WANG

6200

VS Resource Sharing Facility (RSF)

Models:

22V14
23V14

Customer Engineering
Product Maintenance Manual

741-1683

PREFACE

This document is the Product Maintenance Manual (PMM) for the Wang VS Resource Sharing Facility (RSF). 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 RSF. The manual will be updated on a regular schedule or as necessary. Such updates will be published either as Publication Update Bulletins (PUBs) or as full revisions.

First Edition (June, 1986)

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

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CHAPTER 1

INTRODUCTION

1.1 PURPOSE

This manual provides the information necessary for the installation, operation, and maintenance of the Wang VS 22V14 (VS-85/85-H/90/100) and Wang VS 23V14 (VS-300) Resource Sharing Facility (RSF) Controllers.

1.2 SCOPE

This document consists of the following chapters and appendices:

- Chapter 1, "Introduction," provides a description of the hardware and software and system specifications.
- Chapter 2, "Theory of Operation," is not included at this time, but will be added to the manual in a future edition.
- Chapter 3, "Operation," describes the function and use of the RSF Controller switches, initial turn-on procedures, verification, normal shut-down procedures, operator preventive maintenance, and emergency shut-down procedures.
- Chapter 4, "Installation," provides instructions for unpacking and inspection, setup and verification, and lists tools and equipment required.
- Chapter 5, "Corrective Maintenance," contains instructions for removal and replacement of defective equipment.
- Chapter 6, "Illustrated Parts Breakdown," provides illustrations of all field-replaceable units (FRUs), their location within the system, and their respective part numbers.
- Chapter 7, "Troubleshooting," describes the diagnostics required to troubleshoot the Controller down to the FRU level.
- The appendices list the acronyms and diagnostic codes that are helpful to the user.

1.3 RSF DESCRIPTION

The Wang VS RSF is a field-installable option for high-end VS systems which allows high-speed transfer of up to 16K bytes of data between VS systems. As many as four VS systems (VS-85, VS-85-H, VS-90, VS-100, or VS-300 in any combination) can be linked together on a high-speed differential 912 bus.

Each RSF controller is identical except for its unique device address which is set by a DIP switch. The device address determines the priority of a controller when requesting a transmission. The lowest address (0) has the highest priority. When a transmission is initiated, the idle controllers on the bus compare their device address with the receive address placed on the RSF bus by the transmitting device. Only the controller with a device address equal to the receive address can receive the transmission.

Any RSF controller on the bus can initiate a transmission to another RSF controller on the bus. The transmitting controller sets its own Request flag. When the bus is free and there are no higher priority requests pending, the transmitting controller takes control of the bus. The bus BUSY line then sets, the Request flag resets, and the transmission begins. At the end of the transmission, the transmitting device resets the BUSY signal. The transition on the BUSY line indicates to the receiving device that the transmission is finished.

The transmission rate on the RSF bus is set according to the length of the cable that links the systems together. As the cable length increases, the transmission rate must be slowed down. Presently, the cable length is 40 feet. The rate is set by two DIP switches on the RSF controller board. The maximum transmission rate is 13.33 MB/sec.

Each RSF controller contains two 16 KB data buffers: a transmit buffer and a receive buffer. Data can be written into the transmit buffer from main memory and sent to another controller on the RSF bus. Data can also be written into the receive buffer from the RSF bus and sent to main memory.

The RSF bus provides a 16-bit data path. Transmissions on the bus consist of a message word followed by up to 16 KB of data. The message word indicates the length of the data block and the source address of the data. Odd parity is generated for each word.

Powering off any of the controllers on the bus will not affect the operation of the other controllers. The RSF bus provides a READY status line for each controller to notify the other controllers that it is powered on, it has no microcode parity error, RES R or RES RCV F is not active during a receive, and the Ready bit in the diagnostic register is set.

The RSF Controller consists of the following subassemblies:

- RSF Controller Board
- Terminator Board
- I/O rear panel assembly with two 60-pin connectors
- 60-pin, flat, twisted pair cable (40 ft)

1.3.1 RSF CONTROLLER BOARD

In the VS-85/85-H/90/100 Computer Systems, the RSF Controller board is an assembly (WLI P/N 212-3110) which consists of two boards: the 210-7110 IOP Motherboard and a RSF Device Adapter (WLI P/N 210-8861). The VS-300 RSF

Controller board (WLI P/N 210-8862) is a single board Input/Output Controller (IOC).

1.3.2 TERMINATOR BOARD

This 3 1/4 x 3/4 inch board (WLI P/N 210-8172) contains 7-56 SIPs and is required for the termination of the 912 bus at both ends. The terminator board attaches to the inside of a RSF rear panel assembly (VS-85/85-H/80/100 - WLI P/N 270-1041 and VS-300 - WLI P/N 270-1055).

1.3.3 RSF REAR PANEL ASSEMBLY

The RSF Rear Panel Assembly (VS-85/85-H/80/100 - WLI P/N 270-1041 and VS-300 - WLI P/N 270-1055) consists of a half-panel with two 60-pin connectors to which attaches a terminator board or a flat, twisted pair cable from another large VS RSF Controller. A pair of flat, twisted pair cables are attached to the back of the connectors. These cables terminate in a single 60-pin connector which plugs into the RSF Controller Board.

1.3.4 RSF BUS

The RSF bus consists of 30 bidirectional, differential signal pairs of which 16 are used for data, two for addressing, and 12 for control. These signals are carried by 40-ft, 60-pin, twisted pair ribbon cables between systems on the bus.

1.4 SOFTWARE DESCRIPTION

RSF is supported by a minimum of Operating System (OS) Release 7.19. The field engineer loads the OS at the time of system installation. A new set of IOP PROMs with new microcode is required to support up to three external VS connections.

A program called OPERATOR allows the user to attach and detach each CPU from the RSF bus. The program also allows users to view the status of all CPUs on the bus.

1.5 RSF SYSTEM SPECIFICATIONS

Table 1-1, below, describes the system specifications required for the installation, maintenance, and operation of the VS RSF Controller.

Table 1-1. HSF System Specifications

POWER (INPUT)	±5V dc; ±12V dc
OPERATING ENVIRONMENT	
Ambient Temperature	60°F to 90°F (16°C to 32°C)
Relative Humidity (Non-Condensing)	20% to 80%
Maximum Wet Bulb Temperature	75°F (24.5°C)
Operating Temperature Change/Hour	12°F (6.5°C)
SERVICE SPACE	No additional space required.

Table 1-2. Requirements for Clustered VS Systems

HARDWARE	
VS-85/85-H/90/100	RSF controller board (22V14) 16 MB virtual address space Consumes and reserves 1 MB of main memory RSF 60-pin, flat bus cable Terminator board (210-8172) if system is first/last
VS-300	RSF controller board (23V14) 16 MB virtual address space Consumes and reserves 1 MB of main memory RSF 60-pin, flat bus cable Terminator board (210-8172) if system is first/last
SOFTWARE	
VS System	Operating system software version 7.19.40 minimum

CHAPTER 2
THEORY OF
OPERATION

CHAPTER 2

THEORY OF OPERATION

No information is included at this time, but will be available in a future edition.

CHAPTER 3
OPERATION

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CHAPTER 3

OPERATION

3.1 GENERAL

This chapter describes the controls and indicators, power-on and power-off procedures, system verification, and emergency procedures for the Wang VS Resource Sharing Facility (RSF) Controller.

3.2 CONTROLS AND INDICATORS

Table 3-1 lists the RSF service controls and their function.

Table 3-1. RSF Service Controls

NAME	LOCATION	TYPE AND FUNCTION
SW1	210-8861/ 210-8862	Eight-position DIP switch; sets active high time for bus clock (XCLK).
SW2	210-8861/ 210-8862	Eight-position DIP switch; sets active low time for bus clock (XCLK) and provides device addressing. For VS-85/85-H/90/100, sets BIT diagnostic mode.
SW3	210-8862	Four-position DIP switch; sets BIT diagnostic mode for VS-300.

Table 3-2 lists the RSF service indicators and their function.

Table 3-2. RSF Service Indicators

Name	LOCATION	TYPE AND FUNCTION
LED1	210-8861	LED; lights to indicate BIT is running at power up and goes out at BIT's successful conclusion. In stand-by (off-line) mode, LED blinks once every three seconds. In ready (on-line) mode, LED is OFF.

3.3 INITIAL TURN-ON PROCEDURES

Refer to the appropriate product maintenance manual for the power-up procedures for the VS-85/85-H//90/100/300 Computer Systems.

1. Power up the systems to be configured on the RSF bus.

2. Load microcode and IPL each system. Use GENEDIT to indicate that each system is connected to the RSF bus through its individual controller.

3. Power on all peripherals.

3.4 VERIFICATION

1. Verify that a data transmission can be initiated and received by each system on the RSF bus.

2. Verify that the received data is correct for each transmission in step 1.

3.5 NORMAL SHUT-DOWN PROCEDURES

Refer to the appropriate product maintenance manual for the shut-down procedures for each system attached to the RSF bus.

3.6 OPERATOR PREVENTIVE MAINTENANCE

There is no required operator preventive maintenance for the VS RSF.

3.7 EMERGENCY SHUT-DOWN PROCEDURES

Refer to the appropriate VS product maintence manual for the emergency shut-down procedures for each system attached to the RSF bus.

CHAPTER 4
INSTALLATION

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INSTALLATION

4.1 GENERAL

This chapter describes the procedures for unpacking, inspecting, and installing the VS Resource Sharing Facility (RSF) Controller. Included in this chapter are instructions for system interconnection and power-up.

4.2 INSTALLATION SITE REQUIREMENTS

Prior to installation, the following conditions must be met:

1. All site plans must be approved by both the customer and a service representative.

2. All building alterations must be completed and inspected.

3. All electrical wiring, air conditioning, and telecommunications (TC) modifications must be installed and tested.

4. The service representative will perform a preinstallation inspection two weeks prior to delivery. At this time, the service representative will check the site for compliance with RSF site specifications. The service representative will bring any unsatisfactory conditions noted to the attention of the customer for correction.

4.3 TOOLS AND TEST EQUIPMENT

No special tools are required for the installation of the RSF Controller. A standard tool kit is sufficient.

The test equipment required is as follows:

- Digital Voltmeter - Fluke Model #8022A or equivalent

4.4 UNPACKING

Before unpacking the RSF Controller, check all packing slips to ensure that the proper equipment has been delivered. Inspect all shipping containers for damage i.e., crushed corners, punctures, etc.

4.4.1 CLAIMS INFORMATION

If damage is discovered during inspection, file an appropriate claim promptly with the carrier involved and notify your service manager. State the nature and extent of the damage and make arrangements for replacement equipment, if necessary. Be sure to include the following information:

- Work order number
- Customer name
- Customer number
- Model number
- Serial number

4.4.2 UNPACKING THE RSF

1. Remove the RSF 22V14/23V14 Controller board assemblies from their boxes and remove any packing from the assemblies.

2. Remove the two terminator boards from their boxes and remove any packing from the boards.

3. Remove the RSF rear panel assemblies from their boxes and remove any packing from the assemblies.

4. Remove the 40-ft 60-pin cables from their boxes and remove any packing from the cables.

4.4.3 RSF INSPECTION

1. Visually inspect all components of the RSF Controller for damage such as loose hardware and broken connectors.

2. Tighten all loose hardware.

3. Check the shipping list to ensure that the correct circuit boards have been shipped. Refer to table 4-1 for the minimum hardware revision levels.

4. If damage is found, use the reporting procedure outlined in paragraph 4.4.1.

4.5 MINIMUM REQUIREMENTS

This section provides the hardware and software requirements for the VS-85/85-H/90/100 22V14 and the VS-300 23V14 RSF Controllers. The requirements given are the minimum needed for the proper operation of the RSF Controller and may not reflect the latest hardware revs and software versions. Tables 4-1 and 4-2 below list the hardware and software minimum requirements for all high-end VS RSF.

Table 4-1. VS-85/85-H/90/100/300 Hardware Minimum Requirements

DESCRIPTION	WLI P/N	E REV
IOP Motherboard (VS-85/100)	210-7110	R5
Terminator Board	210-8172	R0
22V14 RSF Controller Board (VS-85/100)	210-8861	R0
23V14 RSF Controller Board (VS-300)	210-8862	R0

Table 4-2 below lists the software requirements for the VS 22V14/23V14 RSF Controllers.

Table 4-2. VS-85/85-H/90/100/300 Software Minimum Requirements

DESCRIPTION	VERSION	WLI P/N
Microcode		
CP4	4.70.38	- - -
CP8	X.XX.XX	- - -
VS Operating System	7.19.4C	195-4941

4.6 EQUIPMENT INSTALLATION

The following steps detail the procedure to install the VS RSF 22V14/23V14 Controller in a VS-85/85-H/90/100/300 Computer System.

4.6.1 MICROCODE PROM INSTALLATION

The following procedure describes the installation of the RSF microcode PROMs. Although the PROMs are usually preinstalled by Manufacturing, this information is provided in the event that the PROMs were not installed or the PROMs require a field update.

Use Table 4-3 to determine the location on the board for each PROM. For PROMs labelled by R&D, match the number on the PROM with the PROM numbers in column one in the table. Find the chip location under the correct board number (210-7110 or 210-7810: have different silkscreening) in the "Location" column corresponding to the PROM number.

For PROMs produced by Manufacturing, cross-reference the "WLI Part Number" column with the "Location" column.

Table 4-3. RSF Microcode PROM Installation

PROM NUMBER	WLI P/N	LOCATION		SERVICE DESCRIPTION
		7110	7810	
1	378-XXXX R0	L22	L25	000 - 3FF Odd Byte
2	378-XXXX R0	L10	L12	000 - 3FF Even Byte
3	378-XXXX R0	L21	L24	400 - 7FF Odd Byte
4	378-XXXX R0	L9	L11	400 - 7FF Even Byte
5	378-XXXX R0	L20	L23	800 - BFF Odd Byte
6	378-XXXX R0	L8	L10	800 - BFF Even Byte
9	378-XXXX R0	L11	L13	0-3FF 8-PROM Parity

After you have located the correct board position for each PROM, carefully install the PROMs on the board. Refer to the "map" shown below in figure 4-1.

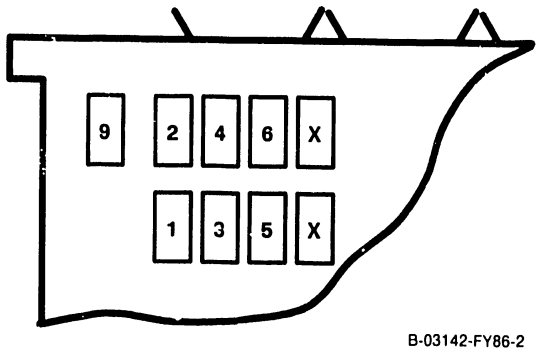


Figure 4-1. RSF Microcode PROM Location on IOP Motherboard

4.6.2 SWITCH SETTINGS

The switches on the RSF IOP motherboard and the RSF device adapter (VS-85/85-H/90/100), and the RSF IOC (VS-300) must be set prior to installation to ensure proper operation of the RSF Controller. The following paragraphs detail the procedures for setting the switches.

4.6.2.1 VS-85/85-H/90/100 RSF IOP Motherboard Switch Settings

The IOP motherboard (refer to figure 4-2) switches must be set to define the correct system bus address. Set the switches on the IOP according to the switch settings shown in figures 4-3 and 4-4.

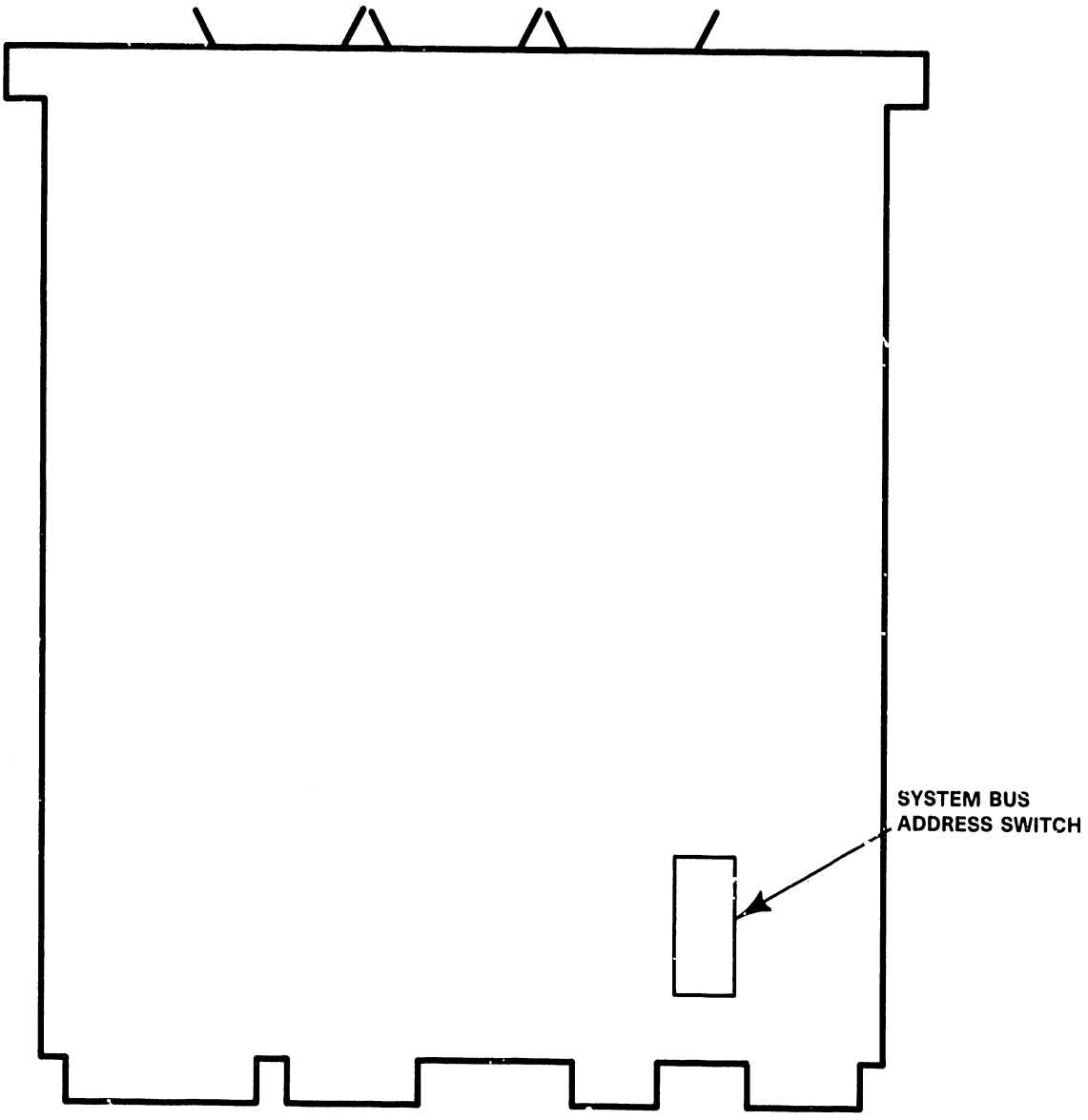


Figure 4-2. VS-85/85-H/90/100 210-7110 RSF IOP Motherboard

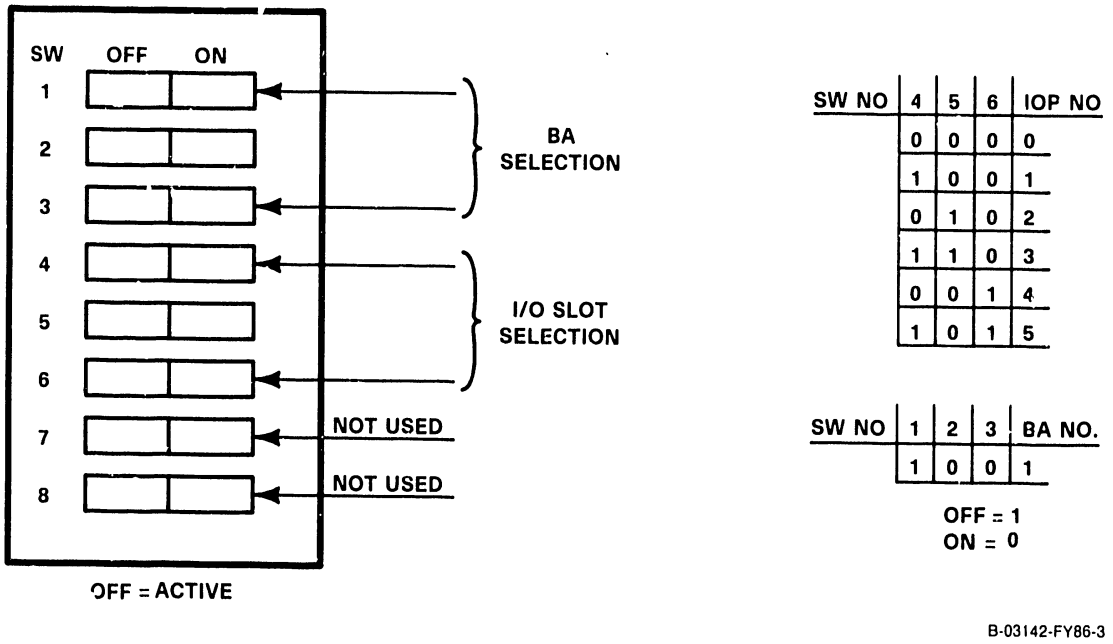


Figure 4-3. VS-85/85-H RSF IOP Motherboard Switch Settings

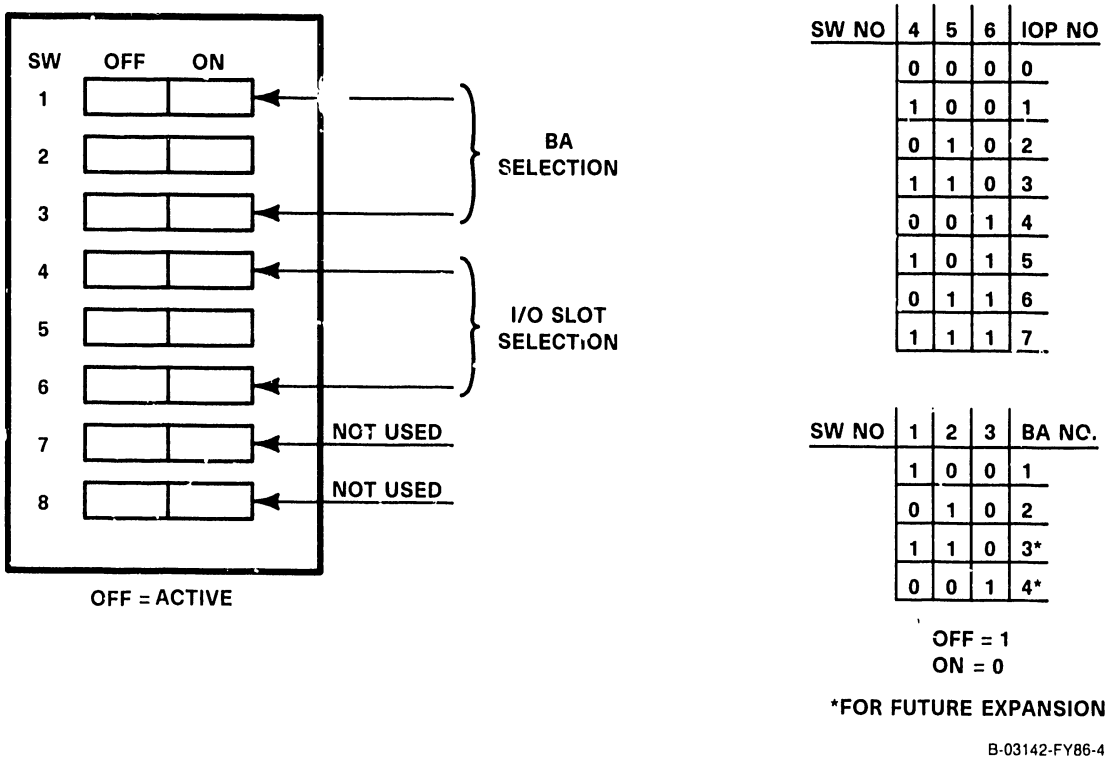


Figure 4-4. VS-90/100 RSF IOP Motherboard Switch Settings

4.6.2.2 VS-85/85-H/90/100/300 Device Adapter Switch Settings

Ensure that the DIP switches (SW1 and SW2) on the 210-8861 (figure 4-5) or the 210-8862 (figure 4-6) controller board are set for the proper bus clock transmission rate and controller addressing according to the switch settings shown in figures 4-7 thru 4-9 below. The switches shown in figures 4-7 thru 4-9 are set for the maximum bus clock cycle time - 150 ns. This is the maximum clock rate for systems cabled within 40 feet of each other. Slower clock rates will be required for longer cable lengths in the future. Refer to table 4-4 for RSF controller priority. Figure 4-10 illustrates the BIT diagnostic switch (SW3) settings for the VS-300.

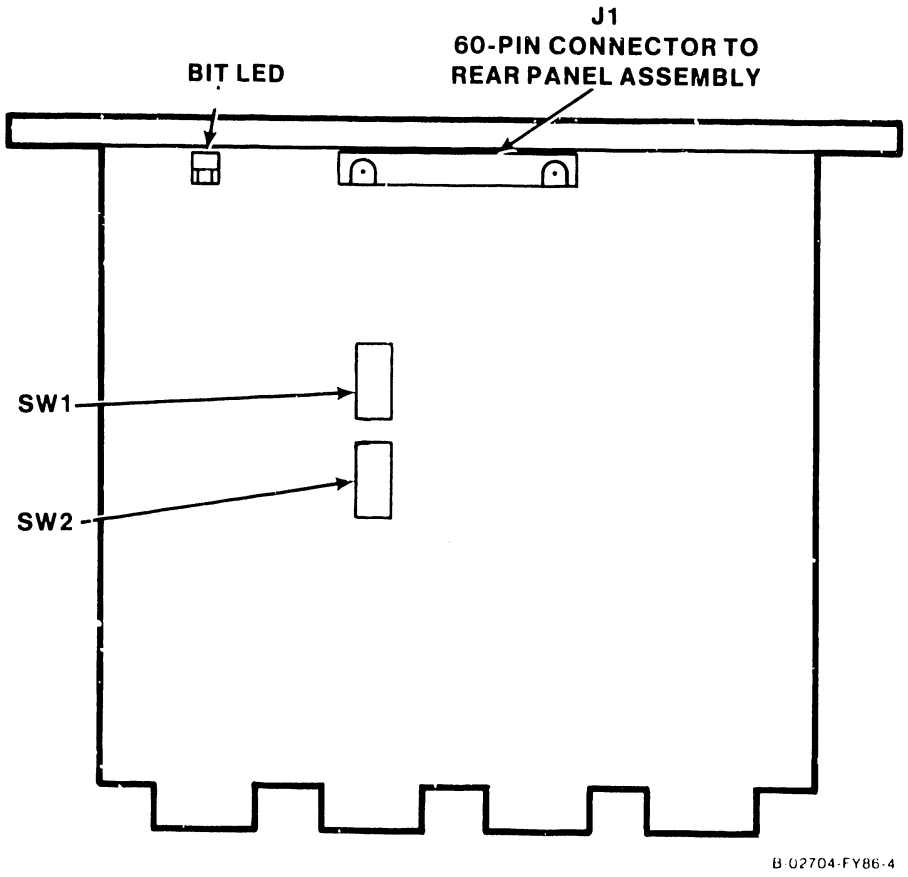


Figure 4-5. 212-3110 VS-85/85-H/90/100 22V14 RSF Controller Assembly (210-8861 Device Adapter Side)

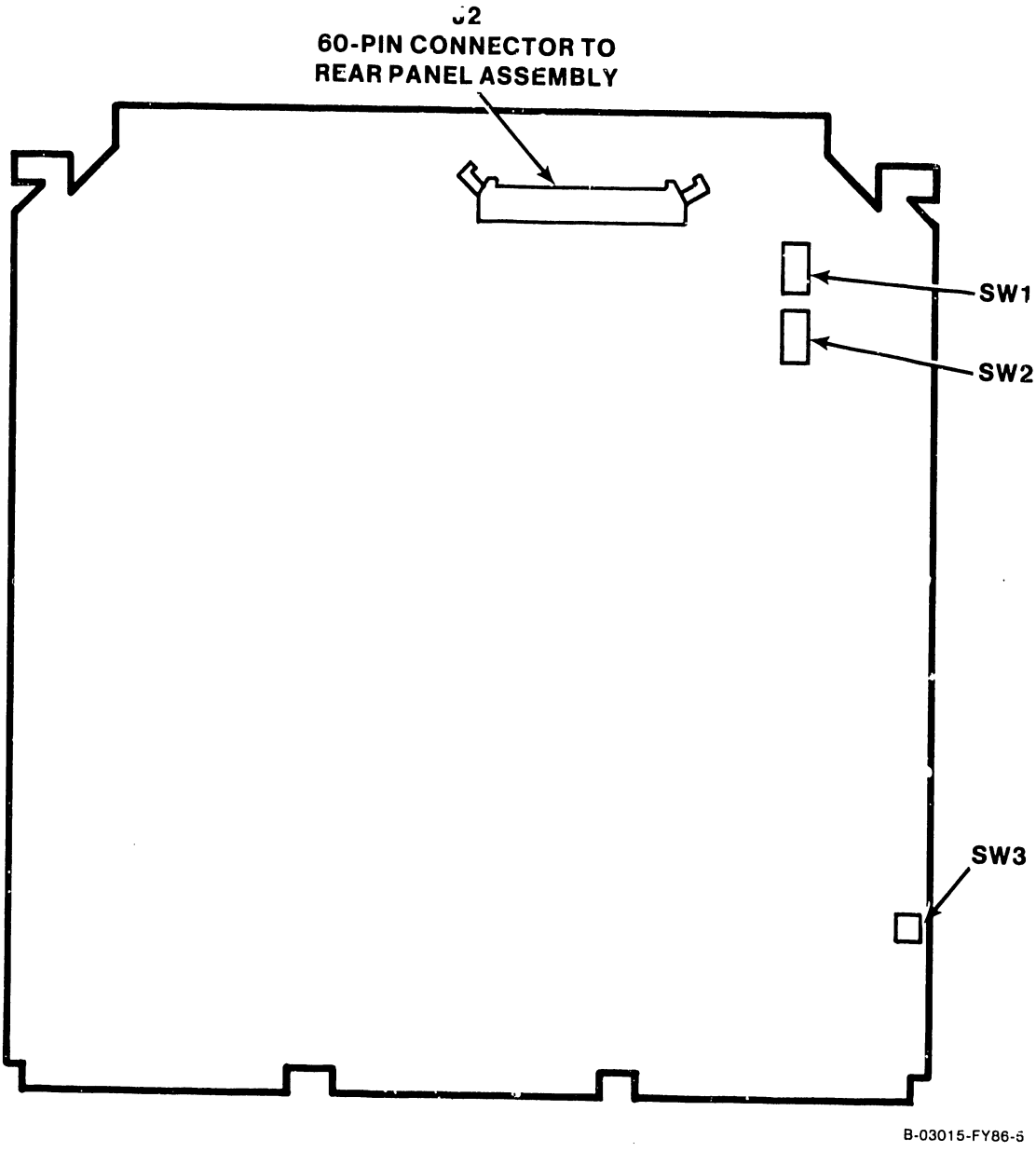
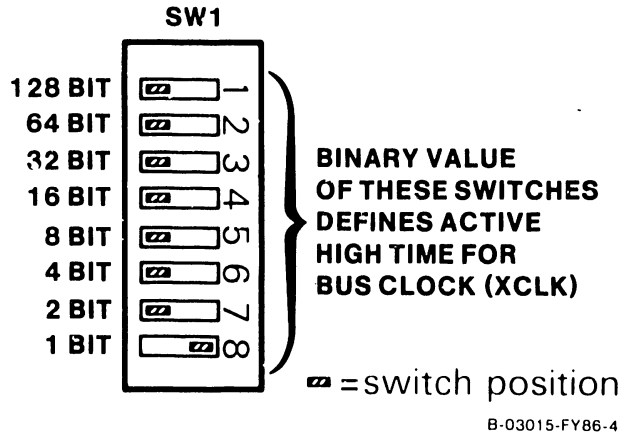


Figure 4-6. 210-8862 VS-300 23V14 RSF Controller



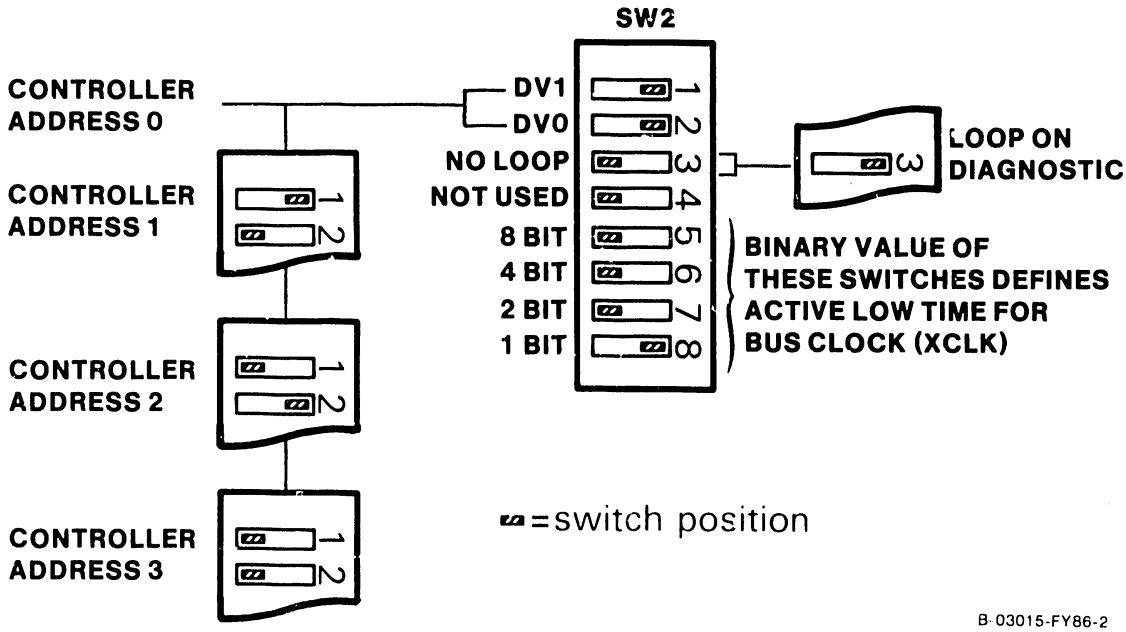
Active high time (ns) =

(SW8*1 + SW7*2 + SW6*4 +SW5*8 + SW4*16 + SW3*32 + SW2*64 + SW1*128) * 50

Where: SWX ON = 1; SWX OFF = 0

With SW8 ON (as shown), active high time = 50 ns

Figure 4-7. VS-85/85-H/90/100/300 RSF Controller SW1 Switch Settings

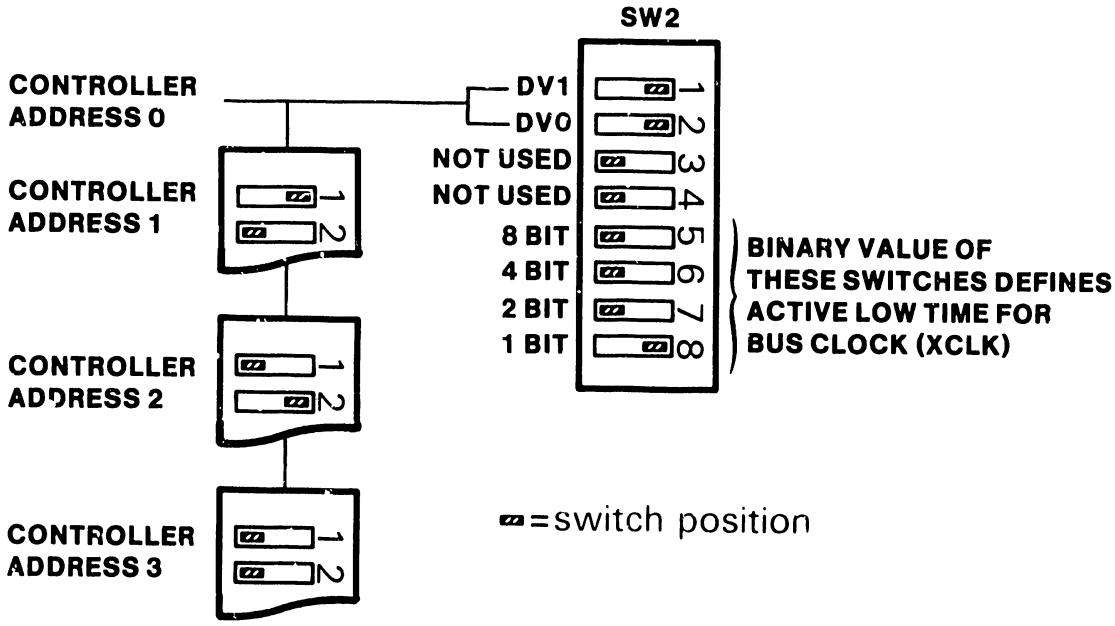


Active low time (ns) = ((SW8*1 + SW7*2 + SW6*4 +SW5*8) + 1) * 50

Where: SWX ON = 1; SWX OFF = 0

With SW8 ON (as shown), active low time = 100 ns

Figure 4-8. VS-85/85-H/90/100 RSF Controller SW2 Switch Settings




```
Active low time (ns) = ((SW8*1 + SW7*2 + SW6*4 +SW5*8) + 1) * 50

Where:  SWX ON = 1; SWX OFF = 0

With SW8 ON (as shown), active low time = 100 ns
```

Figure 4-9. VS-300 RSF Controller SW2 Switch Settings

Table 4-4 illustrates the priority structure of the RSF controllers configured on the bus. The device address (set by SW2 on the controller board) of the controller determines its priority. The lowest address receives the highest priority.

Table 4-4. RSF Controller Priority

CONTROLLER ADDRESS	PRIORITY
0	Highest
1	•
2	•
3	Lowest

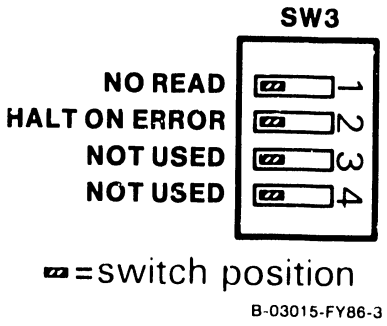


Figure 4-10. VS-300 RSF Controller BIT Diagnostic Switch (SW3) Settings

4.6.3 INSTALLING THE RSF CONTROLLER BOARD

For the all systems, install the RSF Controller board(s) as far away as possible from the disk IOPs/IOCs in the system. Ensure that the board(s) is seated firmly in the motherboard connectors.

4.6.4 RSF REAR PANEL INSTALLATION

Install a terminator board in the RSF rear panel assembly of the first and last systems to be linked on the RSF bus. (The RSF bus must be terminated at both ends.) The terminator board plugs into either connector on the rear panel assembly. Be sure to connect the ground wire of the terminator board to the lug on the rear panel assembly. Refer to figure 4-11.

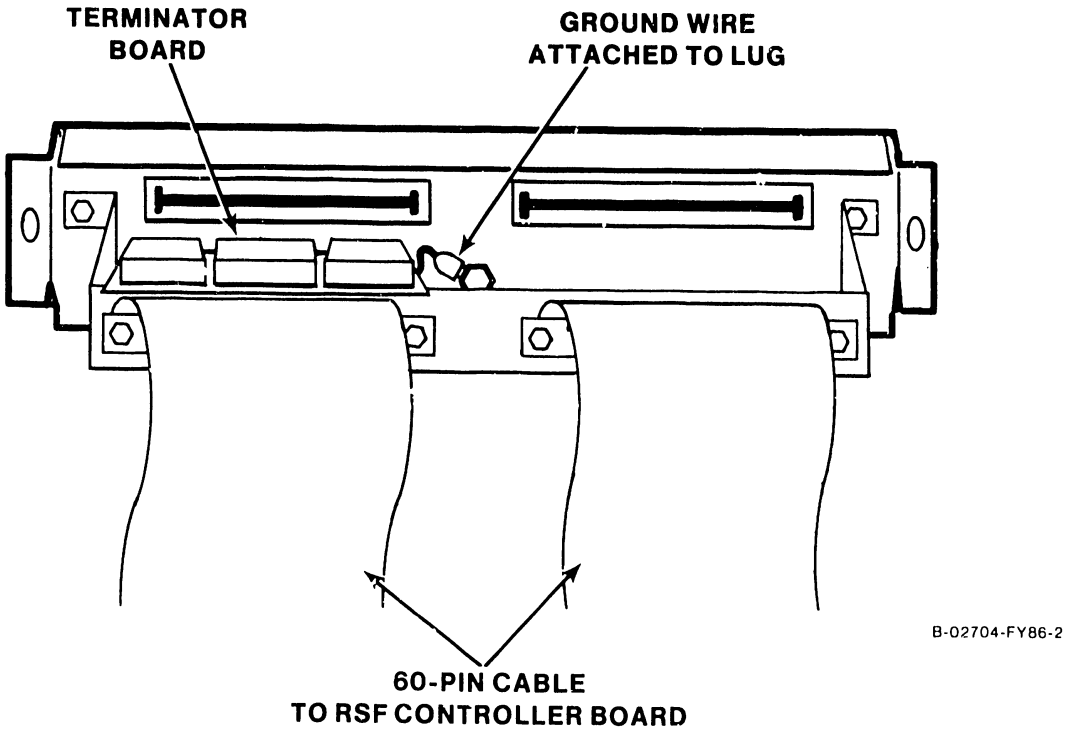


Figure 4-11. VS RSF Terminator Board Installation

Remove a blank panel from the rear panel of the CPU. With the hardware provided, install a RSF rear panel assembly (figure 4-12) in the space formerly occupied by the blank panel. Connect the 60-pin cable connector of the rear panel assembly to the 60-pin connector J1 (VS-85/85-H/90/100) or J2 (VS-300) at the top of the RSF controller board. Refer to figures 4-5 and 4-6. Do this for each system to be configured on the RSF bus.

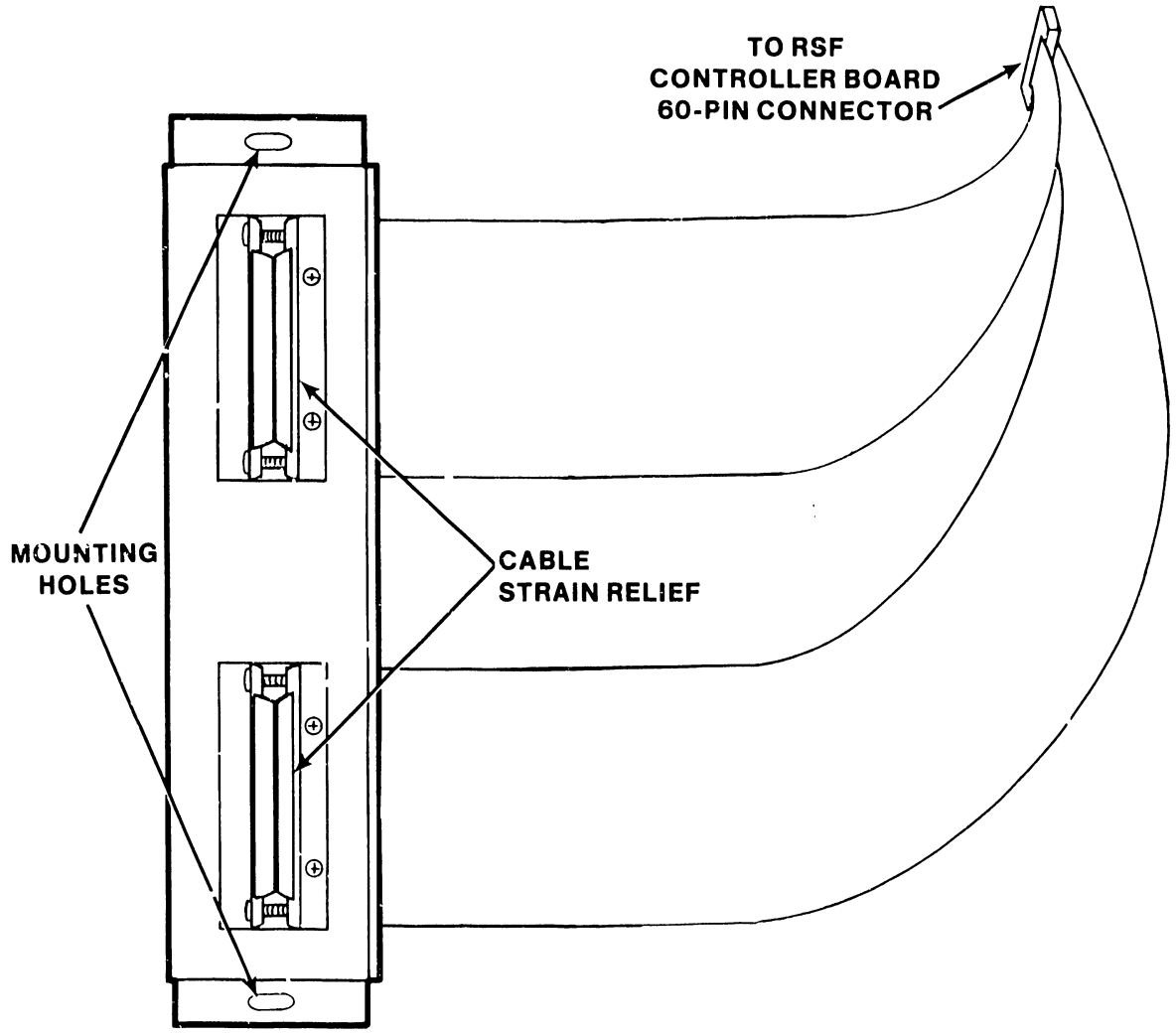


Figure 4-12. VS RSF Rear Panel Assembly Installation

Construct a 220-3449 VS-300 to VS-300 cable or a 220-3449-02 VS-100 to VS-300 cable as needed. Cut back the insulation and the foil shielding on the VS-300 end of the cable as shown below in figure 4-13.

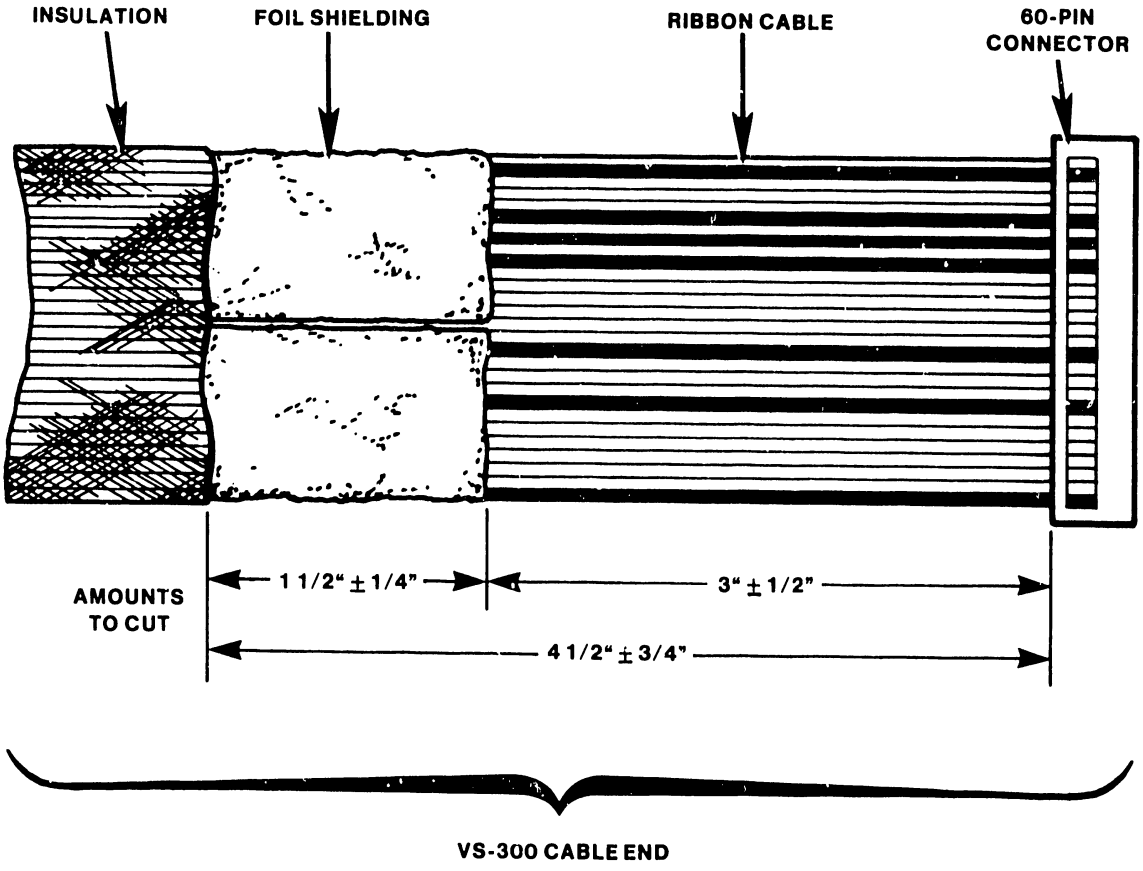


Figure 4-13. Constructing 220-3449 and 220-3449-02 Cable Ends

Attach the appropriate 60-pin cable to each rear panel assembly through the strain relief and plug the cable connector into the rear panel assembly connector. Figure 4-14 illustrates the cable connections for four VS systems on an RSF bus.

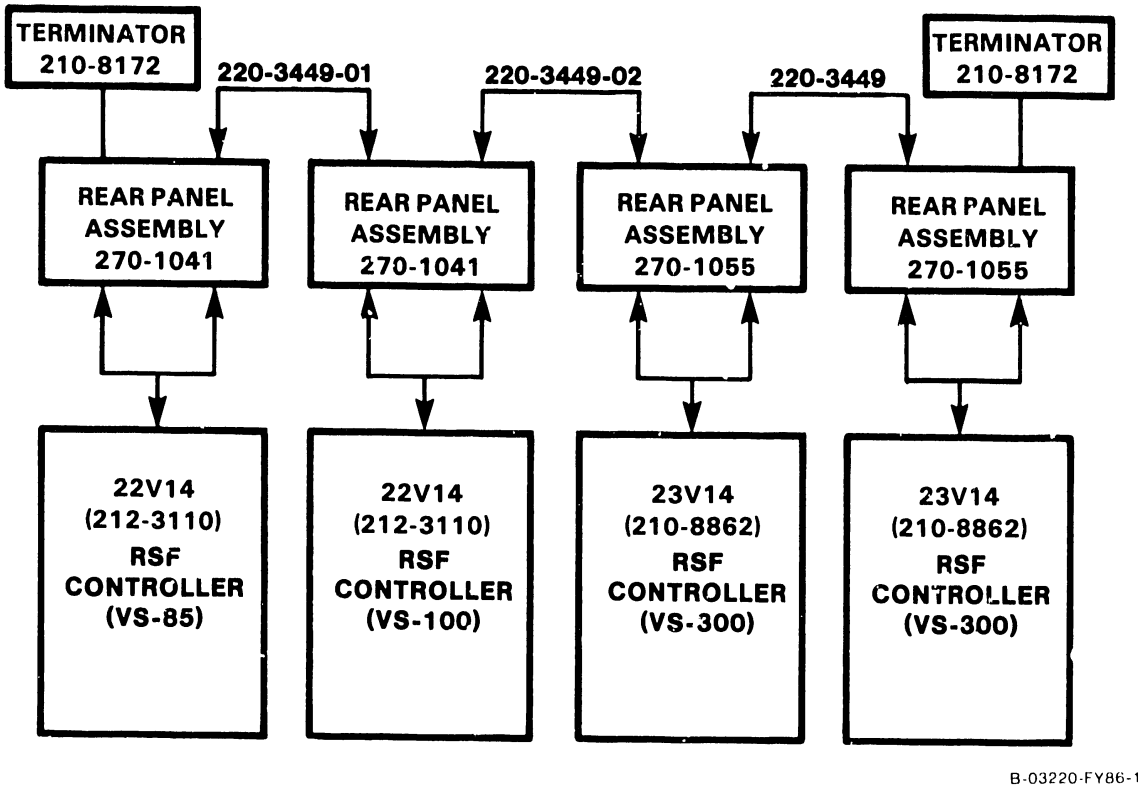


Figure 4-14. VS RSF Cable Connections

4.7 SYSTEM POWER UP

Power up all systems configured on the RSF bus according to the procedures described in the appropriate VS Product Maintenance Manual. As each system is powered on, the PROM-based BIT diagnostics will execute on each RSF board. Refer to Chapter 7. Ensure that the diagnostic LED on each VS-85/85-H/90/100 RSF Controller board lights at power up and then goes out, signalling the succesful conclusion of the diagnostics. If the diagnostic LED does not go out, the RSF Controller is defective and must be replaced. Once the BIT successfully concludes, the system enters the standby (offline) mode. This is indicated by the LED blinking slowly (once every three seconds). When the system is IPLed, the LED will turn OFF and remain OFF. For the VS-300, an error will cause a message to be displayed on workstation 0.

4.8 VOLTAGE CHECKS

Before attempting to use the VS RSF, check all system power supply voltages to ensure proper operation. Refer to the appropriate VS Product Maintenance Manual(s).

4.9 SYSTEM CONFIGURATION

IPL the system and run the program GENEDIT to configure each system on the VS RSF bus. For details, refer to the VS RSF User Guide (714-0133).

4.10 SYSTEM VERIFICATION

Before turning over the system to the customer, verify that the VS RSF is operating porperly by performing the following:

1. Power on and IPL all the systems connected to the RSF bus.

2. Ensure that the following two messages appear at the top of the Operator's Console screen on workstation 0 for each system:

   "■ Local RSF Link Enabled ..... hh:mm
   ■ Successful Connect to RSF ..... hh:mm"

3. From the Operator's Console, press PF Key 1 to go to the VS Command Processor screen.

4. Press PF Key 5 ("Manage FILES/LIBRARIES").

5. Mounted volumes on the remote systems will appear in the list of disk volumes with the letter "R" (remote) next to them. This indicates that the system has been successfully attached to the RSF bus and that communication with the other systems (indicated by the remote system volume names) on the bus is now possible.

CHAPTER 5

MAINTENANCE

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MAINTENANCE

5.1 GENERAL

This chapter contains information on the corrective and preventive maintenance of the VS 22V14/23V14 RSF Controller. Included in this chapter are procedures for adjustments and removal and replacement of field replaceable units (FRUs).

5.2 PREVENTIVE MAINTENANCE

There is no required preventive maintenance for the VS RSF Controller.

5.3 ADJUSTMENT PROCEDURES

There are no adjustments required for the VS RSF Controller.

5.4 CORRECTIVE MAINTENANCE

Corrective Maintenance for the VS RSF Controller consists of removal and and replacement of defective parts.

5.4.1 TOOLS AND EQUIPMENT

No special tools or equipment are required to repair the VS RSF Controller. A standard tool kit is all that is necessary.

5.4.2 212-3110/210-8862 CONTROLLER BOARD REMOVAL AND REPLACEMENT

1. Power down the system. Refer to the appropriate VS manual.

2. For the VS-85/85-H/90/100, remove the top cover. For the VS-300, open the mainframe door and remove the black card cage cover. Refer to the appropriate VS manual.

3. Disconnect the 60-pin cable from the RSF controller board connector J1 (VS-85/85-H/90/100) or J2 (VS-300). Refer to figures 5-1 and 5-2.

4. Remove the controller board from the card cage. Refer to the appropriate VS manual for procedure.

5. Before replacing the controller board, ensure that the switch settings on the new board are correct. Refer to paragraph 4.6.2.

6. To replace the controller board, reverse the removal procedure. Ensure that the board is seated firmly in the motherboard connectors and the 60-pin cable is reconnected properly.

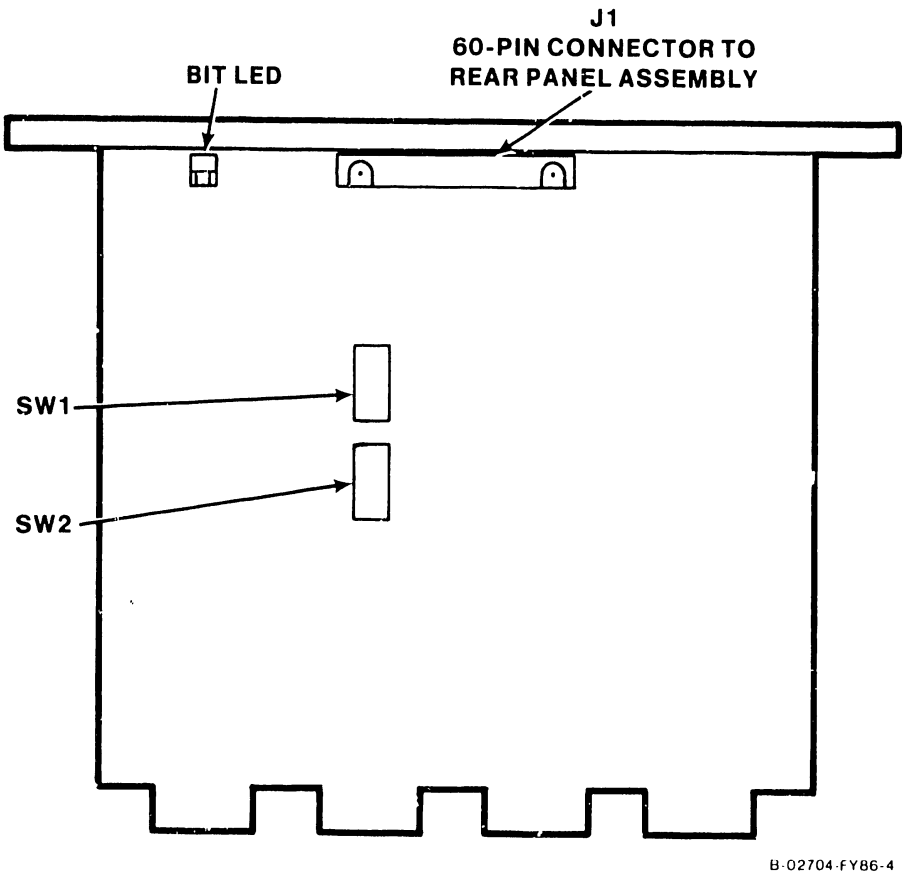

Figure 5-1. 212-3110 VS-85/85-H/90/100 22V14 RSF Controller Assembly (Device Adapter Side)

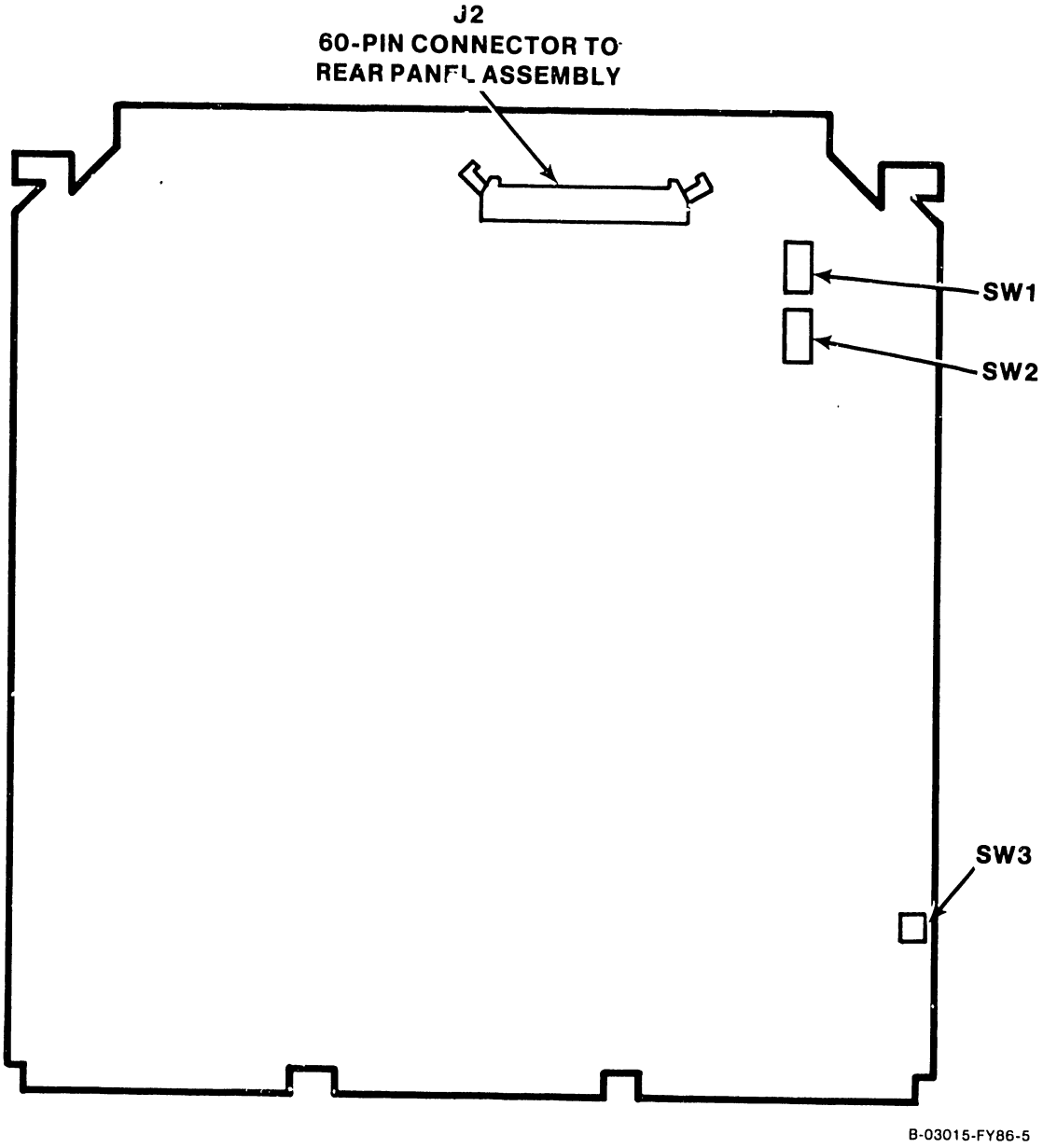

Figure 5-2. 210-8862 VS-300 23V14 RSF Controller

5.4.3 RSF REAR PANEL ASSEMBLY REMOVAL AND REPLACEMENT

1. Power down the system. Refer to the appropriate VS manual.
2. For the VS-85/85-H/90/100, remove the top cover. For the VS-300, open the mainframe door Refer to the appropriate VS manual.
3. Disconnect the internal cable from J1 (VS-85/85-H/90/100) or J2 (VS-300) on the RSF controller board.
4. Disconnect the external cable(s) from the rear panel.
5. Remove and save the hardware that secures the RSF rear panel assembly to the mainframe. Remove the rear panel. Refer to figure 5-3.
6. To replace the rear panel assembly, reverse the removal procedure.
7. Ensure that the terminator board is installed in the rear panel assembly, if necessary.

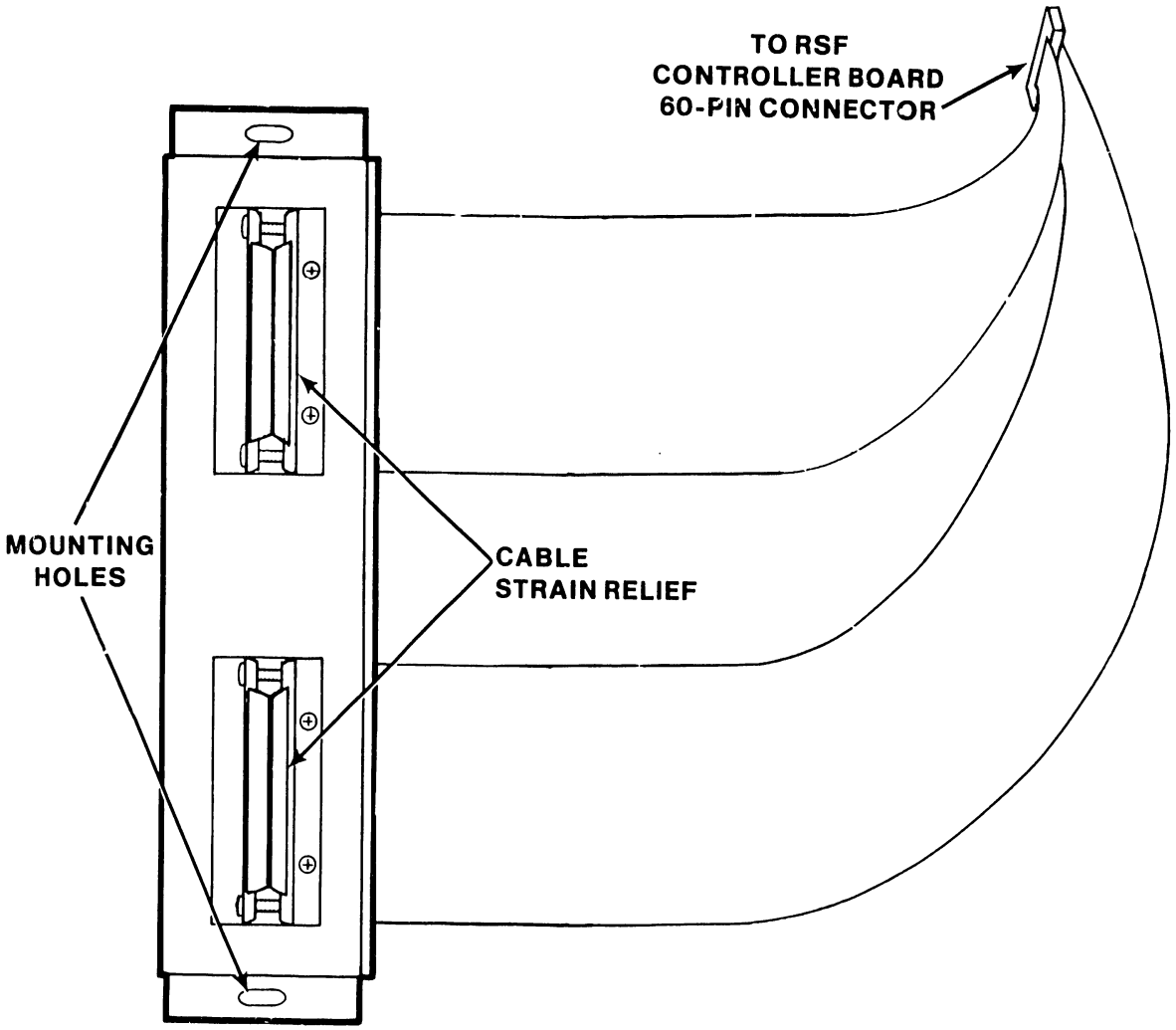

Figure 5-3. VS RSF Rear Panel Assembly Removal

5.4.4 RSF TERMINATOR BOARD REMOVAL AND REPLACEMENT

1. Power down the system. Refer to the appropriate VS manual.

2. For the VS-85/85-H/90/100, remove the top cover. For the VS-300, open the mainframe door. Refer to the appropriate VS manual.

3. Remove the rear panel assembly from the mainframe. Refer to paragraph 5.4.3.

4. Remove the nut that secures the ground wire to the lug on the rear panel. Remove the terminator board from the rear panel assembly connector. Refer to figure 5-4.

5. To replace the RSF terminator board, reverse the removal procedure.

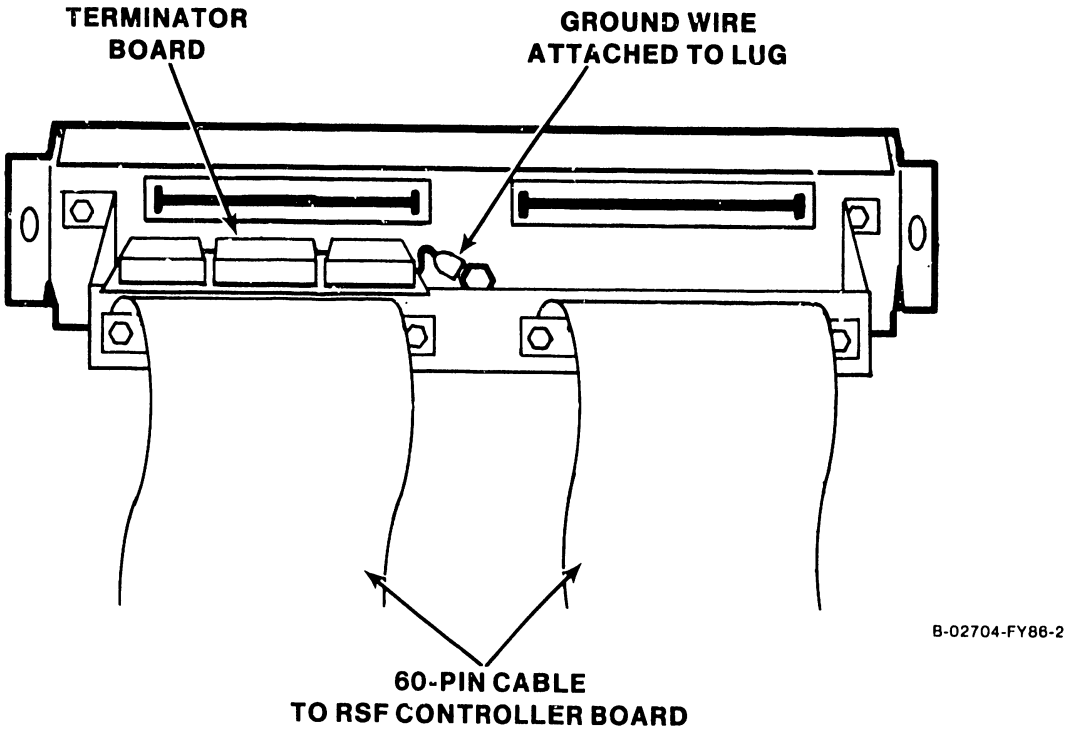

Figure 5-4. VS RSF Terminator Board Removal

CHAPTER 6

ILLUSTRATED PARTS BREAKDOWN

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CHAPTER 6

ILLUSTRATED PARTS BREAKDOWN

6.1 GENERAL

This chapter contains the illustrated parts breakdown (IPB) for the Wang VS 22V14/23V14 Resource Sharing Facility (RSF). The IPB consists of line art drawings of major assemblies, subassemblies, and parts with identifying callouts. In addition, Table 6-1 provides a list of all field-replaceable units (FRUs) for the VS-85/85-H/90/100/300 RSF.

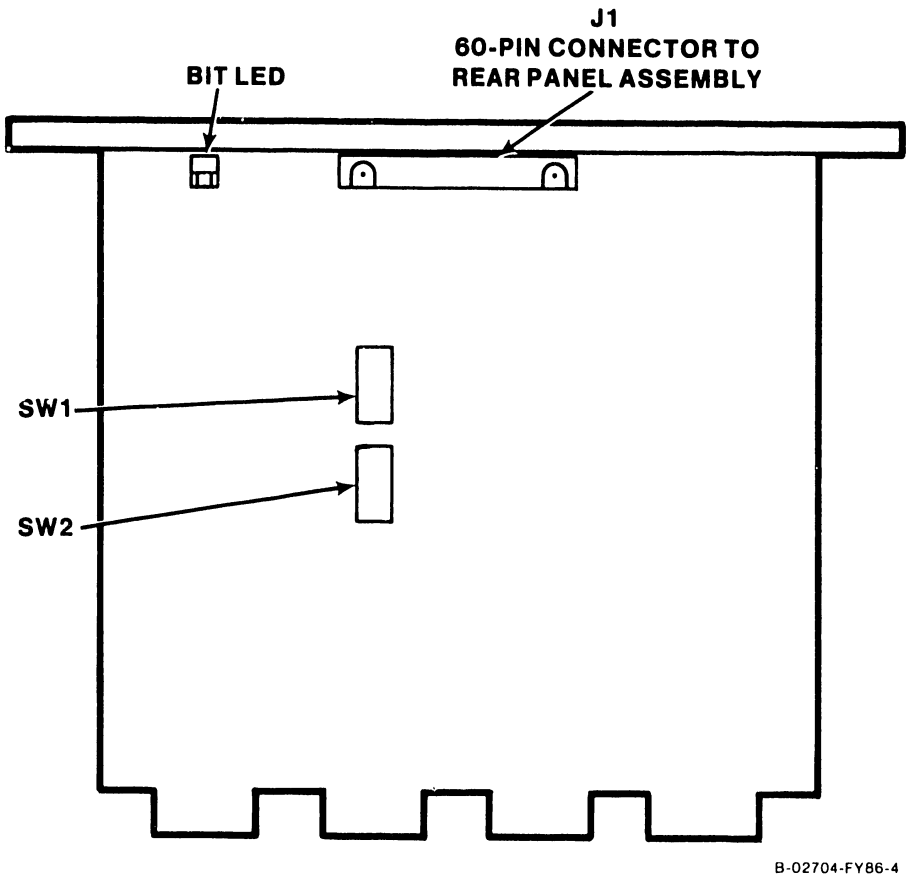

Figure 6-1. 212-3110 VS-85/85-H/90/100 22V14 RSF Controller
(Device Adapter Side)

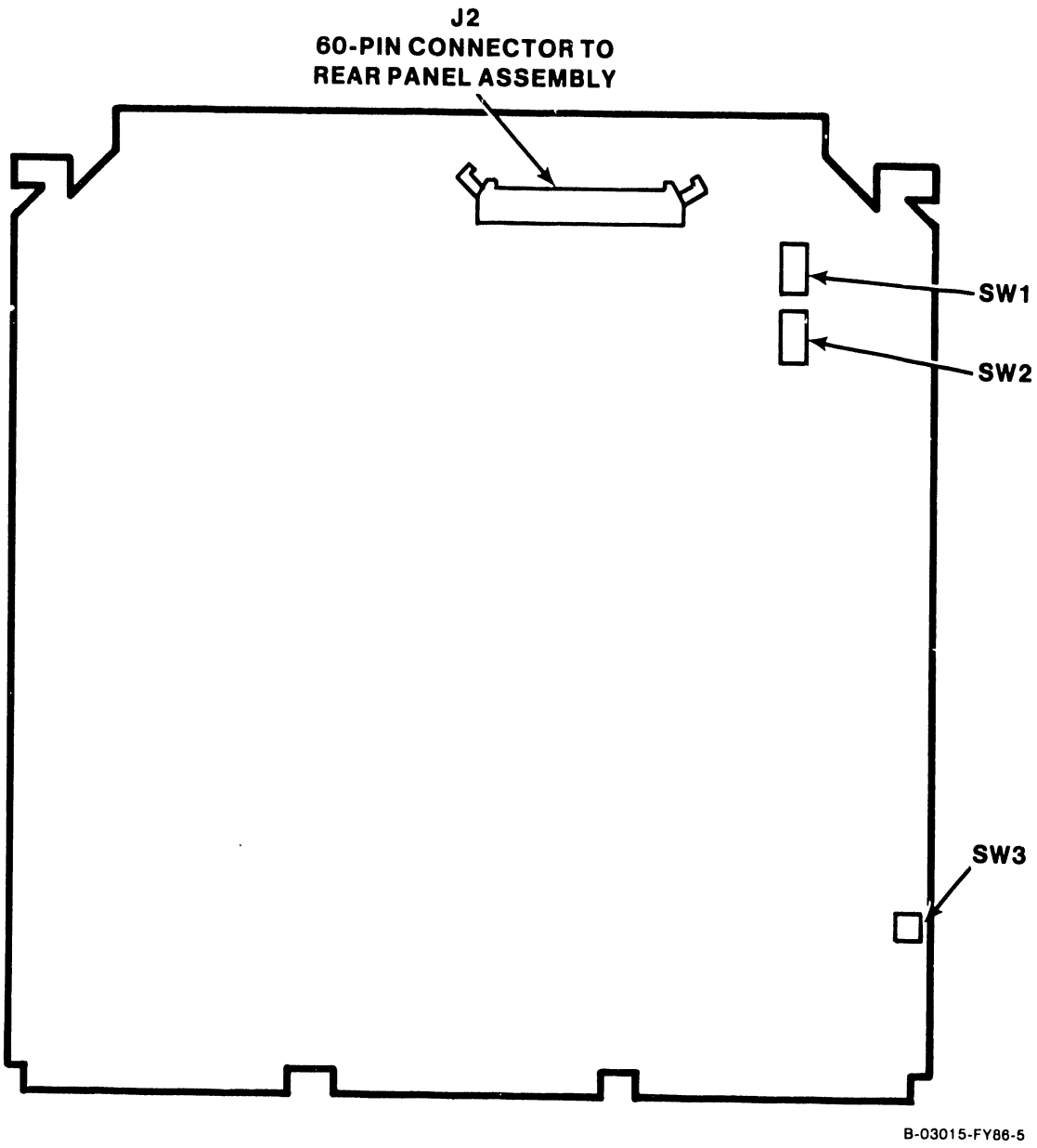

Figure 6-2. 210-8862 VS-300 23V14 RSF Controller

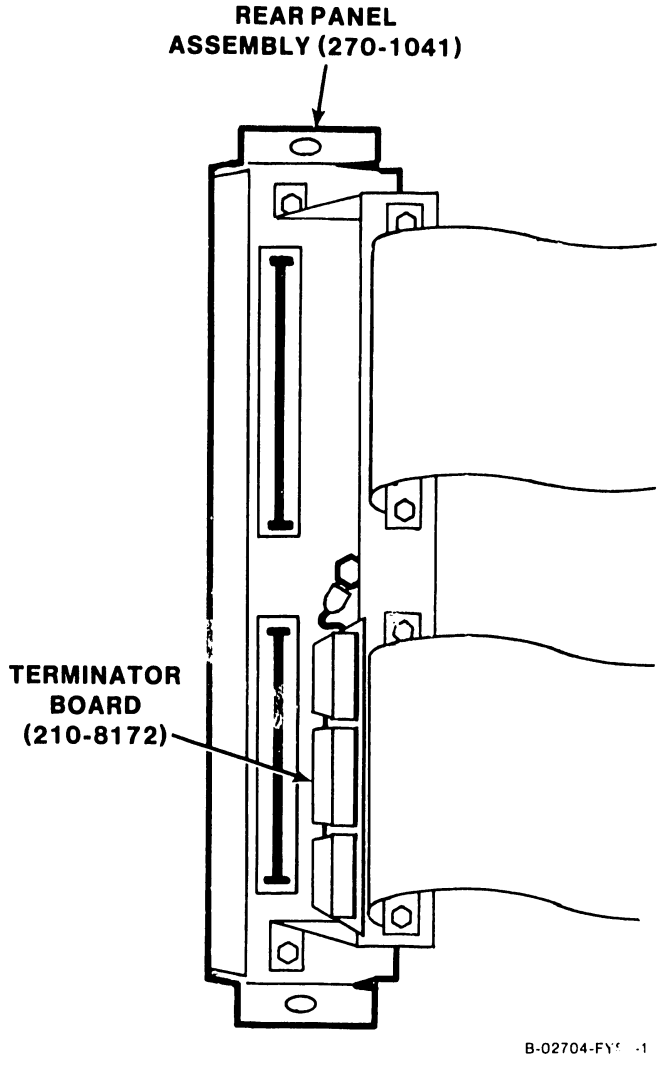

Figure 6-3. 270-1041 VS-85/85-H/90/100 RSF Rear Panel Assembly

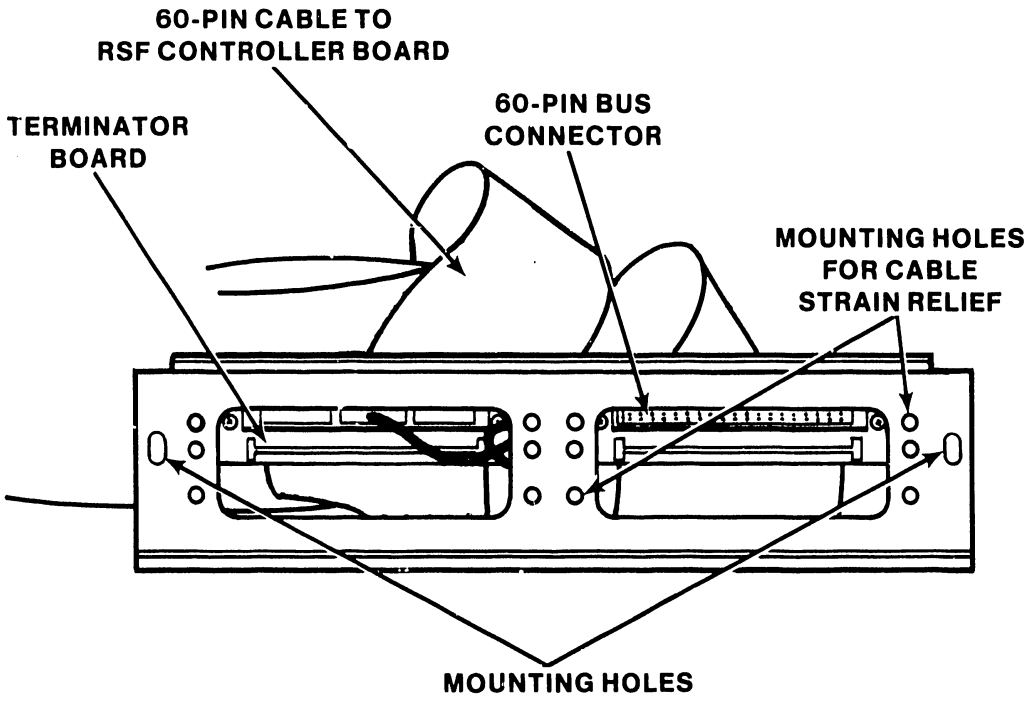

Figure 6-4. 270-1055 VS-300 RSF Rear Panel Assembly

6.2 RSF FIELD-REPLACEABLE UNITS

Table 6-1 below lists the field-replaceable units (FRUs) for the VS RSF Controller along with a description of each FRU and the FRU type. Use this list when ordering replacement parts for the RSF Controller.

Table 6-1. VS RSF Field-replaceable Units

PART NUMBER	DESCRIPTION	FRU
210-8172	Terminator Board	PCA
210-8862	VS-300 23V14 RSF Controller	PCA
212-3110	VS-85/85-H/90/100 RSF 22V14 Controller	PCA
220-3449*	VS-300 to VS-300 60-pin Ribbon Cable (40 ft)	CBL
220-3449-01	VS-100 to VS-100 60-pin Ribbon Cable (40 ft)	CBL
220-3449-02*	VS-100 to VS-300 60-pin Ribbon Cable (40 ft)	CBL
270-1041	VS-85/85-H/90/100 RSF Rear Panel Assembly	ASSY
270-1055	VS-300 RSF Rear Panel Assembly	ASSY

* To be constructed on site by CEs, by cutting back insulation on a standard 220-3449-01 VS-100 to VS-100 cable. Refer to paragraph 4.6.

CHAPTER 7

TROUBLESHOOTING

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CHAPTER 7

TROUBLESHOOTING

7.1 GENERAL

VS RSF utilizes a built-in test (BIT) to detect malfunctions in the 22V14 input/output processor (IOP) or 23V14 input/output controller (IOC). The BIT test is invoked, at power up or whenever the IOP/IOC detects a system initialization. The VS-300 BIT can also be invoked by executing the I/O BIT Monitor in the Diagnostic Control System (DCS).

7.2 BUILT-IN TEST

The VS RSF BIT is a PROM-based diagnostic program which verifies that both the IOC/IOP and the device adapter sections of the RSF board are functional, and that the board can run in a system. The BIT is automatically initiated at system power. In the VS-85/85-H/90/100, the BIT is invoked whenever the IOP powers up or detects system initialization. In the VS-300, the BIT is activated at system power up via support control unit (SCU) commands as part of the confidence test, or by the off-line diagnostic control system (DCS). Refer to VS-300 Product Maintenance Manual.

7.2.1 HARDWARE TESTED

The BIT checks to see if all major circuitry contained on the IOP/IOC is operable. This includes EPROM, interrupt controller, and all RAM. In addition, all testable circuitry related to DMA and data transfer operations is tested.

7.2.2 BIT OPERATION

The RSF BIT can execute in two modes of operation depending upon the position of the diagnostic switches on the RSF controller board.

7.2.2.1 VS-85/85-H/90/100 BIT Operation

In the VS-85/85-H/90/100, the BIT can run in one of two modes: in-system mode and stand-alone mode. The mode is determined by the position of switch 3 of SW2 on the RSF device adapter board, and is dependent upon the system configuration. Refer to figure 7-1 below.

In the in-system mode (more than one RSF controller on the bus), switch 3 of SW2 must be in the OFF (left) position. The diagnostic LED on the RSF controller board will light while the BIT is executing and will turn off at its successful conclusion. If the LED remains ON, an error has occurred, the board is defective, and it must be replaced. Note that the LED will blink slowly (once every three seconds) until the system is IPLed.

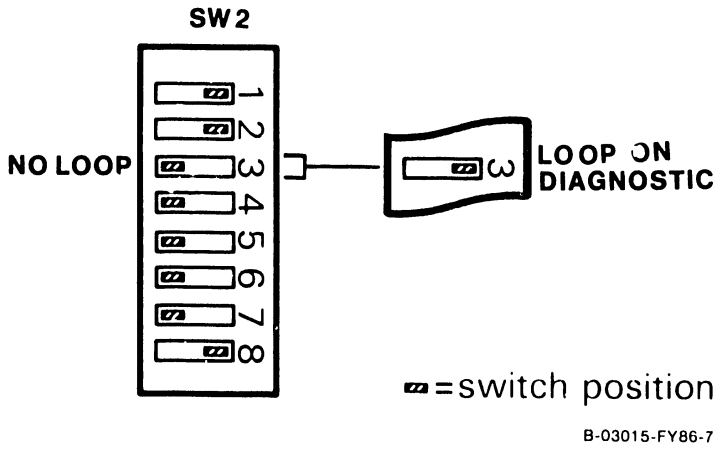

Figure 7-1. VS-85/85-H/90/100 BIT Diagnostic Switch Settings

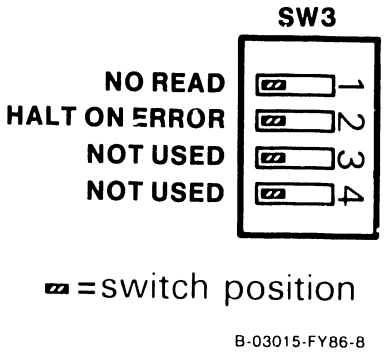

Figure 7-2. VS-300 BIT Diagnostic Switch Settings

In the stand-alone mode (terminator board connected to RSF board connector J1), switch 3 of SW2 must be in the ON (right) position. The diagnostic LED will alternately light and turn off at each pass of the BIT. The BIT will run continuously until an error occurs. If an error occurs, the BIT will halt and the LED will stay ON, and the board must be replaced.

7.2.2.2 VS-300 BIT Operation

In the VS-300, all switches must be in the OFF position for normal BIT operation. Refer to figure 7-2 above. The VS-300 RSF controller must be either cabled in a normal configuration or terminated.

For normal power up, the BIT executes once (along with all of the other IOC BITs) during the confidence test. Refer to the VS-300 Product Maintenance Manual. If the RSF BIT encounters a fault, an error message is displayed, and the RSF IOC must be replaced.

The VS-300 RSF BIT can also be invoked via the DCS menu. To access the DCS, perform the following:

1. Turn the keyswitch to the "Remote Service" position.

2. Go to System Console screen. Refer to VS-300 manual.

3. Enter the following password:

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

4. Press PF key 4 to enter off-line diagnostics. The Diagnostics Disclaimer screen appears.

5. Press EXEC. The DCS menu is displayed.

6. Using the SPACEBAR, position cursor next to "I/O BIT Monitor." Press INSERT to select the diagnostic and EXEC to begin execution.

7. All BITs run automatically.

APPENDIX
A

APPENDIX A

ACRONYMS AND ABBREVIATIONS

A.1 GENERAL

This appendix provides the acronyms and abbreviations, and their definition, used in this manual.

ACRONYM/ABBREVIATION	DEFINITION
ASSY	Assembly
BA	Bus adapter
BIT	Built-in test
CBL	Cable
CPU	Central processing unit
DA	Device adapter
DCS	Diagnostic control system
DIP	Dual in-line package
DMA	Direct memory access
E REV	Electrical revision
EPROM	Erasable programmable read only memory
EXEC	Execute key
FRU	Field-replaceable unit
I/O	Input/output
IOC	Input/ouput controller
IOP	Input/ouput processor
IPB	Illustrated parts breakdown
IPC	Interprocessor communication
IPL	Initial program load
KB	Kilobyte
LED	Light-emitting diode
MB	Megabyte
OS	Operating system
PCA	Printed circuit assembly
PF key	Program function key
PROM	Programmable read only memory
RAM	Random access memory
RSF	Resource sharing facility
SCU	Support control unit
SIP	Single in-line package
SW	Switch
V	Volts
VS	Virtual storage
WLI P/N	Wang Laboratories, Incorporated part number
XCLK	Bus clock
°C	Degrees Celsius
°F	Degrees Fahrenheit
dc	Direct current
ft	Feet
i.e.	That is
ns	Nanoseconds

APPENDIX
B

APPENDIX B

DIAGNOSTIC ERROR CODES

B.1 GENERAL

This appendix contains the error codes that may be encountered when running the VS RSF diagnostics.

B.2 VS-300 BUILT-IN TEST (BIT) ERROR CODES

If any of the error codes listed below (except 00FFH) is displayed by the I/O BIT Monitor, the RSF controller is defective and must be replaced.

ERROR CODE	ERROR NAME
Basic I/O Controller Test Error Codes	
06H	PROM checksum error
11-19H	RAM test error
21H	Self-test error
23, 24H	BSR test error
27H	IPC test error
29H	8259a test error
2BH	OR register test error
2DH	Main memory test error
E1-E2H	IPC failure
F1-F2H	Main memory access failure
D1-D7H	Main memory access failure
RSF Device Adapter Error Codes	
30H-33H	Reset error
35H-36H	DMA counter error
40H-41H	Transmit counter error
50H-5EH	Sequence error
70H-7FH	Data transmit error
80H-85H	ACK/NAK error
86H-8BH	Transmit data parity error
90H-93H	Device ready error
95H-98H	Device ID compare error
A0H-A2H	Sequencer clock error
E3H-E6H	DMA test error
Test Complete Code	
00FFH	Testing done, no errors detected
FFFFH	IOC did not respond
0029H	Unable to send an IPC

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