WANG

7300

2200/VS LOCAL COMMUNICATIONS OPTION

Models:

2258-3
2258-5
2258-9

Customer Engineering
Product Maintenance Manual

741-1723

COMPANY CONFIDENTIAL

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PREFACE

This document is the Product Maintenance Manual (PMM) for the Wang 2200/VS Local Communications Option. 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 2200/VS Local Communications Option. The manual will be updated on a regular schedule or as necessary. Such updates will be published either as Publication Update Bulletins (PUBs) or as full revisions.

First Edition (October, 1986)

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

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1.1 GENERAL

This manual describes the procedures for installation, interconnection, operation, theory, and specifications for the 2200/VS Local Communications Option (Model 2258).

1.2 DESCRIPTION

The 2200/VS Local Communications Option (Model 2258) consists of a single printed circuit assembly (PCA) 210-8576 that resides in the 2200 series MVP, LVP, or Micro VP systems. This PCA provides a link between the 2200 and Wang 928-type systems (i.e., VS) via a dual coaxial cable.

The 2200 series system views the link as a 2200-type peripheral, the 928-type system views the link as a standard workstation on the 928 master with all data transactions initiated by the 2200 system.

The 2200 will enable the link after power-on diagnostics have determined the 2258 hardware is functioning properly. Once enabled, the 928-type master will recognize the link and Initial Program Loads (IPLs) the link with the appropriate software.

Model 2258 option enables the 2200 systems to benefit from VS facilities by making it possible for 2200 system users to:

- Access Data Management Systems (DMS) on the VS
- Emulate VS Workstations
- Utilize the storage facilities on the VS (VDISK)

Three option models are available. All hardware including a 25 foot coaxial cable to connect the 2200 system to the VS, and an auto-enclosure that includes 2200 and VS software, documentation and four VS workstation function strips are included with the 2200 Local Communications option. The option models are defined as follows:

NOTES

1) The dash number following the model number denotes 2200 software media type included with that option.

2) All models include one 5-1/4 and one 8-inch VS diskette that contains VS microcode files (2200SRV and @2258MWS).

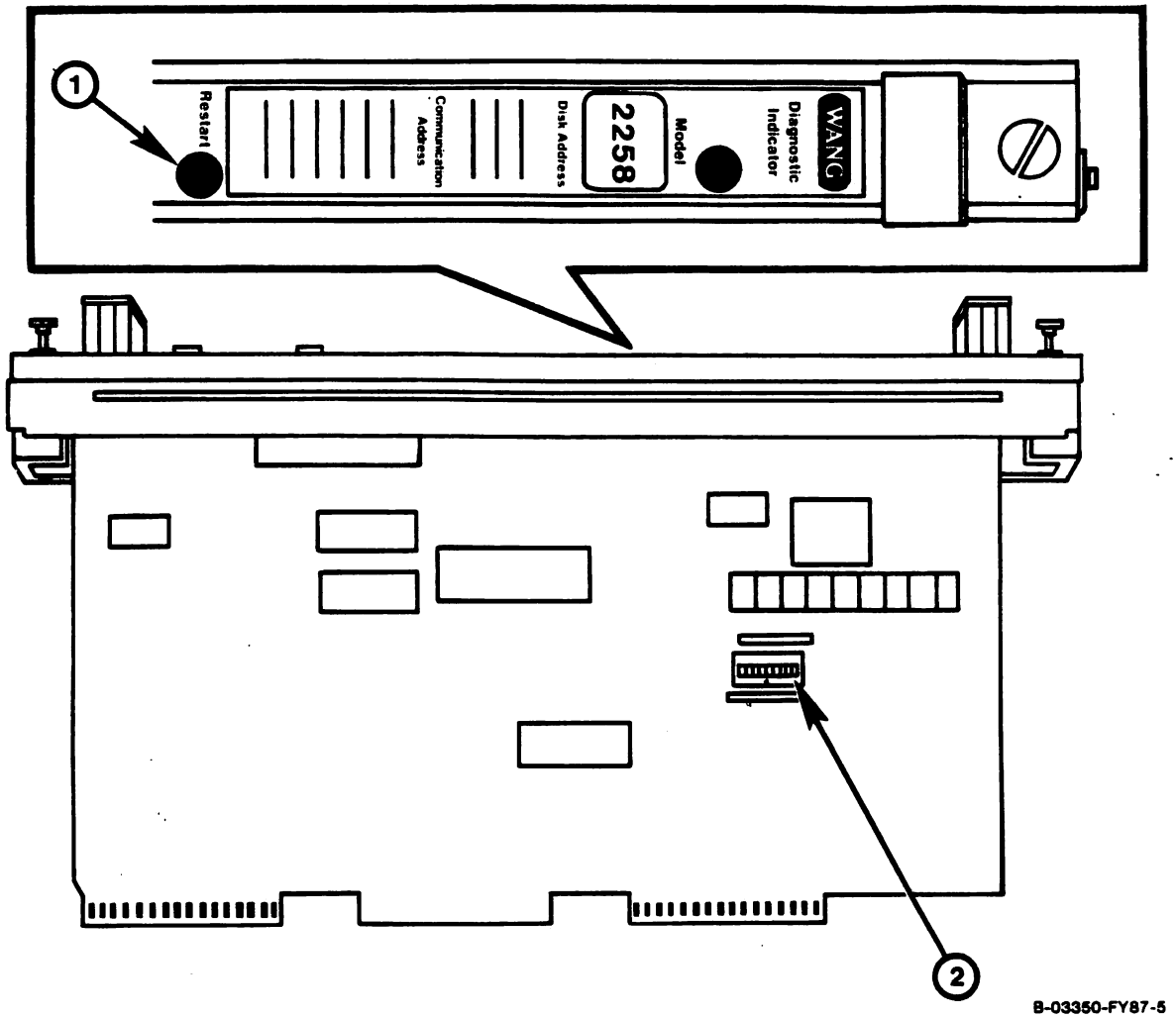
- 2258-3 2200/VS Local Communications Option, 8 inch diskette (SSSD)
- 2258-5 2200/VS Local Communications Option, 8 inch diskette (DSDD)
- 2258-9 2200/VS Local Communications Option, 5-1/4 inch diskette (DSDD)

1.3 CONTROLS AND INDICATORS

1.3.1 2200/VS LOCAL COMMUNICATIONS OPTION PCA CONTROLS

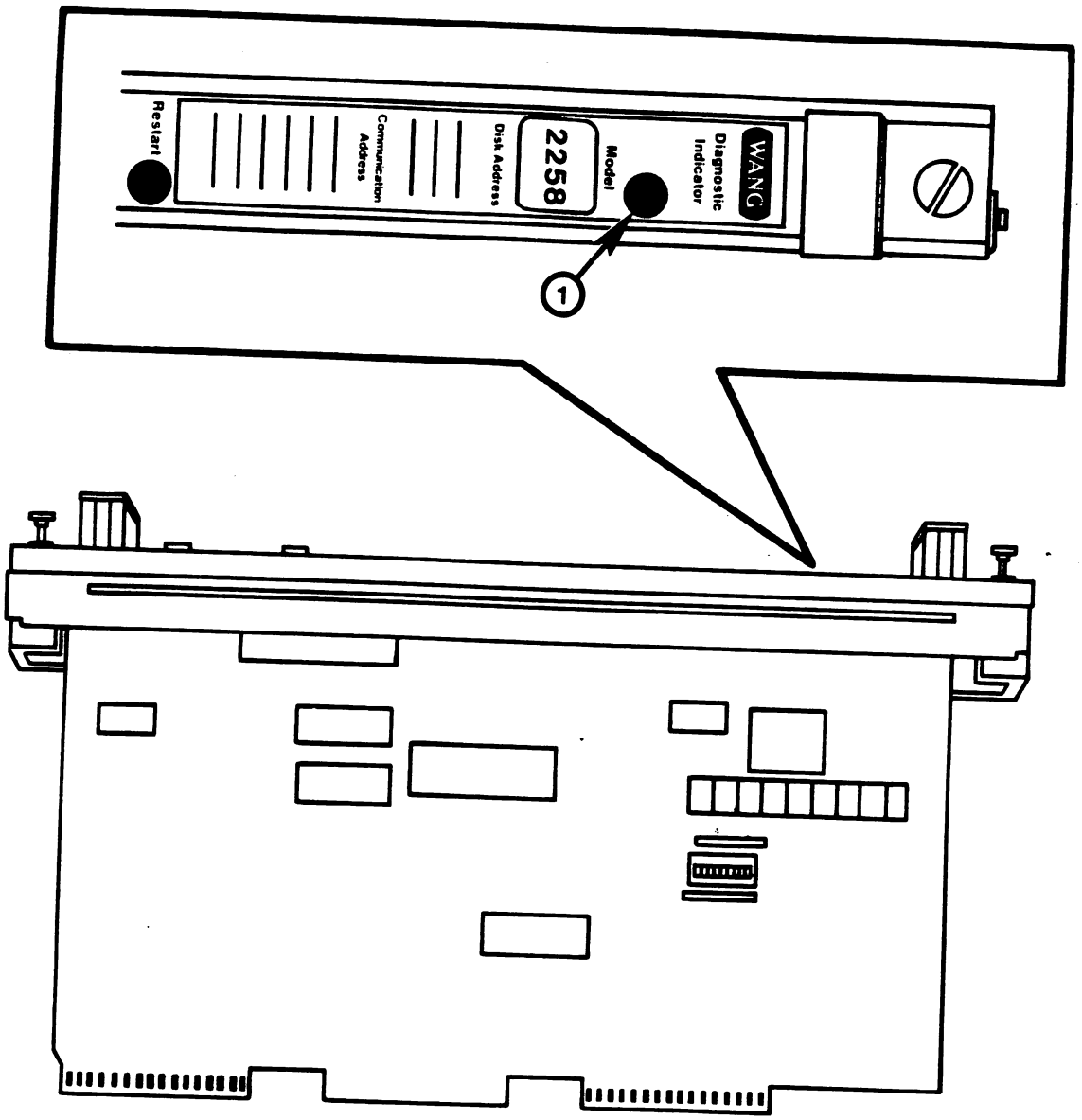
NOTE

Early PCA revisions do not contain the Restart pushbutton.



Item	Name	Type and Function
1	Restart Switch	Recessed pushbutton switch; When pressed clears the 2258 PCA and generates a software power-up reset.
2	Communication/ Disk Address Select Switch SW1	Rocker-type 8-bit switch bank; sets communications address and disk address. Sw1 and Sw2 selects disk address, Sw3-Sw8 selects communications address.

1.3.2 2200/VS LOCAL COMMUNICATIONS OPTION PCA INDICATORS



B-03360-FY87-4

Item	Name	Type and Function
1	Diagnostic Indicator	LED; Red, Illuminates when system is powered-on and BIT test is running and during normal operation denoting parity error. Reference paragraph 1.9.4.

1.4 OPERATION

The section on operation provides information pertaining to 2200/VS Local Communications operation. Refer to paragraph 1.9 Installation for information pertaining to hardware installation/cabling and software installation (2200 system and VS system).

Power-on the 2200 system (refer to the appropriate 2200 series maintenance manual for system being used). The 2258 Option PCA BIT LED will illuminate and after 8-10 seconds will extinguish, thus denoting the 2258 Option completed a successful power-up. At this time, the 2200 system can be used in the native 2200 mode or can be linked to the VS to perform VS services. Perform the following:

1.4.1 LOGGING ONTO THE VS AS A DP USER

Various ways of loading software are available (i.e. Menu picks etc.) for 2200 systems. Software loading from the disk drive is used for this writing. Perform the following to log onto the VS system as a DP User.

NOTE

When the 2200 system is emulating a VS workstation via 2258 Emulation, 2200 Special Function Keys (denoted SF) are mapped as VS workstation Program Function (denoted PF) Keys. Refer to Table 1-1 Workstation Key definitions.

1) Insert the 2200 LCO Software diskette into the disk drive. Type in 'SELECT DISK □□□ (where □□□ = Disk Address)' and press 'LOAD', 'RUN', and 'RETURN'.

2) When the software is successfully loaded, the VS Services menu (figure 1-1) will be displayed. Note menu picks followed by an asterisk are displayed on Terminal 1, Operators Console Only. Select Emulate VS Workstation Option and press 'RUN' key.

***** VS SERVICES *****

Select an item with SPACE & BACKSPACE. Partition x, xxK
Key RUN to execute, CLEAR or PREV SCRN for previous screen. Terminal 1

- ■ Emulate VS workstation
- _ Attach DMS/VDISK*
- _ Detach DMS/VDISK*
- _ Change VDISK configuration*
- _ View DMS/VDISK status
- _ Edit VDISK configuration file
- _ Create VDISK
- _ Delete VDISK*

Figure 1-1. VS Services Menu

3) The Emulate VS Workstation Screen is displayed (figure 1-2). On this screen, enter the desired communications controller address (section 1.9.4.2) and press EXEC/RUN.

```
***** EMULATE VS WORKSTATION *****
(c) Copyright Wang Laboratories Inc. 1986
Revision #.##

Enter Communications Address of desired 2258 Controller: 07C

                    EXEC/RUN - Emulate VS Workstation
                  CANCEL/EDIT - Exit
```

Figure 1-2. 2258 Controller Communications Address Screen

4) The VS Logon screen will be displayed (figure 1-3). Enter a valid user id and password in the appropriate fields and press 'RETURN'. The Command Processor Screen will be displayed (figure 1-4).

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

Workstation x              2:12 PM        Tuesday August 22, 1986

                    Hello new user
                    Welcome to ▯▯▯▯

Please identify yourself by supplying the following information

                    Your userid   = ■■■
                    Your password = ■■■■■■

                    and press (ENTER) to Logon

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

Figure 1-3. VS Logon Screen

NOTE

When VS Logon is accepted, 2200 DE and DW keyboards are mapped as VS workstation keyboards. A VS function strip (part number 615-0403) should be installed on the 2200 keyboard which provides the VS function key numbers (1-32). General VS keys and cursor control keys mapping are as follows:

Table 1. Workstation Keys Definition

2200 DE/DW General Keys

VS Function/key	2200 DE/DW Key
HELP	CONTINUE key
EXIT	EDIT key

2200 DE Cursor Control Keys

Cursor Function	2200 DE Key
Cursor Down	SF 21
Cursor UP	SF 22
DELETE	SF 25
INSERT	SF 26
Cursor Right	SF 28
Cursor Left	SF 29

```
*** WANG VS COMMAND PROCESSOR ***

Workstation x Ready          11:32 PM          Monday August 22, 1985

                          Hello
                  Welcome to the Wang VS

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

        Use function keys to select a command:

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

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

Figure 1-4. Command Processor Menu

5) When the VS Command Processor Menu screen is displayed, the 2200 system is emulating a VS workstation. At this point, the operator selects the desired VS command/function.

NOTE

No VS program or function that downloads microcode to the workstation can be run (i.e. VS Word Processing).

1.4.2 EXITING VS EMULATION

1) When the VS session is completed, log off the VS and press 'CANCEL/EDIT' key. The 'Exit From Emulation' screen will be displayed (figure 1-5).

***** EXIT FROM EMULATION MENU *****

Select Item with SPACE & BACKSPACE Partition x,xxK
Key RUN to execute, CLEAR or PREV SCRN for previous screen. Terminal x

- Resume Workstation Emulation
- Suspend Workstation Emulation
- Terminate Workstation Emulation

Figure 1-5. Exit From Emulation Screen

2) 'Exit From Emulation' menu provides three menu pick options; Resume Workstation Emulation, Suspend Workstation Emulation, and Terminate Workstation Emulation. Each menu pick is discussed below.

Resume Workstation Emulation

Resume Workstation Emulation allows the operator to resume emulation. Position the acceptance block to select Resume Workstation Emulation and press 'RUN'. In the event the operator did not log off the VS, the Command Processor screen is displayed. If the operator logged off the VS, the VS Log On Screen is displayed. Enter a valid user id and password to return to the Command Processor screen.

Suspend Workstation Emulation

Suspend Workstation Emulation enables the operator to suspend VS emulation, perform native 2200 functions and return to VS emulation at a later time. To perform this function, position the acceptance block to select Suspend Workstation Emulation and press 'RUN'. The VS Services menu will be displayed. Select the desired 2200 function(s) and perform the 2200 operation.

To return to the VS emulation session, select Emulate VS Workstation and press 'RUN'. The Emulate VS Workstation screen will be displayed. Enter the same communications address previously used and press 'EXEC/RUN'. The Active Emulation Found Screen will be displayed (figure 1-6).

```
***** ACTIVE EMULATION FOUND MENU *****

Select Item with SPACE & BACKSPACE                    Partition x,xxK
Key RUN to execute, CLEAR or PREV SCRN for previous screen.  Terminal x

                  _ Return to VS Services Menu
                  _ Resume Workstation Emulation
                  _ Terminate Workstation Emulation
```

Figure 1-6. Active Emulation Found Screen

This screen is similar in function to the 'Exit from Emulation' screen with this screen being displayed when the VS contains a 2258 emulation session that was not terminated (Suspended) prior to exiting VS mode. From this screen select 'Resume Workstation Emulation' which causes the VS Command Processor Screen to be displayed or if you are logged off, the VS Logon Screen will be displayed.

Terminate Workstation Emulation option allows the user to terminate the VS session and return to the VS Services Menu.

Return to VS Services Menu will return you to the VS Services Menu.

Terminate Workstation Emulation

Workstation emulation can be terminated at two different points in the emulation software; 'Active Emulation Found Menu' and 'Exit From Emulation' menu. When Terminate Workstation Emulation is selected, the VS Services menu will be displayed, thus allowing 2200 operations to be performed.

To terminate workstation emulation from the 'Active Emulation Found' screen perform the following:

a) Log off from the VS system.
b) Select 'Terminate Workstation Emulation' and press 'RUN' key.

To terminate workstation emulation from the 'Exit From Emulation' menu, perform the following:

a) Log Off from the VS System.
b) Press 'CANCEL/EDIT' key to display the 'Exit From Emulation' menu.
c) Select 'Terminate Workstation Emulation' and press the 'RUN' key.

1.4.3 DMS/VDISK OPERATION

This section provides an overview of DMS and VDISK functionality offered by the 2200/VS Local Communications Option. The following paragraphs describe the functions accessible from the VS Services menu and provides a brief explanation of the required user inputs. For a detailed discussion of these functions and their operation, refer to the 2200/VS LCO User's Guide.

1.4.3.1 Attach DMS/VDISK

Attach DMS/VDISK menu pick is available at the operators console (terminal 1) only. Selecting this function allows the user to Log-On to the VS and run the 2200SRV Utility. The 2200SRV Utility is the interface between the 2200 software and the VS. During the attach process, a link is established from the 2258 controller to the VS and the user defined VDISK configuration file is activated. Perform the following to ATTACH to the VS for DMS/VDISK operation.

NOTE

Configuration files are created using the EDIT VDISK CONFIG FILE function.

1) Select 'Attach DMS/VDISK' on VS Services menu and press 'RUN' (figure 1-7).

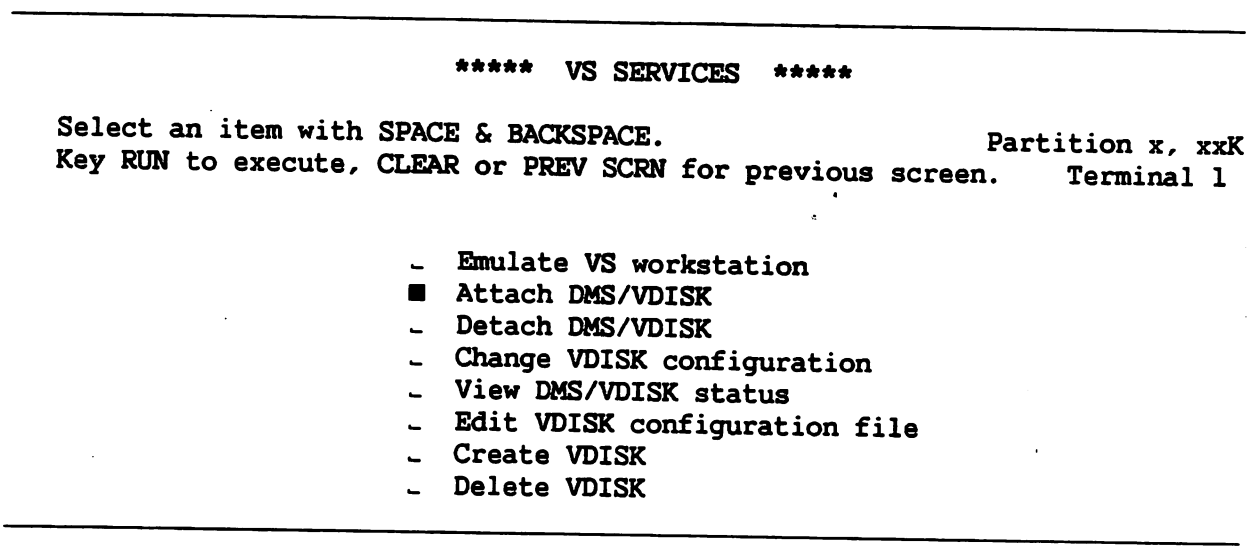


Figure 1-7. VS Services Menu

2) The 'Emulate VS Workstation' screen will be displayed. Enter the communication address of the 2258 controller you wish to attach to the VS and press 'RETURN'.

3) The 'WANG VS LOGON' Screen will be displayed. Enter a valid user id and password and press 'RETURN'.

4) The 'WANG VS COMMAND PROCESSOR' will be displayed. Press PF5 (Manage Files/Libraries) and check Library @SYSTEM@ on the system volume to verify that the program 2200SRV is resident. If not, locate the volume and library that contains the program. Return to the Command Processor Screen.

5) Press PF1 (Run program or procedure) to run a procedure. The 'RUN' screen will be displayed (figure 1-8). Enter the program name, library, and volume name in the designated fields and press 'RETURN'. (Note for the example, the program 2200SRV is in library @SYSTEM@ on volume SYSTEM.)

```
                          *** RUN ***

Supply the name of the Program
(or Procedure) to be Executed
and Press (ENTER):                          PROGRAM = 2200SRV

Options -

  Designate a User Library Which
  Includes Programs (or Procedures)
  to be Used During This Run:
                                            LIBRARY = @SYSTEM@
                                            VOLUME  = SYSTEM

    or Press (1) to Load Program for Interactive Debug

     Press (HELP) to return to the Command  Processor
```

Figure 1-8. The VS RUN Screen

6) The WANG 2200/VS SERVER UTILITY screen should now be displayed indicating the 2200SRV is running (figure 1-9).

```
   *** Wang 2200/VS Server Utility  - 2200SRV Version #.##.##  ***

                    --- 2200SRV Running ---

     Press CANCEL/EDIT to enter 2200 File Server
     Exit: Press (PF16) to terminate the File Server
```

Figure 1-9. The Wang 2200/VS Server Utility Screen

7) Press 'CANCEL/EDIT' Key to exit this screen and to leave 2200SRV running.

8) The ATTACH DMS/VDISK screen will be displayed containing the communications address, Primary Disk address, and current VDISK configuration file name (figure 1-10).

NOTES

1) At this time, the VDISK Configuration file may be replaced using the SF9 key.

2) The attach process can be completed by leaving the 'VDISK Configuration File' field blank. This allows the Attach process to complete with no VDISK Configuration File activated, allowing the creation of VDISK files (using 'Create VDISK') to be included in new VDISK Configuration files.

```
***** ATTACH DMS/VDISK *****
Revision #.##

Communications address:  078
Primary VDISK platter address:  D30
VDISK configuration file:  CONFTEST

SF9  - Replace configuration file
EXEC/RUN  - Attach to VS
CANCEL/EDIT  - Exit
```

Figure 1-10. The ATTACH DMS/VDISK Screen

9) Press 'RUN' to complete the ATTACH process.

10) A message "Controller Successfully Attached. Configuration file Activated" will appear at the bottom of the Attach DMS/VDISK screen (figure 1-11).

11) At this point, the user may Suspend Emulation or Terminate Emulation and proceed with DMS/VDISK activities as described in the 'User's Guide'.

```
***** ATTACH DMS/VDISK *****
Revision #.##

Communications address:  078
Primary VDISK platter address:  D30
VDISK configuration file:  CONFTEST

Select Exit Option:  ■ Suspend Emulation
                     ■ Terminate Emulation

Controller Successfully Attached.  Configuration file activated.
```

Figure 1-11. The Completed ATTACH DMS/VDISK Screen

1.4.3.2 Detach DMS/VDISK

The Detach DMS/VDISK allows the Terminal 1 operator to break the connection (link) to the VS that was established during the ATTACH process.

WARNING

Before selecting DETACH DMS/VDISK check that all DMS Users on your system are ready to detach. Detaching DMS/VDISK will detach all users on your system.

1) Select Detach DMS/VDISK from the VS Services Menu (figure 1-3) and press 'RUN'. The Detach DMS/VDISK screen will be displayed (figure 1-12).

***** DETACH DMS/VDISK *****
Revision #.##

Enter Communications address: 07C

WARNING: Please check that all DMS Users on your system are ready for detach
Press EXECUTE to detach, CANCEL to exit

Figure 1-12. DETACH DMS/VDISK Screen

2) Enter the communications address of the 2258 controller being detached from the VS and press 'RETURN'. Note the Warning displayed on the bottom of the screen and press 'EXECUTE" to detach or CANCEL to exit the DETACH DMS/VDISK screen.

3) Once 'EXECUTE' was pressed, the VDISK Closed message 'VDISKS Closed. Please Logoff VS. Press any key to continue.' will be displayed on the bottom of the screen indicating that detach has been completed. Press any key to continue.

4) The WANG 2200/VS Server Utility screen will be displayed (figure 1-9) indicating that 2200SRV is running. Press PF16 to terminate the server procedure. The DETACH DMS/VDISK screen is displayed with the following message:

Have you logged off the VS? (Y/N)

If logged off press the letter 'Y' and the system returns you to the 'VS Services Menu'.

If not logged off press the letter 'N'. The following prompt is displayed:

Please logoff the VS before continuing
Press any key to return to WSE

1.4.3.3 Change VDISK Configuration File

Change VDISK Configuration File function allows the terminal 1 user to change the current VDISK Configuration file. (NOTE Controller Must Previously Have Been Attached.)

1) Select Change VDISK Configuration option from the VS Services menu (figure 1-3) and press 'RUN'. The Change VDISK Configuration Screen is displayed.

```
***** CHANGE VDISK CONFIGURATION *****
Revision #.##

Enter communications address: ■■■

Enter Configuration File Name: ■■■■■■■■

                    EXEC/RUN - Change Configuration
                CANCEL/EDIT - Exit
```

Figure 1-13. Change VDISK Configuration Screen

2) Enter the communication address of the controller being affected by this change. Enter the new Configuration file name and press 'EXEC/RUN'.

3) The message 'Warning: Changing VDISK Configuration may affect other VDISK users. Press EXECUTE to continue, CANCEL to exit' will be displayed on the lower part of the screen. Press 'EXECUTE' to accept the new configuration file.

4) The files associated with the old configuration file are 'closed' and the new files are opened. Upon successful completion of this task the message 'VDISK Configuration Changed' is displayed. Press 'CANCEL/EDIT' to return to the VS Services Menu.

1.4.3.4 View DMS/VDISK Status

View DMS/VDISK Status allows any terminal user to display the name of the current configuration file and the status of all VDISKs open under that file for a specified 2258 controller address.

1) Select View DMS/VDISK Status function from the VS Services Menu (figure 1-3) and press 'RUN'.

2) The View DMS/VDISK Status Screen (figure 1-14) will be displayed showing the status of each VDISK file currently open in the current configuration file.

3) Up to 32 VDISKs files may be opened. To view the complete list, use the PREV SCRN/SF2 and NEXT SCRN/SF3 keys to scroll through the list.

```
                ***** VIEW DMS/VDISK STATUS *****
                          Revision #.##

                Enter communications address: ■■■
                    Configuration File Name: ■■■■■■■■

 2200      -- VDISK Name on VS System --      Platter
 Platter   Volume    Library    File Name     Size (Sectors)   VDISK STATUS
 D30       SYSTEM    @SYSTEM@   VDTEST2       100              Exclusive
 D31       SYSTEM    @SYSTEM@   VDTEST1       10               Exclusive
 D32       SYSTEM    @SYSTEM@   D32VDISK      500              Exclusive

                                          PREV SCRN/SF2 - Previous Screen
                                          NEXT SCRN/SF3 - Next Screen
                                               EXEC/RUN - View New Status
                                             CANCEL/EDIT - Exit
```

Figure 1-14. View DMS/VDISK Status Screen

4) Other 2258-Controller status may be viewed by changing the address in the 'Enter communications address' field and pressing 'EXEC/RUN'.

5) Exit the View DMS/VDISK Status Utility by pressing the 'CANCEL/EDIT' key.

1.4.3.5 Edit VDISK Configuration File

Edit VDISK Configuration file allows any user to change the VDISK defined by an existing configuration file and to create a new configuration file.

1) Select Edit VDISK Configuration file utility from the VS Services Menu (figure 1-3) and press 'RUN'.

2) The Edit VDISK Configuration File screen will be displayed (figure 1-15).

```
***** EDIT VDISK CONFIGURATION FILE *****
Revision #.##

Load from configuration file:  CONFTEST
  Save to configuration file:  CONFTEST

2200      -- VDISK Name on VS System --      Exclusive, Read Only,
Platter   Volume    Library    File Name     or Shared?
[    ]    [    ]    [    ]    [    ]        ■ E   ■ R   ■ S
[    ]    [    ]    [    ]    [    ]        ■ E   ■ R   ■ S
[    ]    [    ]    [    ]    [    ]        ■ E   ■ R   ■ S
[    ]    [    ]    [    ]    [    ]        ■ E   ■ R   ■ S
[    ]    [    ]    [    ]    [    ]        ■ E   ■ R   ■ S

                                        SF24 - Delete Entry
                                PREV SCRN/SF2 - Previous Screen
                                NEXT SCRN/SF3 - Next Screen
                                    EXEC/RUN - View New Status
                                  CANCEL/EDIT - Exit
```

Figure 1-15. Edit VDISK Configuration File Screen

3) With this screen displayed, the user can load an existing configuration file for editing by entering the configuration file name in the 'Load from configuration file' field and enter the name under which the modified configuration file is to be save in the 'Save to configuration file' field. Press 'RETURN' and the screen will then be loaded with the information describing each VDISK file associated with the selected configuration file.

4) To create a new configuration file, leave the 'Load from configuration file' field blank and enter the name of the newly created configuration file in the 'Save to configuration file' field. Enter the information required to define each VDISK for the new configuration file and press 'EXEC/RUN' to save the file. The screen prompt 'Configuration file saved' will be displayed on the lower portion of the screen.

5) When editing the configuration file is completed, press the 'CANCEL/EDIT' key followed by the 'EXEC/RUN' key to return to the VS Services menu. The double key sequence prevents accidentally exiting the program in the event the CANCEL/EDIT key is mistakenly pressed.

1.4.3.6 Create VDISK

Create VDISK allows any user to create a VDISK file. (NOTE: The controller must be attached before VDISKs can be created.)

1) Select Create VDISK utility from the VS Services Menu (figure 1-3) and press 'RUN'.

2) The Create VDISK screen will be displayed (figure 1-16).

```
                    ***** CREATE VDISK *****
                          Revision #.##

                Enter communications address: 07C

-- VDISK Name on VS System --                Platter
Volume    Library    File Name                Size (Sectors)
SYSTEM    @SYSTEM@   VTEST■1■                 10■■■          Successful
■■■■■■    ■■■■■■■■   ■■■■■■■■                 ■■■■■■
■■■■■■    ■■■■■■■■   ■■■■■■■■                 ■■■■■■
■■■■■■    ■■■■■■■■   ■■■■■■■■                 ■■■■■■
■■■■■■    ■■■■■■■■   ■■■■■■■■                 ■■■■■■

                                    SF24 - Delete Entry
                               PREV SCRN/SF2 - Previous Screen
                               NEXT SCRN/SF3 - Next Screen
                                    EXEC/RUN - View New Status
                                  CANCEL/EDIT - Exit
```

Figure 1-16. Create VDISK Screen

NOTE

When these VDISKs are included in a VDISK Configuration File, they will automatically be opened during the ATTACH and CHANGE VDISK CONFIGURATION FILE functions when that Configuration File is specified.

3) Enter the VDISK volume name, library, file name and platter size (in sectors) for the file to be created. Press 'EXEC/RUN' to create the newly defined VDISK.

4) Press 'CANCEL/EDIT' to exit the Create VDISK screen and return to the VS Services menu.

1.4.3.7 Delete VDISK

Delete VDISK allows the terminal 1 user to delete a VDISK file from the VS.

1) Select Delete VDISK utility from the VS Services Menu (figure 1-3) and press 'RUN'.

2) The Delete VDISK screen will be displayed (figure 1-17).

```
                    *****  DELETE VDISK  *****
                           Revision #.##


          Enter communications address: 07C
                    Enter VDISK volume: SYSTEM
                   Enter VDISK library: @SYSTEM@
                 Enter VDISK file name: VTEST■1■


                                  EXEC/RUN - Delete VDISK file
                               CANCEL/EDIT - Exit
```

Figure 1-17. Delete VDISK Screen

NOTE

When Delete VDISK is performed, the deleted VDISK file is NOT deleted from the Configuration file.

3) Enter the Communications address, volume name, library name, and file name of the VDISK file to be deleted and press 'EXEC/RUN'.

4) Press 'CANCEL/EDIT' to exit the Delete VDISK screen and return to the VS Services menu.

1.5 PREVENTIVE MAINTENANCE

No preventive maintenance is required for this option.

1.6 TROUBLESHOOTING

The 2200/VS Local Communications troubleshooting flowcharts are designed to aid in the systematic investigation and diagnosis of failures of the 2258 Option PCA in the VS emulation environment.

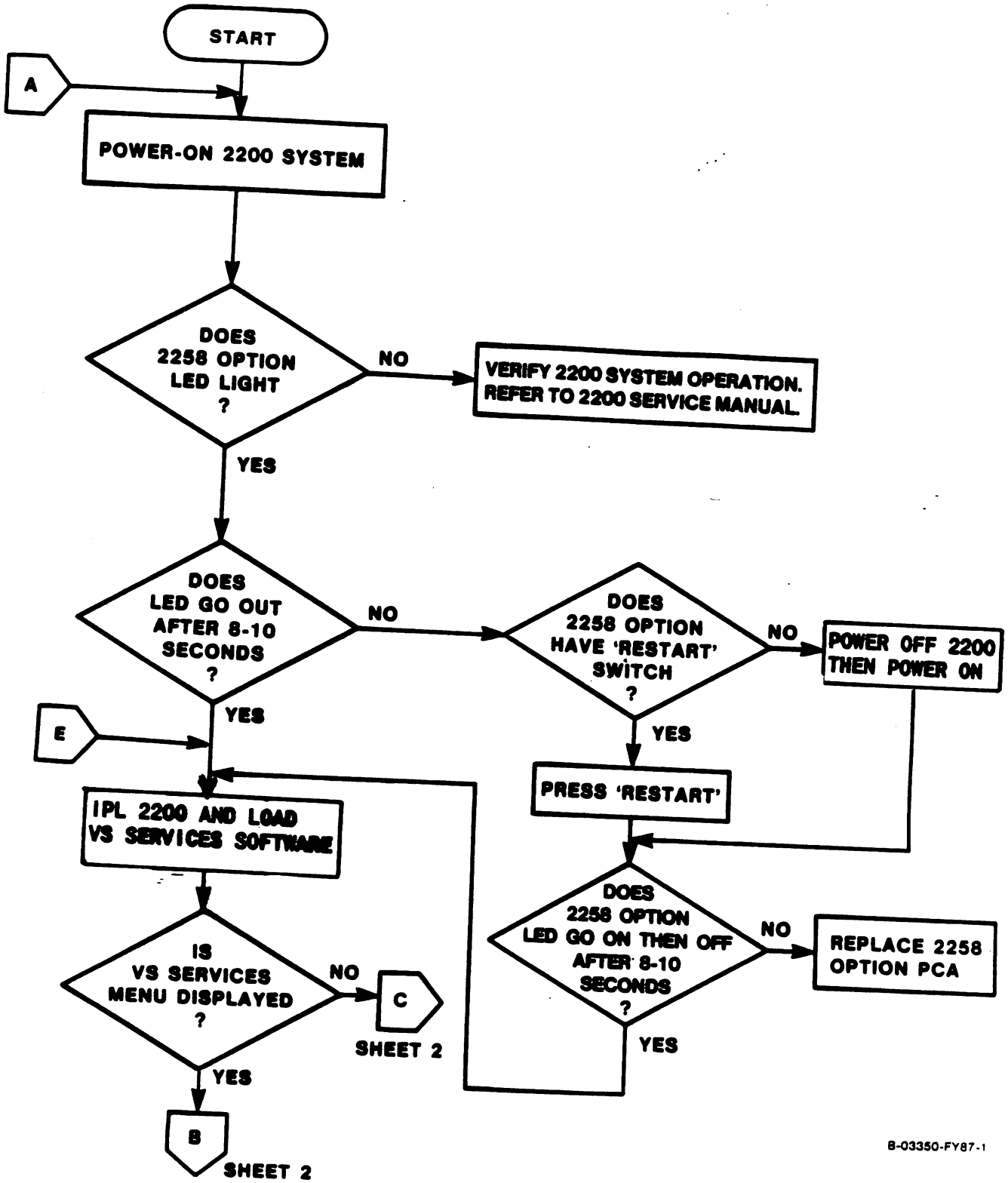


Figure 1-18. 2200/VS LCO Troubleshooting Flowcharts (Sheet 1 of 3)

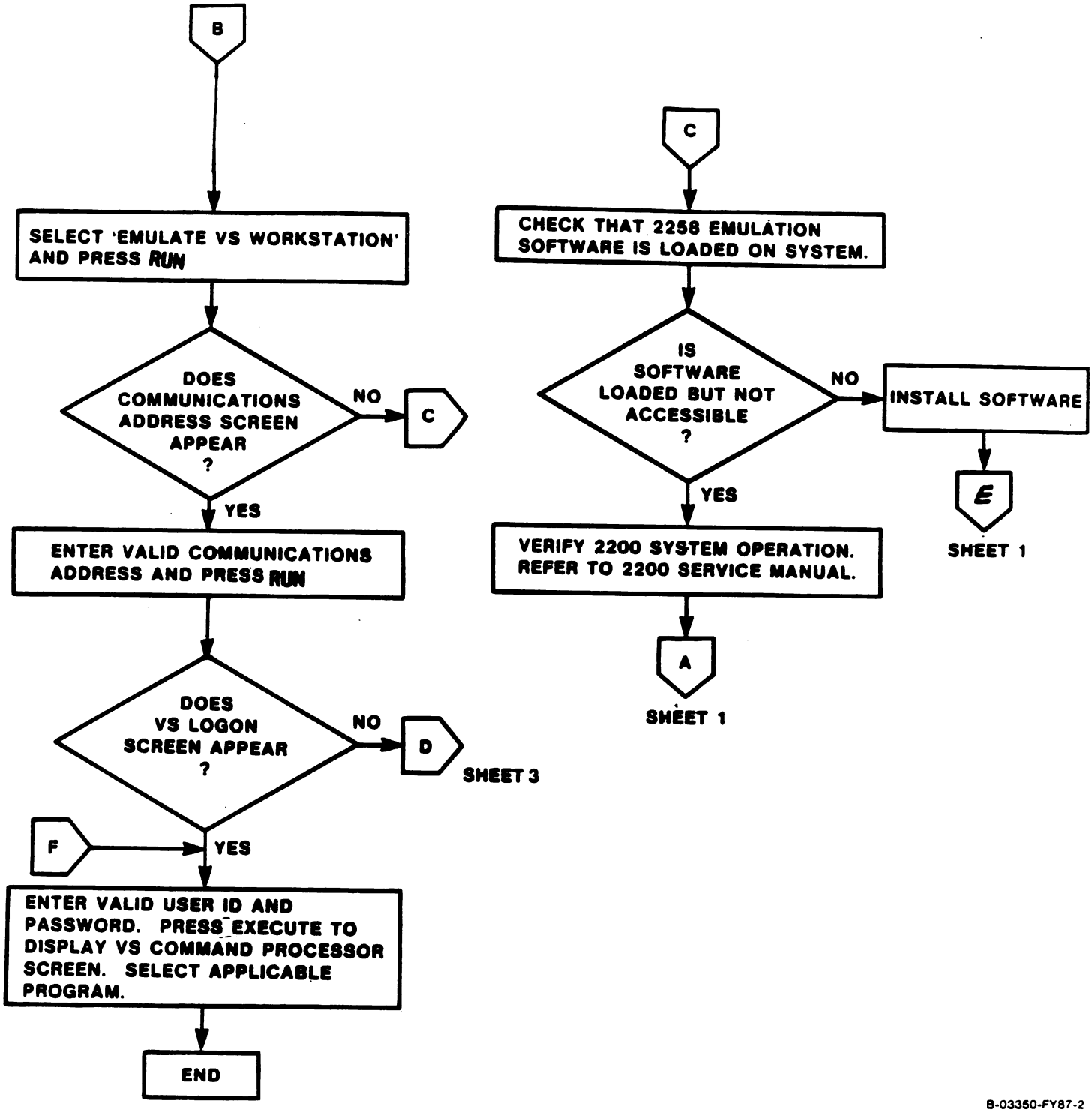


Figure 1-18. 2200/VS LCO Troubleshooting Flowcharts (Sheet 2 of 3)

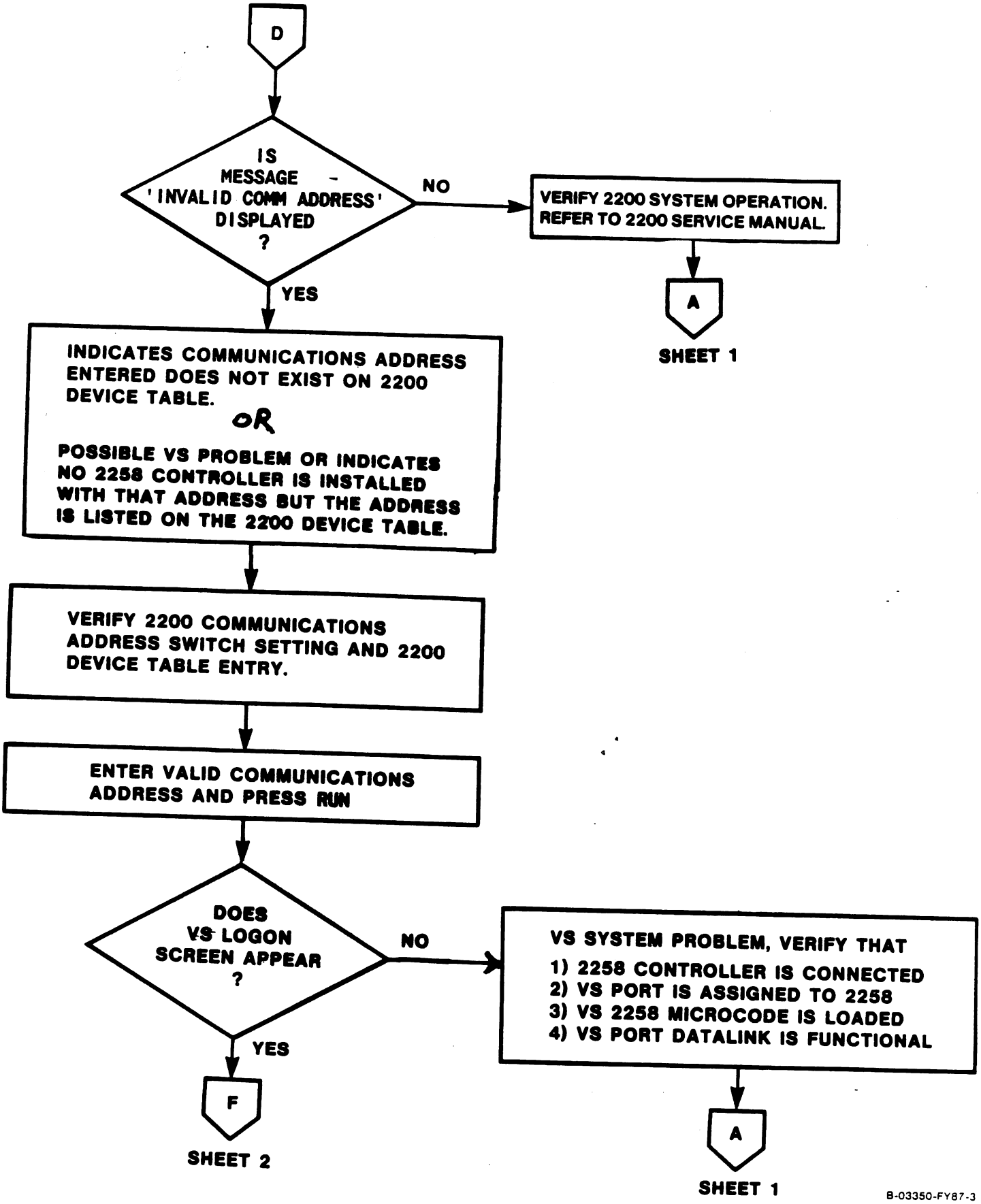


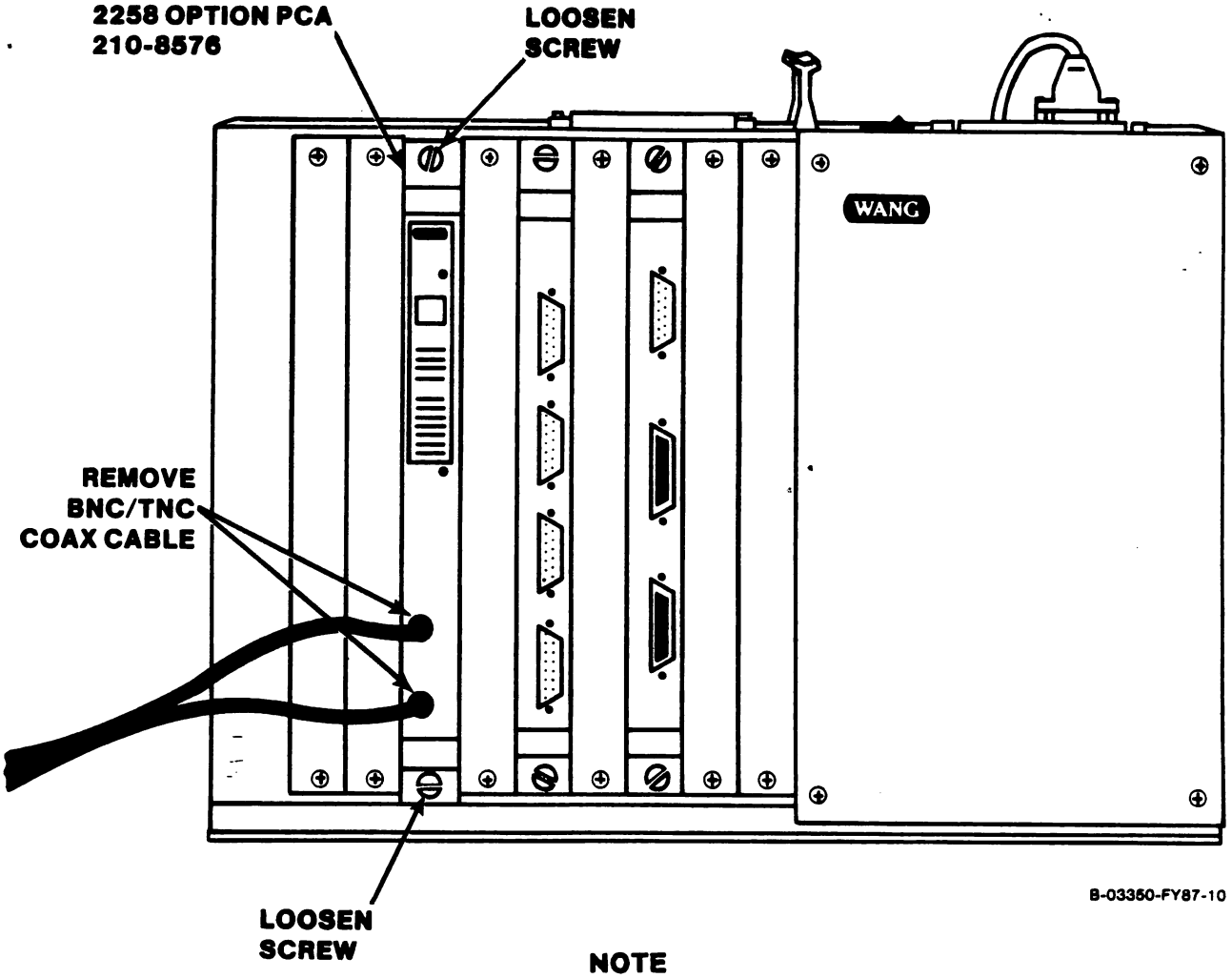
Figure 1-18. 2200/VS LCO Troubleshooting Flowcharts (Sheet 3 of 3)

1.7 REPAIR

This section contains the removal and replacement procedures for the field replaceable components of the 2258 Option. The maintenance philosophy for this option is PCA 210-8576 unit swap. The RF Shield/Spacer is not a field replaceable item and must be removed from the defective PCA and installed on the replacement PCA.

1.7.1 PCA REMOVAL

1) Power down the 2200 system.
2) Remove the TNC/BNC coax cable from the PCA rear panel.
3) Loosen two screws that secure PCA into the 2200 system.
4) Slide PCA out of 2200 System chassis.



NOTE

2200 Micro VP is shown in the example. Refer to the appropriate maintenance manual for 2200 system used.

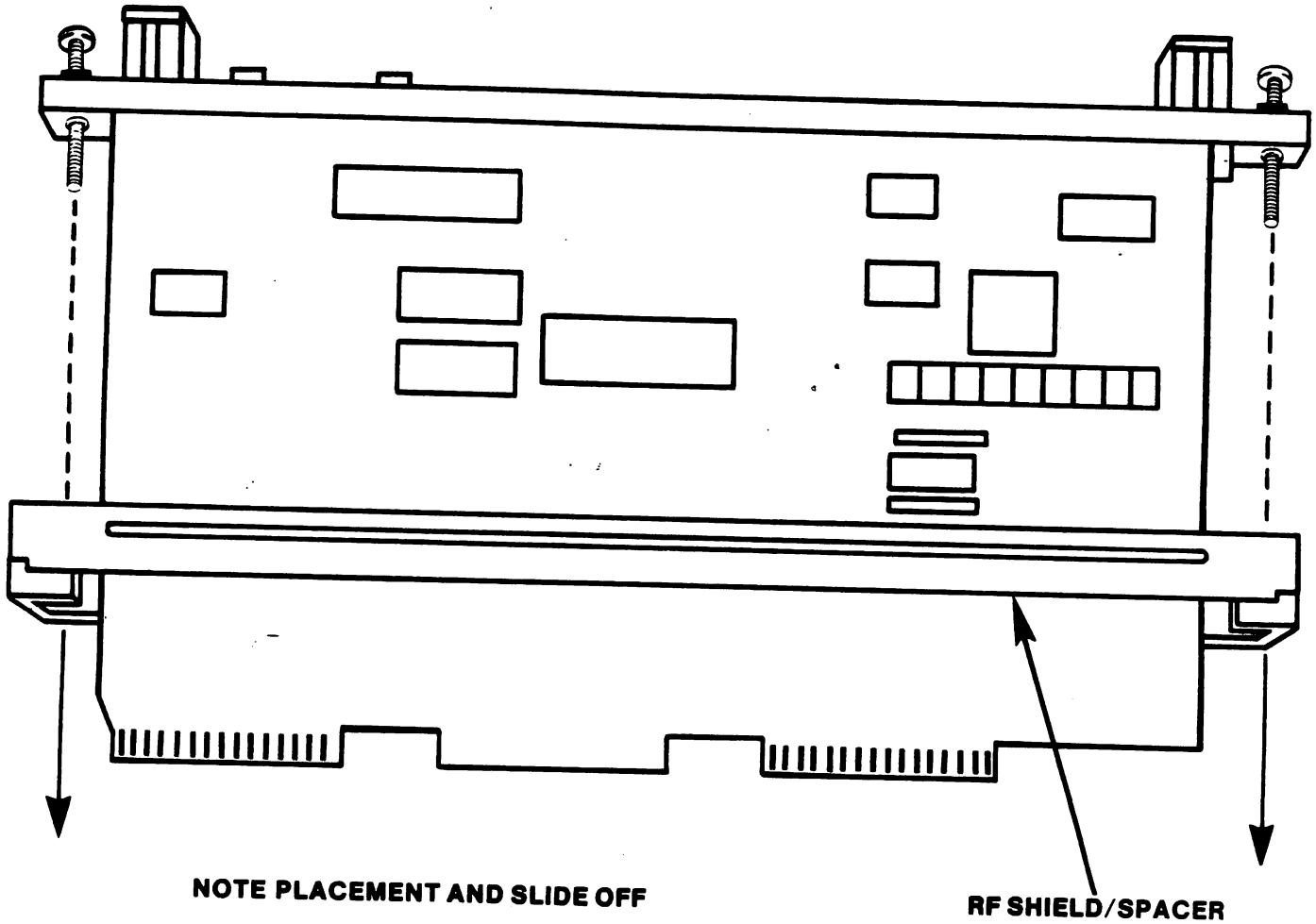
Figure 1-19. 2258 Option PCA Removal

1.7.2 PCA RF SHIELD/SPACER REMOVAL/REPLACEMENT

NOTE

The PCA RF Shield/Spacer must be removed from the defective 2258 Option PCA and installed on the replacement PCA.

1) Note RF Shield/Spacer placement.
2) Slide PCA RF Shield/Spacer towards PCA edge connectors and remove.
3) Install RF Shield/Spacer on replacement PCA.
4) Set the Communications/Disk Address switch to switch settings of PCA removed (paragraph 1.9.3).
5) Install PCA (with RF Shield/Spacer attached) into the 2200 system.
6) Secure in place with the two screws loosened in paragraph 1.7.1.
7) Connect BNC/TNC coax cable connectors.
8) Power-on 2200 system and verify 2258 Option BIT Test (paragraph 1.4).



B-03350-FY87-6

Figure 1-20. 2258 Option RF Shield/Spacer Removal/Replacement

1.8 ADJUSTMENTS

No adjustments are required for the 2258 Option PCA.

1.9 UNPACKING AND INSTALLATION

This section contains information for installing the 2258 Option, 2200 to VS cabling and software installation.

1.9.1 TOOLS AND TEST EQUIPMENT

No special tools or test equipment are required for 2258 option installation.

1.9.2 UNPACKING PROCEDURES

Before unpacking the 2258 Option, check all packing slips to make sure the proper equipment has been delivered. After checking packing slips, inspect all shipping containers for damage (crushed corners, punctures, etc.).

1.9.2.1 Claims Information

If damage is discovered during inspection notify your manager.

1.9.3 SOFTWARE REQUIREMENTS

The following contains the software requirements for the 2200 system and the VS host system.

1.9.3.1 2200 System Software Requirements

Software	Version	Comments	WLI PN
2200 Multi-User O.S.	2.7		195-0049-x

1.9.3.2 VS Software Requirements

Software	Version	Comments	WLI PN
Operating System	7.10.10		195-4681-x

NOTES

Complete 195 package part numbers include media and documentation. The -x following the part number represents the media type (i.e. -7 denotes 9-track magnetic tape).

1.9.4 SWITCH SETTINGS AND JUMPERS

The 2258 Option PCA contains one 8-position switch bank denoted SW1 and two 3-pin Jumper headers denoted J1 and J2.

Switch SW1 is the communications address/disk address switch. The lower two switches (Sw1 and Sw2) are set for the 2200-type disk address, the upper six switches (Sw3 - Sw8) are set for the option board communications address.

Jumper J1 selects Clock Enable, Jumper J2 selects Board Repair Diagnostics. For normal operation, both jumpers must be positioned as shown in figure 11.

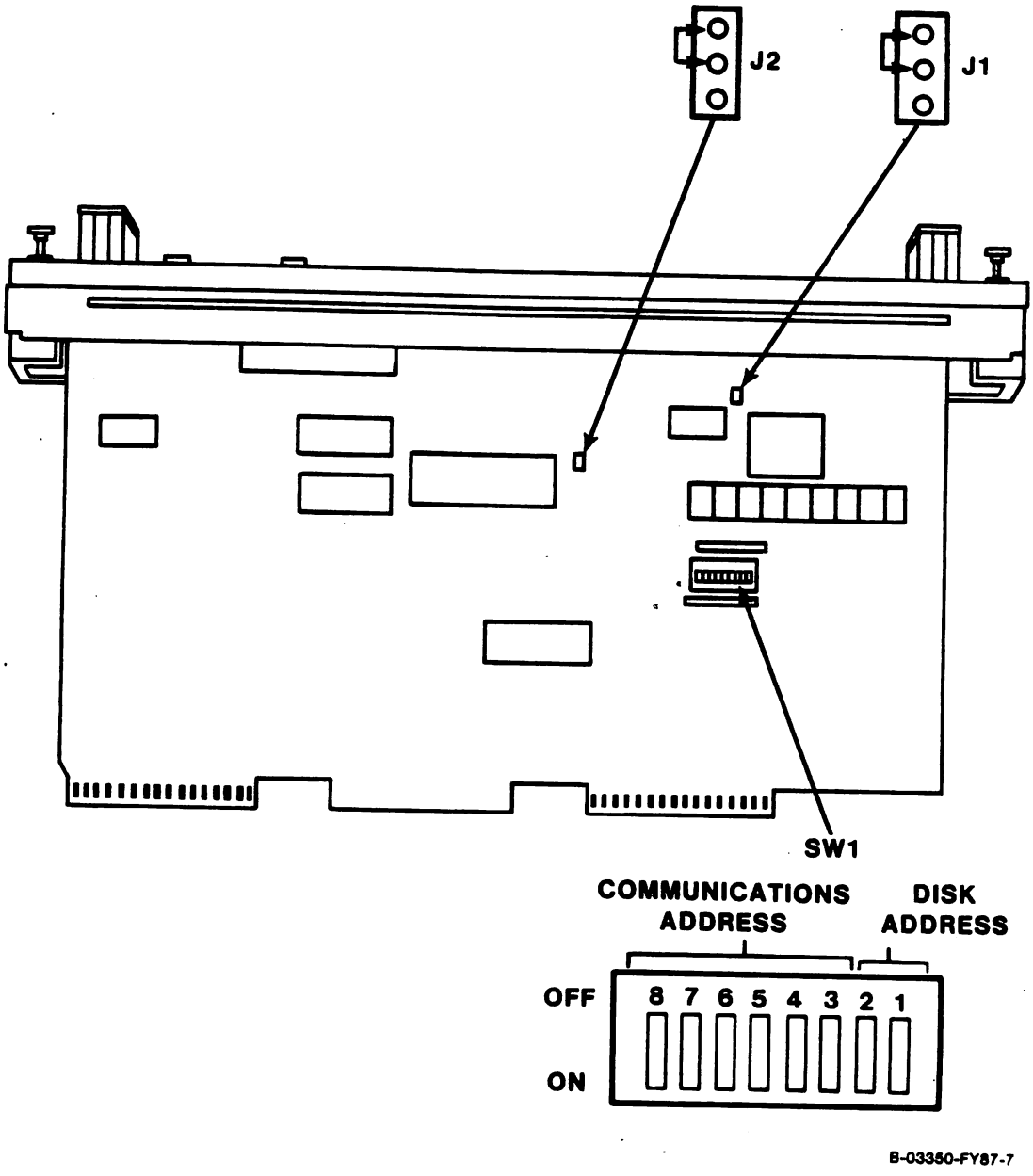
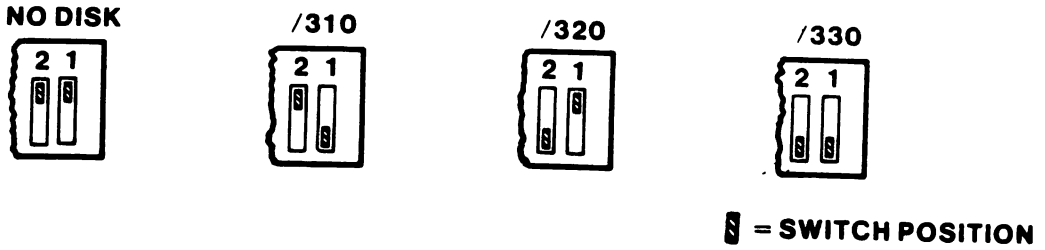


Figure 1-21. 2258 Option Address Switch/Jumpers

1.9.4.1 Disk Address Switch Settings

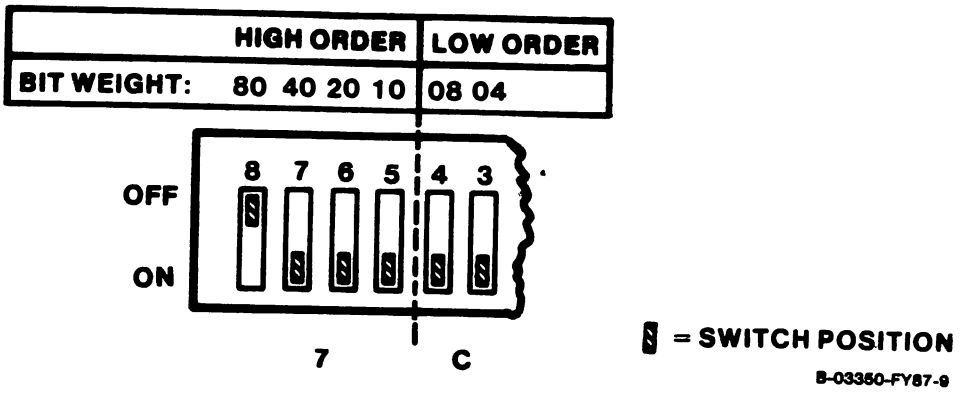
Set the 2200-type disk address switches for disk address used. Disk addresses are /310, /320, and /330. Enter the disk address in the 2200 Device Table and pencil the disk address onto the 2258 Option label for future reference.



1.9.4.2 Communications Address Switch Settings

The communication address represents the base address of the controller. The 2200 system communicates with the controller using three distinct addresses that are directly associated to the base address. The base address plus the bit weight representing Status, Command, and Data addresses must be entered into the 2200 Device Table.

Set communication address switches for a device address not used in the 2200 system (refer to the system's 2200 Device Table). Pencil the communications address onto the 2258 Option label for future reference.



Using the following convention, add the communication address for Status, Command, and Data to the 2200 Device Table (Communication Address 7C is used in the example):

STATUS	Base Address Plus Bit Weight 01 (i.e., 7C + 01 = 7D)
COMMAND	Base Address Plus Bit Weight 02 (i.e., 7C + 02 = 7E)
DATA	Base Address Plus Bit Weight 03 (i.e., 7C + 03 = 7F)

2200 Device Table entries for base communication address 7C are as follows:

Controller Status Address	/07D
Controller Command Address	/07E
Controller Data Address	/07F

1.9.5 INSTALLATION

This section contains procedures for installing the 2258 Option PCA into the 2200 Micro VP system. For installation in the 2200 LVP and MVP systems refer to the appropriate maintenance manual. The cabling and software loading procedures are generic and used for all 2200 system types.

NOTE

The 2258 Option PCA is an oversized board and will not fit into the I/O slots located under the large cooling fans used in some 2200 MVP systems. Refer to Service Newsletter No. 121 dated August 1978, which addresses this problem.

1.9.5.1 2258 Option PCA Installation

1) Remove blank RF shield from the I/O slot the option board will reside in.

2) Verify the communications and disk address switch setting (para.1.9.4) and insert the option board into the I/O slot. Ensure the board is properly seated and secure with the captive screws mounted on the RF Shield.

3) Perform steps 1 and 2 for each 2258 Option PCA installed. (Note: Maximum of four 2258 Option PCAs per system.)

1.9.5.2 2258 Option Cabling

1) Attach a dual coax cable to the 2258 Option PCA BNC/TNC connectors. Label the coax cable with the VS port number configured for the 2258 Option PCA.

2) Perform step 1 for each 2258 Option PCA installed.

1.9.5.3 VS 2258 Microcode Installation

NOTE

VS Operating System release 7.10.10 or higher is required for Workstation Emulation and DMS/VDISK operation. Workstation Emulation Only will function on operating system 6.43 or greater.

1) Use the VS Utilities and load the following 2 files as noted:

- File 2200SRV in library @SYSTEM@ on the System Volume
- File 2258MWS in library @SYSTEM@ on the System Volume

2) Use 'GENEDIT' Utility and configure the VS serial port(s) for the 2258 Device Type with up to 4 devices (cluster device).

1.9.6 POWER-ON PROCEDURES

Power-on the 2200 system (refer to the appropriate 2200 series maintenance manual for system being used). The 2258 Option PCA BIT LED will illuminate and after 8-10 seconds will extinguish, thus denoting the 2258 Option completed a successful power-up. At this time, the 2200 system can be used in the native 2200 mode or can be linked to the VS to perform VS Workstation Emulation by performing the following steps.

Various ways of loading software are available (i.e. Menu picks etc.) for 2200 systems. Software loading from the disk drive is used for this writing. Perform the following:

NOTE

When the 2200 system is emulating a VS workstation via 2258 Emulation, 2200 Special Function Keys (denoted SF) are mapped as VS workstation Program Function (denoted PF) Keys. Refer to Table 1-1 Workstation Keys definitions.

1) Insert the 2200 LCO Software diskette into the disk drive. Type in 'SELECT DISK □□□ (where □□□ = Disk Address)' and press 'LOAD', 'RUN', and 'RETURN'.

2) When the software is successfully loaded, the VS Services menu (figure 1-22) is displayed. Note menu picks followed by an asterisk are displayed on Terminal 1, Operators Console Only. Select Emulate VS Workstation Option and press 'RUN' key.

```
***** VS SERVICES *****

Select an item with SPACE & BACKSPACE.                    Partition x, xxK
Key RUN to execute, CLEAR or PREV SCRN for previous screen.    Terminal 1

                    ■ Emulate VS workstation
                    _ Attach DMS/VDISK*
                    _ Detach DMS/VDISK*
                    _ Change VDISK configuration*
                    _ View DMS/VDISK status
                    _ Edit VDISK configuration file
                    _ Create VDISK
                    _ Delete VDISK*
```

Figure 1-22. VS Services Menu

3) The Emulate VS Workstation Screen is displayed (figure 1-23). Enter the desired communications controller address (section 1.9.4.2) and press EXEC/RUN.

```
***** EMULATE VS WORKSTATION *****
(c) Copyright Wang Laboratories Inc. 1986
Revision #.##

Enter Communications Address of desired 2258 Controller: 07C

                                    EXEC/RUN - Emulate VS Workstation
                                  CANCEL/EDIT - Exit
```

Figure 1-23. 2258 Controller Communications Address Screen

4) The VS Logon screen will be displayed (figure 1-24). Enter a valid user id and password in the appropriate fields and press 'RETURN'.

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

Workstation x          2:12 PM        Tuesday August 22, 1986

                  Hello new user
                  Welcome to ▯▯▯▯

Please identify yourself by supplying the following information

                  Your userid   = ▮▮▮
                  Your password = ▮▮▮▮▮

                  and press (ENTER) to Logon

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

Figure 1-24. VS Logon Screen

5) Once the logon is accepted the Command Processor Screen will be displayed (figure 1-25).

```
                    *** WANG VS COMMAND PROCESSOR ***

Workstation x Ready          11:32 PM          Monday August 22, 1985

                              Hello
                        Welcome to the Wang VS

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

        Use function keys to select a command:

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

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

Figure 1-25. Command Processor Menu

5) At this time, the 2200 system is emulating a VS workstation. The operator can select the desired VS command/function. Refer to section 1.4 for a complete description of screen loads and operating procedures.

NOTE

No VS program or function that downloads microcode to the workstation can be run (i.e. VS Word Processing).

1.10 2258 THEORY OF OPERATION

The Model 2258 option contains the circuitry required to establish a communications link to the VS system and provides 2200 address/data buffering commands and data channeling. The circuitry used includes:

- Z80A Processor and support circuitry
- 80KB Memory consisting of 64KB Main Memory and 16KB Auxiliary Memory
- 8KB EPROM
- Memory Arbitration Gate Array IC (MAGIC)
- 2001 Data Link Chip
- 2200 Address, Data and Command Buffering

1.10.1 Z-80 CENTRAL PROCESSOR UNIT (CPU)

Bus operations are controlled by the Z-80A CPU. The CPU receives sequential instructions from Main Memory over the data bus. It assigns device access and tasks based on these instructions and communicates with 2258 Option logic through the data, address, and control buses.

CPU signals are sequenced according to both its internal instruction set and instructions received from main memory over the data bus. The CPU requires a single, +5 Vdc supply and employs a 4 MHz clock as its time base.

Bi-directional data flow is accomplished by an 8-bit, tri-state data bus. The CPU transmits address information through a 16-bit, tri-state address bus. Both the Z80 data bus and address bus are buffered, thus imposing only one TTL load on the CPU. A reset line initializes the CPU and the six control-output lines. The six control-output lines are:

M1, CPU Fetch Cycle: This line is active during the first cycle (fetch cycle) of each instruction-request cycle, and during the special interrupt cycles.

MREQ, Memory Request: Active when the CPU accesses memory to fetch either an instruction or data.

IORQ, Input/Output Request: Becomes active to indicate either an input or an output to a peripheral device during the interrupt-acknowledge cycles.

RD, Read: When active, indicates that the CPU will input data while performing a memory-access or I/O instruction.

WR, Write: When active, indicates that the CPU will output data while performing a memory-access or I/O instruction.

Z80 control lines RD (Read), WR (Write) and MREQ are conditioned so not to interfere with DMA type operations which use the associated control lines.

In addition to the control-output lines, there are three CPU input control lines. These lines are:

BUSRQ, Bus Request: Becomes active when an outside device requests bus access. BUSRQ input causes the CPU to switch its address, data, and status lines into a high-impedance state to accommodate the outside device.

BUSAK, Bus Acknowledge: Becomes active to indicate that the CPU has complied with a BUSRQ.

WAIT: Becomes active to request the CPU to extend the current memory access or I/O cycle as long as the WAIT is present.

1.10.2 CPU INTERRUPTS

The 2258 Option employs Z-80 interrupt modes type 0 and 2. A mode 2 interrupt is the most powerful mode in the Z-80 CPU control set in that it allows for an in-direct call to any location in memory. In this mode, the CPU forms a 16-bit memory address where the upper eight bits are the content of the interrupt page register (I register) in the CPU. The low order eight bits are supplied by the interrupting peripheral.

The address thus formed points to the first two bytes in a table where the address of the appropriate service routine is located. The CPU automatically obtains the starting address and performs a CALL to this address, thus servicing the peripheral. After the routine is complete, the content of the program counter is retrieved from the stack and the program continues from where it left off before the interrupt.

1.10.3 PROGRAMMABLE READ-ONLY MEMORY (PROM)

At power-up, the bottom 4k bytes of main memory are masked by the diagnostic PROM by the action of the data link enable and PROM select logic. Sequential testing of different groups of logic is performed to verify the integrity of the terminal. During this phase, the data link is disabled. Upon successful completion of the tests, PROM is deselected and the data link is enabled. At this point, conventional data link downloading commences as though the terminal had just been powered-up.

1.10.4 MAIN MEMORY

The 2258 Option contains 80k bytes of memory consisting of 64k bytes main memory and 16k bytes auxiliary memory. Both main memory and auxiliary memory are 8 bits wide with one bit (ninth bit) of parity for each byte of memory. Physically, main memory is implemented with nine 64k x 1 bit surface mount DRAMS contained on one SIMMs module. Auxiliary memory is implemented using three 16k x 4 bit DRAM devices.

Main memory is dual ported, thus accessible by either the Z80A CPU or Data Link Controller. The Z80A CPU controls all bus processing. When the Data Link desires memory access, it must request the bus by issuing a BUSRQ signal. Once the bus is granted, the Data Link provides the required address information to the Memory controller device.

Memory (main and auxiliary) is under the control of the Memory Arbitration Gate Array IC (MAGIC). The MAGIC device provides the following features:

- Arbitration of Memory Request - MAGIC device provides the arbitration of memory requests on the first-come-first served basis. When a device (Z80A or Data Link) requests and is granted memory access, the other device is blocked until the memory access cycle is completed.

- Provides Memory Addresses - The requesting device provides the 16-bit address from which the MAGIC device selects the Row and Column address signals and transmits them to RAM via the 8-bit Memory Address Bus.

- Supplies DRAM Control Signals (RAS, CAS, WR) - The MAGIC device provides two Column Address Strobes CAS64 and CAS16. CAS64 is the normal strobe for the 64k Main Memory DRAM. CAS16 is used to strobe the addresses when the 16k Auxiliary Memory is selected. Both CAS signals are exclusive an non-conflicting. During EPROM access, both CAS signals are disabled.

- Supplies Timing Signals for Requesting Devices - The MAGIC device provides the timing signals LATCHZDL and ZCYCLE. LATCHZDL indicates valid data is available from a memory access. ZCYCLE indicates the end of memory access and is used to generate Z80A wait states.

- Provides RAM REFRESH - The MAGIC device generates REFRESH addresses and REFRESH cycles every 8-10 microseconds ensuring all RAM is continually refreshed.

The MAGIC device and its interface circuitry operate through the following general procedure:

The circuitry monitors memory requests from the Z80A CPU, Data Link and the Refresh circuit. Memory access is granted to the first requesting device and wait conditions are generated to the other devices that requested the bus but were not granted access. The MAGIC device maps the appropriate address, data and control signals onto its bus and generates its own memory sequence signals to read or write the data to or from memory.

During memory read operations, the data is latched onto the appropriate bus and the data output is controlled by the requesting device memory read signals. Upon memory access completion, the next requesting device is granted access and the previous device is locked-out until all currently requesting devices have been granted access.

1.10.4.1 Main Memory Parity Checking

Memory parity logic is generated and appended to the data stream when the Z80A or the Data Link performs a write to memory. During a CPU or Data Link write, a parity bit (even) is calculated, assigned, and stored in memory for each byte written to memory. Parity is checked on all memory read operations.

If a Memory Parity Error is detected, the corrupted data is not delivered and the Z80A is forced to execute in a No OPeration loop (NOP) and the BIT LED is turned on. The NOP loop is exited by a Reset or Data Link Restart. The Master will be notified of the parity error condition through an input to the Data Link status register.

Following a 2258 Option Board Restart or Data Link restart, the diagnostic built-in test (BIT) runs and the usual power-up checks ensues. If the memory parity error was a soft error, the 2258 Option will pass the BIT and be ready for operation again. Parity detection circuitry is also tested by forcing bad parity to be written and then reading back the same data location.

1.10.5 DATA LINK INTERFACE

The Data Link provides the means of local communications between the 2258 option board and the master. The link is configured to the master as a 64K workstation through the use of a Status Register and a Characteristic register.

The upper four bits of the Status Register contains the hardwired device type identification number (device number 9) and is read by the 2001 Data Link Controller. The characteristic register contains the hardwired device ID number (ID number 02) and is read by the Z80A CPU through the command IN07.

The 2001 Data Link Controller chip is a custom CMOS integrated circuit that provides the data communications interface between the peripheral and the master via the Serial Data Link.

The Data Link communicates by using an 11 bit serial data stream used in an asynchronous fashion. The contents of the data stream consists of 1 start bit, 8 bits of data (transmitted MSB first), 1 parity bit (even) and 1 stop bit. The data travels at a bit rate of 4.275 MHz.

The Data Link permits 2258 memory to be loaded or read by the master. The host CPU can write new memory instructions into 2258 Option memory; it can also record (archive) information entered by the 2258 Option onto a common disk. The 2200 workstation is disabled when the host CPU uses the Data Link.

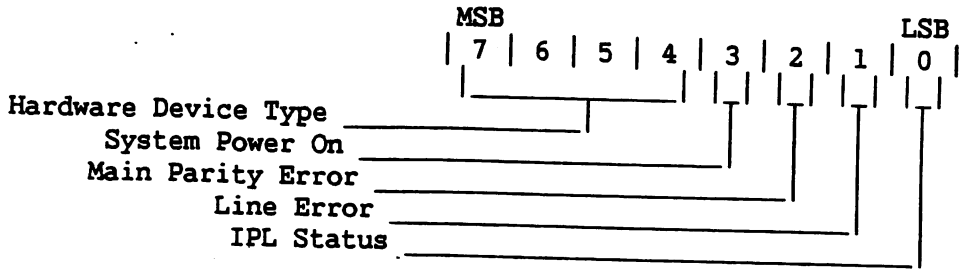
Data is transferred directly between memories using DMA logic. Data transfer is carried out in a serial, asynchronous, byte-oriented format using a half-duplex line. The transmission line itself is a balanced pair of coaxial cables operating at 4M baud. The actual data transfer rate is approximately 260k bytes per second.

1.10.5.1 Data Link Commands

Six Data Link commands permit the host CPU to:

- Check Slave STATUS and ID
- Initiate Slave Operation (RESTART)
- Load Slave Memory (WRITE - 2 commands)
- Store Slave Data (READ - 2 commands)

STATUS and ID commands send Slave status and ID to the host CPU on command. The STATUS read is the method a host CPU uses to interrogate a slave. Eight bits of information are transmitted from the slave as shown in the following bit pattern:



These are further defined as follows:

IPL Status: - a high level indicates to the host CPU that the slave is just powered on.

Line Error: - a high level indicates to the host CPU the slave detected a parity error during a transmission from the host CPU to the slave.

Main Parity Error: - a high level indicates the slave has detected a parity error in its own memory.

Device Type: - defines the type of slave connected to the data link by reading device type ID.

Further Data Link commands include:

RESTART commands reset the Slave CPU on command from the host CPU.

WRITE and READ commands may each transfer either 1 byte or 256 bytes. A one-byte command transfers a single DMA cycle. A 256-byte command transfers a single page of data.

WRITE DATA (1 byte) commands the Slave to receive data (one DMA cycle) from the host CPU on command.

WRITE BYTE (256 bytes) commands the Slave to receive data (one page) from the host CPU on command.

READ DATA (1 byte) commands the Slave to send data (one DMA cycle) to the host CPU on command.

READ BYTE (256 bytes) commands the Slave to send data (one page) to the host CPU on command.

1.10.5.2 Data Path Logic Function

The data path defines the path by which information bytes are transferred between the serial data link and the data bus, address bus, command register, or status register.

The 2258 Option portion of the data link normally monitors the serial, half-duplex transmission line. The first "1" detected by the differential line receiver causes a timing circuit to count out the eleven-bit intervals needed for a byte transfer. When the last bit of the serial/parallel shift register has been loaded, line parity is tested, the first byte of information is loaded into a command register, and, in some cases, a DMA bus request is initiated. Since stray line noise may start the timing circuits, three bits in the first byte are checked for a special header character. The remaining bits can be decoded to indicate a command if and only if the header is correct.

After the first byte has been transmitted, data link operation depends on the decoded command. A Data Transfer command (Read or Write) loads the next two bytes into the high and low address registers, respectively. The low address register is a counter that increments the DMA byte address following each transfer. A 256-byte transfer command ends when the address counter overflows. For Write operations, a data byte(s) immediately follows the low half of the address. For Read operations, line-control logic must reverse the half-duplex line before data can be sent to the host CPU. A built-in delay (8 microseconds) provides time for the line to quiet before data is transmitted.

Non-data commands (Status and Restart) do not transfer an address. Restart generates a 1.8-microsecond reset pulse to the 2258 Option CPU. Status causes a Data Link Status Word to be transmitted to the host CPU after a line reversal. The host CPU monitors each command during its execution and clears the Data Link when the command has been completed.

1.10.5.3 Timing Logic Function

Timing is normally enabled to receive data. Timing logic recognizes the start bit preceding each byte and determines when the entire byte has been received. It also provides bit timing when information is transmitted to the host CPU. During Read and Status commands, timing logic clears timing during line reversal and maintains continuous timing while transmitting.

1.10.5.4 Line Control

Line control ensures that the Data Link is ready to receive command inputs from the host CPU when the Data Link is not in use, determines that the line is quiet before reversing the half-duplex line, generates and checks line parity on each byte, and clears the Data Link both after each command and in the event of a line failure.

Line Control logic interlocks the Data Line Drivers and Receivers to ensure that the 2200 system does not transmit into itself. The Line Drivers are disabled until they are required to transmit data or status to the host CPU during a specific command.

1.10.5.4.1 Command Decode Logic Function

This function decodes and validates commands from the host CPU after a valid command (three-bit header) has been recognized.

1.10.5.5 Bus Requests And DMA Operation

Bus Requests are generated by the Data Link when a non-processor device requires direct memory access (DMA) for a data transfer. DMA transfers typically move blocks of data between main memory and mass storage devices. DMA operations have a higher priority than CPU operations due to real-time requirements.

Before a DMA device can use the bus it must gain control of the bus from the CPU. The CPU permits it to do so by recognizing the presence of a Bus Request and disabling its own bus inputs and outputs as soon as its current machine cycle has been completed. The CPU indicates when the cycle is complete by asserting Bus Acknowledge. The DMA device now has control of the bus for as long as Bus Request remains asserted.

Since CPU bus-control logic is not available to supply data transfer timing or to initiate refresh cycles during a DMA operation, separate DMA bus timing must be provided by the DMA device. This occurs automatically by applying low order address bits during RAS cycles. During a 256-byte transfer, all memory locations get refreshed by the byte counter.

DMA Enables permit selected devices to place DMA addresses and data onto the system bus. DMA Enables also ensure that only the selected device is allowed to control the main memory write control lines.

1.10.6 I/O DECODERS

The Z-80 uses IN and OUT instructions to transfer data to and from input/output devices. These instructions, combined with the assertion of IOREQ, distinguish memory addresses from the addresses of I/O ports. The Z-80 design allows for 256 discrete I/O ports to be assigned using the eight least significant bits of the address bus (A0 - A7). The I/O decoders decode these address lines to provide single chip enable lines for each I/O address. The I/O decodes are summarized below.

Table 1-2. Z80A Input Commands

I/O	Input Commands
IN00-03, 08 0D, 0E, 0F	Not Assigned
IN04	Read Disk Data Buffer, Don't Clear Enable Latch
IN05	Read Disk Data Buffer and Clear Enable Latch
IN06	Read Disk Address/Event Register
IN07	Device type Read by Z80A, Master Device Type Read by Data Link
IN09	Read Communications Data Buffer, Don't Clear
INOA	Read Communications Data Buffer And Clear
INOB	Read Communications Address/Event Register
INOC	Read READY/BUSY Register

Table 1-3. Z80A Output Commands

I/O	Output Commands
OUT00-03, 07, 0F	Not Assigned
OUT04	Select PROM (D0=1)
OUT05	Z80 Set Ready
OUT06	Clear Parity Error
OUT08	Write to 2200 (IB9=0)
OUT88	Write to 2200 (IB9=1)
OUT09	Select Extra 16K Memory (D0=1)
OUTOA	Write Bad Parity (D0=1)
OUTOB	Disable NOP's (D0=1)
OUTOC	Clear Disk Buffer Full
OUTOD	Clear Communications Buffer Full
OUTOE	Enable Data Link

1.10.7 2200 BUS INTERFACE

The 2200 Host Bus Interface section of the 2258 Option board provides the interface circuitry required for the Z80-based 2258 Option board to interface to the 2200 system. The 2200 Host system takes the initiative for I/O exchange with the 2258 option board, thus the option board can not initiate transactions with the 2200. The 2200 system determines the I/O device located on its bus by addressing the device.

The 2258 Option board is designed to compare the 2200's host addressing code with the addresses associated with the link. If the board identity matches the device addressed by the 2200 host, the option board becomes enabled and allowed to exchange I/O. The 2200 host can disable the 2258 option board by addressing a different device.

The 2258 option board 2200 Bus Interface contains two separate and distinctive 2200-type devices, namely; 2200-type disk device and 2200-type communications device.

The 2200-type disk device is switch selectable and is selectable to 10H, 20H, or 30H. The 2200-type disk device provides the functional equivalent of the 2200 disk controller and is used to accomplish the Virtual Disk (VDISK) requirement. When the disk address matches the disk switch setting on the 2258 Option board, this information is made available to the processor which determines the READY and BUSY status.

The 2200-type communication device address is switch selectable and is determined by software. the communications device has uncommitted applications and is used for VS terminal emulation and data traffic for DMS (Data Management System).

The 2200 Bus Interface provides the Z80 with three registers where STATUS, COMMAND, and DATA may be written to or read from to reflect the option board's READY or BUSY condition. The interface functions are summarized as follows:

The 2200 host takes the initiative for I/O exchange with the option board. (The 2258 Option can not initiate transactions with the host 2200.) The default condition for the 2258 option board is BUSY.

When the 2200 host wishes to exchange I/O with the 2258 option, the 2200 transmits one of the board's addresses on the address bus AB8 - AB1. The 2258 option board compares the address to its switch selectable address and, if a match occurs and the Z80 is not busy, the 2258 option sets READY.

1.11 SPECIFICATIONS

Number of Sessions:

4 workstation sessions or 3 workstations sessions and one VS filing session per controller.

2200 to VS Connection:

Operating Mode:
Asynchronous, polled
Data Format:
Serial, 11-bit format
Data Rate:
4.27 Mbps
Transmission Medium:
Dual Coax baseband cable

2200 System Requirements:

MVP OS Release 2.7 or greater (Requires 28K Control Memory)

Adding File Access Subroutine to a BASIC-2 application increases program size by 5-7K.

NOTE

2200 Series Keyboards Special Functions Keys Will Correspond to VS Workstation Keys Once VS Emulation is Selected. Refer to Paragraph 1.4.1; Table 1.

Any 2336DE, 2336DW, 2226DW, 2236DE/DW, 2326DW, 2436DE, 2436DW, or 2426DW workstation can be used to run Workstation Emulation.

VS System Requirements:

Operating System Version 7.10.10 or greater.

One unused serial port per 2258 option. This port must be configured for a 2258 device using VS GENEDIT program.

Workstation Emulation Only will function with Operating System Version 6.43 or greater.

1.12 ILLUSTRATED PARTS

The 2258 Option PCA (210-8576-A) is an unit swap item. In the event of failure, replacement of the PCA is required.

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