

AN-42 Tape devices usage in CHARON-VAX

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Before using a physical tape drive with CHARON-VAX read these recommendations on how to configure tape devices.

For the purpose of this subject tapes drives fall into two categories:

- Physical drives with a SCSI interface that have a corresponding Windows system driver (e.g. TLZ07, TLZ08, TLZ09)
- Older physical drives that do not have a driver but have a SCSI interface and are presented to the operating system as a pure SCSI device (e.g. TQK50, TQK70)

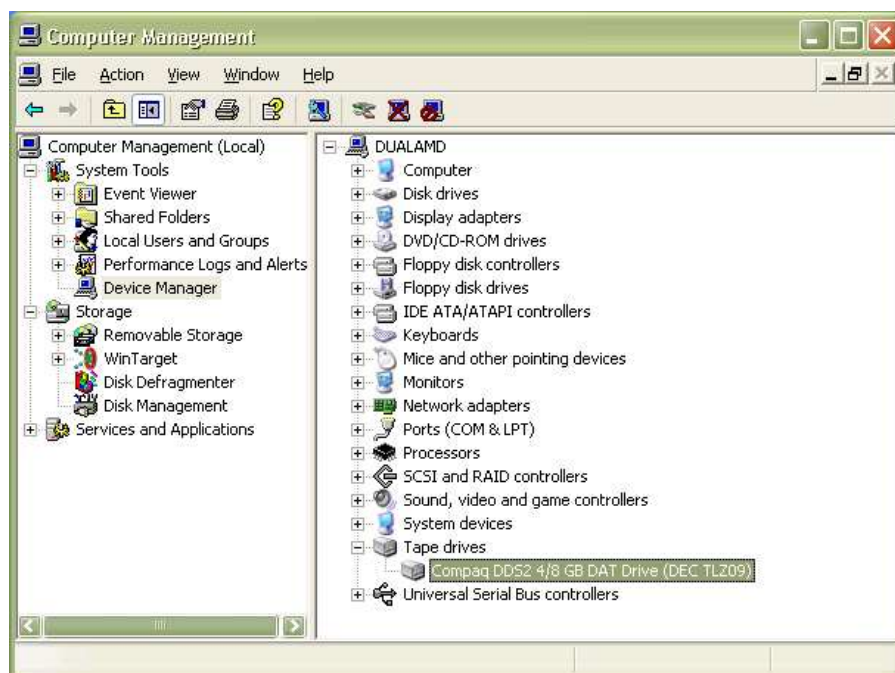
The first group may use the system driver or be addressed as a raw SCSI device; the second group may only be addressed as a raw SCSI device.

The latest version of the SCSI check utility can be downloaded from Software Resources International website at www.softresint.com under VAX emulators downloads/utilities.

Configuring the tape drive via system driver in Windows

Configure the tape drive as follows:

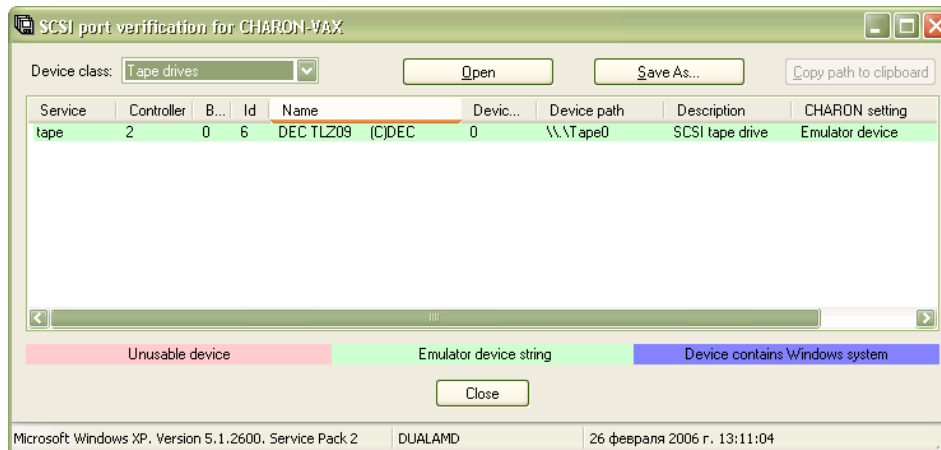
1. Install the appropriate driver for the SCSI adapter installed on your system and make sure that it is displayed correctly in the Device Manager and has no relevant errors.
2. Install the tape driver or connect the tape drive to your system to let the system choose the appropriate driver automatically.
3. Connect the tape drive to the system and check that the tape device is displayed as it should be in the "Device Manager" applet:



CHARON-VAX application note

Make sure that the type of the tape is displayed correctly, implying that the correct driver has been installed.

4. Run the SCSI_check utility and go to the section "Tape drives". All the available tape drives are shown here in the form "[\\.\Tape<x>](#)", where x is the tape device number assigned by the operating system. Note that only the devices marked with green can be used by CHARON:



5. Select the tape drive and press "Copy path to clipboard" button. If the utility does not show any tape device make sure that the tape device is known to the system. Open the "Device Manager" again and make sure that the tape drive is found and displayed correctly.
6. Open the CHARON configuration file and paste the content of the clipboard to the expected name of the tape device. Note that there are 3 types of VAX tape devices that can work with the tape drives mapped via system driver – SCSI tapes ("physical_scsi_device"), TMSCP tapes ("TQK50") and KDM70 tapes ("kdm70"). Below are example configurations for "physical_scsi_device", "TQK50" and "kdm70":

- a. **physical_scsi_device.** This device is available in the SCSI systems emulators such as MicroVAX 3100 model 96 and in the combined SCSI-Qbus systems such as VAX4000 model 106. Create an instance of the "physical_scsi_device" and assign the tape drive ("[\\.\Tape<x>](#)") to it as it is shown in the following example (for the first tape drive installed on the system):

```
load physical_scsi_device/chscsi pka_0 scsi_bus=pka scsi_id=0
set pka_0 container="\\.\Tape0"
```

In this example the tape drive will appear in the OpenVMS running on emulated VAX as MKA0 ("0" – according to the SCSI address, "A" – since this unit is connected to the first SCSI adapter installed on this system - PKA). Adjust the SCSI addresses (note that the address "7" is used by the emulated SCSI adapter itself – this address can be changed from the SRM console) and switch "PKA"/"PKB" in the "scsi_bus" parameter to create the desired configuration.

- b. **KDM70.** This device is available in VAX66x0 systems such as VAX6610, VAX6620, etc. KDM70 is combined MSCP/TMSCP controller, able to support disks and tapes. To map the tape drive to VAX66x0 create an instance of KDM70 controller and assign the tape drive ("[\\.\Tape<x>](#)") to it as it is shown in the following example (for the first tape drive installed on the system):

CHARON-VAX application note

```
load KDM70/KDM70 DUA xmi_node_id=11
```

```
set DUA container[3]="\\.\Tape0"
```

In this example the tape drive will appear in the OpenVMS running on emulated VAX as MUA300 ("300" – according to the KDM70 unit number (3) and "A" – since this unit is connected to the first KDM70 adapter installed on this system).

Note that VAX66x0 supports only the tape devices that can be mapped to CHARON only via system driver. No raw SCSI mapping is allowed in this case.

- c. **TQK50.** This device is available in the Qbus systems emulators such as MicroVAX II, MicroVAX 3600 and in the combined SCSI-Qbus systems such as VAX4000 model 106. User should create an instance of "TQK50" and assign the tape drive ("\\.\Tape<x>") to it as it is shown in the following example (for the first tape drive installed on the system):

```
load TQK50/TQK50 MUA
```

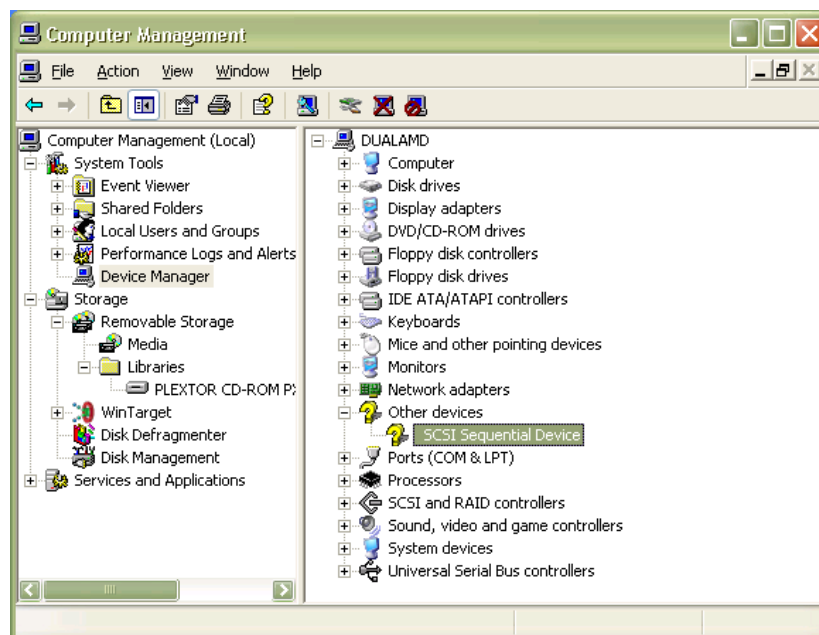
```
set MUA container[0]= "\\.\Tape0"
```

In this example the tape drive will appear in the OpenVMS running on emulated VAX as MUA0 (0 – according to the container index). Note that the letter of the adapter (A, B, C...) is defined only by its Qbus address, not by the name used in the CHARON configuration file. Use the "configure" utility started from the SRM console to find out desired Qbus address to specify it in the configuration file.

Configuring the tape drive as a raw SCSI device in Windows

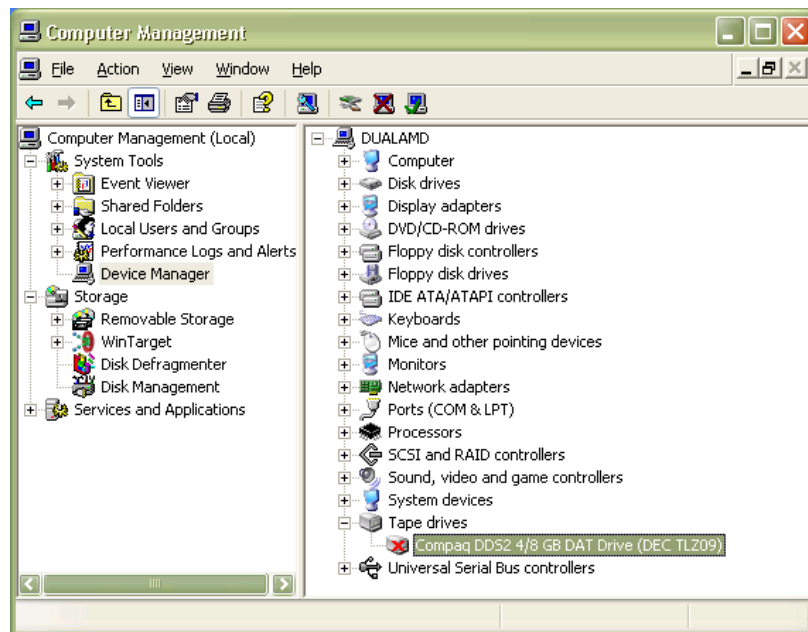
Configure the tape drive as a raw SCSI device as follows:

1. Install an appropriate driver for the SCSI adapter on your system and make sure that it is displayed correctly in the Device Manager and has no relevant errors.
2. Connect the tape drive to the system and make sure that the tape device is displayed as raw SCSI device in the "Device Manager" applet.



CHARON-VAX application note

If for some reasons you decided to use modern tape drive just as a raw SCSI device it's **absolutely required** firstly to disable the tape drive in the Device Manager and then reboot the system. The disabled tape drive is shown in the "Device Manager" like this:



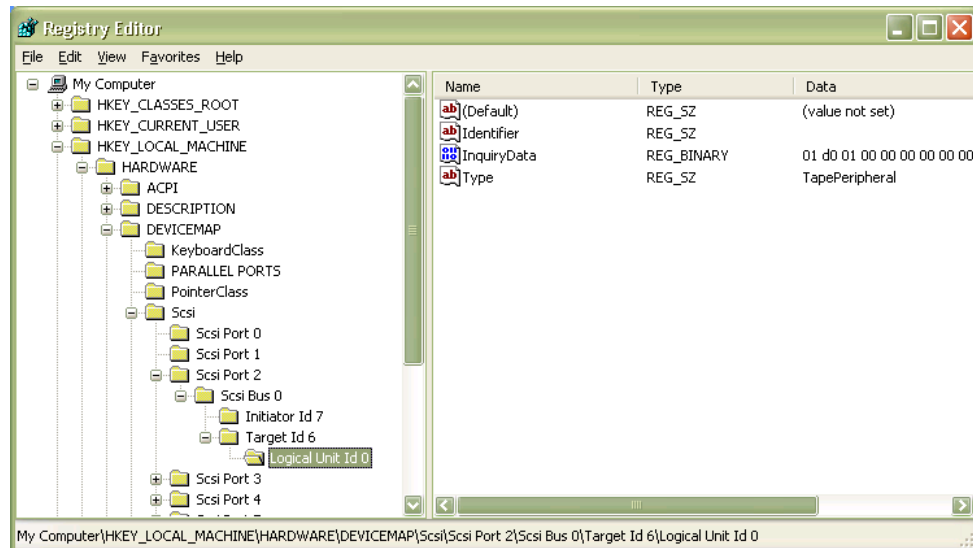
3. In case of the tape drives that do not have associated driver click with right button of the mouse on the "SCSI Sequential Device". Collect the SCSI address (Target ID), LUN (usually 0) and the bus number (usually 0) from the appearing dialog box:



CHARON-VAX application note

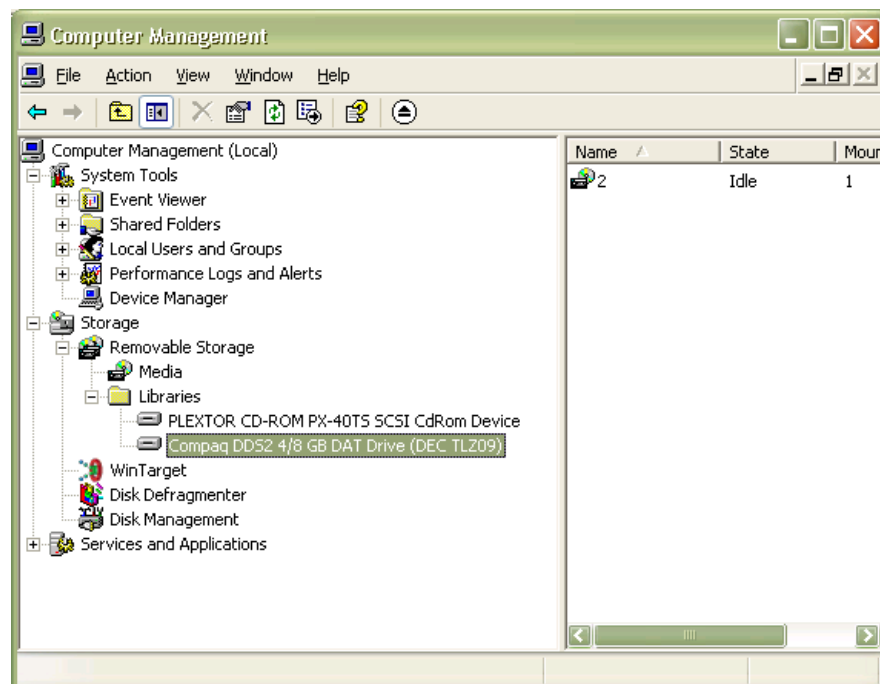
It's also possible to collect the SCSI address by looking directly at jumpers settings on the drive.

To collect the SCSI port, open up "Registry Editor" (regedit.exe) and go to "My Computer\HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\Scsi". There you will find the target tape device looking at different ports.



Once the desired item is found note its "Scsi Port" number.

If the tape drives that has an associated driver, but the idea is to use this tape drive as a raw SCSI device firstly look at the "Removable Storage" branch in the "Storage" applet:



CHARON-VAX application note

and locate the tape drive and click on it with right button of mouse. The following dialog will appear. (Note that this operation must be performed **before** disabling this tape device according to (2).):



There you can collect the SCSI port, Bus, Target and LUN. Once this data has been captured disable the tape drive in the "Device Manager".

- Specify raw SCSI tape drives in the CHARON configuration file in the form of "\\.\scsi<x>:<y>:<z>", where "x" stands for the host SCSI Port, "y" – for a bus number and "z" – for connected device SCSI address (Target). If the tape drive has separate units, the desired number must be added to the end: "\\.\scsi<x>:<y>:<z>:<u>", where "u" is LUN.
- The SCSI_check utility may be able to display the raw SCSI tape drives. Open up SCSSSI_check and go to "Unknown devices". There you may see the tape drive specified in the raw SCSI form. If it is there select it (check the SCSI address before copying to make sure that the proper device will be addressed) and press "Copy path to clipboard" button.
- Paste the content of the clipboard to the tape device in the CHARON configuration file. Note that there are 2 types of VAX tape devices – SCSI tapes ("physical_scsi_device") and TMSCP tapes ("TQK50"), which can be mapped to raw SCSI tapes, connected to CHARON host. Below are example configurations both for "physical_scsi_device" and "tqk50":
 - physical_scsi_device.** This device is available in the SCSI systems emulators such as MicroVAX3100 model 96 and in the combined SCSI-Qbus systems such as VAX4000 model 106. Create an instance of "physical_scsi_device" and assign the tape drive "\\.\scsi<x>:<y>:<z>") to it as it is shown in the following example (for the first tape drive installed on the system):

CHARON-VAX application note

```
load physical_scsi_device/chscsi pka_0 scsi_bus=pka scsi_id=0
set pka_0 container="\\.\lscsi1:0:4"
```

In this example the tape drive will appear in the OpenVMS running on emulated VAX as MKA0 ("0" – according to the SCSI address, "A" – since this unit is connected to the first SCSI adapter installed on this system - PKA). Adjust the SCSI addresses (note that the address "7" is used by the emulated SCSI adapter itself – this address can be changed from the SRM console) and switch "PKA"/"PKB" in the "scsi_bus" parameter to create the desired configuration.

- b. **TQK50.** This device is available in the Qbus systems emulators such as MicroVAX II, MicroVAX 3600 and in the combined SCSI-Qbus systems such as VAX4000. User should create an instance of "TQK50" and assign the tape drive ("\\.\lscsi<x>:<y>:<z>") to it as it is shown in the following example (for the first tape drive installed on the system):

```
load TQK50/TQK50 MUA
set MUA container[0]= "\\.\lscsi1:0:4"
```

In this example the tape drive will appear in the OpenVMS running on emulated VAX as MUA0 (0 – according to the container index). Note that the letter of the adapter (A, B, C...) is defined only by its Qbus address, not by the name used in the CHARON configuration file. Use "configure" utility started from the SRM console to find out desired Qbus address to specify it in the configuration file.

Mapping physical tape drives for use with CHARON-VAX on OpenVMS/Alpha

To configure the tape drive to be used by the AXP version of CHARON-VAX do the following:

1. Collect the name of the available tape devices with "SHOW DEVICE MK" command

Example:

```
> show device mk
```

Device	Device	Error	Volume	Free	Trans	Mnt
Name	Status	Count	Label	Blocks	Count	Cnt
MKA600:	Online	0				

In the example above we see that the tape drive with a name "MKA600" is available for mapping to CHARON. Note that the device must be online and there should be no errors associated with it (see the "Error Count").

It is also important to be sure that this tape device is 100% operational. To check it perform all the operations listed in the "Testing the mapped tape devices" chapter of this Application Note before mapping this device to CHARON.

2. Map the tape device to CHARON as it's shown before. Use the name collected at the previous step. The following are 2 examples on mapping the OpenVMS tape device MKA600 to "physical_scsi_device" (for MicroVAX3198 emulator) and to "kdm70" (for VAX66x0 emulators).

Example 1 (physical_scsi_device):

```
load physical_scsi_device pka_0 scsi_bus=pka scsi_id=0
set pka_0 container="MKA600:"
```

CHARON-VAX application note

Example 2 (kdm70):

```
load KDM70 DUA xmi_node_id=11
set DUA container[3]= "MKA600:"
```

Testing the mapped tape devices

Once the tape device has been configured correctly according to the descriptions above it will be used under OpenVMS running on the emulated VAX exactly as used under OpenVMS running on hardware VAXen. There is no difference in the managing of the tape drive.

To test the mapped drive you should check the following:

1. Tape drive is seen correctly in the OpenVMS running on CHARON-VAX
2. The tape drive has correct name and the status of the device is "online". You can check this with "SHOW DEV M" command
3. It's possible to perform usual tape operations: mounting of tapes, reading Files-11 tapes, listing backups residing on tapes, backuping and restoring backups, dismount of the tapes. All those operations should go flawless without any error messages in the CHARON log file.

Tips for analyzing tape problems

The following table reflects typical problems a user may face trying to map CHARON tape devices to physical tape drives on the host system.

Error message is log file	Description	Proposed resolution
20060226:135907:ERROR:2:000001B8:winspti.cx(457): (2) The system cannot find the file specified. : pka_2: Failed to connect logical unit 0 to \\.\Tape1. 20060226:135907:ERROR:2:000001BA:winspti.cx(841): pka_2: Does not have any containers specified. The device is set offline and is not available.	The tape device was specified incorrectly in the configuration file – there is no such tape device in the system.	Review the name of the tape device. Correct it in the configuration file.
20060226:153654:ERROR:2:000001BE:winspti.cx(2486): (1167) The device is not connected. : pka_2: I/O operation (01093368) @pka_2/0 (0@00000000) > failed. ... (00 00 00 00 00 00 00 00 00 00) 20060226:153654:ERROR:2:000001BE:winspti.cx(2486): (1167) The device is not connected. : pka_2: I/O operation (010935F8) @pka_2/0 (255@06CC0000) < failed. ... (1A 00 10 00 FF 00 00 00 00 00)	The tape device is not connected or some connection problem happened.	Check connection to the tape device. Make sure that it is turned on
20060226:164105:ERROR:2:000001BE:winspti.cx(2486): (1) Incorrect function. : pka_2: I/O operation (01093398) @pka_2/0 (0@00000000) > failed. ... (00 00 00 00 00 00 00 00 00 00) 20060226:164105:ERROR:2:000001BE:winspti.cx(2486): (1) Incorrect function. : pka_2: I/O operation (01093628)	This error means conflicts on system level caused by the fact that while CHARON is using tape drive as raw	Disable tape device as shown above and re-boot the host system.

CHARON-VAX application note

<pre>@pka_2/0 (255@06CC0000) < failed. ... (1A 00 10 00 FF 00 00 00 00) 20060226:164136:ERROR:2:000001BE:winspti.cx(2486): (1) Incorrect function. : pka_2: I/O operation (010938B8) @pka_2/0 (0@00000000) > failed. ... (00 00 00 00 00 00 00 00) 20060226:164136:ERROR:2:000001BE:winspti.cx(2486): (1) Incorrect function. : pka_2: I/O operation (01093B48) @pka_2/0 (0@00000000) > failed. ... (01 01 00 00 00 00 00 00)</pre>	<p>SCSI device, it is still known to the system as usual tape device.</p>	
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Sometimes it's turned out that working through system driver does not cover all the functions required from a certain tape drive. In this case it's recommended to switch to usage of the tape drive as raw SCSI device.

A table of tested combinations

The following table reflects tested tape drives, Operating Systems and recommendations (if any) on mapping.

Tape drive model	OS	Mapping specifics
TQK50	Windows XP, Windows 2003	Mapping as raw SCSI device only. No working through system driver is possible.
TQK70	Windows XP, Windows 2003	Mapping as raw SCSI device only. No working through system driver is possible.
TLZ07	Windows XP, Windows 2003	Both direct mapping (using system driver) and raw SCSI device mapping work Ok.
TLZ09	Windows XP, Windows 2003	Both direct mapping (using system driver) and raw SCSI device mapping work Ok.