EK-VSV21-PSG-003

VSV21
Version 2.0

Pocket Service Guide

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WARNING

Some of the procedures described on this guide call for the removal of system covers. Such procedures should only be performed by suitably trained personnel. For the user, this material is provided for information only.

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FIGURES

TABLES

1 INTRODUCTION

The VSV21 is a single-module quad size option for the Q22 Bus. It is a high functionality graphics control module capable of working on the following processors:

- PDP11/23+
- PDP11/53
- PDP11/73
- PDP11/83
- MicroVAX II

It is capable of interfacing with:

- A color monitor
- An LK201 keyboard
- A pointing device (joystick, trackball, mouse, tablet)
- A serial interface (example DHV11)

When the VSV21 is interfaced to the host processor via its serial interface, it can be configured to emulate a basic terminal. In this configuration the Q22 bus interface is not used, and the VSV21 can be used as the host console terminal.

Full graphics functionality is obtained by down-loading firmware from the host VSV21 device driver.

The strategy for testing the VSV21 is to use the power-up self-test and the host-resident diagnostic to isolate the faulty FRU. The VSV21 FRU's are:

- M7656 quad module

- Panel assembly (70-20091-01) for standard VSV21 option

or

- Bulkhead panel (70-24336-01) for VSV21 Peripheral Concentrator(PC) opt
- Data cable (70-20093-01) 12 inch for BA23 housing

or

- Data cable (70-20093-02) 30 inch for BA123 housing

or

- Data cable (70-20093-03) 36 inch for BA11S/H9642 housing
- Video cable (70-20094-01) 12 inch for BA23 housing

or

- Video cable (70-20094-02) 30 inch for BA1123 housing

or

- Video cable (70-20094-03) 36 inch for BA11S/H9642 housing
- Fuse 3.0 amp (12-10929-07) (+5 volt peripheral device fuse)
- Fuse 3.0 amp (12-10929-07) (+12 volt peripheral device fuse)
- Remote interface box (RIB) assembly (70-24335-01)
- RIB power supply (30-21558-01)
- Fuse 1.0 amp (90-07212-00) (RIB AC mains supply fuse)

Figure 1-1 shows the components that make up a typical standard VSV21 option kit.

Note that the loopback test connectors do not form part of the option kit, and must be separately provided (VSV21-AJ option).

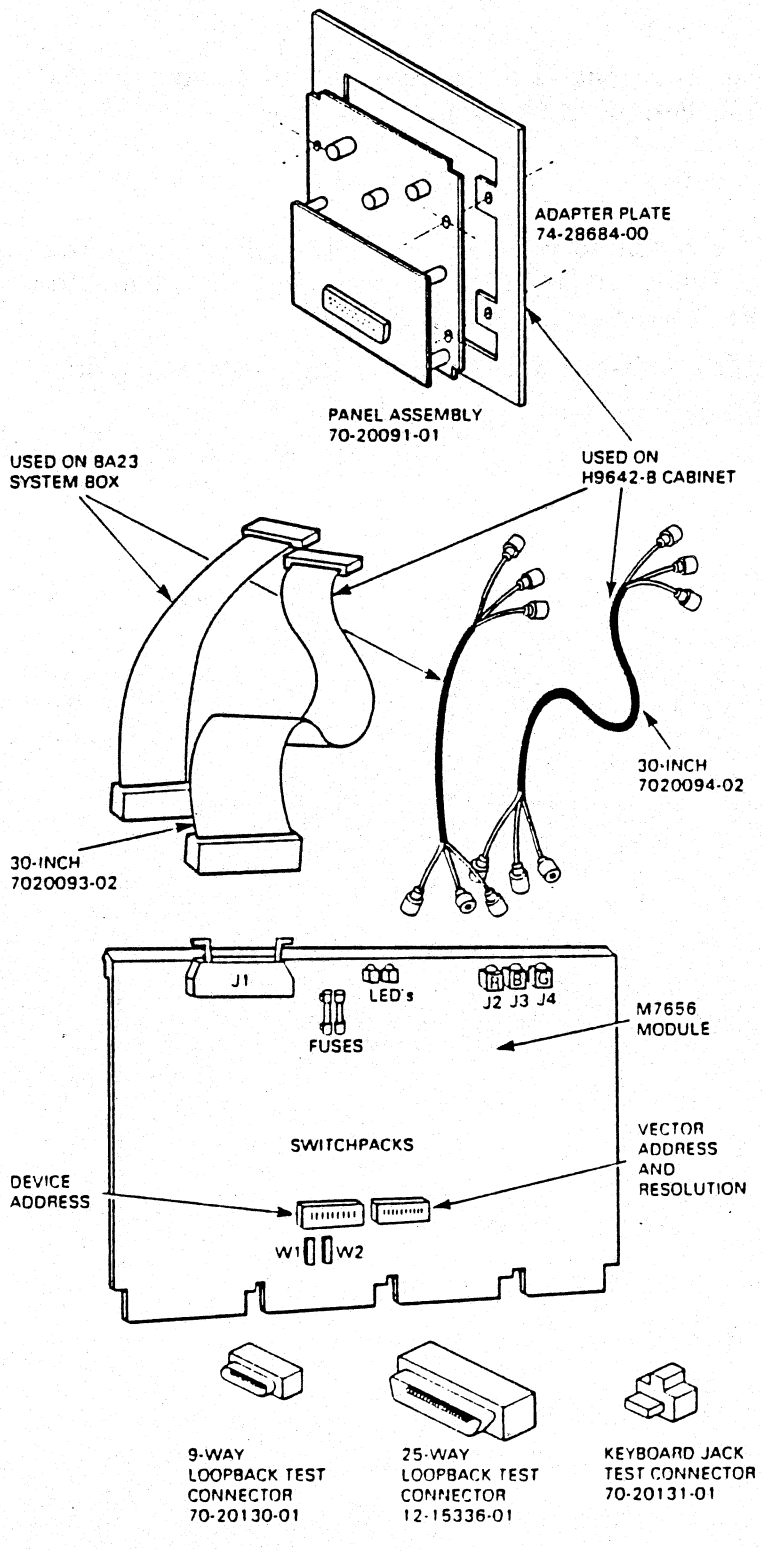

Figure 1-1 Standard VSV21 Option Kit Components

Figure 1-2 shows the components that make up the VSV21 Peripheral Concentrator option kit.

Note that:-

- The bulkhead panel 70-24336-01 replaces the panel assembly 70-20091-01 supplied with the standard VSV21 option kit (see figure 1-1)
- The loopback test connectors form part of the option kit.

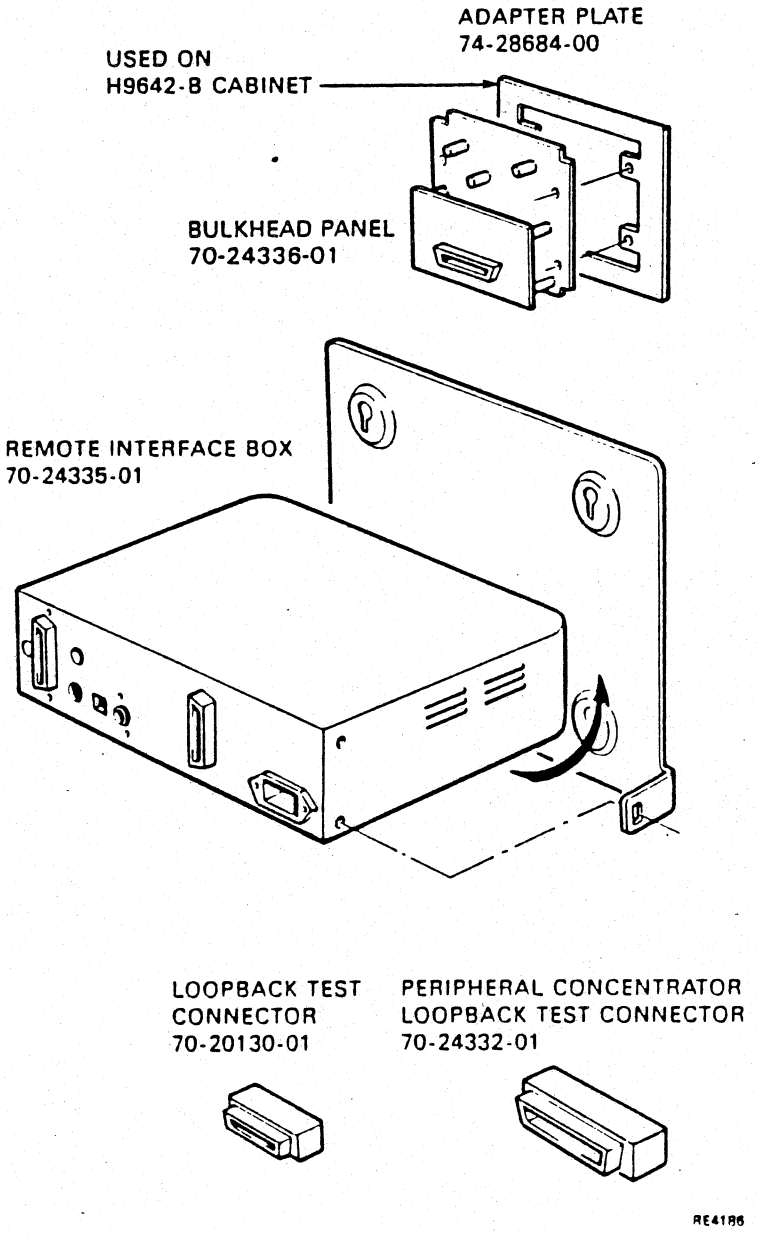

Figure 1-2 VSV21 Peripheral Concentrator Option Kit Components

2 CONFIGURATIONS

Figure 2-1 shows a block diagram of a typical standard VSV21 system configuration.

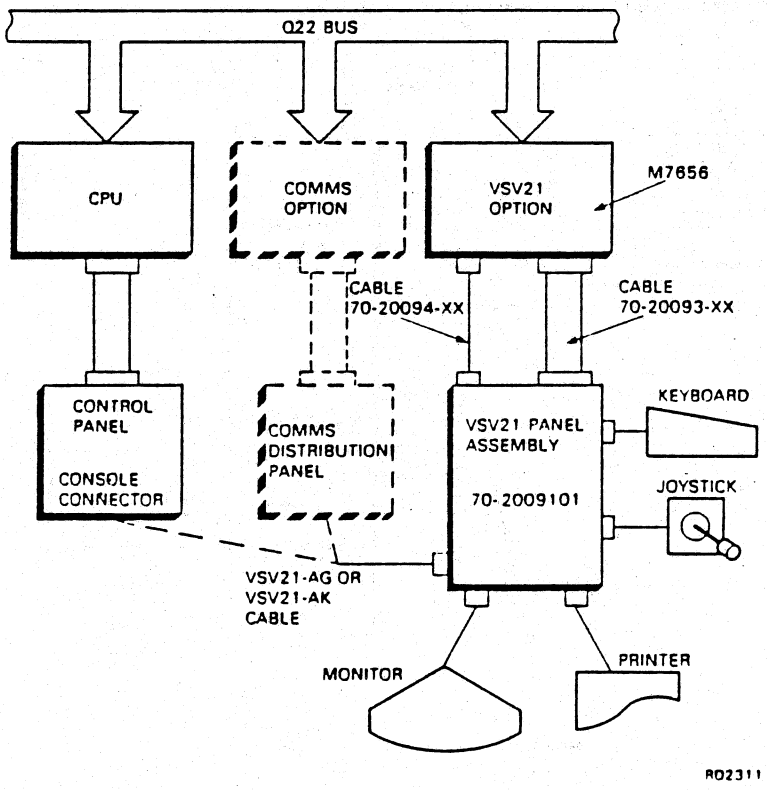

Figure 2-1 Standard VSV21 System Configuration Block Diagram

Figure 2-2 shows a block diagram of a typical VSV21 Peripheral concentrator system configuration.

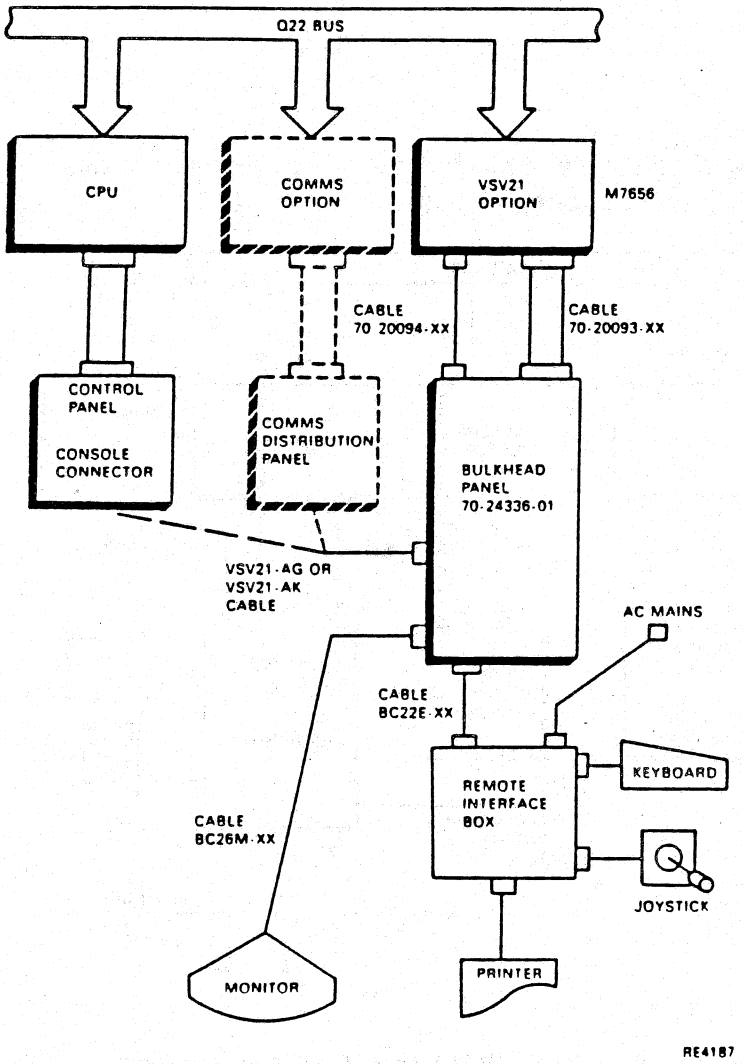

Figure 2-2 VSV21 Peripheral Concentrator System Configuration Block Diagram

Note that the VSV21 can also be configured to function as a system console, and as such is used to boot/set-up the system.

2.1 POWER/BUS REQUIREMENTS

The power requirements are:

5.5 A (typical), 7.6 A (maximum) at +5 V dc

0.15 A (typical), 0.2 A (maximum) at +12 V dc

1.9 Q-bus ac bus loads

0.5 Q-bus dc bus loads

2.2 ADDRESS/VECTOR RANKING

The VSV21 rankings are both in the floating space:-

	Rank	Size	Modulus (octal)
Address -	49	4	10
Vector -	77	2	4

NOTE

To ensure compatibility with the diagnostics on MicroVAX II installations, the device addresses/vectors are required to be set to the following fixed values:-

Dev No.	Address	Vector
1	7772000	300
2	7772010	320
3	7772020	340
4	7772030	360

2.3 MONITOR SECTION

Refer to Table 2-1 which shows the E48 switch settings for selecting the graphic resolution. Ask the customer what resolution is required and adjust the switches accordingly.

VSV21 is designed to work with 60Hz Non-Interlaced Monitors of either 16kHz (nominal) or 32 kHz (nominal) line frequency. The video signals are compatible with RS343 specified voltage levels with sync on green and standard should option be terminated in a 75 ohm impedance.

Table 2-1 Graphic Resolution Selection Guide

E48 9	Switch 10	Resolution (pixels)	Line Frequency kHz
ON	ON	512 × 512	33
ON	OFF	512 × 256	16.5
OFF	ON	640 × 480	32
OFF	OFF	640 × 240	16

2.4 SWITCH SETTING

Switch 8 in switchpack E48 is used to disable the module's response to BUSINIT signals. If the VSV21 is used as a system console, it will normally respond to BUSINIT signals and clear the display when it enters selftest. This may give rise to problems in running diagnostics on other modules. Switch 8 can be moved to disable the response to BUSINIT signals and should be returned to ON on completion of diagnostic testing.

Switch 8 is OFF to disable the module's response to BUSINIT signals and ON to enable the module's response to BUSINIT.

The jumpers W1 and W2 should be installed when the M7656 module occupies a Q/Q slot, and should be removed when it occupies a Q/CD slot.

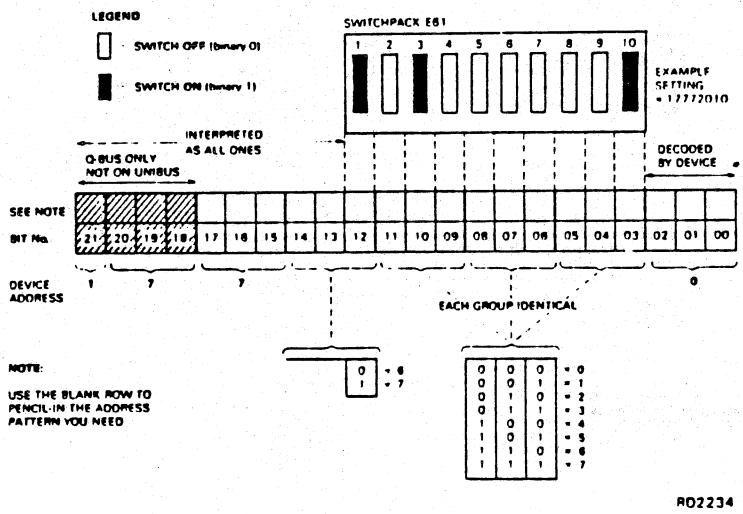

Figure 2-3 Device Address Setting Guide

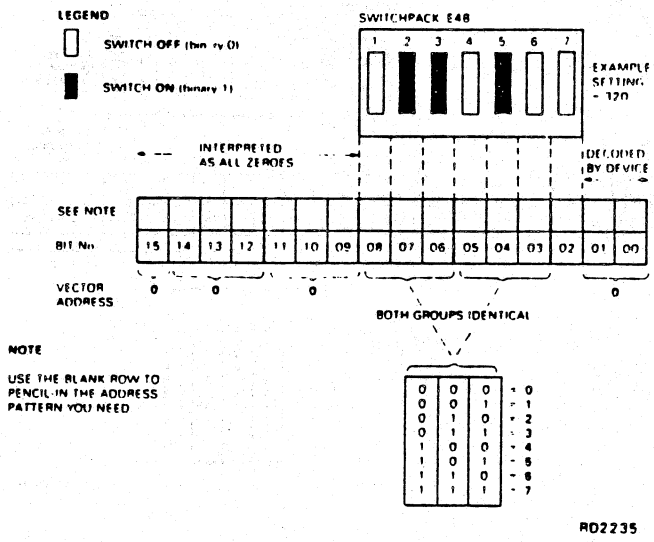

Figure 2-4 Vector Address Setting Guide

2.5 SERIAL PORT DEFAULTS

The VSV21 module serial interfaces are configured to the following default settings. Other settings must be entered on replacement modules:

- Port 0 KEYBOARD 8-data bits, 1 Stop bit, No Parity, 4800 Baud
- Port 1 HOST PORT 8-data bits, 1 Stop bit, No Parity, 9600 Baud
- Port 2 POINTING DEVICE 8-data bits, 1 Stop bit, No Parity, 9600 Baud
- Port 3 TRANSPARENT SERIAL 8-data bits, 1 Stop bit, No Parity, 9600 Baud

Other default settings can be entered and saved on the module. Check to see if the customer has altered and saved the default settings. When a module is replaced, it must be correctly altered and the settings saved so that the module is compatible with its peripherals.

2.6 REMOTE BOX INTERNAL POWER SUPPLY

The VSV21 PC remote box has an integral power supply which has been configured in manufacturing to accept the local mains supply ie. 110-120/220-240V. See figure 6.1.

3 ON-BOARD SELF-TEST

The VSV21 contains an on-board diagnostic held in ROM, which runs on power-up.

To run the tests, you must first make sure the power is turned OFF and you must gain access to the module cage by removing the covers from the appropriate housing box.

Locate the M7656 module and the position of the two on-board LEDs. See Figure 1 for the layout of the module. The LEDs will give an indication when the diagnostics are running.

Now turn the power ON.

The result of the on-board diagnostic tests is displayed on the monitor screen and on the Red and Green LEDs in the following way:

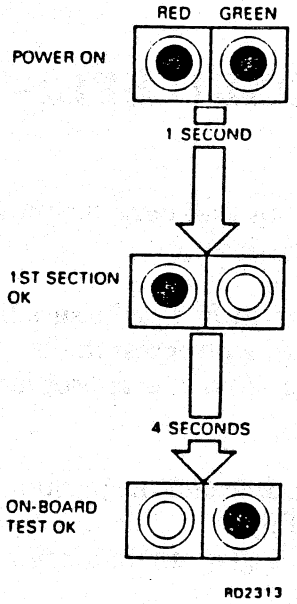

Figure 3-1 On-Board Diagnostic LED Indication

Figure 3-2 shows the picture that is displayed on the monitor screen. If you do get the TEST OK indication but not the correct picture, use the trouble-shooting flow charts shown in Chapter 6 to identify the problem.

The test picture remains on the screen until:

- The host software starts to use the VSV21 by down-loading to it or
- A key is pressed on the attached keyboard or
- On selecting the version of the attached LK-201 keyboard.

Either of the last two will cause the option to enter the terminal emulation mode.

If the keyboard version has not been permanently saved in NVRAM, then it can be selected after the completion of every power-up self-test. If it has been saved, then it can only be changed either by software control or by running the Parameters Reset test of the diagnostic suite.

The test picture displayed gives an indication if the keyboard version has been saved or not. If not, it displays the message NVRAM X on a Red rectangular background. You can now enter the number associated with the keyboard version; then press the RETURN key and the VSV21 will clear the display and enter terminal emulation mode (see Appendix B for list of LK201 keyboard versions and the associated number code required.

If the keyboard version has been previously saved, then the picture will display the message NVRAM v on a Green rectangular background. The keyboard version can only be changed by either program control or by clearing the NVRAM using the diagnostic programs. Press the RETURN key and the VSV21 clears the screen and enters the terminal emulation mode.

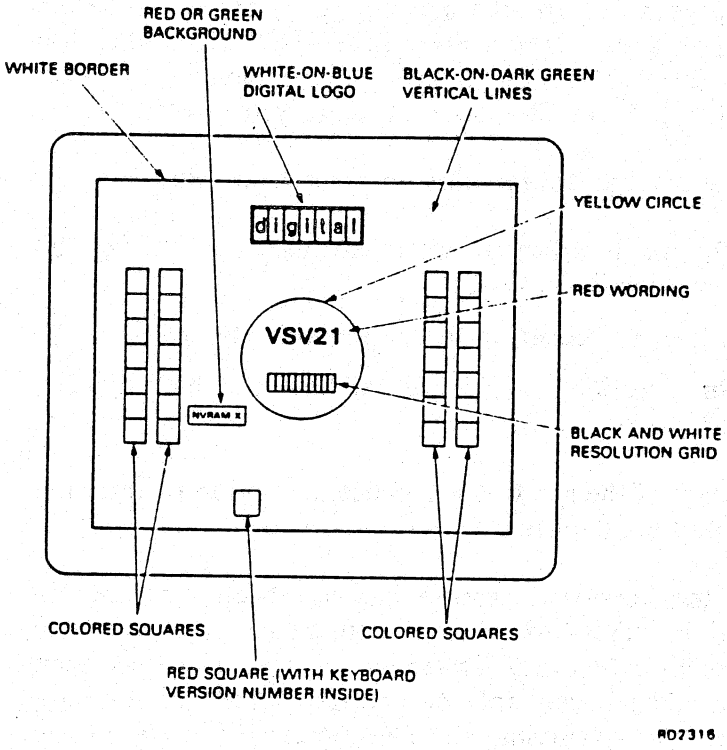

Figure 3-2 Self-Test Test Picture

If you do not get the TEST OK indications, then:

1. Turn off all power

CAUTION
Always switch power OFF before inserting or removing modules. Be careful not to snag module components on the card guides or on adjacent modules.

Take anti-static measures to protect the M7656 module when handling.

2. Disconnect and remove M7656 module
3. Make sure that all switchpack switches are correctly set.
4. Return the module into its slot and re-connect it
5. Turn the power on again, and check the LEDs again If tests still do not pass, replace the M7656 module.

6. (Standard VSV21 Option Only).Check that the fuses on the M7656 module are not blown by checking that +5 volts is available at pin 11, and +12 volts at pin 18 of the 25-way D-type connector on the I/O bulkhead panel. Use pin 1 or pin 7 as the common return. Fuse F1 is for the 12 volt supply, and F2 for the 5 volt supply. Replace any faulty fuses. The rating should be 3.0 amps.

WARNING
Do NOT plug-in or unplug the keyboard or the pointing device while system power is switched ON. The current surge will blow the module fuses. Always plug-in or unplug, with the power switched OFF. (This warning does not apply if the VSV21 PC option is installed.)

7. (VSV21 PC option only). Check that the +5 volt LED on the remote interface box is lit. If the LED is not lit,momentarily press the +5V RESET pushbutton on the box. If the LED does not then light and remain lit, and the pushbutton remain locked-in, switch OFF the ac mains supply and check for a short circuit on the +5V external supply. If no short circuit can be found, check and replace the following as necessary:
   - Remote interface box mains supply fuse
   - Remote interface box power supply (See figure 6.1)
   - Remote interface box

4 DIAGNOSTIC PROGRAMS

NOTE
When the VSV21 is used as the host console terminal, it is not possible to run the host-based diagnostics for module testing, and also get back error messages. Therefore, when used as the console, only the on-board self-test can be run. However, it is possible to run the diagnostic on the VSV21 used as a host console if another terminal is connected temporarily to the host port of the system. Diagnostics can be run on all other modules in the system while using the VSV21 as a console terminal, provided the module is set to DISABLE response to BUSINIT signals.

4.1 XXDP+ — PDP SYSTEMS

Diagnostic Module Name CZVSW?? (?? = revision level)

Basic Functionality Tests (Diagnostic Tests 1-16)

— Fit the loopback test connectors

— BOOT XXDP+

— Answer System Questions

— R(UN) ZVSW??

— At the DR> prompt enter STA/FLA:UAM press RETURN

— Answer the CHANGE H/W (L)? query with Y press RETURN

— Enter the number of units under test after UNITS (D)? prompt

— Enter device and vector addresses for each unit

— The tests will start and will execute all the non-interactive (UAM) tests

— Type CONTROL-C to return to command mode

Manual Intervention Tests

(A) Test 17 NVRAM Read/Write Test

1. Type STA/TEST:1-2:17/PASS:1 press RETURN
2. Respond to questions and prompts

NOTE
This test may change the settings of the NVRAM. Refer to Chapter 6 and Appendix D for further details about the NVRAM

3. Type CONTROL-C to return to command mode

(B) Test 18 Display Test Pictures

1. Type STA/TEST:1-2:18/PASS:1 press RETURN
2. Respond to all the questions and prompts generated by the tests

(C) Test 19 Keyboard Confidence Test

1. Type STA/FLA:LOE/TEST:1-2:19/PASS:1 Press RETURN
2. Press up to six different keys and check for correct code (see Appendix B)

(D) Test 20 Pointing Device Confidence Test

1. Type STA/FLA:LOE/TEST:1-2:20/PASS:1 Press RETURN
2. Respond to instructions and prompts generated by the test
3. Check direction of movement of pointing device is shown correctly

(E) Test 21 Peripheral Confidence Test

1. Type STA/FLA:LOE/TEST:1-2:21/PASS:1 Press RETURN
2. Select Port to be tested
   (i) Port 0 = Keyboard port, 4-way jack
   (ii) 1 = Host port, 9-pin D-type (J3)

(iii) 2 = Pointing device port, 25 pin D-type (J4)

(iv) Port 3 = Transparent serial port, 9-pin D-type (J5)

3. If output is selected, then the test will output a fixed ASCII string as follows:-

/!@#$%^ &*()_+ 1234567890qwertyuiop{}asdfghjkl;'/

4. If input is selected, the first 16 characters input to the port are displayed on the console running the test. The data is displayed as 8 pairs of octal numbers.

This test should only be run when there is no specific test for the peripheral device.

(f) Test 22 Control Parameter Reset Test

1. Type STA/TEST:1-2:22/PASS:1 Press RETURN
2. Diagnostic will display warning about limited NVRAM life
3. Respond to instructions and prompts generated by the test

4.2 DECX-11 PDP SYSTEMS

Exerciser Module Name — CXVSV?? — (?? = revision level)

Each module will exercise up to 4 consecutively addressed modules. The device addresses should be at 10 (octal) spacing and the vectors should be at 4 (octal) spacing. The vector spacing can be changed by modifying Location 704.

Modules not addressed consecutively will need to be exercised via separate modules.

4.3 MDM — MICROVAX II SYSTEMS

(a) Diagnostic Module Name — NAVVA? — (? = revision level)

(b) Device mnemonic — VSV21? (? = device number)

The MDM diagnostic for VSV21 is available in the general release of the MicroVAX Maintenance System (MMS). Tests of the VSV21 can be selected in either the MENU or COMMAND LINE mode of the MicroVAX Diagnostic Monitor (MDM) Refer to the MDM User Guide (AA-FM7AA-DN) or the MicroVAX System maintenance manual (ZNABX-GZ) for further details.

4.3.1 Basic Functionality Test (Diagnostic Tests 1-15)

v = Verify Mode

s = Service Mode

1v = In Depth Q-22 Bus Test

2v = ROM Checksum Test

3v = NVRAM Checksum Test

4v = RAM Test

5v = RAM Addressing Test

6v = 68000 Processor Test

7v = Internal Exceptions Test

8v = ACRTC Internal Test

9v = ACRTC External Test

10v = Illegal Command Test

11s = Basic DUART Test — Loopback Connectors Required

12s = Full DUART Test — Loopback Connectors Required

13s = Full On- Board Test — Loopback Connectors Required

14s = Internal Loopback Test — Loopback Connectors Required

15s = External loopback Test — Loopback Connectors Required

Tests 1 through 10 are tests of the module itself and failure of any of them should result in the need to exchange the VSV21 module.

Tests 11 through 15 are tests of the serial ports of the module and require the fitting of the loopback connectors to the serial ports on the I/O panel. Failure of any of these tests indicate a problem in either the module, the internal data cables, the I/O panel or the loopback connectors themselves.

Exerciser Tests

(a) 1v — Verify DMA Test

(b) 2v — Verify Screen Exerciser

(c) 3s — Service Exerciser — Loopback Connectors Required

Utilities Manual Intervention Test

NOTE
For tests 4, 5, and 6, the user has the option to extend the timeout for use with VSV21 PC option.

1. Monitor Test Picture Utility

   Follow diagnostic prompts to select required test picture

2. NVRAM Reset Utility

   Follow diagnostic prompts to clear the NVRAM so that default settings will subsequently be used.

3. On-Board Error Control Utility

   Leave at default setting, Halt on Error

4. Peripheral Confidence Test Utility

   Select port to be tested

   (a) Port 0 = Keyboard port, 4-way jack (J2)

   (b) Port 1 = Host port, 9-pin D-type (J3)

   (c) Port 2 = Pointing device port, 25-pin D-type (J4)

   (d) Port 3 = Transparent serial port, 9-pin D-type (J5)

   If output is selected, then the test will output a fixed ASCII string as follows:-

!@#$%^&*()_+1234567890QWERTYUIOP{}asadfghjkl;'/

   If input is selected, the first 16 characters input to the port are displayed on the console running the test. The data is displayed as 8 pairs of octal numbers.

   This test should only be run when there is no specific test for the peripheral device.

5. Keyboard Confidence Test Utility

   This utility displays the ASCII code (in decimal) of the first six keys pressed after the test is started. Verify the codes by comparing them with the table in Appendix B.

6. MSI Pointing Device Test Utility

   This utility will output the data received from an MSI Pointing Device.

   Check direction of movement of pointing device is shown correctly.

7. NVRAM Read/Write Test Utility

   Follow diagnostic prompts to test NVRAM.

   NOTE
   This test may change the settings of the NVRAM. Refer to Chapter 6 and Appendix D for further details about the NVRAM.

8. VSV21/VSV90 Selection Utility

   If a VSV21 is being tested, there is no need to select this test.

5 INSTALLATION

To install the option, the following tasks need to be performed:

- Check that all the option items are available
- Check that there is space and power available in the selected backplane
- Configure the M7656 module for correct addresses and graphics resolution

  CAUTION
  Take anti-static measures to protect the M7656 module when handling.

- Plug the module into the host box backplane.
- Attach the I/O bulkhead panel 70-20091-01 (standard VSV21 option) or 70-24336-01 (VSV21 PC option) to the host system box/cabinet. (Use the adapter panel with an H349, see Figures 1-1 and 1-2).
- Install and connect the cables between the module and the I/O panel.
- Connect a host serial port (console) to the VSV21 serial port (if needed).
- Install the remote interface box (VSV21 PC option only).
- Check for correct local mains : ie. 110-120/220-240V
- Connect the data link cable between the I/O bulkhead panel and the remote interface box (VSV21 PC option only).

- Connect any of the peripherals such as the keyboard, colour monitor, pointing device and printer. For the standard VSV21 option, this connection is made direct to the I/O bulkhead panel. For the VSV21 PC option, the keyboard, pointing device and printer are connected to the remote interface box; the colour monitor connects direct to the I/O bulkhead panel via the video cable assembly.

  WARNING
  Do NOT plug-in or unplug the keyboard or the pointing device while system power is switched ON. The current surge will blow the module fuses. Always plug-in or unplug with the power switched OFF. This WARNING does not apply to the VSV21 PC option.

- Power ON and check the on-board diagnostic LED indications, and check the monitor display picture
- Run appropriate diagnostic programs to verify that all installed items are operating correctly.

6 TROUBLESHOOTING

NOTE
The VSV21 uses a non-volatile RAM (NVRAM) to store various parameters associated with the configuration of the module. These settings can be altered by the customer under program control. Be aware that some problems reported can in fact be due to an incompatibility between these settings and the requirements of the peripherals connected to the VSV21. Refer to Appendix D for further information about the NVRAM.

Note that probable causes/remedies assume that all previous steps in the flow-chart have been executed successfully.

Table 6-1 Troubleshooting Procedures for Standard VSV21 Systems

Probable Cause	Remedy
STEP 1 Remove cover to see LEDs	
Power-up system	
Self-test OK ? YES NO	
No power to module	Repair host system
Faulty module	Replace module
YES	

Table 6-1 Troubleshooting Procedures for Standard VSV21 Systems (Cont.)

Probable Cause	Remedy
STEP 2	
Check O/P voltages on I/O panel	
Are voltages OK ?	
YES **NO** ↓	
Host power supply fault	Repair host system
On-board fuses blown	
Faulty cable or I/O panel	Check connections and replace
Faulty module	Replace module
STEP 3	
Is Test picture O.K?	
YES **NO** ↓	
1 No Picture	
Wrong cable connections	Check carefully
Broken connection	Find and replace broken item
Monitor not set-up	Adjust monitor
Module faulty	Replace module
2 Incomplete Picture	
Module faulty	Replace module
3 Incorrect colours	
Wrong connection	Check carefully
Broken connection	Find and replace broken item
Monitor not set-up or faulty	Check/adjust monitor
Module faulty	Replace module

Table 6-1 Troubleshooting Procedures for Standard VSV21 Systems (Cont.)

	Probable Cause	Remedy
	4 Picture distorted Monitor not set-up	Adjust monitor
	5 Picture present but not stable	
YES	NO →	
	Monitor not set-up	Adjust monitor to sync with incoming signal Check termination of all video cables Set monitor to internal sync. (sync on green)
	Incompatible resolution/line frequency	Check resolution switches
	6 Multiple 'stretched' images or Incompatible resolution/line frequency	Check resolution switches
	STEP 4 Type any key or select LK-201 version on keyboard to clear screen	
	Go to Step 5 if no keyboard Is screen clear ?	
YES	NO → Picture complete?	
	NO → Self test failed	Replace module
	YES Keyboard Disconnected	Check connection
	Faulty keyboard	Replace keyboard

Table 6-1 Troubleshooting Procedures for Standard VSV21 Systems (Cont.)

Probable Cause	Remedy
STEP 5	
Is VSV21 configured as system console ?	
YES	
NO	
Fit loopback connectors and test basic configuration.	
Test error-free ?	
YES	
NO	
1 No device on selected CSR	
Address switches wrong	Reset switches
Module faulty	Replace module
2 Interrupt Test fails	
Vector switches wrong	Reset switches
Module faulty	Replace module
3 Loopback Test fails	
Missing loopback connector	Fit connector
Open connection from module to I/O panel	Check and replace
Remove loopbacks and attach peripherals.	
Run Peripheral Confidence Tests.	
Are tests error-free ?	
YES	
NO	
FINISH	
1 Pointing Device or Printer Fault	
Wrong baud rate	Reset baud rate*
Open connection in device cable	Check and replace

Table 6-1 Troubleshooting Procedures for Standard VSV21 Systems (Cont.)

	Probable Cause	Remedy
	Faulty device	Replace device or advise customer
	2 Keyboard Fault	
	Faulty keyboard	Replace keyboard
	Open extension cable	Replace cable
	3 Faulty picture	Refer to table of causes and remedies in Step 3 of flow chart
STEP 6 Fit loopback connector to host port on I/O panel. Type on keyboard. Is echo on screen correct ?		
YES	**NO** →	
	1 Faulty drivers on module	Replace module
	2 No Echo	
	Open connection from module to I/O panel	Check and replace cable
	Faulty module	Replace Module
	Host port missing loopback connector	Fit connector
FINISH		

*

Replacement modules will be set to the default communications settings and may not match the peripheral requirements. If so, ask the customer to set the VSV21 communications settings to the required parameters.

Table 6-2 Trouble-Shooting Procedures for VSV21 PC System

Probable Cause		Remedy
STEP 1		
Remove cover to see LED's		
Power-up System		
Self-test O.K?		
YES	**NO** →	
	No power to module	Repair host system
	Faulty module	Replace module
STEP 2		
Is Test Picture O.K?		
YES	**NO** →	
1 No Picture		
	Wrong cable connections	Check carefully
	Broken connection	Find and replace broken item
	Monitor not set-up	Adjust monitor
	Module faulty	Replace module
2 Incomplete picture		
	Module faulty	Replace module
3 Incorrect colours		
	Wrong connection	Check carefully
	Broken connection	Find and replace broken item
	Monitor not set-up or faulty	Check/adjust monitor
	Module faulty	Replace module
4 Picture distorted		
	Monitor not set-up	Adjust monitor

Table 6-2 Trouble-Shooting Procedures for VSV21 PC System (Cont.)

	Probable Cause	Remedy
	5 Picture present but not stable Monitor not set-up	Adjust monitor to sync with incoming signal
		Check termination of all video cables
		Set monitor to internal sync. (sync. on green)
	Incompatible resolution/line frequency	Check resolution switches
STEP 3 Type any key on keyboard to clear screen or select LK-201 version Go to Step 4 if no keyboard Is screen clear?		
YES	**NO** → Picture complete?	
	NO	**YES** →
	Keyboard disconnected	Check connection
	Remote interface box disconnected	Check connections to keyboard, I/O panel and mains supply
	Faulty keyboard	Replace Keyboard

Table 6-2 Trouble-Shooting Procedures for VSV21 PC System (Cont.)

Probable Cause	Remedy
Faulty remote interface box	Check remote interface box mains supply fuse and power supply
Self-test failed	Replace module

STEP 4

Is VSV21 configured as System Console?

YES

NO

Boot XXDP+ Verson 2

Run ZVSWB?

Fit loopback connectors to* PD1, KBD and AUX ports on remote interface box

Fit host loopback connector* on I/O panel

Test basic configuration

Test error-free?

YES

NO

1 No device on selected CSR	
Address switches wrong	Reset switches
Module faulty	Replace module

Table 6-2 Trouble-Shooting Procedures for VSV21 PC System (Cont.)

Probable Cause	Remedy
2 Interrupt test fails	
Vector switches wrong	Reset switches
Module faulty	Replace module
3 Loopback test fails	
Missing loopback connector	Fit connector
Open connection from module to remote interface box ports	Fit PC loopback connector to data link port on I/O panel
Repeat loopback test	
Test error free?	
YES	NO →
	Open connection from module to I/O panel — Check and replace
Refit data link cable to I/O panel	
Fit PC loopback connector to remote end of data link cable	
Repeat loopback test	
Test error free?	

Table 6-2 Trouble-Shooting Procedures for VSV21 PC System (Cont.)

Probable Cause	Remedy
YES NO → Open connection from I/O panel to remote interface box	
	check/replace data link cable
Faulty remote interface box	Check data circuits within box (see Table 6.3)/replace power supply or box (See fig. 6.1)
Remove loopbacks and attach peripherals	
Run Peripheral Confidence Tests	
Are tests error-free?	
YES → FINISH NO → 1 Pointing Device or Printer fault Wrong baud rate	Reset baud rate**
Open connection in device cable	Check and replace
Faulty device	Replace device or advise customer
Faulty remote interface box	Check remote interface box mains supply fuse and power supply
2 Keyboard fault Faulty keyboard	Replace keyboard
Open extension cable	Replace cable

Table 6-2 Trouble-Shooting Procedures for VSV21 PC System (Cont.)

	Probable Cause	Remedy
	Faulty remote interface box	Check remote interface box mains supply fuse and power supply
	3 Faulty picture	Refer to Table of Causes and Remedies in STEP 2 of flow chart
STEP 5 Fit loopback connector to host port on I/O panel Type on keyboard Is echo on screen correct?		

Table 6-2 Trouble-Shooting Procedures for VSV21 PC System (Cont.)

	Probable Cause	Remedy
YES NO ↓		
1 Incorrect Echo Data		
	Faulty drivers on module	Replace module
2 No Echo		
	Open connection from module to I/O panel	Check and replace cable
	Faulty module	Replace module
	Host port missing loopback connector	Fit connector
FINISH		

*
These actions require the loopback connectors for the standard VSV21 option. The connectors are not supplied as part of the standard option kit and must be obtained separately.

**
Replacement modules will be set to the default communications settings and may not match the peripheral requirements. If so, ask the customer to set the VSV21 communications settings to the required parameters.
The data passed by the remote interface box, and the voltage levels developed by the power supply 30-21558-01, can be monitored at test points along the top of the printed circuit board contained within the box. The test point allocation is shown in Table 6.3.

Table 6-3 Remote Interface Box Test Point Allocation

Test Point	Function
TP1	RX4.H
TP2	TX4.H
TP3	RX3.H
TP4	TX3.H
TP5	RX1.H
TP6	TX1.H
TP7	−12V
TP8	+12V
TP9	GND
TP10	+5V

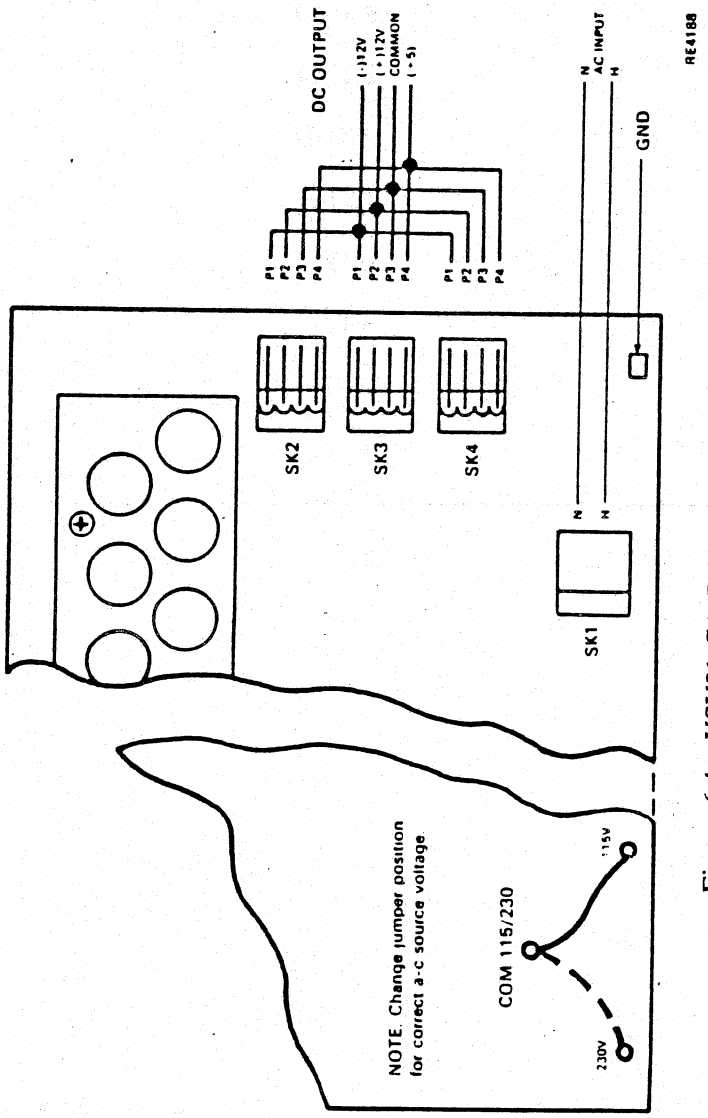

Figure 6-1 VSV21-CA/DA: Remote box power supply replacement

NOTE
VSV21-CA = 110-120V VSV21-DA = 220-240V
Both options use same power supply — 30-21558-01

Removal of power supply

1. Disconnect mains input.
2. Remove 8 cover retaining screws.
3. Remove SK1, SK5, SK3, SK4 from power supply.
4. Remove 4 power supply retaining screws.

Installation of new supply

1. Configure for 115V or 230V (110-120V or 220-240V as per rating plate).
2. Re-connect SK1, SK5, SK3, SK4.
3. Re-fit 4 power supply retaining screws.
4. Re-fit 8 cover retaining screws.

A ASSOCIATED DOCUMENTATION

A list of documents associated with the VSV21 follows:-

	Description	Catalogue No.
VSV21	Installation Manual	AZ-FV71C-TC
VSV21	User Guide	AZ-FV70C-TC
VSV21	Programmers Guide	AA-FV67C-TC
VSV21	Programmers Reference Card	AV-FV68C-TC
VSV21	Peripheral Concentrator User/Installation Guide	EK-VSV21-UM-001

B LK-201 KEYBOARD DETAILS

List of LK-201 keyboard versions supported by the VSV21 option:-

USA	LK-201-AA	Code 00
UK	LK-201-AE	Code 01
Swedish	LK-201-AM	Code 02
Dutch	LK-201-AH	Code 03
Flemish	LK-201-AB	Code 04
Canadian/French	LK-201-AC	Code 05
Danish	LK-201-AD	Code 06
Finnish	LK-201-AF	Code 07
German	LK-201-AG	Code 08
Italian	LK-201-AI	Code 09
Swiss/French	LK-201-AK	Code 10
Swiss/German	LK-201-AL	Code 11
Norwegian	LK-201-AN	Code 12
French	LK-201-AP	Code 13
Spanish	LK-201-AS	Code 14

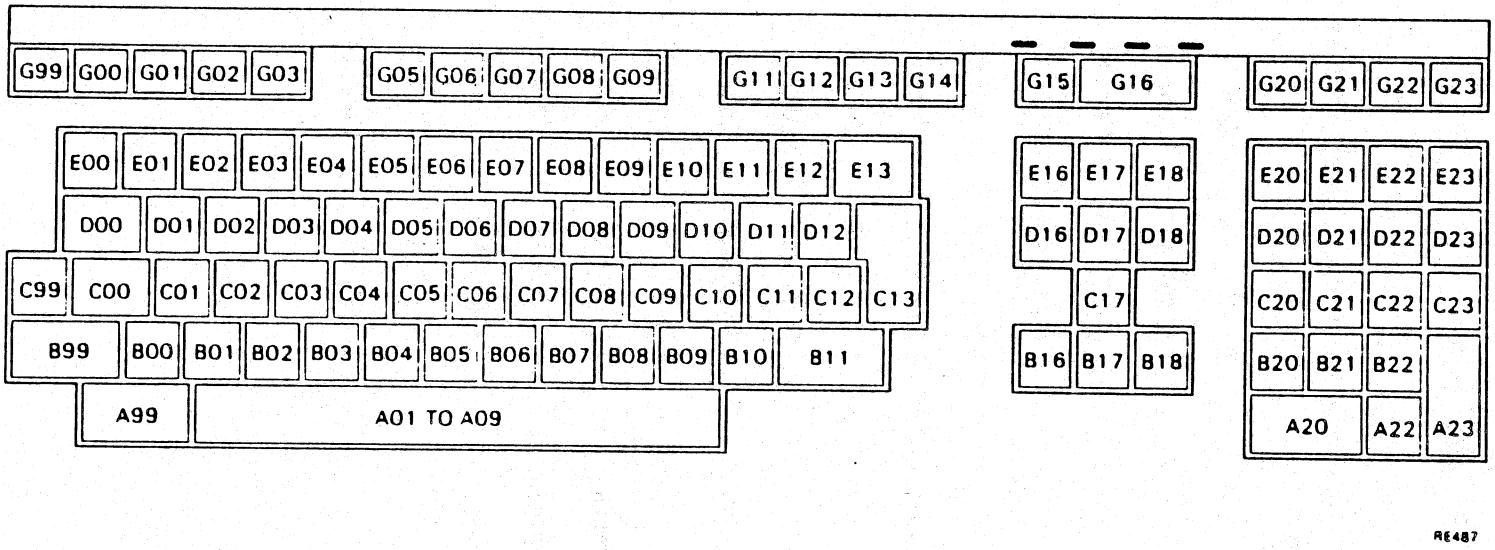

Figure B-1 Layout of an LK-201 Keyboard

The following table shows the Decimal code generated by each of the LK-201 keys:-

Key position Decimal code	Decimal code	Key position	Decimal code
G99	086	E18	140
G00	087	E20	161
G01	088	E21	162
G02	089	E22	163
G03	090	E23	164
G05	100	D00	190
G06	101	D01	193
G07	102	D02	198
G08	103	D03	204
G09	104	D04	209
G11	113	D05	215
G12	114	D06	220
G13	115	D07	225
G14	116	D08	230
G15	124	D09	235
G16	125	D10	240
G20	128	D11	250
G21	129	D12	246
G22	130	D16	141
G23	131	D17	142
E00	191	D18	143
E01	192	D20	157
E02	197	D21	158
E03	203	D22	159
E04	208	D23	160
E05	214	C99	175
E06	219	C00	176
E07	224	C01	194
E09	234	C02	199
E10	239	C03	205
E11	249	C04	210
E12	245	C05	216
E13	188	C06	221
E16	138	C07	226
E17	139	C08	231

Key position Decimal code	Decimal code	Key position	Decimal code
C09	236	B09	237
C10	242	B10	243
C11	251	B16	167
C12	247	B17	169
C13	189	B18	168
C17	170	B20	150
C20	153	B21	151
C21	154	B22	152
C22	155	A99	177
C23	156	A01-A09	212(SPACE BAR)
B99	174	A20	146
B00	201	A22	148
B01	195	A23	149
B02	200		
B03	206		
B04	211		
B05	217		
B06	222		
B07	227		
B08	232		

C RECOMMENDED SPARES LIST

Option Type	Part No.	Description
VSV21-AA module only	M7656	Module
Fuse(0.3Amp)	12-10929-07	Fuse
VSV21-AB BA23 mounting kit	70-20091-01	Panel
	70-20093-02	Cable 30-in Data
	70-20094-02	Cable 30-in Video
VSV21-AC BA123 mounting kit	70-20093-01	Panel
	70-20093-02	Cable 30-in Data
70-20094-02	Cable 30-in Video	
VSV21-AD BA11-S/H9642 mounting kit	74-28684-00	Panel adaptor
	70-20091-01	Panel
	70-20093-03	Cable 36-in Data
	70-20094-03	Cable 36-in Video
VSV21 video cable	17-00223-02	25-foot BNC to BNC
VSV21-AF keyboard cable	17-00397-01	14-foot 4-way jack*
VSV21-AG PDP host cable	17-00301-04	1 foot 9/25-way
VSV21-AH port cable	17-00300-01	25-foot 25/25 way

*
Not allowed to use 14' KBD cable in Germany as VDE do not permit use of unshielded data cables of length greater than 2 metres (6' OK)

Option Type	Part No.	Description
VSV21-AJ loopback set	12-15336-01	25-way connector
	70-20130-01 (X2)	9-way connector
	70-20131-01	4-way jack plug
VSV21-AK MicroVAX host cable	70-21425-01	1-foot 9/9-way
VSV21-AL tablet cable	70-23421-01	D-type/DIN
VSV21-CA	70-24335-01	Remote interface box
VSV21-DA peripheral concentrator	70-24335-02	Panel
	70-24336-01	Power supply
	30-21558-01	Fuse
	90-07212-00	Loopback connector
	70-24332-01	

D THE NVRAM — NON-VOLATILE RAM

The non-volatile RAM (NVRAM) is used to permanently store various parameters used in setting-up the module. These parameters are associated with the following functions:-

Graphics Display	— Colours, Blink, Monitor Timings
Serial Ports	— Speed, Parity, Bits/Char, Xon/Xoff codes
Keyboard	— Mode, Nationality, Bell, Autorepeat
Pointing Device	— Sensitivity

These settings can only be changed by using the VSV21 software function VCP (VSV21 Control Program). The settings can be altered permanently or by configuring the module after every power-up or reset. It can be called in the following way:-

RSX11-M PLUS and Micro RSX

```
RUN $VCP or INS $VCP/TASK=
...VCP
```

MicroVMS

```
MCR VCP
```

(Refer to the VSV21 User Guide (AZ-FV70C-TC) for more information about the VCP).

On Power-up or after a Bus Reset, the VSV21 will attempt to use the parameters stored in NVRAM to configure the module. If no data has been saved in NVRAM, the VSV21 will default to the settings stored in ROM and on the resolution configuration switches on the module. This condition is indicated on the Power-Up Self Test Picture by a 'NVRAM x' message on a red background.

If data is saved to the NVRAM by either:-

- Using the /PERMANENT qualifier with VCP commands
- Running the NVRAM Read/Write Test in the Diagnostic

The Power-Up Self Test Picture will display an NVRAM v (tick) message on a green background. In this situation the VSV21 will use the data saved in the NVRAM to configure the NVRAM Module.

> **NOTE**
> **Running the NVRAM Read/Write Test on a module that has not yet had any parameters saved permanently will cause the default settings to be saved. Running this test will not affect parameters already saved by the customer.**

The diagnostics also provide a Control Parameter Reset Test which will clear the NVRAM so that on the next Power-up or Bus Reset the factory defaults will be used. This test can be used to 'clear' the VSV21 to a known state.

The NVRAM has a life of 10000 storage cycles (minimum). The diagnostic is designed to minimise the potential of damage to the NVRAM by asking the user to answer a qustion on every pass of the tests that write to it. This will stop damage occuring if the tests are started with no pass limit.