AN-032 Configuring devices on the Qbus of a VAX or CHARON-VAX

Author: Software Resources International   Date: 3-Sep-2007

When implementing CHARON-VAX, it may not be possible to implement exactly the same configuration as was used on the original hardware VAX. In case of difficulty, configure CHARON-VAX by specifying the exact addresses and vectors where necessary in the CHARON configuration file. For details on the configuration of peripheral device addresses and vectors refer to the VAX peripheral option manuals.

If you move a Qbus system disk from an existing system to an appropriate CHARON-VAX without modification, you must identify the device / controller addresses and vectors and set them to the same value as your VAX operating system used before. For instance, in VMS you can use the MCR SYSGEN (or MCR SYSMAN) and the show / configuration command to identify the values.

But if you are reconfiguring a VAX fortunately, CHARON-VAX can be used to calculate these addresses as follows:

Decide what kinds of QBUS devices are needed and how many of them should be present. For example, suppose four (4) RQDX3 controllers, two (2) DELQA Ethernet controllers, and three (3) DHV11 controllers are needed. Note that when using a CHARON-VAX TMSCP controller it is seen by the VAX as a TQK50.

For the next step configure CHARON-VAX with only a console terminal. Start CHARON and wait until >>> prompt is displayed:

```
+================================================================
|
|KA650-A V5.3, VMB 2.7
|Performing normal system tests.
|40..39..38..37..36..35..34..33..32..31..30..29..28..27..26..25..
|24..23..22..21..20..19..18..17..16..15..14..13..12..11..10..09..
|08..07..06..05..04..03..
|Tests completed.
|>>>_
...
+================================================================
```

Enter the command "CONFIGURE":

```
+================================================================
...
|08..07..06..05..04..03..
|Tests completed.
|>>>CONFIGURE
|Enter device configuration, HELP, or EXIT
```

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```
|Device,Number? HELP
|Devices:
| LPV11         KXJ11         DLV11J        DZQ11         DZV11         DFA01
| RLV12         TSV05         RXV21         DRV11W        DRV11B        DPV11
| DMV11         DELQA         DEQNA         DESQA         RQDX3         KDA50
| RRD50         RQC25         KFQSA-DISK    TQK50         TQK70         TU81E
| RV20          KFQSA-TAPE    KMV11         IEQ11         DHQ11         DHV11
| CXA16         CXB16         CXY08         VCB01         QVSS          LNV11
| LNV21         QPSS          DSV11         ADV11C        AAV11C        AXV11C
| KWV11C        ADV11D        AAV11D        VCB02         QDSS          DRV11J
| DRQ3B         VSV21         IBQ01         IDV11A        IDV11B        IDV11C
| IDV11D        IAV11A        IAV11B        MIRA          ADQ32         DTC04
| DESNA         IGQ11
|Numbers:
| 1 to 255, default is 1
|Device,Number? _
+================================================================
```

Enter your configuration followed by the command EXIT:

```
+================================================================
...
| IDV11D        IAV11A        IAV11B        MIRA          ADQ32         DTC04
| DESNA         IGQ11
|Numbers:
| 1 to 255, default is 1
|Device,Number? RQDX3,4
|Device,Number? DELQA,2
|Device,Number? DHV11,3
|Device,Number? exit
|
|Address/Vector Assignments
|-774440/120 DELQA
|-774460/300 DELQA
|-772150/154 RQDX3
|-760334/304 RQDX3
|-760340/310 RQDX3
|-760344/314 RQDX3
|-760500/320 DHV11
|-760520/330 DHV11
|-760540/340 DHV11
|>>>_
+================================================================
```

It is possible to see addresses and vectors, which need to be put into the configuration file, for each of the required devices.

Note:

1. Some QBUS devices are not able to set an interrupt vector. For such Devices, VMS sets the vector programmatically when initializing the device. For example, RQDX3 and DELQA/DEQNA

2. The addresses above are 16-bit wide, but CHARON is able to understand 22-bit addresses. Therefore, it is necessary to sign-extend them before writing into CFG file.

3. Numbers are octal, so attach "0" in the beginning.

For this example, the configuration file would be as follows:

```
load RQDX3/RQDX3 DUA address=017772150
load RQDX3/RQDX3 DUB address=017760334
load RQDX3/RQDX3 DUC address=017760340
load RQDX3/RQDX3 DUD address=017760344

load DELQA/DEQNA XQA address=017774440
load DELQA/DEQNA XQB address=017774460

load DHV11/DHV11 TXA address=017760500 vector=0320
load DHV11/DHV11 TXB address=017760520 vector=0330
load DHV11/DHV11 TXC address=017760540 vector=0340
```

Units must obviously be configured, but it is out of scope here.

Your copy of your VMS system may not automatically understand this configuration. It may be necessary to build a new VMS system from the original VMS media but if all the required elements are available in your VMS system, it may be possible to reconfigure by executing the commands.

```
$ SET DEF SYS$UPDATE
$ AUTOGEN GETDATA REBOOT
```

This application note is provided for information only to assist customers in dealing with complex configurations. This functionality described is standard VAX and VAX/VMS functionality and is not covered by CHARON-VAX support contracts.

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