Sequent Balance 8000 and Balance 21000
Parallel Bus Architecture

Architecture: Two products, Balance 8000 and Balance 21000, employing same system components and differentiated only by capacity.

Family has 2-30 NS 32032 processors running at 10 MHz, each with floating-point unit, memory management unit, and 8-Kbyte cache sharing a global memory via a 64-bit wide pipelined packet bus supporting multiple, overlapped memory and I/O transactions with a sustained data transfer rate of up to 53.3 Mbyte/sec enhanced to support future generations of system modules.

Memory: The machine has up to 28 Mbytes of physical memory, a 4-Mbyte I/O address space, and a 16-Mbyte virtual memory address space for each user process. Memory can be two-way interleaved, and there can be up to 4 memory controllers which each manage 2 to 8 Mbytes using 256 Kbit RAM components. Processor and memory boards can go in any slot on the SB8000 bus.

Configuration: A Sequent-designed IC chip (SLIC, System Link, and Interrupt Controller) resides on each board to manage interprocessor communication, synchronization, interrupts, diagnostics, and configuration control. There is an extensive diagnostic subsystem.
Industry-standard I/O, interfaces:
MULTIBUS - has terminal multiplexor and other controllers. Ethernet - at 10 Mbits/sec. Connection to PC as virtual disk through Ethernet.

SCSI - at 2.5 Mbyte/sec. Offers 5-1/4 in. disk drives (72 and 150 Mbytes formatted) and streamer tape drives with adaptor boards for the SCSI bus.

DCC - a very-high-performance SMD and SMD-E disk controller supporting up to 8 disks allowing two simultaneous data transfers at up to 3 Mbyte/sec and overlapped seeks on all drives. Performance enhanced by rotational position sensing and slip sector bad block handling.

Peripherals include 1/2" 1600 and 6250 bpi tape drives and 396, 264, and 540 Mbyte disk drives.

The Balance 8000 packaged system includes a 9-slot SB8000 bus backplane and an 8-slot MULTIBUS backplane and can take up to six dual-processor boards (12 processors).

Other features:
- Table height packaging.
- Dimensions 30.5"h x 23.25"w x 28.625"d
- SB800 chassis 15.5" x 10.5" x 13.5"
- MULTIBUS chassis 14.2" x 6.68" x 8.5"
- 11 amps max at 60Hz 115VAC.

Maximum configuration dissipates 1500 Watts

The Balance 21000 packaged system with a 26 slot backplane and a 12 slot MULTIBUS supports a full configuration of 30 processors (15 dual processor boards). Dimensions are 67"h x 27.5"w x 38"d

Software: The operating system, called DYNIX, is a version of UNIX supporting a dual universe for System V.2 and BSD 4.2 UNIX applications, enhanced for application-transparent multiprocessing and user-controlled parallel processing. Among the enhancements are a completely reentrant kernel, tuneable virtual memory, user-level shared memory, and synchronization services. All processors run a shared copy of the operating system. The configuration is symmetric, and load balancing is automatic and dynamic.

Supports X.25 and ARPANET TCP/IP protocols plus all the networking facilities of UNIX 4.2. Support is also available for customer-provided application accelerators.

Languages: Ada, C, Fortran 77, ANSI-standard PAscal, Assembly language, Lisp, Prolog, Modula-2, Cobol, Mumps, Basic. Parallel programming library callable from any language. Extensions to Fortran, C, and Pascal to allow shared common blocks. Preprocessor for Fortran to parallelize DO-loops.

Performance: Entry-level Balance 8000 similar in power to Microvax II. Fully populated B21000 seen as three times a VAX 8650 (21 mips) in power. Designed as a high throughput system, with support for parallel processing at user level.

Status: Incorporated in January 1983 (original name of company was Sequel). European subsidiary established in UK in March 1986. Sequent Europe now (January 1988) has subsidiaries in the Netherlands (Amsterdam), West Germany (Munich), and United Kingdom (London). Shipments began 12/84.

Entry price for Balance 8000 system (2 processors) of $60,000; ranging to $500,000 for a large Balance 21000.

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