

Charon-VAX/XK PLUS, /XL, and /XL PLUS for Windows

Product version 4.10

Document version 1



DESCRIPTION

Stromasys **Charon-VAX/XK PLUS, Charon-VAX/XL, and Charon-VAX/XL PLUS** are members of the Charon-VAX cross-platform hardware virtualization product family. They are designed to replace **VAXserver, VAXstation, and MicroVAX models 3600 and 3900; VAX 3100-98; VAX 4000-108; VAX 4000-700 and 4000-705; and VAX 6000-310** systems by their virtual equivalents running on an x86-64 compatible standard computer system. Charon-VAX creates a virtual replica of the original DEC VAX hardware, allowing the VAX/VMS operating system and all software running in that environment to continue to work as before in their existing, binary form. No or only minimal configuration changes to the original software (operating system, layered products, and applications), operational procedures, and management are required.

NETWORK

Charon-VAX virtualizes the Ethernet controllers present in the original VAX hardware. Any protocol supported on these controllers (DECnet, TCP/IP, LAT) will work on the virtualized network link.

STORAGE

Charon-VAX/XK/XL (PLUS) provides support for the following VAX storage device types: (T)MSCP, DSSI and SCSI. Charon translates the VAX storage to any modern technology (SCSI, SATA, SAS) by means of virtual disk images on a Windows filesystem or physical LUNs attached locally or remotely by iSCSI, SAN, or NAS.

HOST SYSTEM REQUIREMENTS

A physical system or virtual appliance with a dual-core CPU (Intel Xeon Gold and Platinum CPUs with a clock frequency of 3GHz and above are recommended), dedicated Ethernet adapters, an optional USB port for the license key and enough disk space to keep the VAX/VMS data. Charon-VAX/XL requires a minimum of 3 GB host memory; Charon-VAX/XK PLUS and /XL PLUS require 4 GB.

The Charon-VAX device drivers for an external PCI to QBUS adapter, an FPGA Cesium board, and some serial interfaces require Windows 7 32 bit and cannot be used on other versions. Those devices also cannot be used if the host system runs on hypervisors like VMware.

OPERATING SYSTEM REQUIREMENTS

Microsoft Windows on top of physical hardware or on a hypervisor: VMware ESXi 5.5 – 6.7; Microsoft Hyper-V (Server 2012 R2 – 2016); Oracle VM 3.4.5

- Server 2008 R2, 2012 R2, 2016 (Standard and Datacenter editions)
- Windows 7 SP1, Windows 8.1, Windows 10 32bit and 64bit; (Professional and Enterprise editions)

PERFORMANCE

Charon-VAX is available in a standard and a PLUS version. The PLUS version includes Advanced CPU Emulation (ACE) providing 4 – 6 times better CPU performance compared to the Standard product. On a system based on Intel Core 7th generation (3.0 GHz) CPUs, the PLUS version virtual CPU delivers approximately 125 VUPS, the standard version provides about a quarter of this number. For the reference: the original hardware VAX CPU provided from 1 VUP (MicroVAX II) up to 38 VUPS (VAX3100-96). Therefore the VAX virtualization will deliver a major performance improvement.

CHARON APPLICATION PROGRAM INTERFACE (CHAPI)

CHAPI is an open API to the emulated QBUS bus, thus available for QBUS based emulators. It allows the creation of emulated QBUS devices and connects emulated peripherals, which are implemented by external C++ modules, to the emulator kernel. CHAPI library functions provide standard device elements like registers, interrupt logic, etc

SYSTEM MAINTENANCE

Once installed and configured, the Charon system behaves like the original VAX system, and can be treated as a VAX. Guest OS and applications operating procedures remain the same. The host operating system does not require a network connection and regular patching after the installation. See user's guide for requirements regarding any updates to the host OS.

DISTRIBUTION

Charon Release notes, User manuals and Software Product Descriptions are available for download from the Stromasys Product Documentation and Knowledge Base web pages. Downloading installation kits and patches requires a partner account or credentials provided by Stromasys on an individual basis.

CHARON UTILITIES

Charon-VAX on Windows is delivered with the **Charon Virtual Machines Manager**, a single-window application which consolidates all Charon management tasks: creating and configuring Charon instances, managing Charon licenses, configuring host hardware resources for Charon needs, etc. The following applications are invoked from Charon VM manager:

- **HASP License Details, License Update Tool, and Sentinel Admin Control Center** for Charon license management
- **Network Control Center** for managing Charon network drivers and settings
- **Device Check** for providing configuration assistance for directly connected host devices
- **Virtual Disk Tool** for creating empty disk image files (.vdisk)

The following command line utilities are also available:

- **Virtual Disk Tool** for creating empty disk image files (.vdisk)
- **MTD** for transferring data between physical tapes and Charon tape container files
- **HOSTprint** for redirecting an emulated QBUS LPV11 device (parallel port) output to a Windows local or network printer

Charon Windows Toolkit consists of two sets of scripts to assist with **automated license expiration checks/alerts** and **clean Charon instance shutdown** to ensure that VMS or Tru64 had been shut down before stopping Charon

Stromasys **Charon Guest Utilities for OpenVMS** version 6.1 and above are supplied on a disk image to provide the following functionality:

- **Tape Utilities Package** for manipulating virtual tape images and managing a virtual SCSI tape changer
- **Power consumption optimization (IDLE) VMS utility** for implementing energy saving mode when a virtual VAX CPU is idle
- **Slowdown VMS utility** for slowing down Charon virtual CPU to match hardware VAX performance level

Shutdown VMS utility for an orderly shutdown (Charon after VMS)



VIRTUALIZED HARDWARE

| | VAX 4000-108 | VAX 3100-98 | MicroVAX, VAXserver, VAXstation 3600/3900 | VAX 4700/4705 | VAX 6310 |
|----------------------------------|---|-------------------------------------|--|---|---|
| Virtualized VAX CPU | KA54-A | KA56-A | KA650-A/B / KA655-A/B | KA692-A/KA694-A | KA-62B |
| Earliest VMS version | 5.5-2 (5.5-2H4 if second SCSI adapter is used) | | 4.5 | 5.5-2 | 5.5-2 |
| Max. virtual VAX memory | XK PLUS: 256 MB; XL and XL PLUS: 512 MB | | | | |
| XMI and BI subsystems | No | | | No | Yes (KDB50) |
| QBUS subsystem | Yes ^{1) 3)} | No | Yes ^{1) 3)} | Yes ^{1) 3)} | No |
| UNIBUS subsystem | | No | | No | Yes (TUK50) |
| DSSI subsystem | Yes (HSD50) | No | No | YES (two built-in PAA/PAB and two optional PAC/PAD DSSI adapters, HSD50 storage controller) | No |
| SCSI subsystem | 2 controllers, each supports 7 SCSI IDs. Each SCSI ID could be used with up to 8 LUNs | | No | No | No |
| Emulated VAX disks | Container files; local, iSCSI and SAN partitions; physical SCSI disks | | Container files; local, iSCSI and SAN partitions | Container files; local disk drives, iSCSI and SAN partitions | Container files; local, iSCSI and SAN partitions |
| Emulated VAX tapes | Container files, Windows tape drives, physical SCSI tape drives | | | | |
| Network | Up to 5 Ethernet controllers in total including a built-in SGEC and QBUS controllers: DEQNA, DELQA, DESQA | 1 built-in Ethernet controller SGEC | Up to 4 QBUS Ethernet controllers: DEQNA, DELQA, DESQA | Up to 5 Ethernet controllers in total including a built-in SGEC and QBUS controllers: DEQNA, DELQA, DESQA | Multiple BI DEBNI Ethernet controllers (limited by number of available virtual bus slots) |
| Network performance | Standard version supports 10 Mbps connections; PLUS version supports 100 Mbps connections. PLUS version could be used with 1 Gbps connections provided it is tested in advance. | | | | |
| VAX/VMS clustering | NI or Shared Disk Cluster with emulated MSCP or DSSI controllers | NI Cluster | NI cluster or Shared Disk Cluster with emulated MSCP controllers | NI or Shared Disk Cluster with emulated MSCP or DSSI controllers | NI Cluster |
| Asynchronous serial lines | QUART (4 lines), CXA16, CXB16, CXY08, DHQ11, DHV11, DHW42-AA, -BA, -CA | QUART (4 lines), DHW42-AA, -BA, -CA | UART, CXA16, CXB16, CXY08, DHQ11, DHV11 | CXA16, CXB16, CXY08, DHQ11, DHV11 | UART |
| GPIO (IEEE-488) | IEQ11 ⁴⁾ | No | IEQ11 ⁴⁾ | IEQ11 ⁴⁾ | No |
| Graphics subsystem | No | No | Dummy VCB_02 can be loaded in order to force VMS to accept D type licenses ²⁾ | No | No |

¹⁾ Configurable QBUS components are the MSCP disk controller RQDX3, the TMSCP tape controller TQK50, the serial line controllers as above and the Ethernet controllers DEQNA, DELQA and DESQA. MSCP disk emulation is the preferred storage device emulation in case of heavy disk I/O.

²⁾ An X-Windows emulator on an MS Windows or a Linux system can be used to display graphics provided by an X Client running on Charon.

³⁾ A 3rd party PCI to QBUS adapter can be ordered to connect a physical QBUS basket to Charon-VAX.

⁴⁾ IEQ11 emulation requires National Instruments PCI or PCIe based GPIB adapter

Each virtual VAX model follows the characteristics of its VAX hardware equivalent. It requires the corresponding level of license units and supports the peripherals particular to that VAX model. The virtual VAX does not include diagnostic and maintenance modes or delays to simulate mechanical device behavior.

| Ordering information | Charon-VAX/XK PLUS | Charon-VAX/XL | Charon-VAX/XL PLUS |
|---|------------------------------------|------------------------------------|------------------------------------|
| Perpetual / Annual license ⁵⁾ | CHVX-221-PE / CHVX-221-YE | CHVX-021-PF / CHVX-021-YF | CHVX-221-PF / CHVX-221-YF |
| Annual GOLD / PLATINUM support ⁶⁾ | CHVX-221-UE / CHVX-221-TE | CHVX-021-UF / CHVX-021-TF | CHVX-221-UF / CHVX-221-TF |
| Annual GOLD / PLATINUM subscription ⁵⁾ | CHVX-221-PE-CG / CHVX-221-PE-CP | CHVX-021-PF-CG / CHVX-021-PF-CP | CHVX-221-PF-CG / CHVX-221-PF-CP |
| 720-hour backup license ⁵⁾ | CHVX-221-KE | CHVX-021-KF | CHVX-221-KF |

⁵⁾ Please contact Stromasys Sales team for Charon licensing details

⁶⁾ Please refer to Charon Service Descriptions for GOLD and PLATINUM terms, conditions, and SLAs