figures 7-26 and 7-27, and table 7-5). The two 8-position disk device type switches, SW1 (L76) and SW2 (L51), define the type of drive connected to the 23V98 IOC, ports 0-3. Set the switches for the type of drive(s) connected to the IOC.
4. After checking the Diagnostic switch setting at L247 as shown in figure 7-17, install the new 23V98.
5. Reconnect all cables.
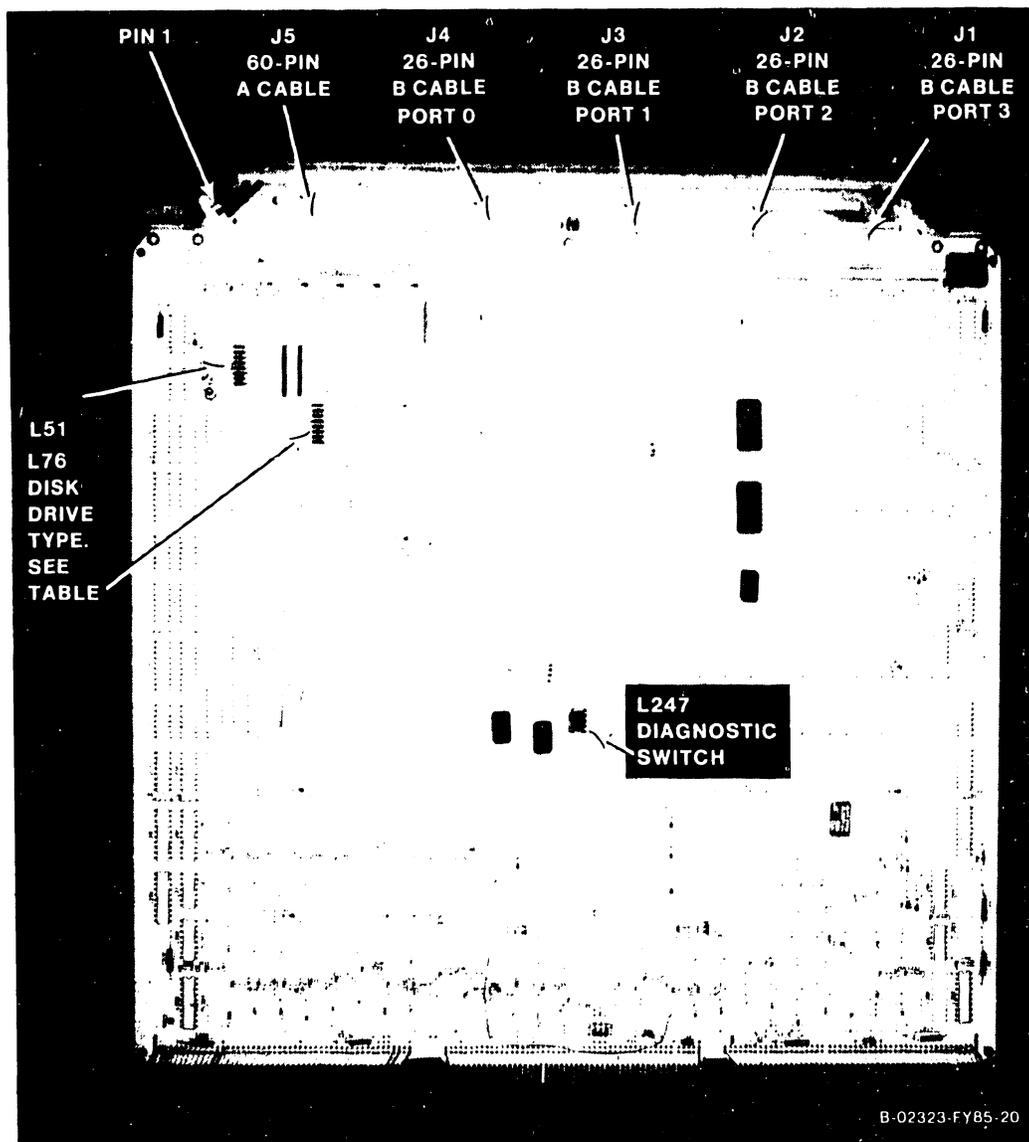


Figure 7-26.  23V98 Disk Drive IOC

```
        Open              Closed
        (Off)             (On)

Bit 1  ┌─ ─ ─┬───────┬─ ─ ─ ─
Bit 2  │     │   2   │  Port
Bit 3  │     │   3   │   0
Bit 4  │     │   4   │
Bit 1  │     │   5   ├─ ─ ─ ─
Bit 2  │     │   6   │  Port
Bit 3  │     │   7   │   1
Bit 4  └─ ─ ─┴───────┴─ ─ ─ ─
```

**SW2 (L51)**

```
        Open              Closed
        (Off)             (On)

Bit 1  ┌─ ─ ─┬───────┬─ ─ ─ ─
Bit 2  │     │   2   │  Port
Bit 3  │     │   3   │   2
Bit 4  │     │   4   ├─ ─ ─ ─
Bit 1  │     │   5   │
Bit 2  │     │   6   │  Port
Bit 3  │     │   7   │   3
Bit 4  └─ ─ ─┴───────┴─ ─ ─ ─
```

**SW1 (L76)**

**Figure 7-27.  Disk Drive
Device Type Switch Settings.**

**Table 7-5.  Disk Drive Types (Formatted)**

| Drive Type | Bit 1 | Bit 2 | Bit 3 | Bit 4 | Hex Code |
|---|---|---|---|---|---|
| 75Meg SMD/76Meg RSD | Closed | Closed | Closed | Closed | 0 |
| 288Meg SMD | Open | Closed | Closed | Closed | 1 |
| 76Meg NEC | Open | Closed | Closed | Open | 9 |
| 147Meg NEC | Closed | Open | Closed | Open | A |
| 600Meg FMD | Open | Open | Closed | Open | B |
| 454Meg CDC/FSD | Closed | Closed | Open | Open | C |
| 314Meg CDC/FSD | Open | Closed | Open | Open | D |
| No Drive | Open | Open | Open | Open | F |

### 7.2.5.6  23V95-1 (210-8790-A) Kennedy Tape IOC Removal and Replacement

1.  Disconnect all cables from the top of the 23V95-1 Kennedy Tape IOC (figure 7-28). Note the position of all cables for later reassembly.
2.  Remove the IOC as described in 7.2.4.1.
3.  After checking the Diagnostic switch setting at L130 as shown in figure 7-17, install the new 23V95-1.
4.  Reconnect all cables.
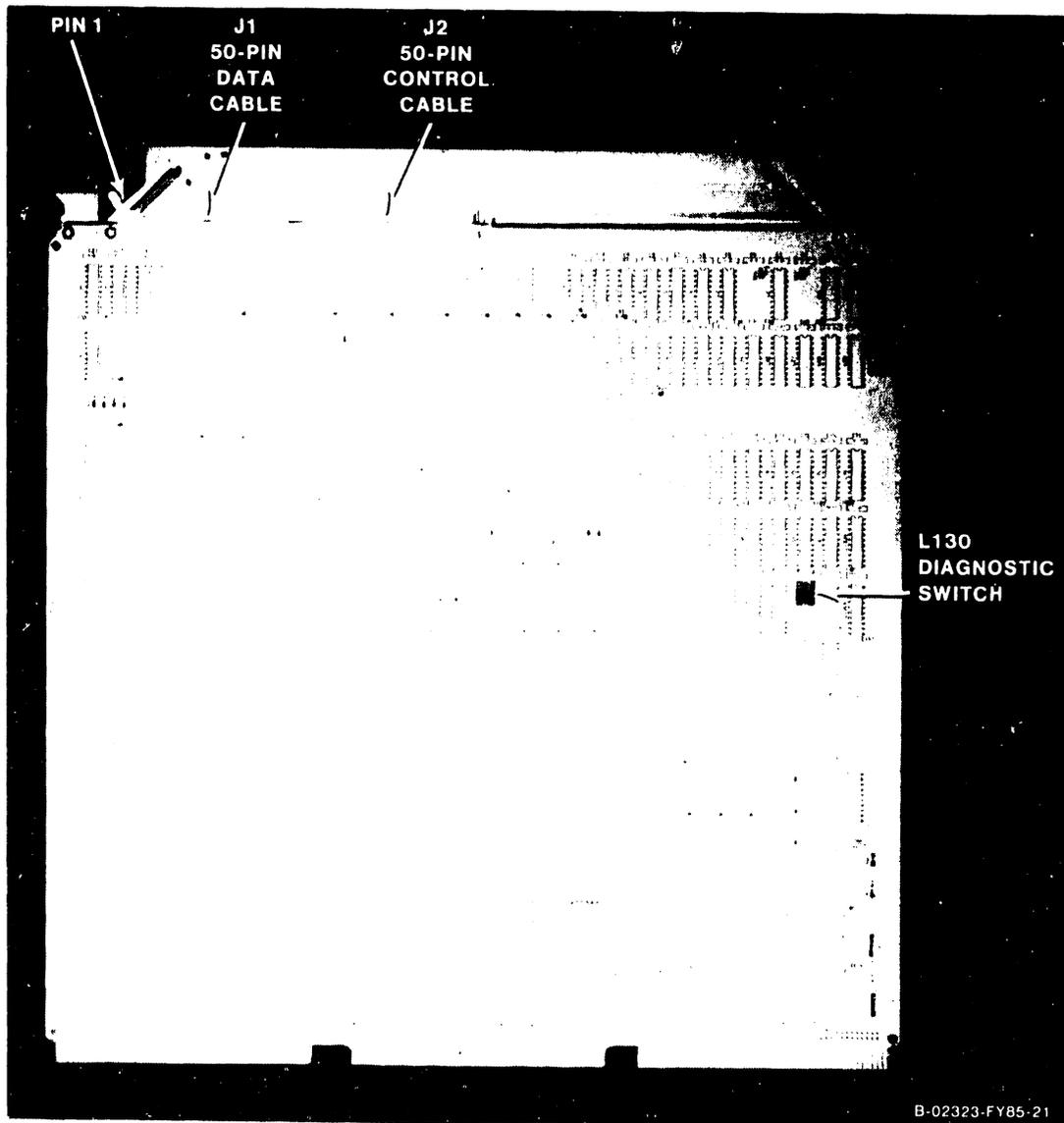


Figure 7-28.  23V95-1 Kennedy Tape IOC

### 7.2.5.7 23V95-2 (210-8789-A) Telex Tape IOC Removal and Replacement

1. Disconnect all cables from the top of the 23V95-2 Telex Tape IOC (figure 7-29). Note the position of all cables for later reassembly.
2. Remove the IOC as described in 7.2.4.1.
3. After checking the Diagnostic switch setting at SW1 as shown in figure 7-17, install the new 23V95-2.
4. Reconnect all cables.
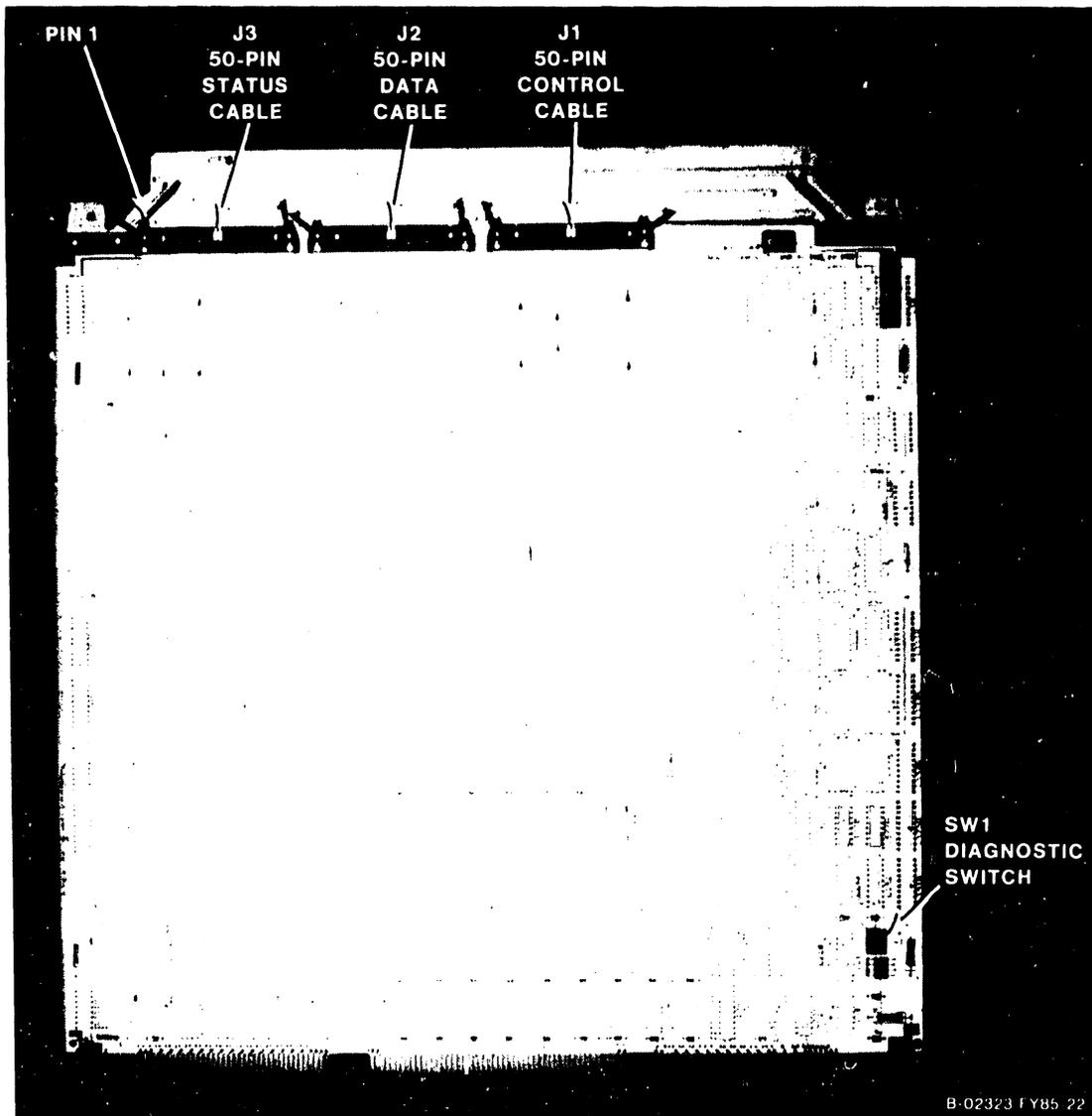


Figure 7-29.  23V95-2 Telex Tape IOC

### 7.2.5.8 23V86/96 (210-8491) Multiline TC IOC Removal and Replacement

1. The 23V86/96 drives up to four Multiline TC (MLTC) back panels. Each back panel drives up to four TC lines.
2. Disconnect all cables from the top of the 23V86/96 Multiline TC IOC (figure 7-30). Note the position of all cables for later reassembly.
3. Remove the IOC as described in 7.2.4.1.
4. Check the 8-position port select loop back test switch at L220. (Figure 7-30, and table 7-6.) For normal power-up, all switches are on.
5. After checking the Diagnostic switch setting at L202 as shown in figure 7-17, install the new 23V86/96.
6. Reconnect all cables.
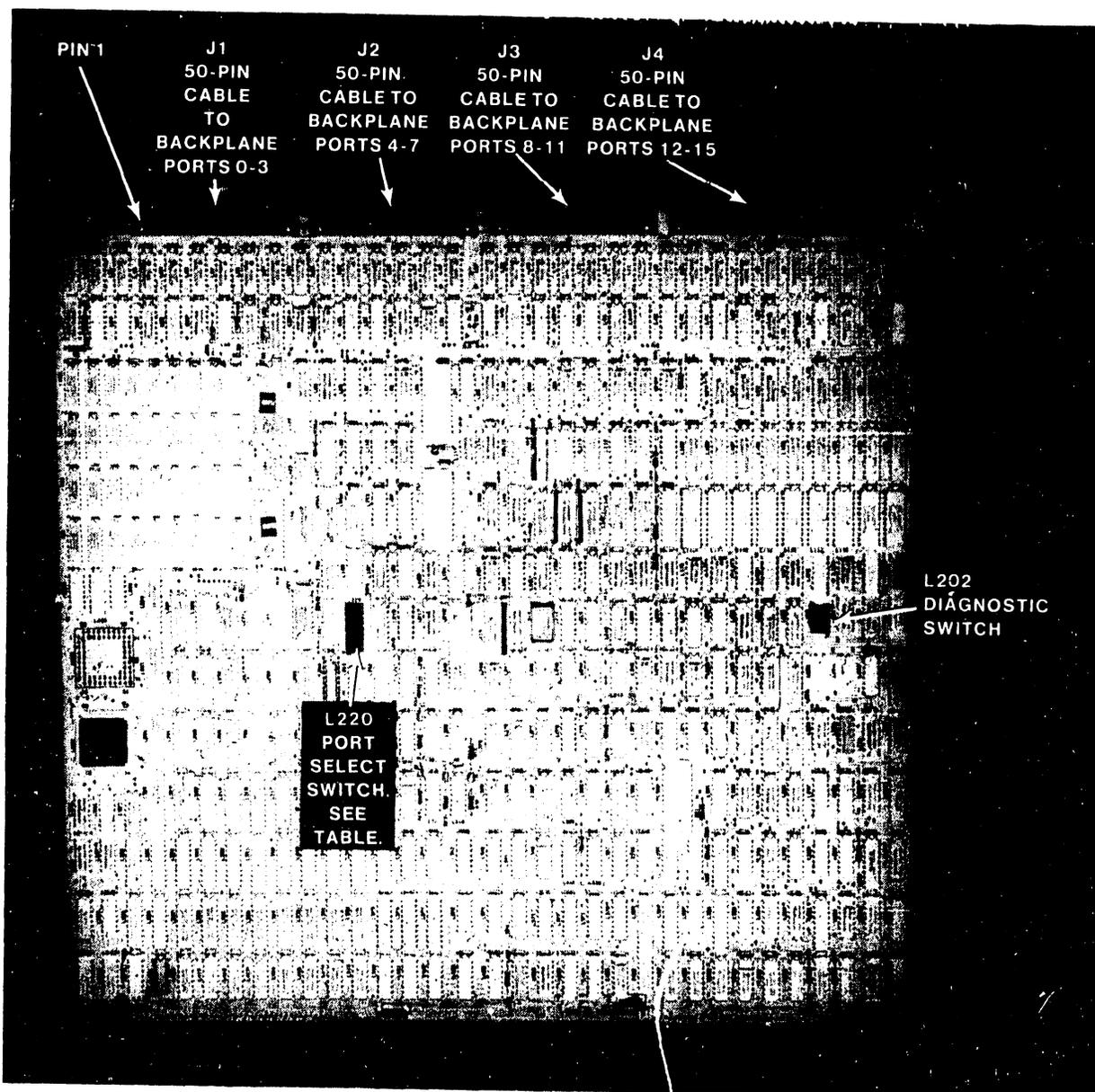


Figure 7-30. 23V86/96 Multiline TC (MLTC) IOC

## Table 7-6. 23V86/96 Multiline TC IOC Port Select Switch Settings For Loopback Test

| SW8 | SW7 | SW6 | SW5 | SW4 | SW3 | SW2 | SW1 | | | |
|-----|-----|-----|-----|--------|--------|--------|--------|--------------|----|-----------|
| | | | | Closed | Closed | Closed | Closed | Select Port 0 | (If 5 Open) |
| | | | | Closed | Closed | Closed | Open | Select Port 1 | ( " ) |
| | | | | Closed | Closed | Open | Closed | Select Port 2 | ( " ) |
| | | | | Closed | Closed | Open | Open | Select Port 3 | ( " ) |
| | | | | Closed | Open | Closed | Closed | Select Port 4 | ( " ) |
| | | | | Closed | Open | Closed | Open | Select Port 5 | ( " ) |
| | | | | Closed | Open | Open | Closed | Select Port 6 | ( " ) |
| | | | | Closed | Open | Open | Open | Select Port 7 | ( " ) |
| | | | | Open | Closed | Closed | Closed | Select Port 8 | ( " ) |
| | | | | Open | Closed | Closed | Open | Select Port 9 | ( " ) |
| | | | | Open | Closed | Open | Closed | Select Port 10 | ( " ) |
| | | | | Open | Closed | Open | Open | Select Port 11 | ( " ) |
| | | | | Open | Open | Closed | Closed | Select Port 12 | ( " ) |
| | | | | Open | Open | Closed | Open | Select Port 13 | ( " ) |
| | | | | Open | Open | Open | Closed | Select Port 14 | ( " ) |
| | | | | Open | Open | Open | Open | Select Port 15 | ( " ) |

Closed ————————————————————————— Deselects single channel mode.

Open ——————————————————————————— Selects single chan. mode (Sws. 1 → 4 select chan.)

————————————————————————————————— Not used

Closed ——————————————————————————— Deselects burn-in

Open ————————————————————————————— Selects burn-in

## NOTES

1. Location of switch is L220.
2. For normal operation, all L202 Diagnostic switches must be as shown in figure 7-30, and all L220 switches must be Closed (on).
3. To select burn-in, switch 8 Open (off), all others Closed (on).

### 7.2.5.9 Multiline TC Back Panel AssemblyRemoval and Replacement

1. The Multiline TC back panel assembly consists of one Serial Communications Link (SCL) subassembly with panel, two Block Connector boards, and up to four interface subassemblies with displays. Replace subassemblies, not individual boards. The Block Connector can be replaced individually.
2. Figure 7-31 shows the Multiline TC back panel assembly, with cabling.
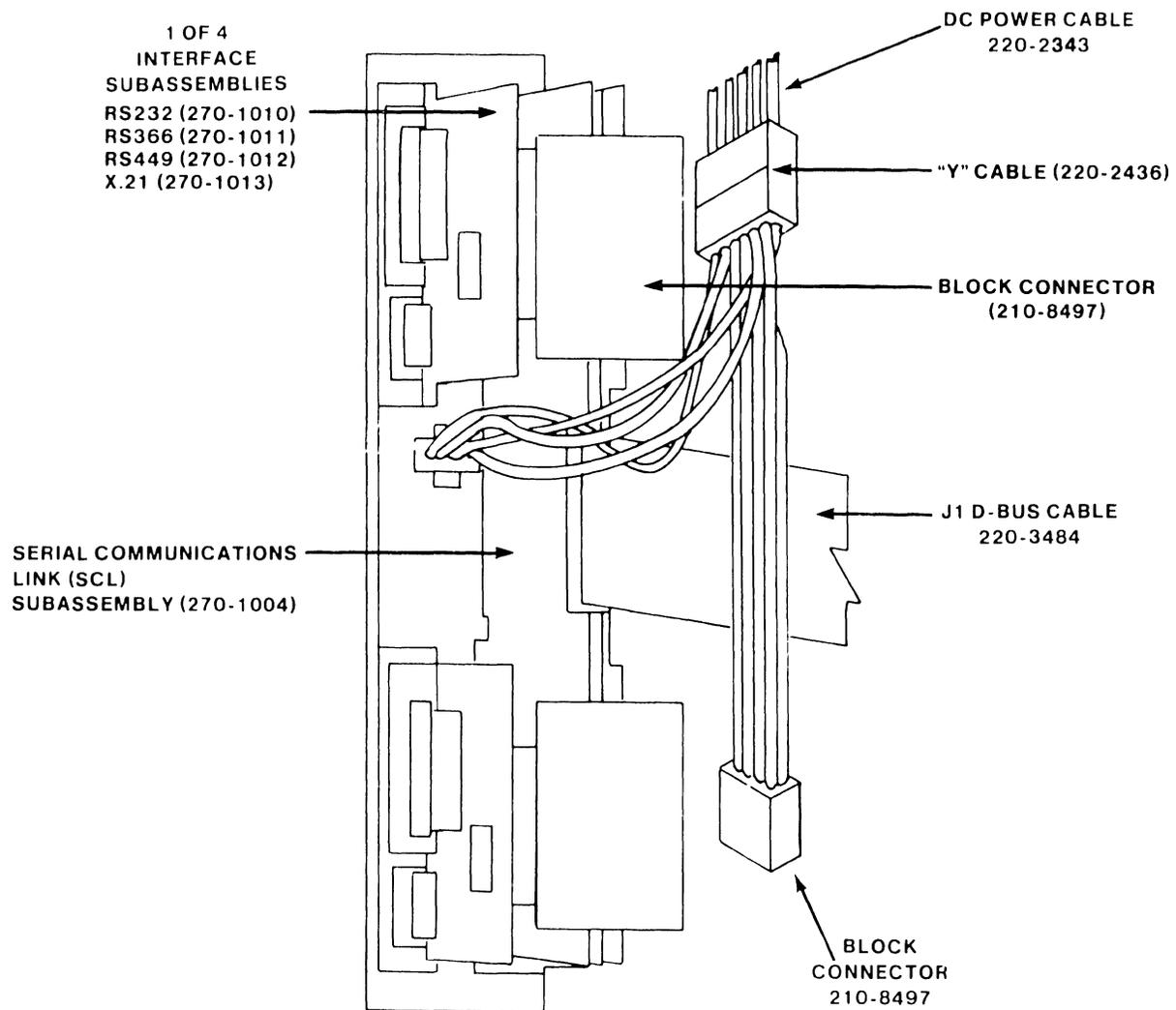


Figure 7-31. Multiline TC Back Panel Assembly

### 7.2.5.10  23V79 (210-8392-A) CIU BLANC IOC Removal and Replacement

1. Disconnect the cable from the top of the 23V79 CIU BLANC IOC (figure 7-32). Note the position of all cables for later reassembly.
2. Remove the IOC as described in 7.2.5.1.
3. After checking the 8-position CIU Functions switch setting at L272 as shown in figures 7-32 and 7-33, install the new 23V79.
4. Reconnect the cable.



**J1**
**40-PIN CABLE**
**TO 210-8391**
**CAB J1**

**PIN 1**

**L272**

| ▨ | 1 |
| ▨ | 2 |
| ▨ | 3 |
| ▨ | 4 |
| ▨ | 5 |
| ▨ | 6 |
| ▨ | 7 |
| ▨ | 8 |

▨ = switch position

B-02675-FY86-12
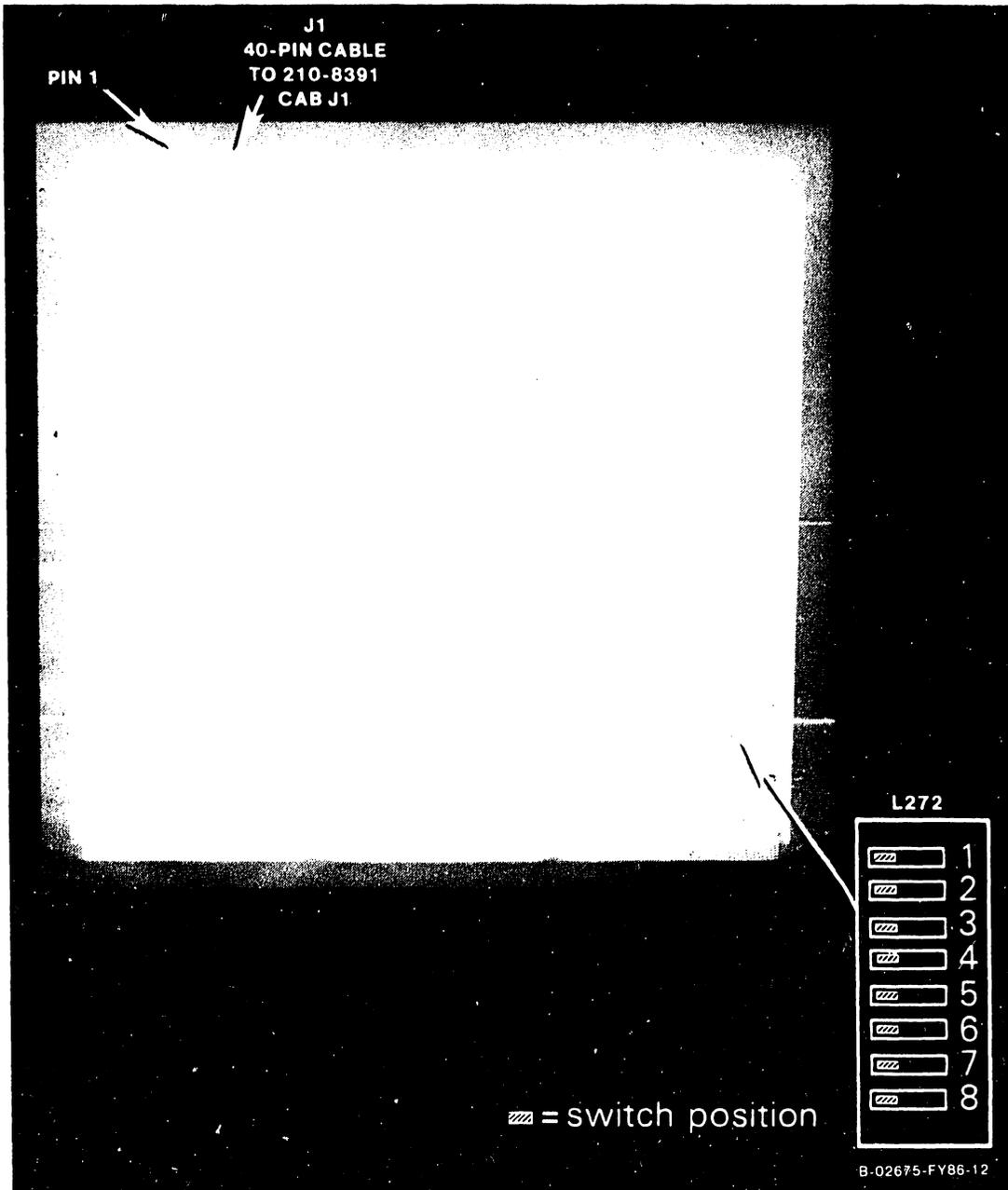
**Figure 7-32.  23V79 CIU BLANC IOC**

Table 7-7. BLANC IOC Functions Switch (L272)

| SW# | Function |
|---|---|
| 1 | Not used |
| 2 | Not used |
| 3 | |
| Open | CAB/modem present |
| Closed | CAB/modem not present |
| 4 | |
| Open | No External Loopback Test |
| Closed | External Loopback Test |
| 5 | |
| Open | Don't loop on BIT test |
| Closed | Loop on BIT test |
| 6 | |
| Open | CIU installed in VS |
| Closed | CIU installed in test bed |
| 7 | Not used |
| 8 | |
| Open | All other switches not valid |
| Closed | All other switches valid |
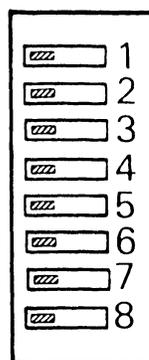


= switch position

B-02675-FY86-10

Figure 7-33. BLANC IOC Functions Switch (L272) Normal Settings

### 7.2.5.11 279-0722 CAB Board/Single Chan. Modem Assembly Removal/Replacement

1. The 279-0722 CIU CAB board/Single Channel 10MBPS RF Modem must be replaced as an entire assembly. The 210-8391 CIU CAB board (figure 7-34) is mounted on top of the Single Channel modem (figure 7-35).
2. Remove the top cover as described in paragraph 7.2.1 and the left side panel as described in paragraph 7.2.3.
3. Disconnect the transmit and receive cables from the front of the modem.
4. Disconnect the 40-pin signal cable from J2 of the CAB board.
5. Disconnect the 3-pin power connector from J3 of the CAB board.
6. Disconnect the 5-pin power connector from J2 of the modem.
7. Remove the two Phillips head screws securing the CAB/Modem assembly to the mainframe and remove the assembly.
8. After checking the 3-position jumper shown in figure 7-34, install the new assembly.
9. Reconnect all cables.
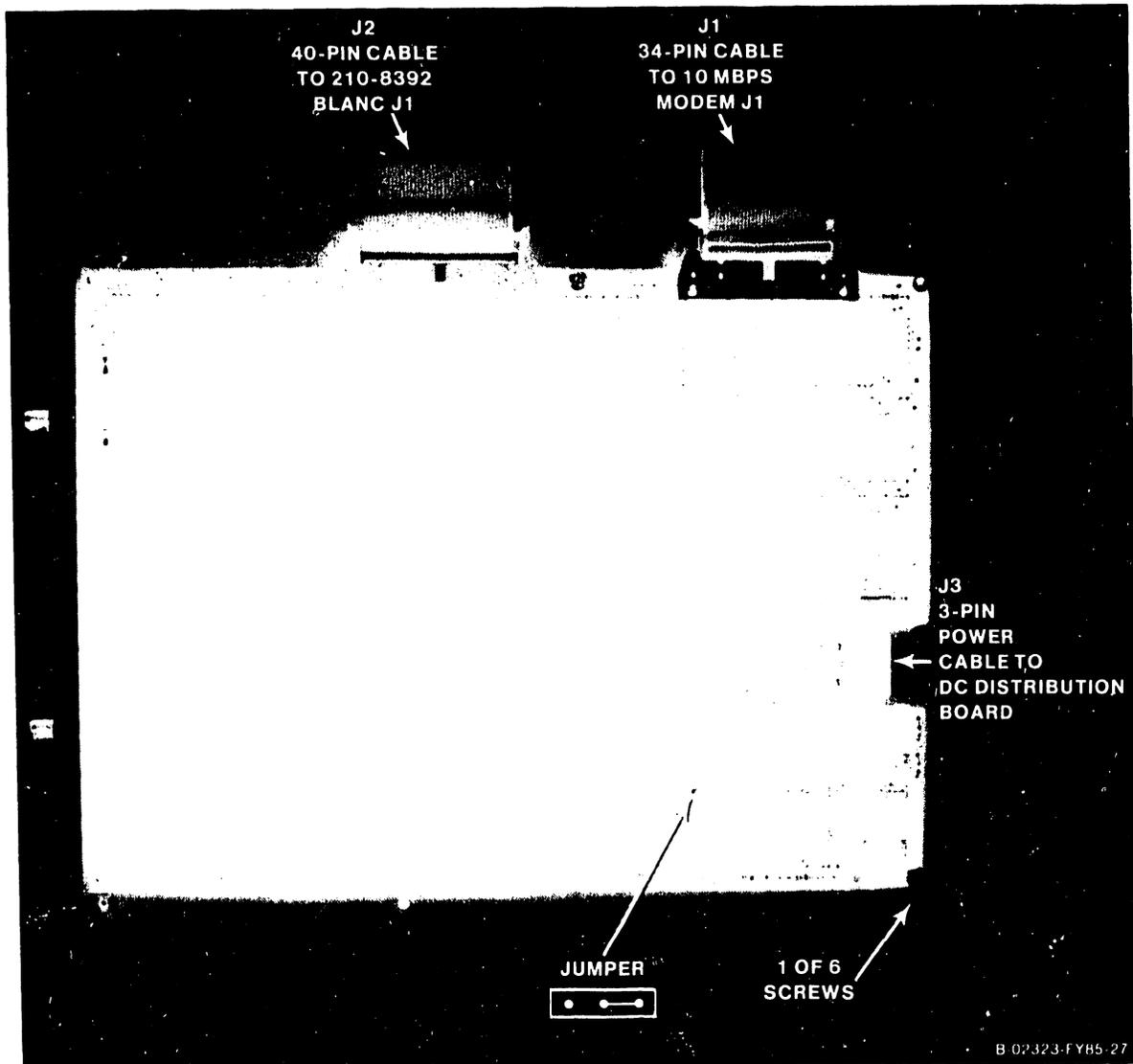


Figure 7-34. 23V79 CIU CAB Board
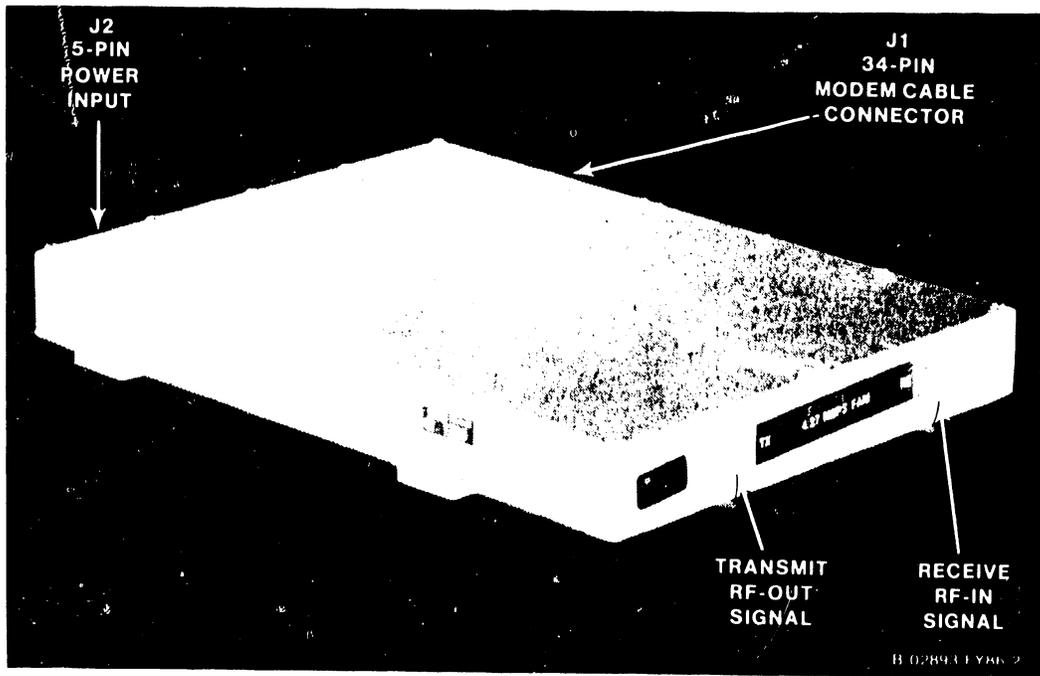
Figure 7-35. Single Channel 10 Megabit Duobinary Modem

## 7.2.5.12  WangNet P-Band Modem Removal and Replacement

1.  Remove the top cover as described in paragraph 7.2.1 and the left side panel as described in paragraph 7.2.3.
2.  Disconnect the cables from the transmit (gold) and the receive (silver) connectors on the front of the P-Band modem panel assembly. (Figure 7-36.)
3.  Disconnect the power cable from J2 on the P-Band modem panel assembly. (Figure 7-37.)
4.  Disconnect the 32-pin ribbon cable from P1 on the P-Band modem panel assembly.
5.  Remove the modem panel assembly.
6.  Remove the two Phillips head screws that secure the P-Band modem to the rear panel of the VS-7100. (Figure 7-36.)
7.  Do not replace the entire assembly; only the modem. Remove the six screws that secure the modem to the mounting plate and remove the plate. Remove the four screws that secure the modem to the mounting panel and remove the panel. (Figure 7-37.)
8.  Remount the modem.
9.  Reinstall all cables.

MOUNTING
HOLES

TX        RX

TRANSMIT
CONNECTOR
(GOLD)

RECEIVE
CONNECTOR
(SILVER)
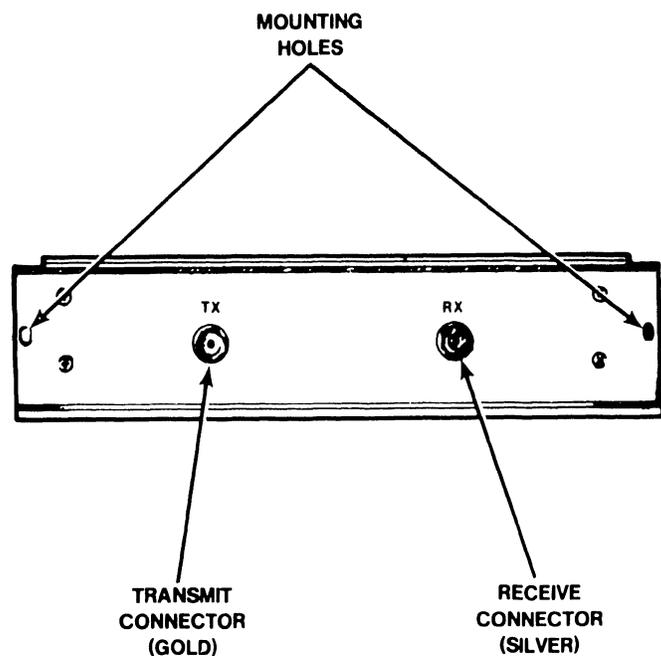
B-02983-FY86-4

Figure 7-36.  WangNet P-Band Modem Panel Assembly

TO SERIAL IOC
J1

P-BAND MODEM
MOUNTING PANEL

P-BAND POWER
INTERCONNECT CABLE
(220-2402)

GREEN (1)
BLUE (2)
VIOLET (3)
RED (4)
GREEN (5)

GREEN (5)
VIOLET (4)
OPEN (3)
BLUE (2)
RED (1)

P-BAND MODEM
MOUNTING PLATE

TO DC
POWER CABLE
(220-2345)

P2
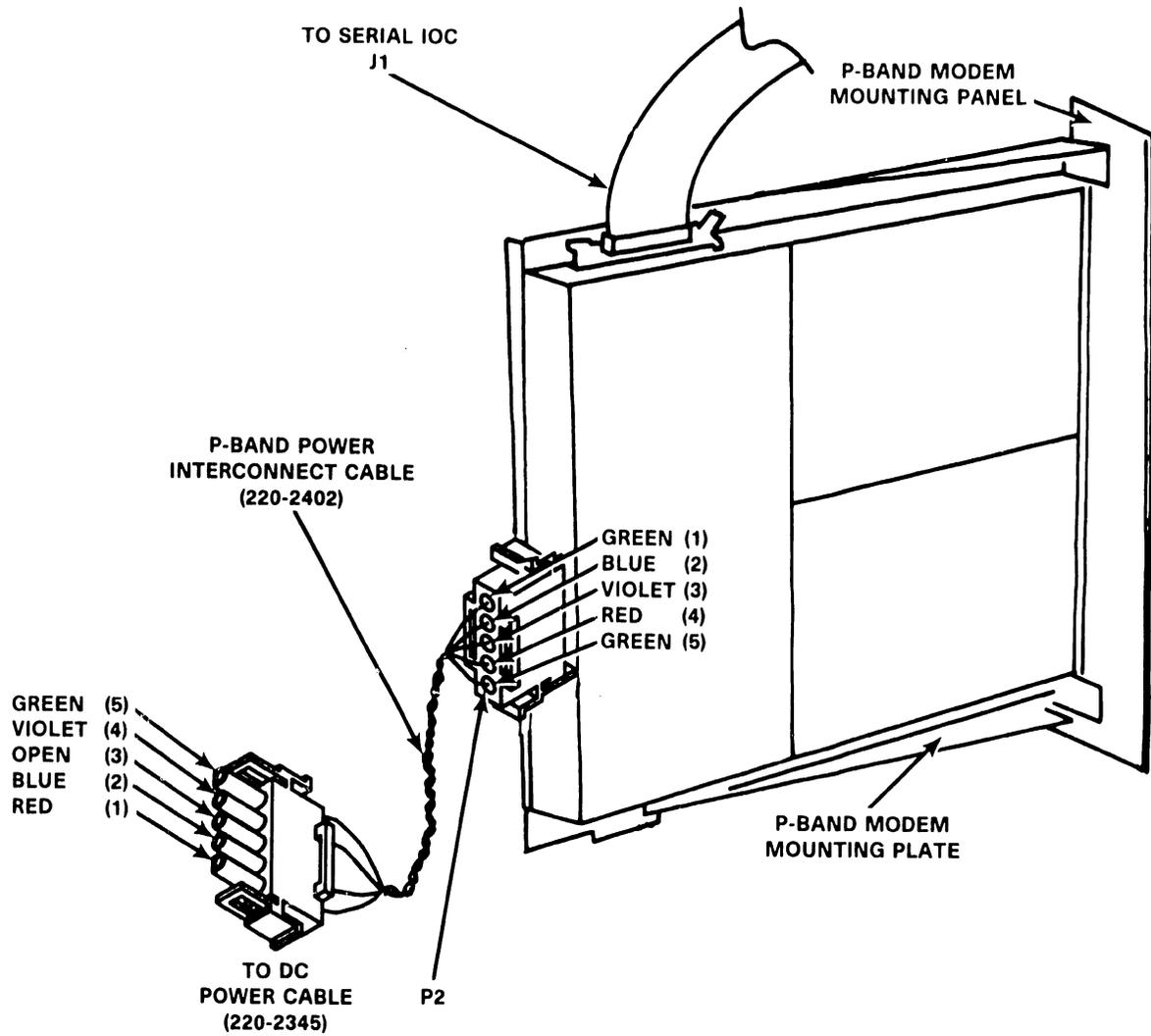
B-02983-FY86-1

Figure 7-37.  WangNet P-Band Modem Removal

### 7.2.6  210-8809 POWER SUPPLY CONTROLLER BOARD REMOVAL

Remove the Power Supply Controller board as follows:

1.  Enter Control Mode from the SCU Console Mode Menu.
2.  Power down the mainframe by pressing the Control Panel Power Off pushbutton (or SW2, Off, on the Power Supply Controller).
3.  Turn off the ac On/Off circuit breaker located on the Power Distribution Unit at the right rear of the mainframe.
4.  Remove the top cover and left side cover.
5.  Disconnect the 9-pin cable connector from J1 of the Power Supply Controller board.
6.  Disconnect the 2-pin jumper connector (WLI P/N 220-2344) from J2.
7.  Disconnect the 4-pin cable connector from J5.
8.  Disconnect the 60-pin cable connector from J6.
9.  Disconnect the 20-pin cable connector from J7.
10. Disconnect the 5-pin cable connector from J9.
11. Disconnect the 2-pin cable connector from J10.
12. Disconnect the 9-pin optional Uninterruptable Power Supply (UPS) cable connector from J11.
13. Remove the six Phillips head screws from the board plastic cover standoffs and remove the plastic cover.
14. Remove the six standoffs.
15. Remove the three Phillips head screws from the board.
16. Remove the board.



B-03174-FY86-6
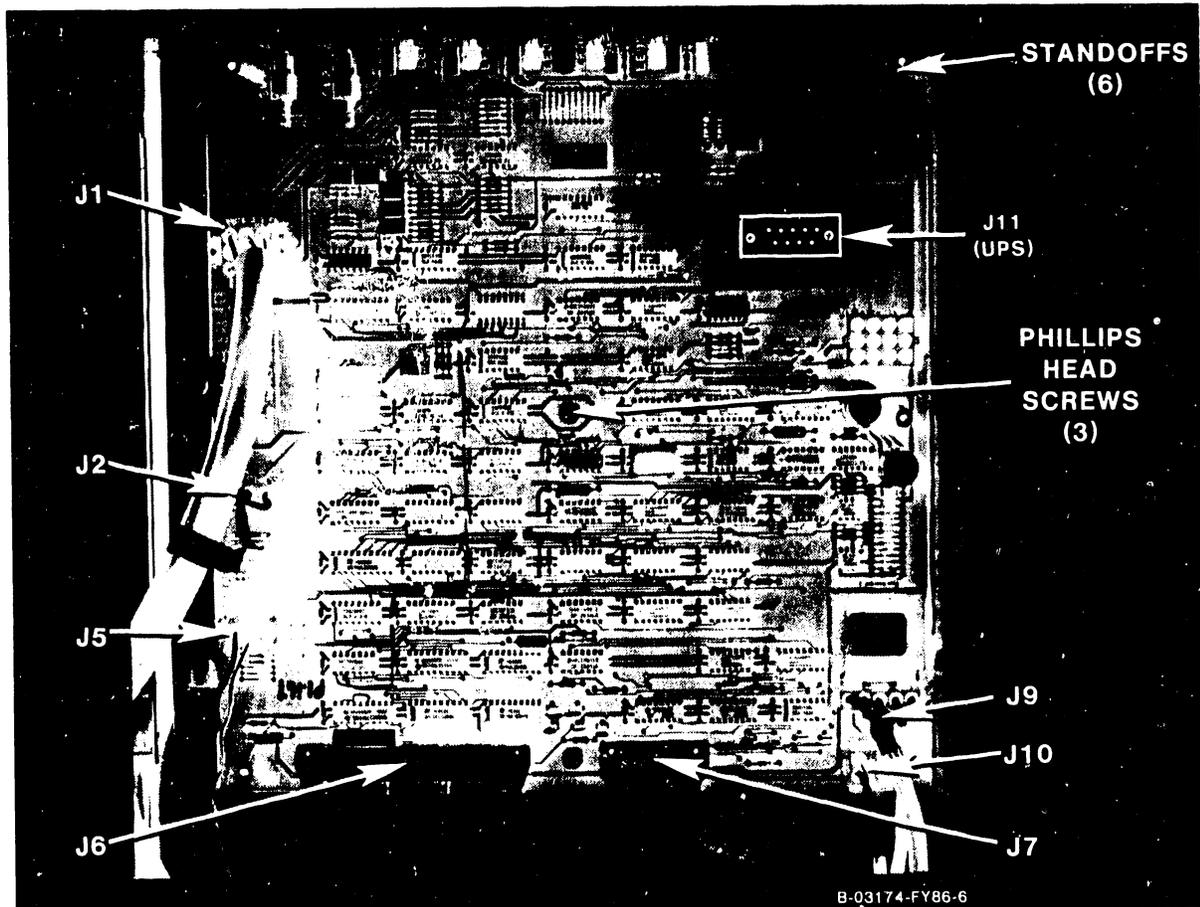
Figure 7-38.  210-8809 Power Supply Controller Board

### 7.2.7  POWER SUPPLY CONTROLLER BOARD REPLACEMENT

1.  To reinstall the Power Supply Controller board, reverse the removal procedure.

**NOTE**

Switch 4, the Battery Backup Time switch, is not used with the VS-7100.

2.  Make sure that all cable connectors are reconnected correctly.
3.  Power up the system and check and adjust the power supply (paragraph 8.3.1), and the Power Supply Controller (paragraph 8.3.2).

### 7.2.8  POWER DISTRIBUTION UNIT REMOVAL

The Power Distribution Unit (PDU) is mounted on the right rear of the mainframe, below the SCU. (Figures 7-39 and 7-40.)

**WARNING**

Because of the high operating voltages passing through the PDU, power down the mainframe and disconnect the mainframe power connector from the power source receptacle before performing the following removal/replacement procedures.

Remove the PDU as follows:

1.  Enter Control Mode from the SCU Console Mode Menu.
2.  Power down the mainframe by pressing the Control Panel Power Off pushbutton (or SW2, Off, on the Power Supply Controller).
3.  Turn off the ac On/Off circuit breaker located on the Power Distribution Unit at the right rear of the mainframe.
4.  Disconnect the ac power input connector from the power source receptacle.
5.  Remove the top cover and right side panel.
6.  Disconnect all ac distribution cable(s) connectors from the AC Distribution board at the rear of the PDU. Note the 5-wire cable connected to J1 (the standalone connector) of the AC Distribution board. This cable must be reconnected to J1 only.
7.  Remove the 14 hex head screws securing the PDU to the mainframe and remove the PDU and ac input power cable.

### 7.2.9  POWER DISTRIBUTION UNIT REPLACEMENT

1.  To reinstall the PDU, reverse the removal procedure.
2.  Make sure that the 5-wire cable is reconnected to J1 of the AC Distribution board, and all other power wiring is reconnected correctly.
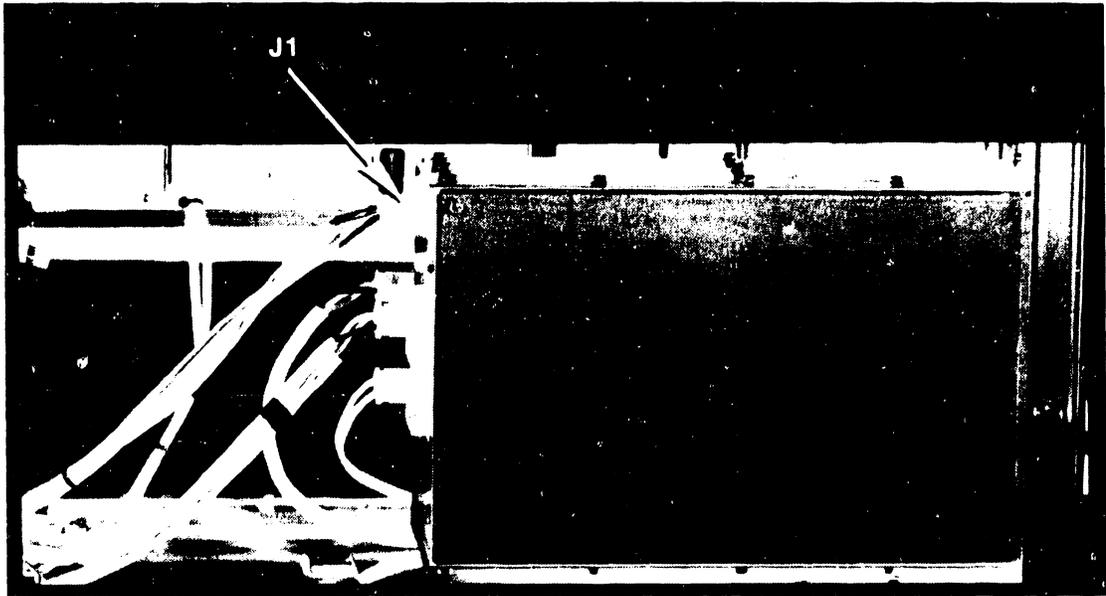
Figure 7-39. PDU Removal
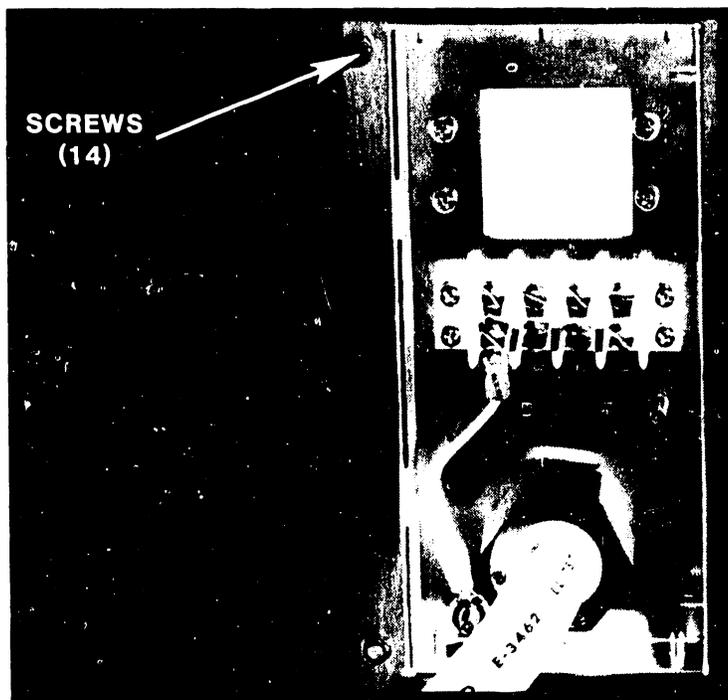


Figure 7-40. PDU Removal

## 7.2.10  AC ON/OFF CIRCUIT BREAKER REMOVAL

The ac On/Off circuit breaker is mounted inside the PDU (figure 7-41) and can be replaced without replacing the entire PDU. The PDU must first be removed from the mainframe.

Remove the circuit breaker as follows: (Figure 7-41.)

1.   With the PDU out of the mainframe (paragraph 7.2.8.), remove the 29 hex head screws securing the PDU cover and remove the cover.
2.   Disconnect the power input cable wiring to the circuit breaker. Note the orientation and color coding of the power wiring to the circuit breaker for reinstallation of the new circuit breaker.
3.   Remove the four Phillips head screws securing the circuit breaker to the front of the PDU and remove the circuit breaker.
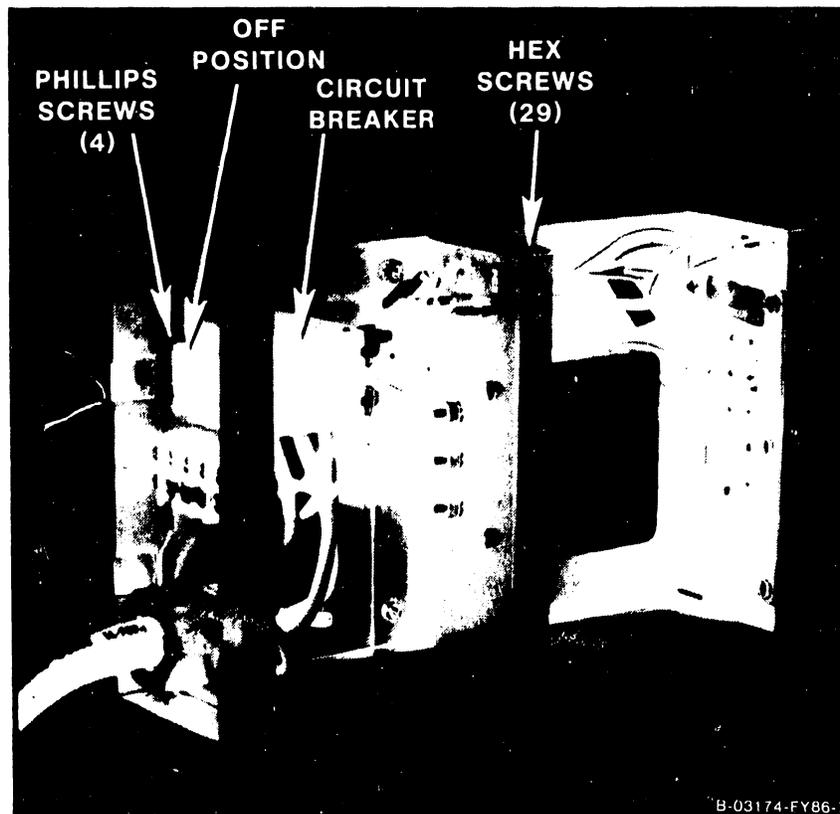


Figure 7-41.  AC On/Off Circuit Breaker Removal

## 7.2.11  AC ON/OFF CIRCUIT BREAKER REPLACEMENT

1.   To reinstall the circuit breaker, reverse the removal procedure.
2.   Make sure the power input cable wiring to the circuit breaker is rewired correctly.
3.   Make sure the circuit breaker is ON (1) when pushed to the right and OFF (0) when pushed to the left.
4.   Reinstall the PDU in the mainframe.
5.   Make sure that the 5-wire cable is reconnected to J1 of the AC Distribution board, and all other power wiring is reconnected correctly.

## 7.2.12  210-8715 AC DISTRIBUTION BOARD REMOVAL

The AC Distribution board is mounted on the rear of the PDU. (Figure 7-42.) The PDU must first be removed from the mainframe.

Remove the AC Distribution board as follows:

1.  With the PDU out of the mainframe (paragraph 7.2.8.), remove the 29 hex head screws securing the PDU cover and remove the cover.
2.  Disconnect the three wires (blue, green, and brown) at TB1 of the AC Distribution board. Note the orientation and color coding of the wiring to TB1 for reinstallation of the new circuit board.
3.  Remove the six Phillips head screws securing the circuit board to the PDU and remove the circuit board.
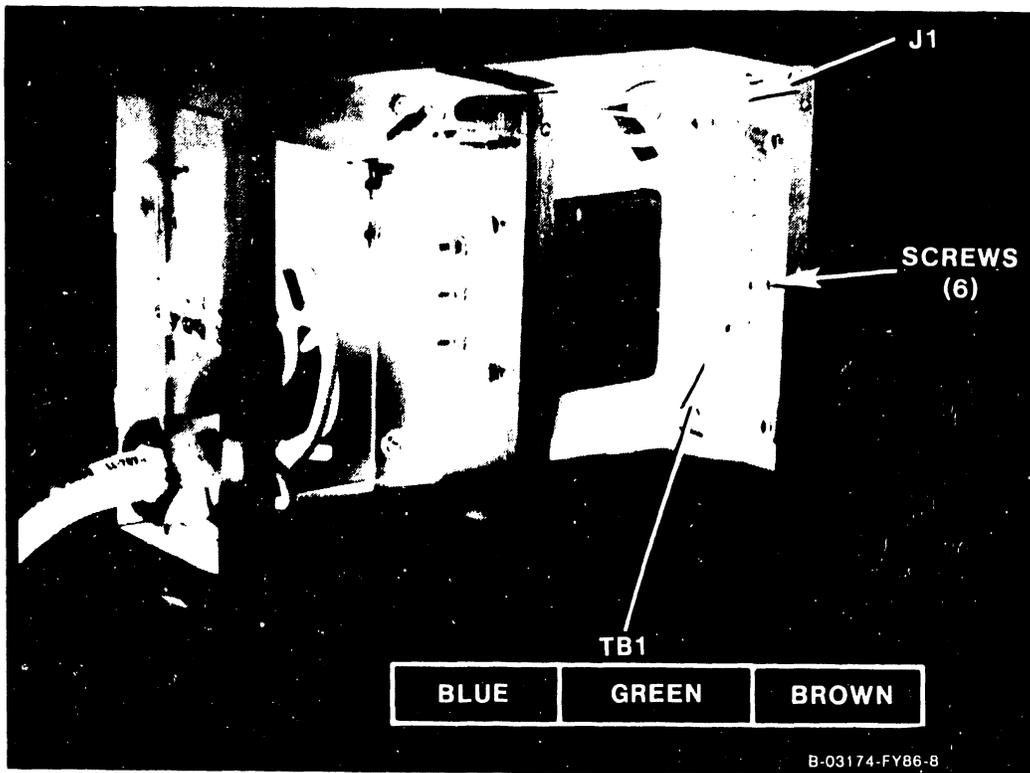


Figure 7-42.  210-8715 AC Distribution Removal

## 7.2.13  AC DISTRIBUTION BOARD REPLACEMENT

1.  To reinstall the AC Distribution board, reverse the removal procedure.
2.  Make sure the the three wires to are correctly reconnected to TB1.
3.  Reinstall the PDU in the mainframe.
4.  Make sure that the 5-wire cable is reconnected to J1 of the AC Distribution board, and all other power wiring is reconnected correctly.

## 7.2.14  SCU PROFESSIONAL COMPUTER (PC) REMOVAL

The SCU (PC) is mounted internally at the right side of the mainframe behind the front door. SCU PCBs can be removed individually. The mainframe front door is opened for SCU PCB access and the mainframe top cover is removed for SCU cable access. However, if it is necessary to remove the entire SCU chassis, proceed as follows: (Figures 7-43 and 7-44.)

1.  Enter Control Mode from the SCU Console Mode Menu.
2.  Power down the mainframe by pressing the Control Panel Power Off pushbutton (or SW2, Off, on the Power Supply Controller).
3.  Turn off the ac On/Off circuit breaker located on the Power Distribution Unit at the right rear of the mainframe.
4.  Remove the top cover and right side panel.
5.  Disconnect the 4-pin keyboard cable connector from J3 of the SCU CPU board.
6.  Disconnect the 25-pin remote diagnostic cable connector from J4 (RS-232 connector) of the SCU CPU board.
7.  Disconnect the 34-pin floppy drive signal cable connector from J5 of the SCU CPU board.
8.  Disconnect the 8-pin monitor video cable connector from J1 of the SCU Monochrome Monitor board.
9.  Disconnect the 5-pin monitor power cable connector from J2 of the SCU Monochrome Monitor board.
10.  Disconnect the coax cable from the BNC/TNC connectors of the Local Comm. Data Link board.
11.  Disconnect the 60-pin signal cable connector from the SCU Professional Computer Interface (PCI) option board.
12.  Remove the two Phillips screws securing the SCU chassis mounting plate to the frame.
13.  Carefully lift up the SCU chassis slightly until the chassis mounting plate is out of the mounting plate slots.
14.  With the chassis raised, disconnect the 15-pin power cable connector under the SCU chassis mounting plate.

### NOTE

On newer VS-7100 systems, this connector may be at the front of the SCU chassis mounting plate.

15.  Lift, tilt to the left, and maneuver the chassis out of the mainframe.
16.  The SCU fan is secured to the bottom of the mounting plate by four screws. The 2-pin fan power connector is located behind the SCU 10 megabyte disk drive.
17.  Refer to the Professional Computer Product Maintenance Manual for disassembly/reassembly procedures and replacement parts.

## 7.2.15  SCU PROFESSIONAL COMPUTER (PC) REPLACEMENT

1.  To reinstall the SCU, reverse the removal procedure.
2.  Make sure that all cable connectors are reconnected correctly.
3.  Make sure that the Local/Remote switch on the Local Comm. Data Link board is in the Local position.
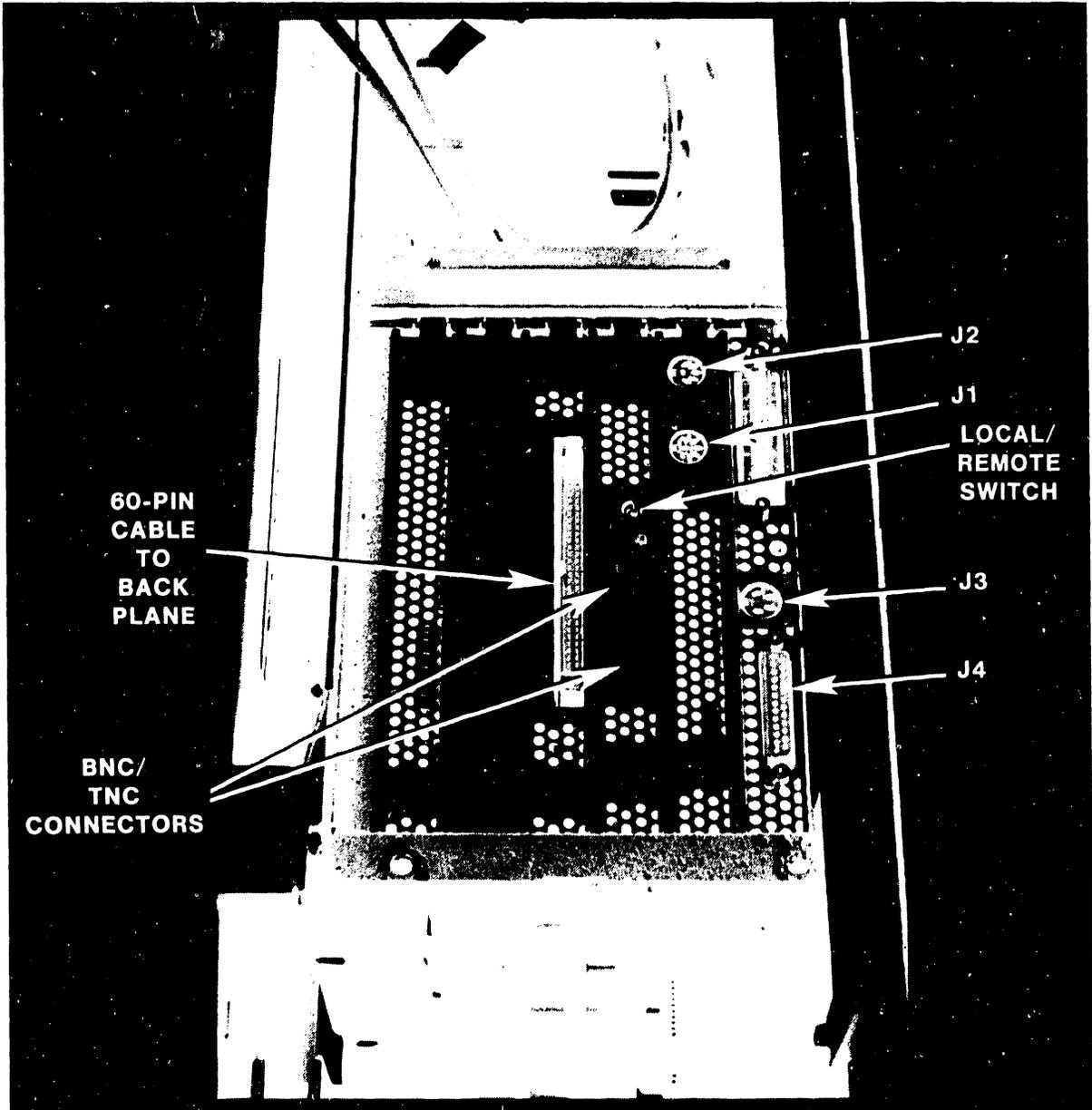
Figure 7-43. SCU PC Removal and Replacement
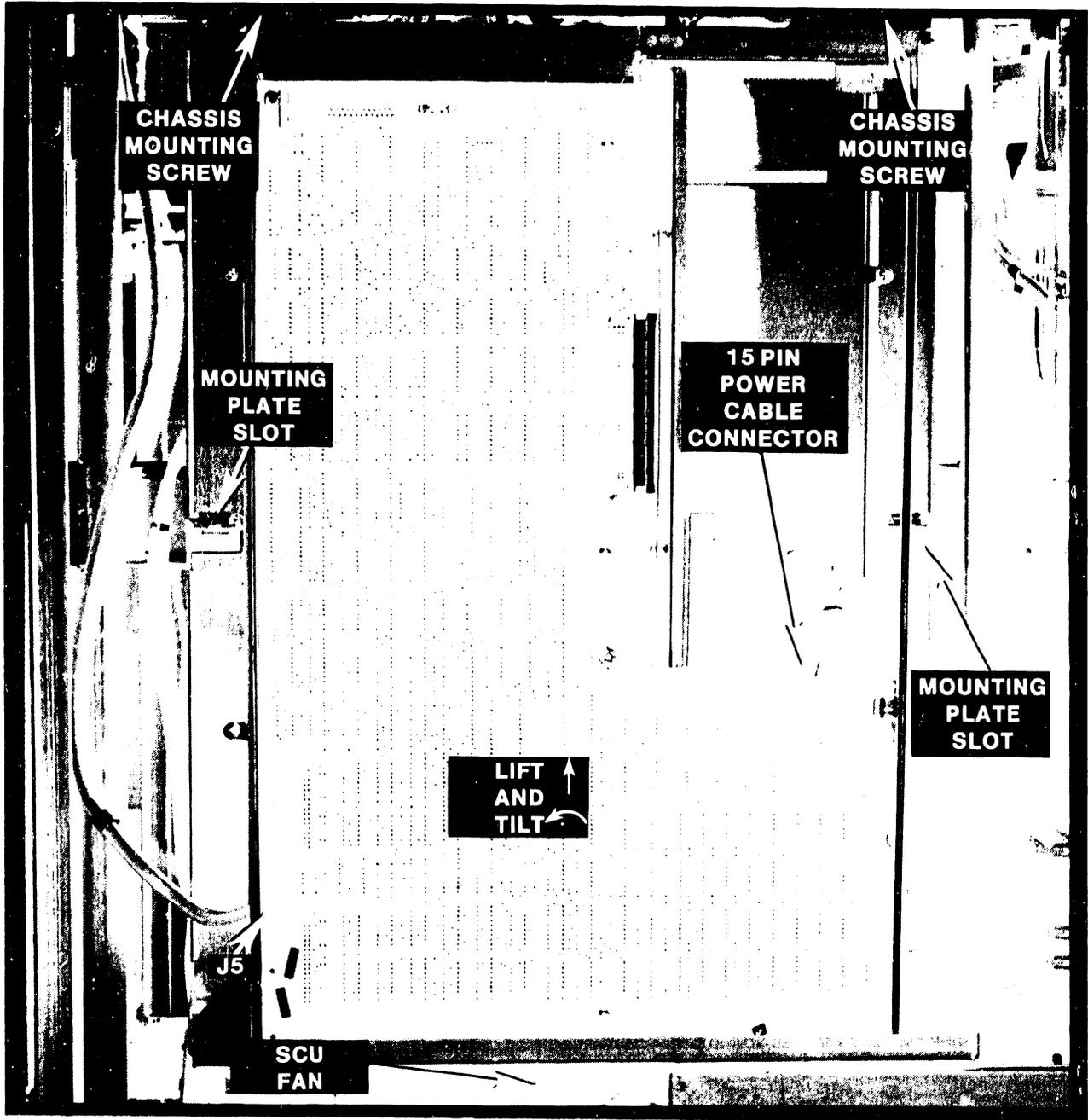
REPAIR



Figure 7-44. SCU PC Removal and Replacement

741-1721-A7-45COMPANY CONFIDENTIAL

## 7.2.16 CONTROL PANEL PUSHBUTTON BULB REMOVAL AND REPLACEMENT

Each of the Control Panel pushbuttons contains an incandescent bulb. Remove and replace the bulbs as follows: (Figure 7-45.)

1. Enter Control Mode from the SCU Console Mode Menu.
2. Power down the mainframe by pressing the Control Panel Power Off pushbutton (or SW2, Off, on the Power Supply Controller).
3. Turn off the ac On/Off circuit breaker located on the Power Distribution Unit at the right rear of the mainframe.
4. With a small screwdriver, pry (top and bottom) the lens cap out of the pushbutton.
5. Pull the small silver lever on the bottom of the pushbutton forward until the bulb pops out.
6. Replace the bulb by pushing it into the pushbutton.
7. Replace the lens cap.
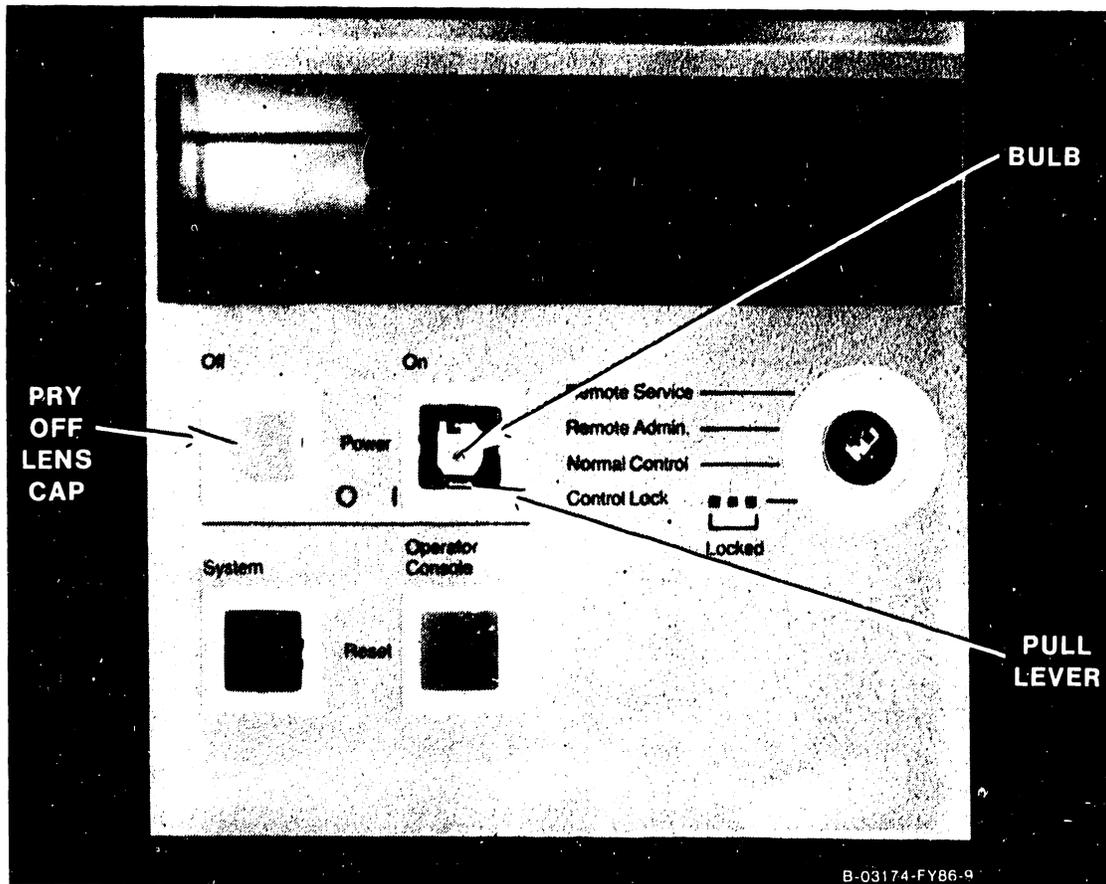


Figure 7-45. Control Panel Pushbutton Bulb Removal and Replacement

## 7.2.17 CONTROL PANEL ASSEMBLY REMOVAL

The Control Panel assembly is mounted inside the top left corner of the mainframe. Remove the 270-5037 Control Panel assembly as follows: (Figures 7-46 and 7-47.)

1. Enter Control Mode from the SCU Console Mode Menu.
2. Power down the mainframe by pressing the Control Panel Power Off pushbutton (or SW2, Off, on the Power Supply Controller).
3. Turn off the ac On/Off circuit breaker located on the Power Distribution Unit at the right rear of the mainframe.
4. Remove the top cover, left side panel, and left front air inlet panel.
5. Disconnect the 20-pin signal cable from the J7 of the Power Supply Controller. Cut the cable clamp loop directly below the Control Panel.
6. Disconnect the 34-pin signal cable from J1 of the floppy disk drive.
7. Disconnect the 3-pin power cable from J2 of the floppy disk drive.
8. Remove the Phillips screws securing the right side and back side of the floppy disk drive holding bracket to the Control Panel mounting bracket.

### NOTE

On some older VS-7100 models, there may be three Phillips screws securing the left side of the floppy holding bracket.
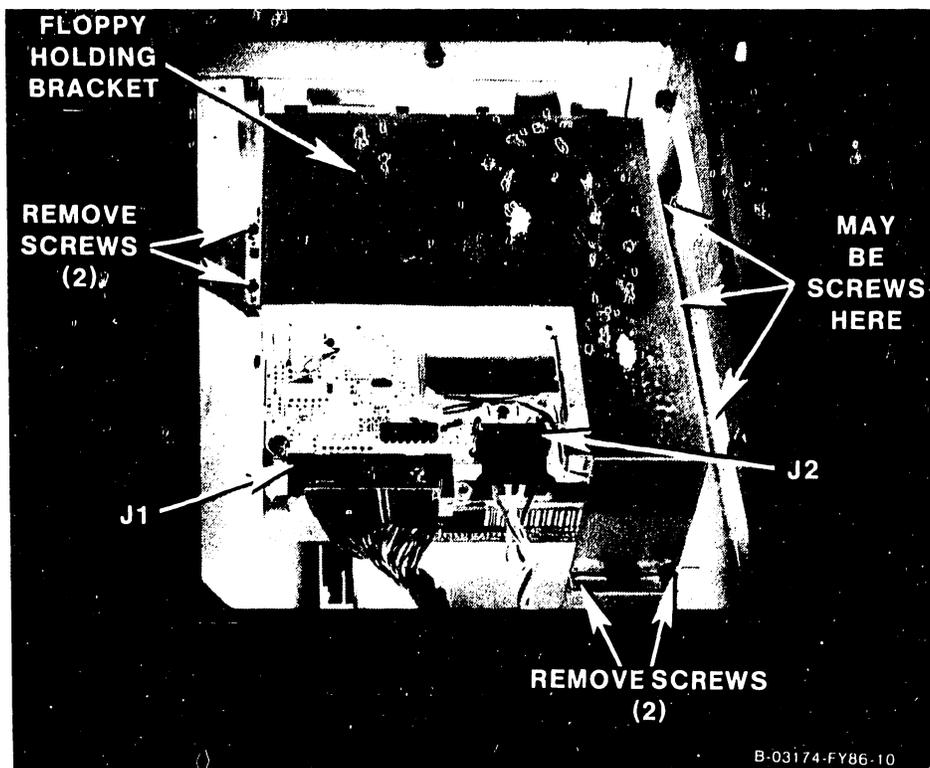


Figure 7-46. 272-0055 Control Panel Removal

9. Tilt down the front of the Control Panel assembly and remove it from the mainframe.

**NOTE**

Remove the floppy disk drive and the floppy disk drive holding bracket (paragraph 7.2.19) and save them for reinstallation of the new Control Panel assembly.
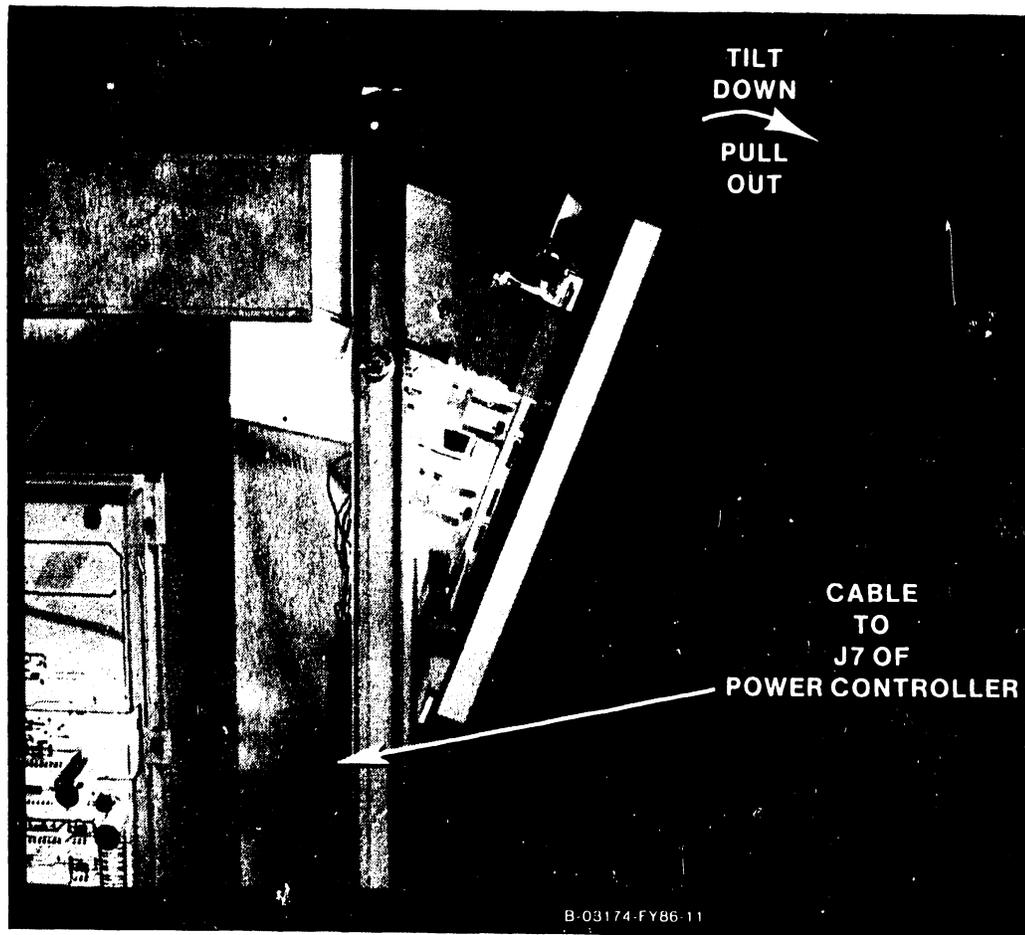


Figure 7-47. 272-0055 Control Panel Removal

## 7.2.18 CONTROL PANEL ASSEMBLY REPLACEMENT

1. To reinstall the Control Panel assembly, reverse the removal procedure.
2. Make sure that all cable connectors are reconnected correctly.

### 7.2.19  SCU PC FLOPPY DISK DRIVE REMOVAL

The SCU floppy disk drive (WLI P/N 278-4045) is mounted in the Control Panel assembly. Remove the floppy disk drive as follows: (Figure 7-48.)

1. Remove the Control Panel assembly (paragraph 7.2.17).
2. Remove the two screws on each side securing the floppy disk drive to the floppy disk drive holding bracket.
3. Remove the floppy drive.
4. Remove the four lock nuts securing the front of the floppy disk drive holding bracket to the Control Panel casting.
5. Remove and save the holding bracket for reinstallation.
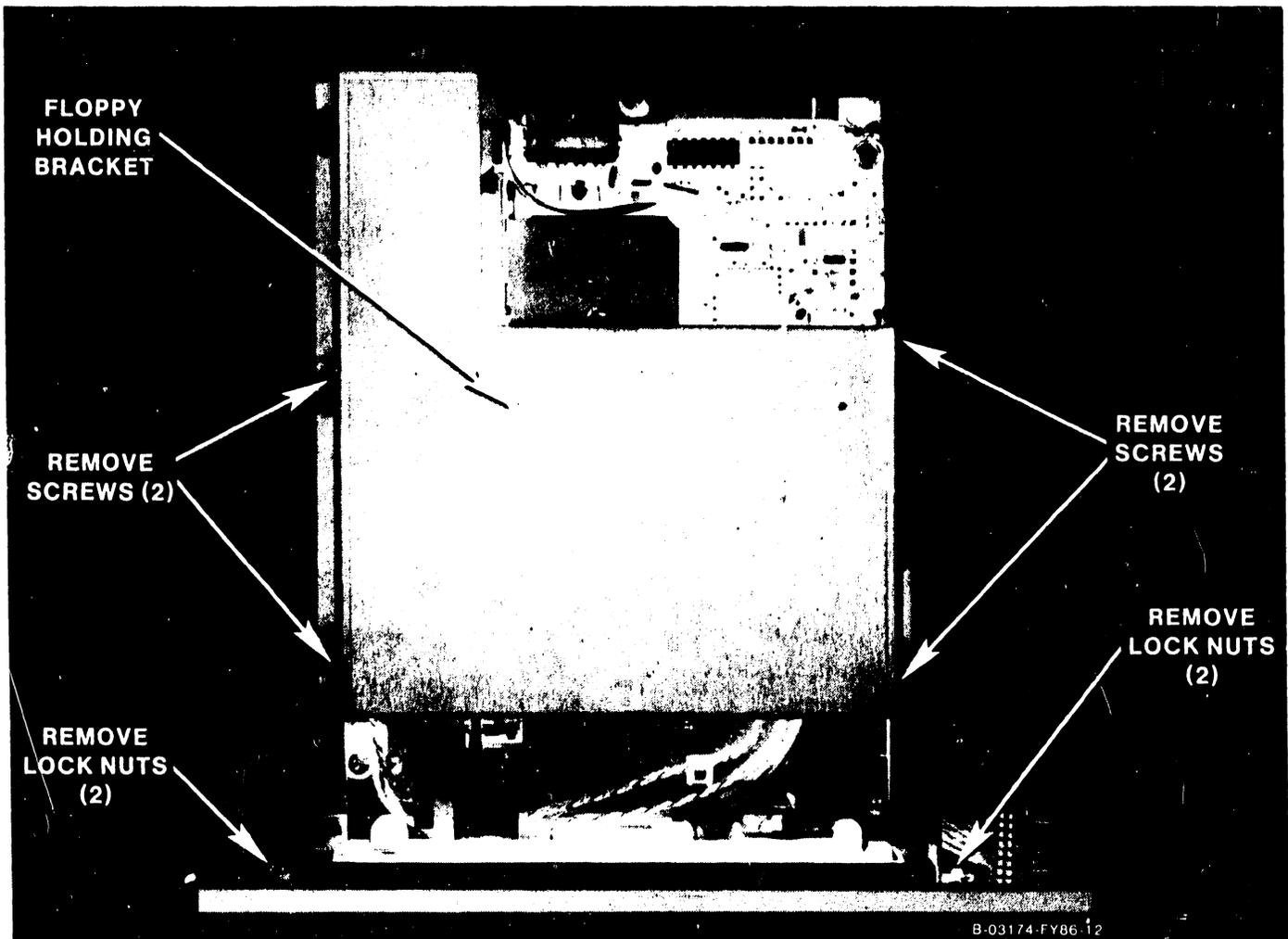


Figure 7-48.  SCU PC Floppy Disk Drive Removal

## 7.2.20  SCU PC FLOPPY DISK DRIVE REPLACEMENT

1.   To reinstall the floppy disk drive and the holding bracket, reverse the removal procedure.
2.   Check the floppy disk drive jumpers as shown in figure 7-49.
3.   Make sure there is a 220 ohm DIP terminator package, WLI P/N 333-0818, next to J1 on the floppy disk drive.
4.   Reinstall the Control Panel assembly (paragraph 7.2.18).
5.   Make sure that all cable connectors are reconnected correctly.
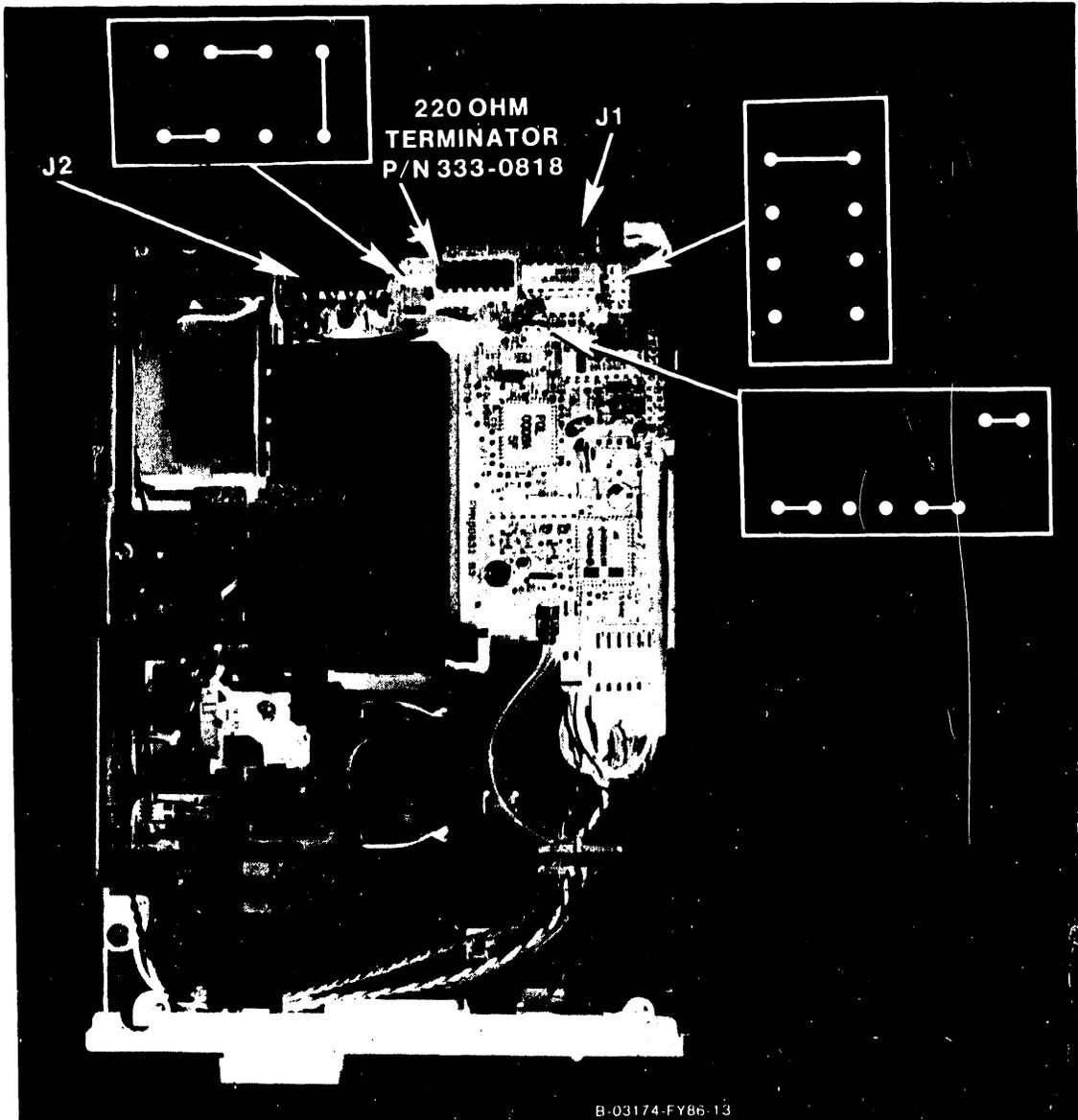


Figure 7-49.  SCU PC Floppy Disk Drive Replacement

### 7.2.21 210-8816 DC DISTRIBUTION BOARD REMOVAL

The DC Distribution board is mounted on the left rear side of the card cage assembly, to the upper right of the Power Supply Controller board. (Figures 7-50 and 7-51.)

Remove the DC Distribution board as follows:

1. Enter Control Mode from the SCU Console Mode Menu.
2. Power down the mainframe by pressing the Control Panel Power Off pushbutton (or SW2, Off, on the Power Supply Controller).
3. Turn off the ac On/Off circuit breaker located on the Power Distribution Unit at the right rear of the mainframe.
4. Remove the top cover and left side panel.
5. Disconnect all cable connectors from the DC Distribution board.
6. Disconnect all wires from the 7-connector terminal strip at the bottom of the board.
7. Remove the four locknuts securing the board cover and remove the cover.
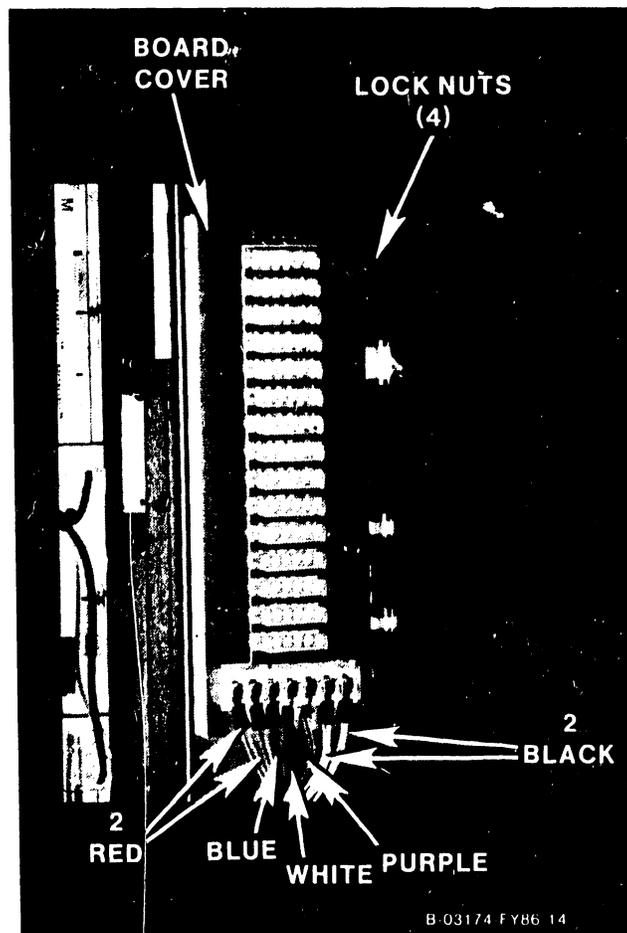


Figure 7-50. 210-8816 DC Distribution Board Removal

8.  Remove the six Phillips screws from the board standoffs, and remove the board.



**PHILLIPS SCREWS (6)**

B-03174-FY86-15
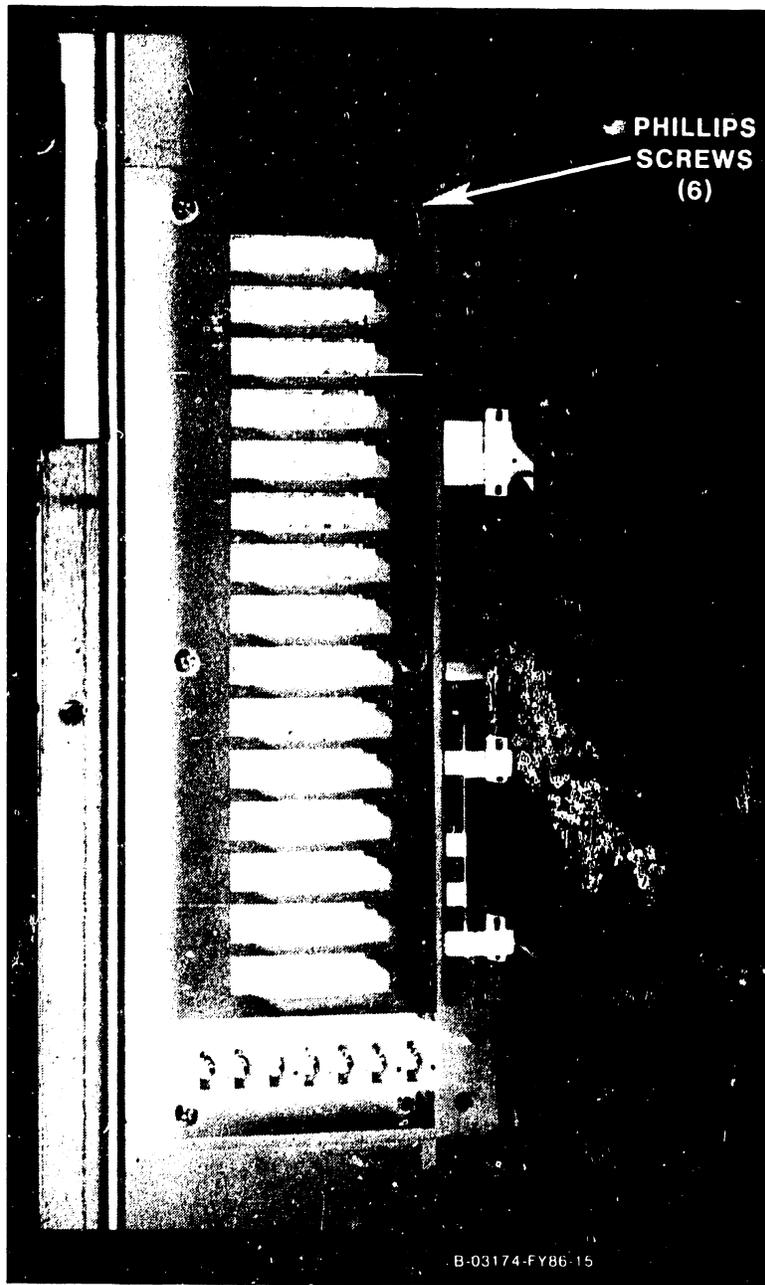
Figure 7-51.  210-8816 DC Distribution Board Removal

## 7.2.22  DC POWER DISTRIBUTION BOARD REPLACEMENT

1.  To reinstall the DC Distribution board, reverse the removal procedure.
2.  Make sure that all cables and wires are correctly reconnected to the DC Distribution board.

### 7.2.23  MULTIOUTPUT SWITCHING POWER SUPPLY ASSEMBLY REMOVAL

Remove the multioutput switching power supply assembly (270-5035) as fol-
lows:

# WARNING

```
**********************************************************************
*                                                                    *
*     DO NOT OPEN THE SWITCHING POWER SUPPLY UNDER ANY               *
*     CIRCUMSTANCE.  EXTREMELY DANGEROUS VOLTAGE AND                 *
*     CURRENT LEVELS (IN EXCESS OF 300 VOLTS DC AND UN-              *
*     LIMITED CURRENT) ARE PRESENT WITHIN THE POWER SUPPLY.          *
*                                                                    *
*     DO NOT ATTEMPT TO REPAIR THE SWITCHING POWER                   *
*     SUPPLY; IT IS FIELD REPLACEABLE ONLY.                          *
*                                                                    *
*     AFTER POWERING THE UNIT DOWN AND DISCONNECTING THE AC          *
*     POWER CONNECTOR FROM THE POWER SOURCE RECEPTACLE,              *
*     ALLOW ONE MINUTE BEFORE REMOVING THE POWER SUPPLY TO           *
*     PROVIDE ADEQUATE TIME FOR ANY RESIDUAL VOLTAGE TO              *
*     DRAIN THROUGH THE BLEEDER RESISTORS.                           *
*                                                                    *
**********************************************************************
```

1.  Enter Control Mode from the SCU Console Mode Menu.
2.  Power down the mainframe by pressing the Control Panel Power Off
    pushbutton (or SW2, Off, on the Power Supply Controller).
3.  Turn off the ac On/Off circuit breaker.
4.  Open the front hinged door.
5.  Remove and set aside the rear fan panel assembly (paragraph 7.2.25).
6.  Remove at least 2 bottom left and right I/O panels to allow access to
    the power supply.
7.  All wiring is color coded as listed in table 7-8. Using figures 7-52,
    7-53, and table 7-8, disconnect the bus bars and wiring from the
    power supply terminals.

Figure 7-52. Multioutput Power Supply Wiring Connections

CASE

208 VAC

1

2  AC

3  AC

4

F1
20A

V1
(+5VA)

A
5

B
6

+  V1  -

B
7

8

-  V2  +

V1

| ON/OFF | +S | -S | PF |
|---|---|---|---|
| 9 | | | 10 |

250
VDC

+

-

+S
+
-  11
12

+S
-S

ON/OFF

V4

V2

+
+
13  RTN
14  RTN

+S

-S

ON/OFF

V3

V2
(+12V)

V3
(-5V)

V4
(-12V)
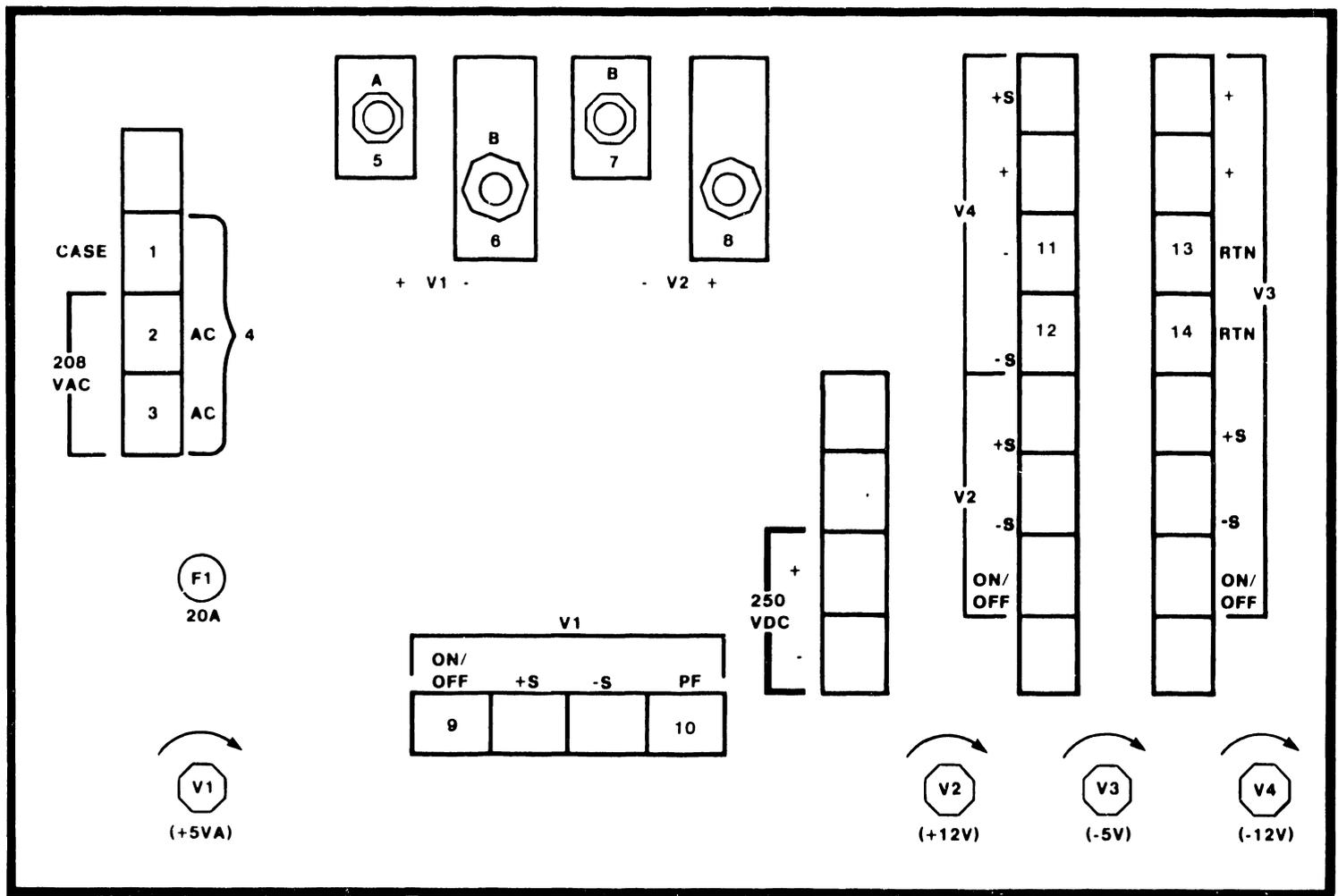
A - + 5V BUS BAR
B - ± 0V BUS BAR

1 - GREEN
2 - BLUE
3 - BROWN
4 - BLACK SHIELD
(CONTAINS 1, 2, & 3)

5 - RED (5)
6 - BLACK (3)
7 - BLACK (2)

8 - BLUE (4)
9 - RED
10 - BLUE

11 - VIOLET (1)
12 - VIOLET (1)
13 - WHITE (1)
14 - WHITE (1)

B-03141-FY86-1

Table 7-8. Multioutput Power Supply
Wiring Color Codes

| Voltage | Color Code |
|---------|------------|
| 220 ac  | Black shield |
| +5      | Red |
| -5      | White |
| +12     | Blue |
| -12     | Violet |
| +/- 0   | Black |

8. Remove the two Phillips screws securing the power supply assembly to the mainframe base at the front of the cabinet.
9. Pull the assembly forward and out the front of the mainframe.
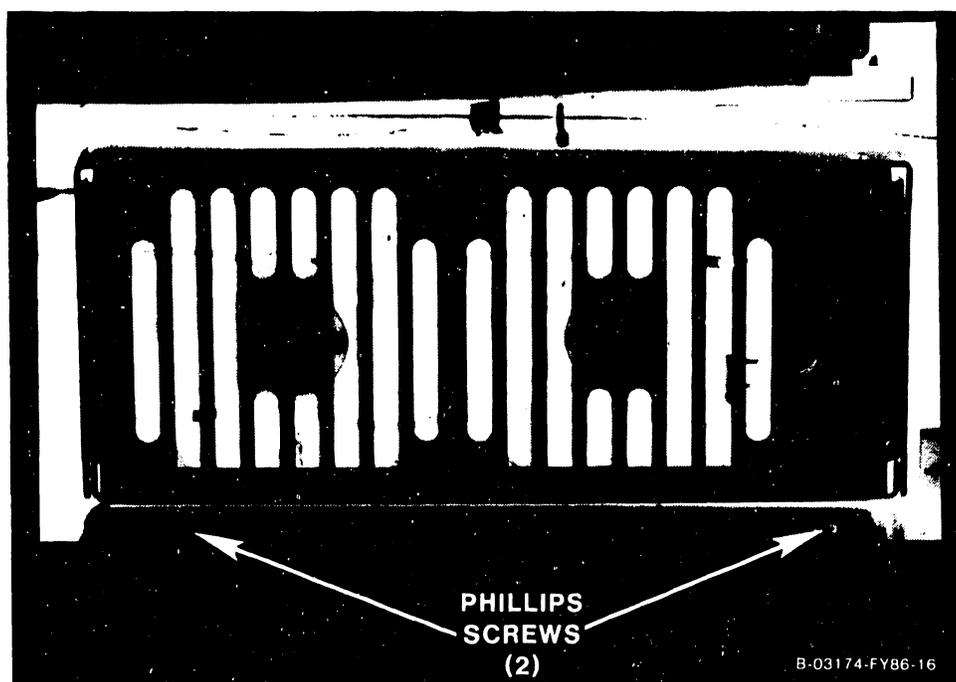


Figure 7-53. Multioutput Power Supply Removal

## 7.2.24 MULTIOUTPUT SWITCHING POWER SUPPLY REPLACEMENT

1. To reinstall the multioutput power supply, reverse the removal procedure.
2. Reinstall all of the power supply wiring as shown in figure 7-52 and table 7-8.
3. Power up the system and check and adjust the power supply voltages as described in paragraph 8.3.1.

## 7.2.25 REAR FAN REMOVAL

Remove the rear fans as follows: (figure 5-54)

1.  Enter Control Mode from the SCU Console Mode Menu.
2.  Power down the mainframe by pressing the Control Panel Power Off pushbutton (or SW2, Off, on the Power Supply Controller).
3.  Turn off the ac On/Off circuit breaker.
4.  Remove the 10 Phillips screws securing the rear fan support panel to the mainframe.
5.  Pull out the fan support panel.



PHILLIPS
SCREWS
(10)

B-03174-FY86-17
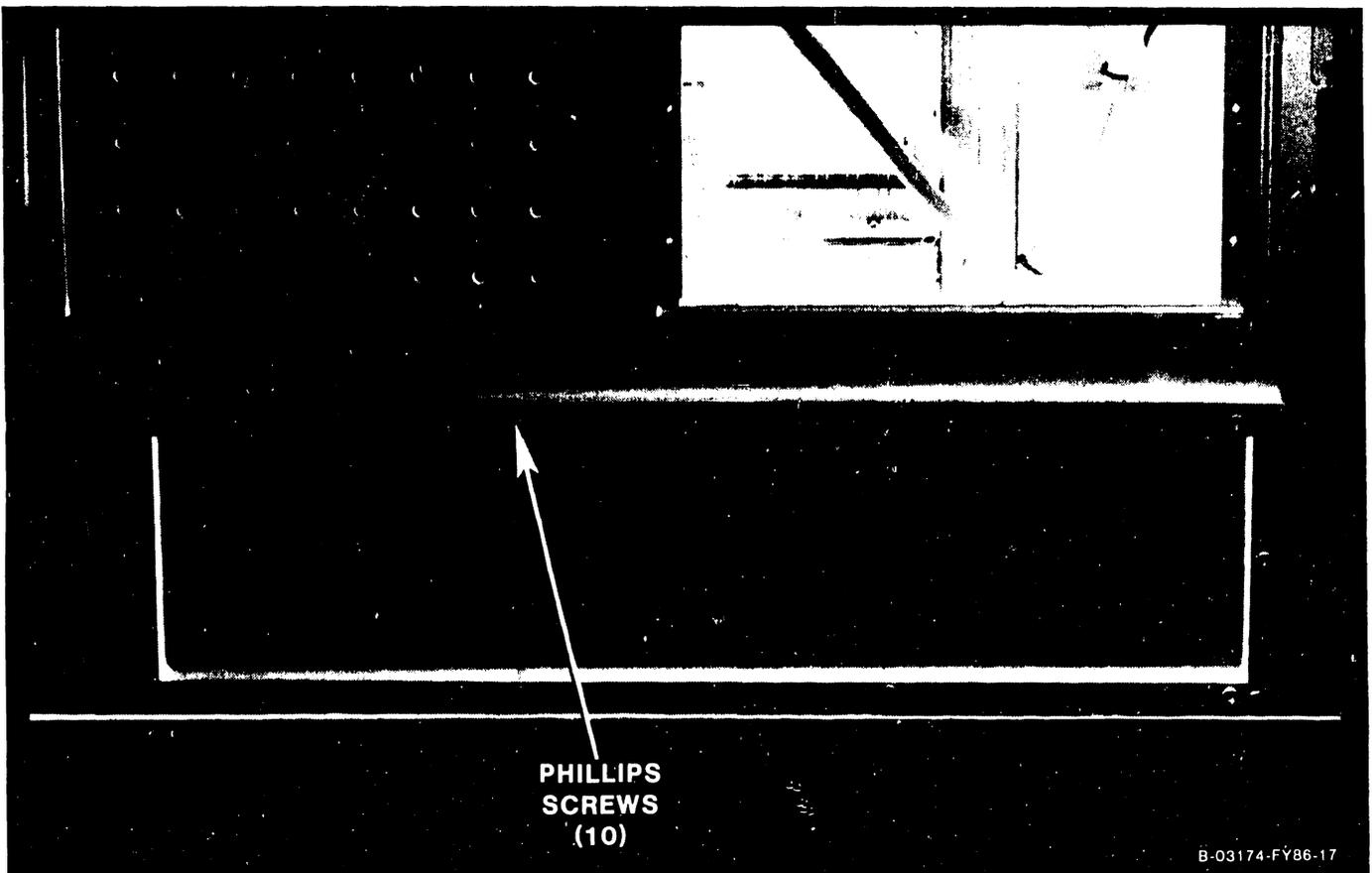
Figure 7-54.  Rear Fan Removal

6. Disconnect the 2-pin ac power connector at the defective fan.
7. Remove the fan.
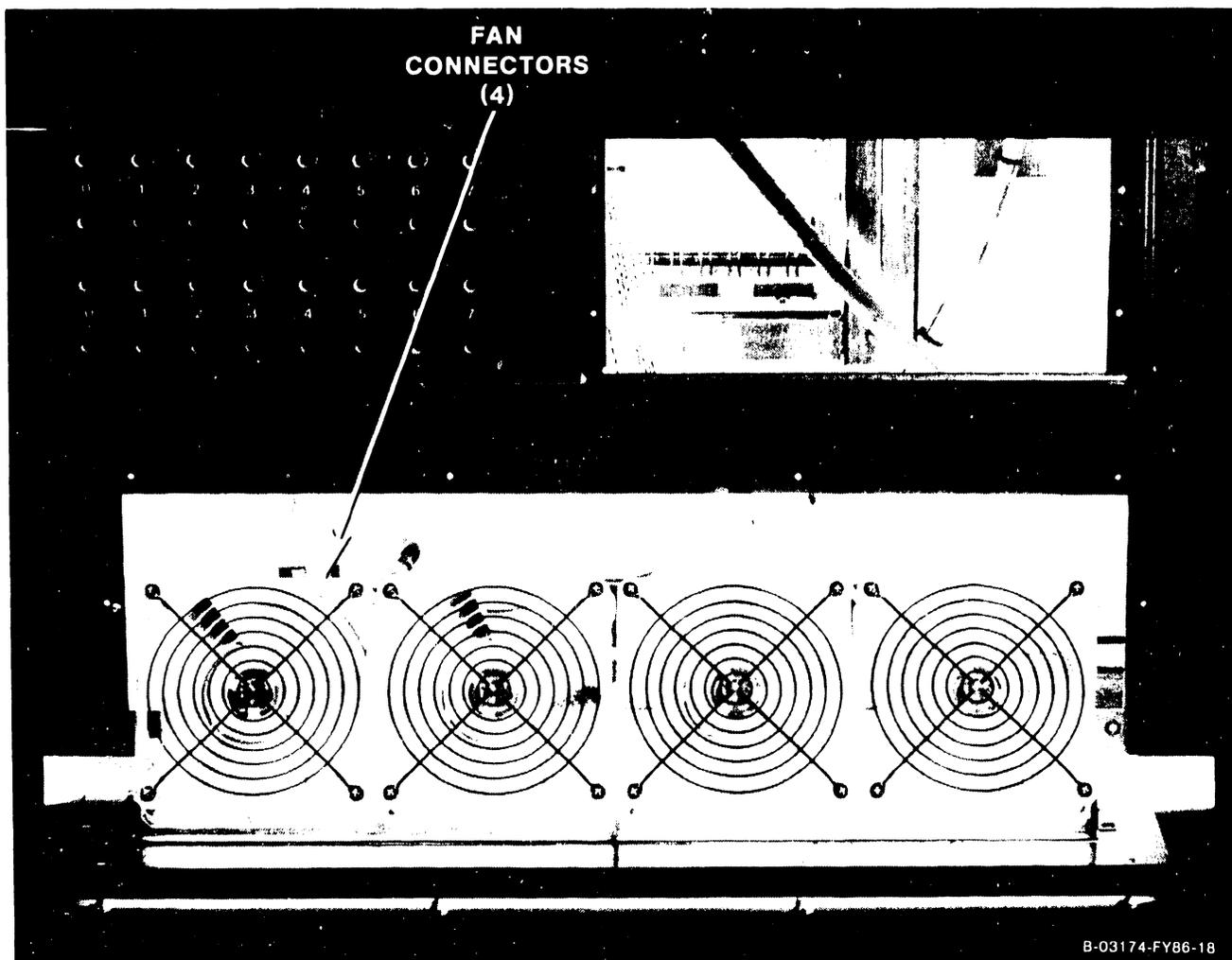


Figure 7-55. Rear Fan Removal

## 7.2.26 REAR FAN REPLACEMENT

1. To reinstall the fans and support panel, reverse the removal procedure.

# SECTION
# 8
# ADJUSTMENTS

# TABLE OF CONTENTS

## LIST OF ILLUSTRATIONS

## LIST OF TABLES

# SECTION 8

# ADJUSTMENTS

## 8.1 GENERAL

This section provides information on adjustments for the VS-7100 mainframe.

## 8.2 TEST EQUIPMENT

| Description | WLI P/N |
|---|---|
| Power Supply Test Jumper | 220-2342 |

## 8.3 ELECTRICAL ADJUSTMENTS

## 8.3.1 POWER SUPPLY ADJUSTMENTS

1. Remove the top cover and the left side panel (paragraphs 7.2.1 and 7.2.3).

**WARNING**

The fans will still be running.

2. Remove the Phillips screws from the lower rear fan panel and set aside the panel.

3. Press the Control Panel On button or SW1 (On) on the Power Supply Controller. Make sure the On lamp on the Control Panel and the voltage sensing LEDs 1 → 5 on the Power Supply Controller are lit. If the LEDs are not lit or go out after a few seconds, there is a problem with the multioutput power supply, or the Power Supply Controller board. No adjustments can be done until the problem is corrected. Do the following:

**NOTE**

LED2 (+5VB) should light but it is not used.

a.  Remove the 4-pin connector from J5 of the Power Supply Controller board. (Figure 8-2.)

**WARNING**

Inserting the test jumper as described below in step b will immediately turn on the multioutput power supply if the ac On/Off circuit breaker is on.

b.  Insert the Power Supply Test Plug (WLI P/N 220-2342) into P5, the control cable to the power supply.

c.  If the power supply comes up and stays up, the power supply is good. (Refer to Section 6 for troubleshooting procedures for the 210-8809 Power Supply Controller board.) If the power supply still does not come up, replace the supply. (Paragraph 7.2.23.)

d.  Disconnect the test jumper and reconnect the cable to J5.

4.  The following power supply voltages should be measured at the test points on the Power Supply Controller. Adjust the voltages to the readings listed below using the potentiometers on the front of the multioutput power supply at the rear of the mainframe (figure 8-1).

**Table 8-1. Power Supply Voltage Measurements**

| Test Point | Adjust (P/S) | Volts | Minimum | Maximum | AC Ripple Limits |
|------------|--------------|-------|---------|---------|------------------|
| TP+5V | V1 | +5.0A | +4.96 | +5.04 | 35mV RMS |
| TP+12V | V2 | +12.0 | +11.96 | +12.04 | or |
| TP-5V | V3 | -5.0 | -4.96 | -5.04 | 50mV Pk-Pk |
| TP-12V | V4 | -12.0 | -11.96 | -12.04 | for all |
| TPGROUND | | +/-0 | +/-0 | +/-0 | |

**NOTE**

It is better to have the +5 V adjusted more toward the maximum than toward the minimum.
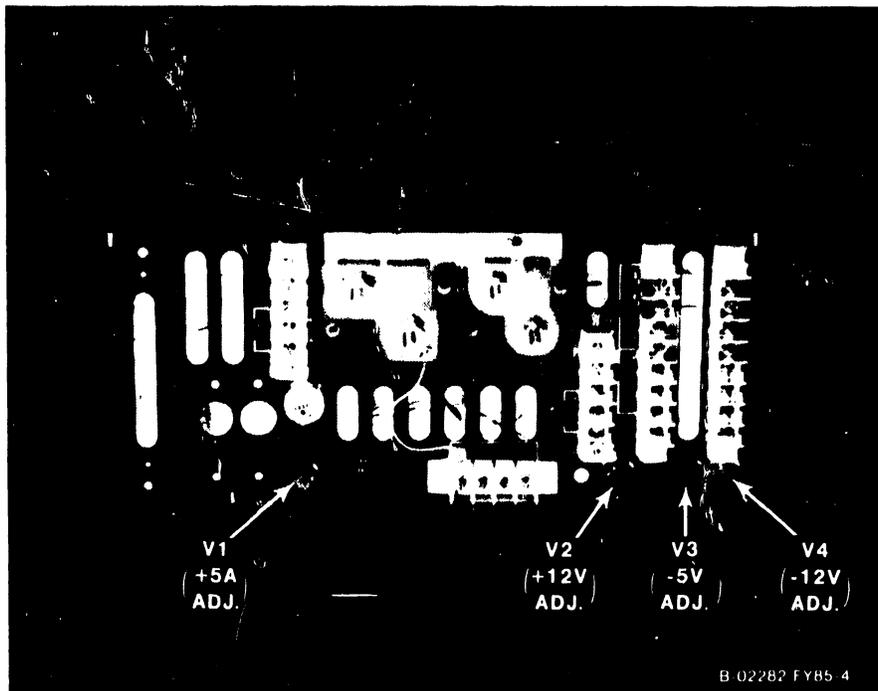
**Figure 8-1. Multioutput Power Supply**

## 8.3.2 POWER SUPPLY CONTROLLER ADJUSTMENTS

1.   Although there are no adjustments, measure the calibration voltages on the Power Supply Controller board (figure 8-2), at:

a.   TP 8 for 8 volts.

b.   TP 2.5 for 2.5 volts.

2.   Set the 4-bit Voltage Address switch SW3 (table 8-2) on the Power Supply Controller board to the A/D input to be calibrated.

**Table 8-2. DC Voltage Address Switch SW3 Settings**

| Voltage | Bit 1 | Bit 2 | Bit 3 | Bit 4 |
|---------|-------|-------|-------|-------|
| -5.0 | Closed | Open | Open | X |
| -12.0 | Open | Closed | Open | X |
| +12.0 | Closed | Closed | Open | X |
| +5.0 | Closed | Open | Closed | X |

**NOTES**

1.   Open = Off
2.   Closed = On
3.   X = don't care (bit 4 not used)

3.  Look at the two hex displays on the Power Supply Controller board. Using the potentiometers on the Power Supply Controller board, adjust the A/D outputs to the hex display values as shown in table 8-3. Change the Voltage Address switch for each voltage to be calibrated.

### Table 8-3. A/D Output Values At Hex Displays

| Voltage | Adjust | Minimum Hex Value | Exact Hex Value | Maximum Hex Value |
|---------|--------|-------------------|-----------------|-------------------|
| -5.0    | R21    | 7E                | 80              | 82                |
| -12.0   | R22    | 7E                | 80              | 82                |
| +12.0   | R18    | 7E                | 80              | 82                |
| +5.0    | R19    | 7E                | 80              | 82                |
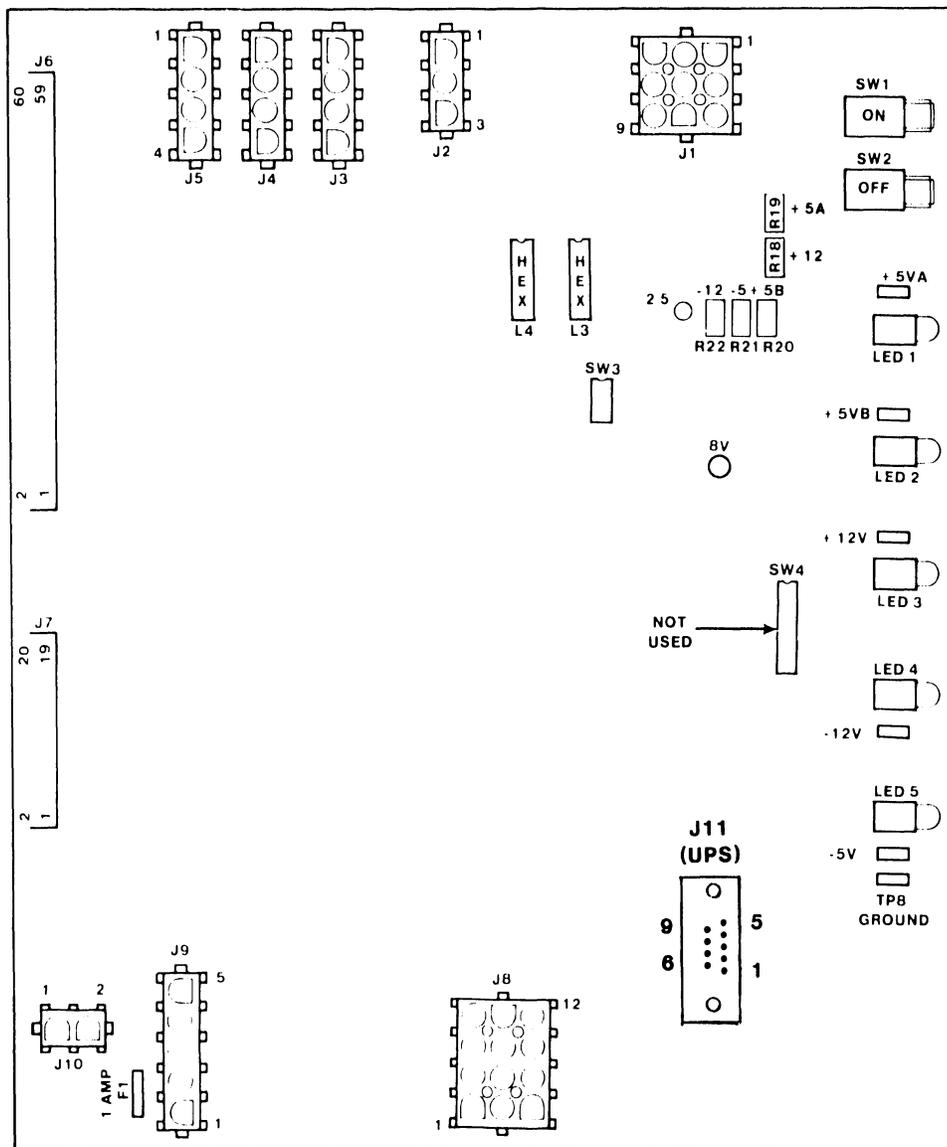


Figure 8-2. Power Supply Controller Board.

4.  From the System Console Screen Menu in Service Mode, enter offline diagnostics. (Refer to Section 6).

5. From the DCS Diagnostic Selection Menu, select the VS Environment.
   (Figure 8-3).

```
mm/dd/yy              Wang VS Diagnostic Control System          .h:mm:ss
            Rev XXXX      (c) Copr. Wang Laboratories, Inc. 1986
                       □□□□ ■□□□ □□□□ □□□□

   Sequence: 1                                           Error Cnt: 0
 Diagnostic: R1684 VSXXX 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

System Reset has been pressed          AC power has been cycled


HELP is available
```

**Figure 8-3. Environment Test Screen**

6. Look at the Environment Test Screen on the Support Control Unit (SCU)
   screen. The voltages shown in table 8-4 will appear on the screen.


**NOTE**

Do not rely on the Environment Test Screen on the
SCU to adjust the voltages. It is strictly a
monitor and will not respond quickly enough to do
a reliable voltage adjustment. Adjust the A/D
outputs while viewing the hex display.


**Table 8-4. DC Voltages On
SCU Screen**

| Voltage | Minimum | Maximum |
|---------|---------|---------|
| +5.0 | +4.96 | +5.04 |
| -5.0 | -4.96 | -5.04 |
| +12.0 | +11.96 | +12.04 |
| -12.0 | -11.96 | -12.04 |

# SECTION
# 9
# UNPACKING
# AND
# SETUP

# TABLE OF CONTENTS

## LIST OF ILLUSTRATIONS

# LIST OF ILLUSTRATIONS (CONT)

# LIST OF TABLES

# SECTION 9

# UNPACKING AND SETUP

## 9.1 GENERAL

This section describes the procedures for unpacking, inspecting, and in-
stalling the VS-7100 mainframe. Also included in this section are instructions
for system interconnection. Refer to Section 4, Operation; Section 7, Repair;
and Section 6, Troubleshooting, of this manual for more information needed to
complete installation. Actual installation should not begin until the site
requirements have been met.

## 9.2 INSTALLATION SITE CHECK

Prior to installation, the following conditions must have been met:

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

2.  All building alterations must have been completed and inspected.

3.  All electrical wiring, air conditioning, and telecommunications (TC)
    modifications must have been installed and tested. (The following TC
    equipment should have been ordered for remote maintenance support:)

    a.  Telephone line. (A dedicated line is not required.)

    b.  Telephone.

    c.  Either of the following modular connecting blocks for the tele-
        phone:

        1)  RJ11C jack for desk top telephones

        2)  RF11W jack for flush mounted wall telephones

### 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.

4.  The preinstallation inspection is to be performed two weeks prior to
    delivery. At this time, the service representative will check the
    site for compliance with VS site specifications. The service repre-
    sentative will bring any unsatisfactory conditions noted to the at-
    tention of the customer for correction.

## NOTE

Before installing a VS-7100, the minimum specifi-
cations described in the Customer Site Planning
Guide (WLI P/N 700-5978) should be met. Failure to
meet these requirements can be cause for the ser-
vice representative to deem a site unsuitable for
the proper functioning of a VS-7100 system. (Refer
to table 9-1 as a source for other publications
concerning site requirements and information that
will be helpful in installing the VS-7100.)

## 9.3 PUBLICATIONS

### Table 9-1. Publications Sources

| Publication Title | WLI P/N |
|---|---|
| Technical Documentation Catalog/Index | 741-0000 |
| Wang Customer Resource Catalog | 700-7647 |

## 9.4 TEST EQUIPMENT

| Description | WLI P/N |
|---|---|
| Power Supply Test Jumper | 220-2342 |

## 9.5 UNPACKING

Before unpacking the VS-7100, check all packing slips to make sure that
the proper equipment has been delivered. Refer to the model number information
below. After checking packing slips, inspect all shipping containers for dam-
age (crushed corners, punctures, etc.).

### Table 9-2. VS-7100 Models

| Model Number | WLI P/N | Description |
|---|---|---|
| VS-7110-4 | 157/177-7471 | 4,096KB Main Memory |
| VS-7110-8 | 157/177-7472 | 8,192KB Main Memory |
| VS-7120-4 | 157/177-7473 | 4,096KB Main Memory |
| VS-7120-8 | 157/177-7474 | 8,192KB Main Memory |
| VS-7150-4 | 157/177-7424 | 4,096KB Main Memory |
| VS-7150-8 | 157/177-7425 | 8,192KB Main Memory |

## NOTES

1. Part number prefix 157 = 50Hz. ac line fre-
   quency mainframes.
2. Part number prefix 177 = 60Hz. ac line fre-
   quency mainframes.

### Table 9-3. VS-7100 Upgrades

| Model Number | WLI P/N | Description |
|---|---|---|
| VS-MEM-4 | 200-1234 | 4 megabyte memory upgrade |
| VS-MEM-8 | 200-1235 | 8 megabyte memory upgrade |

## 9.5.1 CLAIMS INFORMATION

If damage is discovered during inspection, notify your manager.

### 9.5.2  UNPACKING THE MAINFRAME

1.  Cut and remove the strapping that secures the top cover and outside tube to the shipping pallet. (If the strapping is metal be careful that it does not spring out and away from the shipping container.)

2.  Remove the top cover and the outside tube.

**TOP COVER**

**STRAPS**

**OUTSIDE TUBE**
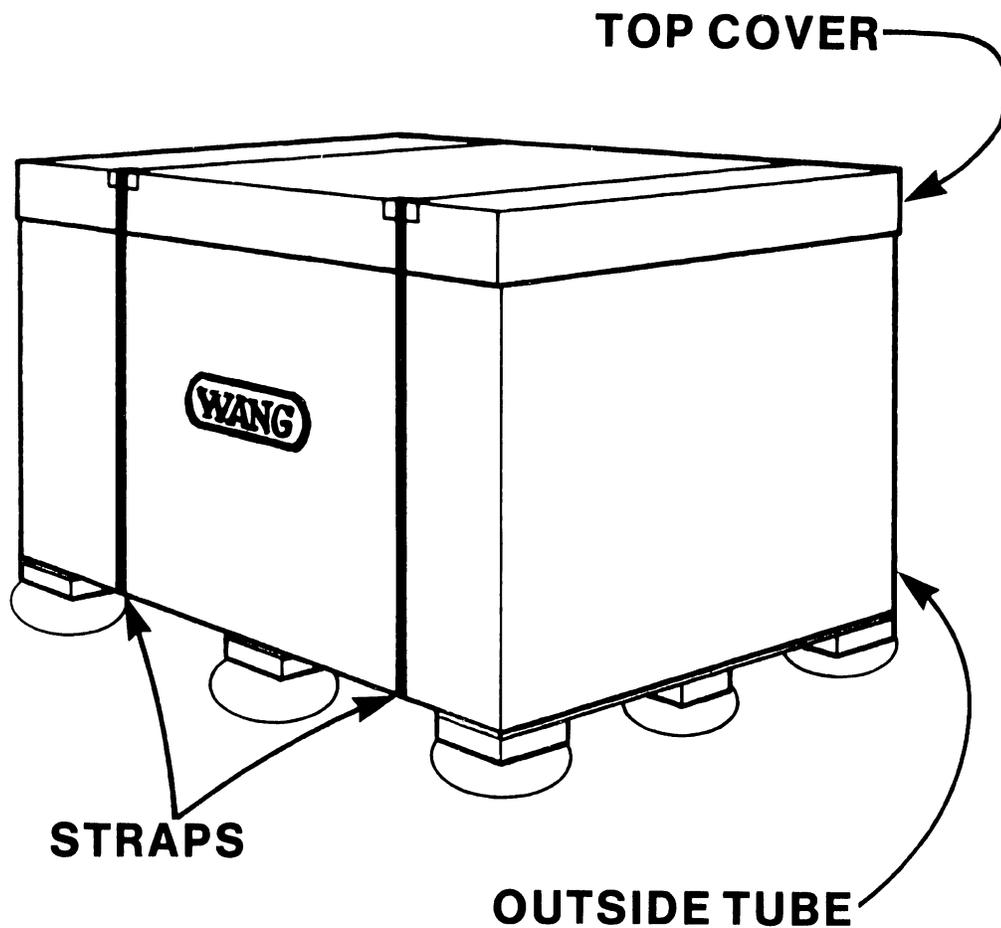
B-03175-FY86-1

Figure 9-1.  Unpacking the Mainframe (1 of 6)

3.   Remove the top cushion pad and plastic wrap covering the mainframe cabinet.

4.   Remove the shipping bolts securing the mainframe cabinet and the support assembly to the pallet.

**CUSHION PAD**
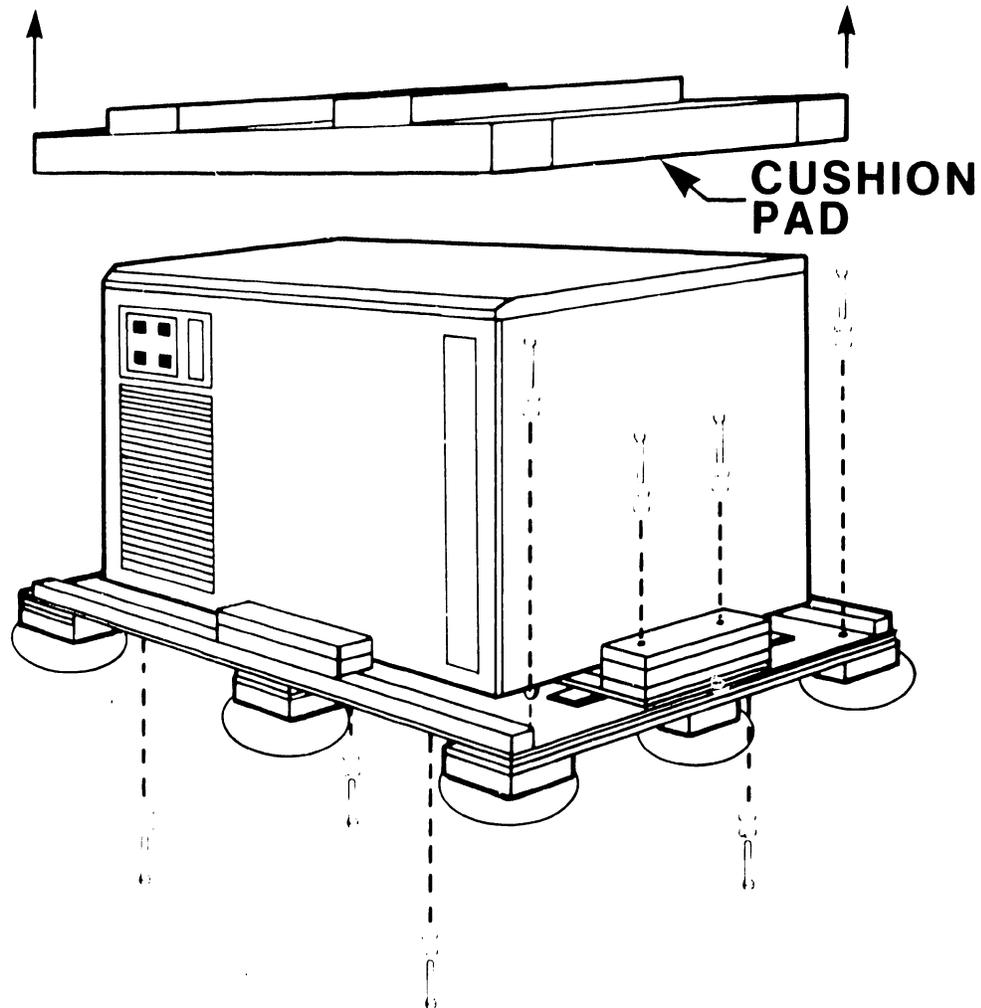
B-03175-FY86-2

Figure 9-2.  Unpacking the Mainframe (2 of 6)

**WARNING**

The mainframe cabinet weighs 550 pounds (250kg). Be careful when performing the following steps.

5.   Push the mainframe 1" or 2", enough to position the casters on the wheel blocks.

**NOTE**

An alternate method is to pry up each corner of the mainframe cabinet at a time with a piece of 2"x4" lumber (if available). Then swivel each caster up onto the wheel blocks.

**PUSH**

**WHEEL BLOCKS
(TYPICAL 4 PLACES)**
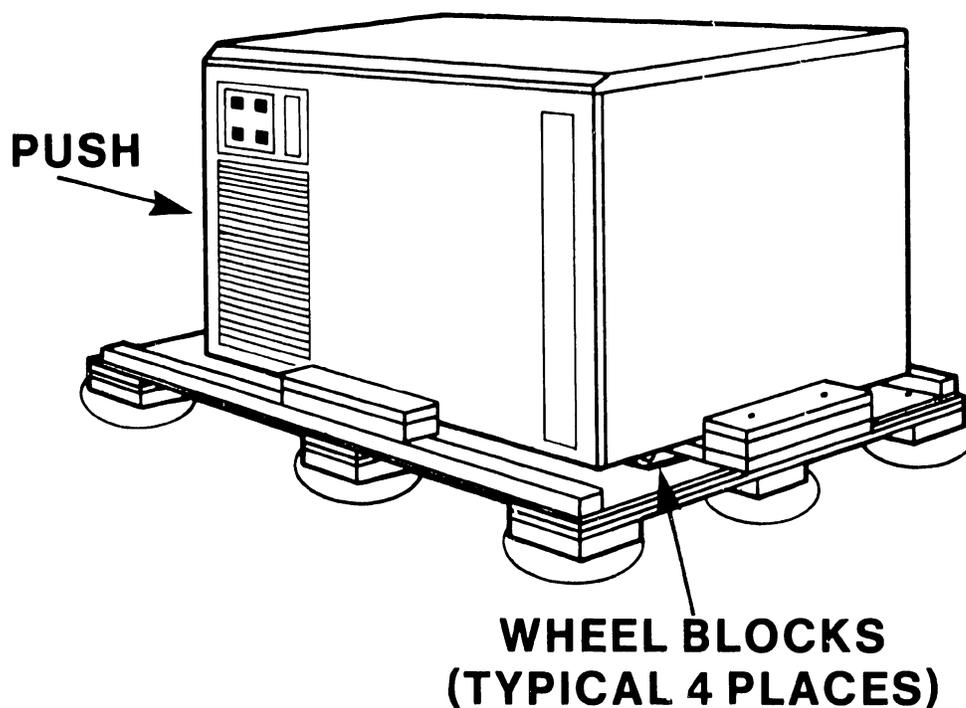
B-03175-FY86-3

Figure 9-3.  Unpacking the Mainframe (3 of 6)

6.    Pull out and remove the support assembly.

**PULL OUT**
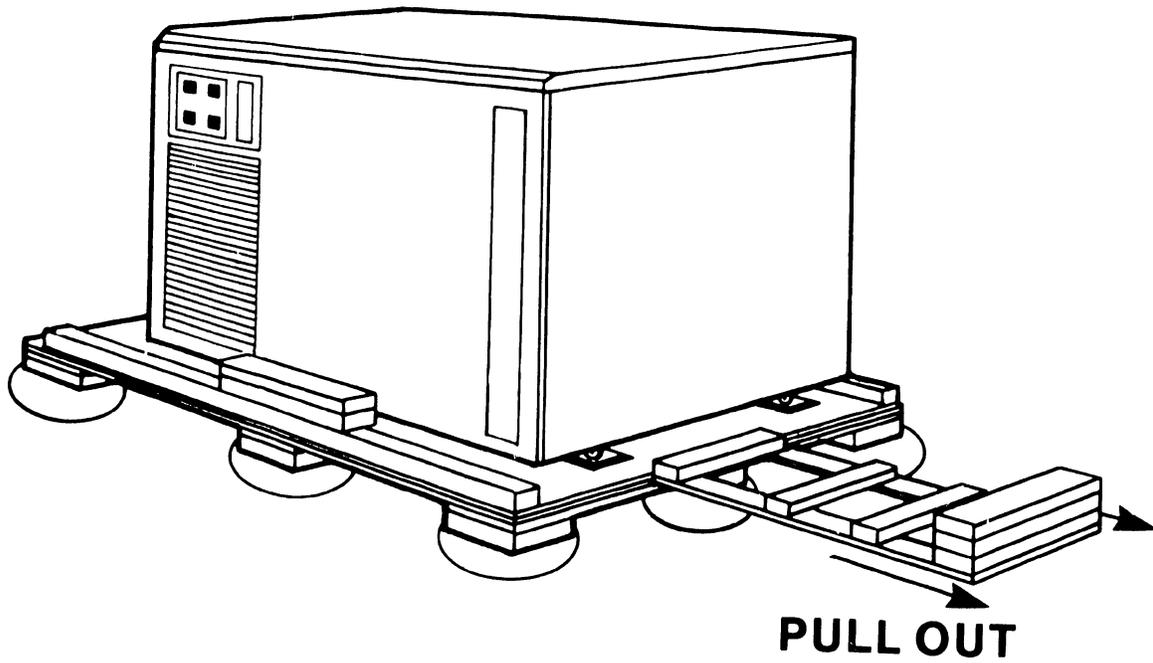
B-03175-FY86-4

**Figure 9-4.  Unpacking the Mainframe (4 of 6)**

**WARNING**

The mainframe cabinet will begin to tilt down when the cushion assembly is pulled out from under the pallet.

7.   Pull the cushion assembly out from under the pallet.
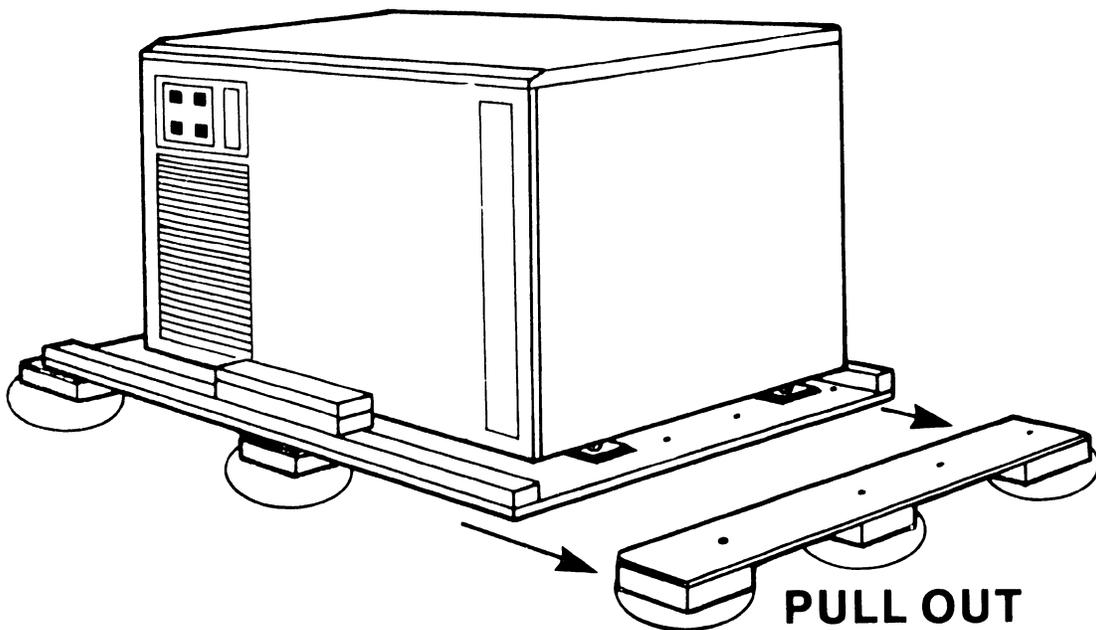


B-03175-FY86-5

**Figure 9-5.  Unpacking the Mainframe (5 of 6)**

8.   Carefully push the cabinet off the pallet.

**PUSH**
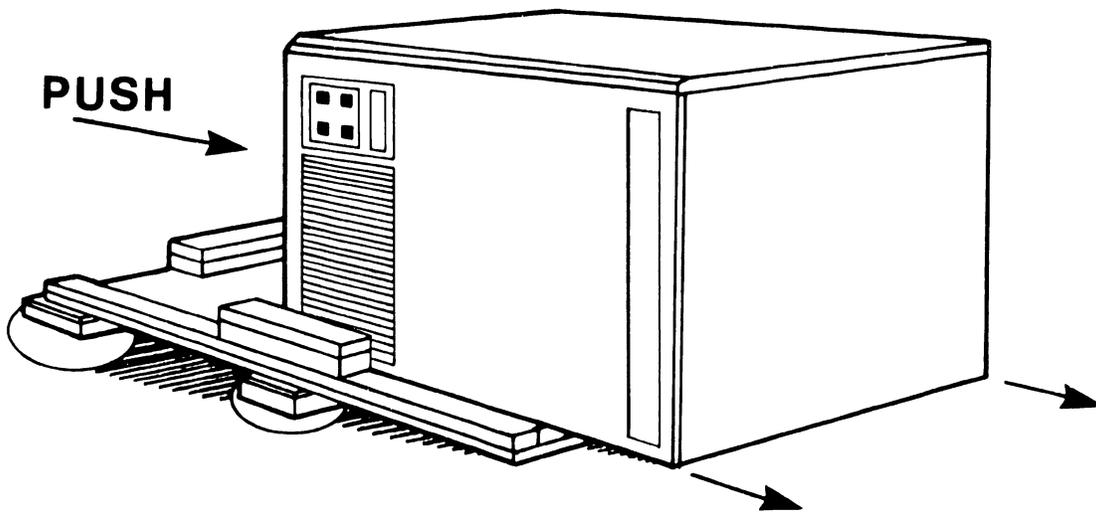
B-03175-FY86-6

Figure 9-6.  Unpacking the Mainframe (6 of 6)

9.   Move the cabinet to it's permanent location.
10.  Once the cabinet is in place, check the service clearances as listed
     below.

| Service Clearances | Inches | Centimeters |
|---|---|---|
| Front | 36 | 91.4 |
| Rear | 36 | 91.4 |
| Left | 24 | 60.9 |
| Right | 24 | 60.9 |
| Top | 36 | 91.4 |

## 9.5.3  UNPACKING THE PERIPHERALS

Before proceeding, carefully unpack all peripherals according to proced-
ures outlined in applicable maintenance manuals. As each unit is unpacked,
check it for any obvious shipping damage. Refer to paragraph 9.5.1 if any
damage is seen.

# 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 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 CABLING 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.

## 9.6   MAINFRAME INSPECTION

**NOTE**

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

**DO NOT REMOVE PRINTED CIRCUIT BOARDS 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 the top, front, and side covers from the VS-7100 cabinet. (Refer to Section 7.)

2.  Remove the shipping protector from the SCU floppy diskette drive.

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

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

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

6.  Carefully inspect the backplane and the power supply and Support Control Unit (SCU) fans for obvious damage.

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

8.  If necessary, vacuum clean the unit.

9.  Do not reassemble the mainframe at this time.

10. If damage is discovered at any time during the inspection, follow the reporting procedure in paragraph 9.5.1

### 9.6.1   PERIPHERAL INSPECTION

After inspecting the mainframe, carefully 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 in paragraph 9.5.1.

## 9.7  MAINFRAME POWER SOURCE

### 9.7.1  208/240 V AC DOMESTIC POWER SOURCE

Even though ac neutral is not used in domestic VS-7100 mainframes, any existing properly installed VS-100 mainframe power service (figure 9-7) can be used without modification. New service must be installed as shown in figure 9-7. Before completing the mainframe reassembly and peripheral equipment installation, use a digital voltmeter (DMV) to check the receptacle for proper wiring and service (table 9-4). Make sure that the receptacle meets all specified requirements before proceeding with the installation.

### CAUTION

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



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
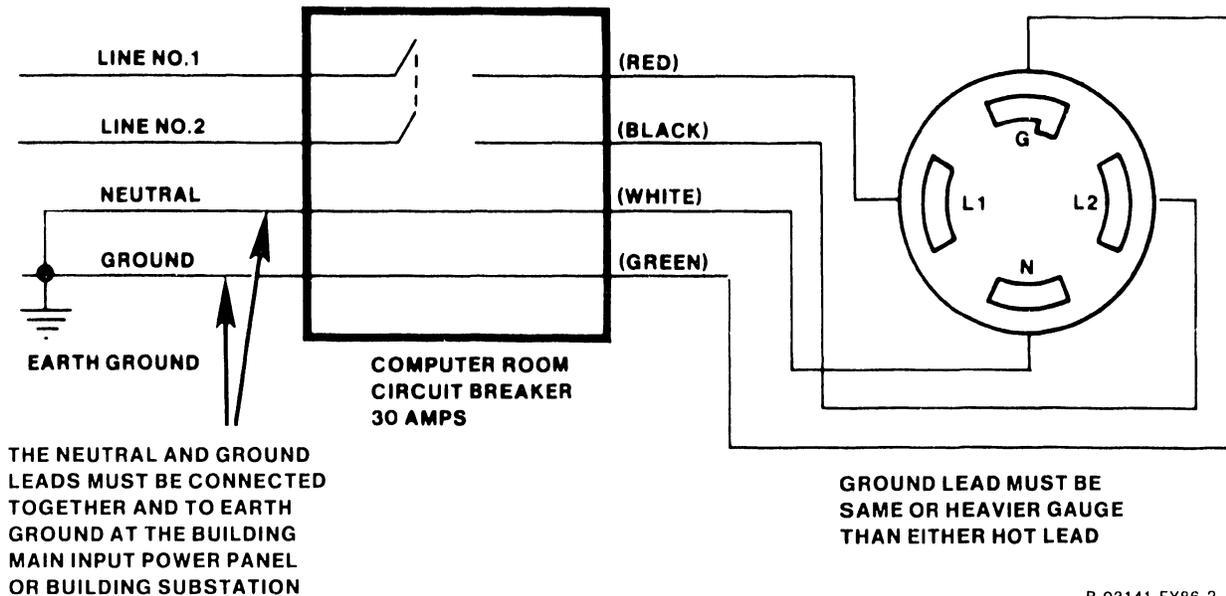
B-03141-FY86-2

| | RECEPTACLE BODY | MATCHING CONNECTOR |
|---|---|---|
| NEMA Configuration | L14-30IGR | L14-30P |
| Hubbel Part Number | IG2710 | 2711 |

**Figure 9-7.  208/240 Volt AC Power Source Requirements for VS-7100 Mainframes.**

**Table 9-4.  DVM Voltage Measurements 208/240 V AC Receptacle**

| Measure From | Acceptable DMV Readings |
|---|---|
| Ac Hot (L1) to Ground | 120 V ac (+/-10%) |
| Ac Hot (L2) to Ground | 120 V ac (+/-10%) |
| Ac Hot (L1) to Ac Hot (L2) | 208/240 V ac (+/-10%) |

## 9.8 INITIAL MAINFRAME POWER-UP

1.  After making sure that the ac On/Off circuit breaker is OFF, plug the mainframe power connector into the power source receptacle.

2.  Perform the following:

    a.  Turn ON the mainframe ac On/Off circuit breaker.

### 9.8.1 DC VOLTAGE CHECKS

#### 9.8.1.1 Power Supply Adjustments

1.  Remove the left side panel (Section 7).

2.  Remove the screws from the rear fan panel and set aside the panel.

3.  Press the Control Panel On button or SW1 (On) on the Power Supply Controller. Make sure the On lamp on the Control Panel and the voltage sensing LEDs 1 → 5 on the Power Supply Controller are lit. If the LEDs are not lit or go out after a few seconds, there is a problem with the power supply, or the Power Supply Controller board. No adjustments can be done until the problem is corrected. Do the following:

    a.  Remove the 4-pin connector from J5 of the Power Supply Controller board. (Figure 9-9.)

    **WARNING**

    Inserting the test jumper as described in step b (below) will immediately turn on the switching power supply if the ac On/Off circuit breaker is on.

    b.  Insert the Power Supply Test Plug (WLI P/N 220-2342) into P5, the control cable to the power supply.

    c.  If the power supply comes up and stays up, the power supply is good. (Refer to Section 6 for troubleshooting procedures for the 210-8809 Power Supply Controller board.) If the power supply still does not come up, replace the supply. (Section 7.)

    d.  Disconnect the test jumper and reconnect the cable to J4 or J5 on the Power Supply Controller.

4.  The following power supply voltages should be measured at the test points on the Power Supply Controller. Adjust the voltages to the readings listed below using the potentiometers on the front of the switching power supply at the rear of the mainframe (figure 9-8).
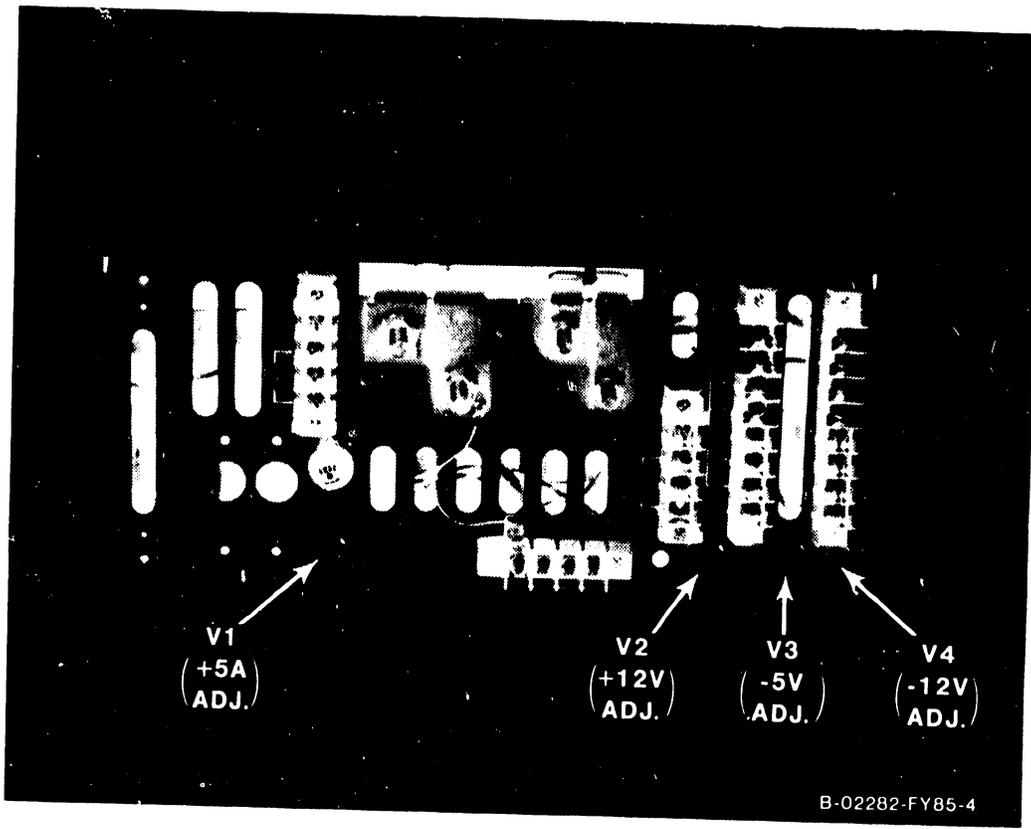
Figure 9-8. Multioutput Power Supply

Table 9-5. Power Supply Voltage Measurements

| Test Point | Adjust (P/S) | Volts | Minimum | Maximum | AC Ripple Limits |
|---|---|---|---|---|---|
| TP+5V | V1 | +5.0 | +4.96 | +5.04 | 35mV RMS |
| TP+12V | V2 | +12.0 | +11.96 | +12.04 | or |
| TP-5V | V3 | -5.0 | -4.96 | -5.04 | 50mV Pk-to-Pk |
| TP-12V | V4 | -12.0 | -11.96 | -12.04 | for all. |
| TPGROUND | | +/-0 | +/-0 | +/-0 | |

**NOTE**

1. It is better to have the +5 V adjusted more toward the maximum than toward the minimum.

### 9.8.1.2 Power Supply Controller Adjustments

1. Although there are no adjustments, measure the calibration voltages on the Power Supply Controller board (figure 9-9), at:

   a. TP 8 for 8 volts.

   b. TP 2.5 for 2.5 volts.

2. Set the 4-bit Voltage Address switch SW3 (table 9-6) on the Power Supply Controller board to the A/D input be adjusted.

Table 9-6. DC Voltage Address Switch SW3 Settings

| Voltage | Bit 1 | Bit 2 | Bit 3 | Bit 4 |
|---|---|---|---|---|
| -5.0 | Closed | Open | Open | X |
| -12.0 | Open | Closed | Open | X |
| +12.0 | Closed | Closed | Open | X |
| +5.0 | Closed | Open | Closed | X |

**NOTES**

1. Open = Off
2. Closed = On
3. X = don't care (bit 4 not used)
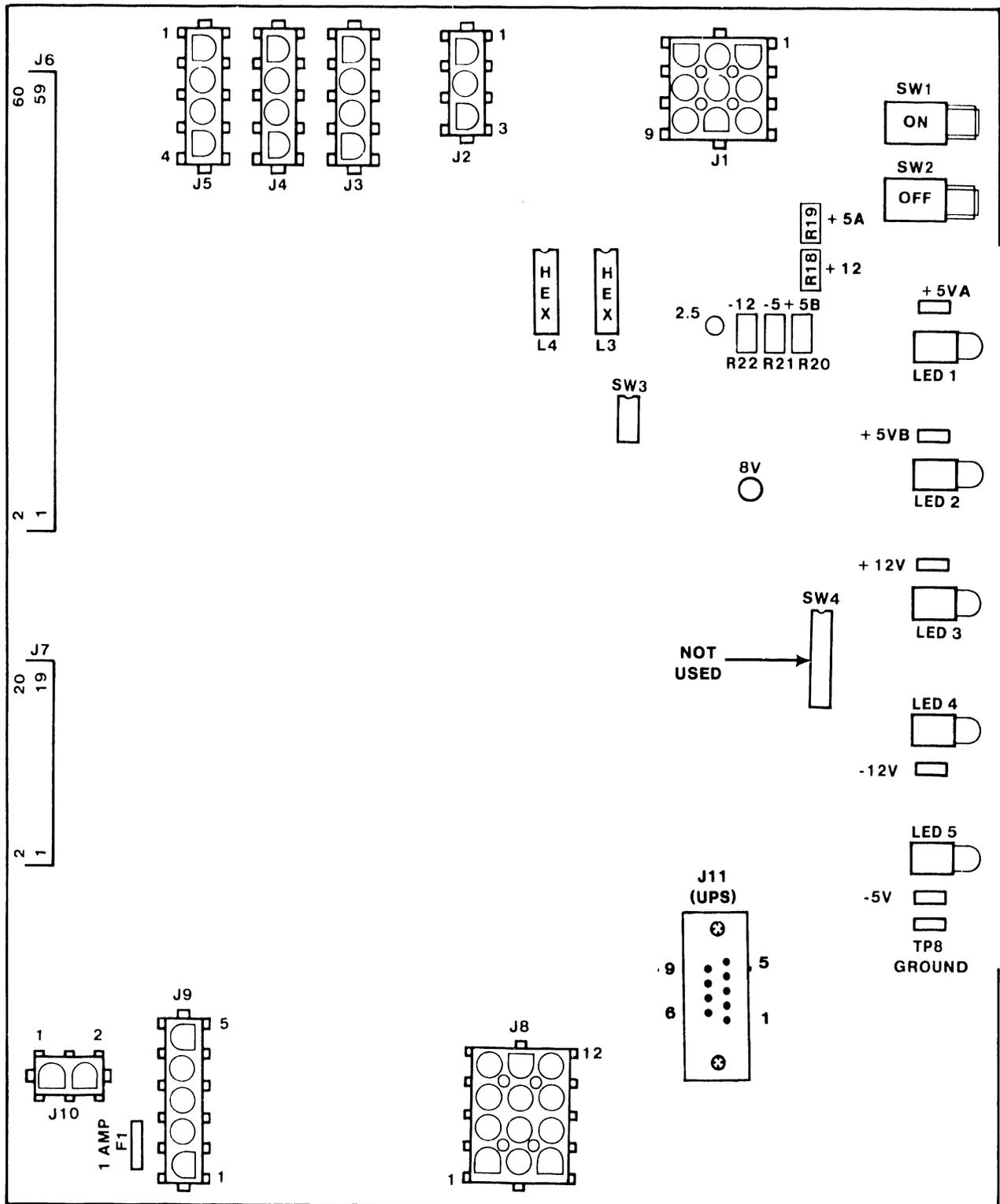
Figure 9-9. Power Supply Controller Board

3.  Look at the two hex displays on the Power Supply Controller board. Using the potentiometers on the Power Supply Controller board, adjust the A/D outputs to the hex display values as shown in table 9-7. Change the Voltage Address switch for each voltage to be measured/-adjusted.

### Table 9-7. A/D Output Values At Hex Displays

| Voltage | Adjust | Minimum Hex Value | Exact Hex Value | Maximum Hex Value |
|---------|--------|-------------------|-----------------|-------------------|
| -5.0    | R21    | 7E                | 80              | 82                |
| -12.0   | R22    | 7E                | 80              | 82                |
| +12.0   | R18    | 7E                | 80              | 82                |
| +5.0    | R19    | 7E                | 80              | 82                |

4.  From the System Console Menu screen, enter diagnostic mode. (Refer to Section 6).

5.  From the DCS Diagnostic Selection Menu screen, select the VSXXX Environment. (Figure 9-10).

```
mm/dd/yy          Wang VS Diagnostic Control System         hh:mm:ss
         Rev XXXX    (c) Copr. Wang Laboratories, Inc. 1986
                     ▢▢▢▢ ◼▢▢▢ ▢▢▢▢ ▢▢▢▢

   Sequence: 1                                    Error Cnt: 0
Diagnostic: R1684 VSXXX 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 SERVICE

System reset has been pressed        AC power has been cycled


HELP is available
```

Figure 9-10. Environment Test Screen

6.  Look at the Environment Test Screen on the Support Control Unit (SCU) screen. The voltages shown in table 9-8 appear on the screen.

**NOTE**

Do not rely on the Environment Test Screen on the SCU to adjust the voltages. It is strictly a monitor and will not respond quickly enough to do a reliable voltage adjustment. Adjust the A/D outputs while viewing the hex display.

**Table 9-8. DC Voltages On SCU Screen**

| Voltage | Minimum | Maximum |
|---------|---------|---------|
| +5.0 | +4.96 | +5.04 |
| -5.0 | -4.96 | -5.04 |
| +12.0 | +11.96 | +12.04 |
| -12.0 | -11.96 | -12.04 |

## 9.9 IPL PROCEDURES

If the voltage checks are correct, the system can be IPLed. If the system fails to IPL, the software may have to be installed on the SCU. Refer to paragraph 9.9.2. Make sure that the following have been connected to the system.

1.  The SCU must be connected to to Port 0 of the APA panel for the first SIO IOC. (Figures 9-19, 9-20, and 9-21.)

2.  The "B" cable of the system disk is attached to the top left "B" cable connector, labeled "0", of the disk connector assembly in the rear panel for the first disk IOC. (Figure 9-28.) The "B" cable from this connector assembly must be connected to J4 of the 23V98 Disk IOC in I/O slot #1.

### 9.9.1 IPLING THE VS-7100

Follow this procedure to perform an IPL.

1.  Make sure the Control Panel key switch is in Normal Control position.

2.  Power up the system disk drive.

3.  Press the System Reset pushbutton and then press the Operator Console Reset pushbutton.

4.  After a pause, the SCU start-up sequence is invoked and start-up messages appear on the SCU screen:

**"WANG SUPPORT CONTROL UNIT REV. X.XX"**
**"01 Start From Winchester"**

5.   Followed by:

**"Wang Support Control Unit – BIOS X.XX"**
**"MS-DOS Version X.XX"**

```
+------------------------------------------------+
|                                                |
|                   WANG                         |
|                                                |
|              System Console                    |
|                                                |
|     Copyright Wang Laboratories, Inc., 1987    |
|                                                |
+------------------------------------------------+
```

6.   The Console Processor Menu screen then appears.

```
+----------------------------------------------------------------------+
|                                                                      |
|                   <<< System in Control Mode >>>                     |
|                                                                      |
|                   *** Wang VS System Console ***                     |
|                                                                      |
|    SYSCON Version X.XX           11:06 AM           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        |
|                                                                      |
|                                                                      |
|     (5)   AUTO IPL                           (12) SET Console Defaults|
|     (6)   RSAF Functions                     (13) SET Time and Date   |
|                                                                      |
|                                                                      |
+----------------------------------------------------------------------+
```
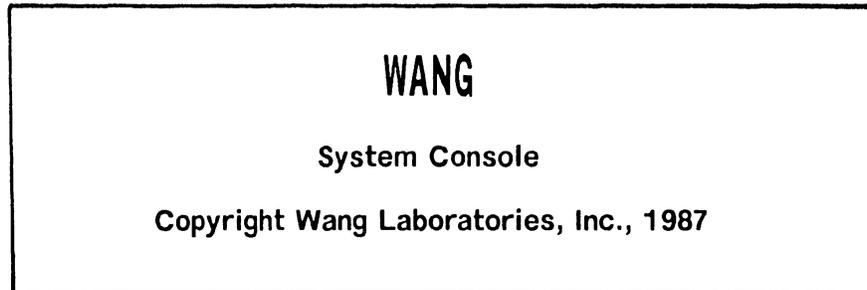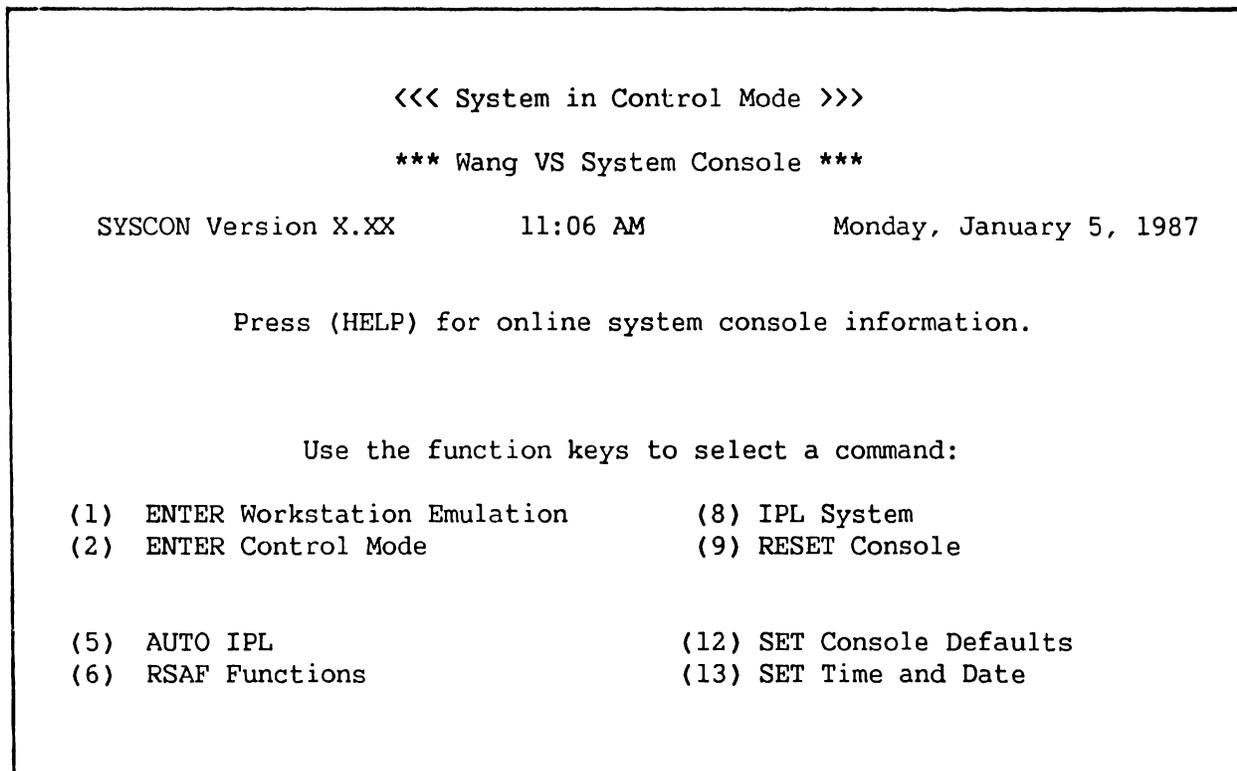
**Figure 9-11.  Console Processor Menu Screen**

**NOTE**

The functions that the key switch allows in any
one of the four key switch positions are high-
lighted on the Console Processor Menu screen.

Certain elements of the System Console Menu are
password-protected to prevent unauthorized use of
some SYSCON facilities. These elements are not
immediately displayed.

7.  If it is necessary to load any SCU software, do step 7. If no soft-
    ware is to be loaded, go to step 8.

    a.  Place the Control Panel key switch in the "Remote Service" posi-
        tion.

    b.  Type in the following password:

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

**NOTE**

The password will not appear on the screen. Also,
while entering the password, the keyboard beeper
will sound as each key is pressed. This is normal.
It is intended to keep unauthorized personnel from
enabling the full System Console Menu.

    c.  A Console Processor Menu screen in service mode, figure 9-12,
        will appear.

```
***  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
```

Figure 9-12.  Modified System Console Screen in Service Mode

d.  Insert the diskette to be loaded in the diskette drive and close the door.

e.  Press PF29 (Shift + Cancel), for Install Software. The diskette will begin loading onto the SCU disk drive.

f.  Upon a successful load, a **"Diskette installed"** message will appear and the system will return to the modified Console Proces- sor Menu screen in service mode.

g.  If no more software is to be loaded, press PF10, Terminate Ser- vice Mode, and return the key switch to the "Normal Control".

8.  a.  Press PF5 (AUTO IPL). This message appears:

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

    b.  Press RETURN. (If _he console defaults need modifying, or if the CPU code has not been loaded, a CPU or IPL error may appear. Go to step 9. If there are no changes necessary, or no CPU or IPL errors appear, go to step 13.)

9.  Press PF12 (SET Console Defaults). The System Console Default screen appears.

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

          *** VS System Console Defaults ***


Select a PF key to perform the indicated function:
_____



Auto IPL device                        IPLDEV   = R 0100
CPU microcode filename                 CPUCODE  = /SCU/OBJ87159.CP8
FPU microcode filename                 FPUCODE  = /SCU/FPUMCA59.MEM
Soft-Boot microcode filename           SBCODE   =
WS emulator options                    WSOPTION = -PC
Pass console Date/Time to VSOS         TIMEDATE = Y
Warning message before a reset         WARNING  = Y
Main memory dump support               MMDUMP   = N


_____


(9) Modify Defaults    (10) Load System Microcode        (16) Exit
```

**Figure 9-13. System Console Default Screen**

    a.  If defaults are incorrect, press PF9 (Modify Defaults), make corrections as shown in figure 9-13, press RETURN, and/or:

## NOTES

1. For CPU microcode file <u>without</u> FPU support, enter /SCU/OBJ87059.CP8
2. For CPU microcode file <u>with</u> FPU support, enter /SCU/OBJ87159.CP8
3. For FPU microcode file, enter /SCU/FPUMCA59.MEM
4. WS emulator options are:
   O — emulate OIS 5536-4 terminal
   A — emulate Alliance 5536-4 terminal
   C — emulate VS-2256C terminal
   S — emulate VS-2246S terminal
   W — select 256-character font mapping
   F — select mini-archiving capability
   P — select immediate return to emulation by-passing Workstation Emulation menu when ENTER terminal emulation selected from Console Processor menu.

    b.  Whether defaults were corrected or not, press PF10 (Load System Microcode).

10. Press PF16 (Exit) and the Console Processor Menu screen (figure 9-11) reappears.

11. Press PF5 (AUTO IPL). This message appears:

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

12. Press RETURN.

13. The Workstation Initialization Screen, figure 9-14, appears.

```
                                    .



                                  Wang
                                   VS
                          Workstation Emulation
                             Version X.XX


             Initialization in Progress – Please Wait


```
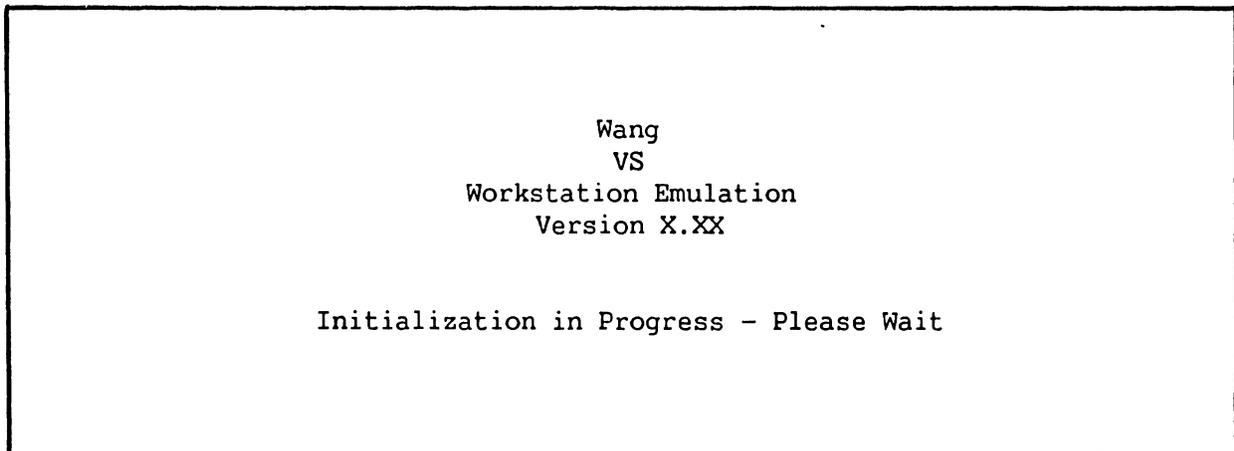
**Figure 9-14. Workstation Initialization Screen**

14. The SYSGEN Configuration File screen (figure 9-15) appears.

```
***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 use, if any

                     COMMFILE = ********
                     COMMLIB  = @SYSTEM@

   Inhibit logons at all workstations?              LOGONS = NO
         Load Micro Code to all devices?            LMCODE = NO
   Inhibit dumping continuable halts?               CMDUMP = NO
```

Figure 9-15. SYSGEN Configuration File Screen

**NOTE**

If the IPL was unsuccessful and an "IPL failed"
message is received, refer to paragraph 9.9.3,
IPL Errors

15. a. On the SYSGEN Configuration File screen, enter the names of the
configuration files and the system library to be used. The field
for the communications configuration file is blank. Fill in the
communications configuration file field only if communications
are going to be used. To change one of these values, move the
cursor to the appropriate field and enter in the new information.
Then, press RETURN.

**NOTE**

If the system is being IPLed for the first time, the default values of @CONFIG@ and @SYSTEM@ are used for the configuration file and system library, respectively. After IPLing for the first time, configuration files can be created using GENEDIT. Refer to the VS Software Bulletin Release 7.12.

b.  After the values have been entered, the VS-7100 stores them in a start-up file. At the next IPL, the system displays the stored values and allows them to be changed.

c.  The prompt "Inhibit logons at all workstations?" allows workstation logons to be inhibited. If "YES" is entered, only the SCU user can log on. The default value is "NO", which allows logons at all workstations, which were enabled before this IPL.

d.  The prompt "Load Micro Code to all devices" lets microcode be loaded to each workstation (including remote workstations) as part of the IPL procedure. If "Yes" is entered, microcode is loaded to each workstation and the IPL process is significantly slower. This option is used when a workstation is hung up or when the workstation configuration has been changed. The default value is "No".

e.  The prompt "Inhibit dumping continuable halts" allows disabling of the Continuable Dump for errors that do not require reIPL. If "Yes" is entered, Continuable Dumps which do not reIPL the system are not performed and system processing continues with the system error in effect. If "No" is entered, all Continuable Dumps occur. The default value is No. Refer to Section 6 for more information on the Continuable Dump.

16.  Press RETURN when finished with the SYSGEN Configuration File screen. (Or, to bring up a minimum configuration of one workstation [W/S0] and one disk, without changing the default values, just press PF1.)

**NOTE**

The IPL procedure automatically activates any remote workstations that have been configured via the remote workstation parameters in the GENEDIT procedure.

17.  After pressing RETURN from the SYSGEN Configuration File screen, the VS-7100 checks to determine if any of the critical operating system components are obsolete or incompatible. If no problems are detected, the IPL continues and the message **"System Generation in Progress"** appears on the SCU screen.

    a.  If incompatibilities exist that can cause problems, the IPL is stopped and a warning message is displayed by @SYSGEN@.

18.  The message **"I/O Subsystem Load in Progress"** appears on the SCU screen.

19.  a.  If the SCU real time clock is not usable, the date and time screen appears. Enter the correct date and time, and press RETURN.

      b.  This screen also allows changing the amount of memory available for use. The default value is the total amount of physical memory for the system. To change the value, move the cursor to the field, enter the new value, and press RETURN.

20.  The message **"System Initialization in Progress"** appears on the SCU screen.

**NOTE**

> In the event of an IPL/Sysinit error that does not appear on the IPL screen (e.g. the system does not complete the IPL and hangs), enter Enhanced Control Mode (figure 6-18) and check low memory location Hex F00. Additional IPL error messages will be displayed in ASCII code at this location. (This applies to OS 7.1X.XX, or higher.)

The VS-7100 is now initialized and ready for operation. VS workstation emulation is running on the SCU and the Operator's screen is displayed. To log on from the SCU;

1.  Press PF1 and the VS Logon screen appears.

2.  Enter the User ID and Password. (As this is the first time that the system has been IPLed and logged onto, use "CSG" for the User ID and leave the Password field blank.)

3.  Press RETURN. The User screen is displayed.

Usually, the SCU is Workstation 0; while workstation emulation is running, perform all Workstation 0 tasks from the SCU. See Chapter 3 of the VS-300 Processor Handbook for information on running the SCU; see Chapter 4 for procedures for running Operator's tasks.

Once workstation emulation is running on the SCU, it is interrupted when one of several conditions occur. When workstation emulation is suspended, Workstation 0 functions are maintained by the SCU; however, they are not displayed on the screen. The conditions interrupting workstation emulation are:

1.  Exiting workstation emulation (press CONTROL, then press SHIFT and CANCEL simultaneously, then select Suspend Emulation and press EXEC). (Returns to figure 9-11, the Console Processor Menu screen.)

2.   The VS-7100 enters Control Mode automatically.

If a system element, such as an IOC, fails, the VS-7100 does not automatically enter Control Mode. Rather, it displays the problem on the screen and continues operation.

After Control Mode is manually invoked and then exited, workstation emulation has to be selected from the Console Mode menu to reenter Operator's mode.

### 9.9.2  SCU SOFTWARE INSTALLATION

The SCU and SCU Installation utility software are stored on the floppy diskettes that are auto-enclosed with the VS-7100. Generally, SCU software need only be installed if the system failed to IPL, or if the SCU fixed drive (the SCU Winchester) is damaged (e.g., during a power outage).

1.   If the system is not already powered up:

   a.   Make sure that the key switch on the Control Panel is turned to the Normal Control position.

   b.   Power up the mainframe and W/S 0 (SCU) by pressing the Power On pushbutton on the Control Panel. Don't power on external disk drives.

2.   If the system is already powered up, enter Control Mode, power off any external disk drives, and exit Control Mode. Then, press the Operator Console Reset pushbutton.

3.   Watch the SCU keyboard. As soon as the keyboard lights go out and the beep signal sounds, press the HELP key.

4.   When the Options menu appears on the SCU screen:

   a.   Insert the Install diskette in the diskette drive and close the door.

   b.   Press D. (Re-direct Start)

   c.   Press A.

   d.   Press Return.

5.   The start-up message appears on the SCU screen:

   "01 Start From Drive A"

6.   Followed by:

   "Wang Support Control Unit – BIOS X.XX"
   "MS-DOS Version X.XX"
   "Loading Menu"

7.   The SCU Install Utility menu appears. (See figure 9-16.)

```
mm/dd/yy            Wang Laboratories, Inc.         hh:mm:ss
                Support Control Unit Install Utility
                       Version XX.XX.XX

Select an Item and Proceed



                   ■ Analyze Winchester Disk
                   ▃ Format Winchester Disk
                   ▃ Realign and Format Winchester
                   ▃ Install SCU Software



                   SPACE BAR - Item Select
                   EXECUTE   - Proceed
                   CANCEL    - Previous Menu
```

**Figure 9-16. SCU Install Utility Menu**

This menu presents four choices:

a.  Analyze Winchester Disk - This utility checks the Winchester disk; it corrects inconsistencies in the File Allocation Table (FAT) and reports the number of extents.

b.  Format Winchester Disk - This utility erases all existing files and prepares the Winchester to accept new files. It takes about 6 minutes.

c.  Realign and Format Winchester - This utility does a complete reformatting of the Winchester, including several passes across the disk to erase current files and file information. It takes about 1 hour and 40 minutes to complete.

d.  Install SCU software - This utility loads the SCU software onto the Winchester.

6.  a.  Press the space bar (or press "F") to select Format Winchester Disk. (Formatting takes about six minutes.)

    b.  Press EXEC. The following message appears on the screen:

        **"Format version X.X.XX"**
        **"Type 'Winchester' to begin formatting C:"**

    c.  Enter Winchester and press RETURN. The following messages appear on the screen during formatting:

        **"Formatting..."**
        **"Writing Winchester"**
        **"Building Winchester FAT table..."**

d. When formatting is complete, this request appears on the screen:

**"Volume label (11 characters, RETURN for none)?"**

Either label the volume or press RETURN for no label.

e. The following message appears on the screen:

**"Format Completed..."**
**"_____ bytes total disk space"**
**"_____ bytes available on disk"**

f. Figure 9-16, the SCU Install Utility menu, reappears.

9. Select the Install SCU Software option from the Support Control Unit Install Utility menu and press EXEC. The **"Setting up Winchester"** message appears, followed by the SCU Install Utility screen, figure 9-17.

```
                        Wang Laboratories Inc.
                  Support Control Unit Install Utility
                        Version XX.XX. ᐧ ᐧ



        Please insert floppy to be installed.
        SCU must be Re-booted after last disk is installed.
        (i.e. push the blue pushbutton)



        Strike a key when ready . . .
```
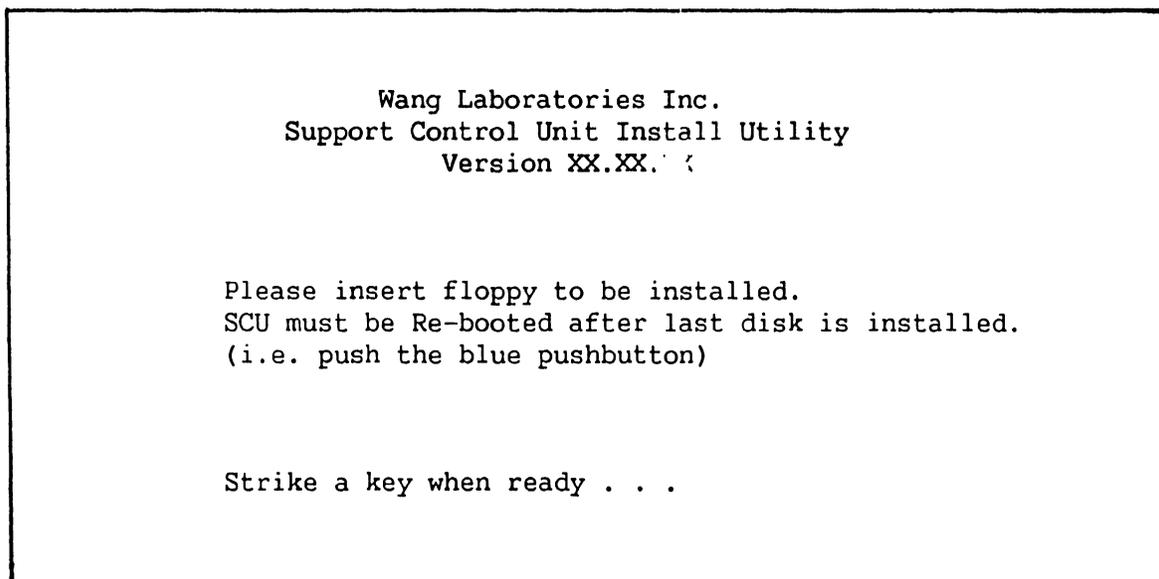
**Figure 9-17. SCU Install Utility Screen**

10. Remove the Install diskette from the diskette drive. Insert any one of the other SCU software diskettes in the diskette drive. It does not matter which one is used first, or if the same diskette is accidentally inserted twice. Close the diskette drive door.

**NOTE**

Once the Install has been used to start up the Install utility, do not copy it. If it is accidentally copied, terminate the Install utility (step 15) and repeat the installation procedure.

11. Press any key to initiate the installation. The message **"Copying ......"** with the list of files as they are being copied appear on the screen.

    a. If this error message appears:

       **"Not ready reading drive A**
       **Abort, Retry, Ignore?"**

       1). Check the arrows on the diskette to make sure that the diskette has been inserted properly in the drive.

       2). Make sure that the diskette door is completely closed.

       3). Restart the Install utility by pressing "R".

    b. If this error message appears:

       **"Write protect error writing drive A**
       **Abort, Retry, Ignore?"**

       1). Remove the diskette from the drive, remove the write-protect tab, and insert the diskette into the drive. Close the door.

       2). Restart the Install utility by pressing "R".

12. After the files from the diskette are copied to the Winchester, the following message appears:

    **"diskette installed.**
    **Please remove floppy from drive.**
    **Strike a key when ready."**

13. Remove the diskette from the drive and press any key. The Install Utility screen, figure 9-17, reappears. Insert another diskette and press any key. Repeat this step until the files from all the diskettes have been copied.

14. After the files from the last diskette have been copied, remove any diskette from the diskette drive and leave the diskette drive door open. Terminate the Install utility.

15. Press the Operator Console Reset pushbutton on the Control Panel. The SCU start-up messages appear, followed by the Command Processor screen.

## 9.9.3 IPL ERRORS

There are four major errors that can be encountered in an unsuccessful IPL. Table 9-9 lists the errors and the action necessary to correct them. Refer to table 6-26 for IPL errors.

Table 9-9. IPL Errors

| Error | Description | What To Do |
|-------|-------------|------------|
| IPL Failed, No SQB (Status Qualifier Byte) received from IOC | The request to the IOC was made, but not acknowledged. | Check the second digit of the 4-digit hexadecimal IPL device number; it may reference an invalid IOC. Change the number and re IPL. Press System Reset pushbutton. |
| IPL failed, no interrupt received from IOC | This indicates a system bus problem. | Check all four digits of the hexadecimal IPL de vice number to see if the number is valid. Change the number and reIPL. Press the System Reset pushbutton. |
| IPL failed, invalid SQB (Status Qualifier Byte) | The IOC may be experiencing a a problem. | IPL from another device; change the 4-digit hexa decimal IPL device number for the new device and reIPL. Press the System Reset pushbutton. |
| IPL failed: Inter- vention required. | The IPL drive is not powered on, or, the disk be damaged, or the drive may be defective. | Power on the drive, change the disk, or change the IPL drive. If changing the IPL drive, change the 4-digit hexadecimal IPL device number. ReIPL the system. Press the System Reset pushbutton. |

### 9.9.4 VERSION CHECKING DURING IPL

If any operating system component cannot be found or has no version number or too low a version number, the system displays the Version Warning screen (figure 9-18) on the SCU.

The Version Warning screen lists all the operating system and bus proces- sor components checked, up to and including the component that causes the "Fatal Error" message to appear on the screen. The sample Version Warning screen (figure 9-18) lists the entire set of operating system and bus proces- sor components to be checked. The entry for any component causing a version number problem is blinking. The current version of the NUCLEUS file is listed at the top of the screen. This screen also lists component information, such as component name, the minimal (oldest) version that will run with the current NUCLEUS file, and the current version number for that component and its status.

```
                              WARNING

Some components of the WANG VS OPERATING SYSTEM could not be identified
as the latest versions for the current NUCLEUS file (rel X.XX.XX)


Component        Minimal Version      Current Version      Status

@SYSGEN@         07.06.02             07.06.03
@SYSSVC@         07.06.06             07.06.06
@SYSTSK@         07.06.06             06.30.57             FATAL ERROR
@TSKMGR@         07.06.03             07.06.03
@OPER@           07.06.05             07.06.05
@SYSCPR@         07.06.02             07.06.02
@SHARER@         07.06.03             07.06.03
@PRTTSK@         07.06.02             07.06.02
@MCBP@           07.06.03             07.06.03
DEVLST           07.06.30             07.06.25             WARNING

               You may continue by pressing ENTER
```

Figure 9-18.  Sample Version Warning Screen


The Status field located on the Version Warning screen indicates a status
error message if the component is in error. The status error messages are
listed in table 9-10.


Table 9-10.  Version Checking Status Error Messages

| Message | Definition | Components |
|---------|------------|------------|
| (blank) | No problems are detected. | |
| WARNING | A version problem exists with this component, though it is not critical enough to halt system initialization. | @PRTTSK@ @SHARER@ DEVLIST |
| FATAL ERROR | IPL procedures cannot continue. Obtain a current, compatible version of the component and then reIPL. | @SYSGEN@ @SYSTSK@ @OPER@ @SYSCPR@ @TSKMGR@ |

If the VS-7100 cannot determine a component's version number, the Current Version field displays UNKNOWN as the version number. This error usually occurs if the file does not exist. If no fatal problems exist (i.e., "NonFatal Error"), continue the IPL procedure by pressing RETURN. If, when pressing RETURN, there is a "Fatal Error", the VS-7100 enters Control Mode.

If the system detects a version number problem with the @SYSSVC@ component, it may not display the Version Warning screen and it may enter Control Mode. Depending on the version numbers of @SYS000@ and @SYSSVC@, the following message is displayed on the workstation screen:

### CURRENT @SYS000@ CANNOT SUPPORT CURRENT @SYSSVC@

When the system enters Control Mode, the Control Mode Dump procedure may have to be performed, as described in Section 6.


## 9.10  PERIPHERAL INTERCONNECTION

After the system has been IPLed and SYSGEN has been run, power down the mainframe and connect all peripheral devices according to the configuration created during GENEDIT. See figures 9-19 through 9-33, the following paragraphs, and appropriate documents for cabling procedures.


## 9.10.1  I/O CONNECTOR ASSEMBLY TO IOC CABLING

Before installing cables in the connector assemblies at the rear of the mainframe, check all cables between the assemblies and associated IOCs. The SCU must be connected to to Port 0 of the APA panel for the first SIO IOC.

Make sure that the "B" cable of the system disk is attached to the top left "B" cable connector, labeled "0", of the disk connector assembly in the rear panel for the first disk IOC. The "B" cable from this connector assembly must be connected to J4 of the 23V98 Disk IOC in I/O slot #1.


## 9.10.2  SERIAL CONNECTORS

Serial I/O devices (workstations, printers, etc.) connect to the mainframe by means of standard BNC/TNC connectors mounted on 16-connector (8-port) Active Port Assembly (APA), WLI P/N 270-0975. Maximum cable length for these devices is 2000 feet. The APAs connect to J2 of the 23V67 Serial IOCs through a 34-pin ribbon cable. Four APAs are supported by each 23V67 IOC. See figure 9-21.

The 23V67 IOC also supports the 6550 Gate Array TC controller (paragraph 9.10.6), and the existing WangNet P-Band 19-channel Global modem and the new 28-channel Global modem (paragraph 9.10.3). Connector J1 on the IOC is always reserved for P-Band. No other type of devices should be connected to J1.

. The APAs, 6550 Gate Array TC controller, and the WangNet P-Band Global modems can also be housed in the free standing Cable Concentrator unit. (Figures 9-23, 9-26 and 9-27.)
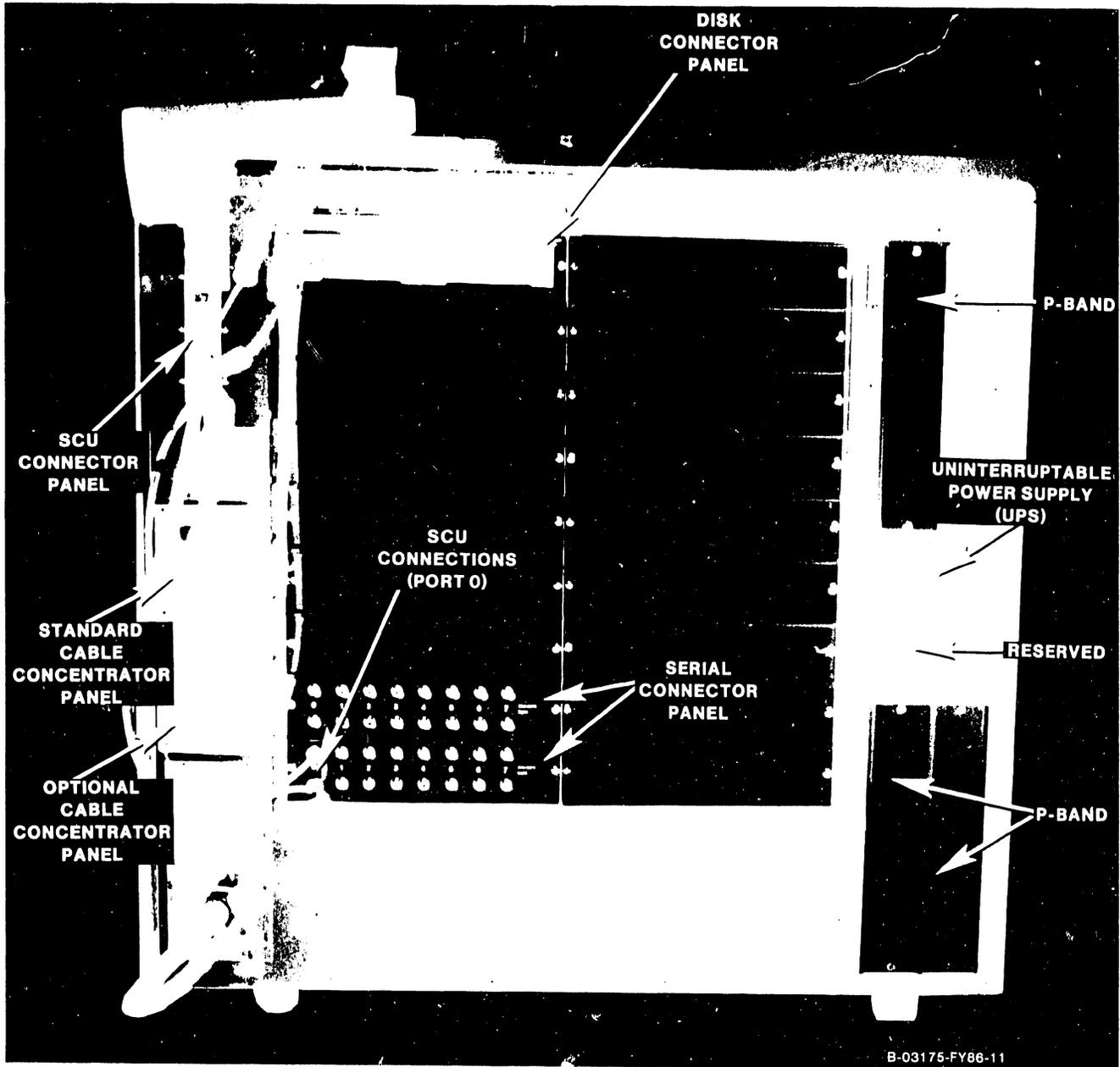
Figure 9-19. VS-7100 I/O Panel Basic Positions

25-PIN
REMOTE
DIAGNOSTIC
CONNECTOR

4-PIN
KEYBOARD
CONNECTOR

5-PIN
MONITOR
POWER
CONNECTOR

8-PIN
MONITOR
VIDEO
CONNECTOR

BNC/TNC
CONNECTORS.
TO PORT 0
OF APA PANEL
FOR FIRST SERIAL IOC.
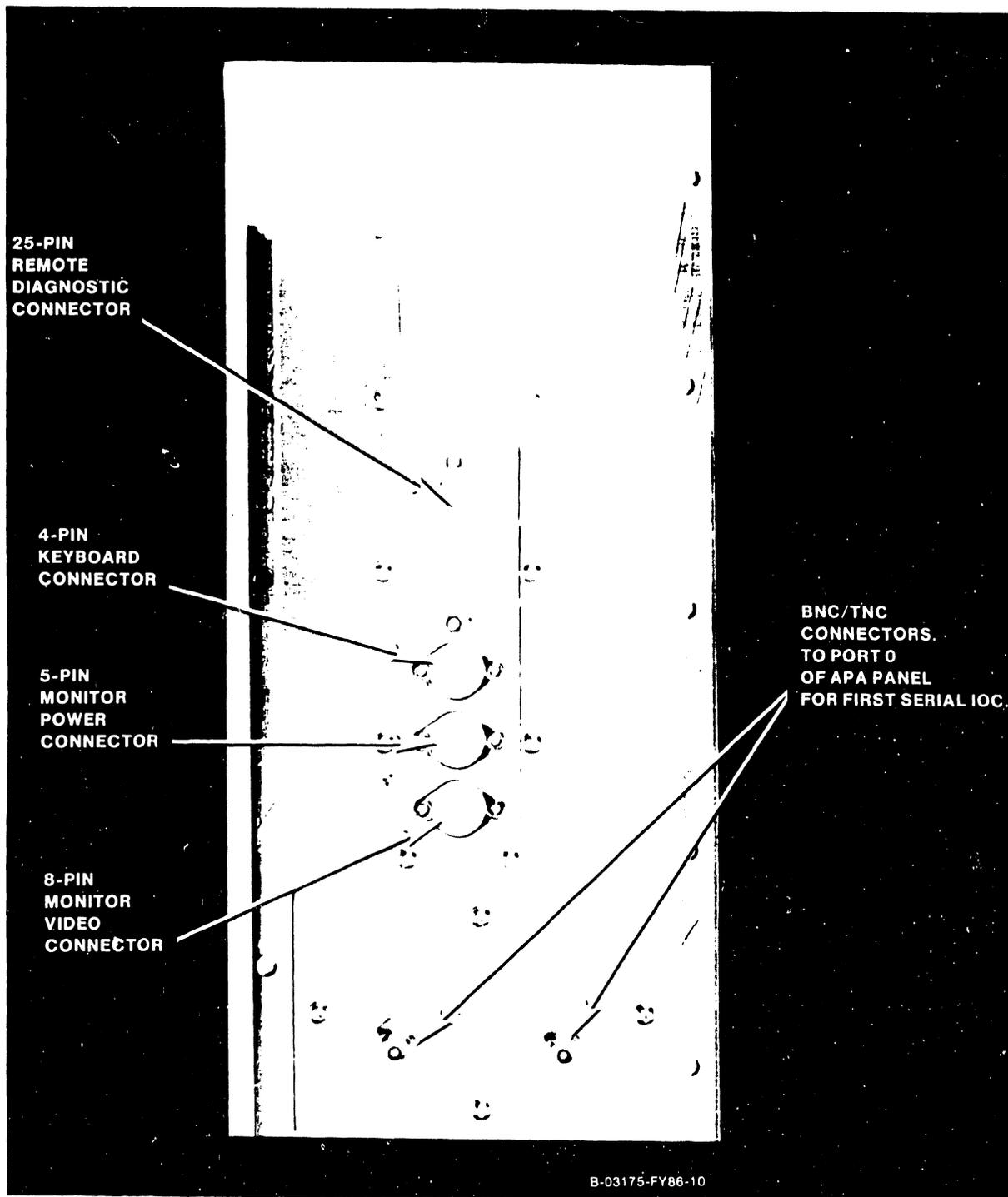
B-03175-FY86-10

Figure 9-20.  VS-7100 SCU Connector Panel
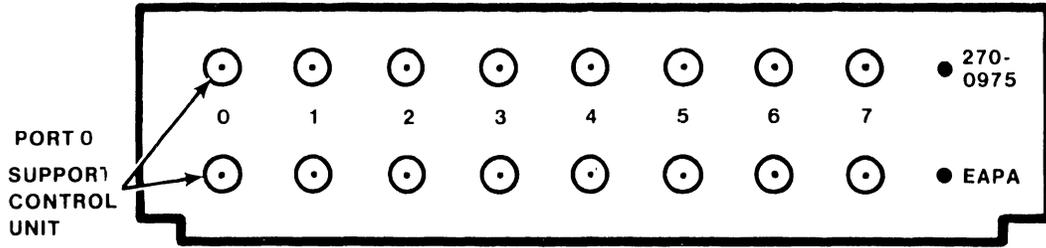
Figure 9-21. Electrical APA BNC/TNC Connector Assembly
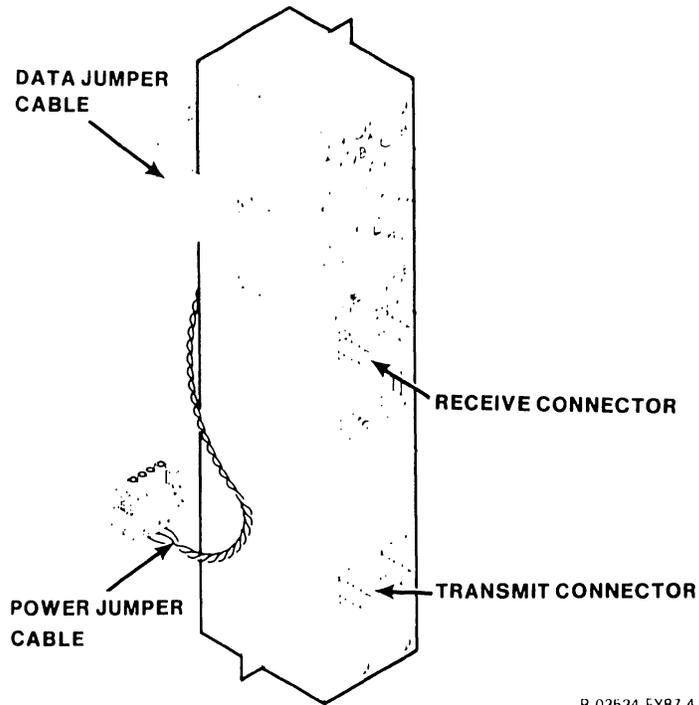


Figure 9-22. FiberWay APA Connector Assembly
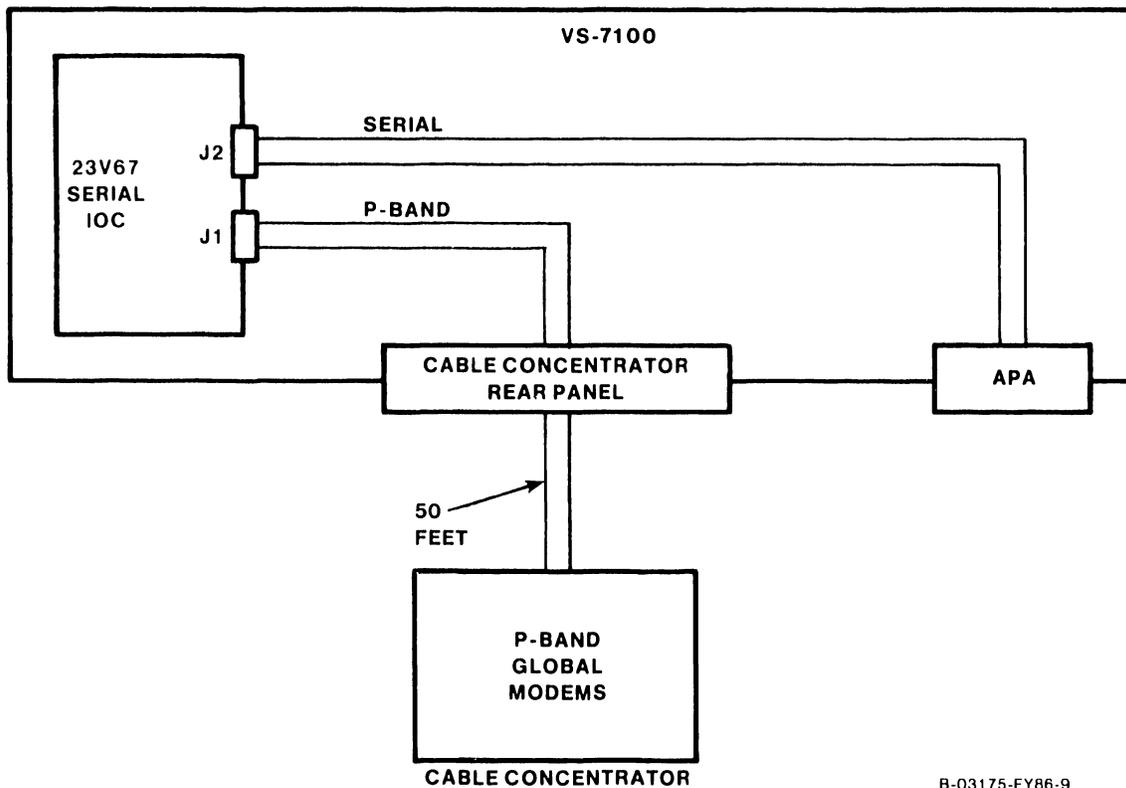
Figure 9-23. APA and P-Band Modem Connections

## 9.10.3 P-BAND CONNECTORS

The WangNet Peripheral Band (P-Band) is supported by the 23V67 Serial IOC. Connector J1 on the IOC is always reserved for the P-Band. P-Band supports Ergo Workstations and Netmux.

The complete Peripheral Band assembly model number is 23V67W-19, which includes the Serial IOC, Global Modem assembly, all interconnecting cables, and hardware.

TO SERIAL IOC
J1

P-BAND MODEM
MOUNTING PANEL

P-BAND POWER
INTERCONNECT CABLE
(220-2402)

GREEN (1)
BLUE (2)
VIOLET (3)
RED (4)
GREEN (5)

GREEN (5)
VIOLET (4)
OPEN (3)
BLUE (2)
RED (1)

P-BAND MODEM
MOUNTING PLATE

TO DC
POWER CABLE    P2
(220-2345)
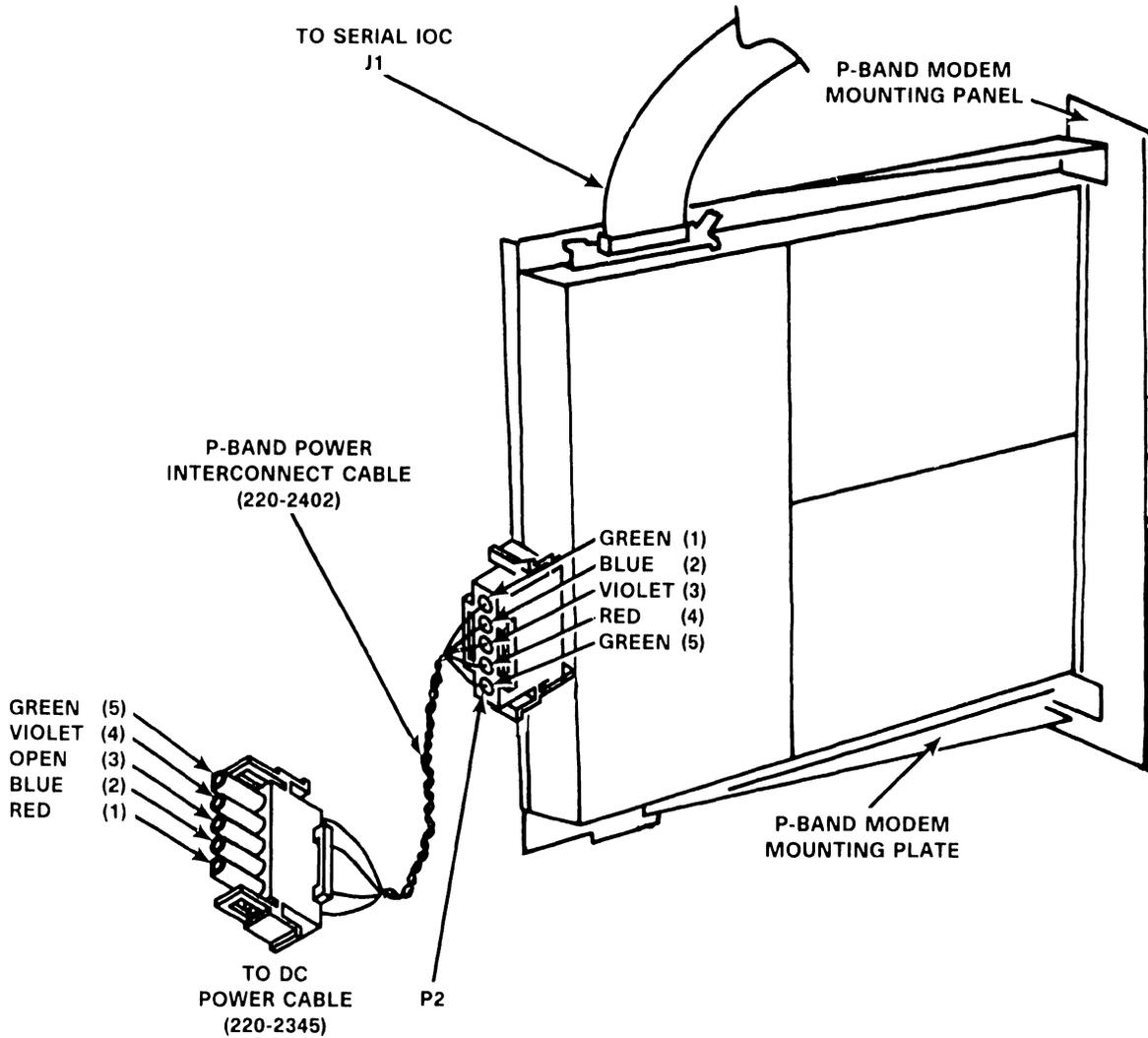
Figure 9-24.  WangNet P-Band Modem Assembly

MOUNTING
HOLES

TX          RX

TRANSMIT                    RECEIVE
CONNECTOR                  CONNECTOR
(GOLD)                      (SILVER)
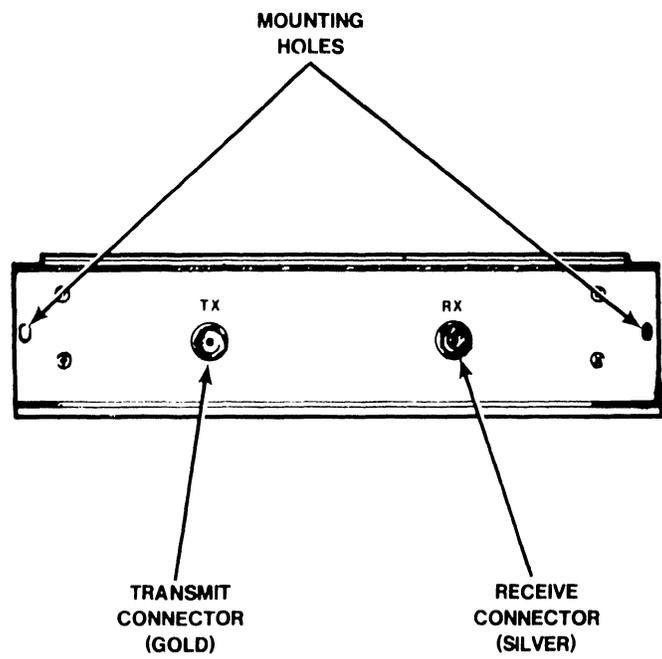
B-02983 FY86-4

Figure 9-25.  WangNet P-Band Modem Rear Panel Assembly

## 9.10.4 CABLE CONCENTRATOR

The Cable Concentrator is a free standing unit used to house APA and Gate Array TC connector panels, and WangNet P-Band modems.
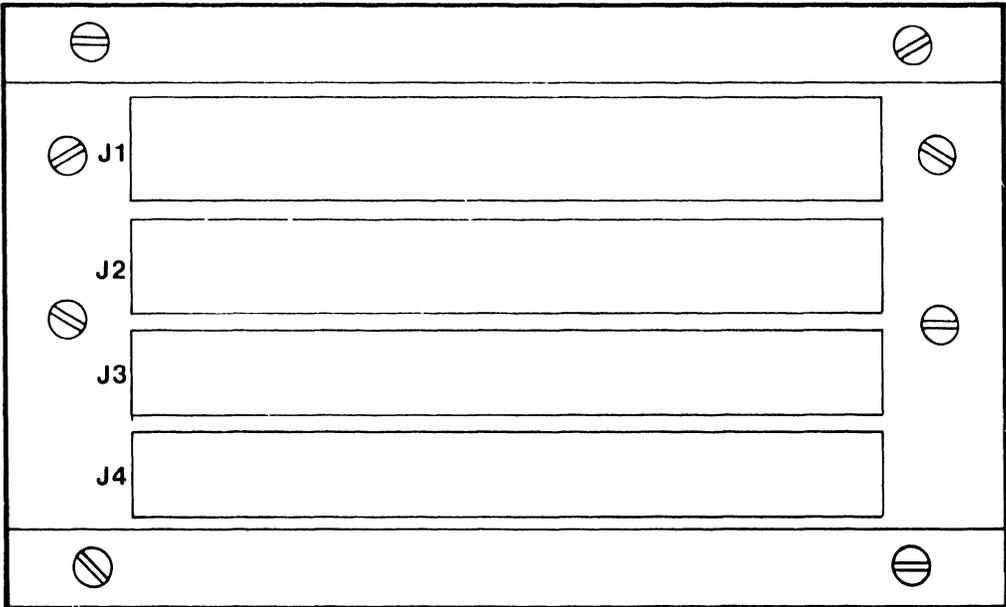


B-03175-FY86-7

Figure 9-26. VS-7100 Cable Concentrator Rear Panel
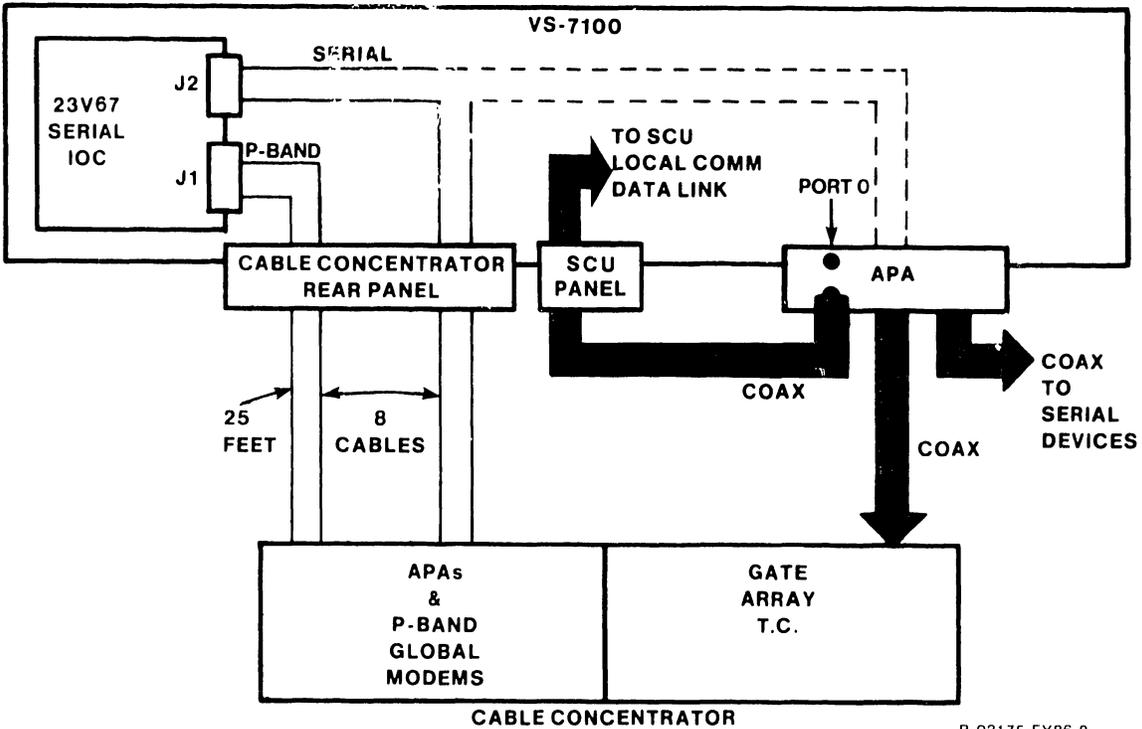


B-03175-FY86-8

Figure 9-27. Cable Concentrator Connections

## 9.10.5  DISK CABLE CONNECTORS

Two types of disk cable connectors are located on the disk connector assembly, WLI P/N 270-1006. The four narrow connectors are 26-pin sockets for the "B" cable connections; the wide connector is a 60-pin socket for the "A" cable connection.

Before connecting an external disk cable, prepare it as follows, if necessary:

1.  Remove the cover plate from the disk connector assembly.

2.  Remove 4 inches of plastic sheathing from one end of the cable.

3.  Disassemble the cable clamps on the cover plate by removing the Phillips screws on either side of the clamp. (Figure 9-28.)

4.  Lay the shielded section of the external "A" disk cable against the face of the clamp at the right side of the plate. Leave 1/4 inch of foil exposed.

5.  Lay the shielded section of the external "B" disk cable(s) against the face of the clamp at the left side of the plate. Group all four "B" cables on the left side. Leave 1/4 inch of foil exposed.

6.  Reassemble the cable clamps by installing the two Phillips screws removed in step 3. Make sure that pin 1 of the cables are oriented properly and tighten the clamp screws until solid contact with the shield is made. DO NOT overtighten the Phillips screws, as this could damage the disk cables.

7.  Plug the cables into the cable connectors on the disk connector assembly. The top left "B" cable connector attaches to Port 0 of the associated 23V98 Disk IOC, the bottom left "B" cable connector attaches to Port 1, and so forth. The extreme left connector on the assembly attaches the "A" cable daisy-chained through each drive to the VS-7100 mainframe.

8.  Reinstall the disk connector assembly cover plate.
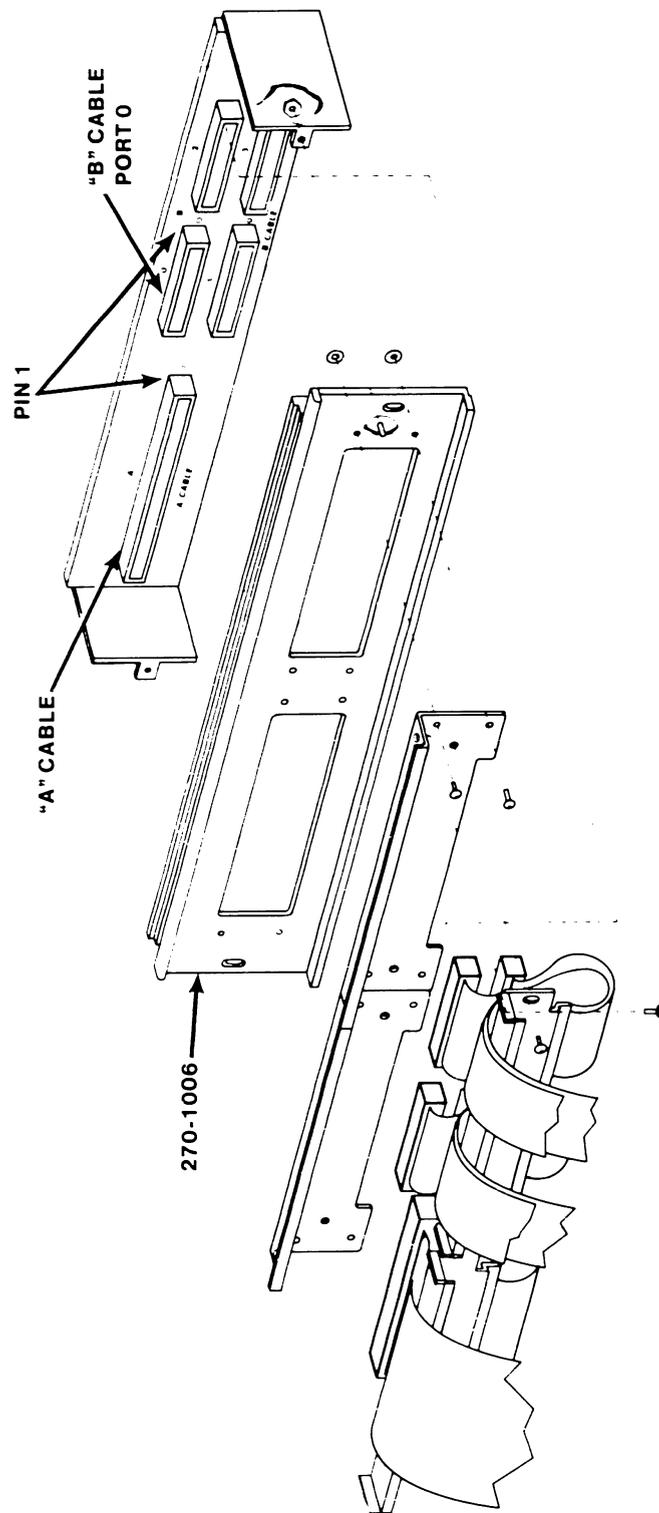
B-02442-FY85-7

**Figure 9-28. 270-1006 "A" and "B" Cable Connector Assembly**

## 9.10.6 TELECOMMUNICATION CONNECTORS

If either the Multiline TC (MLTC) or the Gate Array option is to be in-
stalled, the TC cables must be attached to a MLTC connector assembly, or Gate
Array connector assembly, WLI P/N 270-1016, at the rear of the mainframe (or
on the Cable Concentrator).

Each MLTC assembly provides 16 ports in support of only one type of TC
protocol at a time. If the customer's TC requirement calls for support of
Automatic Calling Units (ACU), each ACU requires one RS232C port link and one
RS366 port link. Currently, each VS-7100 supports two MLTC options for a total
of 32 ports.

The Gate Array supports only one type of TC protocol at a time. Support of
two types of protocols requires a second Gate Array assembly. A single Gate
Array assembly must be reinitialized (reIPL'ed) to support another type of
protocol.
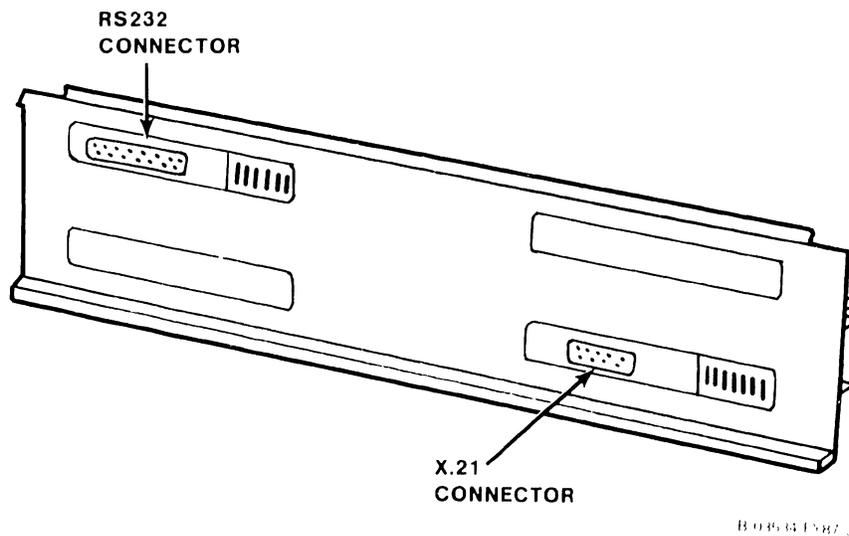


Figure 9-29.  Multiline TC (MLTC) Connector Panel

BNC TNC
CONNECTORS
TO APA

CLEAR

TC
CH

RS
449

RS
232C

RS
366

X.21

1    B
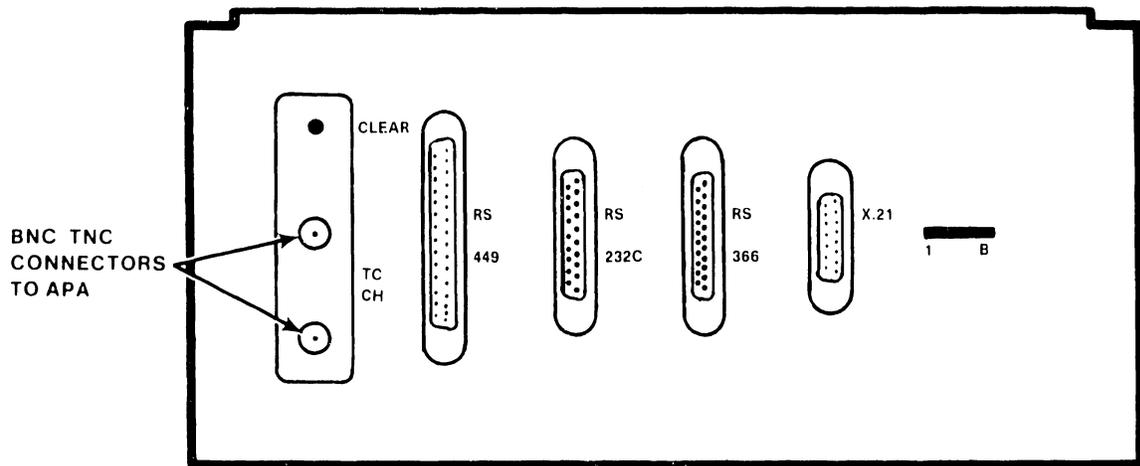
B 03534 FY87 2

Figure 9-30.  Gate Array TC Connector Panel

## 9.10.7 CABLE INTERFACE UNIT (CIU) CONNECTORS
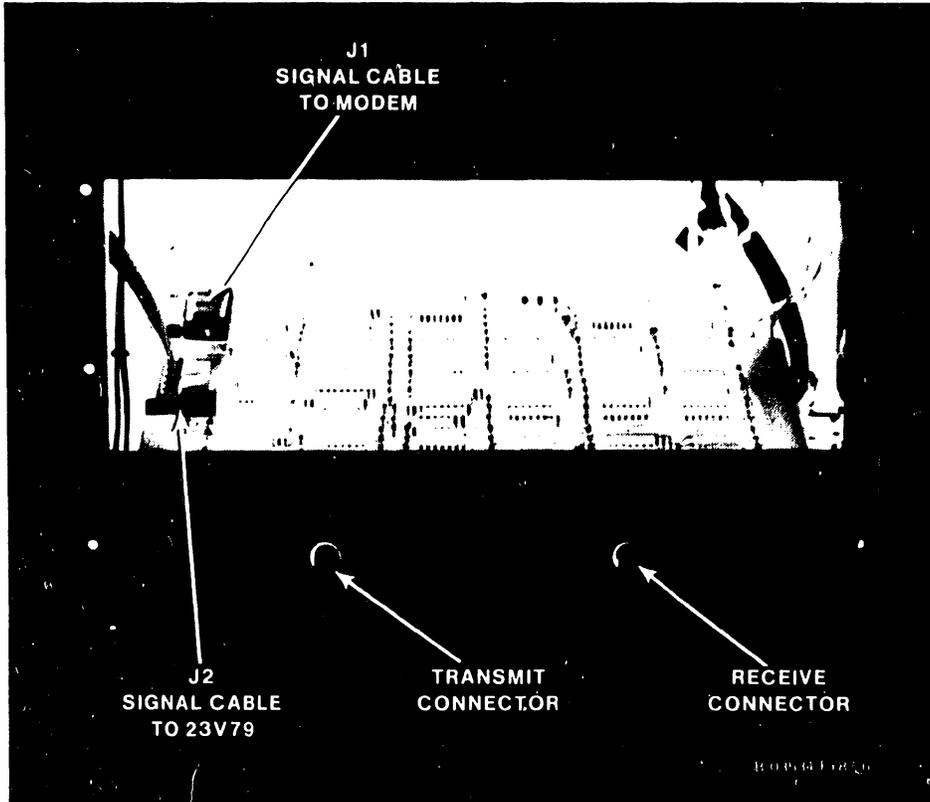


Figure 9-31. CIU 10 MBPS Modem Connector Assembly

## 9.10.8  KENNEDY TAPE DRIVE CONNECTORS

The Kennedy tape connector assembly (WLI P/N 270-1005) is used when one or more Kennedy tape drives are connected to the mainframe. Two 50-pin sockets (labeled Control #1 and Data #2) are located on the assembly for connection to the drives. Note the orientation of the cable plugs when inserting them into the 50-pin sockets.



DATA #2          CONTROL #1
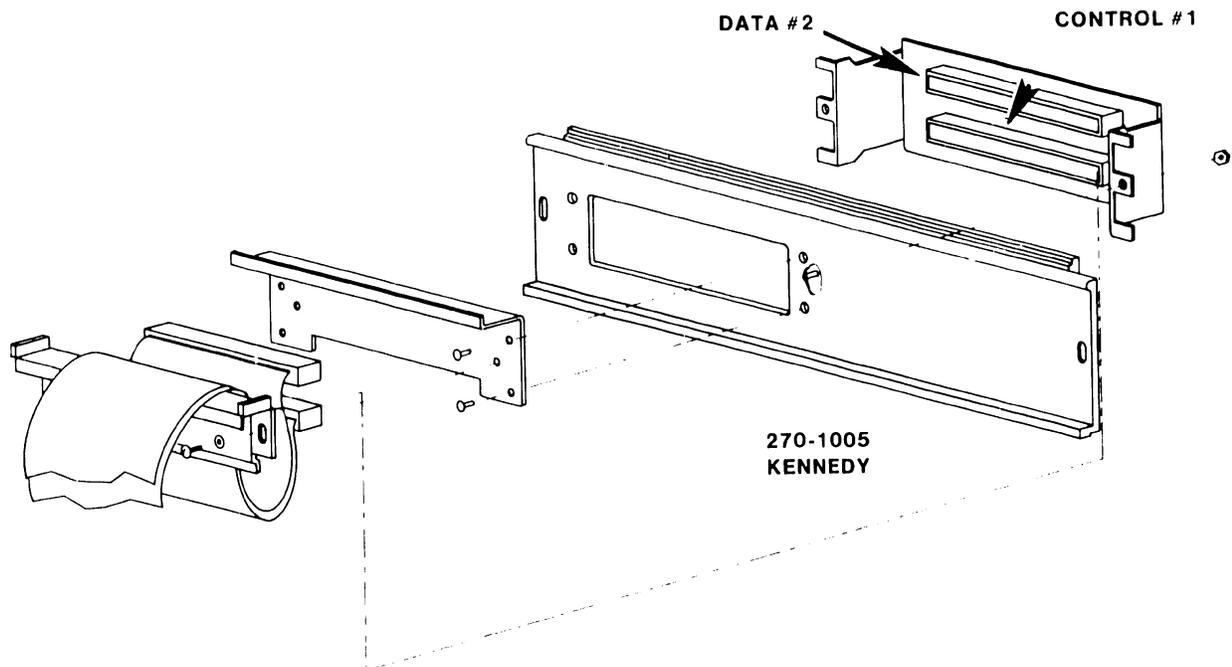
270-1005
KENNEDY

B-02442-FY85-6

**Figure 9-32.  270-1005 Kennedy Tape Drive Connector Assembly**

741-1721-A                           9-45                    **COMPANY CONFIDENTIAL**

## 9.10.9 TELEX TAPE DRIVE CONNECTORS

The Telex tape connector assembly (WLI P/N 270-1007) is used when one or more Telex tape drives are connected to the mainframe. Three 50-pin sockets (labeled 0, 1, and 2) are located on the assembly for connection to the drives. Note the orientation of the cable plugs when inserting them into the 50-pin sockets.
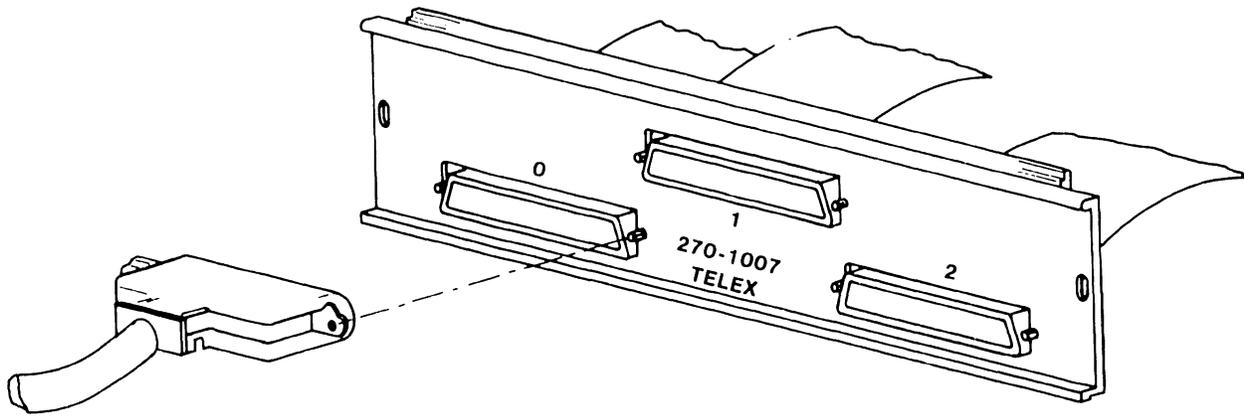


B-02442-FY85-8

Figure 9-33.  270-1007 Telex Tape Drive Connector Assembly

## 9.11  REMOTE MAINTENANCE

Remote maintenance is provided through the Remote System Administrator Facility, version 2 (RSAF2).

Basic functions that can be run on a remote VS-7100 by the Remote Maintenance Center using RSAF2 are:

1.  IPL the remote VS-7100 system
2.  Place the remote VS-7100 into Control Mode
3.  Enter Workstation Emulation
4.  Reset the remote RSAF workstation
5.  Run on-line and off-line diagnostics

The following restrictions apply to RSAF:

1.  Not able to power on remote systems
2.  Not able to power off remote systems

Remote site hardware requirements are:

1.  Dedicated switched telephone line - customer supplied
2.  Rotary dial or pushbutton telephone - customer supplied
3.  Wang WA3451 modem (WLI P/N 725-0110) - supplied with the VS-7100
4.  "T" connector (WLI P/N 726-8089) - supplied with the modem

**NOTE**

> Items 2, 3, and 4 are not required if the modem supplied is a Wang Telemodem, WTM2400.

Software requirements are:

1.  VS-RMP-SO-9 - two diskettes containing the remote maintenance software. One diskette is the actual RSAF2 software, while the other diskette is used to load the RSAF2 software onto the SCU's WInchester disk drive. (Refer to Focus article, dated October 31, 1986.)

To prepare the site for remote maintenance:

1.  Reference Technical Service Bulletin (TSB) HWG 7003 for remote maintenance certification requirements.
2.  Reference VS Remote System Administrator Facility (RSAF) product maintenance manual.
3.  Call the Call Control Center when the system is ready for certification.

# SECTION
# 10
# FUNCTIONAL
# DESCRIPTION

# TABLE OF CONTENTS

**SECTION 10  FUNCTIONAL DESCRIPTION**                                    **Page**

# SECTION 10

# FUNCTIONAL DESCRIPTION

## 10.1 INTRODUCTION

The VS-7100 is based on the CP8 processor architecture and the CP8 system bus. The VS-7100 series has three models: the 7110, 7120, and the 7150. The VS-7110 has a 240 nanosecond CPU microinstruction time, the VS-7120 has a 180 nanosecond CPU microinstruction time, and the VS-7150 has a 120 nanosecond CPU microinstruction time.

## 10.2 SYSTEM OVERVIEW

These paragraphs discuss the basic blocks of the CP8 processor architecture used in the VS-7100 systems.

### 10.2.1 PROCESSOR SECTION

The VS-7100 processor section consists of four printed circuit boards (PCBs): Central Processing Unit, Floating-Point Unit, Address Generation Unit, and Address Translation Unit.

The majority of the processor section interconnecting signals are transmitted through the backplane of the motherboard. The D-Bus, a 32-bit bidirectional motherboard bus, is the main link between all four units of the processor section.

#### 10.2.2.1 Central Processor Unit

The Central Processor Unit (CPU) contains the Arithmetic Logic Unit (ALU), registers, control store memory, address control circuits, and all CPU support logic. It does the majority of the systems computation.

The primary task of the CPU is to execute the machine instruction set and monitor the results of execution. The CPU contains facilities for addressing physical main memory, fetching and storing information, arithmetic and logical processing of data, sequencing instructions in the desired order, and initiating communication between main memory and external devices.

#### 10.2.2.2 Floating Point Unit

The Floating-Point Unit (FPU), used in the VS-7150 only, is a high performance processor that executes the normal and extended floating-point instruction set. The FPU proces-ses both single precision (one word) and double precision (two words) floating-point instructions, and communicates with the

CPU via the D-Bus. It uses multiplication table PROMs and advanced floating-point algorithms to provide enhanced performance. The FPU will run in parallel with the CPU and do all floating-point mantissa and exponent calculations.

### 10.2.2.3  Address Generation Unit

The Address Generation Unit (AGU) contains the instruction queue, the address generation logic, the system Real Time Clock (RTC), and the Exponent Sign Unit (ESU). The AGU computes the microsubroutine dispatch address and the system macrocode operand virtual address. The ESU aids the CPU in the processing of floating-point macroinstructions by processing the exponent and the sign.

### 10.2.2.4  Address Translation Unit

The Address Translation Unit (ATU) contains the Short Address Translation Buffer, the physical address logic, 32K bytes of cache memory, and the Reference and Change Table. The ATU is the connecting point of the computing element with the rest of the system. All address and data information entering or leaving the processor section is processed by the ATU. It supports Interprocessor Communications (IPCs) to and from the CPU, and octal main memory reads. The ATU maintains constant validation of cache memory by monitoring all main memory writes.

### 10.2.2  MEMORY CONTROL UNIT

The Memory Control Unit (MCU) is the interface between the main memory and the rest of the system. The MCU decodes and executes all main memory commands, routes address and data information to and from main memory, and contains the error correction logic.

### 10.2.3  MAIN MEMORY

Main Memory capacity is 8, 12, or 16 megabytes. Each main memory board contains either 4 megabytes half-loaded, or 8-megabytes fully loaded.

Each main memory board, with up to 312 256K byte x 1-bit data RAM chips, is divided into two even and two odd doubleword planes. A doubleword is two 32-bit data words, plus 7 Error Correction Code (ECC) bits for each data word, for a total of 78 bits. The VS-7100 alternates between even and odd doubleword planes on the same board. Pairs of boards are not required.

### 10.2.4  SUPPORT CONTROL UNIT

The Support Control Unit (SCU) is the interface between the Professional Computer (PC) and the rest of the system. Normally the PC drives all SCU operations. However, the PC can be interrupted by another element requesting assistance.

## 10.2.5  SYSTEM BUS INTERFACE

The System Bus Interface (SBI) is the interface between the CP8 system bus and the I/O bus. All of the major buses, except the 78-bit Main Memory Bus, are connected to the SBI. Bus errors and status are assembled in the SBI's Error Register. All major SBI data paths are double latched on both input and output. This increases throughput by making simultaneous parallel operations possible. Command, address, and data are all synchronized as they pass through the SBI on both input and output operations.

## 10.2.6  INPUT/OUTPUT CONTROLLER

The Input/Output Controller (IOC) contains three major functions on a single board:

- The I/O controller
- The I/O arbitration logic
- The device adapter

The I/O controller and the I/O arbitration logic are common to all IOCs. The device adapter (D/A) is device dependent. A 32-bit I/O Bus, 16-bit 8086-2 microprocessor, and a 33-megabyte I/O transfer rate provide a significant increase in performance over the VS-100 system. The IOCs have local RAM buffer storage that allows inspection, modification, and rewrite of device data without having to access main memory. There is a path for D/A to D/A communications, via the IPC network, between fully buffered IOCs.

The device adapters have more intelligent control than other VS series IOPs. After the IOC has initiated a Direct memory Access (DMA) operation, the device adapter can then operate independently.

# SECTION
# 11
# SPECIFICATIONS

# TABLE OF CONTENTS

# LIST OF TABLES

# SECTION 11

# SPECIFICATIONS

## 11.1 HARDWARE

### Table 11-1. Hardware Specifications

| DIMENSIONS | | INCHES | CENTIMETERS |
|---|---|---|---|
| | Width | 36.0 | 91.4 |
| | Height | 36.0 | 91.4 |
| | Depth | 26.0 | 66.0 |

| SERVICE CLEARANCES | | INCHES | CENTIMETERS |
|---|---|---|---|
| | Front | 36 | 91.4 |
| | Rear | 36 | 91.4 |
| | Left | 24 | 60.9 |
| | Right | 24 | 60.9 |
| | Top | 36 | 91.4 |

| NET WEIGHT | POUNDS | KILOGRAMS |
|---|---|---|
| | 550 | 250 |

| POWER REQUIREMENTS | | |
|---|---|---|
| | Volts | 208/240 V, 50/60Hz |
| | Ac Variation | +/- 10% |
| | Amps | 12.0 Start up |
| | | 12.0 Run |
| | Watts | 1600 |
| | Dedicated Circuit | Yes. With 30 amp. circuit breaker in the computer room. |

| HEAT OUTPUT | BTU/HR | KCAL/HR |
|---|---|---|
| | 5440 | 1376 |

| TEMPERATURE | | MINIMUM | MAXIMUM |
|---|---|---|---|
| | Fahrenheit | +60° | +90° |
| | Celsius | +15.5° | +32.2° |

# SPECIFICATIONS

| HUMIDITY | | MINIMUM | MAXIMUM |
|---|---|---|---|
| | Noncondensing | 20% | 80% |

| ALTITUDE (Note) | | FEET | METERS |
|---|---|---|---|
| | Maximum | 10,000 | 3048 |

| CABLE LENGTH | | FEET | METERS |
|---|---|---|---|
| | Power | 8 | 2.8 |

## NOTE

Tape drives installed above 4000 ft. (1200 meters) and disk drives installed above 6500 ft. (1960 meters) require high-altitude options.

### Table 11-2. Architecture

| | | | |
|---|---|---|---|
| Minimum Main Memory | 4MB | Maximum # of disks drives @ 1.8MB | 24 |
| Maximum Main Memory | 16MB | Maximum # of IOCs | 10 |
| Incremental Main Memory | 4MB | Maximum # of disks drives @ 1.2MB | 24 |
| Cache Memory | 32KB | Maximum # of tape IOCs | 8 |
| Maximum disk storage | 20GB | Maximum # of TC IOCs | 8 |
| Concurrent processes | 255 | Background tasks | 63 |
| Concurrent serial W/Ss' | 128 | Concurrent W/Ss' & printers | 178 |
| CPU data path | 32-bit | Main Memory data path | 64-bit |
| I/O data path | 32-bit | Word length | 32-bit |
| Virtual address space/user | 8MB | Virtual address space/process | 8MB |
| System bus bandwidth | 66.6MB/s | I/O bandwidth | 33.3MB/s |

## 11.2  SOFTWARE/DIAGNOSTIC REQUIREMENTS

### 11.2.1  SOFTWARE

### Table 11-3. Minimum Software Requirements

| Software | Version | Comments | WLI P/N |
|---|---|---|---|
| VS-7100 SCU | 1.04.05 | Has CP8 CPU ucode & DCS package (Includes FPU ucode) | 195-4682-9 |
| Operating System | 7.12.XX | | 195-4681-7 |

## 11.2.2 DIAGNOSTICS

### Table 11-4. Built-In Test (BIT) Programs

| Diagnostic Name | PROM | Rev. | Package P/N |
|-----------------|------|------|-------------|
| 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 |
| Inboard CIU | 56A4 | 1 | 295-4927-DA |

### Table 11-5. Other Diagnostics

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

### NOTES

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

# SECTION 12
# ILLUSTRATED PARTS

## TABLE OF CONTENTS

## LIST OF TABLES

# SECTION 12

# ILLUSTRATED PARTS

## 12.1 INTRODUCTION

This section contains the illustrated parts breakdown for the VS-7100 Computer System. Use this IPB for part number identification when ordering field-replaceable components.

## 12.2  MAJOR MAINFRAME ASSEMBLIES

### 12.2.1   TOP COVER

458-3930
COVER, TOP

650-6281 (4)
10-32 X 7/8
PAN HD PHL MS SS

451-5356
BRACKET, MOUNTING L.H.
BEARING BLOCK

652-6002 (8)
10-32 LOCK
NUT KEPS

652-6002 (4)
10-32 LOCK NUT KEPS

650-6120 (8)
10-32 X 3/8 LG
SCR MACHINE PAN HD PHL SS

478-1271 (4)
PIN, CAM, COVER

451-5358
BRACKET, MOUNTING R.H. BEARING BLOCK

461-1576 (4)
BLOCK, BEARING

653-6001 (8)
#10 WASHER

B 03065 FY86 11

## 12.2.2   CABINET

TOP COVER ASSY

ATTACHMENT OF TOP COVER TO FRAME

TOP COVER

FRAME

458-1611
COVER, RETAINER

451-5357 (2)
BRACKET, CAM

458-1637
KEEPER, DOOR

458-1768
COVER, RETAINER

451-5291
BRKT, SUPPORT,
PNL, CNTRL

458-3495 (2)
PANEL, SIDE

458-3942
FRONT INTAKE PLENUM

651-0425 (8)
RIVET AVDEL
3/32 X .337

651-0501 (2)
RECEPTACLE,
BALL STUD

652-0020 (16)
1/4 - 20 NUT

270-5029
AIR INLET PANEL ASSY

655-0333 (4)
CASTER, SWIVEL TWN WHL

650-9013
1/4 - 20 X 1/2 FLANGE
WHIZ LOCK

458-1773
SUPPORT, PANEL

465-0890
MOUNTING PLATE
HINGE

650-4079
8-32 X .25 LG

478-1268
BUTTON, LATCH

270-5027
DOOR ASSY

465-0891
MOUNTING PLATE HINGE

452-0378
PLATE, ACCESS AND MODEM

452-0365
ACCESS PANEL

452-0349
PLATE, COVER

650-0060 (4)
10-32 X 1" SCREW

458-3944
RACK, REAR CABLE

655-0351 (2)
BUMPER, RUBBER END

458-3914
FRAME, WELDMENT

B 03065 FY86 1

## 12.2.3    HINGED DOOR

458-3545 (1)
COVER, DOOR

655-0406
LATCH, SLAM W/KEY
LOCK

458-3932
DOOR WELDMENT

615-2676
CAUTION LABEL

655-0602 (2)
LATCH

653-2006 (4)
FLAT WASHER

650-2087 (4)
4-40 X 1/4 PAN HD

465-0891 (2)
HINGE

650-3121 (4)
6-32 X 38 PHL FLT

652-0029 (4)
8-32 LOCK NUT KEPS

B-03065-FY86-10

## 12.2.4   AIR INLET PANEL

458-3943
PANEL, FRONT (WELDMENT)

650-4091 (20)
6-32 X 1 4
PHIL PAN HD

660-0244 (12 STRIPS)
VELCRO
SIZE 1″ X 1.2″

660-1086
FILTER, DUST

654-0035 (2)
BALL STUD

452-3172
RFI SHEILD

652-0032 (4)
6-32 LOCK NUT KEPS

458-1779 (2)
CLAMP, SHIELD, RFI
(LARGE)

458-1780 (2)
CLAMP, SHIELD, RFI
(SMALL)

B-03065-FY86-6

## 12.2.5    CARD CAGE



458-3942
FRONT INTAKE PLENUM

458-3953
PLENUM, TOP

451-5252
BRACKET, TOP
FAN MTG

651-1176 (27)
SHEET EDGE INSERT

654-1286 (2)
CLAMP

615-3069
CARD LOCATER

465-1839 (6)
SPRING GRND

452-4834
FRAME BACKPLANE

652-3004 (4)
6-32 NUT

650-3160 (27)
5-32 X 1/2 SCREW

400-1017-1 (6)
FAN

653-3002 (27)
WASHER, NYLON

652-2005 (12)
4-40 NUT

PIN PROTECTOR

458-1756 (2)
STRIP, SPRING SUPPORT GUARD

270-5031
MOTHERBOARD
ASSEMBLY

650-3120 (12)
6-32 X 3/8 SCR

465-1854 (2)
SPRING GROUND

650-4120 (16)
8-32 X 3/8 SCR

652-3004 (12)
6-32 NUT

650-3560 (4 PER FAN)
6-32 X 2 3/4 LG

652-3004 (6)
6-32 NUT

452-4814
PLATE, TOP
CARD CAGE (SILKSCREEN)

650-6160 (10)
10-32 X 3/8 SCREW

650-2120 (12)
4-40 X 3/8 SCR

653-6039 (10)
WASHER #10

452-0348
PLATE, END
CARD CAGE, L.H.

458-1770
BAR, BUS GND

653-6013 (6)
WASHER #6

651-0321 (4)
FSTNR STUD 1/4 TURN

652-4000 (3)
8-32 NUT

650-4121 (3)
8-32 X 3/8 FLAT HD SCR

652-3004 (6)
6-32 NUT

650-4121 (3)
8-32 X 3/8 FLAT
HD SCR

652-4000 (3)
8-32 NUT

458-1769
BAR, BUS, +5V (L.H. SIDE)

478-1253 (2)
PIN, LOCATING, SUPPORT

652-6029 (2)
NUT 3/8-24

452-4813
452-4814

452-0347
PLATE, END, CARD CAGE R.H.

650-3560 (4 PER FAN)
6-32 X 2 3/4 LG

458-1756

400-1017-1 (6)
FAN

449-1239
CARD CAGE COVER

452-4813
PLATE, BOTTOM
CARD CAGE (SILKSCREEN)

451-5189
BRACKET, BOTTOM
FAN MTG

465-1854

## 12.2.6   EXHAUST FAN

400-9016 (4)
FAN GUARD 4 1/2" FAN
STEEL ZINC PLATE

650-3560 (16)
6-32 X 1 3/4 LG
FLT PHL SST 82 DEG

653-3003 (16)
WASH 6

653-3003 (16)
WASHER 6

458-3929
SUPPORT, REAR FAN (WELDMENT)

400-1017-1 (4)
FAN T-AXIAL 100 CFM
50/60 HZ

220-2454
FAN CABLE ASSY

653-3008 (10)
O RING

458-1767
BAFFLE, FAN SUPPORT

650-3061 (4)
6-32 X .19
PAN HD PHL SEM SS

650-4240 (10)
8-32 X 3/4
PAN HD PHL
SEMS MS SS

B-03065-FY86-8

# ILLUSTRATED PARTS

## 12.2.7   CONTROL PANEL

451-5219
BRKT. HOLDING, 5 1/4 FLOPPY

652-0029 (4)
8-32 LOCKNUT KEPS

278-4055
5 1/4 FLOPPY DISK

451-5217
HOLDING BRACKET, SWITCHES

325-2262
SWITCH 12V LAMP
W/GREEN LENS

325-2264
SWITCH 12V LAMP
W/YELLOW LENS

652-0032 (3)
6-32 LOCK NUT KEPS

325-2261
SWITCH 12V LAMP
W/RED LENS

451-2565
PLATE, COVER

325-1037
KEYSWITCH

325-2263
SWITCH 12V LAMP
W/BLUE LENS

PUSHBUTTON BULB

452-4837
CONTROL PANEL (CASTING)

B 03065 FY86 7

## 12.2.8    MULTIOUTPUT POWER SUPPLY

### NOTE

Order the entire multioutput switching power supply assembly, **WLI P/N 270-5035.**
**DO NOT** order individual power supply components.

725-3308
POWER SUPPLY

458-1793
BAR, GND, BUS

451-5343
BRACKET, SUPPORT

1546
BUS, +5V

B-03065-FY86-5

## 12.2.9   AC POWER DISTRIBUTION UNIT

615-1094
WARNING LABEL

451-2511
COVER, TOP PDU

452-3103
SHIELD

210-8715
PCA, A.C.
DISTRIBUTION

410-2046
LINE FILTER

310-1204
TERMINAL STRIP

325-2539
CIRCUIT BREAKER

LOAD

LINE

452-4744
CHASSIS, PDU (WELDMENT)

220-0503
POWER CORD

## 12.2.10  DC POWER DISTRIBUTION UNIT

452-4838
COVER

452-3173
SHIELD

210-8816
DC DISTRIBUTION BD

451-5305
BRKT, SUPPORT

B-03065-FY86-4
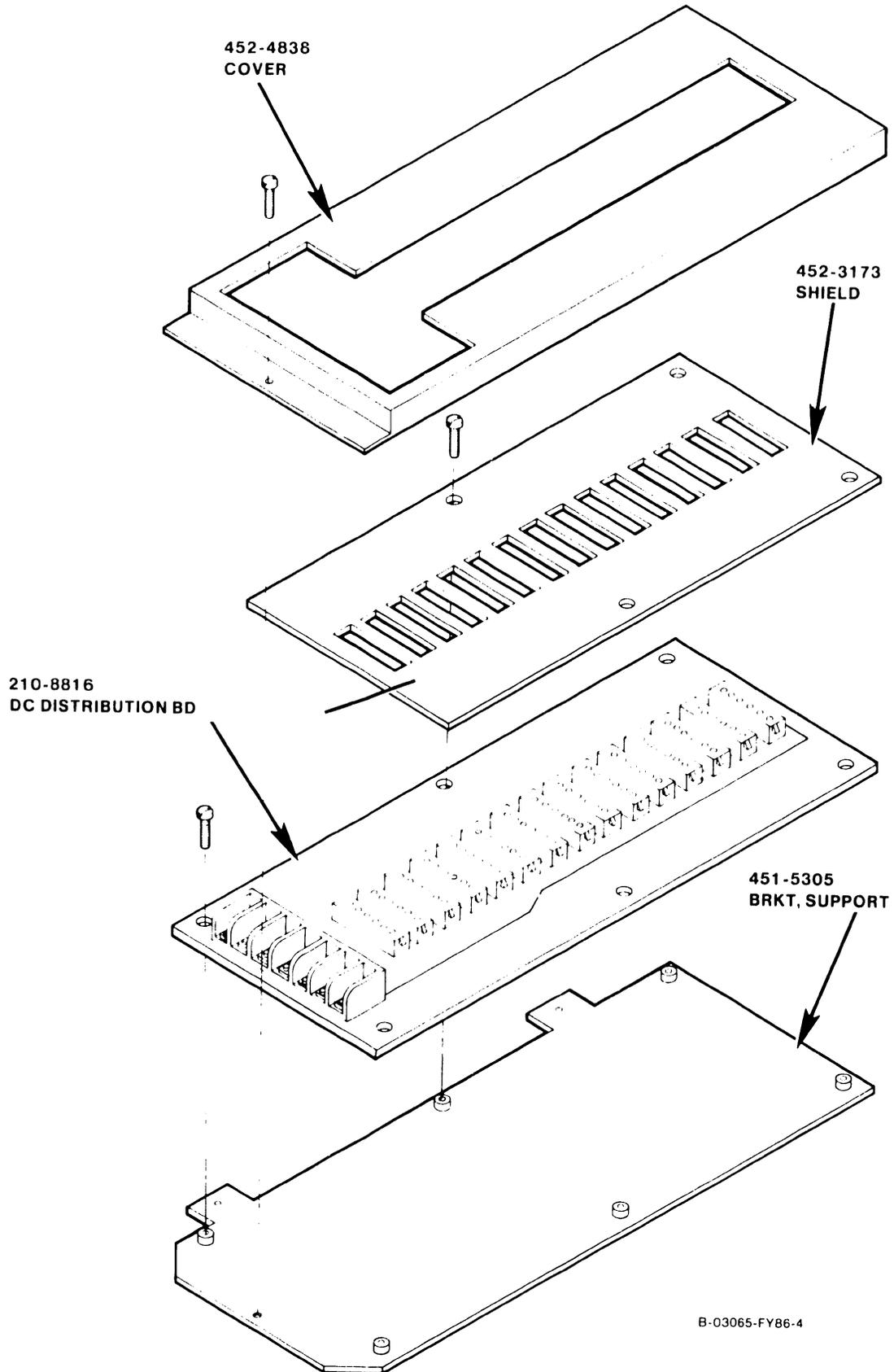
## 12.3　SUPPORT CONTROL UNIT, MONITOR, AND KEYBOARD

279-0659
MONITOR
LOW-COST

200-1063-US
KEYBOARD

279-0694
ARM
ASSEMBLY

450-0933

PANEL
ASSY

650-9096 (3)
SCR 3/8-16 X 1" SKT CAP

650-9101 (3) SCR
3/8-16 X 3/4"
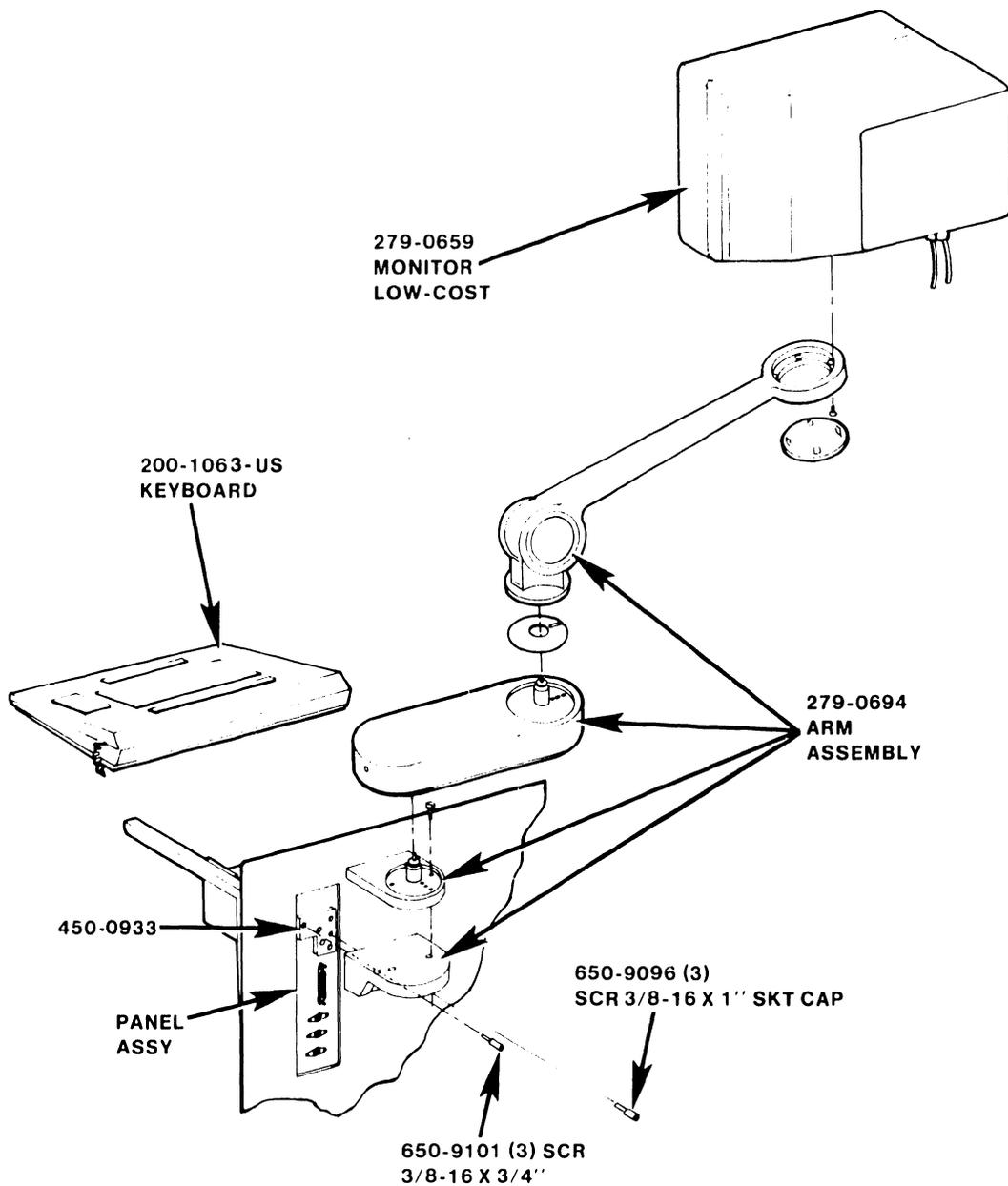
B-03713-FY87-2

### VS-7100 SCU Components

| Description | WLI P/N |
|---|---|
| Support Control Unit | 279-5459 |
| Winchester Disk Drive, 10 Megabyte | 278-4035 |
| Winchester Disk Drive, 20 Megabyte | 278-4062 |

## 12.4 MULTILINE TELECOMMUNICATIONS ASSEMBLY
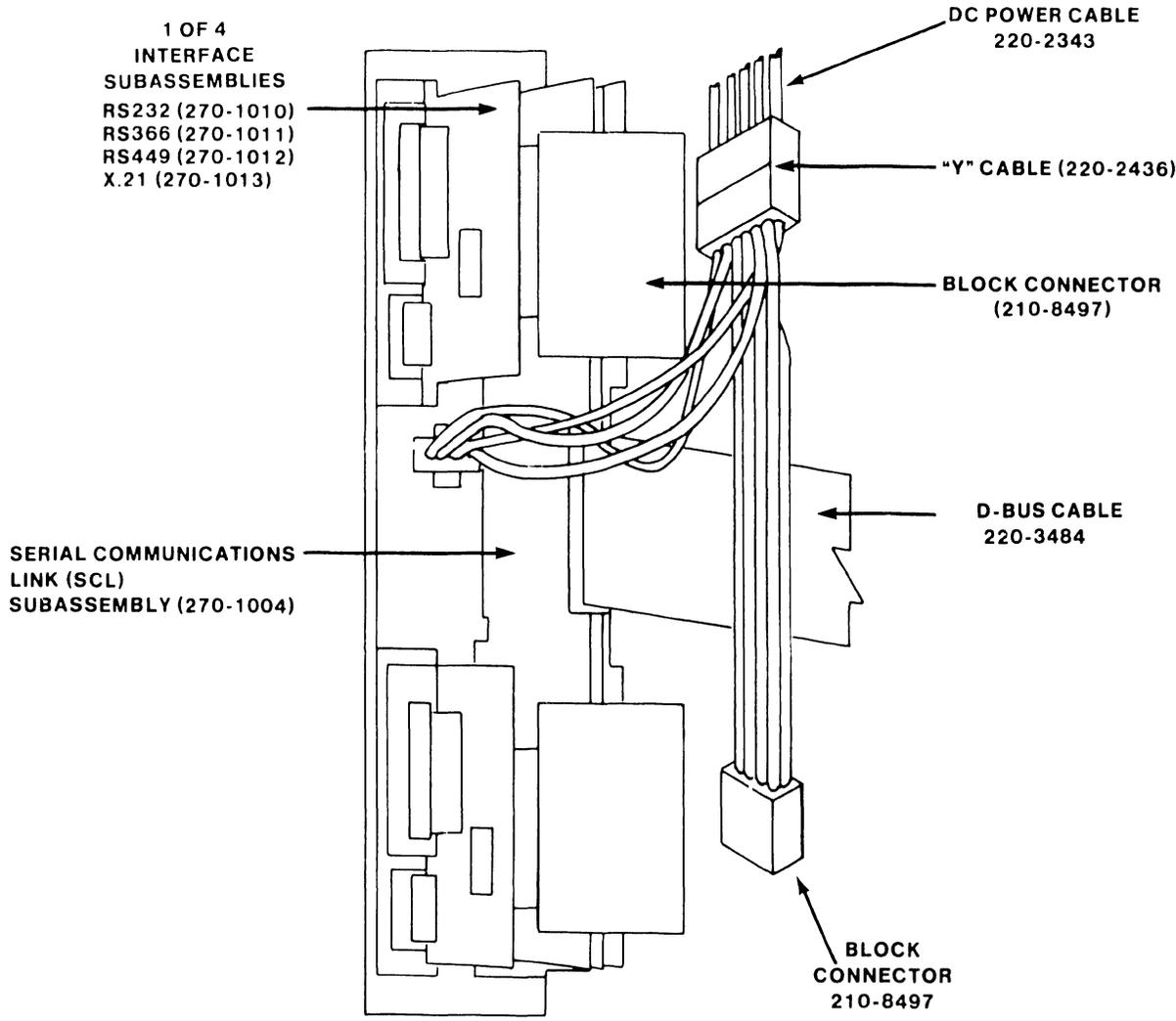
1 OF 4
INTERFACE
SUBASSEMBLIES
RS232 (270-1010)
RS366 (270-1011)
RS449 (270-1012)
X.21 (270-1013)

DC POWER CABLE
220-2343

"Y" CABLE (220-2436)

BLOCK CONNECTOR
(210-8497)

SERIAL COMMUNICATIONS
LINK (SCL)
SUBASSEMBLY (270-1004)

D-BUS CABLE
220-3484

BLOCK
CONNECTOR
210-8497

B-03631-FY87-6

## 12.5    GATE ARRAY TELECOMMUNICATIONS ASSEMBLY

COMPLETE
6550 GATE
ARRAY ASSEMBLY
270-1016

220-2374    220-2375

B-03631-FY87-1

## 12.6    VS-7100 POWER CABLING



VS 7100 POWER CBL
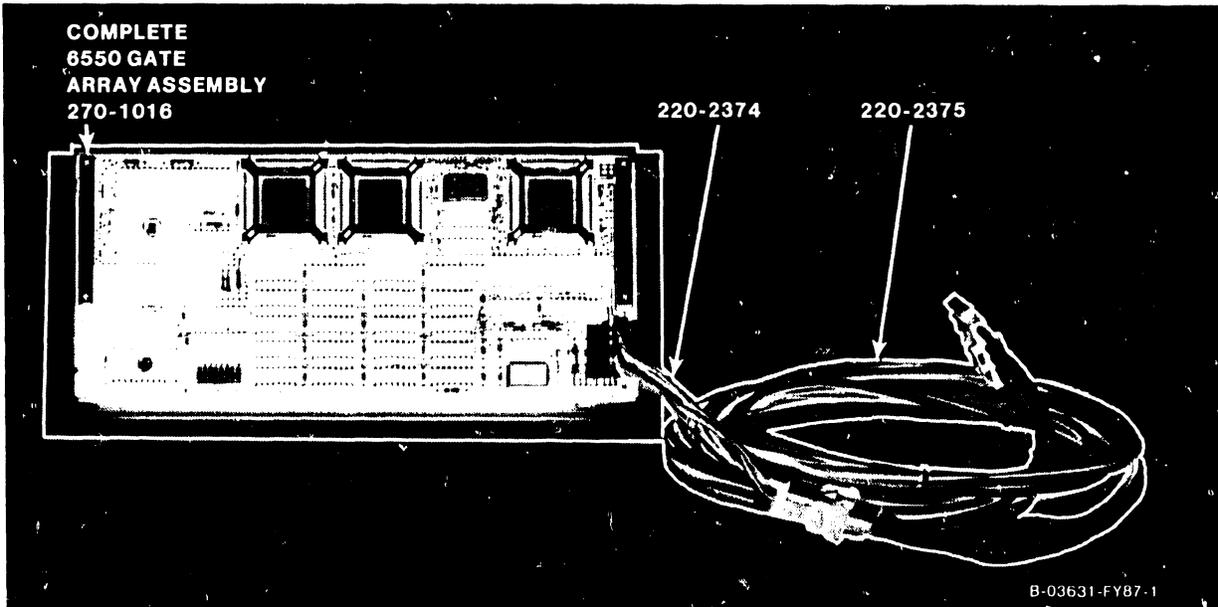
THIS PAGE LEFT INTENTIONALLY BLANK

## Table 12-1. VS-7100 PCB Complement

| Board Description | WLI P/N |
|---|---|
| AC Distribution | 210-8715 |
| APA (Active Port Assembly) Rcv/Dr. | 210-8504 |
| APA Terminator | 210-8503 |
| Address Generation Unit | 210-9832 |
| Address Translation Unit | 210-9833 |
| BNC/TNC (APA) Terminator | 210-8509 |
| Backplane (Motherboard) (Note) | 210-9837 |
| Block Connector (MLTC) | 210-8497 |
| CIU BLANC IOC (23V79) | 210-8392-A |
| CIU CAB IOC (23V79) | 210-8391 |
| Central Processing Unit (VS-7110) | 210-9838 |
| " " " (VS-7120) | 210-9839 |
| " " " (VS-7150) | 210-9831 |
| " " " (VS-7150) | 210-9931 |
| DC Distribution | 210-8816 |
| External Clock Board | 210-8846 |
| Floating Point Unit (VS-7150 only) | 210-9830 |
| Kennedy Tape IOC (23V95-1) | 210-8790-A |
| Main Memory (4 megabytes) | 210-8703 |
| Main Memory (8 megabytes) | 210-8703-1 |
| Memory Control Unit | 210-9834 |
| Multiline TC Controller IOC (23V96) | 210-8491-A |
| Power Supply Controller | 210-8809 |
| RS232A Interface (MLTC) | 210-8494 |
| RS366 Interface (MLTC) | 210-8495 |
| RS449 Interface (MLTC) | 210-8730 |
| SMD IOC (23V98-1) | 210-8785-D |
| " " (23V98-2) | 210-8785-C |
| " " (23V98-3) | 210-8785-B |
| " " (23V98-4) | 210-8785-A |
| Serial Communications Link (MLTC) | 210-8496-A |
| Serial IOC (23V67) | 210-9809-A |
| Support Control Unit | 210-8835 |
| Support Control Unit Paddle Board | 210-8710 |
| System Bus Interface | 210-9836-1 |
| Telex Tape IOC (23V95-2) | 210-8789-A |
| X.21 Interface (MLTC) | 210-8493 |

## NOTE

Order motherboard assembly WLI P/N 270-5031.

## Table 12-2. SCU (PC) PCB Complement

| Board Description | WLI P/N |
|---|---|
| CPU (256KB) (P/N unique to VS-7100) | 210-9521-1B |
| Monochrome Monitor | 210-9343-A |
| PCI (PC to SCU Interface) (P/N unique to VS-7100) | 210-8377 |
| Single Board Local Comm. Option | 210-8310-A |
| Winchester Controller | 210-9025-A |
| Motherboard | 210-9237 |

## Table 12-3. VS-150/300/7100/7300 PCB Cross Reference

| Description | WLI P/N | Current E-Rev. | 150 | 300 | 7110 | 7120 | 7150 | 7310 | 7320 |
|---|---|---|---|---|---|---|---|---|---|
| FPU | 210-8830 | 3 | | X | | | | | |
| FPU | 210-9830 | 1 | X | X | | | X | X | X |
| | | | | | | | | | |
| CPU | 210-8831 | 4 | | X | | | | | |
| CPU | 210-9231 | 3 | | X | | | | | |
| CPU | 210-9831 | 6 | X | | | | X | X | X |
| CPU | 210-9931 | 1 | | | | | X | X | X |
| CPU | 210-9839 | 1 | | | | X | | | |
| CPU | 210-9838 | 1 | | | X | | | | |
| | | | | | | | | | |
| AGU | 210-8832 | 5 | | X | | | | | |
| AGU | 210-9832 | 1 | X | | X | X | X | X | X |
| | | | | | | | | | |
| ATU | 210-8833 | 4 | | X | | | | | |
| ATU | 210-9833 | 3 | X | | X | X | X | X | X |
| | | | | | | | | | |
| SCU | 210-8835 | 1 | X | X | X | X | X | X | X |
| | | | | | | | | | |
| MCU | 210-8834 | 4 | | X | | | | | |
| MCU | 210-9834 | 1 | X | | X | X | X | X | X |
| | | | | | | | | | |
| 4MB Memory | 210-8703 | 3 | X | X | X | X | X | X | X |
| 8MB Memory | 210-8703-1 | 3 | X | X | X | X | X | X | X |
| | | | | | | | | | |
| SBI | 210-8836 | 2 | | X | | | | | |
| SBI | 210-9236 | 2 | | X | | | | | |
| SBI | 210-9836 | 2 | X | | X | X | X | X | X |
| | | | | | | | | | |
| Backplane | 210-8837 | 0 | | X | | | | | |
| Backplane | 210-8838 | 1 | | | | | | X | X |
| Backplane | 210-9837 | 1 | X | | X | X | X | | |

### Table 12-3.  VS-150/300/7100/7300 PCB Cross Reference (Cont)

| Description | WLI P/N | Current E-Rev. | 150 | 300 | 7110 | 7120 | 7150 | 7310 | 7320 |
|---|---|---|---|---|---|---|---|---|---|
| Power Cont. | 210-8709 | 6 | | X | | | | | |
| Power Cont. | 210-8809 | 2 | X | X | X | X | X | X | X |
| Ext. Clock | 210-8846 | 0 | | | X | X | X | X | X |
| PTU | 210-9840 | 0 | | | | | | X | |
| SCU Paddle | 210-8710 | 1 | X | X | X | X | X | X | X |
| Ser/P-Band | 210-8609 | 6 | X | X | | | | | |
| Ser/P-Band | 210-9809 | 1 | | | X | X | X | X | X |

### NOTE

X = use at current E-Revision Level

### Table 12-4  VS-7100 Power Supply

| Power Supply Description | WLI P/N |
|---|---|
| Multioutput supply (1800 watt) | 270-5035 |

# APPENDIX A

# APPENDIX A

## A.1 GENERAL

This appendix provides: VS-7100 Signal Mnemonics, System Errors Requiring a Control Mode Dump, System Errors Causing Continuable Dump, Version Checking Status Error Messages, and I/O Controllers and Supported Devices.

## SIGNAL MNEMONICS

| SIGNAL | DEFINITION |
|--------|------------|
| A-Port | Selects which operand is fed to A-Port |
| ACK | Acknowledge |
| AGRF | Address Generator Register File (AGU) |
| AGU | Address Generation Unit |
| ALU | Arithmetic Logic Unit |
| APA | Active Port Assembly |
| ATU | Address Translation Unit |
| AWS | Archiving Workstation |
| B-Port | Selects which operand is fed to B-Port |
| BCR | Bus Control Register |
| BLANC | Broadband Local Area Network Controller |
| BSR | Bus Status Register |
| C OUT R | Command Out Register |
| CA GEN | Case branch address Generator (CPU) |
| CAB | Contention Access Based |
| CHG | Page Changed flag (ATU) |
| CID | Command Identification |
| CIU | Cable Interface Unit |
| COMP | Comparator |
| CPU | Central Processing Unit |
| CRE | Current Ring of Execution |
| CSMA/CD | Carrier Sense Multiple Access Collision Detection |
| CSPA | Carry Save Propagate Adder |
| Clock | Controls instruction cycle time (microinstruction field) |
| DA GEN | Dispatch Address Generator |
| DAG | Dispatch Address Generator |
| DB BUFF | D-Bus Buffer. Buffers virtual address to D-Bus |
| DCC | Decimal Correction Constant register (CPU) |
| DMA | Direct memory Access |
| DMUX | Switches MIBR or MAC0 data to MAC1 |
| DR | Display Register |
| DSA | Data Store Address |
| DSBS | Data Store Block Select |
| DSL | Data Store Latch |
| DVR | Diagnostic Visibility Register |
| DWBX | Double Word Cache Block crossing |
| DXAG | Dispatch Exception Address Generator |
| E-APA | Electric Active Port Assembly |
| ESU | Exponent Sign Unit. Performs exponent and sign operations |
| FPU | Floating Point Unit |
| HDLC | High Data Link Control (CIU) |
| IAE | Instruction Address Execute Register |
| ICTRL | Interrupt Controller |
| IDR | Identification Register |
| IIOC | Illegal I/O Command (SBI) |
| ILLMGS | Illegal Message type. SBI status |
| IOC | Input/Output Controllers |

## SIGNAL MNEMONICS (CONT)

| SIGNAL | DEFINITION |
|---|---|
| IPC-SBP | Sysbus parity error SBI status |
| IPCC | InterProcessor Communication Control |
| IPCR | InterProcessor Communication Register |
| IPCR | IPC Register |
| IQ | Instruction Queue (Latches, MUXs, and IR0-3 an the SGU) |
| IR MUX | Input Register Multiplexers |
| IR0-3 | Instruction Registers 0 through 3 |
| IR1,2 | Input Registers 1 and 2 |
| IRE | Instruction Registers Execute |
| IRE | Instruction Registers |
| ISMA | Illegal System Memory Address |
| ISMPA | Illegal System Memory Page Access |
| ITMR | Interval Timer |
| IVEAD | Invalid Effective Address Detect |
| LAT | Long Address Translation |
| MAC0 | Microaddress Control 0 (CPU) |
| MAC1 | Microaddress Control 1 (CPU) |
| MAG COMP | Magnitude Comparator. Compares CRE to read/write page protect |
| MC Bus | Memory Control Bus |
| MCIB | Memory Control Input Buffer |
| MCU | Memory Control Unit |
| MIA BUFF | Microinstruction Address Buffer |
| MIA DRVR | Microinstruction Address Driver |
| MIAC | Microinstruction Address Comparator |
| MIAC | Microinstruction Address Comparator (CPU) |
| MIBR | Microinstruction Address Branch Address Register (CPU) |
| MIR | Microinstruction Register |
| MOP-SBP | Memory Operation System Bus Parity Error. SBI status |
| MSRX | Microstate Register Transceiver |
| MSRX | Microstate Register Transceiver. Holds microaddress (CPU) |
| NACK(NAK) | Negative Acknowledge |
| NIA | Next Instruction Address |
| NMI | Nonmaskable Interrupt |
| NVRAM | NonVolitile Random Access Memory |
| OR1-3 | Output Registers 1 through 3 |
| PAR | Physical Address Register |
| PC | Professional Computer |
| PCI | Processor Control Interface |
| PCW | Program Control Word |
| PFLT | I/O Protection Fault. SBI status |
| PIAR | Physical Instruction Address Register |
| PRMD | Protection RAM Data |
| PSR | Processor State Register |
| PTENB | Protection RAM ENaBle |
| R/C MUX | Reference/Change Multiplexer |
| RAM | Random Access Memory |
| REF | Page Referenced flag (ATU) |

## SIGNAL MNEMONICS (CONT)

| SIGNAL | DEFINITION |
|---|---|
| RTRB | Read Transport Reordering Buffer |
| SAIR | System Address bus Input Register |
| SAOR | System Address bus Output Register |
| SBI | System Bus Interface |
| SBMRPE | System Bus Memory Read Parity Error (SBI) |
| SBT | Start Bus Transfer. An 8086 I/O initialization command (IOC) |
| SCM | Support Command Mode. Single microinstruction sequencing |
| SCR | Support Command Register |
| SCR | Segment Control Register (ATU) |
| SCU | Support Control Unit |
| SCUI | Support Control Unit Interrupt Trap. Microlevel interrupt |
| SDIR | System Data bus Input Register |
| SDOR | System Data bus Output Register (SCU) |
| SMDE | System Memory Data Error (SBI) |
| SPB | Support Packet Bus. SCU diagnostic control bus |
| SPDR | Support Packet Data Register (CPU) |
| SPDR | Support Packet Data Register |
| SPU | Satellite Processing Unit (same as IOC or CPU) |
| SR REG | Save Return microaddress REGister (CPU) |
| SRMR | Save Return Microinstruction REGister (CPU) |
| SX BUFF | Sign Extend Buffer |
| TBBP | Translation Buffer ByPass buffer |
| TBTA | Translation Buffer Tag Address |
| TM BUFF | Translation/Memory Buffer |
| TRA | Trap Return Address |
| TSA MUX | Tag Store Address Multiplexer |
| TSPL | Tag Store Pipe Line |
| TV GEN | Trap Vector Generator (CPU) |
| VA BUFF | Virtual Address Buffer. Buffers address to VARs |
| VA MUX | Virtual Address Multiplexer |
| VAR | Virtual Address Register |
| VAR1,2 | Virtual Address Registers 1 and 2 |
| VMAD | Virtual Address illegal Address Detection. SBI status |
| VTPM | Valid Tag Parity Memory |
| WCSX | Writable Control Store register/transceiver |
| WIQD | Write Instruction Queue |
| WR-A | Working register for ALU calculations |
| WR-B | Working register for ALU calculations |
| WS0 | Workstation number zero |
| XMAL | External Memory Address Latch |
| XMIA | Execute Microinstruction Address register |

## SYSTEM ERRORS REQUIRING A CONTROL MODE DUMP

**ERROR HALT**      **EXPLANATION**

CLMM      An attempt has been made to set the clock comparator from the first TQEL on the timer queue, but the TQEL time value is for the next day (ie: the midnight TQEL is missing).

CLQE      An attempt has been made to set the clock comparator from the first TQEL on the timer queue, but the queue is empty.

FMIP      While searching through the available block list, the next-in-chain link was found to be pointing to the current block.

FMRC      While searching through the available block list, the next-in-chain link was found to be pointing to the current block.

FMRN      While searching through the available block list, the next-in-chain link was found to be pointing to the current block.

GMIC      An attempt has been made to obtain a block from the nonresident memory pool, but the memory chain links were found to be invalid.

GMIP      A memory block of sufficient size was found to satisfy the request, however, the block was page-aligned but not a complete page.

GMRL      While searching through the available block list, the next-in-chain link was found to be pointing to the current block.

GMRN      While searching through the available block list, the next-in-chain link was found to be pointing to the current block.

IOBA      Invalid physical address found in IAL.

IOIH      TCBFLGS3IGIGH is set. Ignore 'HELP'

IOIP      Invalid PPB chain. In attempting to locate the PPB for an IOP (for a given device), the PPB chain was found to be empty.

IOMQ      An IORE has been queued more than once on the IOQ for a device; IORE Address = IORECHN Address.

IOPS      An SIO has been attempted to a device that requires Presentation Services.

## SYSTEM ERRORS REQUIRING A CONTROL MODE DUMP (CONT)

| ERROR HALT | EXPLANATION |
|---|---|
| PCNR | The program check interrupt handler was activated, but no TCB is active. |
| PCNT | A program check has occurred in a 'nucleus' task (pager, IO timeout task). |
| PCPR | A page fault program check interrupt has occurred which is a page fault recursion error. |
| PGBI | Block number beyond the last extent in the pagefile. (In converting from block-in-file to block-on-volume an invalid block number was obtained.) |
| PGBT | The paging task was unable to block the faulting task on page frame semaphore. |
| PGFS | The paging task was unable to find a free page frame semaphore for the faulting task. |
| PGIP | An attempt has been made to reload the SCRs for the faulting TCB, however, the physical address of the RN table is invalid (indicated from the LPA instruction). |
| PGIV | A request has been made to mark the paging file with 'No Info' for the input virtual address (VA), but the VA is invalid (cannot be located within the RN table). |
| PGNS | The paging task was unable to find the required page frame semaphore in the PFSA list. |
| PGNW | The paging task has detected the nonreentrant use of a reentrant file (i.e., an attempt to page out to a nonwritable file). |
| PGPS | The paging task was unable to locate the PF semaphore used to block tasks waiting for the current page-in completion. |
| PGPT | The paging task was unable to locate the page table associated with this file (i.e., the block is beyond the end of the file). |
| PGQE | The paging task has been activated, however, all of the pager queues are empty. |
| PPBA | An attempt has been made to return a block to the system page pool but the block is not in use (in use bit already clear). |
| PPPE | A free block has been requested from the system page pool but none is available. |

## SYSTEM ERRORS REQUIRING A CONTROL MODE DUMP (CONT)

| ERROR HALT | EXPLANATION |
|---|---|
| SCEE | A nonreturnable entry has been made to the scheduler to dispatch a task and the scheduler has returned to the caller. |
| SCIE | The scheduler was activated but the event code supplied to the scheduler was invalid. |
| SCIS | A task (TCB) is being unblocked from a semaphore (SEMA) and the semaphore has an invalid type. |
| SGCT | While setting up and initializing the VTOC cache, a call to GETMEM to obtain space for the cache descriptor table has failed. |
| SGDD | The system was unable to destroy the TC scan work area after DLP initialization. |
| SGDI | The system was unable to destroy the IOP scan work area after IOCT initialization. |
| SGIS | The system was unable to create a block in heap storage for use as an IOP specification block. |
| SGIW | The system was unable to create a block in heap storage for use as an IOP scan work area. |
| SGLU | The system was unable to locate the UCB for the specified device. |
| SGNP | While setting up and initializing the VTOC cache, the available PFT chain was found to be empty. |
| SGSP | The system was unable to obtain a block through the GETBLK interface to use as a PPB for an IOP. |
| SGTS | The system was unable to create a block in heap storage for use as a TC specification block. |
| SGTW | The system was unable to create a block in heap storage for use as a TC scan work area. |
| SI3J | The FDR1 block for the JS1 system services file indicates that there are more than three extents for the file. |
| SI3S | The FDR1 block for the Segment 1 SVC file indicates that there are more than three extents for the file. |
| SIFV | The system was unable to free the Segment 0 memory used as the volume label work area. |

## SYSTEM ERRORS REQUIRING A CONTROL MODE DUMP (CONT)

| ERROR HALT | EXPLANATION |
|---|---|
| SIGV | The system was unable to allocate Segment 0 memory to prepare for volume IO (used as a volume label work area to mount accessible disks). |
| SIIE | An IO Error has occurred while loading the disk IOC microcode. The error is contained within LOWIOSW general and error status fields (i.e., failure was defined as 'Normal Completion' not being obtained). |
| SIIV | The VCB chain was discovered to be broken while the system was searching the chain during the mounting of accessible disks. |
| SILF | The FDR1 block for the translation library JSI system services file could not be found. |
| SIMB | The system was unable to allocate segment memory to read the fault tolerant bit map of a mounted volume. |
| SIMD | The system was unable to allocate Segment 0 memory to read FDX1 of a mounted disk volume. |
| SIMF | An attempt to obtain memory for the FLUB for a paging file has failed. |
| SIMP | An attempt to obtain memory for the system page pool descriptors (SPPD) has failed. |
| SIRF | During system initialization, a read fail occurred when trying to read FDR1 from the system VTOC. |
| SIRL | A disk read fail has occurred during disk IOC load. The reason for the error is contained within LOWIOSW general and error status fields (i.e., failure was defined as 'Normal Completion' not being obtained). |
| SIVC | While attempting to scratch any existing Segment 2 paging files, the system VCB chain was found to be invalid. The VCB end-of-chain was detected without locating the required VCB. |
| SIWS | The system was unable to release Workstation 0 to the task manager after the completion of system initialization. |
| USNT | An attempt was made to cancel a task on the system via ZAPTASK, but an unrecoverable error makes continuation of this service questionable (probably task not found). |
| BLIP | Invalid PPB chain. The PPB chain in the MCB was to be accessed to insert the newly created PPB, but the first entry on the PPB chain was zero. |

## SYSTEM ERRORS CAUSING CONTINUABLE DUMP

| ERROR HALT | EXPLANATION |
|---|---|
| BLNP | The system was unable to locate the PPB for the specified device. |
| BLNT | A call to GETBLK was made for individual block allocation but no TCB address was given in the parameter list. |
| CHFE | The CHECK post wait handler was unable to destroy the sub-task. |
| CHII | An invalid IOSW has been received from the IOP. |
| CHLT | The CHECK post wait handler was unable to locate the parent TCB for the requested task number. |
| CHNP | An attempt to locate the PPB associated with this device (R1) has failed. |
| CHTL | An attempt to locate the linkage table entry for translation library routine WV17STRT was unsuccessful. |
| CPNB | An error has been returned from GETHEAP after an attempt to obtain the command processor's buffers from the system pool. |
| CPPS | Presentation services failed to establish a connection with the remote system and the LOGOFF SVC was entered. However, the logoff was unsuccessful. |
| CPTM | For the task manager, a false logoff was set and LOGOFF SVC was entered. However, the logoff was unsuccessful. |
| DBIV | VCB chain invalid. While searching through the VCB chain and sorting the available volumes for paging eligibility, the system volume VCB was not located. |
| DPPT | The system was unable to locate the page table for a file. Given that multiple page tables exist, the system has searched all PTs chained into this FLUB and has been unable to locate the required page number within the file. |
| DTIB | DTI has encountered a failure in converting block-in-file to block-on-volume for Segment 2 paging file. |
| DTIF | DTI has encountered a FLUB not belonging to the SHARER that does not match a Segment 2 paging file FLUB owned by the user task. |

## SYSTEM ERRORS CAUSING CONTINUABLE DUMP (CONT)

**ERROR HALT**      **EXPLANATION**

DTIP           While attempting to unmap a physical page, the page frame number was found to be invalid.

DTLP           Given that multiple page tables exist, an attempt to locate a page table for a file (FLUB) has failed.

DTXE           DTI has received an error return code from XIO on attempting to write out the paging file block.

DUMP*          WM27 calls snapshot dump if the task that PC'd was a system task.

GHNP           No PFB was found within the ETCB for this GETHEAP call.

IDMA           IPC destroy was unable to cancel a mailbox alias.

IKSV           During the invoke task for one of the system tasks, a search of the VCB chain for the system volume was unsuccessful.

IRG2           A call to IWAIT to wait on a temporary mailbox did not result in a return message.

IRMM           IPC retrieve was unable to move a message body from the message buffer to the user specified area. The error response code from PAGRMAP is still held in the local variable area RETCODE (referenced through R11).

MLNF           While searching the FLUB chain, no FLUB with a name matching the file name in work area was found.

MLNO           While searching the OFB file chain, no OFB with OFDTCB = CPUTCB was located.

MLNP           The system was unable to locate the PPB for the specified device.

MLQI           During the close phase of microcode load, prior to freeing the OFB and IORE, a check was made to see if the IORE was still queued on the UCB and the IORE was found to be queued.

PCDU*          WS50 causes a task to suspend, then calls a continuable dump. It Will result in a task crash.

RAOR*          It is not possible to open or read the alias file.


*              After the continuable Dump is completed, the system continues without a reIPL.

## SYSTEM ERRORS CAUSING CONTINUABLE DUMP (CONT)

| ERROR HALT | EXPLANATION |
|---|---|
| RARB | An attempt to obtain nonresident memory as a read buffer for the alias file has failed. |
| RARF* | It is not possible to read the alias file. |
| RAUM | An attempt to allocate memory from the heap for use in the open alias file routine as a UFB has failed. |
| RRMB | No message buffer was found chained to the TCB for this XTERM call. |
| RRNP | No PFB was found within the ETCB for this XTERM call. |
| RSIS | An invalid Segment 1 SVC invocation during system initialization has occurred. |
| SRCN | TCBINSMC is negative. The only legal values are nonnegative. |
| SRSN | TCBSMECBK for the resource in question is negative. The only legal values are nonnegative. |
| TIDC | After attempting to map the debugger code for this task, an error response was returned from the MAP SVC. |
| TIDD | After attempting to unmap the debugger data for this task, an error response was returned from the UNMAP SVC. |
| TIDU | After attempting to unmap the DMS shared area for this task, an error response was returned from the UNMAP SVC. |
| TIID | After successfully mapping the debug code for this task, it is the wrong debug file. This was determined by checking the address at which debug should have been mapped against the address at which it was actually mapped. |
| TIIE | After completing the necessary task initialization, control has been returned to SYSINIT when it should not have been possible to return. |
| TILT | After attempting to map the linkage table for this task, an error response was returned from 'he MAP SVC. |
| * | After the continuable Dump is completed, the system continues without a reIPL. |

## SYSTEM ERRORS CAUSING CONTINUABLE DUMP (CONT)

| ERROR HALT | EXPLANATION |
|---|---|
| TIMD | After attempting to map the DMS services for this task, an error response was returned from the MAP SVC. |
| TIMH | After attempting to map the IPC header buffers for this task, an error response was returned from the MAP SVC. |
| TIMS | After attempting to map the Segment 1 system SVCs for this task, an error response was returned from the MAP SVC. |
| TIS1 | After attempting to unmap the Segment 1 SVCs for this task, an error response was returned from the UNMAP SVC. |
| TISA | After successfully mapping the system services for this task, it was impossible to find the system services address in the linkage table. |
| TISD | An attempt to obtain memory for the DMS vector table has failed. This table is allocated only once, when the first task is initialized. |
| TISM | After attempting to map the DMS shared area for this task, an error response was returned from the MAP SVC. |
| TISS | After attempting to map the system services for this task, an error response was returned from the MAP SVC. |
| TIST | An attempt to obtain memory for the TRN vector table has failed. This table is allocated only once, when the first task is initialized. |
| TITL | After attempting to map the translation library for this task, an error response was returned from the MAP SVC. |
| TIUB | After attempting to unmap the IPC bodies region for this task, an error response was returned from the UNMAP SVC. |
| TIUD | After attempting to unmap the DMS file for this task, an error response was returned from the UNMAP SVC. |
| TIUE | After completing the necessary termination functions and invoking UNLINK, control has been returned to SYSINIT when it should not have been possible to return. Exit from UNLINK should have been to the task quit code. |
| TIUL | After attempting to unmap the linkage table for this task, an error response was returned from the UNMAP SVC. |

## SYSTEM ERRORS CAUSING CONTINUABLE DUMP (CONT)

| ERROR HALT | EXPLANATION |
|---|---|
| TIUS | After attempting to unmap the system services for this task, an error response was returned from the UNMAP SVC. |
| TIUT | After attempting to unmap the translation library for this task, an error response was returned from the UNMAP SVC. |
| TIWD | After successfully mapping the DMS services for this task, it is shown to be the wrong SVC file. This was determined by checking the address at which DMS should have been mapped against the address at which it was actually mapped. |
| TIWS | After successfully mapping the Segment 1 system SVCs for this task, further checking shows it to be the wrong SVC file. This could mean that either the original 8-MB file was incorrectly mapped in or an attempt to subsequently map the 16 MB version also failed. |
| ULDM* | UNLINK has invoked the system service to destroy a mailbox and an error response has been returned. |
| ULDT | UNLINK has invoked the system service to destroy the trace buffers and an error response has been returned. |
| ULFP | UNLINK has invoked the system service to unfix the disk diagnostics pages that were allocated to this task and received an error response. |
| ULNF | UNLINK was unable to locate the current Segment 1 FLUB on the system FLUB chain in order to free the FLUB. |
| ULNL | UNLINK decremented the task's current link level (ETCB) and the resulting link level was negative. |
| ULNP | A PFB SAVE area has not been located in a level stack. A search of all this task's active process level stacks for for one which contains the PFB (comparing against stack minimum and maximum values in the stack header) has failed. |
| ULPC | Having adjusted the necessary stack(s), it is now no longer possible to locate any PFB via the ETCB PFB chain. |
| ULUM | UNLINK was attempting to unmap each MAPB on the specified MAPB chain when, for one MAPB, an error response was received from UNMAP. |
| * | After the continuable Dump is completed, the system continues without a reIPL. |

## VERSION CHECKING STATUS ERROR MESSAGES

| MESSAGE | DEFINITION | COMPONENTS |
|---------|------------|------------|
| (blank) | No problems are detected. | |
| WARNING | A version problem exists with this component, though it is not critical enough to halt system initialization. | @PRTTSK@<br>@SHARER@<br>DEVLIST |
| FATAL ERROR | IPL procedures cannot continue. Obtain a current, compatible version version of the component and then reIPL. | @SYSGEN@<br>@SYSTSK@<br>@OPER@<br>@SYSCPR@<br>@TSKMGR@ |

## I/O CONTROLLERS AND SUPPORTED DEVICES

This appendix lists, according to the input/output controller (IOC), the supported devices for the VS-7100.

| VS-7300 IOC | TYPE OF IOC | DEVICES SUPPORTED |
|---|---|---|
| 23V98-4 | Disk | 2265V-1 75 MB removable drive (SMD) |
| | | 2265V-2 288 MB removable drive (SMD) |
| | | 2265V-3 620 MB fixed drive (FMD) |
| | | 2268V-1 76 MB fixed drive (WINC) |
| | | 2268V-2 147 MB fixed drive (WINC) |
| | | 2268V-3 314 MB fixed drive (WINC) |
| | | 2268V-4 454 MB fixed drive (WINC) |
| 23V67 | 32 port serial | 2529V 6400 bpi cartridge tape drive |
| | | 2238V1 Streamer tape |
| | | 2246S-2B 32K Serial DP workstation |
| | | 2246C 32K Combined DP/WP workstation |
| | | 2276C-3 Combined archiving workstation |
| | | 4250-VS Combined archiving workstation |
| | | 2256C 64KB combined workstation |
| | | 4205 Monochrome combined workstation |
| | | 4210 Monochrome DP workstation |
| | | 4230/4230A 64KB monochrome combined workstation |
| | | 4245 Color combined workstation |
| | | 5300/VS-IIS64 Combined workstation |
| | | 5300W/VS Combined workstation |
| | | 5300/VS-AL-AUD Combined workstation |
| | | 5300/VS-AUD Combined workstation |
| | | 6300/VS-64 Combined workstation, including graphics |
| | | 8100 Advent Graphics workstation |
| | | 5533 100-cps matrix printer |
| | | 5535 180-cps matrix printer |
| | | 5573 250-1pm band printer |
| | | 5574 600-1pm band printer |
| | | 5575 Printer-IIS/DP |
| | | 5577V High density matrix printer |
| | | 5577A High density matrix printer |
| | | 6581W 40-cps daisy printer |
| | | 6581WC-1 Printer-IIS/DP/ALLIANCE |
| | | DW/OS-55 55-cps daisy printer |
| | | LPS-8 Laser printer (WP only) |
| | | LPS-12 Laser printer (WP only) |
| | | LIS-12V Printer-IIS/DP |
| | | LIS-12A Printer-ALLIANCE |
| | | LIS-24 Laser printer (WP only) |

## I/O CONTROLLERS AND SUPPORTED DEVICES (CONT)

| VS-7300 IOC | TYPE OF IOC | DEVICES SUPPORTED |
|---|---|---|
| 23V67 | 32 port serial | 6554/TCB Telecommunications Processor<br>CIU-B WangNet SystemBand Modem<br>6550 Gate Array TCB |
| 23V86/96 | Multiline Telecommunications | 2110 Workstation<br>4220 Binary synchronous remote workstation<br>2246R Remote workstation<br>2281 Remote daisy printer<br>2233 Remote matrix printer<br>2235 Remote matrix printer<br>2273V-1 Remote band printer |
| 23V95-1 | Tape | 2209V Kennedy tape drive |
| 23V95-2 | Tape | 2219V Telex tape drive<br>2248V-1 tre-density tape drive |
| 23V79 | WangBand CIU | |

**COMPANY CONFIDENTIAL**

# END