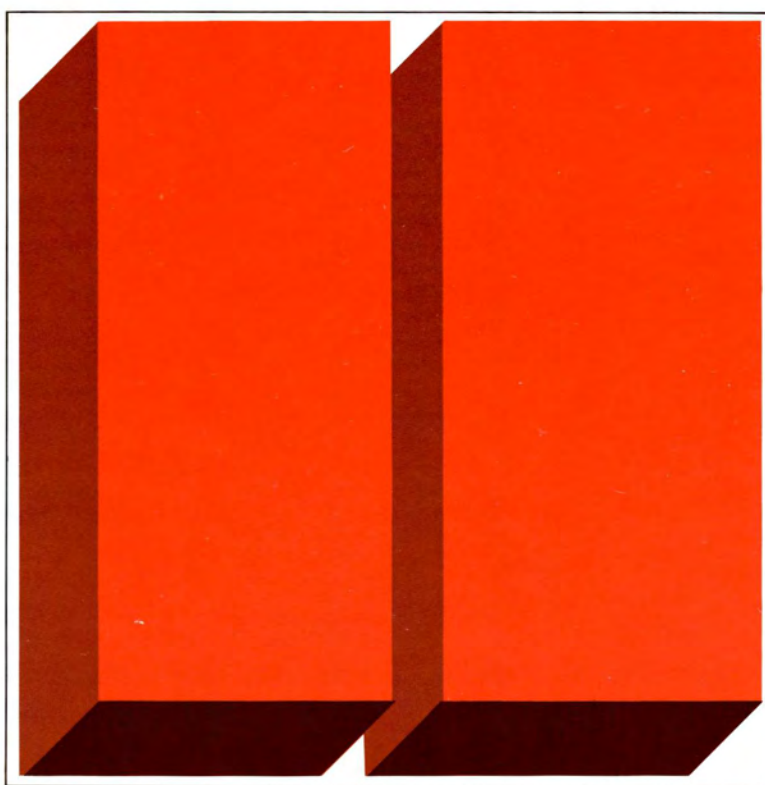


X6818.2013

DataGeneral Corporation



## THE DUAL NOVA SYSTEM



DataGeneral



Data General's Dual Nova is a system with two computers sharing common disc storage, supported by powerful, standard system software.

The Dual Nova is high system availability. A back-up computer, with access to common storage, steps in and takes over critical jobs if the primary computer becomes unavailable.

The Dual Nova is high performance. A pair of computers share files, and handle demanding jobs whose peak loads might slow down or stop a single computer.

The Dual Nova is independent operation. Two separate computers each handle their own work load, and share a common data base.

The Dual Nova is Data General's powerful field-proven hardware and software. Standard operating systems, language processors and utilities run with standard computers, peripherals, and communications equipment.

The Dual Nova is twice the computing power of conventional systems. With traditional Data General features of reliability, hardware and software compatibility, economy, and service. Features you expect from us.

The Dual Nova. When single-computer capability isn't enough.





## YOUR REQUIREMENTS

## DUAL NOVA CAPABILITY

Uninterrupted system operation

A back-up computer switches into active operation if a primary computer becomes unavailable.

A second computer continues to run if the primary computer shuts down.

Redundant shared-disc subsystems keep the system running even if one disc is inoperative.

Extra computing power for demanding jobs

Two computers load-share with programs and data base on common disc storage.

Minimum turnaround time

Two computers, each operating independently, give twice the computing power of single-computer systems.

Standard, supported systems with easy expansion

Dual Nova systems are compatible with Data General's extensive line-up of computers, peripherals, input/output devices and communications equipment. They operate with currently available operating systems, language processors, and utilities.

The systems can be configured using any two Data General computers, which have memory cycle times from 800 to 1200 nanoseconds.

Reduced programming costs

Real-time Disc Operating System supports high-level languages that include Fortran 5, Fortran IV, single- and multi-user Extended BASIC, and Algol as well as MACRO assembler, Batch and utilities.

Data base security

An advanced directory/partitioning system guarantees the integrity of disc files in a multi-user, dual computer environment.

Data base accessibility for minimum response time

Both computers, under control of the Real-time Disc Operating System, have on-line access of program and data files.

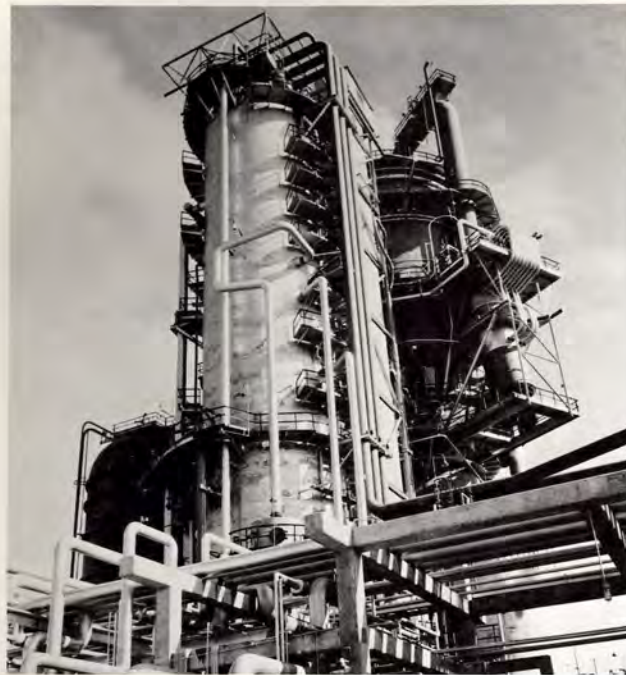
Hardware multiplexed data paths ensure data base/program access by both computers.

Large storage capacity for demanding applications

Two computers share up to 8 million bytes of fixed-head disc storage, and up to 199 million bytes of moving head disc storage.



## DUAL NOVA APPLICATIONS



### Instrumentation & Control: Real-Time Process Control

In process control applications, users want systems that can gather, analyze, and reduce incoming data, and vary control parameters. They also need to develop new programs or carry out Batch computation. High value is placed on system availability.

The Dual Nova system is ideal for real-time process control applications. Its primary computer, controlled by the Real-time Disc Operating System (RDOS), runs the programs that monitor and control real-time processes. The analog and digital input/output subsystems are connected by an I/O bus switch. Data gathered from the process is stored in files shared by a second computer.

The second computer also runs under RDOS, but in a background mode for program development, Batch computation, or reduction of data gathered by the primary computer and stored on the shared disc. This computer has a small foreground program that monitors the primary computer. Should the primary computer become unavailable, the second computer suspends its background work, switches the process I/O interfaces, and seizes control of the real-time process. Because the secondary computer has access to the control program and all monitored data stored in the shared file, it continues the entire process control function with minimum interruption.



GTE Lenkurt (Canada) Ltd.

### Communications: Store & Forward Message Switching

Message switching applications involve numerous communications lines, and data rates that peak at unpredictable times. Users require systems with high throughput for normal message loads, and with reserve capability for peak periods. To ensure continuous service—a prime consideration—users also require highly reliable systems. And systems flexible enough for record keeping and other system management functions.

The Dual Nova is ideal for store and forward message switching systems. Its primary computer handles the majority of message switching functions, and uses its shared files to temporarily hold transmitted data.

The second computer is used in three ways. It shares the message work load with the primary computer, producing a system with almost twice the throughput of single-computer systems. It provides reserve capacity during peak load periods. Or it controls the message switching function if the primary computer needs servicing.

The system's shared disc storage gives the second computer fast access to messages and work queues necessary to continue system operation. Such redundancy helps ensure continuous customer service. It also provides a second computer, with access to the system programs/data, that can do things like accumulate network statistics, compile management reports, and generate customer service charges.



### Computation: Timesharing

In timesharing, users need programs shared among several terminals. At the same time, they need files protected from modification by other users. System availability and capacity are prime considerations.

The Dual Nova system presents an attractive alternative to traditional single-computer/ multi-terminal systems. Each Dual Nova computer operates as a virtually independent timesharing system that provides Extended BASIC features to each of its own terminals.

The shared disc storage lets any terminal access public library programs and data on the file. At the same time, sophisticated file protection mechanisms prevent unauthorized users from modifying private programs and data.

If one computer needs maintenance, the system can continue in a "fail-soft" mode with the second computer running its terminal load uninterrupted.



### Data Processing: On-Line Customer Service Scheduling

In interactive customer service applications, users need on-line, multiple-terminal access to the entire customer data base, to schedule customer service.

The Dual Nova is an excellent system for this application. One of its computers controls the on-line terminals which support customer service requests. It also gathers and stores service-related information on a disc common to both computers.

This facility lets the second computer operate independently of the first. It analyzes service-related operations, bills customers, or performs engineering calculations in a Batch mode, under normal conditions. When required, the second computer directly supports the customer service application, either to assist during peak load periods, or as back-up.

Dual Nova offers a unique capability for on-line systems requiring continuous system operation.

### And Lots More

The Dual Nova system features high system availability, redundancy, and shared program/data bases. These features make the Dual Nova suitable for many applications: supervisory control, front-end processing, data acquisition, point-of-sale, patient monitoring, data entry, and many others.

In fact, Data General's Dual Nova system is the solution for any application where critical processes or services are involved. Where increased throughput is essential. Where system availability or load-sharing capabilities are required.



## THE DUAL NOVA SYSTEM

The Dual Nova system consists of two Data General computers, common disc storage, and an Interprocessor Bus, all supported by and running under the Real-time Disc Operating System (RDOS).

### The Computers

Data General computers are modular, economical units, field-proven in thousands of installations. Any two with sufficient options, input/output capacity, and memory can be used in a Dual Nova system.

The computers all have a 16-bit multi-accumulator architecture and use a 16-bit general-purpose, multi-function instruction set. Their input/output system has a 16-bit word length, programmed data transfer, automatic interrupt source identification, 62-device addressing capability, 16-level programmed priority interrupt, and Direct Memory Access data channel. The computers use the same software, basic mechanical package, and interfaces to peripherals. They differ primarily in size, expansion capability and speed, offering a wide selection of performance and storage capacity.

Nova 840 is Data General's most powerful computer. It operates with a Memory Management and Protection Unit, and can be expanded to 128K words of memory. Nova 2 is well-suited to the needs of volume buyers, with 800- and 1000-nanosecond memories, and a 32K word memory capacity. Nova 1200 series computers are Data General's most popular computer, with a 1200-nanosecond memory cycle time, and a 32K word memory capacity. Nova 800 series computers have an 800-nanosecond cycle time that makes them well-suited for high-performance applications.

### The Disc Storage

The Dual Nova system uses three types of disc storage. Data General's *fixed head Novadiscs* permit fast disc access. Novadiscs have an 8.4 millisecond average access time, and a 256K to 1536K byte capacity. Up to 8 million bytes of Novadisc storage can be shared between two Dual Nova computers.

Moving head *disc cartridge drives* provide convenient mass storage. There are two models, one with a removable cartridge and 2.494 million byte capacity. The other has one fixed and one removable cartridge, and a 4.988 million byte capacity. Up to 20 million bytes can be shared between Dual Nova computers.

Moving head *disc pack drives* give the highest storage capacity of any Data General rotating storage medium, with a 24.944 million byte maximum capability. Nearly 200 million bytes can be shared between Dual Nova computers.

The modularity of disc subsystems lets Dual Nova systems use either fixed or moving head disc storage, or fixed and moving head disc storage. Maximum Dual Nova system storage is eight moving head disc packs (approximately 200 million bytes) and 8 million bytes of fixed head storage.

### The Interprocessor Bus

The Interprocessor Bus coordinates the two Dual Nova computers, and allows communications between them. The Bus has three elements: a buffer, a data path, and a pair of interval timers.

The buffer is an interlocked communication path used by RDOS to resolve competing access to system and user files. The data path is available to users for inter-computer communication.

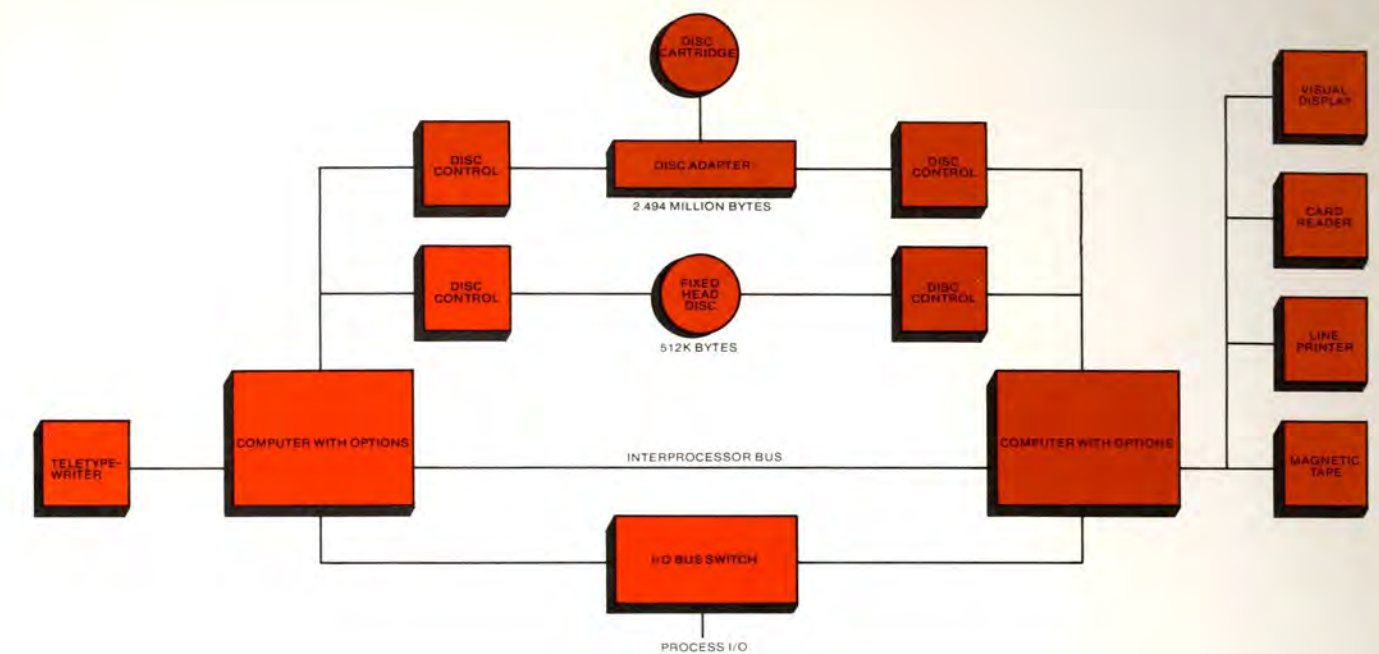
The third part of the Bus consists of dual one-second interval timers, one in each computer. The timers are usually used as "watchdogs" to report malfunction of either computer. If one computer fails to restart its timer every second, an interrupt will be generated in the other computer signaling it to assume system responsibility.

### The System Software

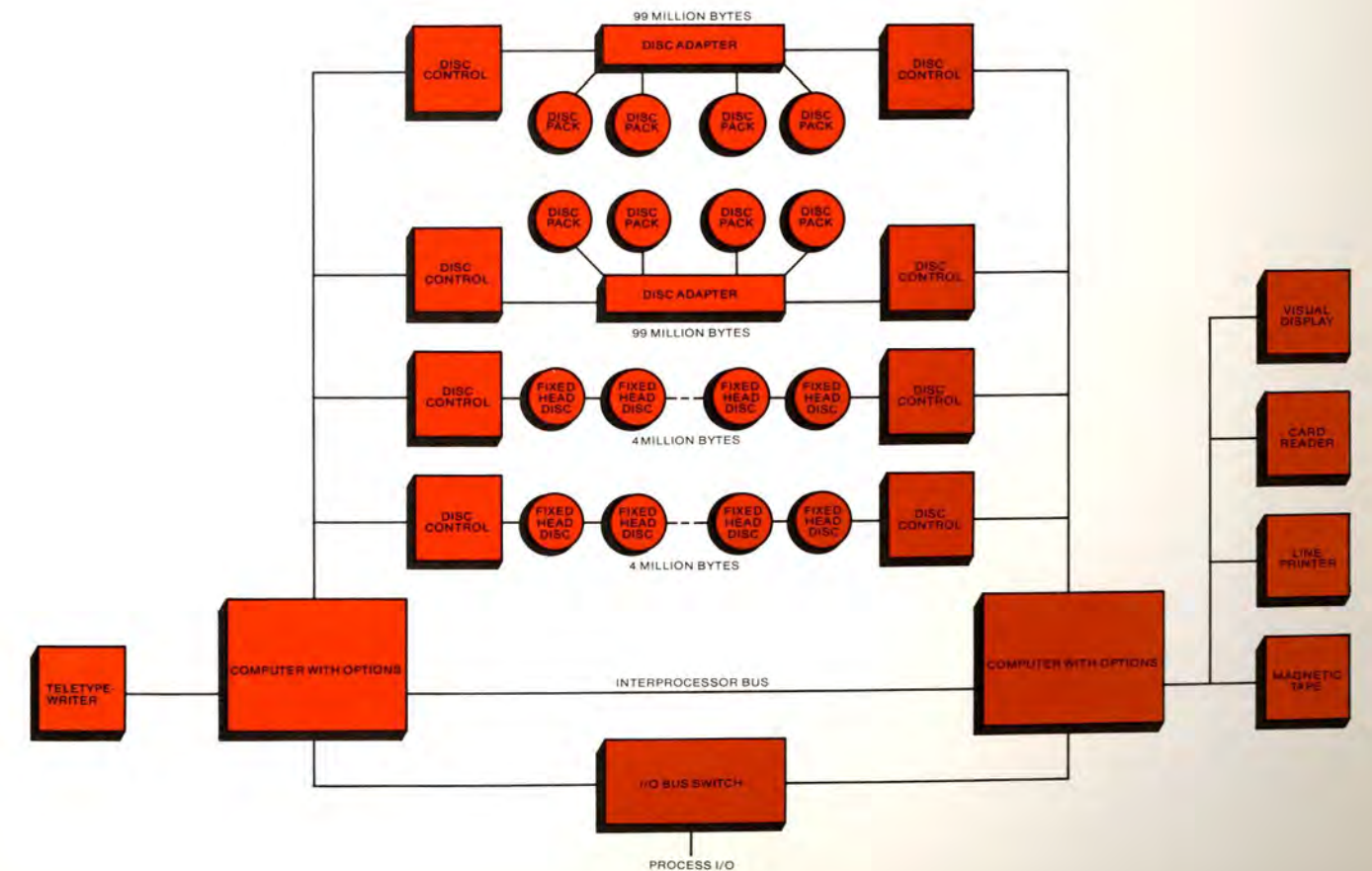
The Dual Nova hardware is under control of the Real-time Disc Operating System (RDOS). To the user, RDOS is a simple interface to the Dual Nova's sophisticated hardware. RDOS manages peripherals and provides a common input/output interface to all of them. It provides a suitable environment for program development, computation, multitasking, real-time control, and foreground/background operation. It buffers input, spools output, and allocates system resources. And RDOS does all this through a powerful, easy to use command language. Control is interactive from the console terminal, from any input device in a Batch mode, or from a program.

RDOS includes a flexible file management system with security features that ensure system and file integrity. It also supports high-level language processors that simplify programming and maximize the system utility. Both Fortran 5 and Fortran IV have real-time features such as multitasking, real-time input/output, re-entrant code generation, program segmentation, and overlays. The Fortran 5 compiler also produces very efficient run-time code.

Extended BASIC gives one or several users convenient, interactive access to system resources, including peripherals, mass storage, and I/O devices. BASIC is widely used in computation and data processing applications. RDOS also supports Batch, Algol, Remote Synchronous Terminal Control Program, and a wide variety of utilities.



TYPICAL DUAL NOVA SYSTEM



MAXIMUM DUAL NOVA DISC STORAGE



## ANOTHER INNOVATIVE TOOL FOR TOUGH PROBLEMS



Navy News Bureau Photo

The Dual Nova system is one unique, innovative tool Data General has developed to help customers solve tough computing problems. Another important tool is Data General's Multiprocessor Communications Adapter. The MCA interconnects up to 15 Nova-line computers in a network, giving any one computer access to any other in the system. The MCA is connected to the I/O bus of each computer. It transfers data between computers, block-by-block, through the high-speed data channel. Up to 1,000,000 bytes per second are handled, making the MCA suitable for the most demanding applications.

The MCA is used at the Pensacola, Florida Naval Air Station where eight communicating Nova 800 computers run a 40-station simulation system. The system, developed by General Electric Space Division, is used to train U.S. Navy flight officers in airborne navigation and communications techniques.

Four computers drive the training stations. They simulate performance, fuel consumption and communications/navigation operations for several different types of aircraft. The system allows all 40 stations to simulate the same mission, or divides two missions among them.

Two other computers control visual instructor/operator displays. Another two function as the system executives. All eight computers operate simultaneously.

## THE DATA GENERAL LINE-UP

Data General supplies an entire line-up of compatible computers and computer-related products that let users configure systems as basic or as sophisticated as their applications demand.

### Computers

- Nova 840
- Nova 800 series
- Nova 1200 series
- Nova 2 series

### Peripherals

- Fixed head Novadisks
- Moving head disc cartridge drives
- Moving head disc pack drives
- Magnetic tape transports
- Nova Cassettes
- Line printers
- Serial matrix printers
- Paper tape reader/punch
- Plotters
- Visual displays
- Teletypewriters

### Input/Output

- High-level analog input systems
- Wide-range analog input systems
- Digital-to-analog converters
- Digital input/output interfaces
- IBM 360/370 interfaces
- Multiprocessor Communications Adapter
- Communications devices

### Software

- Real-time Disc Operating System (RDOS)
- Real-Time Operating System (RTOS)
- Stand-alone Operating System (SOS)
- Fortran 5
- Fortran IV
- Algol
- Single-user and multi-user Extended BASIC
- Batch
- MACRO Assembler

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- ☐ Please add my name to your mailing list.
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- ☐ Interprocessor Bus, ☐ other \_\_\_\_\_
- My application is:
- ☐ instrumentation and control, ☐ computation,
- ☐ communications, ☐ data processing.

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