



CHARON-AXP/SMA V2.2.40 and V2.3.3 for Microsoft Windows - Users Guide



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About This Guide

This preface describes the conventions and organisation of this user's guide. It also describes its intended audience and how to obtain further copies of this guide, related documentation and further support.

Intended Audience

This user guide is targeted at anyone attempting to install, configure or manage the CHARON-AXP/SMA(+) or CHARON-AXP/Station line of Alpha system emulators. While the content of this manual is targeted at general users (not just system managers and administrators) a general, working knowledge of the host platform and its conventions is expected.

This user guide covers the following Stromasys products:

- CHARON-AXP/SMA+ for Microsoft Windows,
- CHARON-AXP/SMA for Microsoft Windows, and
- CHARON-AXP/Station for Microsoft Windows.

Unless otherwise specified, the name CHARON-AXP/SMA(+) refers to all emulators listed above. When referring to a specific emulator product in this family, the name of that product will be used in full.

Document Structure

This user guide is organised into the following chapters:

- **Introduction** – Provides an overview of the virtual machines and the devices and guest systems they support.
- **Installation** – Details the installation and removal of the CHARON-AXP/SMA(+) software.
- **Using the CHARON-AXP/SMA Software** – Describes how to use the CHARON-AXP/SMA(+) software.
- **Supporting Utilities** – Describes the installation, configuration and use of the optional guest utilities and drivers.
- **Configuration Reference** – Provides a complete reference for the CHARON-AXP/SMA(+) configuration file format.

Obtaining Documentation

The latest version of this manual and other, related manuals and documentation can be found at the Stromasys Support website, here:

<http://www.stromasys.com/services/documentation/>

Complete Software and Product Descriptions (SPD) and a copy of the End User License Agreement (EULA) can also be obtained here:

<http://www.stromasys.com/products/>

Obtaining Technical Assistance

The CHARON-AXP/SMA+, CHARON-AXP/SMA, and CHARON-AXP/Station Alpha virtual machines can be covered by a number of different support options. The support options themselves are listed in the section **Emulator Licensing**. However, for further, more complete information about which option is best for you and purchasing, contact your regional sales team using one of the methods below:

Region	Phone	Address	Local Open Hours
Australasia-Pacific apac.sales@stromasys.com	+852 2853 1600	28/F Room D, Tower B, Billion Centre 1 Wang Kwong Road, Kowloon Bay Hong Kong, S.A.R. China	8 a.m. - 5 p.m.
Americas ams.sales@stromasys.com	+1 919 239 8450	2840 Plaza Place, Ste 450 Raleigh, NC 27612 U.S.A.	8 a.m. - 5 p.m.

Europe, Middle-East and Africa emea.sales@stromasys.com	+41 22 794 1070	Avenue Louis-Casai 84 5th Floor 1216 Cointrin Switzerland	8 a.m. - 5 p.m.
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Alternatively, the support centre can be contacted by email at support@stromasys.com.

If you have purchased CHARON-AXP/SMA(+) via a Value Added Reseller (VAR) then please contact them directly.

Conventions

Throughout the document(s) these conventions are followed

Notation	Description
\$	The dollar sign in interactive examples indicates an operating system prompt for VMS. The dollar sign can also indicate non superuser prompt for UNIX / Linux.
#	The number sign represents the superuser prompt for UNIX / Linux.
>	The right angle bracket in interactive examples indicates an operating system prompt for Windows command (cmd.exe).
User input	Bold monospace type in interactive examples indicates typed user input.
<path>	Bold monospace type enclosed by angle brackets indicates command parameters and parameter values.
Output	Monospace type in interactive examples, indicates command response output.
[]	In syntax definitions, brackets indicate items that are optional.
...	In syntax definitions, a horizontal ellipsis indicates that the preceding item can be repeated one or more times.
<i>disk0</i>	Italic monospace type, in interactive examples, indicates typed context dependent user input.

The following definitions apply

Term	Description
Host	The system on which the emulator runs, also called the Charon server
Guest	The operating system running on a Charon instance, for example, Tru64 UNIX, OpenVMS, Solaris or MPE

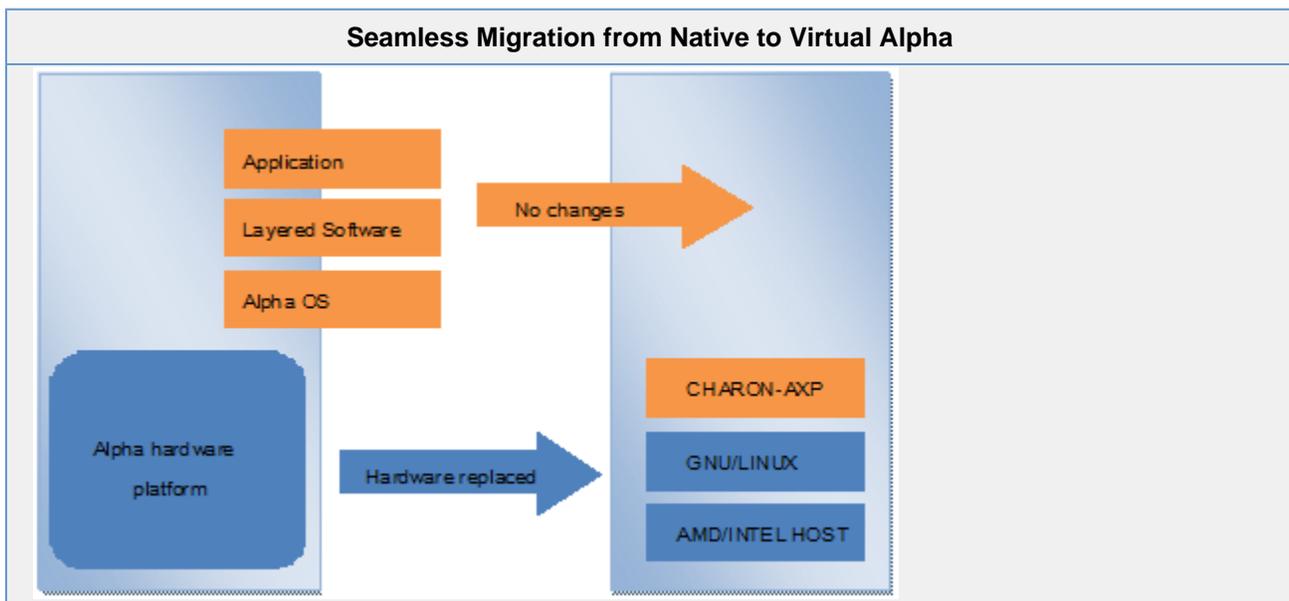
Introduction

In 1992 Digital Equipment Corporation (DEC) released the Alpha AXP processor, a high-performance 64-bit RISC processor supported by both OpenVMS and DEC OSF/1 (later Tru64 UNIX). In 1998 DEC merged with Compaq Computer Corporation and in 2001 the decision was made to cease development of the Alpha processor and port OpenVMS and Tru64 UNIX to the Itanium. With the merger of Compaq with Hewlett-Packard in 2002 the decision was made not to port Tru64 UNIX to Itanium. Unfortunately, these decisions left a great number of customers without a platform to run their applications on.

To fill the continued need for the Alpha platform Stromasys S.A. has developed the CHARON-AXP/SMA(+) line of emulator products. These emulators are a software-based, virtual machine replacement for the following native-hardware Alpha systems:

- Digital DEC 3000 Model 400
- DIGITAL AlphaStation 200, 250, 500, 600
- DIGITAL AlphaServer 300, 400, 800, 1000, 1200, 2000, 2100, 4000, 4100, 8200, 8400
- DIGITAL Personal Workstation au
- DIGITAL Modular Computing Components (DMCC)
- Compaq AlphaStation XP900, XP1000
- Compaq AlphaServer DS10, DS20, DS25, ES40, ES45

The CHARON-AXP/SMA(+) virtual machines allow users of DIGITAL, Compaq and HP Alpha-based computers to replace their native hardware counterparts, in such a way that there is little or no change required to the original system configuration. This means you can continue to run your applications and data without the need to switch or port to another platform. The CHARON-AXP/SMA(+) virtual machines run on commodity, Intel 64 and AMD64 based systems ensuring your continued investment is protected.



The CHARON-AXP/SMA(+) virtual machines support the following guest operating system releases:

- OpenVMS Alpha V6.1 - V8.4,
- Digital UNIX 3.2 - 4.0E, and
- Tru64 UNIX 4.0F - 5.1B-6

The virtual system must still be supported by the operating system release, i.e. it is not possible to install OpenVMS V6.1 on a virtual AlphaServer DS20 as hardware support for the AlphaServer DS20 was not included until OpenVMS Alpha V7.1-2.

Emulated Systems

The different classes of CHARON-AXP/SMA(+) virtual machine support a number of different hardware devices. Each system is capable of emulating the hardware described in the following sections (unless specifically stated otherwise).

Storage Adapters

CHARON-AXP/SMA(+) provides emulation of the KZPBA UltraSCSI PCI Adapter, which is based on the QLogic 1040B chipset. This can be used in place of any native SCSI-based controller.

For OpenVMS systems it is possible to install the bypass driver (a special OpenVMS disk driver) which allows emulation of DSSI (DI), IDE (DQ), FibreChannel (DG), MSCP (DU) and RAIDArray (DR) class disk devices.

At this point there is no bypass driver available for Digital UNIX and Tru64 UNIX.

Network Adapters

CHARON-AXP/SMA(+) offers emulation of the following DECchip 21x4x "Tulip" based network cards:

- DE435 EtherWORKS Turbo PCI Adapter,
- DE450 EtherWORKS Turbo PCI 10 Adapter, and
- DE500-BA FastEtherWORKS 10/100 PCI Adapter.

CHARON-AXP/SMA(+) provides a complete emulation of these devices, meaning that any network protocol working on an existing native Alpha system will continue to work under emulation. This includes, but is not limited to DECnet, TCP/IP, LAT, MOP and SCS.

The actual network speed depends on the CHARON-AXP/SMA(+) hosting server network speed and hosting server performance as well as on VMS or Tru64 network stack and applications, and may exceed 100Mbps when working over 1Gbps / 10Gbps network.

Communications Adapters

The CHARON-AXP/SMA(+) emulators are capable of emulating the standard two serial ports present on most Alpha systems as well as the following serial line adapter:

- PBXDA-AB Digiboard RJ45 to MMJ 8 pack adapter

CHARON-AXP/SMA is also capable of emulating a parallel port.

It is possible to connect these emulated serial and parallel ports to TCP/IP ports or native serial and parallel adapters attached to the host system.

In situations where the emulation of serial devices is insufficient, it is often possible to replace the directly connected serial ports with a networked DECserver or terminal server.

Graphics Adapters

At this point there is no support for an emulated graphics adapter. Almost all graphical applications used under Tru64 UNIX and OpenVMS are implemented using the X-Windows, CDE and Motif environments. To support graphical environments it is necessary to install an X-Windows server and connect to the guest over a network connection.

Optical Drives

The CHARON-AXP/SMA(+) virtual machine is capable of emulating an RRD47 SCSI CD-ROM. This allows you to connect host attached CD-ROM devices as well as file based containers (or ISOs) to the virtual Alpha system.

Disk Devices

CHARON-AXP/SMA(+) is capable of emulating a generic SCSI disk device. Through the manipulation of various configuration parameters it is possible to modify all details of the disk device presented to the virtual machine. These virtual disk devices can be both container files on the host file system or physical disk devices attached to the host system.

The CHARON-AXP/SMA(+) virtual machine also emulates an RX28 floppy disk drive.

Tape Devices

CHARON-AXP/SMA(+) is capable of emulating a generic SCSI tape device. This virtual tape device can be connected to a file based container, on the host file system. Alternatively, it is also possible to attach a physical SCSI tape drive connected to the host system. This includes DDS, DLT and SDLT devices supported by the guest operating system.

For OpenVMS Alpha guests, CHARON-AXP/SMA(+) ships with an installable Tape Control Utility. This utility makes it possible to create, load, unload and delete virtual tape container files on the host system, from the guest.

Host System Requirements

To ensure maximum performance when emulating an Alpha-based system it is important to follow some guidelines regarding the set up of the host system. These are described in the following sections.

Hardware Requirements

To run the CHARON-AXP/SMA(+) emulator products the host system must have at least two CPUs (or cores) and must be either an Intel 64 or AMD64 based processor.

When determining the best hardware configuration it is generally best to follow these three basic rules:

1. Use a processor with a speed of at least 2.8GHz.
2. Allow for 1 CPU (or core) plus the number of emulated CPUs.
3. Allow for a minimum of 2GB of RAM plus the total RAM of the emulated system.

There are other options available to achieve higher performance, including high-speed I/O controllers, but these basic rules are an excellent starting point to get a system up and running.

HP Software Support

In order to maintain an HP Services software support agreement for the operating system running on the CHARON-AXP/SMA(+) emulator, it is required that the host system be manufactured by Hewlett-Packard.

Operating System

The CHARON-AXP/SMA(+) virtual machine products can be run on both Microsoft Windows and GNU/Linux-based systems. The following Microsoft Windows editions and versions are supported by Stromasys as host environments:

- Microsoft Windows 7 and Server 2008 R2.  For Charon-AXP/SMA(+) version 2.3.3, Windows 2008 R2 requires SP1 and the [KB2949927](#) patch installed
- Microsoft Windows 8, 8.1, Server 2012 and Server 2012 R2

The following distributions and releases of GNU/Linux are also supported host environments:

- Fedora 17 - 20
- Red Hat Enterprise Linux 6.3 - 6.5
- CentOS 6 - 7

This manual covers the Microsoft Windows targeted versions of CHARON-AXP/SMA(+). For the GNU/Linux version of CHARON-AXP, please consult the [CHARON-AXP/SMA V2.2.14 for Linux User's Guide](#).

Licensing

When running an emulated system it is important to consider the different licensing aspects of the software involved. Aside from operating system license for the host system there is also CHARON-AXP/SMA(+) and guest operating system licensing to consider. The following sections include details of these licensing requirements.

Emulator Licensing

The CHARON-AXP/SMA(+) products are licensed using a USB Sentinel HASP (Hardware Against Software Piracy) key. A valid and current key is required to run all CHARON-AXP/SMA(+) emulator products. The table below describes the license part numbers for specific products, support and options in the CHARON-AXP/SMA(+) product line.

CHARON-AXP Products, Support and Options			
	CHARON-AXP/SMA	CHARON-AXP/SMA+	CHARON-AXP/Station
Annual License	CHAXP-800IY-WI	CHAXP-807IY-WI	CHAXP-805IY-WI
Unlimited License	CHAXP-800IP-WI	CHAXP-807IP-WI	CHAXP-805IP-WI
Gold Support	CHAXP-800IU-WI	CHAXP-807IU-WI	CHAXP-805IU-WI
Platinum Support	CHAXP-800IT-WI	CHAXP-807IU-WI	CHAXP-805IT-WI
Backup License	CHAXP-800IK-WI	CHAXP-807IK-WI	CHAXP-805IK-WI
Additional CPU	CHAXP-CPUIP-WI	CHAXP-CPUIP-WI	

Guest Software Licensing

As well as maintaining the HP OpenVMS or Tru64 operating system licenses, there is also the requirement to obtain an operating system extension license. For both Tru64 UNIX and OpenVMS Alpha the part numbers for these licenses are listed in the table below.

HP Tru64 UNIX and OpenVMS Alpha operating system extension licenses	
Part Number	Description
QM-755AA-AA	Alpha OS on an AXP system extended to an Alpha Emulator
QM-755AA-AA	Alpha OS on a DS system extended to an Alpha Emulator
2*QM-755AA-AA	Alpha OS on an ES system extended to an Alpha Emulator

To use HP layered products on OpenVMS and Tru64 UNIX it is also necessary to obtain layered product extension licenses. The part number for these licenses are listed in the table below.

HP Tru64 and OpenVMS Alpha layered product extension license	
Part Number	Description
QM-756AA-AA	Alpha LPs on an AXP system extended to an Alpha Emulator
QM-756AA-AA	Alpha LPs on a DS system extended to an Alpha Emulator
2*QM-756AA-AA	Alpha LPs on an ES system extended to an Alpha Emulator

For costs, purchasing and definitive information on your specific requirements please contact Hewlett-Packard. For other third-party software products, such as Oracle Rdb, please contact the vendor for further details on licensing their product on the CHARON-AXP/SMA(+) platform.

Installation

This section describes the installations and removal of the CHARON-AXP/SMA(+) software on all supported versions of Microsoft Windows.

Installing the CHARON-AXP/SMA(+) Software

The CHARON-AXP/SMA(+) virtual machine software is shipped as a compressed .zip package. Within that package is an executable software installation package. This package may be obtained by contacting Stromasys and can be shipped via physical media or download. Once you have the compressed installation package and it has been unpacked, follow the steps below to install the software.

CHARON-AXP Installation Steps	
Step	Task
1	<p> If you install CHARON-AXP/SMA version 2.3.3, all previous versions of CHARON-AXP/SMA have to be uninstalled before continuing.</p> <p>Log in to a privileged account (e.g. Administrator).</p>
2	Press WinKey+E to start the Windows Explorer and locate the installation executable, either on installation media or downloaded to a folder.
3	Double-click the setup.exe executable to begin the installation.
4	After a moment the Setup application starts and displays the introduction dialogue. Click Next to proceed.
5	<p>Before proceeding with any installation tasks it is necessary to agree to the Stromasys End User License Agreement (EULA). In order to proceed you must select I Agree and click Next.</p> <p>In the event that you do not agree with the EULA, click Cancel to exit the installation process.</p>
6	<p>Release Notes:</p> <p>Before asking any further questions related to the installation the Setup application displays the release notes for the CHARON-AXP/SMA(+) software being installed. Please read these carefully before proceeding as they contain details of changes from previous releases, known issues and caveats. To proceed past the release notes, click Next.</p>
7	<p>Installation:</p> <p>At this point the setup application will now ask the following questions:</p> <ul style="list-style-type: none"> • Location: where the software is to be installed to. • Ownership: is this installation for Everyone or Just me. <p>Click Next to continue.</p>
8	This is the final stage before the software is unpacked and installed to the host system. To continue, click Next . If you believe there is something to be reviewed, click Back and change as necessary.
9	When the installation has completed, the Setup application displays a dialogue indicating that the installation completed successfully. At this point, click Close to exit.

Removing the CHARON-AXP/SMA(+) Software

To remove the CHARON-AXP/SMA(+) software, follow the steps listed below for the specific host operating systems.

Removing CHARON-AXP from Microsoft Windows 8 and Windows Server 2012

Step	Task
1	<ul style="list-style-type: none"> Press WinKey+X to access the Power User Menu. Click Control Panel.
2	<ul style="list-style-type: none"> Switch View by to Small Icons or Large Icons. Click Programs and Features.
3	<ul style="list-style-type: none"> Select CHARON-AXP/SMA(+) from the list of installed software. Click Uninstall.

Removing CHARON-AXP from Microsoft Windows 7, Vista, Server 2008 and Server 2008 R2

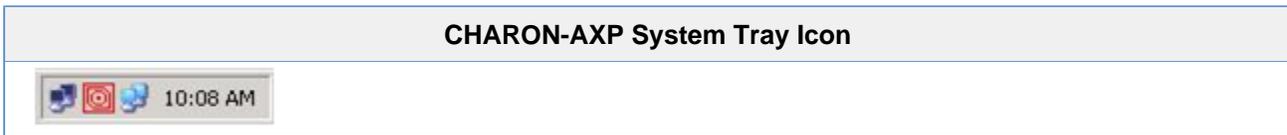
Step	Task
1	Click Start , then click Control Panel .
2	<ul style="list-style-type: none"> Switch View by to Small Icons or Large Icons. Click Programs and Features.
3	<ul style="list-style-type: none"> Select CHARON-AXP/SMA(+) from the list of installed software Click Uninstall.

Removing CHARON-AXP from Microsoft Windows XP and Server 2003

Step	Task
1	Click Start , then click Control Panel .
2	Double-click Add or Remove Programs .
3	<ul style="list-style-type: none"> Select CHARON-AXP/SMA(+) from the installed software list. Click Remove.

Using the CHARON-AXP/SMA(+) Software

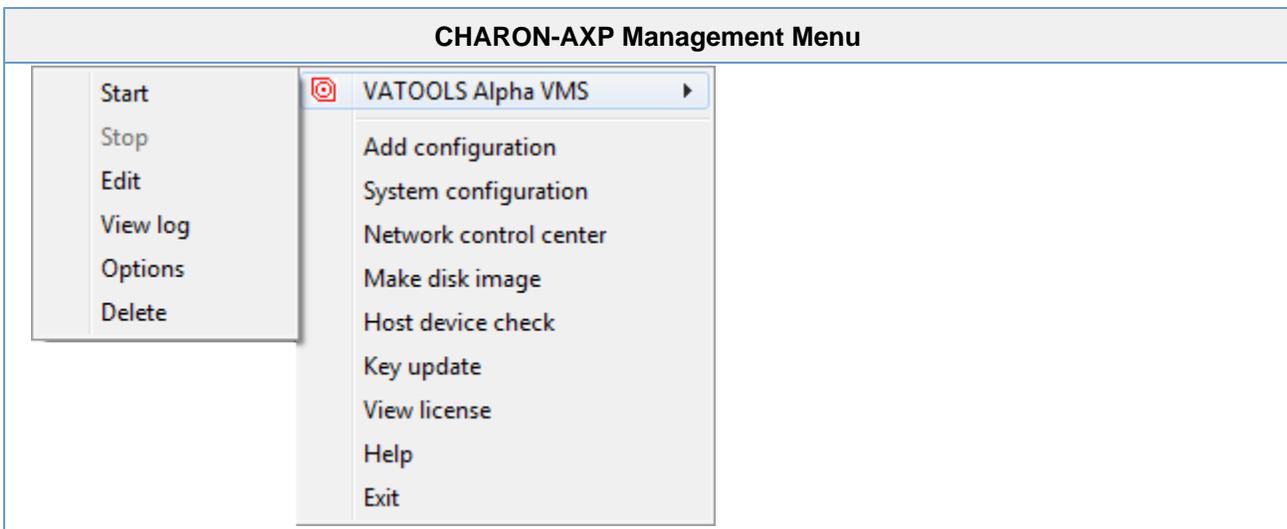
To start the CHARON-AXP/SMA(+) software, click the CHARON-AXP/SMA(+) icon in the CHARON-AXP/SMA(+) Start menu group. Once running the CHARON-AXP/SMA(+) software can be managed by the system tray icon. The image below shows the location of the icon.



The colour of the icon indicates the current virtual machine activity. These colours are:

- **RED** – all virtual machines are stopped,
- **GREEN** – a virtual machine is running, and
- **YELLOW** – a virtual machine is in an intermediate state.

At any state, it is always possible to access the management menu, by right-clicking the system tray icon. The image below demonstrates accessing this menu.



The following sections describe the different menu options and the functions they perform:

Add Configuration

The **Add configuration** menu option is used to create a new virtual machine configuration. Clicking this option displays the screen shown below.

To create a new virtual machine configuration, complete the fields and click **OK**. The table below describes each of the fields.

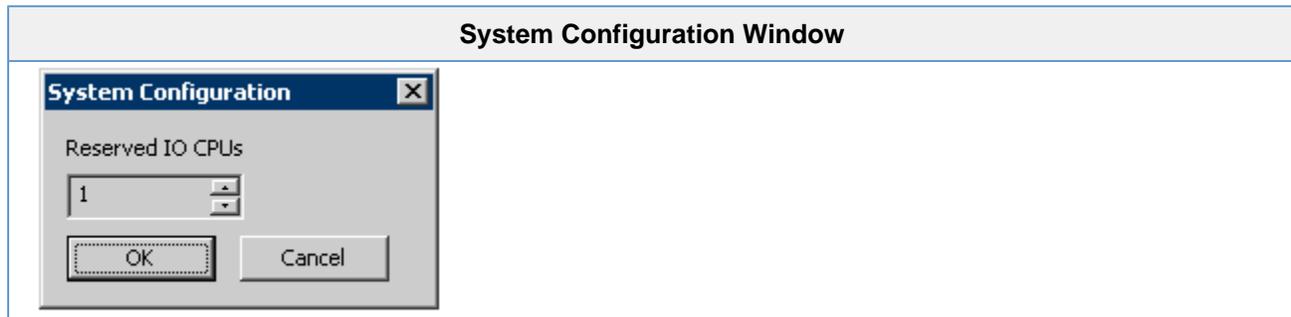
New Emulator Field Description	
Field	Description
Configuration File	Specify the path of the virtual machine configuration file.
Log File	Location and path to write the virtual machine log file to.
Name	This field is required. It names the virtual machine instance and will appear in the CHARON-AXP/SMA(+) management menu.
Auto Start	Selecting this option will ensure that the virtual machine automatically starts every time Microsoft Windows starts.
Auto Restart	The virtual machine will be restarted if the CHARON-AXP/SMA(+) software stops for any reason. This option is disabled, unless Auto Start is selected.
Append logfile	If checked then all CHARON-AXP/SMA(+) logging messages will be appended to the log file. Otherwise, at virtual machine start the log file will be truncated.

Example configuration files can be found in the CHARON-AXP/SMA(+) installation directory. All example configuration files are named *model.cfg*, where *model* is the virtual machine model name.

There is no limit to the number of virtual machines that can be created and/or run by the CHARON-AXP/SMA(+) virtual machine. However, limitations may be encountered depending on the active license or hardware available in the host system.

System Configuration

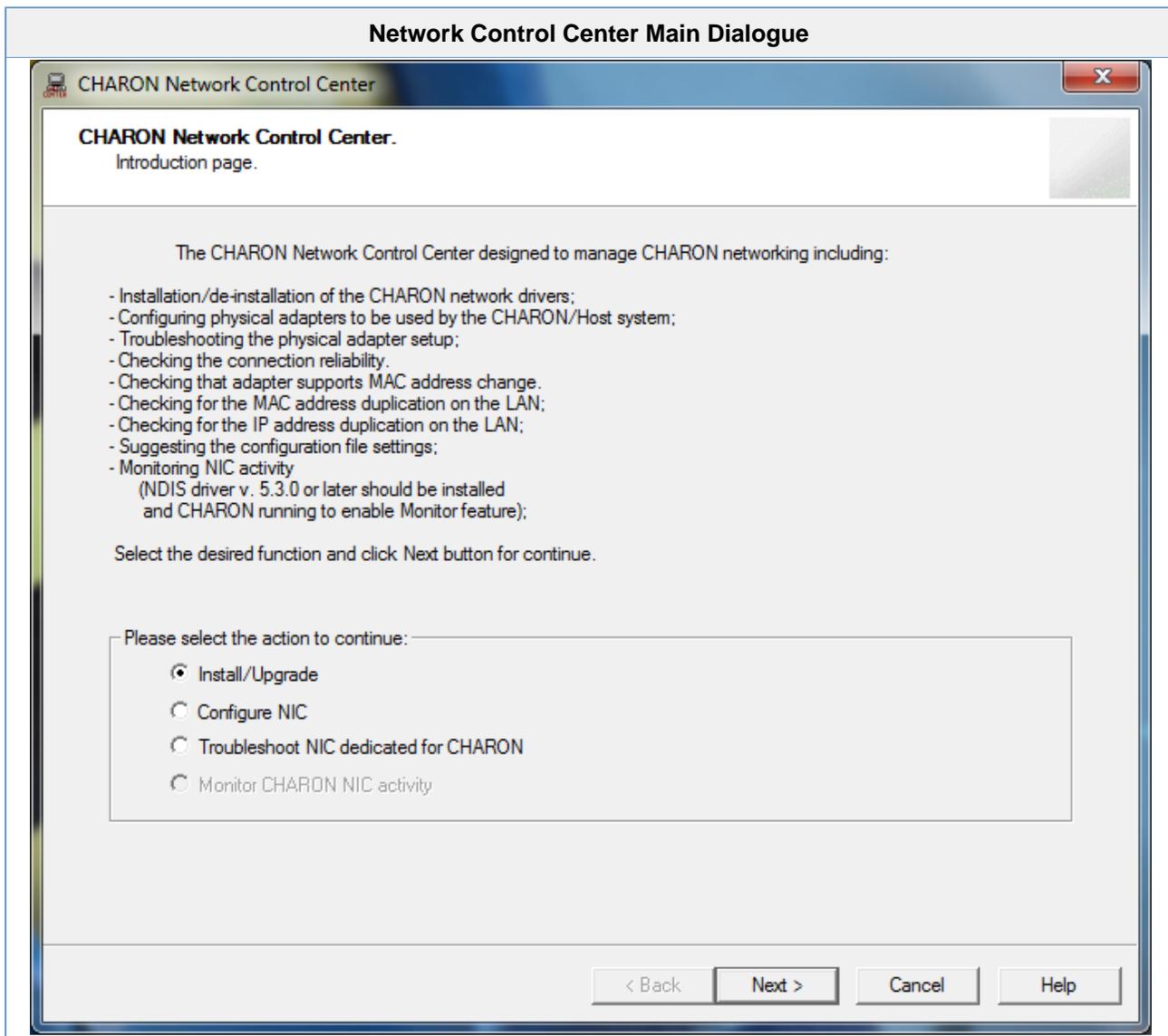
The **System configuration** option displays a window similar to the one below.



The only system configuration option currently available specifies how many of the host system CPUs (or cores) should be reserved specifically for I/O handling. On systems that run high I/O loads or multiple virtual machines this option can improve performance.

Network Control Center

The Network Control Center is a utility that is used to configure, troubleshoot and manage host network devices used by CHARON virtual machine software. Upon selecting the Network Control Center from the main menu, you are presented with the window shown below.

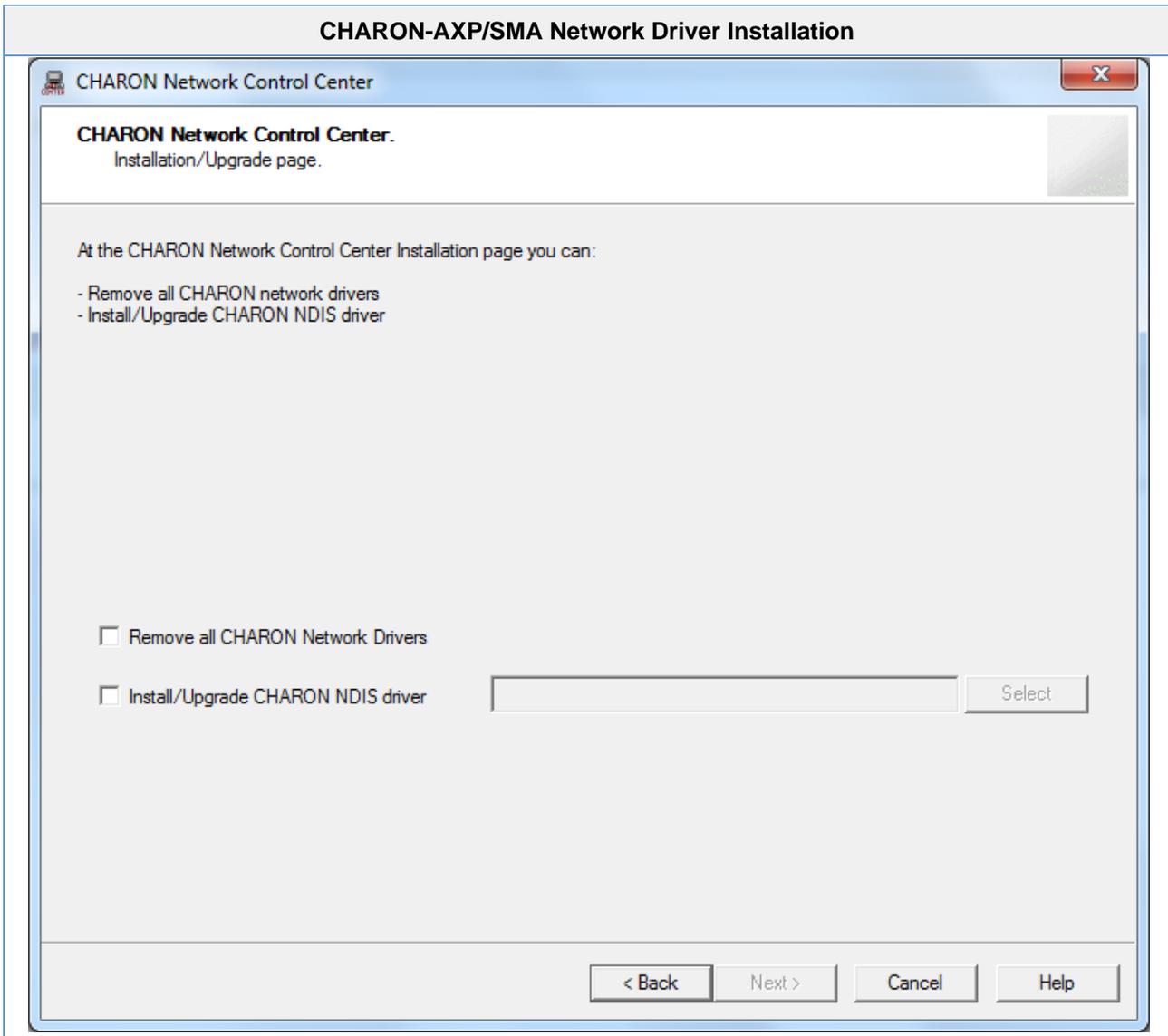


There are four possible choices from this window. To proceed, select one of the following four options and click **Next**.

The following sections describes the different functions of this utility.

Install/Upgrade

From this window it is possible to install, upgrade or remove the CHARON-AXP/SMA network drivers.

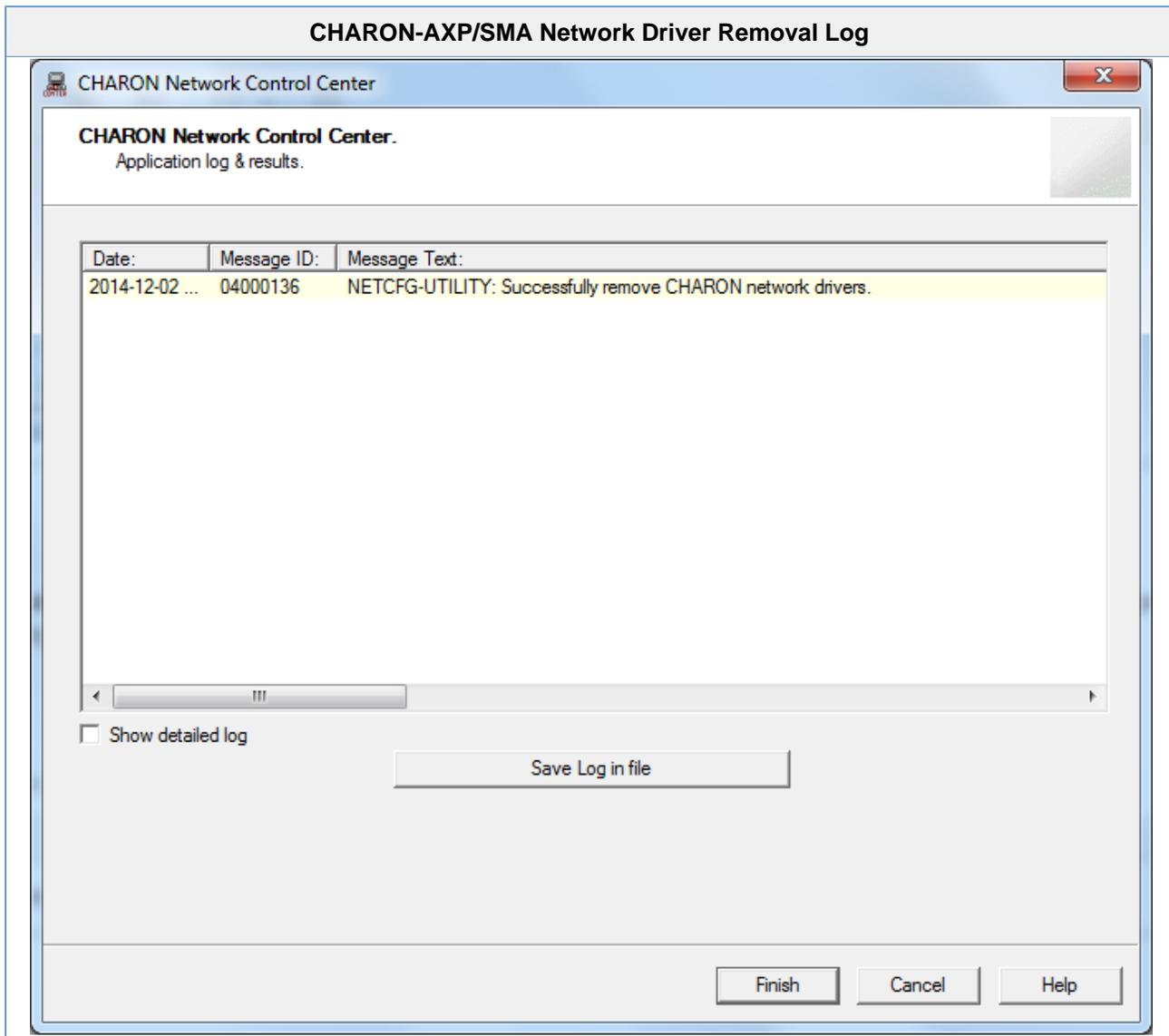


The following sections describe the actions that can be taken from this window:

- Remove all CHARON Network Drivers
- Install/Upgrade CHARON NDIS driver

Remove all CHARON Network Drivers

To remove all CHARON-AXP/SMA network drivers, select the **Remove all CHARON Network Drivers** checkbox and click **Next**. This may take between one and five minutes, depending on the number of network interfaces present on the host system. Upon completion, a window (similar to the one below) containing a log of the process will be shown.



To view a more detailed version of the log file, simply select the **Show detailed log** check box. In the event that there is an error of some kind during the removal process, click **Save Log in file** to retain a copy of log for submission to Stromasys Technical Support. To return to the main Network Control Center menu, click **Finish**.

This process does not remove the network interfaces themselves, only the drivers and any associations with them.

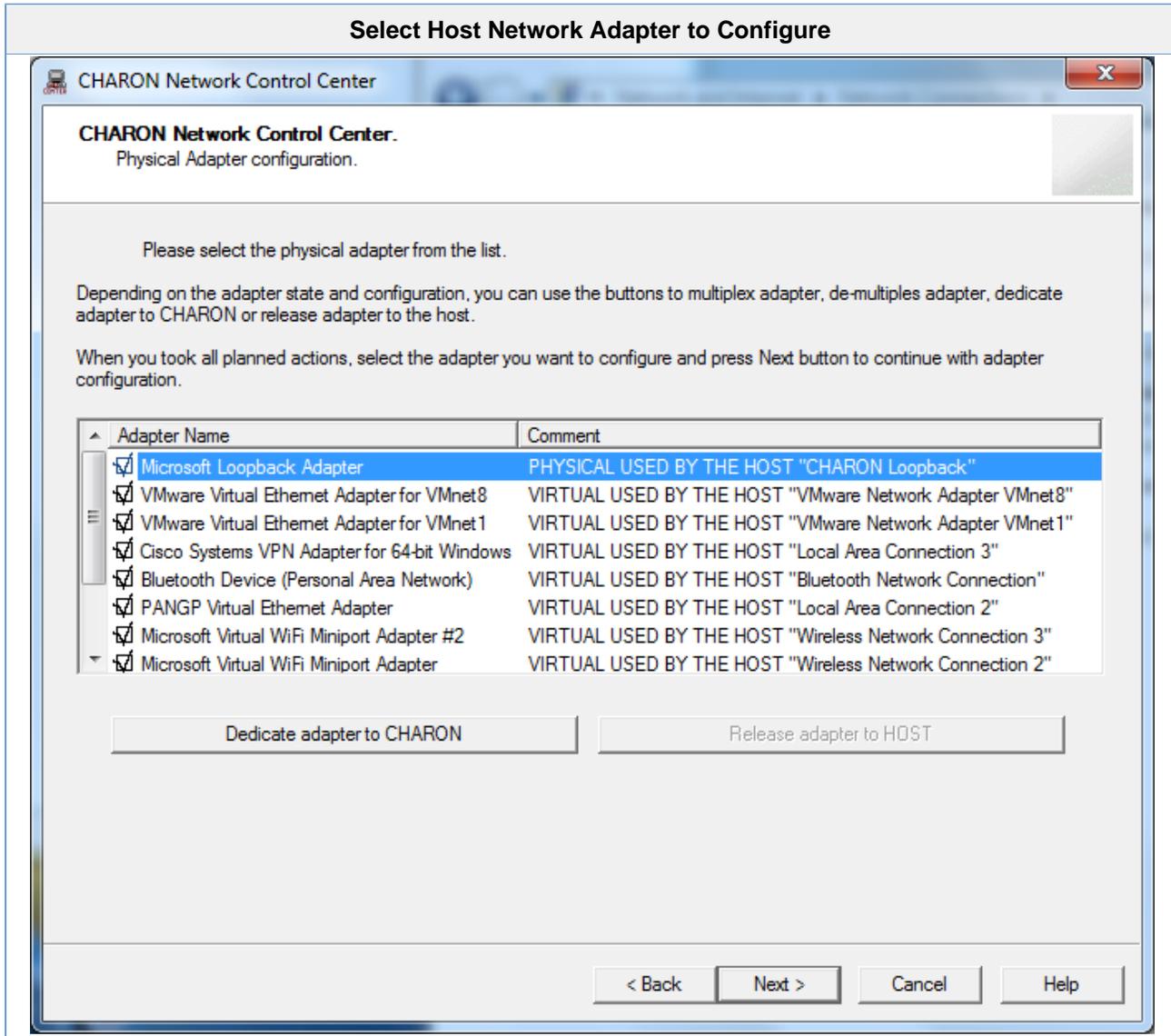
Install/Upgrade CHARON NDIS driver

To either install the CHARON-AXP/SMA network driver or upgrade an existing installation, follow the instructions below.

Step	Description
1.	Select the Install/Upgrade CHARON NDIS driver checkbox.
2.	<p>Click Select:</p> <ul style="list-style-type: none"> • If the Driver details box is not empty, click Ok and proceed to step 3. • Click Browse to locate the driver. • Locate the CHARON-AXP/SMA installation and enter the path to the driver package. Below is a example <div style="border: 1px solid gray; padding: 5px; width: fit-content; margin: 10px 0;"> <p>C:\Path\To\CHARON-AXP\Driver\NDIS6\</p> </div>
3.	Click Next .
4.	<ul style="list-style-type: none"> • After a moment, you will be presented with the following Windows Security dialogue box: <div style="border: 1px solid gray; padding: 10px; margin: 10px 0;">  <p>Windows Security</p> <p>Would you like to install this device software?</p> <p>Name: STROMASYS SA Network Protocol Publisher: Stromasys SA</p> <p><input checked="" type="checkbox"/> Always trust software from "Stromasys SA". Install Don't Install</p> <p> You should only install driver software from publishers you trust. How can I decide which device software is safe to install?</p> </div> <ul style="list-style-type: none"> • Select the checkbox labelled, Always trust software from "Stromasys SA" and click Install.
5.	<p>At this point you will be presented with the Application log & results window:</p> <ul style="list-style-type: none"> • To view a more detailed version of the log file, select the Show detailed log checkbox. • In the event that there was an error during the CHARON-AXP/SMA Network Driver installation, click Save Log in file and retain a copy for submission to Stromasys Technical Support. • Lastly, to return to the main Network Control Center menu, click Finish.

Configure NIC

This utility allows a host attached network adapter to be either configured exclusively for use by a CHARON-AXP/SMA virtual machines or returned to the operating system. The following is an example of the **Configure NIC** window.



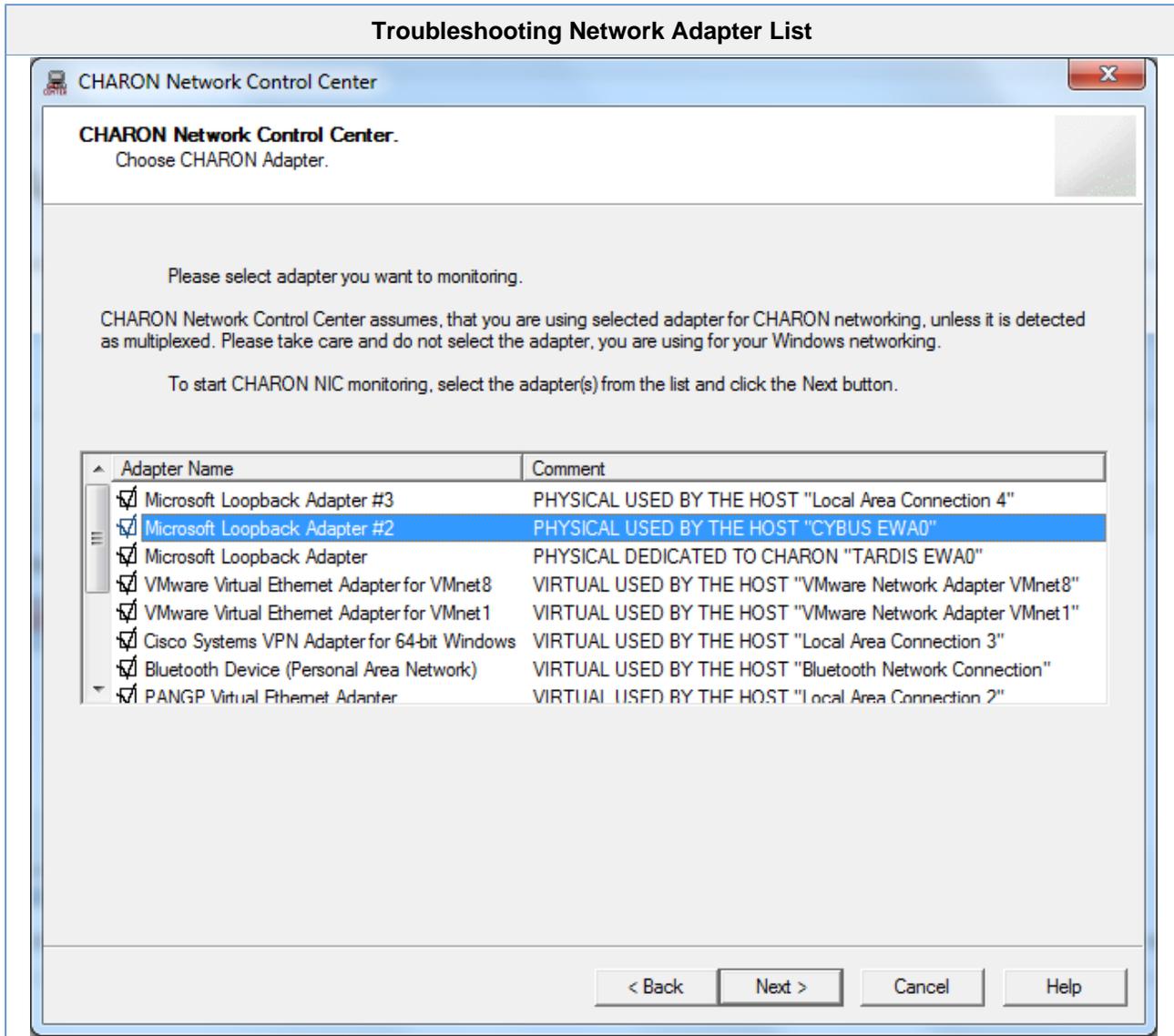
To configure a host network adapter, use the following steps:

Step	Description
1.	Select a network adapter from the list.
2.	Click the appropriate button: <ul style="list-style-type: none"> Click Dedicate adapter to CHARON to configure this adapter for exclusive use by CHARON-AXP/SMA, or Click Release adapter to HOST to remove all CHARON-AXP/SMA configuration from the adapter.
3.	To configure another adapter, return to Step 1 . Otherwise, click Back to return to the main Network Configuration Center menu.

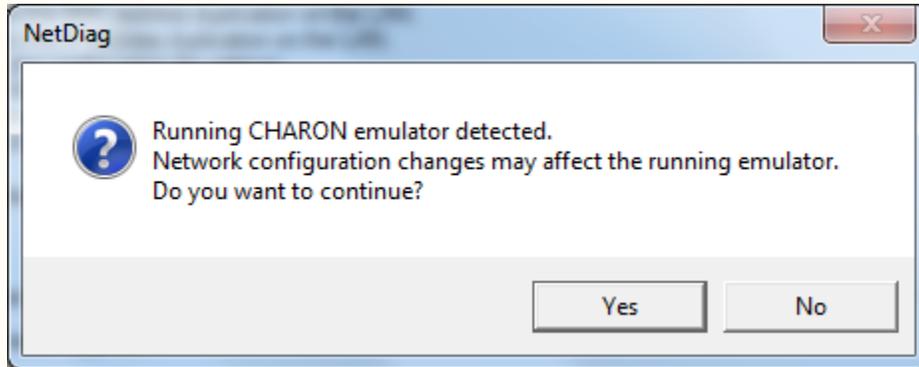
After dedicating or releasing the network adapter, use the **Back** button to return to the main menu. This utility does offer other features by selecting a network adapter and clicking **Next**. However, these are used by other CHARON virtual machine products and do not apply to CHARON-AXP/SMA.

Troubleshoot NIC Dedicated for CHARON

This part of the Network Control Centre utility is for troubleshooting network adapter issues. Upon selecting this option from the main menu you will be immediately presented with a list of network adapters, similar to the window shown below. To begin, select a network adapter from the list and click **Next**.



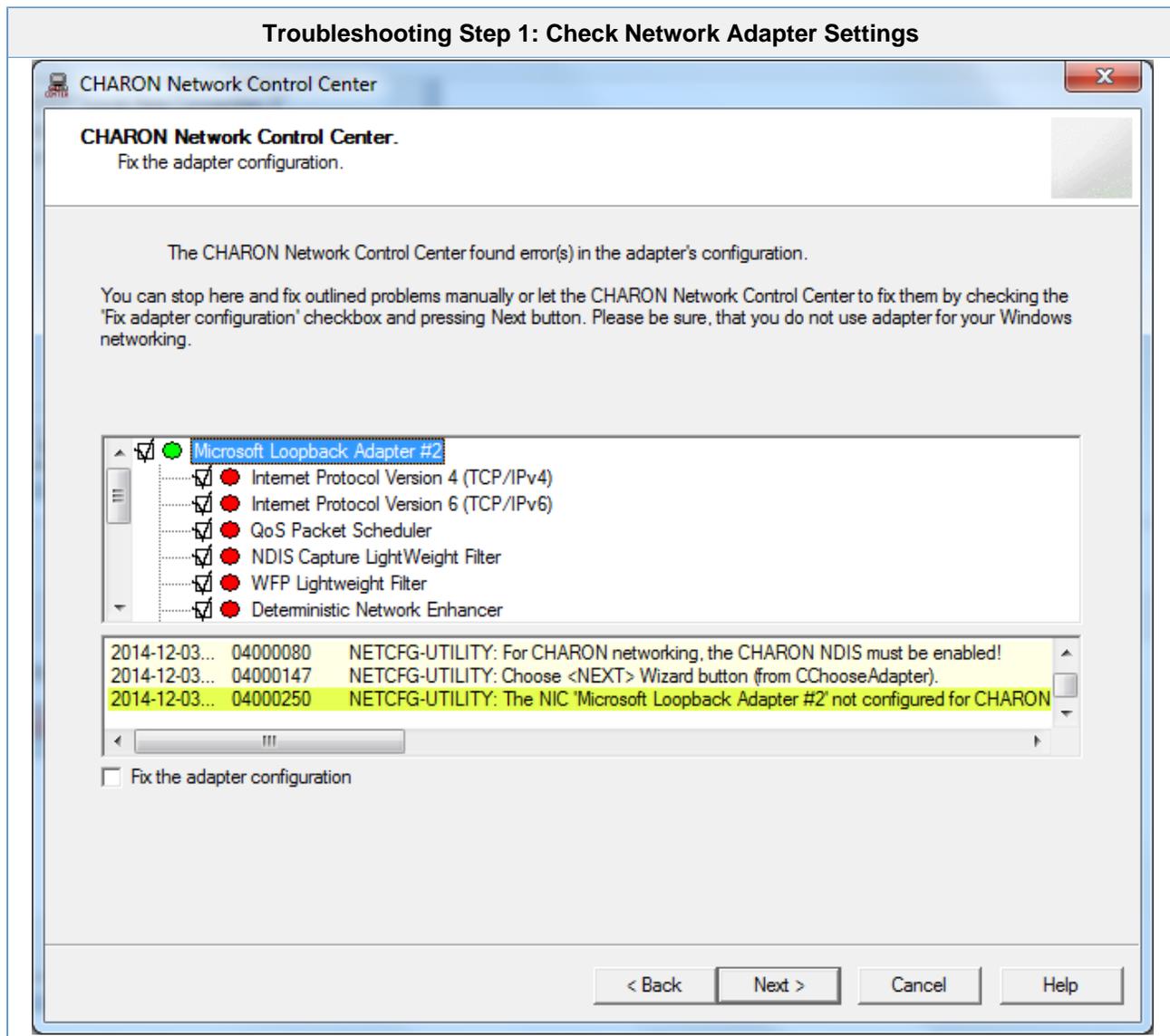
If the CHARON-AXP/SMA virtual machine is operating while running the troubleshooting tool you will receive the following warning:



As the troubleshooting tool can generate packets that appear to be coming from the guest system it is not recommended to run the tool and the virtual machine in a production environment.

Testing Network Adapter Settings

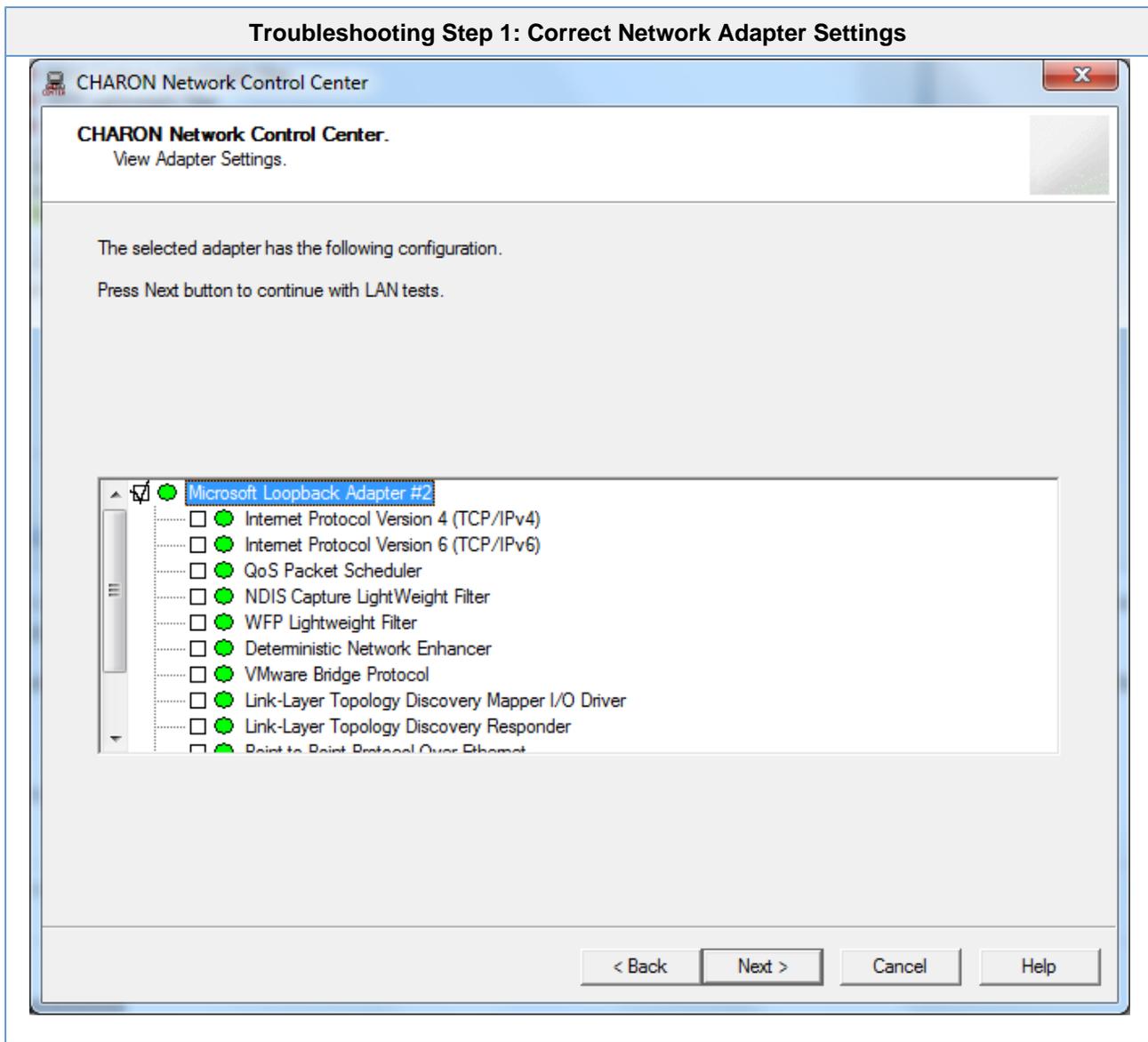
The first troubleshooting step the utility takes is to determine if the network adapter has been configured appropriately, as described in [Configure NIC](#). The example below shows an adapter that has not been configured correctly. The relevant messages will be highlighted in **YELLOW**



To rectify the network adapter settings, select the **Fix the adapter configuration** checkbox and click **Next**. This may take a minute as all unnecessary protocols are removed from the network adapter and the CHARON-AXP/SMA driver is enabled.

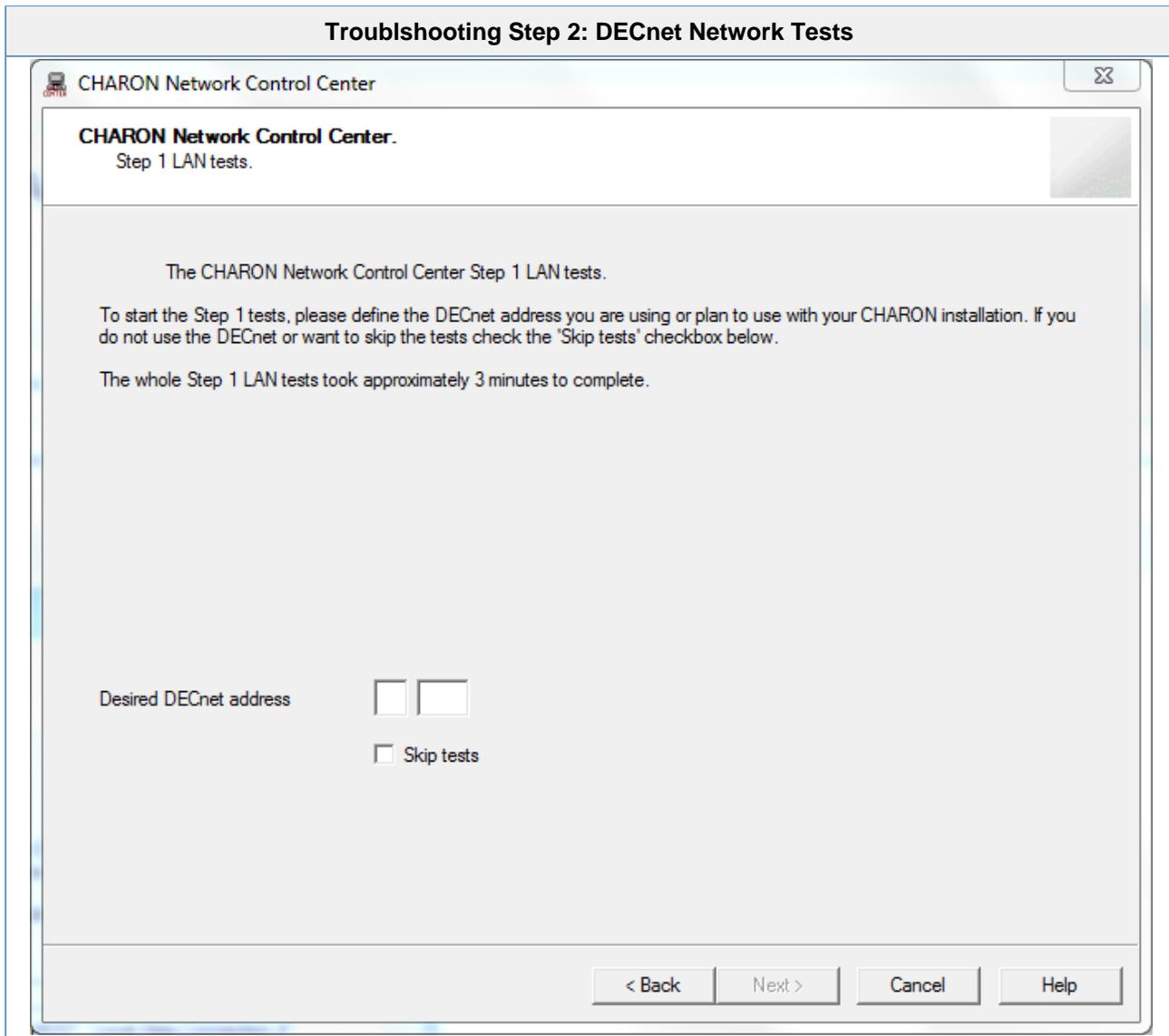
If you have possibly selected the wrong network adapter from the previous window or for some reason do not want to fix the settings, do not select **Fix the adapter configuration**, just click **Next**. This will take you to the final step.

Once the settings have been applied, or if the network adapter was already correctly configured, you will see a window similar to the following. Click **Next** to move on to the next step.



DECnet Network Tests

The next troubleshooting step is to test the DECnet network. If this test is not necessary in your environment, simply select the **Skip tests** checkbox and click **Next**. This will take you to the next step.



The screenshot shows a dialog box titled "Troubleshooting Step 2: DECnet Network Tests". Inside the dialog, the title bar reads "CHARON Network Control Center". The main content area is titled "CHARON Network Control Center. Step 1 LAN tests." and contains the following text:

The CHARON Network Control Center Step 1 LAN tests.

To start the Step 1 tests, please define the DECnet address you are using or plan to use with your CHARON installation. If you do not use the DECnet or want to skip the tests check the 'Skip tests' checkbox below.

The whole Step 1 LAN tests took approximately 3 minutes to complete.

Below the text, there is a label "Desired DECnet address" followed by two empty text input boxes. Below the input boxes is a checkbox labeled "Skip tests".

At the bottom of the dialog, there are four buttons: "< Back", "Next >", "Cancel", and "Help".

At this point, enter the DECnet Phase IV network and node numbers for the CHARON-AXP/SMA virtual machine and click **Next**. This will start the DECnet tests. The next window will show a progress bar as the network tests are executed. To cancel the DECnet tests at any time, just click **Cancel**.

TCP/IP Network Tests

The next troubleshooting step is to test the TCP/IP network. If this test is not necessary in your environment, simply select the **Skip tests** checkbox and click **Next**. This will take you to the next step.

The screenshot shows a window titled "Troubleshooting Step 3: TCP/IP Network Tests" from the CHARON Network Control Center. The window contains the following text and controls:

CHARON Network Control Center.
Step 2 LAN tests.

The CHARON Network Control Center Step 2 LAN tests.

To start the Step 2 tests, please define the IP address and subnet mask you are using or plan to use with your CHARON installation or your LAN's subnet address and subnet mask. If you want to skip that tests check the 'Skip tests' checkbox below.

WARNING: The IP address duplication test can result in the loosing connections by the Windows host that using the IP address you specify.

The whole Step 2 tests duration depends on the size of you subnet. Typically, for class C networks, or subnetted networks with amount of node ~256 the whole Step 2 tests took ~15 minutes maximum.

Desired IP address (or subnet address)
Subnet mask

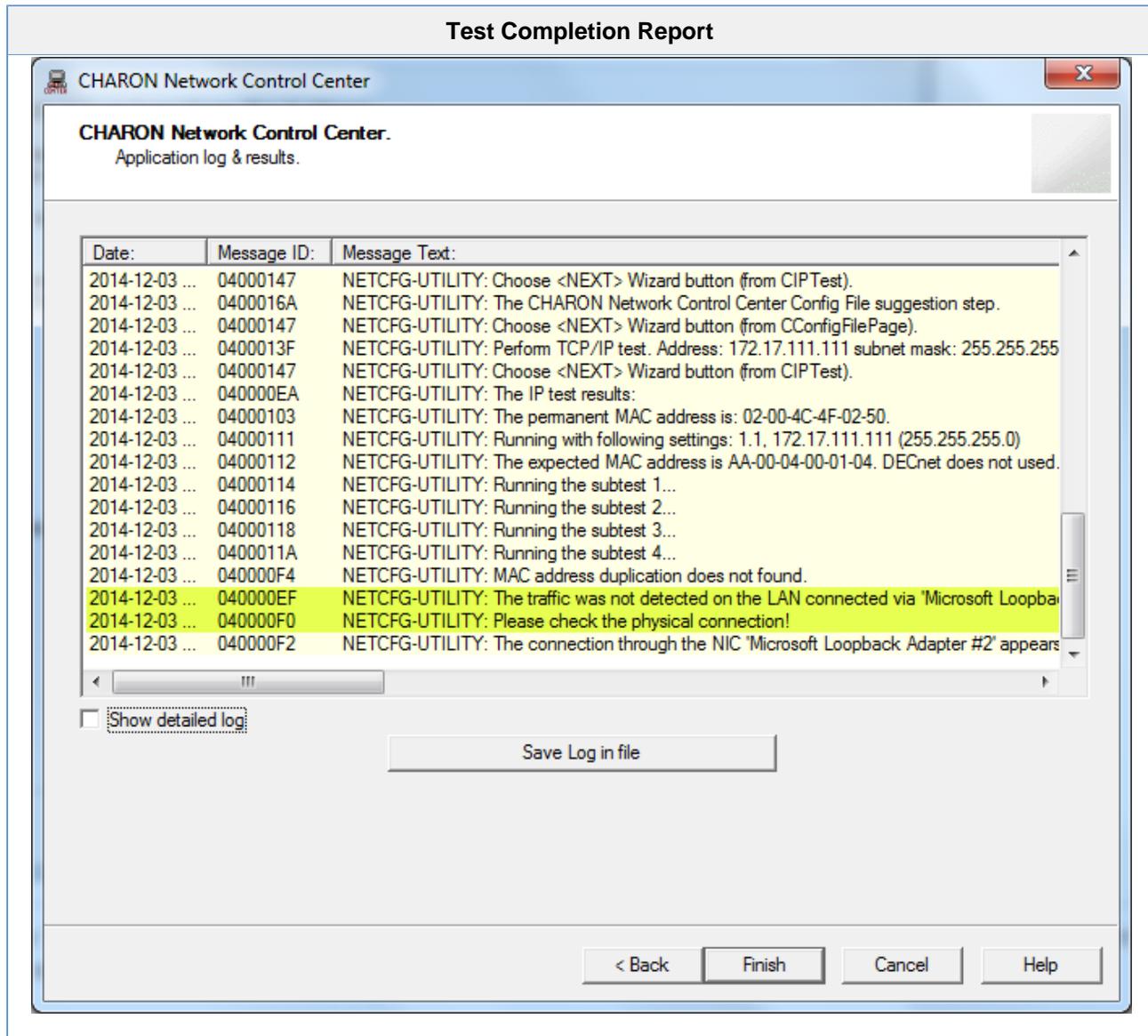
Skip tests

< Back Next > Cancel Help

At this point, enter the TCP/IP address and subnet mask of the CHARON-AXP/SMA virtual machine and click **Next**. This will start the TCP/IP tests. The next window will show a progress bar as the network tests are executed. To cancel the TCP/IP tests at any time, just click **Cancel**.

Test Completion

Once all tests have been run (or the first step aborted) the troubleshooting utility will present a log indicating the test performed and their results. The example below shows a report indicating that the network adapter may not be connected.



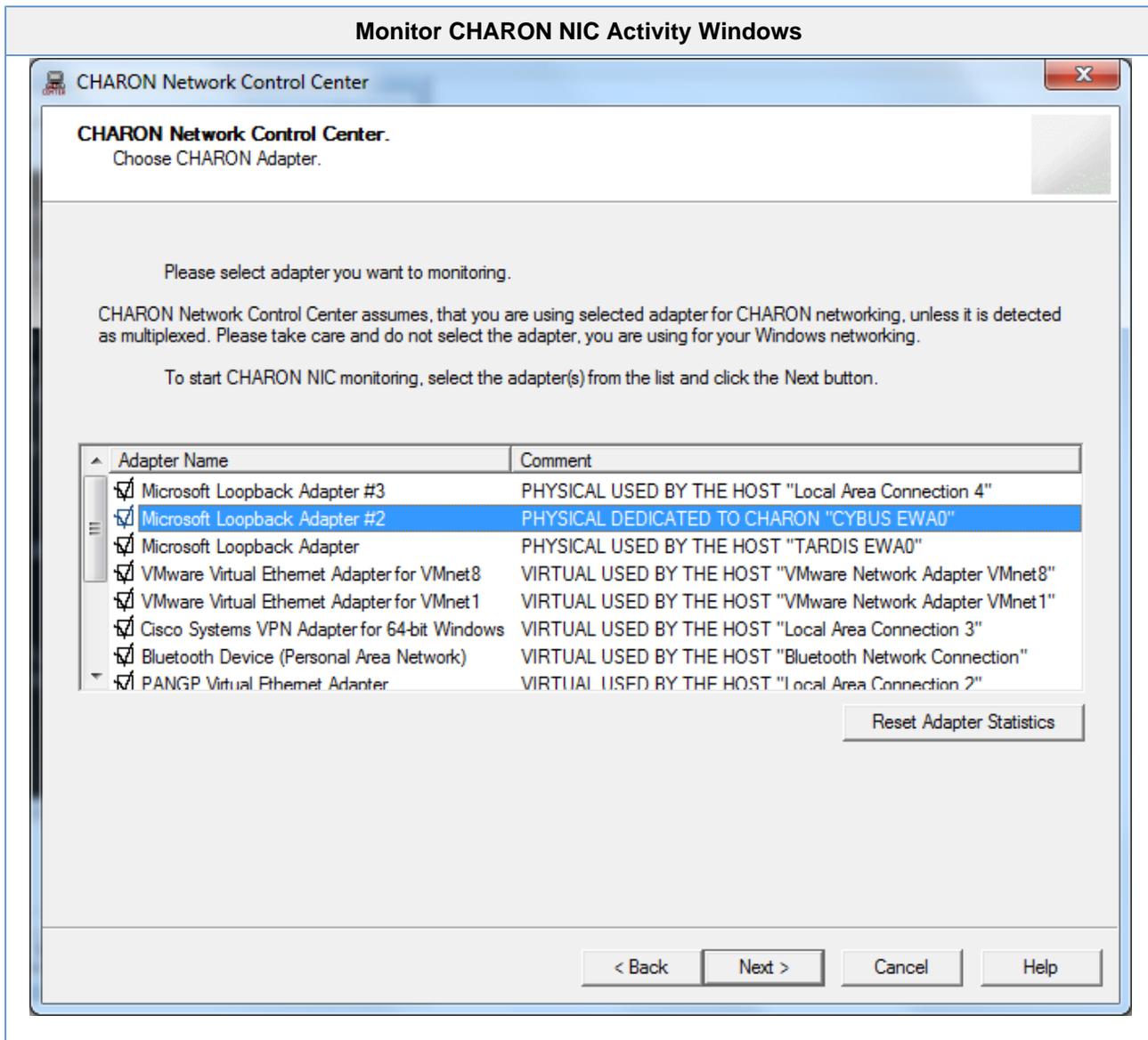
To view a more detailed version of the log file, select the **Show detailed log** checkbox.

To resolve network issues, follow the recommendations of the utility. Click **Save Log in file** to retain a copy of the troubleshooting log for future reference or, in the event of failure or a need for further assistance, submission to Stromasys Support.

To return to the main Network Control Center menu, click **Finish**.

Monitor CHARON NIC Activity

Upon selecting the **Monitor CHARON NIC activity** option from the menu, the following window will be displayed.

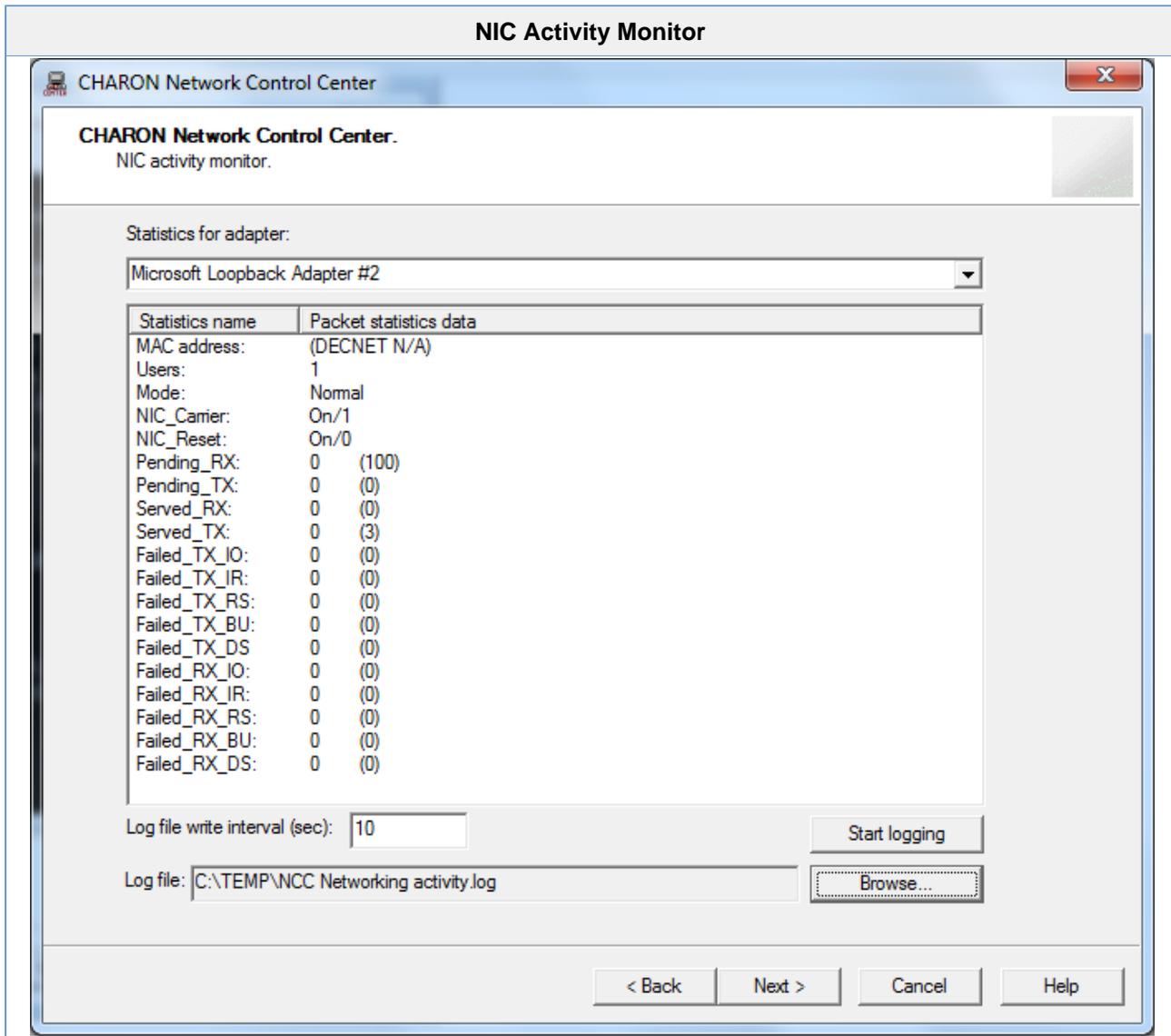


At this point it is possible to select one or more network adapters to monitor and click **Next**.

If this is a new monitoring session, it is usually a good idea to also click **Reset Adapter Statistics**. This will ensure that the statistics gathered are only relevant to the current gathered data.

NIC Activity Monitoring

The window shown below, is a live monitoring of the network interface activity counters. If multiple interfaces were selected for monitoring, use the dropdown box to select a different card to observe.



As well as observing the network activity counters in real time, it is also possible to log all network adapter activity counters at specific intervals to a file. To specify an interval, change the value labelled **Log file write interval (sec)**, select a log file name and path by clicking **Browse**. Once the file name and interval are set, click **Start logging**. This will generate a tab delimited file. Each row contains the columns specified in the table below and is written at the specified interval.

NIC Activity Log File Columns

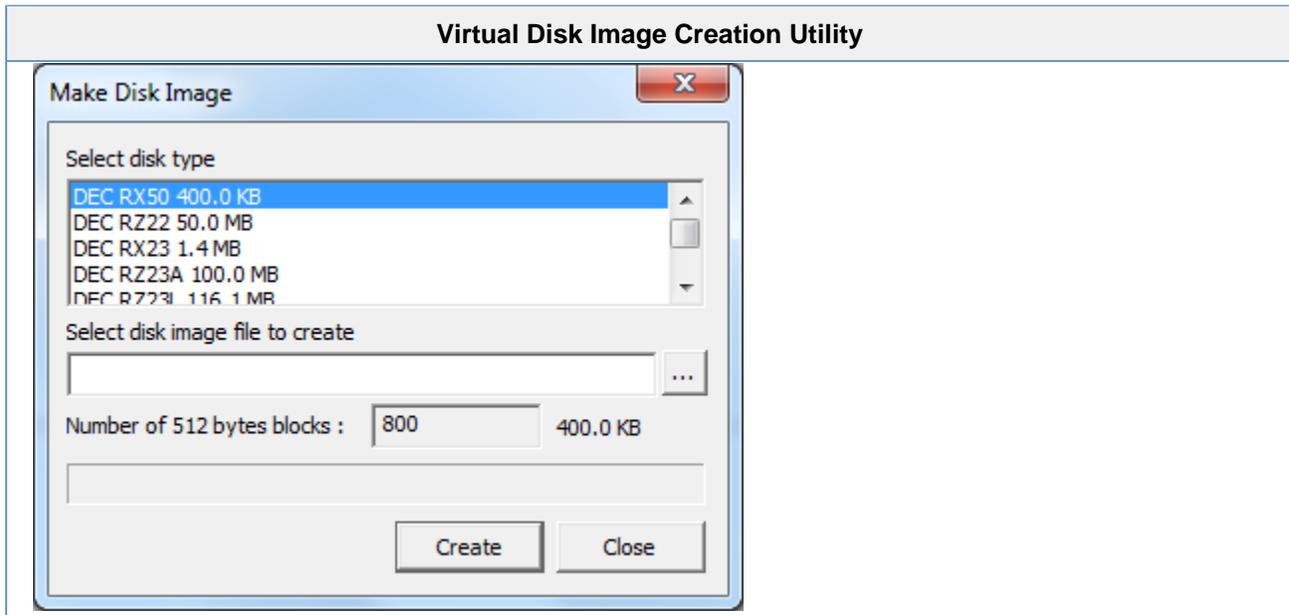
Number	Heading	Type
1	Date and time:	String
2	Adapter:	String
3	MAC Address:	String
4	Users:	Integer
5	Mode:	String
6	NIC_Carrier:	Integer
7	NIC_reset:	Integer
8	Pending_RX:	Integer
9	Pending_TX:	Integer
10	Served_RX:	Integer
11	Served_TX:	Integer
12	Failed_TX_IO:	Integer
13	Failed_TX_IR:	Integer
14	Failed_TX_RS:	Integer
15	Failed_TX_BU:	Integer
16	Failed_TX_DS:	Integer
17	Failed_RX_IO:	Integer
18	Failed_RX_IR:	Integer
19	Failed_RX_RS:	Integer
20	Failed_RX_BU:	Integer
21	Failed_RX_DS:	Integer

After gathering the required network adapter statistics, click **Stop Logging** to close the log file. Click **Next** to continue. At this point you will be presented with the **Application log & results** window. To view a more detailed version of the log file, select the **Show detailed log** checkbox. In the event that there was an error during the logging process, click **Save Log in file** and retain a copy for submission to Stromasys Technical Support.

To return to the main Network Control Center menu, click **Finish**.

Make Disk Image

This menu option runs a host utility to create a virtual disk container file. The image below shows the user interface to this utility.



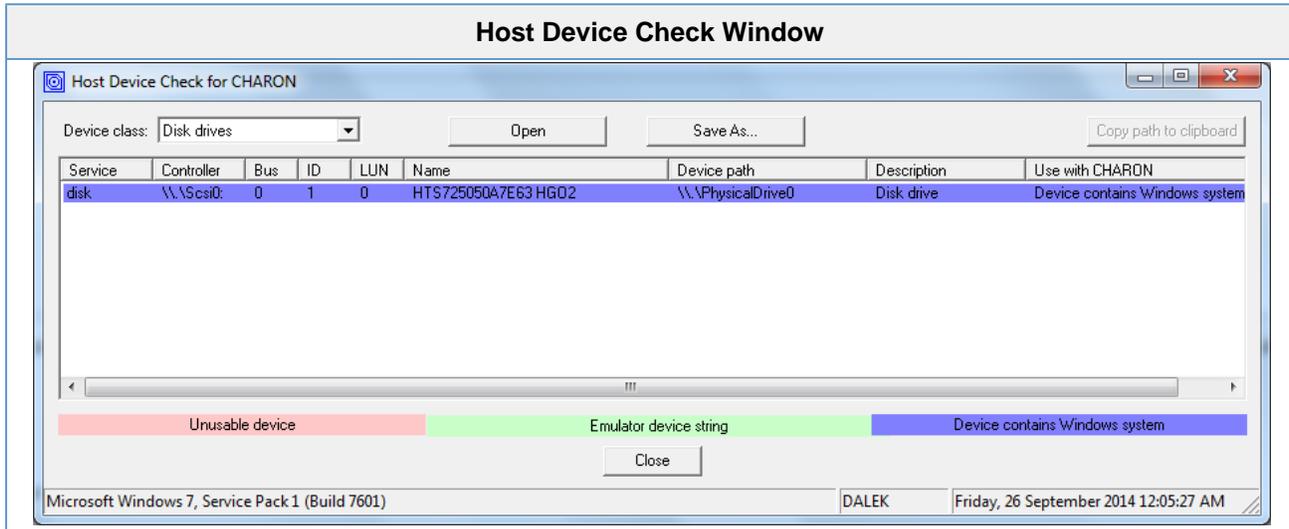
Select a disk type from the list and enter a path specifying the name and location for the created container file.

The final item in the list of disk types is **Custom**. Selecting this option allows you to enter a user defined disk size. Further options related to the disk configuration can be specified in the configuration file and are documented in the DK object reference.

Please note that the user defined disk size is specified in 512 byte blocks.

Host Device Check

The **Host device check** option loads a utility (shown below) for accessing details related to the peripherals attached to the host system.

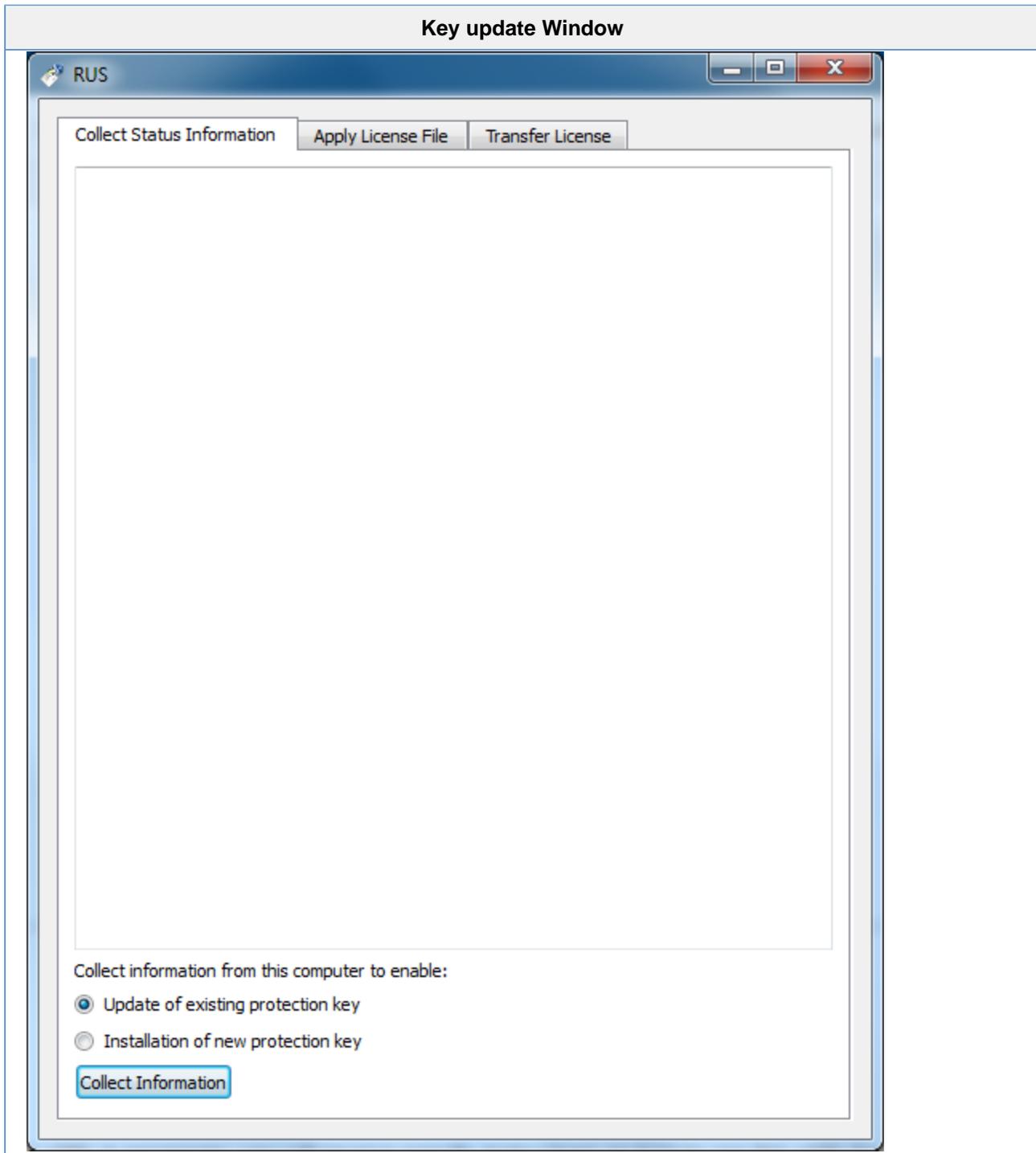


This utility can be useful when trying to determine the device path of physical devices. For example, when connecting a physical disk to a virtual machine. It is also useful for discovering the SCSI path details when configuring a GK type object.

This utility can filter the devices shown by changing the value of the **Device class** dropdown box. It is also possible to save the information to a text file, using the **Save As...** button. Previously saved data can also be display by using the **Open** button.

Key Update

The **Key update** menu option is provided for applying updates to HASP license dongles and retrieving license information. Clicking on it will display a window similar to the one shown below.



From this window it is possible to:

- Collect status information for updating or applying a new license,
- Apply a new license file to the key, or
- Transfer a license.

The following sections describe how to perform specific actions related to managing CHARON-AXP/SMA for Microsoft Windows licenses.

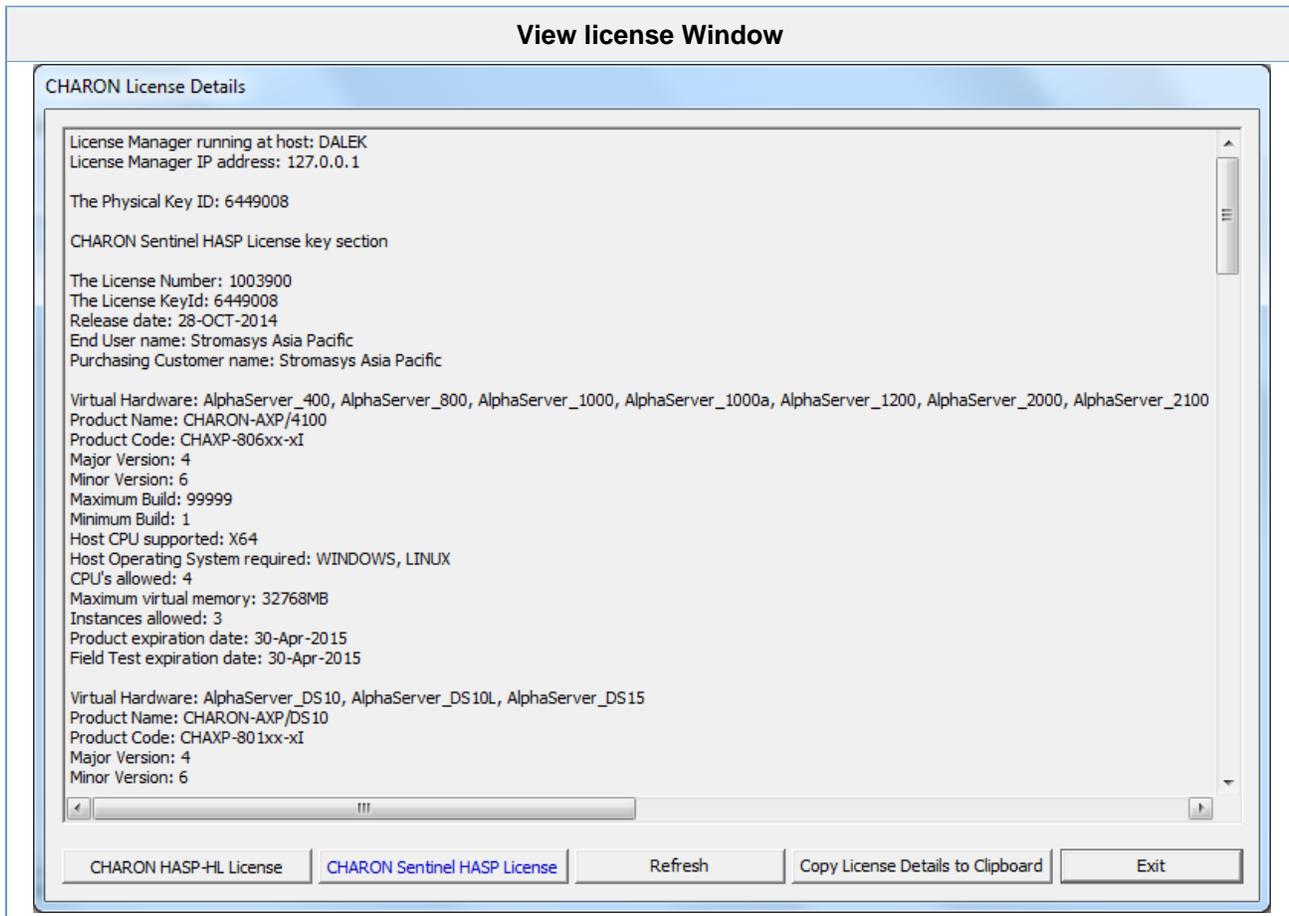
How to Apply a License to CHARON-AXP/SMA

The following steps describe the process of installing a new or updated license for CHARON-AXP/SMA for Microsoft Windows.

License Installation and Update Instructions	
Step	Description
1.	Ensure that the USB HASP key is connected to the host system.
2.	<p>From the Collect Status Information tab, gather the HASP license information:</p> <ul style="list-style-type: none"> To update an existing license, click the radio button labelled Update of existing protection key, or To install a new key, click the radio button labelled Installation of new protection key. <p>Click the button labelled Collect Information.</p>
3.	<p>A file dialogue box labelled Save Key Status As will display.</p> <p>Select a location and name for the Update receipt file (*.c2v).</p>
4.	The *.c2v file must then be sent, via email to Stromasys Orders Administration at orders@stromasys.com .
5.	<p>Upon receipt of the corresponding *.v2c file:</p> <ul style="list-style-type: none"> Click the tab labelled Apply License File, Click the button labelled ... at the Update File field, and From the Select file to apply window, locate the saved *.v2c file and click the button labelled Open. Click the button labelled Apply Update.
6.	<p>The message window should display a message indicating that the update was a success.</p> <p>If the update was not a success, please contact Stromasys Support.</p>

View License

The **View license** menu option allows you to access the HASP license key details. Clicking on it will display a window similar to the one shown below.



It is possible to view the licenses content for different HASP license technologies by **clicking** the buttons labelled **CHARON HASP-HL License** or **CHARON Sentinel HASP License**. If for some reason the key has been exchanged or altered, then **click** the button labelled **Refresh** to reload the license details from the key.

The contents of the license information window can be moved to the clipboard, say to send in an email to Stromasys Support, by **clicking** the button labelled **Copy License Details to Clipboard**.

To close the utility **click** the button labelled **Exit**.

Supporting Utilities

Installed along side CHARON-AXP/SMA, there are a number of host and guest utilities intended to improve performance and ease management. The host-based utilities can be found in the CHARON-AXP/SMA(+) Management interface and are described under [Using the CHARON-AXP/SMA\(+\) Software](#). The following guest utilities are all installed by the user from a virtual disk image that ships with CHARON-AXP/SMA(+).

However, before proceeding with the installation of the guest utilities, it is necessary to attach the virtual disk image to the guest. This is described in the section [Preparing to Install the Guest Utilities](#).

Preparing to Install the Guest Utilities

Although each of the guest utilities is installed separately, they are all installed from a single virtual disk image that is installed along side the CHARON-AXP/SMA(+) virtual machine software. In order to install the utilities from the virtual disk it must first be added to the virtual machine configuration file. The following excerpt contains an example of the configuration lines necessary to attach the virtual disk as DKA400.

Add Utilities Virtual Disk to Configuration

```
load DKA400
DKA400.image="C:\path\to\CHARON-AXP\Driver\VMS\drivers.vdisk"
```

Once attached, the device DKA400: can be mounted on the guest OpenVMS Alpha system. The commands below demonstrate how to mount the disk.

Mount Utilities Disk

```
$ MOUNT/OVERRIDE=IDENTIFICATION/NOASSIST DKA400:
%MOUNT-I-MOUNTED, TOOLS mounted on _TARDIS$DKA400:
```

Please refer to the documentation for the individual utilities for specific installation instructions.

At this time, the guest utilities are only available for OpenVMS Alpha guest operating systems.

Bypass Driver

The Bypass Driver is used to provide a special class of storage controller to the CHARON-AXP/SMA.

Installation

After attaching the virtual disk, as described in [Preparing to Install the Guest Utilities](#), use the POLYCENTER Software Installation (PCSI) utility to install the Bypass Driver. The following example demonstrates the PCSI `PRODUCT INSTALL` commands to execute and the expected output (the example assumes the utilities virtual disk image is attached at `DKA400:`).

Bypass Driver Installation

```

$ PRODUCT INSTALL CHARON_DISK/SOURCE=DKA400:[BYPASS]
%PCSI-I-CANNOTVAL, cannot validate DKA400:[BYPASS]SRI-AXPVMS-CHARON_DISK-V0104--1.PCSI:1
-PCSI-I-NOTSIGNED, product kit is not signed and therefore has no manifest file

The following product has been selected:
  SRI AXPVMS CHARON_DISK V1.4 Layered Product

Do you want to continue? [YES] YES

Configuration phase starting ...

You will be asked to choose options, if any, for each selected product and for any products
that may be installed to satisfy software dependency requirements.

SRI AXPVMS CHARON_DISK V1.4: Charon disk driver V1.4 for OpenVMS Alpha.

  Copyright (C) 1976, 2009 Software Resources International

  CHARON_DISK was produced by Software Resources International

* This product does not have any configuration options.

Execution phase starting ...

The following product will be installed to destination:
  SRI AXPVMS CHARON_DISK V1.4 DISK$TARDISSYSTEM:[VMS$COMMON.]

Portion done: 0%...10%...20%...80%...100%

The following product has been installed:
  SRI AXPVMS CHARON_DISK V1.4 Layered Product

```

Configuration

To make use of the Bypass Driver it is necessary to add some options to the CHARON-AXP/SMA(+) configuration file. The following sections describe the changes to the syntax and keywords.

Controller Definition

Configuring a storage controller for use with the Bypass Driver is as simple as adding a single **bypass** keyword to the storage controller **load** command.

One of the benefits of the Bypass Driver is that it allows you to specify a storage technology other than SCSI for the controller. This can be particularly important if an existing native environment has been set up as dependant on a certain type of storage technology. The table below shows the command necessary to define a storage controller for the supported technologies. In the configuration command definition, *n* denotes the number of controllers to create.

Bypass Driver Storage Controllers

Control Type	Storage Technology	Configuration Commands
PG	FibreChannel	<code>load n PG bypass</code>
PI	DSSI	<code>load n PI bypass</code>
PK	SCSI	<code>load n PK bypass</code>
PQ	IDE	<code>load n PQ bypass</code>
PR	RAIDArray	<code>load n PR bypass</code>
PU	MSCP	<code>load n PU bypass</code>

Device Definition

Configuring a disk device as attached to a bypass enabled controller is no different for SCSI devices. For other storage technologies only the device class changes, all other object members mentioned in ... are applicable. The table below lists the disk device class for each storage technology.

Bypass Disk Device Classes

Device Class	Storage Technology	Example load Command
DG	FibreChannel	<code>load DGA500</code>
DI	DSSI	<code>load DIA0</code>
DK	SCSI	<code>load DKA400</code>
DQ	IDE	<code>load DQA0</code>
DR	RAIDArray	<code>load DRA0</code>
DU	MSCP	<code>load DUA0:</code>

It is not supported to connect non-disk devices (such as tape) to a storage adapter configured to use the bypass driver.

PBXDA-AB Serial Board Driver

The PBXDA-AB Serial Board requires that a third-party driver, supplied by Digi International, be installed so that OpenVMS Alpha can access it.

Installation

After attaching the virtual disk, as described in [Preparing to Install the Guest Utilities](#), use the POLYCENTER Software Installation (PCSI) utility to install the PBCDA-AB Driver.

When installing the driver it is important to pick the installation package that is appropriate for the OpenVMS Alpha version installed on the guest system. By using the following `PRODUCT` command to install the packages it is possible to select the appropriate driver from a list.

PBXDA-AB Serial Driver Installation Command

```
$ PRODUCT INSTALL */SOURCE=ddcu:[DIGIBOARD]/HELP
```

The following table describes the package that should be selected for specific OpenVMS Alpha versions.

PBXDA-AB Serial Driver/OpenVMS Alpha Version Matrix

OpenVMS Alpha Version	PCSI Choice	Product Name
V6.2	1	DIGI AXPVMS DGDRIVER D1.3-0
V7.n	2	DIGI AXPVMS DGDRIVER_7 D1.3-0
V8.n	3	DIGI AXPVMS DBDRIVER_8 D1.5-0

The following example demonstrates the PCSI `PRODUCT INSTALL` commands and output shown when installing the DIGI DGDRIVER on an OpenVMS Alpha V8.3 virtual machine (the example assumes the utilities virtual disk image is attached as `DKA400`).

PBXDA-AB Serial Board Driver Installation

```
$ PRODUCT INSTALL */SOURCE=DKA400:[DIGIBOARD]/HELP

 1 - DIGI AXPVMS DGDRIVER D1.3-0 Layered Product
 2 - DIGI AXPVMS DGDRIVER_7 D1.3-0 Layered Product
 3 - DIGI AXPVMS DGDRIVER_8 D1.5-0 Layered Product
 4 - All products listed above
 ? - Help
 E - Exit

Choose one or more items from the menu: 3
%PCSI-I-CANNOTVAL, cannot validate DKA400:[DIGIBOARD]DIGI-AXPVMS-DGDRIVER_8-D0105-0-1.PCSI;1
-PCSI-I-NOTSIGNED, product kit is not signed and therefore has no manifest file

%PCSI-W-SFTREF, product DEC AXPVMS VMS V8.3 references product DEC AXPVMS DWMOTIF_SUPPORT

The referenced product is not installed and a kit for it was not found
in the source directory.

It is not yet known if this reference is a "hard" or a "soft" dependency.
If the product you are installing identifies the referenced product as a
prerequisite, the PCSI utility will terminate the installation after the
configuration phase, but before the execution phase begins. However, if
the software dependency is expressed as part of a configuration option
of the product, the PCSI utility will mark the option as unselectable
during the configuration phase so that the product can be installed.

Do you want to continue? [YES] YES
```

The following product has been selected:

DIGI AXPVMS DGDRIVER_8 D1.5-0 Layered Product

Do you want to continue? [YES] **YES**

Configuration phase starting ...

You will be asked to choose options, if any, for each selected product and for any products that may be installed to satisfy software dependency requirements.

DIGI AXPVMS DGDRIVER_8 D1.5-0: Digi AccelePort Device Driver for VMS 8.x

The Digi AccelePort Device Driver package allows a VMS system administrator to install, configure, and use the following intelligent, multi-connect serial adapters:

- o Digi AccelePort Xr adapters for ISA and PCI
- o Digi AccelePort Xr 920 adapters for ISA and PCI
- o Digi AccelePort EPC adapters for ISA, EISA and PCI
- o Digi AccelePort Xem adapters for ISA, EISA and PCI
- o Digi AccelePort C/X adapters for ISA, EISA and PCI

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Do you want the defaults for all options? [YES] **YES**

The /HELP option is required; if you didn't use it, do not continue.

(If you can read this text, the /HELP option was used)

Do you want to continue? [YES] **YES**

Do you want to review the options? [NO] **NO**

Execution phase starting ...

The following product will be installed to destination:

DIGI AXPVMS DGDRIVER_8 D1.5-0 DISK\$TARDISSYSTEM:[VMS\$COMMON.]

Portion done: 0%...10%...20%...30%...40%...50%...60%...70%...80%...90%...100%

The following product has been installed:

DIGI AXPVMS DGDRIVER_8 D1.5-0 Layered Product

DIGI AXPVMS DGDRIVER_8 D1.5-0: Digi AccelePort Device Driver for VMS 8.x

Post Installation Procedure

The installation procedure has created the logical "DIGI\$DRIVER" which defines the location of the installed software kit. To ensure that this logical is defined after each reboot, add the contents of the following file to the SYS\$STARTUP:SYLOGICALS.COM file:

```
DIGI$DRIVER:MAKE_DIGI_LOGICAL.COM
```

Once the installation procedure is complete, you must configure the driver by executing the following command:

```
@DIGI$DRIVER:DG_SETUP.COM
```

This configuration command should be executed once now, and once each time that the hardware configuration changes. This command procedure automates driver configuration, and will generate a command procedure to be added to the system startup as described below.

You should take the time to examine the release notes which are included in this distribution. To find these notes, execute the following commands:

```
$ SET DEFAULT DIGI$DRIVER:  
$ SET DEFAULT [.RELNOTES]  
$ DIR
```

Users of this product require the following process resource limits:

BYTLM minimum 45000

This product requires the following SYSGEN parameters:

MAXBUF minimum 45000

Insert the following lines in SYS\$MANAGER:SYSTARTUP_VMS.COM:

```
$! DON'T FORGET TO REMOVE THE ! FROM THE LINE BELOW  
$! @DIGI$DRIVER: DIGI_INSTALL_EPCA.COM
```

Configuration

Configuration of the PXBDA-BA Serial Board is performed using the procedures mentioned in the post installation task list seen after installation (see the example above). The adapters themselves are configured using the procedure @DIGI\$DRIVER: DG_SETUP.COM. During the configuration process it will be necessary to select the serial adapter type. The PXBDA-AB is also known as a Digi AccelePort Xr 920 PCI and this is the model that should be selected.

The driver itself is loaded by adding @DIGI\$DRIVER: DIGI_INSTALL_EPCA.COM to SYS\$MANAGER: SYSTARTUP_VMS.COM.

Idle Powersaver Driver

The Idle Powersaver Driver is a software product that works with CHARON-AXP/SMA(+) to significantly reduce host CPU usage. This software detects when OpenVMS Alpha enters its idle loop and instructs CHARON-AXP/SMA(+) to stall the virtual machine to use less host CPU cycles.

Please note that it is not recommended to use the Idle Powersaver Driver in a real-time processing environment. Use of this driver will result in I/O performance degradation.

Installation

After attaching the virtual disk, as described in [Preparing to Install the Guest Utilities](#), use the POLYCENTER Software Installation (PCSI) utility to install the Idle Powersaver Driver. The following example demonstrates the PCSI `PRODUCT INSTALL` commands to execute and the expected output (the example assumes the utilities virtual disk image is attached at `DKA400:`).

Idle Utility Installation

```
$ PRODUCT INSTALL IDLE/SOURCE=DKA400:[IDLE]
%PCSI-I-CANNOTVAL, cannot validate DKA400:[IDLE]SRI-AXPVMS-IDLE-V0102--1.PCSI;1
-PCSI-I-NOTSIGNED, product kit is not signed and therefore has no manifest file

The following product has been selected:
    SRI AXPVMS IDLE V1.2 Layered Product

Do you want to continue? [YES] YES

Configuration phase starting ...

You will be asked to choose options, if any, for each selected product and for any products
that may be installed to satisfy software dependency requirements.

SRI AXPVMS IDLE V1.2: Idle cpu powersave driver V1.2 for OpenVMS Alpha.

    Copyright 1976, 2007 Software Resources International

    IDLE was produced by Software Resources International

* This product does not have any configuration options.

Execution phase starting ...

The following product will be installed to destination:
    SRI AXPVMS IDLE V1.2 DISK$TARDISSYSTEM:[VMS$COMMON.]

Portion done: 0%...10%...20%...80%...100%

The following product has been installed:
    SRI AXPVMS IDLE V1.2 Layered Product
```

Before installing idle one should make sure that for VMS version V6.2 up to V7.1-2 the PCSI kit VMS62TO71U2_PCSI has been installed.

Tape Control Utility

The Tape Control Utility allows the guest operating system to be able to create, delete, load and unload virtual tape container files on the host system. This can be very useful as it allows all the backup control logic to live on guest system.

Installation

After attaching the virtual disk, as described in [Preparing to Install the Guest Utilities](#), use the POLYCENTER Software Installation (PCSI) utility to install the Tape Control Utility. The following example demonstrates the PCSI `PRODUCT INSTALL` commands to execute and the expected output (the example assumes the utilities virtual disk image is attached as `DKA400:`).

Tape Control Utility Installation

```

$ PRODUCT INSTALL EMULATOR_TAPEUTIL/SOURCE=DKA400:[TAPEUTIL]
%PCSI-I-CANNOTVAL, cannot validate
DKA400:[TAPEUTIL]SRI-AXPVMS-EMULATOR_TAPEUTIL-V0101--1.PCSI;1
-PCSI-I-NOTSIGNED, product kit is not signed and therefore has no manifest file

The following product has been selected:
    SRI AXPVMS EMULATOR_TAPEUTIL V1.1      Layered Product

Do you want to continue? [YES] YES

Configuration phase starting ...

You will be asked to choose options, if any, for each selected product and for
any products that may be installed to satisfy software dependency requirements.

SRI AXPVMS EMULATOR_TAPEUTIL V1.1: Charon Emulator tape control utility V1.1 for OpenVMS Alpha.

    Copyright (C) 1976, 2009 Software Resources International

    EMULATOR_TAPEUTIL was produced by Software Resources International

* This product does not have any configuration options.

Execution phase starting ...

The following product will be installed to destination:
    SRI AXPVMS EMULATOR_TAPEUTIL V1.1      DISK$TARDISSYSTEM:[VMS$COMMON.]

Portion done: 0%...20%...30%...40%...50%...60%...100%

The following product has been installed:
    SRI AXPVMS EMULATOR_TAPEUTIL V1.1      Layered Product

SRI AXPVMS EMULATOR_TAPEUTIL V1.1: Charon Emulator tape control utility V1.1 for OpenVMS Alpha.

Please add "@SYS$MANAGER:EMUCTL_SYMBOLS" to your system manager's LOGIN.COM procedure.

```

As the post-installation messages indicate the example above, it is recommended that the procedure `SYS$MANAGER:EMUCTL_SYMBOLS.COM` is added to either the system manager's login procedure, or the system-wide login procedure.

Once installation is complete, it is unnecessary to keep the utilities virtual disk mounted or attached to the virtual machine. It can be dismounted and removed from the configuration file.

Command Reference

TAPE_CREATE

Syntax

```
$ TAPE_CREATE container-path
```

Description

The TAPE_CREATE command accepts one parameter, *container-path*. This path indicates a file path on the host system where a virtual tape container file should be created.

TAPE_DELETE

Syntax

```
$ TAPE_DELETE container-path
```

Description

The TAPE_DELETE command accepts one parameter, *container-path*. This path specifies a virtual tape container file on the host system to be deleted.

TAPE_UNLOAD

Syntax

```
$ TAPE_UNLOAD device-name[:]
```

Description

The TAPE_UNLOAD command will detach (the equivalent of an eject) the virtual tape container file on the host system from the guest *device-name*.

TAPE_LOAD

Syntax

```
$ TAPE_LOAD device-name[:] container-path
```

Description

The TAPE_LOAD command will associate the host virtual tape container file in *container-path* with the guest tape device, *device-name*. Once loaded, normal mount, read, etc. operations can be performed on *container-path*.

Configuration Reference

The CHARON-AXP/SMA(+) virtual machines are configured via a text-based configuration file. This configuration file treats all configurable options as objects. Each of these objects has a number of members that control specific options related to the object.

This configuration file format is not shared with the CHARON-AXP/SMA or CHARON-AXP/Station products for GNU/Linux.

Syntax

The syntax of the CHARON-AXP/SMA(+) configuration file is very simple. The following section describes each of the syntactic components, with examples.

Comments

All comments begin with a # character and terminate at the end of a configuration line. They are not processed by the virtual machine. The following example demonstrates comments both at the beginning of a line and the end of a configuration statement.

Example Configuration Comments

```
# This configuration is for an AlphaServer 4100
#
load 5 PK      # Add 5 SCSI controllers
```

Declarations

All objects, with the exception of the built in OPA0, must be declared (or **loaded**) using the **load** command. Most objects have extra options controlling features such as controller model. Please see the specific object documentation for further details. The following example demonstrates these.

Example of Configuration Object Declaration (load)

```
load 1 EW DE450
load 1 PK
```

Options (Configuration Object Members)

Each object is configurable using a collection of object-specific members. These can be assigned either double-quoted string or integer values. The following examples show the assignment of both string and integer values.

Assigning Configuration Object Members

```
DKA0.image = "C:\disks\dka0.vdisk"
DKA0.size = 8192
```

Reference

The following sections describe how to manipulate the configuration objects and their members to set up a virtual Alpha machine:

- [DK](#) — Disk device configuration object.
- [EW](#) — Ethernet device configuration object.
- [GK](#) — Generic SCSI device configuration object.
- [LPT1](#) — Parallel port configuration object.
- [memory](#) — Configure size of guest RAM.
- [model](#) — Specify the Alpha system model of the virtual machine.
- [OPA0](#) — Configure the Alpha virtual machine console device.
- [PK](#) — Storage controller configuration object.
- [system](#) — System configuration object.
- [TX](#) — PBXDA-AB serial board configuration object.
- [License keys](#) — Specify regular (primary) and backup keys

DK

Disk device configuration object.

Syntax

```
load DKcu

DKcu.bps = bytes-per-sector
DKcu.image = "image-path"
DKcu.mapped = "on" | "off"
DKcu.product = "product-type"
DKcu.ncyl = cyls-on-disk
DKcu.read_cache = "on" | "off"
DKcu.readonly = "on" | "off"
DKcu.removable = "on" | "off"
DKcu.revision = "disk-revision"
DKcu.size = disk-size
DKcu.spt = sectors-per-track
DKcu.shared = "on" | "off"
DKcu.tpc = tracks-per-cyl
DKcu.vendor = "vendor-name"
DKcu.write_cache = "on" | "off"
```

Description

The DK object presents a disk device configuration to the virtual machine. Each disk device must be loaded using the load command above. It is important to note that a [PK storage controller](#) must be loaded before adding disk devices. It is possible to connect both container files and physical disk devices to the virtual machine.

To connect a container file to the virtual disk device, specify a host system file path for *image-path*. To specify a physical disk device, the *image-path* must be specified in one of two ways.

To access a physical disk device using the Microsoft Windows disk driver, ensure the device is available in the *Device Manager* and specify *image-path* as "\\PhysicalDrive*n*", where *n* is the disk device number. The *image-path* can be determined with the help of the [Host Device Check utility](#) in the CHARON-AXP/SMA(+) Management Menu.

Alternatively, the disk device can be presented directly to the guest system. Please see the documentation for the [GK device object](#) for further details.

The following table describes the more advanced configuration members of the DK object. They are typically determined automatically by the virtual machine.

Advanced DK Object Members

Member	Type	Description
bps	integer	Defines the number of bytes per sector.
product	string	Sets the disk device product type (e.g. "RZ1HD").
ncyl	integer	Defines the number of cylinders on the disk.
revision	string	Defines the disk device revision string.
size	integer	Specifies the total size of the disk device, in bytes).
spt	integer	Defines the number of sectors per track.
tpc	integer	Sets the tracks per cylinder.
vendor	string	Defines the disk device vendor string (e.g. "COMPAQ").

The advanced options are not typically recommended for inexperienced users. These options are used primarily to support installation of early versions of Digital UNIX.

EW

Ethernet device configuration object.

Syntax

```
load ew-count EW [ model ]

EWc0.iface = "iface-name"
EWc0.macaddr = "hardware-address"
```

Description

The CHARON-AXP/SMA(+) virtual machine is capable of emulating a total of 4 network controllers. The total number of controller objects is set by the *ew-count* parameter of the **load** command. The individual ethernet controller objects are then available as EWA0, EWB0, EWC0 and EWD0 (depending on the number of controllers loaded).

Each virtual interface can be attached to either a physical, host-attached interface or an internal shared memory bus allowing multiple virtual machine instances to communicate with each other. This is controlled by the **iface** member of the ethernet object. Specifying a value of **memory** for *iface-name* will connect the interface to the shared memory bus. To attach to a physical controller *iface-name* must be set to the name of the controller. This can be found in the host network adapter configuration folder.

By default the network controller is configured as a DE435. This model was chosen as it is supported by almost all operating systems and versions supported on CHARON-AXP. However, it is possible to configure an alternate model by specifying the optional *model* parameter to the **load** command. The values for *model* and the ethernet adapters they emulate are listed in the table below.

Ethernet Controller Models	
<i>model</i>	Emulated Ethernet Controller
DE435	DE435 EtherWORKS Turbo PCI Adapter
DE450	DE450 EtherWORKS Turbo PCI 10 Adapter
DE500	DE500-BA FastEtherWORKS 10/100 PCI Adapter

Occasionally it is necessary to force the physical address of a network controller. This can be done using the **macaddr** member. The value *hardware-address* must be specified in a hexadecimal, hyphen separated format (e.g. AA-BB-CC-DD-EE-FF).

In the event that the DECnet address of the virtual machine is reconfigured, it may be necessary to reboot the virtual machine to prevent instability.

GK

Generic SCSI device configuration object.

Syntax

```
load GKcu
GKcu.image = "scsi-path"
```

Description

The GK object presents a generic SCSI device to the virtual machine. Using this device it is possible to attach a host-connected SCSI device to the virtual machine, without specifying a type, leaving it to the guest operating system to identify and communicate with the device directly. A [PK storage controller](#) must be loaded before attaching GK device objects.

The SCSI device path is specified using the syntax "**\\SCSI***p: b i l*", where *p*, *b*, *i* and *l* are the SCSI device port, bus, ID and LUN, respectively. These parameters can each be determined using the [Host Device Check utility](#) in the CHARON-AXP/SMA(+) Management Menu.

LPT1

Parallel port configuration object.

Syntax

```
LPT1.type = "lpt-device"  
LPT1.port = "lpt-port"  
LPT1.mode = "lpt-mode"
```

Description to a telnet

The LPT1 object configures the virtual parallel port, it is always present and therefore does not have a load statement.

It is possible to connect the virtual parallel port to either a network port or physical parallel port attached to the host by specifying `telnet` or `device` for `lpt-device`, respectively. If connecting a telnet port, `lpt-port` can be set to an unused TCP/IP port number. This port number must be prefixed with a colon. For a physical device, specify the parallel port using the syntax, "\\LPTn", where *n* is the controller number.

To control the access mode of the physical parallel port, set the value `lpt-mode` to either `EPP` or `ECP`.

There are some limitations to the parallel port interface and it is intended for non-bidirectional printing.

memory

Configure size of guest RAM.

Syntax

```
memory size-in-MB
```

Description

This optional parameter controls the amount of memory (in megabytes) available to the virtual Alpha system. This parameter is restricted by the amount of memory available to the native Alpha system model.

The default value for *size-in-MB* is 512.

The default CHARON-AXP/SMA(+) license provides for a maximum memory size of 4GB (limited, depending on model). Further 4GB options can be purchased. Part numbers can be found in [Emulator Licensing](#). Please contact your Stormasys account manager or VAR for further details.

model

Specify the Alpha system model of the virtual machine.

Syntax

```
model model-name
```

Description

The model keyword is used to indicate the specific model of the Alpha-based system to emulate. The following table lists the possible values of *model-name* and the systems they represent.

Virtual Machine Model Names

Model name	System Name
AS200	Digital AlphaStation 200
AS250	Digital AlphaStation 250
AS300	Digital AlphaStation 300
AS500	Digital AlphaStation 500
AS600	Digital AlphaStation 600
AS800	Digital AlphaStation 800
AS1000	Digital AlphaServer 1000
AS1200	Digital AlphaServer 1200
AS2000	Digital AlphaServer 2000
AS2100	Digital AlphaServer 2100
AS4000	Digital AlphaServer 4000
AS4100	Digital AlphaServer 4100
AS8200	Digital AlphaServer 8200
AS8400	Digital AlphaServer 8400
DS10	Compaq AlphaServer DS10
DS20	Compaq AlphaServer DS20
DS25	Compaq AlphaServer DS25
ES40	Compaq AlphaServer ES40
ES45	Compaq AlphaServer ES45
XP900	Compaq AlphaStation XP900
XP1000	Compaq AlphaStation XP1000
DPW	DIGITAL Personal Workstation au
DMCC	DIGITAL Modular Computing Components (DMCC)
DEC3000	DIGITAL DEC 3000 Model 4000

The *model-name* specified here must correspond to what is configured on the HASP license dongle.

OPA0

Configure the Alpha virtual machine console device.

Syntax

```
OPA0.command = "emulator-command"
OPA0.port = ":port-number" | "port-name:"
OPA0.type = "telnet" | "socket" | "device"
OPA0.stop_process = "no" | "yes"
```

Description

The OPA0 object configures the virtual serial console, it is always present and therefore does not have a load statement.

The **type** member of the OPA0 object indicates what kind of serial console the virtual Alpha is to use. The following table describes the supported values.

Virtual Serial Console Types	
Type	Description
device	Connect the virtual console to a physical serial device attached to the host system (i.e. COM1).
socket	Attach the virtual serial console to a raw TCP/IP listener socket on the host.
telnet	Attach the virtual serial console to a TCP/IP listener socket on the host

The value of the **port** member depends on the setting of the **type** member. For the *socket* and *telnet* types, **port** can be set to an unused TCP/IP port number. This *port-number* must be prefixed with a colon. For the **port** type of *device*, the value must be a serial device physically available on the host and the name must be suffixed with a colon.

The **command** member can be used to start a terminal emulator as part of the virtual machine start up.

The **stop_process** member is used to kill the console terminal emulator started by **command** when the virtual machine powers off. It has a default value of "yes". However, sometimes it is important to retain the console output, even after power off in which case **stop_process** would be set to "no".

The OPA0 object is not supported under CHARON-AXP/Station.

PK

Storage controller configuration object.

Syntax

```
load pk-count PK [ bypass ]
```

Description

The PK object is used to configure the SCSI adapters available to the guest, it has no members. The value of *pk-count* must be between 1 and 10. Without loading the SCSI adapters it is not possible to then load and configure [disk](#), [tape](#) or [generic](#) SCSI devices.

For further information on the **bypass** qualifier, see section [Bypass Driver](#).

system

System configuration object.

Syntax

```
system.cpus = cpu-count
system.hw_name = "hw-name"
system.smm = smm-value
```

Description

The system configuration object is used to control the number of CPUs as well as the system identification and marketing values provided by the emulated Alpha system. The following tables describes how these values correspond to \$GETSYI item codes.

System Objects Members Compare to \$GETSYI Item Codes

System Object Member	\$GETSYI Item Code	Description
cpus	SYI\$_AVAILCPU_CNT	The number of CPUs in the Alpha.
hw_name	SYI\$_HW_NAME	The Alpha model name string.
smm	SYI\$_HW_MODEL	An integer that indicates the Alpha hardware model type (System Marketing Model).

The system object and its members are optional. If not defined *cpu-count* defaults to 1. The maximum number of virtual CPUs can be calculated by subtracting the number of host CPUs from those reserved for I/O processing. The number of host CPUs reserved for I/O processing can be configured in the graphical user interface. However, the maximum CPU count is still limited by the virtual Alpha system model.

Occasionally, when moving from a native to virtual Alpha system it is not possible to create an exact configuration match. A number of third-party software products can often license against the specific hardware model and it is necessary to adjust these values to allow these products to continue to run.

TX

PBXDA-AB serial board configuration object.

Syntax

```
load tx-count TX

TXc.linen.port = ":port-number" | "port-name:"
TXc.linen.type = "telnet" | "socket" | "device"
TXc.linen.command = "line-command"
TXc.linen.stop_process = "no" | "yes"
```

Description

The TX object is used to configure the PBXDA-AB serial boards available to the guest. The value of *tx-count* must be between 1 and 7. Each TX adapter supplies a total of 8 serial lines to the guest system allowing for a maximum of 56 serial ports. These serial devices can be connected to both physical serial ports and network sockets.

The **type** member of the TX object indicates what kind of serial port the virtual Alpha is to use. The following table describes the supported values.

Virtual Serial Console Types	
Type	Description
device	Connect the virtual serial port to a physical serial device attached to the host system (i.e. COM1).
socket	Attach the virtual serial port to a raw TCP/IP listener socket on the host.
telnet	Attach the virtual serial port to a telnet TCP/IP listener socket on the host

The value of the **port** member depends on the setting of the **type** member. For the *socket* and *telnet* types, **port** can be set to an unused TCP/IP port number. This *port-number* must be prefixed with a colon. For the **port** type of *device*, the value must be a serial device physically available on the host and the name must be suffixed with a colon.

The **command** member can be used to start a terminal emulator (or some other software package) as part of the virtual machine start up.

The **stop_process** member is used to kill the process started by **command** when the virtual machine powers off. It has a default value of "yes". However, sometimes it is important or unnecessary to kill the process, even after power off in which case **stop_process** would be set to "no".

In order to use these devices under OpenVMS and Tru64 UNIX it is necessary to install the Digiboard driver. This process is documented, for OpenVMS in the section [PBXDA-AB Serial Board Driver](#).

License keys

Specify regular (primary) and backup keys

Syntax

```
regular_key_id <primary-key-id>
backup_key_id <secondary-key-id>
```

Description

These parameters are available starting with Charon-AXP/SMA(+) version 2.3.3 only

The CHARON emulator products can only use one **active** key at one time. Without additional configuration, they cannot make decisions about which key to use. If there is more than one available key, the first one found (default license key) will be used. The default license key is determined by the Sentinel software. As this can lead to undesirable effects, newer CHARON emulator products have configuration parameters that allow the definition of a **primary** (or production) and a **secondary** (or backup) key.

If only one license is available, either locally installed or via the network, this section does not apply. However, if a backup license is to be used to keep a production system running in case of problems with the primary license, this chapter describes the configuration parameters used to define the primary and secondary keys. The parameters can also be used to define the correct production key, for example if a conflicting key for a different CHARON product is installed on the same system.

This section applies **only** when a second key is to be used for backup purposes or to specify the correct production key if there is a conflicting license for a different CHARON product on the same system.

Behavior

1. When no key is defined in the configuration, the emulator always makes a best effort attempt to find available keys.
2. When both the regular key and the backup key are defined but both are NOT valid or don't exist, the emulator exits.
3. When only one key is defined - as regular key or backup key - but doesn't exist or is incorrect, the behavior is same as in (1).

Backup License Characteristics

Backup keys are provided by Stromasys in addition to standard licenses.

It is strongly recommended to order a backup key to recover immediately from damage or loss of the main license. A backup license key can also help in situations where the CHARON host hardware fails and the software must be moved to a different system, thus invalidating the original software license.

Backup keys use a counter (integer) value programmed in the key. This integer value corresponds to a number of hours the CHARON software is allowed to run. Each time the CHARON software checks the license (at start and then every hour), the value is decreased (by 1 hour). Please note that backup keys have additional restrictions when compared to regular licenses:

- The runtime is typically limited to 720 hours (30 days). This is the time allotted to get a replacement license from Stromasys.
- A backup license may be valid only until a certain date.

If you start and stop the emulator frequently (e.g. frequent runs with a duration of under one hour), the runtime may be significantly less than 30 days, because the license check during the start of an emulator will reduce the counter by one.