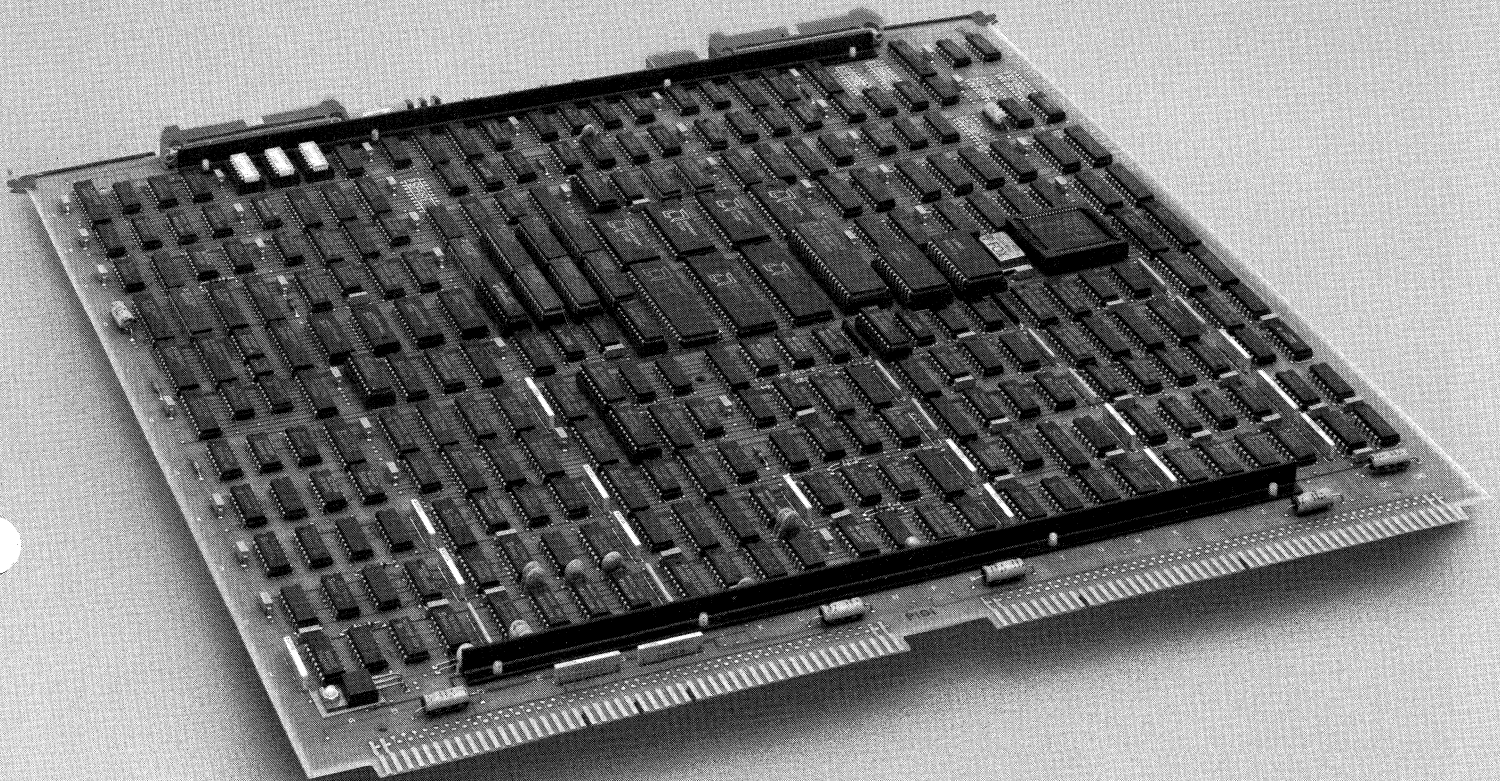


Argus-Emulating Disk Controller for Eclipse/MV: Model ARZ-1

ZETAC



- Fully emulates Data General's Argus/DPJ (6236/37 and 6239/40).
- Zetaco's added enhancements yield higher performance from your entire system.
- Supports drives with data transfer rates up to 3 MB/sec, interfacing via BMC.
- Yields higher formatted capacities from SMD, HSDMS & SMDE disk drives.
- Supports Mirroring and Dual Porting.
- Continuous surface analysis through Automatic Error Logging and Sector Relocation.

Versatile Drive Compatibility

Zetaco works closely with drive manufacturers to ensure trouble-free interface with all drive models and full support of the high performance technology they offer.

Because there are so many popular drives with different functions and features, the ARZ-1 is designed to be versatile.

The Configurator Program, which contains the characteristics of most popular drive models, is stored in an E²PROM (programmable, non-volatile memory), so that you choose controller functions and drive configurations from the console via menu-driven software. This configuration program, revised and improved for the ARZ-1, is easier, faster and more reliable than ever before! And, unlike other controllers with switch packs, the ARZ-1 does not have to be removed from the chassis for configuration.

E²PROM technology also provides future flexibility: because it can be written to, you can input characteristics of drives not already in the memory. The last menu in the Configurator Program offers a fill-in-the-blank arrangement, so you can easily integrate new drive technology as it becomes available, without changes to the controller or the operating system.

High data transfer rate capability — up to 3 MB/sec — supports the latest high speed disk drives from Fujitsu, Century Data, Control Data and others, as well as standard SMD drives.

Integrate a combination of disk drives to suit your exact mass storage needs. Mix Winchester, removable media and fixed/removable drives on the same controller. Mix drives from different manufacturers. Mix up to 4 drives of differing capacities and speeds on one ARZ-1.

Hardware Compatibility

ARZ-1 fully emulates Data General's Argus 6236/37 and 6239/40. This controller incorporates the powerful Intel 80186 microprocessor to control the Data General interface and provide the necessary intelligence. For the disk interface, a high speed, 48-bit wide microprocessor provides the intelligence and speed for high speed disks.

Delayed Pick-Hold provides disk drive power sequencing to eliminate excessive peak current demands on the AC power source. A dual power fail scheme is incorporated for double protection in the event of a power failure.

Improved Processor Performance

When the Argus driver in the operating system requests blocks of data, it doesn't specify cylinder, head, sector address, etc., as non-Argus Data General drivers do. Instead, the onus is on the controller to obtain the control block from memory and execute the disk command without further instruction from the CPU. Leaving these menial tasks to this intelligent controller enables the processor to work on your applications programs faster and more efficiently.

Another feature that speeds system performance is Dynamic BMC Break, which automatically adjusts the BMC break count based on bus traffic. The time between data bursts is not preset, but is adjusted according to needs. This lets the CPU run faster and allows other I/O devices access to the BMC without having to wait. Data bursts from the ARZ-1 are not made to wait, either, so disk performance is not at all degraded.

To make back-up time faster, the ARZ-1 supports Data General's MSCOPY utility, to back up only the records that have been modified on non-system disks since the last back-up. The system does not waste time on redundancy.

Enhanced Data Retrieval Performance Features

In addition to emulating all functions and features of the Argus, ARZ-1 also has many new and significant features to help decrease data retrieval time during 'read' and 'write' operations:

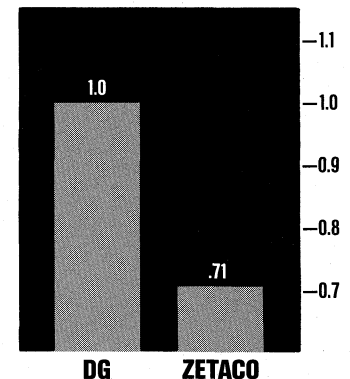
Rotational Latency Minimization allows the controller to start transferring sectors at any point on the track, so latency time, a key factor in performance, is reduced. Depending on the block size, this feature can yield up to a 20% data throughput improvement.

The ARZ-1 requires no physical interleaving on the disk drive. For those few times that interleaving sectors may be necessary due to a CPU slowdown or busy bus conditions, the **Sector Sequence Optimization** feature allows the ARZ-1 to read or write sectors in the most efficient sequence, automatically. This avoids extra disk revolutions and optimizes overall throughput.

To reduce seek time, another key factor in disk performance, the ARZ-1 utilizes **Seek Optimization** to re-order the sequence of the seek commands into the most efficient order. This minimizes the physical travel of the heads, thereby reducing seek time significantly.

Error-free Media

The Formatter Program for the ARZ-1 Controller formats, analyzes, and deletes all bad sectors from the usable media. Sectors are then automatically renumbered, so that the system sees only flawless media in a contiguous form, without the performance-inhibiting extra revolutions. This feature is integral in the ARZ-1 and is done automatically.



Relative time to move a large file from disk to disk, where DG's 6236=1.0: Benchmark tests, using an MV/15000-8, of Zetaco's ARZ-1 Controller with Control Data's 9772 disk drive, versus Data General's 6236/354 MB Argus disk subsystem, show that the Zetaco subsystem performs 29% faster.

ZETACO

Data Late Immunity

Zetaco's exclusive Ping-Pong Buffering feature and switchable DMA throttle control minimize 'data late' problems while maintaining the maximum allowable data transfer rates between the controller and the CPU.

Ping-Pong (toggle) Buffering is a better alternative to traditional FIFO buffers because it allows the concurrent, yet independent, action of two separate full-sector buffers. While data is being transferred from one buffer, to or from the system, the disk is transferring data to or from the other. This results in continuous transfer of verified data with minimal interruptions to the CPU, and prevents the data under/overflows that are a common problem with traditional FIFO buffers.

The throttle control feature establishes the maximum number of consecutive DMA transfers allowable, so that conflict with other DMA devices and the potential for 'data late' conditions are minimized.

To minimize 'data lates,' ARZ-1 offers tolerance not found on other disk controllers: if a condition occurs where data is not read within the normal 32 milliseconds timeframe, the ARZ-1 allows another revolution without reporting a 'data late' error, so that the data may be recovered.

Data Integrity

Automatic Error Logging & Sector Relocation: ARZ-1 logs media errors during run time, and automatically relocates the data to another sector without operator assistance. From the systems management viewpoint, this feature is convenient and time-saving, because no longer does the system have to be taken down to re-run the formatter to relocate bad sectors; it's done automatically by the ARZ-1. Also, because of this extensive and continuous surface analysis, there's no need to run DFMTR for anything but putting the Data General system information out to the disk.

Header Verification: Each sector contains a separate header preamble consisting of sector, head, and cylinder positioning data, along with an associated header CRC. The preamble and CRC are automatically checked before any data transfer is executed. Before each header and data field is a Sync Byte (as opposed to a single Sync Bit) to further ensure correct recognition and identification of these fields.

Automatic Error Retry: A powerful Error Correction Code (ECC) facilitates data error detection and correction of up to an 11-bit error burst. The actual ECC correction can be performed either by the system software or on the controller before transfer to the host. This feature is activated/deactivated via the Configurator Program.

Data Recovery: Other unique features that aid in the recovery of data are Data Strobe Early/Late, and 2 positioner offset commands. These functions work in concert with the ECC, enabling the controller to try every possible combination of position factors to read data. This helps compensate for such conditions as media flaws and imprecise data positioning.

Dual Port Support

Dual port capability, when access to one disk drive is shared by two CPU's, is supported as defined under the AOS/VS operating system.

Mirroring Useful in Critical Applications

ARZ-1 supports mirrored systems wherein two disks are "written to" simultaneously to ensure total redundancy back-up.

Full Factory Back-Up

Model ARZ-1 Disk Controller carries Zetaco's full 2-year warranty on materials & workmanship. Our technical sales and support staff is standing by to assist you in any way before, during, and after purchase.

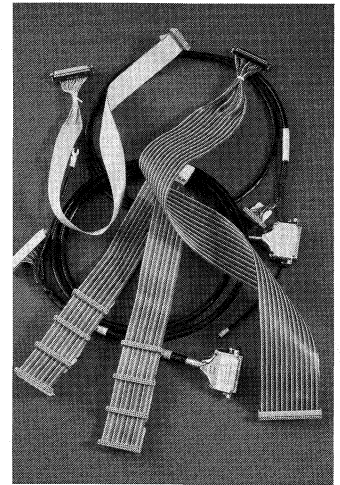
In the rare event of a hardware failure, our 48-hour turnaround policy on repair/replacement means minimal downtime for you.

Each Unit Fully Tested

Zetaco disk controllers are manufactured under state-of-the-art conditions, and checked by our experienced Quality Assurance Team throughout the production cycle. From incoming components to final assembly, each controller is carefully examined to ensure that it meets Zetaco's stringent quality standards.

Once a controller has been confirmed as fully operational, it enters the two phases of final test. First, it's exercised under the most demanding conditions whereby each operational section of the controller is run at its maximum speed and capacity.

Each controller is then installed and tested for an extended period of time on a Data General system.



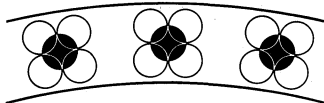
Reliable Cabling

Zetaco offers a full line of cables for reliable controller-to-peripheral connection. Our fully tested cables, manufactured in-house to ensure superior quality, are recommended for use with the ARZ-1 to help system reliability and prevent the line noise and hard-to-trace system malfunctions that poor quality or improper cables can cause. Cables are shielded per the FCC's RFI emissions standards.

A Complete Package

The ARZ-1 Disk Controller is shipped with complete documentation, detailed installation instructions, diagnostic software, a protective board cover, and cables (if ordered). Standard program media is 9 track magnetic tape, 1600 bpi.

Two 4-position BMC bus cables are provided with each ARZ-1, as well as an A & B paddleboard set. 6- and 8-position BMC jumpers are available optionally.



Not only is the data bit location tested for integrity during bad sector mapping, but four areas surrounding it are tested as well for extra assurance against media errors, via Zetaco's Bit Cell Perimeter Analysis.

Specifications

ARZ-1 Disk Controller

Operational

Disk Drive Interface:
SMD, HSMD, SMDE

CPU Interface: Via the BMC in any Data General minicomputer equipped with BMC bus. ARZ-1 requires an "I/O Only" slot in the chassis.

Data General Emulations:
Argus/DPJ (6236/37, 6239/40).

Operating System:
Unmodified AOS, AOS/VS, ERDOS.

Data Transfer Rate:
Up to 3 megabytes per second.

Device Codes: Primary controller 24₈. Secondary controller 64₈. Others selectable via Configurator Program.

Bus Load: 1 unit load.

Interrupt Priority Mask Bit:
7 standard.

Sector Addressing:
Contiguous (1:1).

Sectors Per Track: Supports up to 255 physical sectors.

Data Per Sector: 512 bytes.

Data Storage Buffer: 2 sectors Ping-Pong Buffering.

Error Correction Polynomial: 56 bits.

Memory Address: 21 bits (physical).

Power Requirements

42.5 watts, $\pm 5\%$
(+5Vdc @ 8.5 amps).
2.25 watts, $\pm 5\%$
(-5Vdc @ .45 amps).

Physical

Drives Supported: up to four physical.

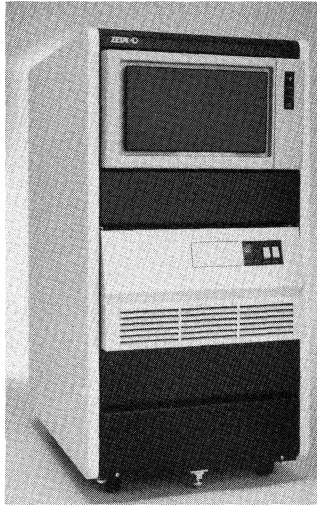
Size: 15" x 15" (38.1 x 38.1 cm)

Cables: "A/B" set required. See Zetaco's cable brochure for recommended cables.

Operating Environment:

0°C to 55°C with 10% to 90% relative humidity (non-condensing).

Shipping Weight: 7 lbs/3 kg. (includes controller, paddleboards, documentation, diagnostic software.)



Complete, Pre-Formatted Subsystems

Now you can get the ARZ-1 Disk controller integrated into a complete data storage subsystem, pre-formatted at the factory to save you the 6 to 7 hours of downtime normally associated with installation.

ARZ-1 Subsystems, called the MAX Series, are available in a variety of formatted capacities, ranging from 317 megabytes to 4.26 gigabytes. These are the highest capacity and highest performance subsystems available today in the Data General world! All fully emulate Data General's Argus, plus offer higher data storage capacities at a lower cost per megabyte.

MAX Series Disk Subsystems include from 1 to 4 formatted disk drives, a configured ARZ-1 Controller, AC power supply, full interconnect cabling, terminator and mounting hardware, ready to be installed into your Data General system.

For full details, call the Zetaco Sales Team, or write for our brochure on Disk Subsystems.

High Performance Backed by Experience and Service

Zetaco's longevity in the Data General-compatibles market assures you of a reputable, reliable source. The firm was founded in 1972 as Custom Systems Inc., designing and building turnkey systems using Data General minicomputers. Evolving into the leading designer and manufacturer of Data General-emulating peripheral controllers, we changed our name to Zetaco in 1984 to better reflect our market position. In 1985, Zetaco became a part of the Carlisle Corporation, a Fortune 500 company.

Our specialty is peripheral interfaces for Data General minicomputers. We concentrate our efforts and resources on Data General's technology, so you are assured of true emulation and compatibility.

Technical Support: Each Zetaco product is shipped complete with detailed installation instructions, and a Customer Support Hotline (800-537-5292) is available to answer your questions.

2-Year Warranty: All Zetaco controllers and couplers are warranted against defects in material and workmanship for up to two years from date of shipment. Refer to Zetaco's Terms & Conditions Policy for complete warranty information.

Variety: Zetaco currently offers a complete line of Data General-compatible peripheral controllers and processor enhancements: SMD/HSMD disk controllers, mag tape couplers, Slot Savers™, general purpose I/O, communications multiplexors, line printer, memory expansion, and others. Normal delivery time on standard product is 30 days, ARO.

Custom Designs: Many OEM's have taken advantage of the engineering resources of Zetaco. Contact us to design interfaces to your specifications.

References: We have a long, prestigious list of satisfied customers and we'll be happy to supply you with references.

The Most Intelligent Disk Controller Yet

The Model ARZ-1 Disk Controller combines the technological advantages of Data General's Argus with Zetaco's added performance features, to produce the highest performing DG-compatible controller yet made.

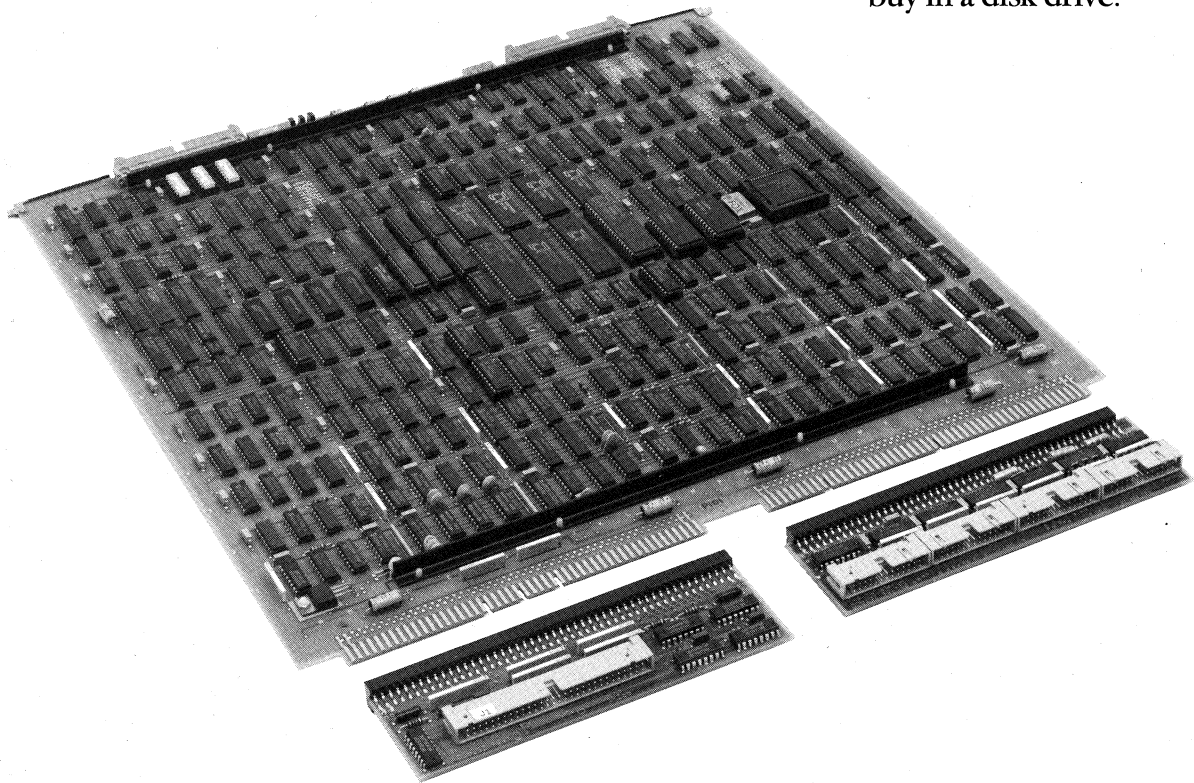
ARZ-1 is an intelligent controller: it off-loads memory management responsibilities normally done by the CPU, and thereby frees the CPU to do other tasks. The result is a more efficient system, able to execute your applications programs faster.

ARZ-1 also improves data retrieval time over previous controllers through several new performance features that Zetaco has added: Seek Optimization, Rotational Latency Minimization, Sector Sequence Optimization, and an independent, powerful microprocessor-based disk interface.

ARZ-1 interfaces Data General minicomputers to non-DG disk drives via the high speed Burst Multiplexor Channel (BMC). It supports data transfer rates up to 3 MB/sec, so virtually any SMD, HSMD or SMDE drive on the market today can be interfaced.

More Formatted Capacity

You can maximize formatted capacity of the disk drive. No longer is there the need to match a Data General capacity (specific head/cylinder/sector count) when mapping a new disk, because the Argus emulation, under standard AOS or AOS/VS, maps the disk differently than previous Data General drivers, by using all available blocks reported by the controller. The result is more usable disk space than ever before! Maximum formatted capacity of the drive – not the Data General equivalent – determines the formatted yield. Now you can obtain all of what you buy in a disk drive.





The Link To Tomorrow.

A Subsidiary of the Carlisle Corporation

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