Software Product Description

PRODUCT NAME: MicroVAX/DRQ3B Device Driver, Version 1.4 **SPD 29.25.05**

DESCRIPTION

The MicroVAX/DRQ3B Device Driver V1.4 (HXDRIVER) supports the DRQ3B interface, which is a general purpose 16 bit parallel interface between the MicroVAX Q–bus and a user's peripheral. The DRQ3B, under driver control, is capable of performing double buffered direct memory access (DMA) using the block mode capabilities of the Q–bus to provide high bandwidth data transfers. The DRQ3B interface also has 512 word FIFO (First In, First Out) buffers on both the input and output ports to allow data to be transferred while an interrupt service routine is setting up the next buffer.

Driver Features

- Double buffering of I/O requests
- Buffer termination via an external event (EOP)
- External interrupt
- Function bit setting/clearing
- DMA operations directly to Q–bus memory
- Error handling

Double Buffering of I/O Requests

As long as two or more buffers are queued to the driver it will automatically try to double buffer the I/O requests. A function modifier IO$M_HX_HOLD_DMA allows an application to queue up multiple buffers before starting I/O, so that all of those queued buffers can be double buffered.

Buffer Termination Via an External Event (EOP)

The hardware has a line on the input connector that is handled like a 17th data bit but will cause a DMA operation to terminate and a new one to start when asserted and read out of the FIFO by the DMA controller. The driver supports this condition and returns the number of words transferred including the last one transferred with the external event asserted as well as the success code SS$_WASSET rather than the conventional SS$_NORMAL so that an application can test for the occurrence of this condition.

External Interrupt

A line separate from the external event line allows an interrupt to be generated. The driver allows the detection of this condition in an AST routine.

Function Bit Setting/Clearing

The driver provides SETMODE functions that will set /clear the function bits for a given port, and allows the function bits to be read with a SENSEMODE function.

DMA Operations Directly to Q–bus Memory

The driver supports two forms of I/O, logical and physical.

- Physical I/O transfers allow the transfer of data directly to Q–bus memory and specialized I/O subsystems such as those found in some types of array processors.
- The driver also allows MicroVAX memory to be used for physical I/O transfers to reduce overhead.
- Logical I/O supports the more traditional mechanisms for performing DMA. As a result, it is easier to program but is a little less efficient.

Error Handling

The driver will report nonexistent memory conditions (NXMs), FIFO overruns and FIFO underruns in case the interface logic stops handshaking correctly.

INSTALLATION

Only experienced customers should attempt installation of this product. Digital recommends that all other customers purchase Digital's Installation Services. These services provide for installation of the software product by an experienced Digital Software Specialist.

HARDWARE REQUIREMENTS

Processors Supported

VAX: VAX 4000 Model 100,
VAX 4000 Model 100A,
VAX 4000 Model 200,
VAX 4000 Model 300,
VAX 4000 Model 400,
VAX 4000 Model 500,
VAX 4000 Model 600,
VAX 4000 Model 500A,
VAX 4000 Model 600A,
VAX 4000 Model 700A

MicroVAX: MicroVAX II,
MicroVAX 3300, MicroVAX 3400,
MicroVAX 3500, MicroVAX 3600,
MicroVAX 3800, MicroVAX 3900

VAXstation: VAXstation II, VAXstation 3200,
VAXstation 3500

Processors Not Supported

VAX: VAX 10000 Model 600 Series

VAX 9000 Model 110,
VAX 9000 Model 210,
VAX 9000 Model 310,
VAX 9000 Model 400 Series,

VAX 7000 Model 600 Series

VAX 6000 Model 200 Series,
VAX 6000 Model 300 Series,
VAX 6000 Model 400 Series,
VAX 6000 Model 500 Series,
VAX 6000 Model 600 Series

VAX 8200, VAX 8250, VAX 8300,
VAX 8350, VAX 8600, VAX 8650

VAX 8500, VAX 8530, VAX 8550,
VAX 8700, VAX 8800, VAX 8810,
VAX 8820, VAX 8830, VAX 8840,
VAX 8842, VAX 8974, VAX 8978

VAX–11/730, VAX–11/750,
VAX–11/780, VAX–11/785

VAXft Model 110, VAXft Model 310,
VAXft Model 410, VAXft Model 610,
VAXft Model 612, VAXft Model 810

MicroVAX: MicroVAX 2000,
MicroVAX 3100 Model 10/10E,
MicroVAX 3100 Model 20/20E,
MicroVAX 3100 Model 30,
MicroVAX 3100 Model 40,
MicroVAX 3100 Model 80,
MicroVAX 3100 Model 90

VAXstation: VAXstation 2000,
VAXstation 3100,
VAXstation 3100 Model 30,
VAXstation 3100 Model 38,
VAXstation 3100 Model 40,
VAXstation 3100 Model 48,
VAXstation 3100 Model 76,
VAXstation 3520,
VAXstation 3540
VAXstation 4000 Model 60,
VAXstation 4000 VLC,
VAXstation 4000 Model 90

VAXserver: VAXserver 3100, VAXserver 3300,
VAXserver 3400,
VAXserver 3500, VAXserver 3600,
VAXserver 3800,
VAXserver 3900

Processor Restrictions

The following restrictions apply to support the MicroVAX/DRQ3B Device Driver on the VAX 4000 processor family:

- Only one (1) DRQ3B module is supported.
- For VAX 4000-100 and VAX 4000-100A systems, a Q–bus expansion chassis is required.
- Only *Single Cycle* and *Block Mode* transfers are supported.
- *Extended Block Mode* transfers are not supported and should be disabled on the module by setting switch position 8 on Switch Pack 1 to OFF/0.
- *Burst Mode* transfers are not supported.
- The DRQ3B module must have jumper W5 installed (factory default) to select a 2.7 microsecond holdoff time between transfers.
- It is recommended that the DRQ3B module be placed as the last device on the Q–bus.
- Use of hardware features such as memory-to-memory transfers, transfer-with-compare, and chaining are not supported.

Refer to the *DRQ3B Parallel DMA I/O MODULE User's Guide* for additional information.

Other Hardware Required

DRQ3B-AA/SA/SF Parallel DMA Input/Output Module

Block Space Requirements (Block Cluster Size = 1):

Disk space required for installation:	700 blocks (0.3 MB)
Disk space required for use (permanent):	500 blocks (0.25 MB)

These counts refer to the disk space required on the system disk. The sizes are approximate; actual sizes may vary depending on the user's system environment, configuration, and software options.

OPTIONAL HARDWARE

Up to 3 additional DRQ3B interfaces may be added to MicroVAX and VAXstation systems for a total of 4 maximum. The maximum number of interfaces that can be installed in a BA23 or BA123 system may be limited by the number of available A-size I/O panel openings.

CLUSTER ENVIRONMENT

This layered product is fully supported when installed on any valid and licensed VAXcluster* configuration. It must be installed once on each MicroVAX or VAXstation processor from which usage is planned.

In order to configure some product specific attributes that must remain unique to each system, certain components of the product are stored in the system specific environment, SYS$SPECIFIC:[SYSxxx], of the MicroVAX or VAXstation processor on which the installation is performed. The remaining components of the product, including some or all of the executable images will be installed common to all accessing systems.

The *HARDWARE REQUIREMENTS* section of this product's Software Product Description detail any special hardware required by this product.

* V5.x VAXcluster configurations are fully described in the VAXcluster Software Product Description (29.78.xx) and include CI, Ethernet and Mixed Interconnect configurations.

SOFTWARE REQUIREMENTS

OpenVMS VAX V5.5-2H4 for VAX 4000-x00A models and OpenVMS VAX V5.5 - V6.0 for all other supported Q–bus processors.

OpenVMS Tailoring

For OpenVMS and OpenVMS Operating Systems, the following OpenVMS classes are required for full functionality of this layered product:

- OpenVMS Required Saveset
- Programming Support
- System Programming Support
- Utilities

For more information on OpenVMS classes and tailoring, refer to the OpenVMS Operating System Software Product Description (SPD 25.01.xx).

GROWTH CONSIDERATIONS

The minimum hardware/software requirements for any future version of this product may be different from the minimum requirements for the current version.

DISTRIBUTION MEDIA

TK50 Streaming Tape

This product is also available as part of the OpenVMS Consolidated Software Distribution on CD-ROM.

ORDERING INFORMATION

Software Licenses: QL-0APA9-**
Software Media: QA-0APA*-**
Software Documentation: QA-0APAA-GZ
Software Product Services: QT-0APA*-**

* Denotes variant fields. For additional information on available licenses, services and media refer to the appropriate price book.

The above information is valid at time of release. Please contact your local Digital office for the most up-to-date information.

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License Management Facility Support

This layered product supports the OpenVMS License Management Facility.

License units for this product are allocated on an Unlimited System Use basis.

For more information on the License Management Facility, refer to the OpenVMS Operating System Software Product Description (SPD 25.01.xx) or the License Management Facility manual of the OpenVMS Operating System documentation set.

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