

# DILOG

Model DQ40X

## SHUGART SA4000 INTERFACE COMPATIBLE WINCHESTER DISC CONTROLLER DEC LSI-11 COMPATIBLE

### FEATURES

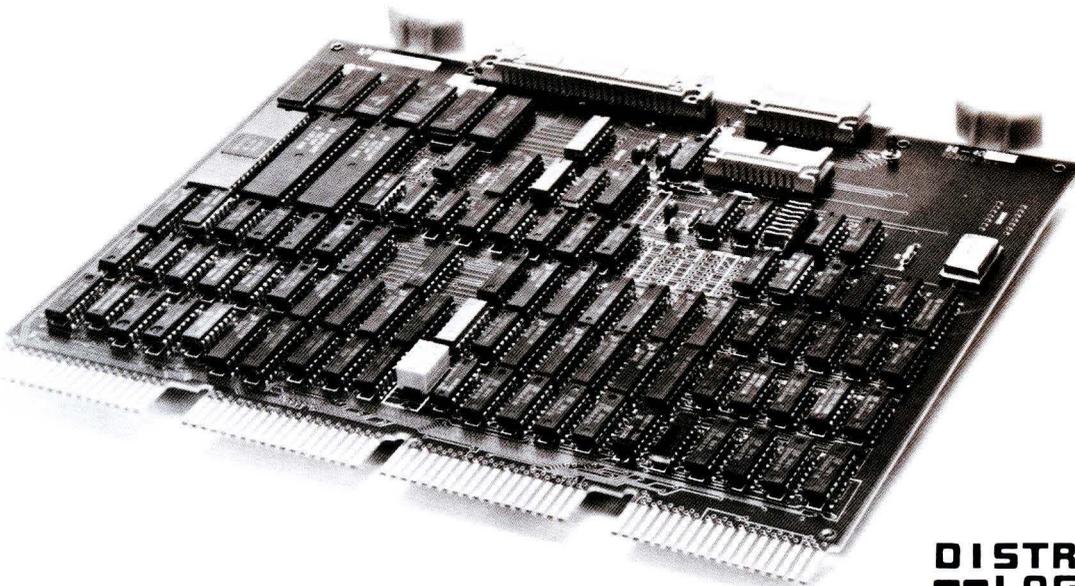
- Interfaces LSI-11, 11/2 and 11/23 computers to the Shugart Associates SA4000 or interface compatible disc drives.
- Emulates DEC RK05, RL01/RL02 software drivers in RT-11, RSX-11 and RSTS software systems.
- Low cost microprocessor based intelligent controller, completely contained on one quad printed circuit card.
- Automatic media flaw compensation.
- Automatic retry on read errors.
- Full sector data buffer for elimination of Q-BUS data late errors due to DMA latency.
- On-board bootstrap loader for RK05 or RL01/RL02 and TM-11 support, with jumper selectable bootstrap address selection.
- Automatic self-test with status indicator and data protect feature.
- Memory addressing to 128K words.
- Automatic power fail/power down protection.
- Low power consumption, less than 3.5 amps @ 5 volts.

### DESCRIPTION

The Distributed Logic Corporation (DILOG) Model DQ401 (RK05 emulation), or DQ404 (RL01/RL02 emulation) Disc Controllers interface up to two Shugart Associates SA4000 or interface compatible disc drives to DEC LSI-11, 11/2 or 11/23 based computer systems. The controller runs under the RT-11, RSX-11 and RSTS operating software systems using the standard DEC RK05 or RL01/RL02 drivers.

The Model DQ40X controllers are microprocessor based, and implemented on a single quad board which plugs into one quad slot in any LSI-11 compatible backplane. On-board firmware provides such features as automatic media flaw compensation and write protect features.

A complete disc subsystem is comprised of the controller, one or more disc drives, and the necessary interconnecting ribbon cables. No specially wired connectors, additional formatting circuitry, bus converters, chassis or power supplies are required for the controller to function. The single quad printed circuit board contains all necessary disc drive and Q-BUS interfaces, in addition to all formatting and control functions.



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## DISC DRIVE COMPATIBILITY

The Model DQ40X can interface up to two Winchester disc drives having the same I/O structure. With drives available from some manufacturers, increased capacities over and above those allowed for by the DEC RK05 (DQ401) or RL01/RL02 (DQ404) disc driver software are optionally available.

## MEDIA FLAW COMPENSATION

The Model DQ40X comes with two methods of providing for prevention of data errors caused by media flaws. The first is bad sector mapping when formatting the disc. The second is automatic flawed media compensation, built into the firmware, which causes transparent track skipping function to be implemented whenever a hard error is detected on a given track. Soft errors are compensated for by an automatic read retry function.

## HARDWARE BOOTSTRAP

The Model DQ40X contains an on-board bootstrap loader for RK05 (DQ401) or RL01/RL02 (DQ404) and TM-11 mag tape support. On-board jumpers allow you to select one of two bootstrap addresses, in addition to enabling/disabling of the bootstrap. When the bootstrap is disabled the Model DQ40X will boot from the standard DEC bootboard.

## SOFTWARE SUPPORT

The Model DQ40X will run the standard DEC RK05 or RL01/RL02 drivers (or modified drivers for increased capacity) in RT-11, RSX-11 and RSTS software systems. A format diagnostic routine is supplied with each unit. The factory should be contacted for special drivers requiring different logical unit sizing.

## DATA FORMAT MAPPING

The Model DQ40X allows the various types of physical drives with which it is compatible to be mapped into a maximum of 8 logical units. Logical unit size may vary with drive capacity and type.

## MICROPROCESSOR BASED

The heart of the Model DQ40X is a proprietary, high speed, bipolar microprocessor configuration. The majority of controller functions are implemented in firmware. This allows a parts count significantly reduced from conventional controllers. User benefits include reduced size, increased controller reliability and applications flexibility.

## AUTOMATIC SELF-TEST

The Model DQ40X is supplied with an automatic self-test feature, which causes on-board microdiagnostics to be run on the controller each time the Q-BUS is initialized. A green card-edge LED indicator is lit after each successful completion of the microdiagnostics. Should the microdiagnostics fail, the LED indicator is extinguished, and a data protect feature is invoked which disallows any communications between the CPU and the disc, thus protecting critical data base areas from the overwriting of erroneous information.

## MODE CONTROL SWITCHES

The Model DQ40X contains on-board jumpers and switches for selection of starting bootstrap address, bootstrap enable/disable and disc mapping control.

## FULL SYSTEM SUPPORT

Distributed Logic Corporation also supplies fully integrated and tested disc systems, including the discs themselves. For the customer that wishes to purchase drives directly from the manufacturer, they can be drop-shipped to DILOG where they will be integrated, tested, and shipped as a complete system with the Model DQ40X.

## DOCUMENTATION

Each Model DQ40X is supplied with an Instruction Manual.

## OPTIONS

Disc Drive I/O cables • Disc Drives • Factory integration of customer-supplied drives.

## DISC DRIVES SUPPORTED

SHUGART  
FUJITSU  
MEMOREX

## CONTROLLER SPECIFICATIONS

**Mechanical**—The Model DQ40X is completely contained on one quad module 10.44 inches wide by 8.88 inches deep, and plugs into and requires one slot in any DEC LSI-11 based system quad backplane.

### Computer I/O

**Register Addresses** (PROM selectable)

	DQ401	DQ404
Drive Status Register	(RKDS) 777 400	N/A
Error Register	(RKER) 777 402	N/A
Control Status Register	(RKCS) 777 404	(CS) 774 400
Word Count	(RKWC) 777 406	N/A
Current Bus Address	(RKBA) 777 410	(BA) 774 402
Cylinder Address	N/A	N/A
Disc Address	(RKDA) 777 412	(DA) 774 404
Data Buffer	(RKDB) 777 416	N/A
Multipurpose Interrupt Vector	N/A	(MP) 774 406
Address	220	330
Priority Level	BR5	BR5
Maximum Block Size Transfer	64K Words	5K Words

### Data Transfer

—Method DMA

### Bus Load

—1 std unit load

### Address Ranges

—Disc Drive: 20 megabytes (DQ401) or 40 megabytes (DQ404)  
—Computer memory to 128K words

### Disc Drive I/O

—50 pin I/O connector to personality board (required for some drives) which will arrange signals for proper termination at drive.

### Drive I/O

—TTL open collector on bus, except for differential on data.

**Power**— + 5 volts @ 3.5 amps from CPU power supply.

**Environment**—Operating temperature 40°F. to 140°F., humidity 10–95% non-condensing.

**Shipping Weight**—5 pounds, includes documentation and cables.

†Specifications subject to change without notice.



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