

**DILOG**

MODEL DQ202

# MASS STORAGE DISC CONTROLLER

DEC LSI-11 COMPATIBLE

## FEATURES

- Interfaces LSI-11, 11/2, and 11/23 computers to any two SMD flat cable interface compatible hard disc drives with capacities from 8 to 160 megabytes.
- Cost effective for 8" Winchester yet allows larger 14" Winchester, SMD pack or CMD cartridge type drives to be used without changing controllers.
- Runs DEC RP02 software drivers.
- Supports both soft and hard sectored discs.
- Low cost microprocessor based intelligent controller is completely contained on one quad printed circuit module.
- Up to 60% less power consumption than other similar controllers.
- Automatic media flaw compensation with bad sector flagging and transparent automatic track skipping features.
- Automatic power down data protection.
- Full sector data buffer for elimination of data late errors due to DMA latency.
- On-board bootstrap loader for RP11 & TM11 support.
- Automatic self test mode with built in microdiagnostics and a data protect feature.
- Multiple sector transfers across track boundaries to 64K words.
- Software write protect capability.
- Automatic retry on read errors.
- Memory addressing to 128K words.

## DESCRIPTION

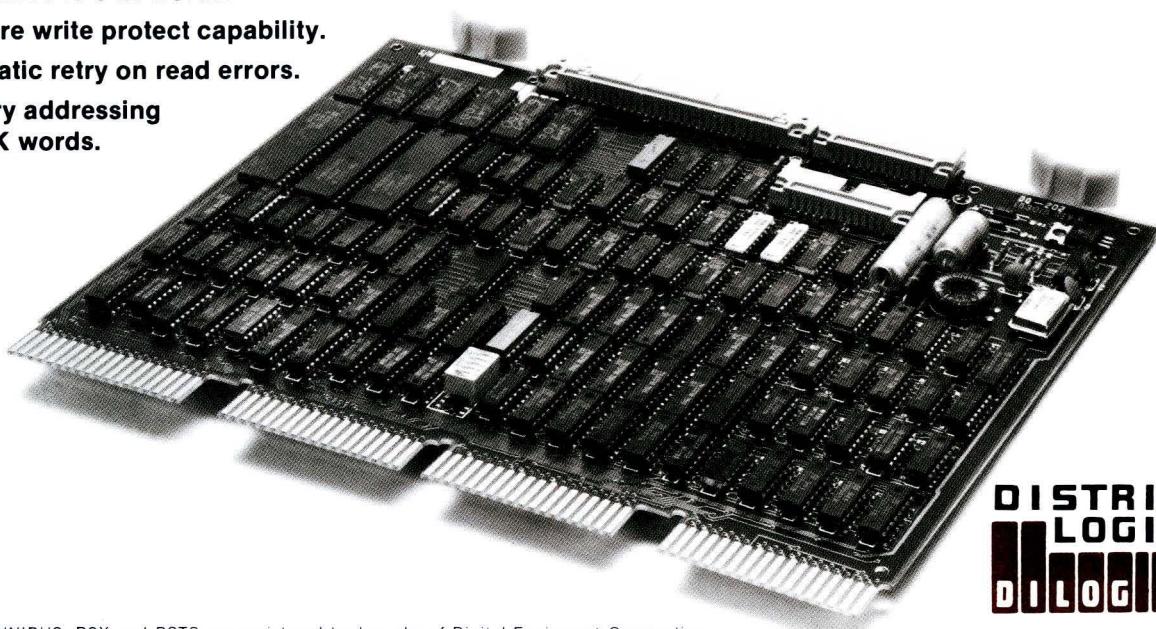
The Distributed Logic Corporation (DILOG) Model DQ202 Mass Storage Disc Controller, couples up to two Winchester or removable media type disc drives with SMD flat cable type interfaces to the sub-UNIBUS of LSI-11 based computer systems. The controller is compatible with all LSI-11, 11/2 and 11/23 based configurations.

The Model DQ202 is microprocessor based and implemented on a single quad board which plugs into and requires one slot in any LSI-11 based quad backplane.

On-board firmware provides such features as automatic self test, automatic media flaw compensation, write protect, and automatic read retry.

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 chassis, power supplies or bus converters are required. The single quad printed circuit module contains all necessary disc controller interface and formatting circuitry.



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## DISC DRIVE COMPATIBILITY

The Model DQ202 can interface with up to two drives having up to 160 megabytes of unformatted capacity each. Winchester (8" or 14"), SMD pack type or cartridge/fixed combination drives are supported by the Model DQ202.

## MEDIA FLAW COMPENSATION

The Model DQ202 is available 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 a 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 DQ202 contains an on-board bootstrap loader for support of RP-11 & TM-11 or compatible controllers. An on-board switch is provided which allows the user to disable the on-board bootstrap when it is not required. When the on-board bootstrap is disabled, the Model DQ202 will boot from the standard DEC REV-11 module.

## SOFTWARE SUPPORT

The Model DQ202 runs the RP02 drivers for the various DEC operating systems. A format/diagnostic routine is supplied with each unit.

## DATA FORMAT MAPPING

The Model DQ202 allows the various types of physical drives with which it is compatible to be mapped into up to 8 logical units. Logical unit size may vary with drive capacity and type.

## MICROPROCESSOR BASED

The heart of the Model DQ202 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 FEATURE

The Model DQ202 is supplied with an automatic self test feature which causes on-board microdiagnostics to be run on the controller each time the sub-UNIBUS is initialized. A green edge card LED indicator is lit and remains 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

Model DQ202 contains on-board mode control switches for: hardware bootstrap enable/disable; format protect enable/disable; and disc mapping control.

## LOW POWER CONSUMPTION

With its single board architecture and extensive use of Low Power Schottky circuitry, the Model DQ202 exhibits up to 60% less power consumption than other DEC compatible SMD type disc controllers.

## FULL SYSTEMS SUPPORT

Distributed Logic Corporation also supplies fully integrated and tested disc subsystems including the disc drives themselves. For the customer that wishes to purchase drives directly from the manufacturer they can be drop shipped at our facility where they will be integrated, tested and shipped as a complete system with the Model DQ202.

## DOCUMENTATION

Each Model DQ202 is supplied with a full set of documentation including a User's Guide.

## OPTIONS

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

## DISC DRIVES SUPPORTED

The Model DQ202 will interface to industry standard SMD flat cable interface compatible disc drives including manufacturers and drive types as follows:

**CDC — SMD/CMD/MMD**

**CENTURY DATA — TRIDENT SMD**

**BALL COMPUTER PRODUCTS — SMD**

**AMPEX — SMD/WINCHESTER/CMD**

**FUJITSU — WINCHESTER**

**MITSUBISHI — SMD/WINCHESTER**

**MICRODATA — WINCHESTER**

**KENNEDY — WINCHESTER**

**OKIDATA — WINCHESTER**

**PRIAM — WINCHESTER**

**BASF — WINCHESTER**

**Rotational Rates — to 3,600 rpm**

**Unformatted Capacities — to 300 megabytes**

## CONTROLLER SPECIFICATIONS

**Mechanical** — The Model DQ202 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)

Factory set at:

- Device Status Register (RPDS) 776710
- Error Register (RPER) 776712
- Control Status Register (RPCS) 776714
- Word Count (RPWC) 776716
- Bus Address (RPBA) 776720
- Cylinder Address (RPCA) 776722
- Disk Address (RPDA) 776724
- Silo Memory (SILO) 776726

### Data Transfer

- Method: DMA
- Maximum block size transferred in a single operation is 64K words.

### Bus Load

- 1 std unit load

### Address Ranges

- Disc drive: up to 240 megabytes total
- Computer memory: to 128K words

### Interrupt Vector Address

- PROM selectable (factory set at 254 priority level BR5)

### Disc Drive I/O

**Connector** — one 60 pin type "A" flat ribbon cable mounted on outer edge of controller module. Two 26 pin type "B" ribbon cable (1 for each drive interfaced with).

**Signal** — SMD A/B flat cable compatible

**Power** — +5 volts at 3.5 amps, +12 volts at 300 millamps from computer power supply.

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

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

Specifications subject to change without notice.

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