



CHARON-11 v 2.2 build 106 Specification (17 November 1999)

CHARON-11 is a PDP-11 software emulator available from Software Resources International (SRI). CHARON-11 executes binary PDP-11 code like a hardware PDP-11 CPU, and also emulates most PDP-11 peripheral hardware components. Utilities are available to transfer files between the host system and the emulated environment.

Supported host systems

CHARON-11 is available for the following platforms:

- Compaq Tru64[®] UNIX 4.0 C, D or E on Alpha based systems
- Compaq OpenVMS[®] 7.2 or higher
- Windows NT[®] 4.0 on Intel[®] and Alpha[®] based systems
- Red Hat[®] Linux 6; other platforms on request

64 MB main memory and an Alpha 21164 or Intel Pentium (300 MHz or higher) are recommended to provide adequate performance. The installation of CHARON-11 requires 10 MB disk space; this does not include the disk space for the PDP-11 disk images.

Hardware emulated directly on the host system

- The PDP-11 CPU models 11/03, 04, 05, 10, 15, 20, 21, 23, 24, 34, 34 A, 35, 40, 44, 45, 50, 53, 55, 60, 70, 73, 83, 84, 93, 94, and the LSI 11. The Instruction Set Expanders EIS, FIS, and FP-11. Not supported are the CIS (on the PDP-11/24 and 11/44), the user micro code option on the 11/44 and the 11/60, the multiple I/D space option on the 11/45, the PDT 11/150 family, and the 11/74 multi processor.

- Unibus[®] and Qbus[®]; 16-bit, 18-bit and 22-bit addressing, separate I/D space, Unibus mapping.
- KW11-L, KW11-P, KWV11-A, KWV11-C and TOY clocks.

- Disk controllers and disk drives:

UDA50, KDA50	RA60,RA70,RA71, RA72,RA80, RA81,RA82,RA90,RA92,	RL11	RL01, RL02	RH11	RM02, RM03, RM05,
RUC25, RQC25	RD31, RD32, RD51, RD52, RD53, R D54, RZ23L, RZ24L, RZ26L,	RLV11		RH70	RM06, RM80, RP04,
RQDX1, RQDX2		RL211			RP05, RP06, RP07,
RQDX3, RQZX1	RC25, RX33, RX50	RLV22			RS03, RS04, ML11
RUX50					
RXV11, RXV21	RX01, RX02	RK611	RK06, RK07	RP11	RP03
RX11, RX211		RK711			
RK11-D, RKV11-D	RK05, RK05F				

- Tape controllers and tape drives:

TMSCP	TK30, TK50, TK70, TU81, TU81E	RH11	TE16, TU16, TU45, TU77	TS11	TS11, TU80, TSV05, TK25
TM11	TE10, TU10, TU10W, TS03				

- Serial line interfaces:

DL11-A	DL11-B	DL11-C	DL11-D	DL11-E	DL11-W	DLV11	DZV11
DLV11-E	DLV11-F	DLV11-J	DH11	DHV11	DHQ11	DHU11	DFA11
CXA16	CXB16	CXY08	DHF11	DJHFA01	DZ11	DZQ11	DZS11

- LP11 line printer interface and the DEQNA, DELQA, DELUA, DESQA Ethernet cards.

Optional product extensions:

Hardware emulated through host hardware options:

- The DRV11 parallel interface can be substituted by the National Instruments PC-DIO-96 PnP or the DCI1300 of the Logical company (cabling modifications required).
- Reception and generation of external signals for the KWV11-A or the KWV11-C can be emulated via the PC-DIO-96 card.
- The ABB ED1000 subsystem bus interface can be substituted by an Ethernet connection via an ED-0210 interface in the ED1000.
- Existing Qbus or Unibus peripheral hardware can be connected via a PCI to Qbus or Unibus adapter.
- The VT30-H video terminal can be mapped on the host system console, on an RGB graphics card or as a window on a networked PC.

Virtual special function PDP-11 devices:

- The QQ11-N software communication interface provides a high-speed connection between a PDP-11 application running on CHARON-11 and a host platform application. Can also be used as an interface between existing PDP-11 applications and new host based peripheral devices.
- CHANA is a virtual network interface to connect multiple copies of CHARON-11 running in the same host, or to assist in replacement of proprietary bus systems like Partnerbus.
- WIRE is a virtual serial line to connect two copies of CHARON-11 running in the same host. Supports asynchronous DECNET.
- Virtual Ethernet implements a virtual network between multiple CHARON-11 instances, within one host or within a LAN.
- The binary load utility can load multiple blocks of binary code (e.g bootstrap code) directly into memory.
- The fast clock option accurately handles RT clock interrupts up to 1 kHz under Windows NT.
- VT52/100 terminals can be emulated as a window on the host system console or on a graphics terminal. Mainly intended to display the PDP-11 console, the emulation is a subset of the VT100 functionality.

Compatibility and Y2000 compliance

CHARON-11 is designed as a true PDP-11 hardware emulator, with the goal to execute all PDP-11 hardware instructions correctly, as used by both Digital and non-Digital operating systems and applications. CHARON-11 has been tested to work with the following PDP-11 operating systems: RSX-11M+ with DECnet-11M+, RSX-11M, RSTS/E, IAS, RT-11 and UNIX System 7. Additional environments are being qualified.

Every effort is made to make the CHARON-11 runtime system behave as compatible as possible with the known PDP-11 hardware behavior. However, a few limitations and incompatibilities do exist depending on the host platform and the application.

CHARON-11 itself does not contain any Y2K non-compliant code. Most PDP-11 hardware did not have a Time Of Year (TOY) clock, hence their emulation does not have date dependent components. The emulation of the TOY clock of the PDP 11/93 and PDP 11/94 is fully Y2K compliant.

Like a hardware PDP-11, CHARON-11 directly executes binary PDP-11 instructions, and does not require or use source code. This implies that CHARON-11 itself will not change any existing Y2K problems in the running PDP-11 operating system and / or applications, which will consequently require separate examination.

Software Resources International SA

Case Postale 156, 1228 Plan-les-Ouates, Switzerland

Tel +41 22 794 1070 Fax +41 22 794 1073

Email: info@sri-gva.ch