DILOG
MODEL DQ200
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 for up to 500 megabytes of on-line storage.**

- **Compatible with Winchester, SMD top load pack, and cartridge class disc drives from most major manufacturers.**

- **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.**

- **Soft sectoring permits use of standard DEC sector sizes or variable sector sizes on a track by track basis for special applications.**

- **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 with 128 bytes of spare area for special applications.**

- **Automatic self test mode with built in microdiagnostics and a data protect feature.**

- **Ability to mix drive types with the same controller, for example, a Winchester and an SMD drive with different capacities.**

- **Multiple sector transfers to 64K words.**

- **Software write protect capability.**

- **Automatic retry on read errors.**
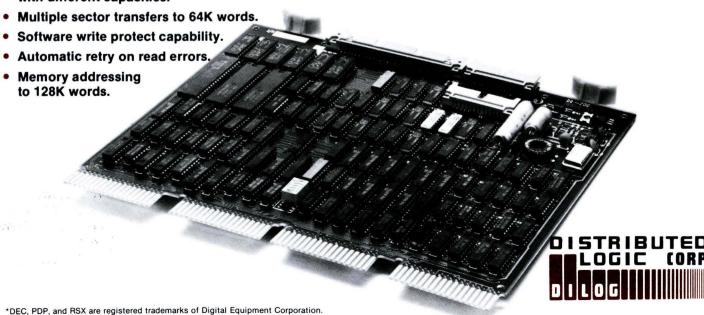
- **Memory addressing to 128K words.**

DESCRIPTION

The Distributed Logic Corporation (DILOG) Model DQ200 Mass Storage Disc Controller, couples up to two removable media or Winchester 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 DQ200 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 variable sector size.

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 DQ200 can interface with up to two drives having up to 300 megabytes of unformatted capacity each (total formatted capacity in excess of 500 megabytes). Winchester, SMD pack type or cartridge/fixed combination drives are supported by the Model DQ200.

MIXED DRIVE TYPES

The Model DQ200 has the ability to intermix SMD interface compatible drive types, rotational rates, etc. For instance, a winchester and an SMD pack type drive having different capacities and/or rotational rates can be intermixed.

MEDIA FLAW COMPENSATION

The Model DQ200 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 DQ200 contains an on board hardware bootstrap loader. An additional 128 bytes of spare bootstrap area is provided which can be configured via PROMS for other system startup features required in special OEM applications. 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 DQ200 will boot from the standard DEC REV-11 module.

SOFTWARE SUPPORT

The Model DQ200 can be supplied with and runs modified DEC RK drivers for operating systems. A format/diagnostic routine is supplied with each unit. For special drivers the factory should be contacted.

DATA FORMAT MAPPING

The Model DQ200 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, operating system, and application.

MICROPROCESSOR BASED

The heart of the Model DQ200 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 DQ200 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 DQ200 contains on board mode control switches for: hardware bootstrap enable/disable; automatic read retry enable/disable; and format protect enable/disable.

LOW POWER CONSUMPTION

With its single board architecture and extensive use of Low Power Schottky circuitry, the Model DQ200 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 DQ200.

DOCUMENTATION

Each Model DQ200 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 • Special software drivers.

DISC DRIVES SUPPORTED

The Model DQ200 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/HUNTER
BALL COMPUTER PRODUCTS — SMD
AMPEX — SMD/WINCHESTER/CMD
FUJITSU — CARTRIDGE/FIXED DISC UNIT
MITSUBISHI — SMD/WINCHESTER
MICRODATA — WINCHESTER
KENNEDY — WINCHESTER
OKIDATA — WINCHESTER
PRIAM — WINCHESTER

Rotational Rates — to 3,600 rpm
Unformatted Capacities — to 300 megabytes

CONTROLLER SPECIFICATIONS

Mechanical — The Model DQ200 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:
  — Drive Status (RKDS) 777 400
  — Error (RKER) 777 402
  — Control Status (RKCS) 777 404
  — Word Count (RKWC) 777 406
  — Current Bus Address (RKBA) 777 410
  — Cylinder Address (RKDC) 777 414
  — Disc Address (RKDA) 777 412
  — Data Buffer (RKDB) 777 416

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 500 megabytes total
  — Computer memory: to 128K words

Interrupt Vector Address
  — PROM selectable (factory set at 220 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 milliamps from computer power supply.

Environment — Operating temperature 50°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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