DILOG

Model DQ215
SMD INTERFACE COMPATIBLE
DISC CONTROLLER
DEC LSI-11 COMPATIBLE

FEATURES

- Interfaces LSI-11, 11/2 and 11/23 computers to one or two SMD I/O disc drives, including 8- and 14-inch Winchester, SMD pack and CMD cartridge type drives.

- 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.

- Maintains compatibility with RK06/RK07 software drivers in RT-11, RSX-11 and RSTS.

- Cost effective for 8" Winchesters, yet allows larger 14" Winchesters, SMD pack or CMD cartridge type drives to be used in a mix-or-match arrangement without changing controller or components on the controller.

- Up to 88% utilization of drive unformatted storage capacity.

- Switch selectable RK06/RK07 emulation.

- 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.

- Contains an expanded error correction code (ECC) utilizing a 56-bit checkword, plus bad-sector flagging and transparent, automatic, track-skipping features.

- Automatic power down protection.

- Full sector data buffer for elimination of data late errors due to DMA latency.

- On-board bootstrap loader for RP02/RP03, RK06/RK07, RX02, RK05, RL01/RL02 and TM-11 support, with jumper selectable bootstrap address.

- Automatic self-test mode having built-in microdiagnostics and a data protect feature with status indicator.

- Memory addressing to 2 megawords.

- Automatic retry on data errors.

- Multiple sector transfers across track boundaries to 64K words.

DESCRIPTION

The Distributed Logic Corporation (DILOG) Model DQ215 Disc Controller allows the user to mix-or-match up to two 8" and/or 14" Winchester, SMD pack or cartridge type disc drives without changing the controller or components on the controller. The Model DQ215 emulates RK06/RK07 drivers in RT-11, RSX-11 and RSTS operating systems.

22-bit addressing has been incorporated in the controller for direct addressing of up to 2 megawords of computer memory. An expanded 56-bit error correction code (ECC) has been incorporated in the DQ215 for detecting and correcting data errors. This is in addition to the media flaw compensation features used on all DILOG disc controllers.

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.
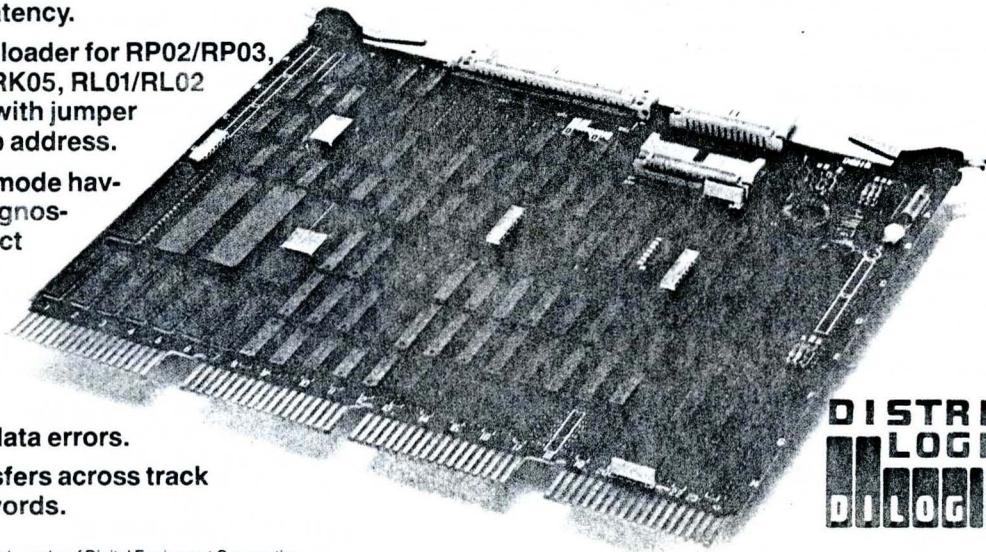
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DISC DRIVE COMPATIBILITY

The Model DQ215 can interface with up to two SMD-I/O compatible drives having up to 300 megabytes of unformatted capacity each. Two drives with the same or different characteristics and/or types (Winchester, SMD pack, or CMD cartridge) may be handled by the same controller. This includes mixing 8" or 14" Winchester, SMD pack, or CMD cartridge type drives.

MEDIA FLAW COMPENSATION

Incorporated in the DQ215 are three features used to compensate for data errors whether they are caused by media flaws, minor drive misalignment or weak components in the drive (i.e. soft servo system). First, the DQ215 flags bad sectors on the disc and assigns alternate tracks when formatting. Second, an automatic read-retry is incorporated once the pack is formatted. Read-retries will compensate for soft errors that can occur due to marginal drive components. These features are transparent to the RT-11, RSX-11 & RSTS operation systems. Third, a 56-bit ECC polynomial is used for detecting and correcting data errors up to 11 bits in length. With this polynomial the chances of misdetecting and/or miscorrecting single or double burst errors are greatly reduced when compared with the commonly used 32-bit polynomial. Switch selection of software on hardware connection is implemented on the controller. The DQ215 is compatible with the software correction facility utilized in the DEC operating systems.

HARDWARE BOOTSTRAP

The Model DQ215 contains an on-board bootstrap loader for RP02/RP03, RK06/RK07, RX02, RK05, RL01/RL02 and TM-11 mag tape support. On-board jumpers allow selectable bootstrap addresses, in addition to enabling/disabling the bootstrap. When the bootstrap is disabled, the Model DQ215 will boot from the standard DEC REV-11 Module.

SOFTWARE SUPPORT

The Model DQ215 is transparent to RK06/RK07 drivers contained in the various DEC operating systems, such as RT-11, RSX-11 and RSTS. A format/diagnostic routine is supplied with each unit.

DATA FORMAT MAPPING

The Model DQ215 allows the various types of physical drives with which it is compatible to be mapped into a maximum of 8 logical units. The controller contains switches for the selection of RK06 or RK07 emulation for each logical unit to maximize the capacity of various disc drives.

MICROPROCESSOR BASED

The heart of the Model DQ215 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 DQ215 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

Model DQ215 contains on-board jumpers and switches for selection of starting bootstrap address, bootstrap enable/disable, disc mapping control, device address selection and hardware or software selection of ECC data error correction.

LOW POWER CONSUMPTION

With its single board architecture and extensive use of Low Power Schottky circuitry, the Model DQ215 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 to DILOG where they will be integrated, tested and shipped as a complete system with the Model DQ215.

DOCUMENTATION

Each Model DQ215 is supplied with an Instruction Manual.

OPTIONS

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

DISC DRIVES SUPPORTED

The Model DQ215 will interface to industry standard SMD I/O compatible disc drives including manufacturers and drive types as follows:

CDC—SMD/CMD/MMD/LARK
CENTURY DATA—TRIDENT SMD—MARKSMAN
BALL COMPUTER PRODUCTS—SMD
AMPEX—SMD/WINCHESTER/DFR
FUJITSU—WINCHESTER
KENNEDY—WINCHESTER
PRIAM—WINCHESTER
BASF—WINCHESTER
MEMOREX—WINCHESTER
SLI INDUSTRIES

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

CONTROLLER SPECIFICATIONS

Mechanical—The Model DQ215 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 Register 1 (RKCS 1) 777 440
  —Word Count Register (RKWC) 777 442
  —Bus Address Register (RKBA) 777 444
  —Disc Address Register (RKDA) 777 446
  —Control/Status Register 2(RKCS2) 777 450
  —Drive Status Register (RKDS) 777 452
  —Error Register (RKER) 777 454
  —Attention Summary/Offset Register (RKAS/OF) 777 456
  —Desired Cylinder Register (RKDC) 777 460
  —Data Buffer Register (RKDB) 777 464
  —Maintenance Register 1 (RKMR1) 777 466
  —ECC Position Register (RKECPS) 777 470
  —ECC Pattern Register (RKECPT) 777 472
  —Maintenance Register 2 (RKMR2) 777 474
  —Maintenance Register 3 (RKMR3) 777 476

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 224 megabytes
  —Computer Memory: to 2 megawords

Interrupt Vector Address
  —PROM selectable (factory set at 210, 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 cables (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 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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