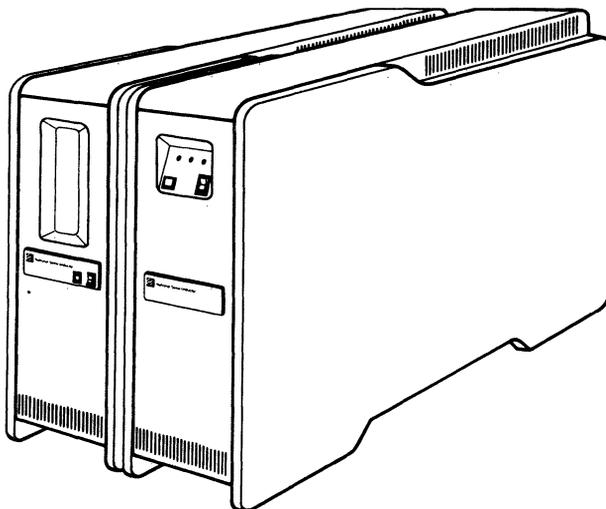


SYS16™ Multi-User Development System for the NS16000™ Microprocessor Family



TL/F/5266-1

- **GENIX™ enhanced Berkeley 4.1 bsd UNIX operating system**
- **Time-shared support for up to eight users**
- **NS16032 Microprocessor Family based**
- **Demand-Paged Virtual Memory (DPVM) support**
- **Easy to use, proven programming environment**
- **1.25 MB RAM, expandable to 3.25 MB**
- **20 MB Hard Disk, expandable to 140 MB**
- **Streamer Tape backup, with 20 MB cartridges**
- **C and Pascal High Level Language Compilers**
- **NS16000 assembler**
- **Supports emulation of NS16000 Microprocessor Family**

Product Overview

The SYS16 is a multi-user development system which provides powerful software and hardware tools for the development of applications using National Semiconductor's NS16000 Microprocessor Family components.

Based on the NS16032 16-bit Microprocessor, SYS16 gives the designer access to an assembler, high level language compilers and real-time In-System Emulation (ISET™) tools. Total development support is provided for up to eight users, on a time-shared basis.

The SYS16 includes two main modules: the Processor module, which houses most of the electronics and the Disk-Tape module, which houses the hard disk and streamer tape back-up.

Optional disk drive modules may be added to increase system capacity. Disk drive modules contain two drives of 20 MB each.

One terminal is provided with the system. Additional terminals may be added to the system as the demand warrants. Emulation and software development work may be performed concurrently. Shared resources of the hard disk and user-supplied printer lowers the system's cost per user.

National's GENIX Operating System is an enhanced version of Berkeley 4.1 bsd UNIX. These enhancements have been added to fully utilize the advanced architecture of the NS16032 Microprocessor Family.

Hardware Description

Processor Module

This six-slot module houses most of the electronics for the SYS16. Standard configuration includes boards installed in four of the slots, with the remaining two available for additional Random Access Memory boards. The bus is an extended-CPU National proprietary bus designed for fast interface between the boards. The four boards provided in the standard configuration are the CPU, Serial I/O, Memory, and Disk-Tape Controller.

The CPU board is based on the NS16032 microprocessor family and includes the CPU plus the NS16082 Memory Management Unit, the NS16201 Timing Control Unit, the NS16081 Floating-Point Unit and the NS16202 Interrupt Control Unit. The CPU board also contains diagnostic firmware, one parallel I/O port, one GPIB IEEE-488 port, one RS232 port, and 256 kB of RAM.

The Serial I/O board contains logic supporting eight RS232 ports.

The memory board contains 1 MB of RAM with error checking and correction. Access time is 400 ns. Additional memory boards may be added to the system, up to a total of 3.25 MB.

The Disk-Tape Controller board contains the necessary electronics to control the disk drives and the streamer tape.

Disc-Tape Module

This module houses an 8-inch Winchester hard disk with a capacity of 20 MB (17.8 MB formatted). It also contains a 1/4" streamer tape for backup and ready access for Operating System and other software updates. The tape cartridge has a 20 MB capacity.

Disc only Module

Additional hard disk memory may be added to the system. Disk-only modules are available which house 40 MB each. A total of 3 modules may be added for a total of 140 MB.

Hardware Support:

Parallel Printer Interface: Centronics interface is provided to support both 700 and 300 series printers.

Prom Programming: support is provided for Data I/O System 19.

Software Description

The SYS16 includes the GENIX operating system, an enhanced version of Berkeley 4.1 BSD UNIX. These enhancements allow GENIX to fully support the features of the NS16000 family, providing an advanced, proven programming environment.

The GENIX operating system is a time-shared, demand-paged system with protected address spaces, supporting from one to eight users. It is completely compatible with the NSXC16 cross software package.

Included are a C compiler, based on Berkeley's portable C compiler, NS1600 assembler, linker, libraries, utilities, loader, editor, and debugger. Virtually all of the utilities that make UNIX a powerful operating system are provided.

A Pascal compiler is available as an option.

Physical Specifications

The standard SYS16 consists of the Processor Module, Disk-Tape Module, one terminal, the required interconnect cables, and supporting manuals.

Processor Module: this is a rectangular floor mounted unit with front mounted controls and indicators, and rear mounted I/O connections.

Height: 24 inches

Width: 7.5 inches

Depth: 27 inches

Color: beige side panels with grey inner frame, and black front and rear

Weight: 38 pounds

Disk-Tape Module: this unit is physically similar to the processor module, with the exception of the weight, which is 48 pounds.

Terminal: DEC VT100 compatible.

Environmental:

Altitude: 25,000 ft. non-operating
15,000 ft. operating

Temperature: -20°C to 65°C non-operating
10°C to 40°C operating

Humidity: 5% to 80% max wet bulb
32°C minimum dew point 2°C

Electrical:

Processor Module:

FCC: Class A

AC Voltage: 90-130 or 180-260 V_{AC};
47-63 Hz

Fusing: 6A-Domestic
3A-European

Disk-Tape Module: same as processor module

Odering Information

Systems:

- NS-SYS-1001: Full system: Processor Module, Disk-Tape Module, one Terminal, GENIX operating system, cables, and manuals.
- NS-SYS-1001E: same as above configured for European power.

Accessories:

- NS-SYS-2001: Disk Drive Expansion Module with 40 MB
- NS-SYS-2001E: same as above configured for European power
- NS-SYS-2002: 1 MB RAM Expansion Board
- NS-SYS-2003: Terminal
- NS-SYS-2003E: Terminal with European power configuration

- NS-SYS-2004: ISE for 16032
- NS-SYS-2004E: ISE for 16032 with European power configuration
- NS-SYS-2005: 20 MB Streamer Tape Cartridge
- NS-SYS-2006: Hardware manual
- NS-SYS-2007: Software manual
- NS-SYS-2008: ISE for 16008
- NS-SYS-2008E: ISE for 16008 with European power configuration

Software:

- NS-SYS-3001: Pascal software