KFESA DSSI Adapter

Installation and User's Guide

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FCC NOTICE: The equipment described in this manual generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense may be required to take measures to correct the interference.

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Contents

3 Troubleshooting

A KFESA Specifications

Index

Figures

Tables

Preface

Purpose of This Guide

This guide describes how to install and operate the KFESA DSSI adapter for EISA-based systems.

Who Should Use This Guide

This guide is intended for system administrators. A system administrator should be an experienced user who is familiar with OpenVMS AXP and OpenVMS VAX operating systems.

Structure of This Guide

This guide is divided into three chapters and one appendix:

- Chapter 1 describes how to install the KFESA module.
- Chapter 2 describes how to set and examine DSSI parameters.
- Chapter 3 provides troubleshooting tips for solving DSSI-related hardware problems.
- Appendix A provides KFESA specifications.

Finding More Information

The following documents provide information related to DSSI VMScluster systems:

- *Alpha AXP Systems DSSI VMScluster Installation and Troubleshooting,* EK-D4AXP-TS
- *VAX Systems DSSI VMScluster Installation and Troubleshooting,* EK-410AB-MG
- *VMScluster Systems for OpenVMS*
- *OpenVMS AXP Version 6.1 Upgrade and Installation Manual,* AA-PV6XB-TE

- *StorageWorks Solutions HSD05 Array Controller User's Guide,* EK-HSD05-UG

Conventions

The following coventions are used in this guide.

Convention	Meaning
lowercase	Lowercase letters in commands indicate that commands can be entered in uppercase or lowercase.
Caution	Cautions provide information to prevent damage to equipment or software.
[ ]	In command format descriptions, brackets indicate optional elements.
`boot`	Console and operating system commands are shown in this special typeface.
italic type	Italic type in console command sections indicates a variable.

1
Installation

In This Chapter

This chapter describes the procedure for installing the KFESA EISA-to-DSSI host adapter module:

- Step 1: Shut Down and Unplug System
- Step 2: Install KFESA: End-Node Configurations
- Step 3: Install KFESA: Middle-Node Configurations
- Step 4: Power Up System and Run ECU

KFESA Configurations

Each KFESA adapter provides a DSSI bus for EISA-based systems. Up to two KFESA adapters can be installed in a single system. The KFESA can be configured as an end-node, with a single host on a bus, or as a middle-node in a DSSI VMScluster, where up to three hosts can reside on a single DSSI bus.

Each KFESA or DSSI bus supports up to eight nodes. Each of the following counts as one DSSI node:

- A DSSI adapter
- An RF-disk controller interface
- A TF-tape controller interface

For a two-system DSSI VMScluster system, for instance, a maximum of six RF-disks can be configured per DSSI bus: two DSSI adapters + six disks = eight nodes.

End-Node Configurations

End-node configurations do not require the installation of the internal DSSI cable and second DSSI connector. If the KFESA will not used in a DSSI VMScluster configuration, you can skip step 3 of the installation.

Middle-Node Configurations

Middle-node configurations require that you install the second DSSI connector and its internal DSSI cable. If your system does not have ports for standard bulkhead connectors, you can use the EISA slot bracket to install the second connector in an unused EISA slot.

Step 1: Shut Down and Unplug System

Before installing the KFESA module:

- Perform orderly shutdown of the operating system.
- Set power switches to off.
- Unplug the AC power cord for each power supply.

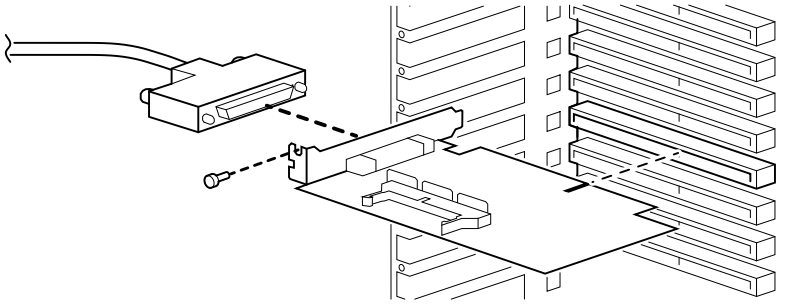
Caution

Static electricity can damage integrated circuits. Always use a grounded wrist strap and grounded work surface when installing or removing modules.

Step 2: Install KFESA: End-Node Configurations

If you are installing the KFESA as an end-node adapter, install the KFESA module and attach the external DSSI cable as shown in Figure 1–1, then go to Step 4.

Figure 1–1 Installing KFESA (End-Node Configuration)



Step 3: Install KFESA: Middle-Node Configurations

If you are installing the KFESA as a middle-node adapter, complete the following steps. Refer to Figure 1–2.

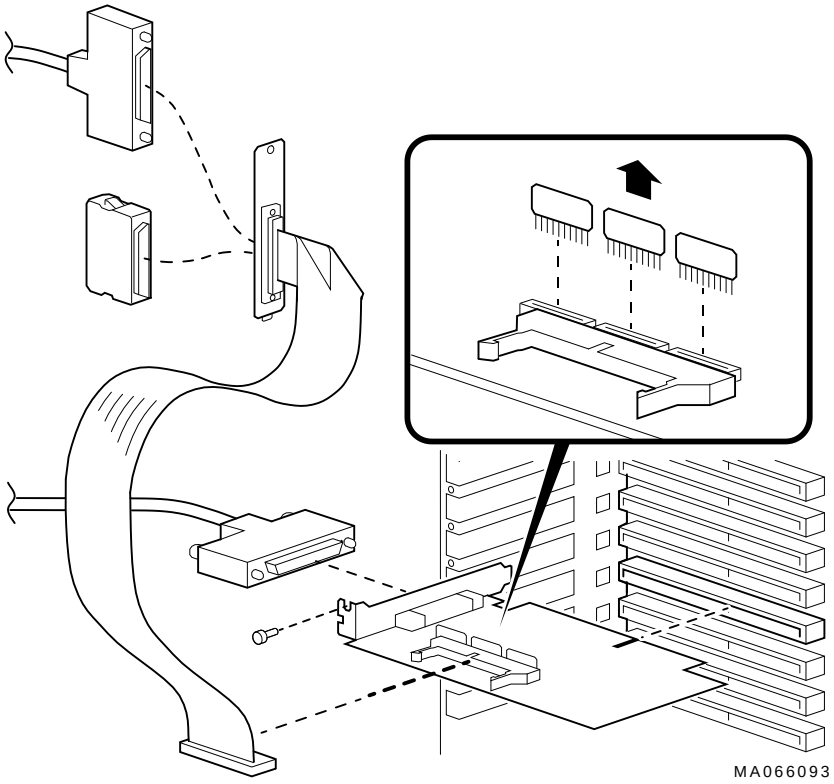
a. Using a pair of needle-nose pliers, remove the three internal terminators.

b. Install the KFESA module.

c. Install the internal cable to provide the second DSSI connector. The connector is installed in a standard bulkhead port.

d. Connect the external DSSI cables or external DSSI terminator.

Figure 1–2 Installing KFESA (Middle-Node Configuration)



Step 4: Power Up System and Run ECU

Whenever you add, remove, or move an EISA option, you need to run a utility called the EISA Configuration Utility (ECU). The ECU uses the corresponding configuration (CFG) file for the KFESA to allocate system resources and create a conflict-free configuration. This configuration information is saved to your system's nonvolatile memory.

The ECU also allows you to change user-selectable settings. Table 1–1 describes the KFESA functions or settings you can change using the ECU, as well as the default settings for the option.

Note

In most cases, the CFG file for the KFESA is provided with the ECU diskette for AXP systems that was shipped with your system. If the file is not found, the ECU program will prompt you to insert the CFG diskette (AK-Q767A-CA) shipped with the KFESA option.

Table 1–1 KFESA Configuration Settings

Function	Choice of Settings	Description
Host Adapter Interface	Edge (Default) Level	Sets the trigger type for the host adapter interface. All AXP systems use the Edge trigger type.
Host Adapter Interrupt	IRQ 15 (Default) IRQ 14 IRQ 12 IRQ 11 IRQ 10	Sets the host adapter IRQ. Choose a unique IRQ for each host adapter on the system. The ECU program prevents you from assigning duplicate IRQs for multiple KFESA options. Never use a host adapter IRQ of 9.
Host Adapter DSSI ID	Device ID 7 (Default) Device ID 6 Device ID 5 Device ID 4 Device ID 3 Device ID 2 Device ID 1 Device ID 0	Sets the DSSI bus node ID for the host adapter. Bus node ID 7 is normally reserved for the host adapter. In a DSSI VMScluster, where up to three host adapters can share a single DSSI bus, unique bus node IDs must be selected for each host adapter. For example, in a multi-host DSSI VMScluster, leave one KFESA at bus node ID 7, set the second to 6, and the third to 5.

Running the ECU

Run the ECU as follows:

1. Start the ECU according to the instructions provided with your system documentation.
2. After the ECU copyright is displayed, the ECU will load the configuration file for the KFESA. If the file is not included on the ECU diskette, the ECU program will prompt you to insert the configuration diskette for the option.

   While the configuration files are loading, the ECU displays the message:

   ```
   Loading configuration files
   Please wait...
   ```

   When the files have finished loading, a menu similar to the following is displayed.

   ```
        EISA Configuration Utility
            Steps in configuring your computer

     STEP 1: Important EISA configuration Information

     STEP 2: Add or remove boards

     STEP 3: View or edit details

     STEP 4: Examine required details

     STEP 5: Save and exit

   >Select=ENTER<  <Cancel=ESC>
   ```

3. If you are using the default values for the host adapter interrupt (IRQ 15) and host adapter DSSI ID (device ID 7), you can skip this step.

   Select the View or edit details option (Step 3 in the example below) and press the Enter key. Scroll through the file until you find the KFESA option and its slot number. The display lists the current settings. A sample file is shown below:

   ```
        Step 3: View or edit details

   Slot 7 -- Digital KFESA DSSI EISA Host Adapter   Added

   Host Adapter Interface..................Trigger EDGE
   Host Adapter IRQ........................IRQ 15
   Host Adapter DSSI ID....................Device ID 7
   ```

To change the settings (edit details), select a function or setting you want to change and press the Return key. Table 1–1 describes the KFESA functions or settings you can change using the ECU.

When you have finished with the option settings, press F10. A main menu similar to the following is displayed.

```
    EISA Configuration Utility
        Steps in configuring your computer

  STEP 1: Important EISA configuration Information

  STEP 2: Add or remove boards

  STEP 3: View or edit details

  STEP 4: Examine required details

  STEP 5: Save and exit

>Select=ENTER<  <Cancel=ESC>
```

4. Select Save and exit (Step 5 in the example above) and press the Enter key. A screen will verify that you want to save the configuration and a screen similar to the following is then displayed:

```
    EISA Configuration Utility

Your configuration file has been saved, and if possible a backup SYSTEM.SCI file
has been made on the current drive.

To complete your configuration, you must do one of the following:

If you need to install boards or change switches and jumpers on boards already
installed, turn off your computer and do so.

If you want to test your system or install an operating system, press ENTER to
restart your computer, run the configuration utility again, and select the appropriate
main menu item.

If you are finished configuring, remove the SYSTEM CONFIGURATION diskette if
it is in drive A and press ENTER to restart your system.

Ok=ENTER
```

Follow the directions on the screen displays until you have saved and exited the ECU.

5. Return to your system documentation for instructions on returning to the SRM console, which supports OpenVMS.

Step 4: Power Up System and Run ECU

DSSI VMScluster Configurations

For more information on DSSI VMScluster configurations, refer to the *Alpha AXP Systems DSSI VMScluster Installation and Troubleshooting* Guide, EK–D4AXP–TS.

2

DSSI Device Parameters

In This Chapter This chapter describes DSSI device parameters and the commands used to set and examine them.

Setting and Examining Storage Device Parameters

When you change a DSSI configuration by adding a new bus or devices, or by adding devices to a cluster, you must set DSSI parameters. Console commands are used to set and examine these DSSI parameters.

If you are not familiar with DSSI parameters and their function, refer to the next section, "DSSI Device Parameters."

Caution

The HSD05 array controller does not currently support the `cdp` command. If your configuration includes the HSD05, do not use the `cdp` command. Doing so will cause the console subsystem to hang and you will have to press the Reset button to return to the console prompt.

For systems configured with the HSD05 array controller, use the `set host -dup -dssi` *`device_name`* command to set and examine DSSI parameters using the Diagnostic and Utility Program (DUP).

For examples of the `set host -dup -dssi` command, see the section "Set host -dup -dssi Command." For more information, refer to the *StorageWorks Solutions HSD05 Array Controller User's Guide*, EK-HSD05-UG.

cdp Console Command

The AXP console command `cdp` allows you to modify the NODENAME, ALLCLASS, and UNITNUM parameters. The `cdp` command automatically connects to the device's DUP server for all devices or any number of specified devices.

Note

When a DSSI bus is shared with a VAX system, the `cdp` console command can connect to all the shared drives, even though they physically reside in the VAX enclosure (and/or expansion enclosure).

Enter `cdp` without an option or target device to list the DSSI parameters for all DSSI drives on the system.

Command Description

cdp ([-{i,n,a,u,o}] [-sn] [-sa allclass] [-su unitnum] [dssi_device])

Arguments:

[dssi_device] Name of the DSSI device or DSSI adapter. Only the parameters for the specified device or devices on this adapter will be modified.

Options:

[-i]	Selective interactive mode, set all parameters.
[-n]	Set device node name, NODENAME (alphanumeric, up to 6 characters).
[-a]	Set device allocation class, ALLCLASS.
[-u]	Set device unit number, UNITNUM.
[-sn]	Set node name (NODENAME) for all DSSI drives on the system to either RF*hscn* or TF*hscn*, where: *h* is the device hose number (0) *s* is the device slot number (0–3) *c* is the device channel number (0) *n* is the bus node ID (0–6).
[-sa]	Set ALLCLASS for all DSSI devices on the system to a specified value.
[-su]	Specify a starting unit number for a device on the system. The unit number for subsequent DSSI devices will be incremented (by 1) from the starting unit number.

DSSI Parameters Displayed Using cdp

A sample display of DSSI device information using the `cdp` command is shown below:

```
>>> cdp
    ❶            ❷          ❸              ❹ ❺    ❻
pua0.0.0.0.0    ALPHA0     0411214901371     2  0   $2$DIA0
pua0.1.0.0.0    ALPHA1     0411214901506     2  1   $2$DIA1
pua0.2.0.0.0    ALPHA2     041122A001625     2  2   $2$DIA2
pua0.3.0.0.0    ALPHA3     0411214901286     2  3   $2$DIA3
pua0.4.0.0.0    ALPHA4     0411224904506     2  4   $2$DIA4
pua0.5.0.0.0    ALPHA5     0411233087412     2  5   $2$DIA5
>>>
```

❶ Storage adapter device name

❷ Node name (NODENAME)

❸ System ID (SYSTEMID) — modified during warm swap

❹ Allocation class (ALLCLASS)

❺ Unit number (UNITNUM)

❻ Operating system device name

cdp Example

In the following example:

- The unit numbers for drives on DSSI buses B, C, and D are changed to avoid duplicate unit numbers. Bus B is given unit numbers starting with 10; Bus C starting with 20; and Bus D starting with 30.
- The allocation class for all drives is changed to 1.
- Drive dub0 is given the new node name, SYSTEM.

```
>>> cdp -sa 1
pua0.0.0.0.0    ALPHA0     0411214901371      1  0   $1$DIA0
pua0.1.0.0.0    ALPHA1     0411214901506      1  1   $1$DIA1
pua0.2.0.0.0    ALPHA2     041122A001625      1  2   $1$DIA2
pua0.3.0.0.0    ALPHA3     0411214901286      1  3   $1$DIA3
pua0.4.0.0.0    ALPHA4     0411224904506      1  4   $1$DIA4
pua0.5.0.0.0    ALPHA5     0411233087412      1  5   $1$DIA5
>>> cdp -sa 1 -su 10 dub
pub0.0.0.1.0    SNEEZY     0411214906794      1  10  $1$DIA10
pub1.1.0.1.0    DOPEY      0411214457623      1  11  $1$DIA11
pub2.2.0.1.0    SLEEPY     0478512447890      1  12  $1$DIA12
pub3.3.0.1.0    GRUMPY     0571292500565      1  13  $1$DIA13
pub4.4.0.1.0    BASHFL     0768443122700      1  14  $1$DIA14
pub5.5.0.1.0    HAPPY      0768443122259      1  15  $1$DIA15
>>> cdp -sa 1 -su 20 duc
puc0.0.0.2.0    RF0200     0347500845133      1  20  $1$DIA20
puc1.1.0.2.0    RF0201     0889734564411      1  21  $1$DIA21
puc2.2.0.2.0    RF0202     0411780351455      1  22  $1$DIA22
puc3.3.0.2.0    RF0203     0555613903222      1  23  $1$DIA23
puc4.4.0.2.0    RF0204     0744673884100      1  24  $1$DIA24
puc5.5.0.2.0    RF0205     0298438401226      1  25  $1$DIA25
>>> cdp -sa 1 -su 30 dud
pud0.0.0.3.0    RF0300     0620707250334      1  30  $1$DIA30
pud1.1.0.3.0    RF0301     0889734564411      1  31  $1$DIA31
>>> cdp -n dub0
pub0.0.0.1.0:
Node Name [SNEEZY]? SYSTEM
>>>
```

show device Command

The `show device` command displays information for all DSSI and SCSI devices in the system.

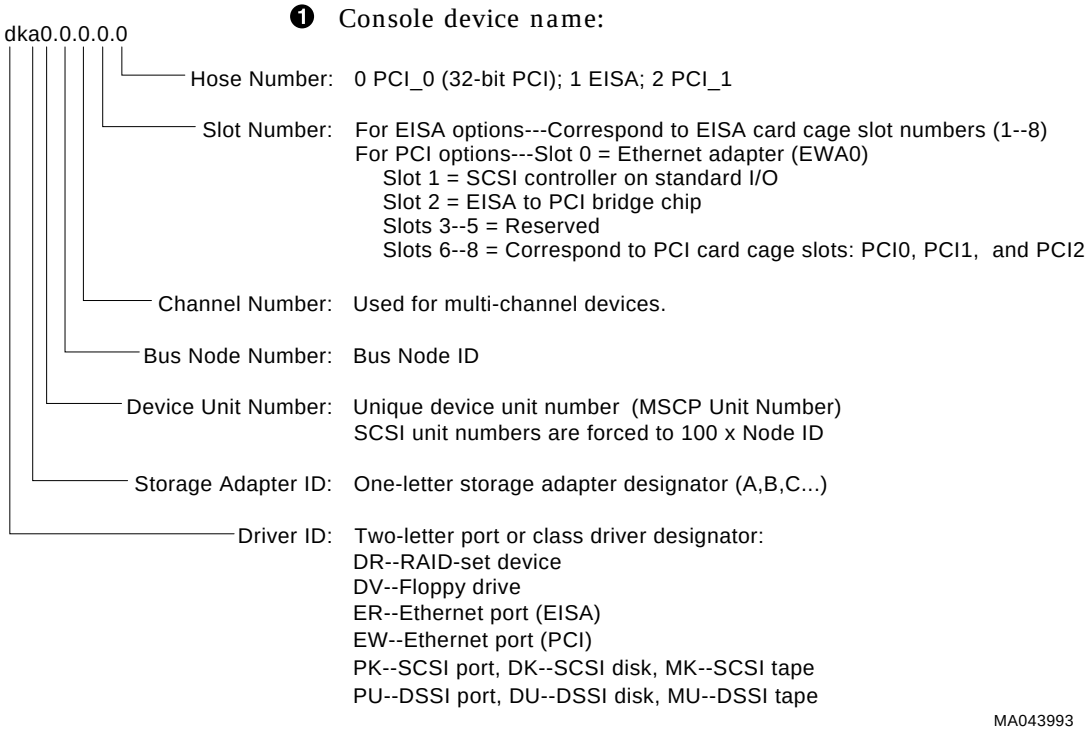
Device Parameters Displayed

show device

Example:

```
>>> show device
    ❶                    ❷       ❸                  ❹     ❺
dka600.6.0.1.0           DKA600                     RRD43  2893
dua0.0.0.2.1             $2$DIA0 (ALPHA0)           RF35
dua1.1.0.2.1             $2$DIA1 (ALPHA1)           RF35
dua2.2.0.2.1             $2$DIA2 (ALPHA2)           RF35
dua3.3.0.2.1             $2$DIA3 (ALPHA3)           RF35
dua4.4.0.2.1             $2$DIA4 (ALPHA4)           RF35
dua5.5.0.2.1             $2$DIA5 (ALPHA5)           RF35
dva0.0.0.0.1             DVA0                       RX26
mka500.5.0.1.0           MKA500                     TLZ06  0435
ewa0.0.0.0.0             EWA0             08-00-2B-3B-42-FD
pka0.7.0.1.0             PKA0                 SCSI Bus ID 7
pua0.7.0.2.1             PAA0                 DSSI Bus ID 7
pub0.6.0.3.1             PAB0                 DSSI Bus ID 6
>>>
```

❶ Console device name:



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❷ Operating system device name:

- For an allocation class of zero: NODENAME$DIA*u*

  NODENAME is a unique node name and *u* is the unit number. For example, R7BUCC$DIA0.

- For a nonzero allocation class:

  $ALLCLASS$DIA*u*

  ALLCLASS is the allocation class for the system and devices, and *u* is a unique unit number. For example, 1DIA0.

❸ Node name (alphanumeric, up to 6 characters)

❹ Device type

❺ Firmware version (if known)

set host -dup -dssi Command

The `set host -dup -dssi` *`device_name`* command allows you to enter the DUP server utility for a specified device. Through the DUP server utility, you can set and examine DSSI parameters for the specified device. This command must be used in place of the `cdp` command for systems using the HSD05 array controller.

Starting DUP: Example

```
>>> set host -dup -dssi dub34

starting DIRECT on pub0.3.0.3.1 (HSD05A)

Copyright  1994 Digital
        HSD05    Serial No: 2033
        Firmware Rev. B1   (X36A)

DIRECT V1.0  D  Mar 21 1994 17:09:41
PARAMS V1.0  D  Mar 21 1994 17:09:41
UTILIT V1.0  D  Mar 21 1994 17:09:41

End of directory
Task? params

starting PARAMS on pub0.3.0.3.1 (HSD05A)

Copyright  1994 Digital
        HSD05    Serial No: 2033
        Firmware Rev. B1   (X36A)
PARAMS>
```

Setting Allocation Class

After entering the DUP server utility for a specified device, you can examine and set the allocation class for the device as follows.

Note

Set the ALLCLASS parameter only through console mode, at the PARAMS> prompt. Setting the ALLCLASS parameter from the operating system is not recommended.

Devices connected through the HSD05 array controller use the parameter DISK_ALCS for allocation class; all other DSSI devices use the parameter ALLCLASS.

1. At the PARAMS> prompt, enter `show allclass` (or `show disk_alcs` for HSD05 devices) to check the allocation class of the device to which you are currently connected.
2. Enter `set allclass 1` (or enter the allocation class you desire).
3. Enter `show allclass` to verify the new allocation class.

The following example shows the steps for examining and changing the allocation class for a specified device. In the example, the allocation class is changed from class 0 to class 1 for a device connected through an HSD05.

```
PARAMS> show disk_alcs

DISK_ALCS                0          0         255    DecimalNum
PARAMS> set disk_alcs 1

PARAMS> show disk_alcs

DISK_ALCS                1          0         255    DecimalNum
```

Setting Unit Number

After entering the DUP server utility for a specified device, you can examine and set the unit number for the device as follows.

Note

The HSD05 array controller automatically provides unique unit numbers for its drives. Devices connected through the HSD05 do not need to change this parameter.

1. At the PARAMS> prompt, enter `show unitnum` to check the unit number of the device to which you are currently connected.
2. Enter `set unitnum 10` (or enter the unit number you desire).
3. Enter `set forceuni 0` to override the default unit number value supplied by the bus node ID plug.
4. Enter `show unitnum` to verify the new unit number.
5. Enter `show forceuni` to verify that the current value for the FORCEUNI parameter is 0.
6. Label the device with its unit number, using the unit number labels shipped with your system.

The following example shows the steps for changing the unit number of a specified device from number 0 to number 10.

```
PARAMS>show unitnum

Parameter     Current           Default        Type     Radix
--------- ---------------  ---------------  --------  -----
UNITNUM                 0                0      Word    Dec   U

PARAMS>set unitnum 10
PARAMS>set forceuni 0
PARAMS>show unitnum

Parameter     Current           Default        Type     Radix
--------- ---------------  ---------------  --------  -----
UNITNUM                10                0      Word    Dec   U

PARAMS>show forceuni

Parameter     Current           Default        Type     Radix
--------- ---------------  ---------------  --------  -----
FORCEUNI                0                1   Boolean    0/1   U
```

Setting Node Name

After entering the DUP server utility for a specified device, you can examine and set the node name for the device as follows.

1. At the PARAMS> prompt, enter `show nodename` to check the node name of the device to which you are currently connected.
2. Enter `set nodename sysdsk` (or enter the desired alphanumeric node name of up to eight characters).
3. Enter `show nodename` to verify the new node name.

The following example shows the steps for changing the node name of a specified device from the factory-supplied name to SYSDSK.

```
PARAMS>show nodename

Parameter     Current           Default        Type     Radix
--------- ----------------  ----------------  --------  -----
NODENAME          R7CZZC            RF35        String  Ascii   B

PARAMS>set nodename sysdsk
PARAMS>show nodename

Parameter     Current           Default        Type     Radix
--------- ----------------  ----------------  --------  -----
NODENAME          SYSDSK            RF35        String  Ascii   B
```

Exiting the DUP Server Utility

After you have finished setting and examining DSSI device parameters for a specified device, enter the `write` command at the PARAMS> prompt to save the device parameters you have changed using the SET command. The changes are recorded to nonvolatile memory.

Note

If you have set host to devices connected through the HSD05 array controller, you must enter the `restart` command, and then press the Reset button or enter the `init` command for the new parameters to take effect.

- If you have changed the allocation class or node name of a device, the DUP server utility will ask you to initialize the controller. Answer Yes (Y) to allow the changes to be recorded and to exit the DUP server utility.

  ```
  PARAMS>write
  Changes require controller initialization, ok? [Y/(N)] Y

  Stopping DUP server...
  >>>
  ```

- If you have not changed the allocation class or node name, enter the `exit` command at the PARAMS> prompt to exit the DUP server utility for the specified device.

Note

You must repeat the procedures in this step for each device for which you want to change parameters.

DSSI Device Parameters

Principal Parameters

Five principal parameters are associated with each DSSI device:

- Bus node ID
- ALLCLASS (DISK_ALCS for devices connected through the HSD05 controller)
- UNITNUM
- NODENAME
- SYSTEMID

Parameter Descriptions

Bus Node ID

The bus node ID parameter for DSSI storage devices is provided by the bus node ID plug on the front panel of the storage compartment. Each DSSI bus can support up to eight nodes, bus nodes 0–7. Each DSSI adapter, HSD05 array controller, and each DSSI storage device count as a node. Hence, in a single-system configuration, a DSSI bus can support up to seven devices, bus nodes 0–6 (with node 7 reserved for the adapter); in a two-system DSSI VMScluster configuration, up to six devices, 0–5 (with nodes 6 and 7 reserved for the adapters); in a three-system DSSI VMScluster configuration, up to five devices, 0–4 (with nodes 5, 6, and 7 reserved for the adapters).

Note

Drives connected through the HSD05 array controller do not count as DSSI nodes; thus, using multiple HDS05

controllers, up to 36 SCSI drives can be configured in a two-system DSSI VMScluster.

The bus node ID for the KFESA host adapter is set using the EISA Configuration Utility (ECU). The bus node ID for the HDS05 array controller is set by switches on the HSD05 controller module board.

ALLCLASS

Note

For devices off the HSD05 array controller, this parameter is called DISK_ALCS.

The ALLCLASS parameter determines the device allocation class. The allocation class is a numeric value from 0–255 that is used by the OpenVMS AXP operating system to derive a path-independent name for multiple access paths to the same device. The ALLCLASS firmware parameter corresponds to the OpenVMS AXP IOGEN parameter ALLOCLASS.

DSSI devices are shipped from the factory with a default allocation class of zero.

Use the `cdp` command to examine and modify the ALLCLASS parameter. Systems using the HSD05 array controller must use the `set host -dup -dssi` *`device_name`* command.

Note

Each device to be served to a cluster must have a nonzero allocation class that matches the allocation class of the system.

Refer to *VMScluster Systems for OpenVMS* for rules on specifying allocation class values.

UNITNUM

The UNITNUM parameter determines the unit number of the device. By default, the device unit number is supplied by the bus node ID plug on the front panel of the storage compartment.

Note

Systems using multiple DSSI buses require that the default values be replaced with unique unit numbers. See the section "How OpenVMS AXP Uses the DSSI Device Parameters ."

To set unit numbers and override the default values, use the `cdp` console command to supply values to the UNITNUM parameter.

Note

Devices connected through the HSD05 array controller are automatically assigned unique unit numbers.

NODENAME

The NODENAME parameter allows each device to have an alphanumeric node name of up to six characters. DSSI devices are shipped from the factory with a unique identifier, such as R7CZZC, R7ALUC, and so on. You can provide your own node name, keep the factory-supplied node names, or use the `cdp` console command to supply node names that relate to the device name conventions for AXP systems. Systems using the HSD05 array controller must use the `set host -dup -dssi` *`device_name`* command.

SYSTEMID

The SYSTEMID parameter provides a number that uniquely identifies the device to the operating system. This parameter is modified when you replace a device using warm-swapping procedures. The SYSTEMID parameter is changed using the console command: `set host -dup -task -params` *`device name`*.

How OpenVMS AXP Uses the DSSI Device Parameters

Allocation Class Zero

With an allocation class of zero, the operating system can use the default parameter values to provide each device with a unique device name. The operating system uses the node name along with the device logical name as follows:

NODENAME$DIA*u*

NODENAME is a unique node name and *u* is the unit number. For example, R7BUCC$DIA0.

Nonzero Allocation Class

With a nonzero allocation class, the operating system relies on unit number values to create a unique device name. The operating system uses the allocation class along with the device logical name as follows:

$ALLCLASS$DIA*u*

ALLCLASS is the allocation class for the system and devices, and *u* is a unique unit number. For example, 1DIA0.

Multiple and Shared Buses

Using KFESA modules, you can fill two DSSI buses: buses A and B. Each bus can have up to seven DSSI drives (bus nodes 0–6). When a bus is shared between two systems in a DSSI VMScluster, six DSSI drives can be shared; in a three-system DSSI VMScluster, five DSSI drives can be shared.

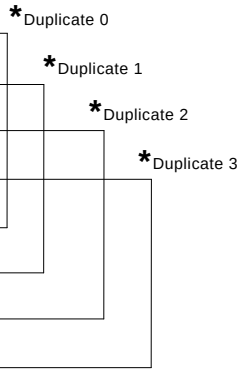
When more than one bus is being used, and your system is using a nonzero allocation class, you need to assign new unit numbers for devices on all but one of the DSSI buses, since the unit numbers for all DSSI storage devices connected to a system's associated DSSI buses must be unique.

Example of Duplicate Device Names

Figure 2–1 illustrates the problem of duplicate operating system device names for a system that is using more than one DSSI bus and a nonzero allocation class. In the case of the nonzero allocation class, the operating system sees four of the devices as having duplicate device names. This is an error, as all unit numbers must be unique. The unit numbers for one of the two DSSI buses in this example need to be reprogrammed.

Figure 2–1 How OpenVMS Sees Unit Numbers for DSSI Devices

Allocation Class=0	**Nonzero Allocation Class** (Example: ALLCLASS=1)
R7BUCC$DIA0	1DIA0
R7CZZC$DIA1	1DIA1
R7ALUC$DIA2	1DIA2
R7EB3C$DIA3	1DIA3
R7IDFC$DIA0	1DIA0
R7IBZC$DIA1	1DIA1
R7IKJC$DIA2	1DIA2
R7ID3C$DIA3	1DIA3
R7XA4C$DIA4	1DIA4
R7QIYC$DIA5	1DIA5
R7DA4C$DIA6	1DIA6



* Nonzero allocation class examples with an asterisk indicate duplicate device names. For one of the DSSI buses, the unit numbers need to be reprogrammed to avoid this error.

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3
Troubleshooting

Troubleshooting Procedure

In This Chapter

This chapter provides troubleshooting tips for solving DSSI-related hardware problems.

Common Problems

If hardware failures occur, check the following common problem sources first:

- Loose or missing terminators
- Incorrect bus node ID plugs (duplicate device names)
- Loose or damaged cables or connectors

Symptoms and Corrective Action

Table 3–1 lists symptoms and corrective action for possible problems.

Table 3–1 DSSI Hardware Installation Troubleshooting

Problem	Symptom	Corrective Action
Drive failure	Fault LED for drive is on (steady).	Replace drive.
Duplicate bus node IDs	Drives with duplicate bus node IDs are missing from the `show config` display.	Correct bus node IDs.
Drive bus node ID set to 7 (reserved for host adapter ID)	Valid drives are missing from the `show config` display. One drive may appear seven times on the display.	Correct bus node IDs. KFESA bus node ID for host adapter is set using the EISA Configuration Utility (ECU).
Missing or loose cables	Drive activity LEDs do not come on. Drive missing from the `show config` display.	Remove device and inspect cable connections.
Terminator missing	Read/write errors in console event log; storage adapter port may fail.	Attach terminators as needed.
KFESA module failure	Problems persist after eliminating the above problem sources.	Replace KFESA module.

A

KFESA Specifications

KFESA DSSI Adapter Specifications

Lengths of Interconnects

Table A–1 gives the maximum electrical lengths of KFESA-based DSSI interconnects with single and dual connectors.

Table A–1 Electrical Lengths of DSSI Interconnects

Enclosure	Connector Type	Internal DSSI Length
KFESA adapter using 1 connector (end-node)	1 external MR[1]	0.15 m (6.0 in)
KFESA adapter using 2 connectors (middle-node)	2 external MR[1]	0.6 m (24.0 in)

[1]MR is a midrange or micro ribbon style shielded connector used for bulkhead mounting. This connector mates with MR only.

DSSI Adapter Characteristics

Table A–2 provides adapter information for AXP supported adapters.

Table A–2 DSSI Adapter Characteristics for AXP Supported Adapters

Adapters	Cluster Traffic Support	Middle-Node[1] Support	I/Os per Second[2]	Type	Cluster Serviceability[3]
KFESA (EISA-to-DSSI)	Yes	Yes	1000 x 1	EISA-bus	Yes
N710 (DEC 4000 AXP)	Yes	No	1200 x 4	Embedded	Yes
SHAC (KA676, KA681, KA691, KA692)	Yes	Bus 0—No Bus 1—Yes	1200 x 2	Embedded	Yes
SHAC (KA670)	Yes	Bus 0—No Bus 1—Yes	800 x 2	Embedded	Yes
SHAC (KA52, KA53)	Yes	With IN/OUT connectors—Yes Without IN/OUT connectors—No	1200 x 2	Embedded	Yes
SHAC (KA660)	Yes	No	800	Embedded	No
EDA640	Yes	No	340	Embedded	No
KFMSA	Yes	Yes, BA variant No, AA variant	800 x 2	XMI	Yes
KFQSA[4]	No	With IN/OUT connectors—Yes Without IN/OUT connectors—No	170	Q–bus	With IN /OUT connectors—Yes Without IN/OUT connectors—No

[1]Middle nodes do not contain embedded DSSI termination, and thus support more than two hosts on their DSSI bus.

[2]Throughput is per DSSI bus. Total throughput may be less than the sum.

[3]Cluster serviceability refers to the ability to service the adapter without violating DSSI bus termination.

[4]DEC 4000 CPUs cannot coexist on a DSSI with the KFQSA adapter.

Power Requirements

Table A–3 provides the power requirements for the KFESA module.

Table A–3 KFESA Power Requirements

Module	3.3V	5.1V	+12V	-12V	Watts
KFESA (EISA-to-DSSI)	0	2.0	0	0	10.2

Index

T

U

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Reader's Comments

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Installation and User's Guide

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