

# VSI OpenVMS

## Media Robot Utility Guide to Installation, Connectivity, and Operation

**Revision Update Information:** This is a revised manual.

**Operating System and Version:** VSI OpenVMS IA-64 Version 8.4-1H1 or higher  
VSI OpenVMS Alpha Version 8.4-2L1 or higher  
VSI OpenVMS x86-64 Version 9.2-1 or higher

---

# Media Robot Utility Guide to Installation, Connectivity, and Operation



---

Copyright © 2024 VMS Software, Inc. (VSI), Boston, Massachusetts, USA

## Legal Notice

Confidential computer software. Valid license from VSI required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

The information contained herein is subject to change without notice. The only warranties for VSI products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. VSI shall not be liable for technical or editorial errors or omissions contained herein.

Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

Itanium is a trademark of Intel. Intel and Itanium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

<b>Preface</b> .....	<b>v</b>
1. About VSI .....	v
2. Document Structure .....	v
3. VSI Encourages Your Comments .....	v
4. OpenVMS Documentation .....	v
<b>Chapter 1. Media Robots and MRU Software</b> .....	<b>1</b>
1.1. What Is a Media Robot? .....	1
1.2. Mechanical Attributes of a Media Robot .....	1
1.3. What Is Media Robot Utility Software? .....	1
1.4. MRU Software Variants .....	2
1.5. MRU Command Line Interface .....	2
1.6. MRU Graphic User Interface .....	2
<b>Chapter 2. Media Robot Utility Software for Microsoft Windows 2000/Windows XP</b> .....	<b>3</b>
2.1. Connecting the Media Robot Hardware .....	3
2.2. Device Naming for Windows 2000/Windows XP .....	3
2.3. Finding SCSI Coordinates for a Connected Media Robot .....	3
2.4. MRU Software Installation .....	4
2.5. MRU Distribution Medium .....	4
2.6. Installing MRU Software .....	4
2.7. Verifying Installation .....	4
2.8. The Windows 2000/Windows XP Operating Environment .....	5
2.9. Logging Robot Operations .....	5
2.10. Default Robot .....	5
2.11. Case Sensitive Searches .....	6
2.12. Verifying a MUSL Configuration .....	6
<b>Chapter 3. Media Robot Utility Software for Tru64 UNIX</b> .....	<b>7</b>
3.1. Software Version Compatibility .....	7
3.2. Connecting the Media Robot Hardware .....	7
3.3. Media Changer Restrictions .....	7
3.4. Hardware Connection Restrictions .....	8
3.5. Creating Special Device Files for Tru64 UNIX V4.0F through 4.0G Systems .....	8
3.6. Special Device Files for DLT and DAT Media Loaders .....	8
3.7. Special Device Files for TL8nn Automated Tape Libraries .....	9
3.8. Configuring Media Changers on Tru64 UNIX V5.1 & above .....	10
3.9. CLI Command .....	11
3.9.1. Known Problem .....	11
3.10. MRU Software Installation .....	15
3.10.1. Installation Procedure .....	15
3.10.2. Verifying the Installation .....	16
3.10.3. Internationalization .....	16
3.10.4. Using the Media Robot Utility Manual Pages .....	16
3.11. The Tru64 UNIX Operating Environment .....	17
3.11.1. Required Authorization .....	17
3.11.2. Logging Robot Operations .....	17
3.11.3. Default Robot .....	17
3.11.4. Case Sensitive Searches .....	18
3.11.5. Exit Status .....	18
3.11.6. The MRU Interfaces .....	18
3.11.7. Accessing the MRU Graphic User Interface .....	18

---

3.11.8. Verifying a MUSL Configuration .....	19
<b>Chapter 4. Media Robot Utility Software for OpenVMS .....</b>	<b>21</b>
4.1. Software Version Compatibility .....	21
4.2. Connecting the Media Robot Hardware .....	21
4.3. Direct Connect SCSI Devices .....	21
4.4. Connecting DLT, DAT and TSL1000 Media Loaders .....	21
4.5. Connecting TL8nn, ESL9nnn, SSL2nnn and MSL5nnn Automated Libraries .....	22
4.6. Creating a Tape Robot Unit .....	22
4.7. Connecting Through an HSxnn Controller .....	23
4.8. Configuring Media Changer on Fibre channel: .....	23
4.8.1. Alpha System: .....	24
4.9. MRU Software Installation .....	25
4.10. MRU Distribution Medium .....	25
4.11. Preparing to Install MRU Software .....	25
4.12. Installing the Software .....	25
4.13. Verifying the Installation .....	26
4.14. Updating the OpenVMS DCL Tables .....	26
4.15. The OpenVMS Operating Environment .....	26
4.16. Required Process Privileges .....	26
4.17. Logging Robot Operations .....	26
4.18. Default Robot .....	27
4.19. Case Sensitive Searches .....	27
4.20. Exit Status .....	27
4.21. Using the Inport on TL820 Class Libraries .....	27
4.22. Waiting for the Robot .....	28
4.23. The MRU Interfaces .....	28
4.24. Accessing the MRU Graphic User Interface(GUI) .....	28
4.25. Verifying a MUSL Configuration .....	29
<b>Chapter 5. Media Robot Utility Command Reference .....</b>	<b>31</b>
5.1. Command Parameters .....	31
5.2. Commands for Operating a Media Robot .....	31
5.3. Commands for Showing Media Robot Status .....	34
5.4. About Media Robot Utility Software .....	34

# Preface

The Media Robot Utility provides an ability to load a cartridge from a selected robot slot into a specified robot drive and unload the cartridge from the drive. It also provides the user the ability to move the cartridge from slot/drive/port to slot/drive/port if the hardware device qualifies the move.

## 1. About VSI

VMS Software, Inc. (VSI) is an independent software company licensed by Hewlett Packard Enterprise to develop and support the OpenVMS operating system.

## 2. Document Structure

This manual is organized as follows:

- Chapter 1 describes the purpose of the Media Robot Utility (MRU) software.
- Chapter 2 describes the aspects of hardware installation, establishing the operating system connection, installing the MRU software, and the MRU operating environment for the Microsoft Windows 2000/Windows XP.
- Chapter 3 describes the aspects of hardware installation, establishing the operating system connection, installing the MRU software, and the MRU operating environment for Tru64 UNIX.
- Chapter 4 describes the aspects of hardware installation, establishing the operating system connection, installing the MRU software, and the MRU operating environment for the OpenVMS system.
- Chapter 5 describes the command references used throughout the document.

## 3. VSI Encourages Your Comments

You may send comments or suggestions regarding this manual or any VSI document by sending electronic mail to the following Internet address: <docinfo@vmsoftware.com>. Users who have VSI OpenVMS support contracts through VSI can contact <support@vmsoftware.com> for help with this product.

## 4. OpenVMS Documentation

The full VSI OpenVMS documentation set can be found on the VMS Software Documentation webpage at <https://docs.vmsoftware.com>.



# Chapter 1. Media Robots and MRU Software

This section defines the terms media robot and describes the purpose of the Media Robot Utility (MRU) software.

## 1.1. What Is a Media Robot?

A media robot is an enclosure that houses one or more tape drives and multiple slots for storing cartridges, and a mechanical transport for moving cartridges between locations in the enclosure. Another term for media robot is medium changer.

## 1.2. Mechanical Attributes of a Media Robot

SCSI robotic medium changers present four different objects to host systems; the transport, slots, drives, and ports. These are collectively called “elements” by the SCSI-2 specification.

### Transport

This is the robot used to move tapes or optical cartridges (media). The SCSI term for the transport is “Medium Transport Element.” Most media changer subsystems only have one robot, but there can be more.

### Slot

This is the place that a medium is stored. For the robot subsystems qualified by the Media Robot Utility, the number of slots ranges from 4 to 1320. The SCSI term for a slot is “Storage Element”.

### Drive

This is the tape or optical drive. The robot has very little control over its drives and is often at a different SCSI address. Robot subsystems have at least one drive, but the DLT libraries, for example, have more than one. The SCSI term for a drive is “Data Transfer Element.”

### Ports

Some media robots have slots for storing many cartridges. Such robots also have ports which are used to place cartridges into the robot, or remove them from the robot. Media loaders have no ports. Media libraries can have one or more ports; on the TL810 automated tape library system, a port is both to add media to a robot and remove, and on the TL820 automated tape library system, separate ports are used for importing and exporting cartridges. The SCSI terms for port are “Import Export Element,” “Import Element,” and “Export Element” depending on the function of the port.

## 1.3. What Is Media Robot Utility Software?

The Media Robot Utility (MRU) is a multiplatform utility for controlling robotic medium changers. MRU allows users to control operations at a very low level: injecting and ejecting cartridges, loading and unloading cartridges, and showing status and media robot attributes.

## **Caution**

Use MRU in a managed media environment with care. MRU provides no media management or cataloging capability. Manipulating cartridges with MRU alone could create inconsistency between the media management system's view and the physical status of the robot and cartridges.

---

## **1.4. MRU Software Variants**

MRU software runs on computers under Microsoft Windows 2000/Windows XP, Tru64 UNIX, and OpenVMS. All of these systems are capable of communicating with media robots. On each system, MRU offers both a command line operating environment and a graphic user environment. Each interface environment offers access to the software and to online information.

## **1.5. MRU Command Line Interface**

The command line interface allows users with character cell terminals to access MRU. The MRU command line interface uses a common syntax across all three platforms. Case sensitivity, however, is an issue on Tru64 UNIX systems, as is the rule with all UNIX systems.

Online help is available for character cell terminal users. See the operating system specific information for instructions on how to access the online information.

## **1.6. MRU Graphic User Interface**

The graphic user interface provides allows users with Motif, the Common Desktop Environment (CDE) or Windows 2000/Windows XP systems to access MRU. The MRU graphic user interface provides a similar look and feel across all platforms. Although there are some minor differences, they all offer similar features.

Online help is available through the Help pull down menu as well as through context sensitive help. See the operating system specific information for instructions on how to access online help.



# Chapter 2. Media Robot Utility Software for Microsoft Windows 2000/Windows XP

This chapter describes the Microsoft Windows 2000/Windows XP variant of Media Robot Utility software. It explains some important aspects of hardware installation, establishing the operating system connection, installing the MRU software, and the MRU operating environment.

MRU software for Windows runs under Windows 2000/Windows XP.

---

## Important

MRU software will not work concurrently with a third party medium changer driver installed on a Windows 2000/Windows XP workstation.

---

## 2.1. Connecting the Media Robot Hardware

Refer to the documentation that comes with your media robot hardware for information about connecting to the computer system. When you configure the hardware for installation, you select the SCSI coordinates (the SCSI bus, target ID, and LUN). Make a note of the SCSI coordinates as you set them on the hardware.

---

## Important

If the media robot has a hardware setting to enable or disable automatic inventory on startup, MAKE SURE this option is enabled. If the automatic inventory on startup option is disabled, MRU may not work.

---

## 2.2. Device Naming for Windows 2000/Windows XP

MRU uses special routines for communicating with the changer in a media robot. These routines use the pass-through SCSI driver built into the Windows 2000/Windows XP system. MRU derives the name of the medium changer device (not the tape device) from its SCSI port, bus, target and LUN. This name lets you know which device you control with MRU.

For instance, a medium changer connected to SCSI port 3, bus 0, target ID 2, LUN 1 would be named by MRU software as **Scsi3:B0T2L1**.

## 2.3. Finding SCSI Coordinates for a Connected Media Robot

If your system is already connected to media robot, you can find the SCSI coordinates through Windows 2000/Windows XP Control Panel. Write down the target ID, LUN, SCSI Port, and bus numbers and apply them to the convention described above to relate the MRU device name to the media robot.

---

Use the “SCSI Adapters” control panel to help identify the port, bus, target, and lun numbers. On the “Devices” tab, expand the host adapter entry to show its devices. Highlight the medium changer, and click on the “Properties” button. The pop-up window has a “Settings” tab which displays the,

- TargetID
- Firmware revision
- Logical unit number
- SCSI Adapter Name
- SCSI Port
- Bus number

## 2.4. MRU Software Installation

This section describes the installation prerequisite tasks and information, the installation procedure, and some follow up information.

## 2.5. MRU Distribution Medium

The distribution CDROM contains the Windows 2000/Windows XP Media Robot Utility software in the ISO 9660 format.

## 2.6. Installing MRU Software

By default, the MRU installation procedure creates its own subdirectory under the system drive and places the software and help files into it.

For example, if your system drive is C, the MRU installation creates the subdirectory

```
C:\Program Files\MRU
```

You have the option of placing the files into a different directory during installation. Follow these steps to install MRU software:

1. Insert the CDROM into the drive, or onto a shared device accessible by the system.
2. Use Explorer to locate the WINDOWS subdirectory.
3. Execute the SETUP.EXE file.

## 2.7. Verifying Installation

Use the following procedure to verify the MRU installation:

1. Change directory to the MRU installation directory.
2. Execute the xrobot.exe file.

Verify that your media robots are displayed in the startup window. If you have no media robots available, take these steps:

- a. Verify and note the SCSI setting on the hardware.
  - b. Verify and note the SCSI device information using the Control Panel.
3. Correlate the device information.

## 2.8. The Windows 2000/Windows XP Operating Environment

Before you use the MRU software, you should get to know the logging features and learn how to select a media robot for operation.

## 2.9. Logging Robot Operations

MRU software allows you to capture results of robot operations in a log file. To do so, set the MRU\_LOG environment variable.

```
set MRU_LOG=logfile
```

Where *logfile* is the full path and file name of the file in which you want to audit activities.

Remove this environment variable if no log file is desired.

You can control the amount of information captured. By default, MRU software supplies brief information. For more information, you can enable the verbose option with the MRU\_VERBOSE environment variable.

```
set MRU_VERBOSE=1
```

Remove this environment variable to disable this feature. Refer to the media robot hardware information to interpret SCSI sense data returned when this option is enabled.

## 2.10. Default Robot

By defining a default robot, you do not have to supply a robot name parameter with MRU commands you execute. This is especially useful in the command line and batch file environment. The default robot is the implicit target for any command which does not include the ROBOT robot\_name parameter.

```
set MRU_ROBOT=SCSIp:BbTtLl
```

Where:

- *p* is the port number
- *b* is the bus number
- *t* is the target ID
- *l* is the LUN

For instance, the default robot parameter for a medium changer connected to SCSI port 3, bus 0, target ID 2, LUN 1 would be named by MRU software as **Scsi3:B0T2L1**

## 2.11. Case Sensitive Searches

The FIND command default search behavior matches cartridge labels without case sensitivity. If you need a case sensitive search, then use the MRU\_CASE\_SENSITIVE environment variable.

```
set MRU_CASE_SENSITIVE=1
```

This environment variable also affects the behavior of the graphic user interface find feature.

## 2.12. Verifying a MUSL Configuration

You can use MRU to verify a successful Multi-Unit, Single LUN (MUSL) configuration. Use the SHOW ROBOT command to get information about the configuration:

```
robot show robot Scsi2:B0T2L2
Robot Name : Scsi2:B0T2L2 Type: SCSI

Media Robot   Identifier:   DEC    TL820    (C)    DEC2A5A
Slots:        176
Drives:       6
Inports:      1
Outports:     1
Transports:   2
```

MUSL control is available on firmware 2A5A or higher. This information appears on the Media Robot Identifier line of the SHOW ROBOT output.

When MUSL is activated, the combined hardware units respond to a single medium changer unit. MRU shows this with a Transport count greater than 1.

# Chapter 3. Media Robot Utility Software for Tru64 UNIX

This chapter describes the variant of Media Robot Utility software for Tru64 UNIX V 4.0F through 4.0G and V5.1 through 5.1B. It explains some important aspects of hardware installation, establishing the operating system connection, installing the MRU software, and the MRU operating environment.

## 3.1. Software Version Compatibility

The MRU command line interface runs under Tru64 UNIX Version V4.0F and above and Version 5.1, 5.1A, and 5.1B. The graphic user interface runs under Tru64 UNIX V4.0F and later and Version 5.1, 5.1A, 5.1B and requires Motif Version 1.2.3 or later.

---

### Important

Use the correct version of the CLC driver with MRU. Using the incorrect version can cause a system crash. For Tru64 UNIX Version 4.0 use CLC Version 3.1C. For Tru64 UNIX Version 5.0 use the driver CLC MC500. For future versions of Tru64 UNIX this driver will be included in the Base OS itself. Do not use the CLC driver distributed with the MRU software.

---

The following table identifies the required versions of the SCSI CLC.

**Table 3.1. UNIX Versions and Required CLC Versions**

UNIX Version	SCSI CLC Version
Tru64 UNIX Version 4.0D	CLC Version 3.1C
Tru64 UNIX Version 4.0E	CLC Version 3.1D
Tru64 UNIX Version 4.0F and 4.0G	CLC Version 3.1E
Tru64 UNIX Version 5.0	CLCMC500
Tru64 UNIX Version 5.0A onwards	NA

## 3.2. Connecting the Media Robot Hardware

Go through the documentation that comes with your media robot hardware for information about connecting to the computer system. This section includes information about creating special device files for the media robot changers.

---

### Important

If the media robot has a hardware setting to enable or disable automatic inventory on startup, MAKE SURE this option is enabled. If the automatic inventory on startup option is disabled, MRU may not work.

---

## 3.3. Media Changer Restrictions

TLZ7L and TL820 libraries may have some problems with Tru64 Unix V5.0 and above.

## 3.4. Hardware Connection Restrictions

You cannot connect a TL820 changer on the AHA1740 EISA adapter. A workaround for this case would be to connect the changer to a different SCSI adapter and leave the drive connected to the AHA1740 EISA adapter.

You cannot connect a TL82n robotic library running firmware below the 1G revision to the KFTIA adapter. If you have a TL82n robotic library running a firmware below the 1G revision, contact your service representative for information on the firmware upgrade.

## 3.5. Creating Special Device Files for Tru64 UNIX V4.0F through 4.0G Systems

MRU software qualifies locally connected medium changers and also medium changers in Tru Cluster environment with Tru64 Unix 5.1A Patch kit-0002 from all nodes in the Tru Cluster. Before you can use the Media Robot Utility software on a UNIX system, you must create special device files for the medium changers. This is not the same as creating special device files for tape drives.

There are two types of medium changers to consider:

- The TL8nn, ESL9nnn, SSL2nnn and MSL5nnn automated tape libraries require you to create a device file for the medium changer that is separate from the drives.
- The TLZ6L, TLZ7L and TZ8nn SCSI loaders require you to create a device file for the medium changer that is a logical unit of the loader.

Each of these types of robots imposes special rules for naming the robot (changer) device name. The MRU software uses the robot device name as the target for MRU commands. Some restrictions apply to the kinds of connections you can between a robot and a host system.

Determine the device name for the media changer, then use the name in the command to create the special device file. For more information, see the mc(7) manual page.

## 3.6. Special Device Files for DLT and DAT Media Loaders

---

### Important

This information applies to the TLZnx and TZ8nn classes of DLT and DAT media loaders.

---

Tape loaders of the DLT and DAT variety treat their robotic devices and tape devices as logical units of the device target ID. The are four parts to the naming convention with this type of medium changer:

1. Determine the target ID for a drive in the loader:

```
# scu show edt bus num
```

Where: *num* is the number of the bus on which the loader is connected.

- a. Multiply the SCSI bus number by 8 and add the value of the target ID.

Then append a letter corresponding with the logical unit number. The correspondence for letter to logical unit number starts with b corresponding to logical unit number 1, c corresponding with logical unit number 2, and so on.

- b. Create the device name by concatenating **mc** with the number and letter derived in the previous step.
2. Use the device name to create the special device file for the media changer.

The following example shows how to construct a device name for a desktop TZ media changer. The media changer is on bus 2, target ID of 5, logical unit 1.

### Example 3.1. Constructing a Device Name for a Desktop TZ Loader

```
# /sbin/scu show edt bus 2
Bus: 2, Target: 5, Lun: 0, Device Type: Sequential Access
Bus: 2, Target: 5, Lun: 1, Device Type: Changer
Bus: 2, Target: 5, Lun: 2, Device Type: (not present)
Bus: 2, Target: 5, Lun: 3, Device Type: (not present)
Bus: 2, Target: 5, Lun: 4, Device Type: (not present)
```

The name of the device for the media changer would be calculated by multiplying 2 by 8 and adding 5, and concatenating the letter b, providing a name of mc21b. The commands for creating the special device would be:

```
# cd /dev ; ./MAKEDEV.MC mc21b
```

## 3.7. Special Device Files for TL8nn Automated Tape Libraries

---

### Important

This information applies to the TL81n, TL82n, TL89n classes of libraries.

---

To determine the device name for the media changer in a TL8nn automated tape library, use the following procedure:

1. Determine the target ID for a drive in the robot:

```
# scu show edt bus num
```

Where *num* is the number of the bus on which the loader is connected.

- a. Multiply the SCSI bus number by 8 and add the value of the target ID of the changer.
  - b. Create the device name by concatenating mc with the number derived in the previous step.
2. Use the device name to create the special device file for the media changer.

The following example shows how to construct a device name for a TL810 media changer with two drives. The media changer is on bus 4, target ID of 0, logical unit 0.

### Example 3.2. How to Construct a Device Name for a TL895 Medium Changer

```
# /sbin/scu show edt bus 4
```

```
Bus: 4, Target: 0, Lun: 0, Device Type: Changer
Bus: 4, Target: 1, Lun: 0, Device Type: Sequential Access
Bus: 4, Target: 2, Lun: 0, Device Type: Sequential Access
Bus: 4, Target: 3, Lun: 0, Device Type: Sequential Access
```

The name of the device for the media changer would be calculated by multiplying 4 by 8 and adding 0, providing a name of mc32. The commands for creating the special device would be:

```
# cd /dev ; ./MAKEDEV.MC mc32
```

When installing a TL8nn medium changer system, you need to keep track of the device file names for the drives serviced by the particular robotic transport device. MRU software cannot unload a cartridge from a drive in a TL8nn medium changer system without first taking the drive offline. MRU software has no way of associating the drives with the robotic transport device. You must supply the device file name before unloading a cartridge.

## 3.8. Configuring Media Changers on Tru64 UNIX V5.1 & above

MRU software now runs on Tru64 UNIX V5.1 & above. It qualifies locally connected medium changers and also medium changers in Tru Cluster environment with Tru64 Unix 5.1A Patch kit-0002 from all nodes in the Tru Cluster. Before you can use the Media Robot Utility software on a Tru64 UNIX V5.1 system, you must ensure that the *Media Changer Drivers* are installed and configured.

The following steps will help you check for installation and configuration.

1. Check that the appropriate *changer driver* is installed.

```
# setld -i | grep -i mc
CLCMC500 Installed SCSI CAM Medium Driver V5.0
```

If it is not installed, you can install it from *Associated Products CDROM #2* with the following command:

```
# mount -r /dev/disk/cdrom0c /cdrom
```

Go to the *CAM Layered Product* directory kit to install the CAM driver. Build the new kernel and reboot the system.

---

### Important

In later versions of Tru64 UNIX, you can skip [step 1](#), because this changer driver will be included in the Base OS.

---

2. Run the following commands to configure devices:

- a. To view all devices connected to the system:

```
#hwmgr -view devices
```

- b. To create device special files for devices connected, after system boot:

```
#dsfmgr -k
```

- c. To create device special files for all devices connected:



```
#dsfmgr -K
```

- d. To complete the respective action:

```
#scu scan edt
#scu show edt
#hwmgr -scan scsi
#hwmgr -show scsi
```

For more information you can access manual pages using:

```
# man hwmgr (8)
# man dsfmgr (8)
```

## 3.9. CLI Command

You can run the CLI robot command after specifying robot name as:

```
/dev/changer/mcnn
```

### xrobot Command

```
#xrobot /dev/changer/mcnn
```

Where *mcnn* is the number assigned to the device. Users can specify more than one changer device on the command line as follows:

```
#xrobot /dev/changer/mcn1 /dev/changer/mcn2 /dev/changer/mcn3
```

Or you can create a hard link between `/dev/changer/mcnn` and `/dev/mcnn` for `xrobot` to find media changer devices by itself, then you need not to give changer device name with `xrobot` command.

## Referencing Changer Devices in the API

Application programs should reference changer devices by the naming convention described above. These devices can be viewed by the `hwmgr` command.

### 3.9.1. Known Problem

*robot init* fails in case of ESL9000

This problem occurs in case of multitower ESL9000, and has been found to be due to a very short default *init timeout* value. Adding a `ddr` entry for ESL9000 and setting a larger timeout value helps set this problem right.

To add the `ddr` entry do as follows:

1. Open the `ddr.dbase` file as follows.

```
# vi /etc/ddr.dbase
```

2. Search for the TL800 entry. You will see the following:

```
SCSIDEVICE
#
Type = changer
Name = "DEC      " "TL800"
#
PARAMETERS:
    DisperseQueue      = false
    TagQueueDepth      = 0x0
    InquiryLength      = 0x38
ATTRIBUTE:
    AttributeName = "Init_Timeout"
    Length       = 4
    uint[0]      = 1800
```

3. Add the following text to create the ESL9000 entry:

```
SCSIDEVICE
#
Type = changer
Name = "COMPAQ " "ESL9000"
#
PARAMETERS:
    DisperseQueue      = false
    TagQueueDepth      = 0x0
    InquiryLength      = 0x24
ATTRIBUTE:
    AttributeName = "Init_Timeout"
    Length       = 4
    uint[0]      = 1800
```

This means you have increased the timeout value to 1800 seconds.

4. Save and exit.
5. # /sbin/ddr\_config -c
6. Reboot.

Configuring TLZ9L with Tru64 UNIX V5.0 can pose problems.

## Workaround:

Users should edit the *ddr* entry for this device type and change the way it creates the WWID. The change will result in the creation of unique ids for the changer and tape unit of the TLZ9.

1. Find the HWID for the device in question using:

```
# hwmgr -view devices
HWID: Device Name      MfgModel      Location
3:    /dev/kevm        :      :      :
.    .                .      .      .
*51:  /dev/changer/mc2 TLZ9 (C)      DEC bus-2-targ-7-lun-1
```

\* use this information for the next command

2. Show the device in question, using:

```
# hwmgr -show scsi -id 51 -full

SCSI Device Device Device Subtype Driver OwnerNum Device First
Valid
HWID ID HostnameType Path File
Path
51: 33 camtst2 changer none 0 2 (null) [2/7/0]

WWID:04100022:"DEC TLZ9 C) DEC0008300071"
BUS TARGET LUN PATH STATE
2 7 0 valid
2 7 1 valid
```

You will note that there are two Bus/Target/Luns for this HWID. This is because the WWID string :

```
04100022:"DEC TLZ9(C) DEC0008300071)
```

created by the system is the same for both changer and tape. Also, the WWID shows that the id was formed using:

```
(04) SCSI_WWID_PG80_SERIALNO
```

and that you are going to change it to use the following method instead.:

```
(08) SCSI_WWID_DEC_UNIQUE
```

This will avoid the problem of the serial number being the same for both changer and tape units.

Steps and show how the device is set up on the system before the *ddr* database is changed.

### 3. Edit the ddr database using:

```
# vi /etc/ddr.dbase
```

With the file open, search for TLZ9. Insert the following after the PARAMETERS section for TLZ9. Make sure that you insert this for both the tape and changer entries.

```
ATTRIBUTE:
    AttributeName = "VPDinfo"
    Length = 16
    ubyte[5] = 8 # TLZ9 WWID with dev type appended
```

The resulting *ddr.dbase* sections should appear as follows:

```
SCSIDEVICE
#
Type = tape
Name = "DEC" "TLZ9"
#
PARAMETERS:
    TypeSubClass = rdat, loader
    TagQueueDepth = 0
    MaxTransferSize = 0x0fffffff # (16MB - 1)
    ReadyTimeSeconds = 90 # seconds

ATTRIBUTE:
    AttributeName = "VPDinfo"
    Length = 16
```

```

        ubyte[5] = 8 # TLZ9 WWID with dev type appended
DENSITY:
#
DensityNumber    = 0,3,4,5,6,7
DensityCode      = default
CompressionCode  = 0x0
Buffered         = 0x1
: : : :

```

There will be another one of these for the changer within the *ddr* file that is also updated to include the PARAMETER section. The inserted section should include the comment as is according to development engineering. The comment is needed to get future auto-installations or upgrades to work correctly.

#### 4. Apply the changes using:

```

# ddr_config -c
# reboot

```

#### 5. Review and verify using:

```

# hwmgr -view devices
HWID:      Device NameMfg      Model      Location
3:         /dev/kevm           :          :          :
          .          .          .          .          .

53:        /dev/ntape/tape9DECTLZ9 (C) DEC bus-2-targ-7-lun-0
54:        /dev/changer/mc3      TLZ9 (C) DEC bus-2-targ-7-lun-1
# hwmgr -show scsi -id 53 -full

SCSI Device Device Device Subtype Driver OwnerNum Device First
Valid
HWID ID      HostnameType           Path      File
Path
53:  34      camtst2 tape      none      0         1  tape9  [2/7/0]

WWID:08100026:"DEC TLZ9      (C) DEC0008300071:d01"
BUS TARGET LUN  PATH  STATE
2   7     0   valid

# hwmgr -show scsi -id 54 -full

SCSI Device Device Device Subtype Driver OwnerNum Device First
Valid
HWID ID      HostnameType           Path      File
Path
54:  35      camtst2 changer     none      0         1  mc3    [2/7/0]

WWID:08100026:"DEC TLZ9      (C) DEC0008300071:d01"
BUS TARGET LUN  PATH  STATE
2   7     0   valid

WWID:08100026:"DEC TLZ9      (C) DEC0008300071:d08"
BUS TARGET LUN  PATH  STATE
2   7     1   valid

# hwmgr -show scsi -id 51 -full

```

```

SCSI Device Device Device Subtype Driver OwnerNum Device First
Valid
HWID ID HostnameType Path File
Path
51: 33 camtst2 changer none 0 2 (null) [2/7/0]

WWID:08100026:"DEC TLZ9 (C) DEC0008300071:d01"
BUS TARGET LUN PATH STATE
2 7 0 valid

WWID:04100022:"DEC TLZ9 (C) DEC0008300071"
BUS TARGET LUN PATH STATE
2 7 0 stale
2 7 1 stale

$ hwmgr -show comp -cs

51:camtst2 -cd-- iomap SCSI-WWID:04100022:"DEC TLZ9(C) DEC0008300071"
53:camtst2 rcd--iomap SCSI-WWID:08100026:"DEC TLZ9(C)DEC0008300071:d01"
54:camtst2 rcd--iomap SCSI-WWID:08100026:"DEC TLZ9(C)DEC0008300071:d08"

```

This shows that the changer and tape devices have different WWIDs within the system and are correctly configured to function as clusterable device(s). The 'c' in 'rcd--' string above shows that device is cluster sharable. The old hardware id still exists, but is marked as stale.

## 3.10. MRU Software Installation

The distribution CDROM contains the Tru64 UNIX Media Robot Utility software in the ISO 9660 format.

### 3.10.1. Installation Procedure

This procedure explains how to install the MRU Software on Tru64 UNIX MRU software for CDROM systems with and without Rock Ridge Interchange Protocol (RRIP) extensions to the ISO 9660 format.

#### If your system supports RRIP Extensions

1. Log in as a superuser.
2. Use the command for device rz4c at mount point /mnt/CDROM as follows:

```
# mount -r -t cdfs -o noversion,rrip /dev/disk/cdrom0c /mnt/CDROM
```

3. Invoke setld with the following option and the kit location name:

```
# setld -l /mnt/CDROM/unix/robot180/kit
```

#### If your system does not support RRIP Extensions

1. Log in as a superuser.
2. First mount the CDROM, then copy the files from the CDROM to your system.

- The mount command for device cdrom0c at mount point /mnt /CDROM would be:

```
# mount -r -t cdfs -o noversion /dev/disk/cdrom0c /mnt/CDROM
```

- Copy the kit to /var/tmp. Of the following two commands, use the first to go to the /var/tmp directory and the next to copy the files from the CDROM:

```
# cd /var/tmp # tar xvf /mnt/CDROM/unix/robot180.tar
```

3. Invoke setld with the following option and the kit location name:

```
# setld -l /var/tmp/robot180/kit
```

### After Step 3 - common to all systems

4. Select subset options from the displayed list.

You have two options for the graphic user interface, Motif and CDE. You can select either or both subsets.

5. Confirm the selected subset options.
6. Select to build a kernel file when prompted.
7. Decline the option to edit the configuration file.
8. After installation, delete the /tmp/ROBOT.Legal.Notice file.

## 3.10.2. Verifying the Installation

Use the following procedure to verify the MRU installation:

As the verification utility under Tru64 Unix V5.1 will not by itself detect robots connected to systems, you need to create a hard link between /dev/changer/mcnn and /dev/mcnn.

1. Invoke setld with the following option and subset name:

```
# setld -v ROBOTBASE180
```

2. Select the robot on which you want to verify the installation.

## 3.10.3. Internationalization

A UNIX friendly, American English message catalog is included with the Media Robot Utility kit. The default messages contain examples that are more appropriate to OpenVMS systems. To use this alternate message catalog, set the LANG environment variable to en\_US.ISO8859-1:

```
# setenv LANG en_US.ISO8859-1
```

## 3.10.4. Using the Media Robot Utility Manual Pages

The Media Robot Utility software manual pages require the installation of the Admin/ User Reference Pages (OSFMANOS) or the Windows Admin/Users Reference Pages (OSFMANWOS). These two subsets require the installation of the Document Preparation Tools (OSFDCMT) subset. The OSFMANOS and OSFMANWOS subsets are not automatically installed as a result of installing OSFDCMT.

Before you can use the robot.8 and xrobot.1X manual pages, you must have installed OSFDCMT and either OSFMANOS or OSFMANWOS subsets.

## 3.11. The Tru64 UNIX Operating Environment

Before you use the MRU software, you need to know the required privilege level to execute the software. You should also understand the logging features, and understand the implicit and explicit selection of a media robot for any operation.

### 3.11.1. Required Authorization

To use MRU software, you must have read access to the special device files for the robots you want to operate. For more information on special device files for MRU software, refer to the section entitled *Creating Special Device Files for Tru64 UNIX Systems*.

### 3.11.2. Logging Robot Operations

MRU software allows you to capture results of robot operations in a log file. To do so, set the MRU\_LOG environment variable in the process running MRU software.

These commands create a log file named logfile in the current default directory for the shell indicated.

C-Shell:

```
# setenv MRU_LOG logfile
```

Bourne Shell:

```
# MRU_LOG=logfile ; export MRU_LOG
```

Remove this environment variable if no log file is desired.

You can control the amount of information captured. By default, MRU software supplies brief information. For more information, you can enable the verbose option with the MRU\_VERBOSE environment variable.

These commands enable verbose logging.

C-Shell:

```
# setenv MRU_VERBOSE
```

Bourne Shell:

```
# MRU_VERBOSE= ; export MRU_VERBOSE
```

Remove this environment variable to disable this feature. Refer to the media robot hardware information to interpret SCSI sense data returned when this option is enabled.

### 3.11.3. Default Robot

By defining a default robot, you do not have to supply a robot name parameter with MRU commands you execute. The default robot is the implicit target for any command which does not include the ROBOT robot\_name parameter.

These commands set the default robot to /dev/changer/mc32

C-Shell:

```
# setenv MRU_ROBOT /dev/changer/mc32
```

Bourne Shell:

```
# MRU_ROBOT=/dev/changer/mc32 ; export MRU_ROBOT
```

You can override the default robot by explicitly including the `ROBOT robot_name` parameter in an MRU command. Remove this environment variable if no default robot is needed.

### 3.11.4. Case Sensitive Searches

The `find` command default search behavior matches cartridge labels without case sensitivity. If you need a case sensitive search, then use the `MRU_CASE_SENSITIVE` environment variable.

C-Shell:

```
# setenv MRU_CASE_SENSITIVE
```

Bourne Shell:

```
# MRU_CASE_SENSITIVE= ; export MRU_CASE_SENSITIVE
```

This environment variable also affects the behavior of the graphic user interface `find` feature.

### 3.11.5. Exit Status

Starting with this version, MRU returns operating system specific status messages to programs written against the application programming interface.

If you want to continue using scripts and programs written against previous versions of MRU, then use the `MRU_OLD_STATUS` environment variable.

C-Shell:

```
# setenv MRU_OLD_STATUS
```

Bourne Shell:

```
# MRU_OLD_STATUS= ; export MRU_OLD_STATUS
```

With this logical defined, exit status reports either success or failure.

### 3.11.6. The MRU Interfaces

MRU software includes two interfaces. The MRU command line interface allows for direct interaction with the MRU software, and for the development of scripts for programmed operations. A manual page file contains information about MRU software for Tru64 UNIX systems. You can access the information in the manual page with this command:

```
# man robot
```

### 3.11.7. Accessing the MRU Graphic User Interface

The MRU graphic user interface runs under Tru64 UNIX V5.1, and Motif Version 1.2.3. This interface provides a simple way to operate a library or loader. If you have created the hard links between `/dev/`



changer/mcnn and /dev/mcnn then by default, the graphic user interface scans the system to provide access to all connected robots. To start the graphic user interface, enter:

```
# xrobot
```

To use the graphic user interface to access particular robots, specify the robot special device files in a list following the xrobot command. The following command example shows this feature:

```
# xrobot /dev/changer/mc32 /dev/changer/mc48 /dev/changer/mc19b
```

The system view window shows all libraries and loaders connected to the system. Select the library or loader you want from the system view window by placing the pointer on the robot icon and double clicking MB1. The robot dialog represents the selected library or loader. Use it to conduct operations with the robot, and set robot-specific customizations. Move cartridges by either drag and drop operation with MB1, or use point and click operations on cartridge source and destination locations. Cartridges can be moved from any location to any other location as allowed by the media robot hardware (except for the explicit dismount/offline operation required by drives in the TL8nn automated tape libraries).

The online help provides detailed information on using the graphic user interface and, operating your media robot.

### 3.11.8. Verifying a MUSL Configuration

You can use MRU to verify a successful Multi-Unit, Single LUN (MUSL) configuration. Use the SHOW ROBOT command to get information about the configuration:

```
robot show robot /dev/changer/mc48
Robot Name : mc48 Type: SCSI
Media Robot Identifier: DEC TL820 (C) DEC2A5A

Slots:          176
Drives:         6
Inports:        1
Outports:       1
Transports:     2
```

MUSL control is available on firmware 2A5A or higher. This information appears on the Media Robot Identifier line of the SHOW ROBOT output.

When MUSL is activated, the combined hardware units respond to a single medium changer unit. MRU shows this with a Transport count greater than 1.



# Chapter 4. Media Robot Utility Software for OpenVMS

This chapter describes the Media Robot Utility software variant for the OpenVMS system. It explains some important aspects of hardware installation, establishing the operating system connection, installing the MRU software, and the MRU operating environment.

## 4.1. Software Version Compatibility

The MRU command line interface runs on OpenVMS VAX Version 7.3, OpenVMS Alpha Versions 7.3-2 and 8.2 and OpenVMS I64 Versions 8.2 and 8.2-1.

The graphic user interface(GUI) runs on OpenVMS VAX Version 7.3, OpenVMS Alpha Versions 7.3-2 and 8.2, and I64 Versions 8.2 and 8.2-1. On OpenVMS VAX Version 7.3, OpenVMS Alpha Versions 7.3-2 and 8.2, and I64 Versions 8.2 and 8.2-1, the GUI requires Motif Version 1.2.5.

## 4.2. Connecting the Media Robot Hardware

Refer to the documentation that comes with your media robot hardware for information about connecting to the computer system.

---

### Important

If the media robot has a hardware setting to enable or disable automatic inventory on startup, **MAKE SURE** this option is enabled. If the automatic inventory on startup option is disabled, MRU may not work.

---

## 4.3. Direct Connect SCSI Devices

A SCSI device that is directly connected to a VAX or Alpha system uses the GKDRIVER software to control the movement of the robotics. (The tape devices use tape device drivers.) The GKDRIVER is a standard OpenVMS device driver and does not require a separate installation. However, you must first create a tape robot unit to use the robotic features on tape jukeboxes directly connected through a SCSI bus. The tape robot unit is named such that it describes the physical SCSI connection.

There are two categories of medium changers to consider, and each uses a different naming convention for its drive and changer devices because of the manner in which it is configured and physically connected to the SCSI bus. Keep these conventions in mind as you configure your systems, especially for creating tape robotic units.

## 4.4. Connecting DLT, DAT and TSL1000 Media Loaders

---

### Important

This information applies to the TLZnx, TZ8nn and TSL10000 classes of DLT and DAT media loaders.

---

DLT, DAT, and TSL10000 tape loaders treat their robotic devices and tape devices as logical units of the device target ID. There are four parts to the naming convention with this type of robotic loader:

- The name begins with a prefix of MK for the tape device and GK for the robotic device.
- The prefix is followed by a letter indicating the physical SCSI bus to which the device is connected to the host system. For devices connected to the first bus detected at boot time, the letter is A, for the second bus detected, B, and so on.
- The next part is a number corresponding to the SCSI target ID.
- The last part is a two-digit number corresponding to the SCSI target ID logical unit number. Because tape drives in a DLT or DAT loader are always at logical unit 0, the last two digits are 00. The last two digits for the robotic device are 01.

MKA400 is the name of a tape device connected to the first SCSI bus seen at boot time, at target ID 4. GKA401 is the name of the robotic device and the name of the robotic unit corresponding to the tape device MKA400.

## 4.5. Connecting TL8nn, ESL9nnn, SSL2nnn and MSL5nnn Automated Libraries

---

### Important

This information applies to the TL81n, TL82n, TL89n, ESL9000, SSL2000, MSL5000 classes of libraries.

---

With TL8nn, ESL9nnn, SSL2nnn, MSL5nnn tape libraries, the drives and robot units are separate. There are three parts to the naming convention for a tape library:

- The name begins with a prefix of MK for the tape device and GK for the robotic device.
- The prefix is followed by a letter indicating the physical SCSI bus to which the device is connected to the host system. For devices connected to the first bus detected at boot time, the letter is A, for the second bus detected, B, and so on.
- The next part is a number corresponding to the SCSI target ID.

For example, for a TL810 library system with the robotic unit connected to the second bus detected at boot time at target ID 5, the name would be GKB500.

When installing a TL8nn, ESL9nnn, SSL2nnn, MSL5nnn medium changer system, you need to keep track of the device names for the drives serviced by the particular robotic transport device. MRU software cannot unload a cartridge from a drive in a TL8nn medium changer system without the OpenVMS system first dismounting the cartridge. MRU software has no way of associating the drives with the robotic transport device. You must correlate the device and device name before unloading a cartridge.

## 4.6. Creating a Tape Robot Unit

For SCSI magazine loaders connected directly to a SCSI bus, enter the SYSGEN or SYSMAN command in the appropriate format:

VAX system:

```
$ MCR SYSGEN CONNECT GKannn:/DRIVER=GKDRIVER/NOADAPTER
```

Alpha/I64 system:

```
$ MCR SYSMAN IO CONNECT GKannn:/DRIVER=SYS$GKDRIVER -  
$_ /NOADAPTER
```

Where: *GKannn*: is the robot device name. With media loaders, the robot device name is always the same as the tape drive name incremented by one, and without any prefixes (allocation class or NODE\$ prefix) to the GK string. For example, a tape drive name of \$1\$MKA200: could use a robot device name of GKA201:.

VSI recommends that you include the SYSGEN commands in your system startup command procedure.

## 4.7. Connecting Through an HSxnn Controller

When connecting a media robot to an HSJnn or HSDnn controller, you must associate the loader name with an internal passthrough name. After installing the media robot hardware, and connecting the cables between host, controller, and media robot, you can make the association at the controller console terminal.

1. Add the loader to the controller by identifying the loader name and SCSI port, target ID, and LUN

```
CLI> ADD LOADER loader_name port target lun
```

2. Add the passthrough name to the controller, relating it to the loader name.

```
CLI> ADD PASSTHROUGH pass_name loader_name
```

3. Add the unit name, relating it to the passthrough name.

```
CLI> ADD UNIT unit_name pass_name
```

This example shows the commands for connecting a TL810 Automated Tape Library system loader. The SCSI port is 5, Target ID is 4, and LUN is 0.

```
CLI> ADD LOADER TL810A 5 4 0  
CLI> ADD PASSTHROUGH P810A TL810A  
CLI> ADD UNIT D810 P810A
```

## 4.8. Configuring Media Changer on Fibre channel:

Media Changer devices on Fibre Channel (FC) will be auto configured. As the device name of a Media Changer on Fibre Channel does not imply to its physical address, so FC connected Media Changers cannot be configured manually (i.e. the CONNECT command is not used). For FC connected device the naming scheme is mentioned below:

---

### Important

Fibre Channel is not qualified on Vax. However, if an Alpha system has a Fibre Channel adapter and can configure tapes on the Fibre Channel, that Alpha system may TMSCP-serve those tapes to V7.3 VAX clients.

---

The Fibre Channel tapes and changers will be named by a scheme similar to the one implemented on Fibre Channel disks. A Fibre Channel tape name will be of the form \$2\$MGA $n$ , where  $n$  is a number chosen by OpenVMS. The letter chosen for the controller will always be 'A', with the prefix \$2\$. In general the name creation algorithm chooses the first free unit number starting with 0, so the first tape discovered on the Fibre Channel will be named \$2\$MGA0. The next will be \$2\$MGA1 and so on. Likewise, the first medium changer detected on the Fibre Channel will be named \$2\$GGA0, and so on.

---

## Important

Two non-clustered systems that share a common library through a FC switch have no knowledge of each other, and may assign a tape drive two different names. Note that there is no resource locking between non-clustered systems, which may result in conflicting allocation of the tape drives or robot. Within a cluster, the naming and allocation is controlled and consistent.

---

### 4.8.1. Alpha System:

1. `$ MCR SYSMAN IO FIND_WWID`

This will list all detected tapes and Media Changers along with their suggested names. It stores the names and their worldwide identifiers (WWID) in `SYS$DEVICES.DAT` file.

2. `$ SYSMAN IO AUTOCONFIGURE`

This will configure the devices.

Sample Output of `SYSMAN` commands:

```
$ mcr sysman io find_wwid
```

On port `_BOLERO$PGA0:`, the following tape WWIDs and their proposed device names have been found but not yet configured:

```
[Device $2$GGA0]
WWID=04100024:"DEC      TL800      (C)      DEC3G9CCR82A017"

[Device $2$MGA0]
WWID=04100022:"DEC      TZ89      (C)      DECCX939S2777"

[Device $2$MGA1]
WWID=04100022:"DEC      TZ89      (C)      DECCX942S6295"
```

```
$ mcr sysman io auto/log
```

```
%SYSMAN-I-OUTPUT, command execution on node BOLERO
%IOGEN-I-PREFIX, searching for ICBM with prefix SYS$
%IOGEN-I-PREFIX, searching for ICBM with prefix DECW$
%IOGEN-I-SCSIPOLL, scanning for devices through SCSI port PKA0
%IOGEN-I-SCSIPOLL, scanning for devices through SCSI port PKB0
```

```
%IOGEN-I-FIBREPOLL, scanning for devices through FIBRE port PGA0
%IOGEN-I-CONFIGURED, configured device GGA0
%IOGEN-I-CONFIGURED, configured device MGA0
%IOGEN-I-CONFIGURED, configured device MGA1
$
```

## 4.9. MRU Software Installation

This section describes the installation prerequisite tasks and information, the installation procedure, and some follow up information.

## 4.10. MRU Distribution Medium

The distribution CDROM contains the OpenVMS Media Robot Utility software in the Files11 format.

## 4.11. Preparing to Install MRU Software

Use the following procedure for preinstallation:

1. Login to the SYSTEM account.
2. Enable all privileges.
3. Verify that the current system disk backup copy is appropriate.
4. Load and mount the media that contains the software kit.

## 4.12. Installing the Software

Use the following procedure to install the software:

1. Invoke the VMSINSTAL procedure using the following form, where *location* is the name of the device and directory in which the kit is located:

```
$ @SYS$UPDATE:VMSINSTAL ROBOT018 location:
```

Where: *location*: is the name of the device from which you are installing the kit.

2. Confirm the state of the system disk.
3. Select no additional options.
4. Purge previous MRU files.
5. If you are upgrading MRU

At this point, you are likely to get a message from the VMSINSTAL procedure about version sequencing. If you receive this message, select to replace the image that is currently installed.

This message is an artifact of a naming change for the underlying image.

6. Run the Installation Verification Procedure (IVP).

## 4.13. Verifying the Installation

The IVP searches the system for connected libraries and loaders and any it finds are presented to you for selection. If the IVP finds none, the installation finishes, but the IVP fails. In this case, you must install the hardware and/or appropriate drivers and execute the IVP. Use this command line to execute the IVP:

```
$ @SYS$COMMON:[SYSTEST]ROBOT$IVP.COM
```

## 4.14. Updating the OpenVMS DCL Tables

If you installed MRU on a VMScluster system, users will have to log out and log in again to use MRU. This is due to the automatic update of the DCLTABLES performed during MRU software installation.

## 4.15. The OpenVMS Operating Environment

Before you use the MRU software, you need to know the required privileges to execute the software. You should also understand the logging features, and understand how to select a media robot for operation.

---

### Caution

Define logical names only within the context of a user process if you use any Storage Management Software product that includes the Media and Device Management Services (MDMS) software. If you use MDMS software and define any of these logicals so they are set for any MDMS process (i.e. any group or system logical table accessible by MDMS, you could cause failures in MDMS operations.

---

## 4.16. Required Process Privileges

Privileges required to operate MRU software depend on the robot connection to the host. Table 4.1 lists the privileges required for each of three different kinds of connections.

**Table 4.1. Required Process Privileges**

Required Privilege	Direct Connect SCSI	HSJ Controller Connect
SYSRV	X	
PHY_IO	X	X
DIAG	X	X

## 4.17. Logging Robot Operations

MRU software allows you to capture results of robot operations in a log file. To do so, define the MRU\_LOG logical in the process running MRU software.

This command creates a log file named *file\_name* in the current default directory:

```
$ DEFINE MRU_LOG file_name
```

Deassign this logical if no log file is desired.



You can control the amount of information captured. By default, MRU software supplies brief information. For more information, you can enable the verbose option with the MRU\_VERBOSE logical.

This command enables verbose logging:

```
$ DEFINE MRU_VERBOSE 1
```

Deassign this logical to disable this feature. Refer to the media robot hardware information to interpret SCSI sense data returned when this option is enabled.

## 4.18. Default Robot

By defining a default robot, you do not have to supply a robot name parameter with MRU commands you execute. The default robot is the implicit target for any command that does not include the robot\_name parameter.

This command sets the default robot to *robot\_name*:

```
$ DEFINE MRU_ROBOT robot_name
```

You can override the default robot by explicitly including the ROBOT robot\_name parameter in an MRU command. Deassign this logical if no default robot is needed.

## 4.19. Case Sensitive Searches

The FIND command default search behavior matches cartridge labels without case sensitivity. If you need a case sensitive search, then use the MRU\_CASE\_SENSITIVE logical.

```
$ DEFINE MRU_CASE_SENSITIVE 1
```

This environment LOGICAL also affects the behavior of the graphic user interface find feature.

## 4.20. Exit Status

Starting with this version, MRU returns operating system specific status messages to programs written against the application programming interface.

If you want to continue using scripts and programs written against previous versions of MRU, then use the MRU\_OLD\_STATUS logical.

```
$ DEFINE MRU_OLD_STATUS 1
```

With this logical defined, exit status reports either success or failure.

## 4.21. Using the Inport on TL820 Class Libraries

The MRU\_READY\_DELAY logical defines the amount of time you will take to place a cartridge into a TL820 class ATL inport and close the inport door, after you issue the READY command. If you fail to close the inport door within the specified time, MRU may report an error on subsequent commands.

The default value is 65 seconds.

This logical definition sets the time to two minutes.

```
$DEFINE MRU_READY_DELAY 120
```

## 4.22. Waiting for the Robot

If you issue a command to a media robot while it is performing an ongoing operation, the MRU software waits until the ongoing operation completes before attempting to execute the command. By default, the MRU software waits up to approximately 18 hours for the operation to finish before failing the command. If you, or a scripted procedure, cannot tolerate a long delay, you can specify number of seconds delay you can tolerate with the MRU\_WAIT logical.

This command sets the longest wait period to two minutes:

```
$ DEFINE MRU_WAIT 120
```

Another feature of MRU software controls the amount of time it waits after an unload operation is initiated on a DLT media robot. It can take up to about three minutes for a tape to rewind in response to an unload request. By default, MRU software will attempt to perform an unload up to 180 times, until the unload is successful. You can change this by specifying an unload retry value with the MRU\_UNLOAD\_DELAY logical. The amount of time taken to retry a single unload operation can take from one to approximately seven seconds depending on the particular media robot.

This command sets the number of unload retries to 10:

```
$ DEFINE MRU_UNLOAD_DELAY 10
```

## 4.23. The MRU Interfaces

MRU software includes two interfaces. The MRU command line interface allows for direct interaction with the MRU software, and for the development of scripts for programmed operations. A help file contains information about MRU software for OpenVMS systems. You can access the information in the help file with this command:

```
$ HELP ROBOT
```

## 4.24. Accessing the MRU Graphic User Interface(GUI)

The MRU system now includes a GUI which runs on the following: OpenVMS I64 Versions 8.2 and 8.2-1, OpenVMS Alpha Versions 7.3-2 and 8.2, OpenVMS VAX Version 7.3, and Motif Version 1.2.5. This interface provides a simple way to operate a library or loader. By default, the graphic user interface scans the system to provide access to all connected robots. To start the graphic user interface, enter:

```
$ XROBOT
```

To use the graphic user interface to access particular robots, specify the robot devices in a list following the XROBOT command. The following command example shows this feature:

```
$ XROBOT $1$DUA812: GKA2: $1$MIA4:
```

The system view window shows all libraries and loaders connected to the system. Select the library or loader you want from the system view window by placing the pointer on the robot icon and double clicking MB1.

The robot dialog represents the selected library or loader. Use it to conduct operations with the robot, and set robot- specific customizations.

Move cartridges by either drag and drop operation with MB1, or use point and click operations on cartridge source and destination locations. Cartridges can be moved from any location to any other location as allowed by the media robot hardware (except for the explicit dismount/offline operation required by drives in the TL8nn automated tape libraries).

The online help provides detailed information on using the graphic user interface and, operating your media robot.

## 4.25. Verifying a MUSL Configuration

You can use MRU to verify a successful Multi-Unit, Single LUN (MUSL) configuration. Use the SHOW ROBOT command to get information about the configuration:

```
$ROBOT SHOW ROBOT $1$DUA560:
Robot Name : $1$DUA560: Type: SCSI

Media Robot Identifier: DEC TL820 (C) DEC2A5A

Slots:                176
Drives:                6
Inports:               1
Outports:              1
Transports:            2
```

MUSL control is available on firmware 2A5A or higher. This information appears on the Media Robot Identifier line of the SHOW ROBOT output.

When MUSL is activated, the combined hardware units respond to a single medium changer unit. MRU shows this with a Transport count greater than 1.



# Chapter 5. Media Robot Utility

## Command Reference

All the MRU command listed are subcommands of the robot command under Digital UNIX systems, and the ROBOT command under OpenVMS systems.

### 5.1. Command Parameters

MRU software uses these common parameters in its commands:

#### **slot\_number**

An integer value indicating a physical slot in the media robot.

#### **drive\_number**

An integer value indicating a physical drive in the media robot.

#### **port\_number**

An integer value indicating a physical port in the media robot.

#### **robot\_name**

The system name for the media robot accessed. MRU software will use the default robot name if none is specified. To override the default robot name, supply a response to the robot\_name parameter in the command.

#### **cartridge\_name**

The name of the cartridge as identified by its external label. MRU treats cartridge names with case sensitivity.

MRU drive, slot, and port numbering begins with 0. The default value supplied by MRU for DRIVE, SLOT, and PORT is 0.

### 5.2. Commands for Operating a Media Robot

The following command descriptions show the general command syntax.

For commands that involve cartridges, such as LOAD and MOVE, you can optionally specify the cartridge name as it appears on the barcode. If the media robot has a vision capability, MRU can determine the bar code value before actually executing the command. If the specified bar code is not the bar code value at the source, the command fails before processing any farther. If the media robot does not qualify bar codes, the bar code value is ignored.

Consult your online information for examples and detailed descriptions of commands for your operating system.

#### **INJECT**

The INJECT command moves a cartridge from a port to a slot.

```
INJECT [ PORT port_number ] { SLOT slot_number }  
  [ ROBOT robot_name ] [ CART cartridge-name ]
```

## EJECT

This EJECT command moves a cartridge from a slot to a port.

```
EJECT SLOT { SLOT slot_number } [ PORT port_number ]  
{ ROBOT robot_name } [ CART cartridge_name ]
```

This EJECT command moves a cartridge from the PTM of a TL82n Automated Tape Library System to a port.

```
EJECT [ ROBOT robot_name ] { PORT } [ port_number ]  
[ CART cartridge_name ]
```

## LOAD

The LOAD command moves a cartridge from a slot into a drive.

```
LOAD { SLOT slot_number } [ DRIVE drive_number ] [ ROBOT robot_name ]  
[ CART cartridge_name ]
```

## UNLOAD

The UNLOAD command moves the cartridge from a drive into a slot.

```
UNLOAD [ DRIVE drive_number ] { SLOT slot_number }  
[ ROBOT robot_name ] [ CART cartridge_name ]
```

## READY

The READY command enables the inport door release button on the TL82n Automated Tape Library System.

```
READY { PORT port_name } [ ROBOT robot_name ]
```

## LOCK

The LOCK command sends a SCSI Prevent Media Removal command to the media robot. Refer to your hardware documentation for a description of the result of issuing this SCSI command.

```
LOCK [ ROBOT robot_name]
```

## UNLOCK

The UNLOCK command sends a SCSI Allow Media Removal command to the media robot. Refer to your hardware documentation for a description of the result of issuing this SCSI command.

```
UNLOCK [ ROBOT robot_name ]
```

## MOVE

The MOVE command moves a cartridge from a source location to a destination. Allowable actions with the MOVE command are determined by the specific library or loader system.

```
MOVE {PORT port_number | SLOT slot_number | DRIVE DRIVE_NUMBER }  
{ PORT port_number | SLOT slot_number | DRIVE drive_number }  
[ ROBOT robot_name ] [ CART cartridge_name ]
```

## POSITION

The POSITION command positions the cartridge manipulation mechanism to the specified location.

```
POSITION { Port port_number | SLOT slot_number | drive drive_number }  
[ ROBOT robot_name ]
```

## HOME

The HOME command returns a cartridge from the specified location to its home (previous) location.

The home position varies between different media robots. To find out the home location on your media robot, consult your hardware documentation, or issue the command and observe the placement of the mechanism.

```
HOME [ ROBOT robot_name ] { PORT port_number | SLOT slot_number |  
DRIVE drive_number | TRANSPORT transport_number }
```

## FIND CARTRIDGE

The FIND CARTRIDGE command locates a named cartridge in any media robot which includes a vision system. If the named cartridge resides in the media robot, MRU software returns its location.

This command uses the name on the external label affixed to the cartridge, it DOES NOT use the name of the recorded label on the medium.

```
FIND CARTRIDGE { cartridge_name } [ ROBOT robot_name ]
```

---

### Important

The following Wild card support is for the CLI command *robot find cartridge* only and not for the GUI.

---

MRU V1.4 or higher allows wildcard names for this command as in the following examples:

```
FIND CARTRIDGE {"?*"}  
  
this command shows all elements namely:
```

- slots
- drives
- transports
- ports

that are full.

```
FIND CARTRIDGE {"*"}  
  
this command shows all slots, drives, transports and ports.
```

Irrespective of whether they are full or empty this command shows all the elements available in the library.

## INITIALIZE

The INITIALIZE command inventories the robot and updates the robot's internal element status. The time it takes to complete the operation depends on the size of the robot. A small loader takes less time to inventory than does a multitower robot.

```
INITIALIZE [ ROBOT robot_name ]
```

## 5.3. Commands for Showing Media Robot Status

The following command descriptions show the general command syntax. Consult your online information for examples and detailed descriptions of commands for your operating system.

### SHOW ROBOT

The SHOW ROBOT command shows the status of the specified robot.

```
SHOW ROBOT [ ROBOT robot_name ]
```

### SHOW PORT

The SHOW PORT command shows the status of the specified ports. For a description of the results, review the online information.

```
SHOW PORT [ ROBOT robot_name ] { PORT }
```

### SHOW SLOT

The SHOW SLOT command shows the status of the specified slots. For a description of the results, review the online information.

```
SHOW SLOT [ ROBOT robot_name ] { SLOT }  
[[ slot_number | slot_number-slot_number ],... ]
```

### SHOW DRIVE

The SHOW DRIVE command shows the status of the specified drives. For a description of the results, review the online information.

```
SHOW DRIVE [ ROBOT robot_name ] { DRIVE }  
[[ drive_number | drive_number-drive_number ],... ]
```

## 5.4. About Media Robot Utility Software

### SHOW VERSION

The SHOW VERSION command displays the current version of the Media Robot Utility software



SHOW VERSION

## **HELP**

The HELP command displays information about MRU commands.

HELP

