CHARLES RIVER DATA SYSTEMS

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Product Brief
Universe 68
Computer Systems
Models 37 and 47

1983

FEATURES

- 32-bit architecture
- 16-megabyte address space
- Memory protection/allocation hardware
- 20-Megabyte-bandwidth bus
- Reliable VLSI technology
- Built-in diagnostic and error detection
- Standard 32-bit VERSAbus
- 16 to 200 megabytes on-line disk storage
- Supported by the multi-processing UNOS Operating System

DESCRIPTON

The Universe 68 family of computer systems provides the power and functionality of a 32-bit architecture with up to 16 megabytes of direct addressing capability. Direct addressing of the full address space permits the use of large programs and data structures without the need for segmentation and/or overlaying. The memory capacity is ideally suited for multi-processing/timesharing environments.

High performance is provided by the 12.5 megaHertz processor with a 4 Kb cache, and separate 68000 processor.

The 32-bit (data and address) VERSAbus allows direct channel access to all memory for high performance DMA peripherals.

Maximum reliability is provided by built-in diagnostics and error detection capabilities. Parity or ECC memories are available for error detection and recovery. Diagnostic checks are performed on power-up to insure proper operation.

RESOURCE MANAGEMENT

The Universe 68 memory management unit provides logical segmentation of process address spaces for high-performance, multi-processing operation. Protection between processes is provided to maintain system integrity. The central processor provides bus arbitration, allowing concurrent processing and data transfer.

A second 68000 processor on the CPU board is used to manage character oriented devices. This provides control for the onboard serial ports, as well as the expansion I/O bus. Multiplexor cards for the I/O bus contain 4 ports for Asynch/HDLC or SDLC operation, as well as a 16-bit parallel port. A communication processor transfers directly to/from main memory,

eliminating character driver service overhead from the main processor.

The optional selector channel interface provides an additional level of concurrent processing. The Shugart Associates Standard Interface (SASI) bus is used on the selector channel for expansion to a wide range of burst-mode devices.

The 5-megaHertz bus cycle allows 16-bit transfers at 10 megabytes/second and 32-bit transfers at 20 megabytes/second. This insures maximum performance in demanding timesharing and data base management environments, in which disk performance is crucial.

ADVANCED VLSI TECHNOLOGY

The Universe 68 systems are built around the Motorola 68000 microprocessor. The 68000 is suitable for both 16-bit and 32-bit architectures. It is the industry's best accepted wide-word microprocessor, in terms of both availability of second sources, and the frequency with which it is integrated into new microcomputer-based products.

By making it possible to provide all the functions of the central processor on a single chip, VLSI (very large scale integration), reduces part counts, increases reliability, and reduces the potential for system failures. Increased single-board functionality reduces the number of boards and interconnections at the system level, again improving reliability. This is enhanced further by the use of larger (9 inch by 14 inch) printed circuit boards. The larger VERSAbus-standard boards

make possible a reduction in the number of boards and interconnections. Finally, the 1 mbyte ECC memories provide error correction as well as detection, permitting both continued operation and the detection of errors for future maintenance attention.

The universe 68 computer can be programmed efficiently at a high language level. UNOS, a UNIX-compatible operating system developed by Charles River Data Systems is written in C, making possible lower development and maintenance costs, as well as increased system portability. The instruction set is well-suited for C implementation, providing 14 modes of addressing and sixteen general-purpose, 32 bit registers. Efficient subroutine linkage instructions and direct arithmetic manipulation of data on the stack minimize the overhead of structured modular programming.

EXPANSION AND GROWTH

A wide range of interfaces are available for system expansion. Eight-inch Winchester disk drives (8-mega-byte capacity, with integral one-megabyte floppy disk) and storage module (SMD) 80-megabyte disks are available. 256 or 512 kbyte parity memory boards and 1 mbyte ECC memory boards are available for expansion of main memory to as much as 5 megabytes. A 4-line multi-plexor board makes it possible to expand the number

of serial ports to 64. Multiplexor boards do not use slots in the main chassis.

Expansion to bus structures other than the VERSAbus can be accomodated. A micromodule adapter provides access to a range of analog and digital I/O modules. Interfaces to IEEE 488 and an adapter for multibus are also available.

SOFTWARE

The UNIX-compatible UNOS operating system sup-ports a multi-processing/multi-user environment on Universe 68 systems. UNOS process management facilities take full advantage of the hardware protection and efficient context switching capabilities of the Universe 68 system. Timesharing, background, transaction processing and real-time operations are all supported by the UNOS oper-ation system. To support real-time, transaction-oriented applications, extensions such as eventcount

synchronization, priority scheduling, and localized disk file allocation are provided. A wide range of software management, text management, and file management tools provide simplified development and production operations. Support for PASCAL, FORTRAN, C, BASIC, COBOL and ASSEMBLER is available. The UNOS Nucleus DBMS provides high-performance data base management capability.

MODELS 37 AND 47

The Universe 68 system family includes models using the seven slot package. When ordered with UNOS software and the appropriate number of terminals, each forms a complete computer system.

Each of these models contains the CP-32 processor board, a memory board (256KB-1MB) and the disk control-ler. This leaves 4 slots free for expansion of memory or I/O. The units differ in the configuration of hard disk and back-up media. The model 37 provides 32 Mb of fixed disk with the same floppy disk, and the model 47 combines 32 Mb fixed disk with a 10MB removable Win-chester, which provides both back-up and a second

spindle for independent maintainable file structures. The removable Winchester is ideal for applications using sensitive data or data required only once in awhile, such as monthly reports or updates.

Users can build a wide variety of alternate config-urations by building on the basic components of the Universe 68 product line. Board sets are available for combination with the 5, 7 and 15-slot chassis or for inte-gration into the user's own package. For users with their own manufacturing capabilities, licenses to manufacture Universe 68 boards to Charles River Data Systems' designs and specifications are available.

UNIVERSE 68 SYSTEM SPECIFICATIONS

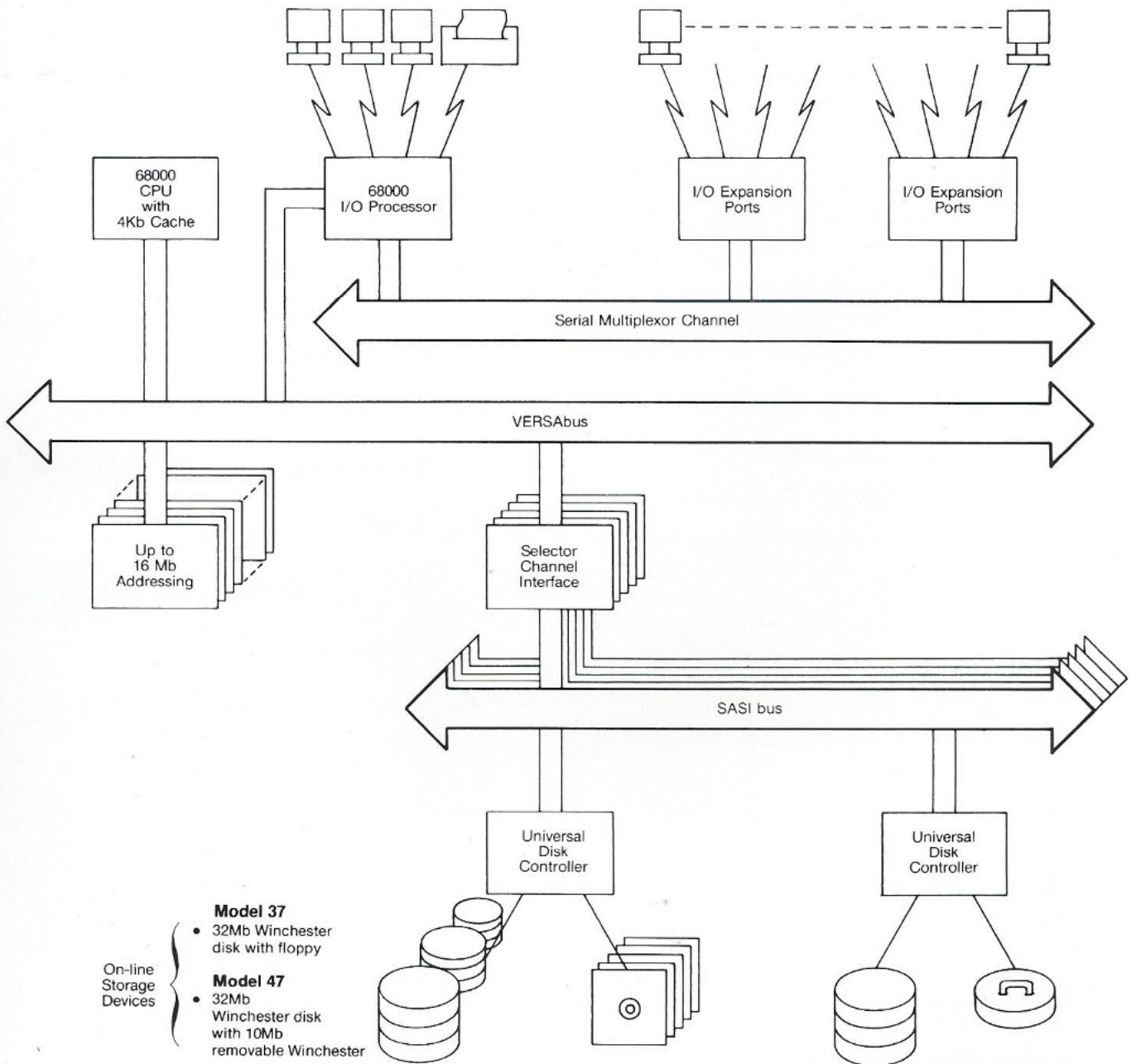### Common Features

Memory range: 256 kb to 5 mb
Chassis slots: 7 (4 free for expansion)
Serial ports: 4 (to 64 maximum)
           above 12 requires an I/O expansion box
Parallel ports: Zero expansion to 8 ports
Dimensions: 23"w x 14"h x 25"d
A/C power: 120v/60Hz or 220V/50Hz
Mounting: Table top (19" rack mount optional)
Registers: sixteen 32-bit, general purpose registers
Addressing: direct addressing of up to 16MB data
             and/or instructions
VERSAbus: 5 MHz bandwidth with 8-, 16-, or 32-bit
             data paths
Memory protection: 8 segments with protection;
             address protection for user mode,
             8 for system mode
Temperature range: 0 degree C to 35 degree C
Relative humidity: 20% to 80% operating
             (non-condensing)
Altitude range: 7,000 feet maximum
Processor speed: 12.5 MHz clock speed, 320 NS register
             to register ADD

Model Specific Features

	Model 37	Model 47
Fixed disk (formatted capacity)	32 MB	32 MB
Back-up media	1.25 MB Floppy	10 MB Removable Winchester

Options

Serial ports: 4-line board, RS-232/RS-422
           (110-9600 Baud)
Selector channel: For SASI bus (Shugart Associates
           Standard Interface)
Disk drives: 16 and 32 mb Winchester, 10MB removable
           Winchester, 80 mb SMD (67 mb fixed/13mb
           removable)
Bus converters: MicroModule adapter board/Multibus
           adapter board/IEEE 488 interface

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                    68000
                    CPU
                    with
                    4Kb Cache         68000              I/O Expansion      I/O Expansion
                                      I/O Processor      Ports              Ports
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Serial Multiplexor Channel

VERSAbus

Up to 16 Mb Addressing

Selector Channel Interface

SASI bus

Universal Disk Controller

Universal Disk Controller

On-line Storage Devices

Model 37
• 32Mb Winchester disk with floppy

Model 47
• 32Mb Winchester disk with 10Mb removable Winchester

The Universe 68 is organized around three bus structures. The primary system bus is the 32-bit VERSAbus, which provides a bandwidth of up to 20M bytes/second. The VERSAbus interfaces the main 68000 processor, main memory, and channel control processors. One or more selector channel interface subsystems can be used to interface burst mode or block transfer devices. Devices on the selector channel are interfaced using the Shugart Associates Systems Interface (SASI) bus. A second 68000 processor is used to control character-oriented I/O devices. This processor and four serial ports are contained on the central processor PC board. I/O control for serial devices is multiplexed across the serial multiplexor channel.

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