# DILOG

## Model DQ204

# SMD INTERFACE COMPATIBLE DISC CONTROLLER

### DEC* LSI-11 COMPATIBLE

## FEATURES

- **Interfaces one or two drives (mix-or-match) with the same or different characteristics such as transfer rates, number of heads, data surfaces and capacities to LSI-11, 11/2 and 11/23 computers.**
- **Switch selectable for RL01 and/or RL02 emulations; and software compatible with RT-11, RSX-11 and RSTS.**
- **Cost effective for 8″ or 14″ Winchesters, SMD pack, or cartridge type drives to be used without changing controller or components on the controller.**
- **Low cost, microprocessor based, intelligent controller on one quad printed circuit board.**
- **Up to 88% utilization of drive unformatted storage capacity.**
- **Software write protect capability.**
- **Automatic power down protection.**
- **On-board bootstrap loader for RL01/RL02 and TM-11 support with jumper selectable bootstrap address.**
- **Automatic media flaw compensation with bad-sector flagging and transparent, automatic, track-skipping features.**
- **Full sector data buffer for elimination of data-late errors due to DMA latency.**
- **Memory addressing capability to 128K words.**
- **Low power consumption — less than 3.5 amps @ 5 volts.**
- **Automatic self-test mode having built-in micro-diagnostics and a data protect feature with status indicator.**

## DESCRIPTION

The Distributed Logic Corporation (DILOG) Model DQ204 mass storage disc controller couples up to two 8″ or 14″ Winchester, fixed and removable, or removable disc drives with SMD flat cable type interfaces to the Q-Bus of LSI-11 based computer systems. The controller is compatible with all LSI-11, 11/2 and 11/23 based systems.

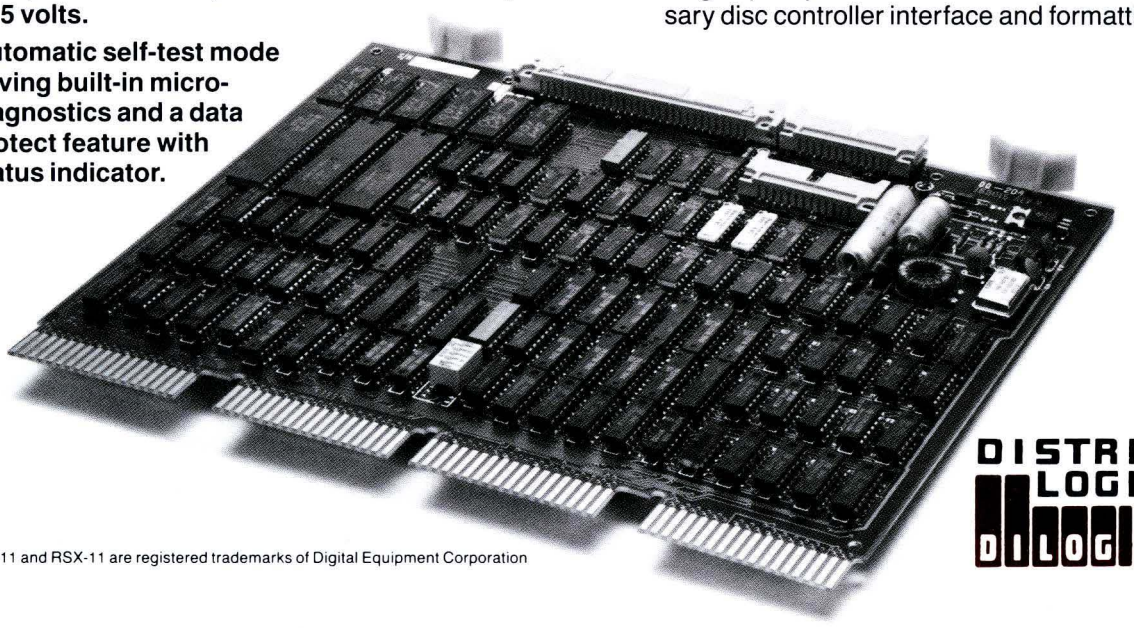
The DQ204 also contains the same universal firmware set contained in other DILOG products. This feature allows mixing and/or matching drives without using special components such as configuration PROMs or special firmware. This feature permits stocking one product for both production and support applications thereby reducing costs.

The Model DQ204 controller is microprocessor based and implemented on a single quad board which plugs into one quad slot in any LSI-11 based 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 two 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 DQ204 can interface with up to two SMD-I/O or compatible drives having up to 50 megabytes of unformatted capacity each. Two drives with the same or different characteristics and/or types (Winchester and cartridge) may be handled by the same controllers. This includes mixing 8″ or 14″ Winchester, SMD pack, or cartridge type drives.

## MEDIA FLAW COMPENSATION

The Model DQ204 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 DQ204 contains an on-board bootstrap loader for RL01/RL02 and TM-11 mag tape support. On-board jumpers allow selection of one or two bootstrap addresses in addition to enabling/disabling the bootstrap. When the bootstrap is disabled, the controller will boot from the standard DEC bootboard.

## SOFTWARE SUPPORT

The Model DQ204 will run the standard RL01/RL02 drivers contained in DEC operating systems such as RT-11, RSX-11 and RSTS.

## DATA FORMAT MAPPING

The Model DQ204 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 DQ204 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 DQ204 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 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

The DQ204 contains switches for selecting RL01 or RL02 emulations for each of four logical units.

## LOW POWER CONSUMPTION

With its single board architecture and extensive use of Low Power Schottky circuitry, the Model DQ204 exhibits up to 60% less power consumption than other DEC compatible SMD type disc controllers.

## FULL SYSTEMS SUPPORT

The customer may purchase drives directly from the manufacturer and have them drop-shipped to DILOG where they will be integrated, tested and shipped as a complete system with the Model DQ204.

## DOCUMENTATION

Each Model DQ204 is supplied with an Instruction Manual.

## OPTIONS

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

## DISC DRIVES SUPPORTED

The Model DQ204 will interface to industry standard SMD flat cable interface compatible disc drives including manufacturers and drive types as follows:

**CDC—SMD/CMD/MMD/LARK***
**CENTURY DATA—TRIDENT SMD**
**BALL COMPUTER PRODUCTS—SMD**
**AMPEX—SMD/WINCHESTER/CMD**
**FUJITSU—WINCHESTER**
**MITSUBISHI—SMD/WINCHESTER**
**KENNEDY—WINCHESTER**
**PRIAM—WINCHESTER**
**BASF—WINCHESTER**

**Rotational Rates**—to 3,600 rpm
**Unformatted Capacities**—to 50 megabytes

*Lark is a trademark of Control Data Corp.

## CONTROLLER SPECIFICATIONS

**Mechanical**—The Model DQ204 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 backplane.

**Computer I/O**

**Register Addresses** (PROM selectable)
—Control Status (RLCS) 774 400
—Current Bus Address (RLBA) 774 402
—Disc Address (RLDA) 774 404
—Multipurpose (RLMP) 774 406

**Data Transfer**
—Method: DMA
—Maximum block size transferred in a single operation is 10K words.

**Address Ranges**
—Disc drive: up to 50 megabytes total
—Computer memory: to 128K words

**Interrupt Vector Address**
—PROM selectable (factory set at 160, priority level BR5)

**Bus Load**
—1 std unit load

**Disc Drive I/O**
—One 60 pin type "A" flat ribbon cable connector mounted on outer edge of controller module. Two 26 pin type "B" ribbon cables (one for each drive interfaced)

**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 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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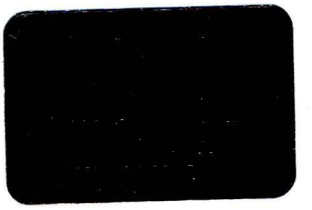

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