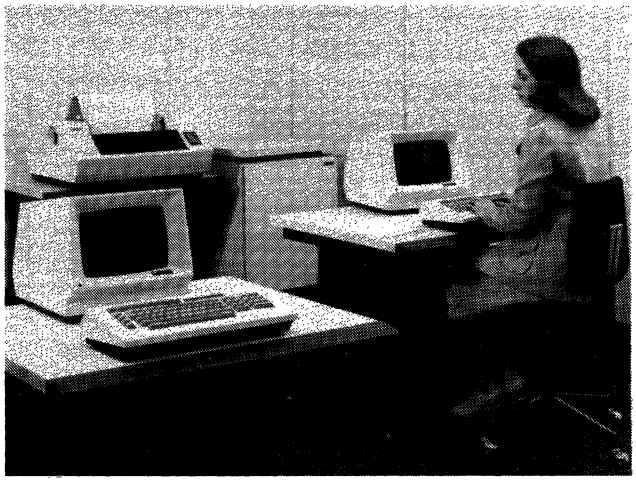
Sanders Series 800 and 8000 Systems



The Sanders 8170 uses its programmable processor to execute an emulator program to imitate an IBM 3270 local (8171) or remote (8172) CRT display system including up to 32 displays plus up to 32 printers. The same equipment with expanded memory and additional software enhanced capabilities, including data validation capabilities, is called the 8181 (local) or 8182 (remote). The 8180 system can also add diskette or cartridge disk storage for local data retention. With appropriately reduced optional features and emulation programs, the same equipment is also configurable to imitate a UNIVAC Uniscope 100/200 (8210), Burroughs TD 800 series (8220), or Honeywell VIP 775/7700 (8770).

The Series 8000 systems are a family of programmable clustered, interactive, communications terminals designed to emulate the IBM 3270, Univac Uniscope Series, Burroughs TD Series, and Honeywell VIP Series terminals.

Up to 32 clustered displays and printers can be supported per system. Display sizes range from 480 to 1920 characters. Printer speeds are offered from 30 cps to 200 lpm. Transmission rates range up to 9600 bps using asynchronous, bisynchronous, and SDLC compatible line disciplines.

A typical 8172 system (remote IBM 3270 emulation) with 16 displays of 1920 characters rents for $2,120 per month including maintenance on a three-year arrangement.

The older Series 800 systems are remote batch/data entry terminals in configurations of up to 8 displays and supported by a card reader, printers, and auxiliary disk or cassette memory.

MANAGEMENT SUMMARY

Sanders offers a wide variety of versatile, intelligent communications terminals ranging from remote batch/data entry, single or multi-station arrangements to fully interactive, clustered systems capable of emulating (in some cases with enhancements), many of the more popular terminal systems being marketed by the major mainframe companies. Sanders' current marketing efforts have been largely concentrated on the newer 8000 Series of interactive, clustered, display terminal systems. While still being actively manufactured and marketed, the older 800 Series from Sanders, which are essentially single or multistationed remote batch/data entry systems are accounting for only a small portion of the company's new business.

The newer series, which consists of the 8170, 8180, 8210, 8220 and 8770, are on-line, interactive systems that emulate the IBM 3270, Univac Uniscope 100/200, Burroughs TD 800 Series and Honeywell VIP 775 and 7700 Series. Systems can be clustered to include up to 32 display units and/or printers. In some cases, such as the 8180, the systems offer enhanced capabilities, compared to the IBM 3270, through the use of extended memory.

The older 800 Series includes the 804, 810 and 8100 systems. These are remote batch/data entry systems that can be configured with up to 8 displays. They provide IBM 2260/2265 and 2770/2780 emulation and are ➢

CHARACTERISTICS

VENDOR: Sanders Data Systems, Inc. (a subsidiary of Sanders Associates, Inc.), Daniel Webster Highway South, Nashua, New Hampshire 03060. Telephone (603) 885-6685.

DATA OF ANNOUNCEMENT: See System Characteristics table.

DATE OF FIRST DELIVERY: See System Characteristics table.

NUMBER DELIVERED TO DATE: See System Characteristics table.

SERVICED BY: Sanders Data Systems, Inc.

CONFIGURATION

The Series 800 and 8000 systems are a family of programmable communications terminals built around a common processor and peripheral group. Various processor models and memory sizes are used in the different systems to accommodate particular configurations and functions. A description and configuration outline for each model are contained in the following paragraphs. A summary of major characteristics are presented in the accompanying tables. See the end of the report for a graphic configuration outline.

804 SYSTEM: A single-station terminal with full software and peripheral expansion, except disk storage. The basic terminal includes a 4K-byte processor and a CRT display ➢

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Sanders Series 800 and 8000 Systems

SERIES 8000 SYSTEM CHARACTERISTICS

MODEL	8170	8180	8210	8220	8770
CRT Displays, maximum number/cluster	32	32	32	32	32
Display size—					
480 char. (12 lines; 40 char/line)	●	●	–	–	–
924 char. (22 lines; 42 char/line)	–	–	–	–	●
960 char. (12 lines; 80 char/line)	●	●	●	●	●
1024 char. (16 lines; 64 char/line)	–	–	●	–	–
1920 char. (24 lines; 80 char/line)	●	●	●	●	●
Storage options—					
Dual diskette (250K bytes)	–	Opt.	–	–	–
Disk (5M byte)	–	Opt.	–	–	–
Compatibility (emulation)	IBM 3270 local & remote	IBM 3270 enhanced local & remote	Univac Uniscope 100/200	Burroughs TD 800 Series	Honeywell VIP 775, 7700
Options—					
Printers; 30 cps, 88 cps, 165 cps, 200 lpm	●	●	●	●	●
Photopen (light pen)	●	●	–	–	–
ID card reader	●	●	–	–	–
Keyboards:					
Typewriter	●	●	●	●	●
Data entry	●	●	–	●	–
Operator console	●	●	–	–	–
Communications—					
Asynchronous	–	–	●	●	–
Bisynchronous (EBCDIC & ASCII)	●	●	–	–	–
Synchronous	–	–	●	●	●
SDLC	●	●	–	–	–
Maximum speed supported (bps)	4800	4800	9600	9600	4800
Date of Announcement	9/74	4/76	4/76	4/76	4/76
Date of First Delivery	6/75	9/76	5/76	6/76	6/76
Number Delivered to Date	Over 2500 Series 8000 systems of all models have been delivered.				

supported by card reader, printer, and, in some cases, optional disk or cassette memory capability. (The 8040 and 8041 are no longer being marketed by Sanders.)

Both series are manufactured with an integral processor and memory which enables either user programming or a tailored, Sanders supplied, operating system and application packages.

Broadly speaking, the Series 800 and 8000 can be considered a single family of communications terminals. However, there are considerable functional and other differences between the Series 800 and 8000 which warrant some evaluation and explanation. Adding to this confusion is Sanders' method of numbering specific models; for example, the 8100 is part of the 800 Series. Furthermore, there are numerous individual components, software packages, and configurations available, and Sanders will undertake custom programming on a negotiated basis.

Perhaps the best way to summarize the Sanders product line is to begin with the accompanying System Characteristics tables. Because of obvious functional

screen. Variable screen sizes can be incorporated as determined by the display memory included. A variety of keyboards can be added. The program memory of the processor can be expanded to 6K or 8K bytes. I/O device options include tape cassette, card reader, printer and communications interface.

810 SYSTEM: A multi-station system with full software and peripheral expansion, including disk storage. The basic system includes a 4K-byte processor. It can be expanded to include up to 8 stations and a wide range of peripheral devices including tape cassette, disk, card reader, and printer. Three models of the processor are used for various configurations. Program memory can be expanded to 6K or 8K bytes with total memory of 28K bytes including display memory. Standard software packages require up to 8K bytes as detailed under Software.

8100 SYSTEM: A multi-station system supporting up to 8 CRT stations for data entry/batch transmission. The basic system consists of an 8K-byte processor, 960 or 1920 character CRT display, communications interface, and 5 million byte disk drive. The system can be expanded to include up to seven additional CRT displays; a Memory Module is required for each additional display. Peripheral expansion includes one additional 5 million byte disk, printers, and a card reader.

8170 SYSTEM: A multi-station system designed primarily to emulate the IBM 3270. The system is offered for either

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Sanders Series 800 and 8000 Systems

SERIES 800 SYSTEM CHARACTERISTICS

MODEL	804	810	8100
CRT Displays, maximum number/cluster	1	8	8
Display size—			
480 char (12 lines; 40 char/line)	–	●	–
960 char (12 lines; 80 char/line)	●	●	●
1920 char (24 lines; 80 char/line)	●	●	●
Storage Options—			
Dual Cassette Drives	Opt.	Opt.	–
Disk Storage, 5 M-byte drive	–	4 max.	1 std.
I/O Options—			
Printers: 30 cps, 88 cps, 165 cps, 200 lpm	Opt.	Opt.	Opt.
Card Reader: 300 cpm	Opt.	Opt.	Opt.
Communications—			
Asynchronous IBM 2260/2265	Opt.	Opt.	–
Bisynchronous:			
IBM 2780 ASCII	●	–	–
IBM 2770/2780 EBCDIC	●	●	●
Maximum speed supported (bps)	9600	9600	4800
Software—			
BOSS (IBM 2260 emulation):			
Local	–	●	–
Remote	●	●	–
IN-FORM (off-line, format controlled data entry; batch transmission)	●	–	●
IMP (Sanders high level language, multi-station)	–	●	–
User-programmed routines	●	●	●
Date of Announcement	7/71	10/71	8/74
Date of First Delivery	12/71	3/72	11/74
Number Delivered to Date	Over 2000 Series 800 Systems of all models have been delivered.		

differences, separate charts have been constructed for the Series 800 and 8000. In general, the capabilities and features available are primarily a function of the software supplied. Sanders supplies a variety of software packages for particular application and emulation tasks but, due to the programmable features of the systems, you can provide tailored programs of your own—but be sure to add this cost when evaluating the equipment.

Selection among the many models is thus based on the specific emulation capability you need, cluster size required, peripherals required, and features desired.

The Sanders Series 800 and 8000, like any other intelligent (user programmable) terminal on the market today, offers advantages over the conventional non-intelligent terminal. The concept of pre-editing and massaging data at a remote location before it reaches the host computer can relieve the central site from these tasks and make the manual tasks of error correction much easier. Additionally, the capability to move some of the processing functions and diagnostics to the remote location, as well as the ability to program tailored applications can be very attractive for some organizations.

remote mode (8171) or local mode (8172) operation. Up to 32 displays and/or printers may be configured per control unit by adding adapters. Basic program memory is 12K bytes expandable to 16K bytes with a maximum total memory of 44K bytes. Peripherals include printers (any model), I.D. card reader, and Photopen (light pen).

8180 SYSTEM: This system is essentially an enhanced 8170 system and as such provides basic IBM 3270 emulation. The major difference is expanded memory size, functional capabilities, and peripheral options. It is offered in both remote mode (8181) and local mode (8182), and up to 32 displays and/or 16 printers may be configured per system. Maximum total memory size is 60K bytes (compared to 44K bytes on the 8170) to allow for function enhancements. With Sanders supplied software, the system has additional capabilities compared to the 8170 (see Software). Peripheral options include those of the 8170 plus an optional disk (5 megabytes) and/or diskette (500K bytes) unit.

8210 SYSTEM: This system is designed primarily to emulate Univac's Uniscope 100/200 display terminals. Up to 32 displays and/or printers may be configured per control unit using adapters. No other peripheral options are currently available for these units. Maximum total memory for the system is 44K bytes.

8220 SYSTEM: The Burroughs TD 800 Series terminals are emulated by the 8220. It is otherwise similar to the 8210

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Sanders Series 800 and 8000 Systems

▻ USER REACTION

In May 1976, Datapro talked with 12 users of Sanders' equipment, representing a total of 40 single-station and clustered configurations, concerning their experience with these systems. Included in these systems were the Sanders Model 804, 810, 8100, 8171 and 8172. In the majority of cases, users installed the Sanders supplied operating software for emulation. In some cases, the user provided his own customized software program. In one case, the software used was a standard Sanders supplied package modified by the user for his particular application.

The ratings which follow indicate a significant degree of satisfaction with all aspects of the Sanders systems. It should be noted that users did not always respond to all questions asked due to lack of applicability of some questions to their particular use.

	Excellent	Good	Fair	Poor	WA*
Overall performance	4	8	0	0	3.3
Ease of programming	2	1	2	0	3.0
Ease of operation	4	8	0	0	3.3
Hardware reliability	4	8	0	0	3.3
Maintenance–promptness	6	5	1	0	3.4
Maintenance–quality	5	7	0	0	3.4
Technical support	2	7	2	0	3.0
Operating systems	3	6	0	0	3.3
Compilers and assemblers	0	2	1	0	2.7

*Weighted Average on a scale of 4.0 for Excellent.

Taken as a whole, the key advantages cited by the user of the Sanders systems were generally made relative to the equipment being emulated (IBM 2260 and 3270 in most cases). These advantages included additional function keys, local print option, vertical format control, underscoring capability, easily read CRT face, ease of use, reliability, and better price/performance.

Datapro was unable to discover any significant dissatisfaction, a great improvement over user ratings in 1974. One user did express some dissatisfaction with the documentation available with the system. However, this comment was concerned more with interfacing with the host computer system rather than the individual Sanders equipment. Another user expressed some degree of difficulty in becoming accustomed to the use of the equipment, (i.e., he was more familiar with IBM equipment), but indicated that after a short exposure, this problem was resolved. □

➤ system with maximum configuration being 32 displays and/or printers. No other peripheral options are currently being offered. Maximum total memory is 44K bytes.

8770 SYSTEM: The system is similar to the 8210 and 8220, but is designed to emulate the Honeywell VIP 775 and 7700 terminals. Maximum total memory is 44K bytes. Up to 32 displays and/or printers can be configured per controller. No other peripherals are currently offered with the system.

TRANSMISSION SPECIFICATIONS

A wide range of communications capabilities is provided for the Series 800 and 8000 including half- or full-duplex operation using line disciplines of asynchronous, synchronous, bisynchronous and SDLC (Model 8170 and 8180). Transmission rates include 110, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200 and 9600 bps. Other speeds can be achieved through external clocking. Transmission code can be either ASCII or EBCDIC in 8 level (synchronous) or 10/11-level (asynchronous) format. The communications adapter can be configured with an EIA RS-232C interface for connection to an external modem. Bell System or independent modems can be used with automatic answer (available on all terminals).

In general, the communications capabilities that can be implemented for each model within the family of Sanders terminals depend on the line discipline used and are summarized in the accompanying chart of System Characteristics. More specific information is given in the individual paragraphs under Software.

DEVICE CONTROL

All operations are software-controlled by Sanders standard operating software and by parameterized programs residing on cassettes, on punched cards, or in a remote computer; program loading is controlled by a ROM (Read Only Memory) program loader. Series 8000 systems can also be loaded by optional diskette, disk, or cassette tape device.

The software offered by Sanders is extensive and diversified. One basic operating system per terminal emulated is offered. Emulated terminals include the IBM 2260/2265, IBM 2770/2780, IBM 3270, Univac Uniscope 100/200, Burroughs TD 800, and Honeywell VIP 775 and 7700; see the accompanying System Characteristics table for the emulation capabilities of each system. Many of the packages offered are oriented toward specific functions such as on-line interactive communications, remote job entry, off-line source data entry, and stand alone disk-based applications. Other software currently available includes assemblers that run on IBM System/360 or System/370 computers, debugging aids, test programs, a math package, edit routines and utilities, as well as a library of user-developed software packages. A high level language called IMP is also available for the 810. Major software programs, languages and diagnostics are described in more detail in the following paragraphs.

8000 SERIES SOFTWARE

DIAGNOSTICS: Complementary software and hardware diagnostic aids are available for the Series 8000 systems. These allow for isolation of hardware and/or software problems present in the terminal, host computer system, or data communications links. Two basic packages are provided. The Sanders Selftest System (software) isolates hardware failures to a particular field replaceable module. The Line and Event Monitor (hardware) provides analysis of line traffic and I/O events taking place between the terminal and the host computer.

ON-LINE 2: This package, available for the Series 8170 and 8180 systems provides complete compatibility with the addressing sequence, command code structure, and line discipline employed by the IBM 3270 Information Display System. The 8170 responds to and executes the full repertoire of IBM 3270 commands via the control program stored in the programmable microprocessor. The control program can be loaded from punched cards, cassette tape, or the remote computer via the communications facility. On-Line 2 emulates all functions that are basic to the IBM 3270 and also provides enhancements, including editing and validation functions, such as those related to typical data entry applications, as outlined below.

8180 SOFTWARE: The Series 8180 is an enhanced version of the 8170, but still retains IBM 3270 compatibility. The ❱

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Sanders Series 800 and 8000 Systems

software supplied with the 8180 provides a number of attractive features not available with the 3270. These subroutines include 1) Local Format Storage, 2) Queued Transaction Handling; 3) Local File Reference, 4) Local Validation and Arithmetics, 5) Formatted Local Print and 6) Automated Keystrokes. Use of the software routines requires the additional memory (60K bytes total) supplied with the 8180.

800 SERIES SOFTWARE

IMP: The Sanders Information Management Package (IMP) is a high level language system that is used on the Series 810 system to facilitate the development of application systems. It is made up of several subsystems. Operating system functions are performed by the Sanders Disk Management System (DMS), using IMP commands by means of an Interpreter and Program Generator. The IMP Interpreter is a modular set of machine language programs resident in control memory during executing IMP programs. The IMP Program Generator is the program used in create, modify, and save the IMP programs.

IN-FORM: This software package is available for the Series 800 system on cassette for the 804 and on disk for the 810 and 8100. There are some variations between the two, but, in general, IN-FORM includes facilities for defining the format of data entry records, for governing field manipulations and calculations, for entering data according to predicted formats and field specifications, and for batch communications with a remote host computer. The disk-based version stores the record formats and specifications on disk rather then cassette tape and provides additional field manipulation capabilities, including the capability for incorporating user-written subroutines assembled on the host computer and loaded over the communications link. Both versions of IN-FORM require 8K bytes of processor memory. There are five programs available with IN-FORM. These are the Descriptor program, the Preformatter program, the Data Entry program, the Index Program, and the Remote Communications program.

BOSS: Four versions of this package are available for the Series 804 and 810 systems; 804 BOSS, 804 Extended BOSS, 810 BOSS Remote and 810 BOSS Local. In general, BOSS is intended to emulate the IBM 2260/2265 display terminals in single-station or cluster arrangements for local or remote environments. The 804 Extended BOSS version provides a format capability for data entry applications. All versions of the package can run in 4K bytes except for 804 Extended BOSS, which requires 6K bytes of processor memory.

COMPONENTS

Due to the evolutionary and diversified nature of the product line offered by Sanders, there are some minor variations in the components to be described in the following paragraphs. These variations exist primarily between the 800 and 8000 systems; important differences are noted in the appropriate sections below.

PROCESSOR: The integral processor is a byte-oriented, serial computer which has an instruction execution time of 6.4 microseconds and 16 basic instructions; of these, 15 logical instructions are expandable to 80 via the use of modifiers. Instructions are 16 bits long and are accessed during one memory cycle.

Read/write program memory is a random-access memory with a cycle time of 6.4 microseconds. Available storage capacities are 2K, 4K, 6K, 8K, 12K and 16K bytes. Total memory, including program memory and display memory, can be up to 60K bytes depending on system model.

Memory organization is on a page basis; each page contains 256 16-bit words (512 bytes). The first one or two (communications loader only) pages are reserved for the ROM program loader. Both ROM and read/write memories are semiconductor.

Internal processor architecture includes three general-purpose registers, each with a single-level stack, an instruction address register with combined page reference register and four-level stack, and a memory access register. The microprocessor also includes up to 256 general-purpose (scratchpad) registers. All stacks use the "push-down/pop-up" technique for manipulating data and addresses, which is a last-in/last-out arrangement for inter-connecting registers. The microprocessor also features an I/O device interrupt capability.

CRT Displays: A 12-inch (diagonal measurement) CRT provides a 7.5 by 9.5-inch view (7-by-9 inch on the 8000). A character set of up to 96 ASCII characters, including upper and lower case alphabetics, numerics, and special symbols, is displayed in white against a dark background. Characters are generated via a 5-by-7 dot matrix. The CRT screen is viewed through a tinted anti-glare shield (etched non-glare face on the 8000).

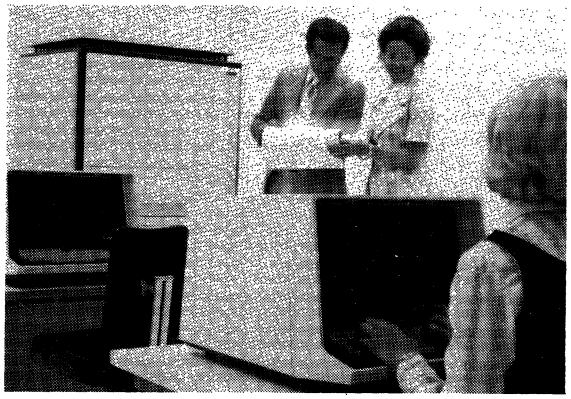
The display layouts available for each model, ranging from 480 to 1920 characters per screen, are shown in the accompanying System Characteristics table.

Display character sets available include: upper case only, IBM 2260-compatible upper and lower case, and IBM 2260-compatible upper case only. A number of International sets are also available. The display arrangement and character set must be identical for all display units associated with a common terminal processor.

Beam intensity, via program control, can be switched between normal intensity and off (blanked) for the 800 series or among high, low, blink, off, and underscore on the 8000. Characters or fields can be blinked. An audible alarm for each display station is optionally available for all models.

KEYBOARDS: A number of Keyboard styles are available, depending on model, including:

- IBM 3270 typewriter style
- IBM 3270 data entry style
- IBM 3270 operator console
- Univac Uniscope style
- Burroughs TD800 style
- Honeywell VIP style



The Sanders 8100 is actually part of the 800 family and includes as standard, a 5 megabyte disk drive. Standard software is included to accommodate data entry/validation operations as well as operation as a remote batch terminal using the IBM 2780 discipline.

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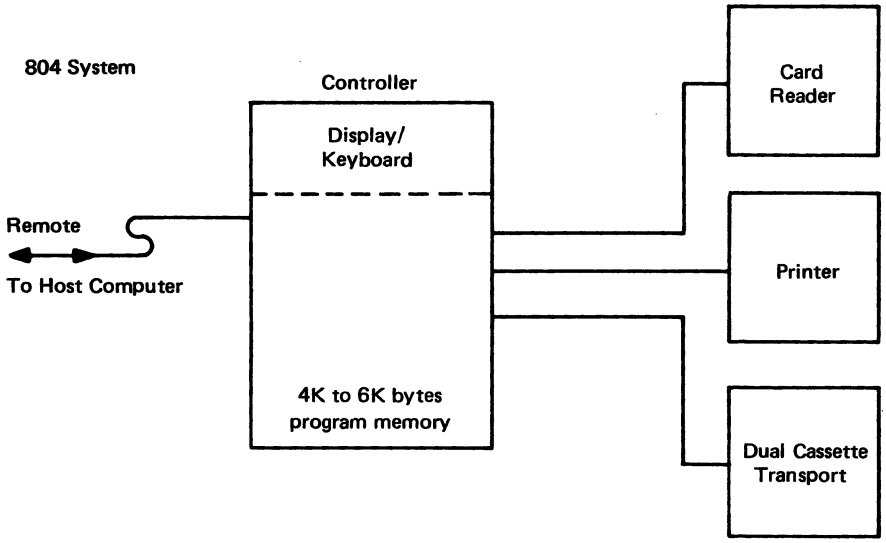
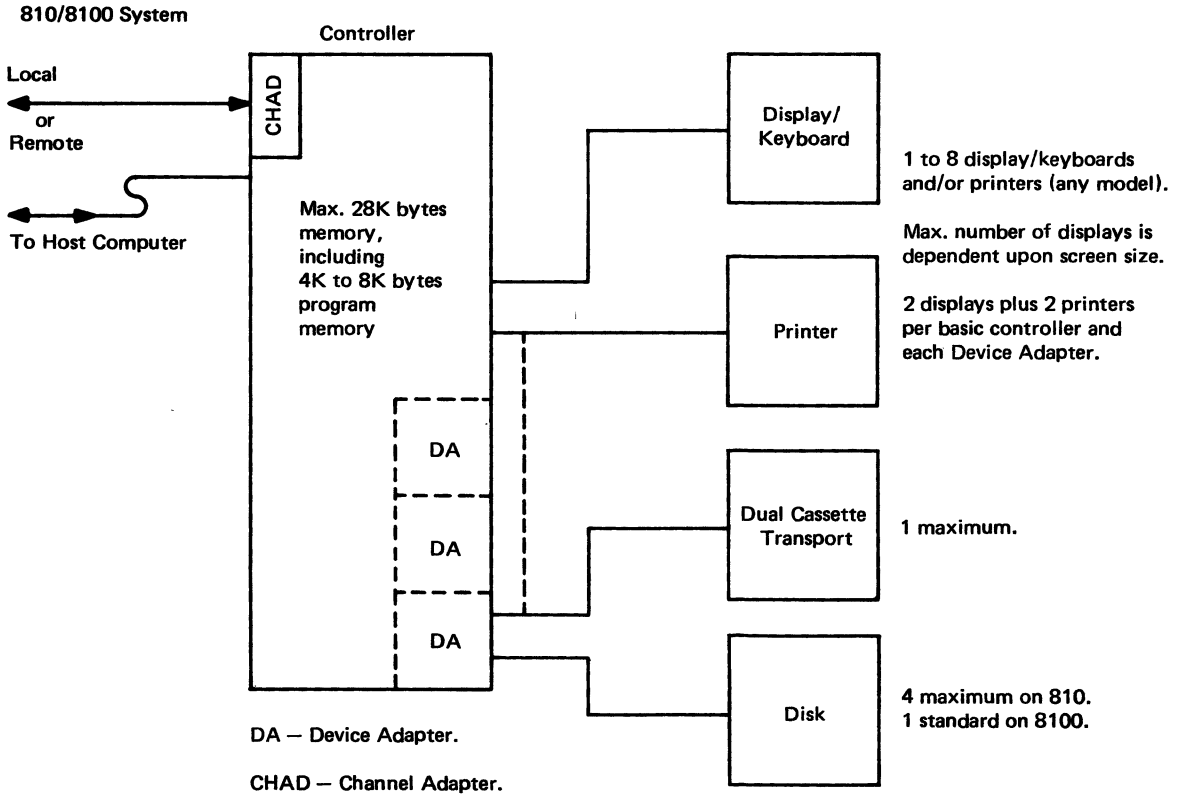
Sanders Series 800 and 8000 Systems

SERIES 800 CONFIGURATIONS





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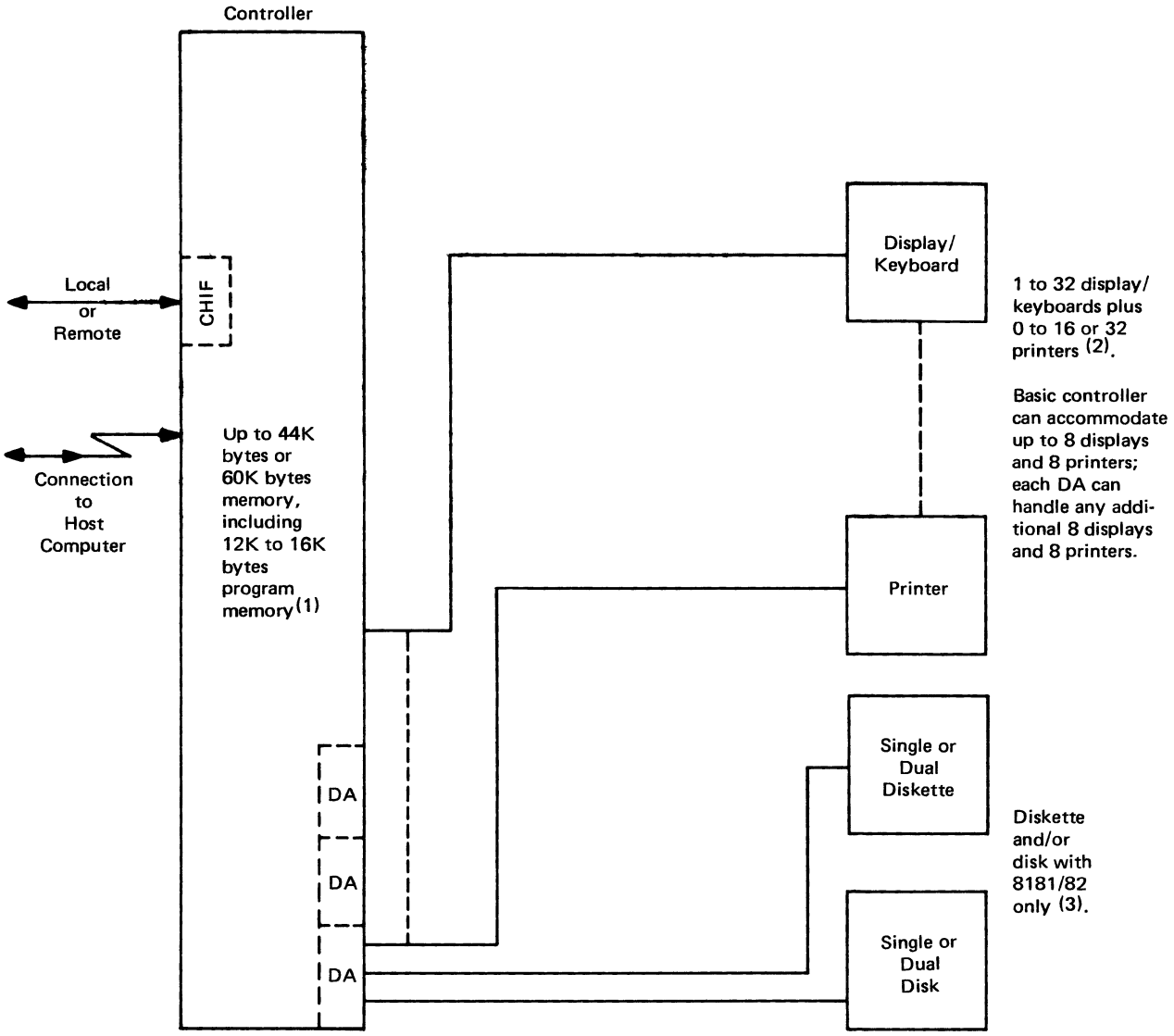
Sanders Series 800 and 8000 Systems

SERIES 8000 CONFIGURATION



CHIF – Channel Interface Feature

DA – Device Adapter

(1) 44K bytes max. memory for 8171, 8172, 8210, 8220, and 8770; 60K bytes max. memory for 8181 and 8182.
(2) 16 printers max. for 8181 and 8182.
(3) Single or dual diskette or disk occupy one device attachment point on basic controller or Device Adapter.

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Sanders Series 800 and 8000 Systems

All keyboards are equipped with:

- 10 key numeric keypads,
- 20 program function keys (minimum),
- 7 indicator lights, and
- Selectable keyclick.

PRINTERS: Four printers are available:

- Model 3110–a 30-char/second impact page printer with an adjustable line length of 13 to 132 columns. Printing is performed via a rotating print wheel that contains a set of 64 ASCII characters. Accommodates six-part, continuously sprocketed forms up to 14-7/8 inches wide. Horizontal and vertical spacing are 10 char/inch and 6 lines/inch, respectively. The printer employs a Singer print mechanism.

- Model 3115–an 88-char/second impact printer with adjustable line length up to 132 characters. Printing is performed by a 5-by-7 dot matrix, containing 64 ASCII or EBCDIC characters. Features include vertical format under control unit direction. Accommodates single or up to six-part continuously sprocketed forms up to 14-7/8 inches wide.

- Model 3120–a 165-char/second matrix printer that prints up to 132-char/line. Any of 64 ASCII symbols are formed within a 5-by-7 dot matrix. Accommodates six-part, continuously sprocketed forms up to 14-3/8 inches wide. Horizontal and vertical spacing are 10 char/inch and 6 lines/inch, respectively.

- Model 3135–a line printer with a rated speed of 200 lines/minute. It has a 64 ASCII character set and 132 print positions. It accommodates six-part continuously sprocketed forms from 2 to 16 inches wide and features programmable (tape) vertical format control.

CASSETTE TAPE INPUT/OUTPUT: The Model 3210 Dual Cassette Tape Transport features two independent cassette tape recorders with shared electronics. Each drive accommodates a Philips-type cassette containing 300 feet of 0.15-inch-wide magnetic tape. Phase-encoded data is recorded serially at 400 bits/inch. The tape format accommodates 8-bit characters with record lengths up to 2,048 characters. Total storage capacity is rated at 300,000 characters. Manual or programmable tape functions include rewind-search, fast forward search, read, write, and stop. Search and rewind functions are performed at 100 inches/second; read/write functions are performed at 6 inches/second. Maximum search time is 36 seconds. The tape transports (drives only) are manufactured by Conrac.

DISK STORAGE: The disk drive is similar, except for data format, to the IBM 5444 drives used with IBM's System/3 computers. Storage capacity is 5.0 million bytes. It features a 2.5M-byte removable disk cartridge and 2.5M-byte fixed disk. Data access is provided by four vertically aligned heads, one per disk surface. Average rotational delay and data transfer rate are 20 milliseconds and 200,000 bytes/second, respectively. Average head positioning time is 85 milliseconds.

DISKETTE STORAGE: The Model 3450 diskette features a dual drive capability with maximum storage of 500K bytes. Track density is 48 tracks per inch, and bit density is 3200 bits per inch. Rotational time is 166.67 milliseconds per revolution with a transfer rate of 250K bits per second. Average access time is 302 milliseconds, while maximum access time is 711 milliseconds.

PRICING

The Sanders Series 800 and 8000 systems are available for purchase or on a one-, three-, four-, or five-year lease which includes maintenance. A separate maintenance contract is available for purchased units. Sanders declined to supply complete pricing information, but furnished prices for the following representative systems.

		Monthly Rental* (3-year lease)	Purchase	Monthly Maint.
810	IBM 2260 Remote Emulation with 12 Displays of 960 characters	$1,560	$ 46,100	$270
8172	IBM 3270 Local Emulation with 8 Displays of 1920 characters	1,120	42,200	186
8171	IBM 3270 Remote Emulation with 16 Displays of 1920 characters	2,120	71,600	338
8181	Enhanced IBM 3270 Remote Emulation with Queued Transaction Handling, 6 Displays of 1920 characters, and Dual Diskette (500K bytes)	1,035	38,060	179
8210	Univac Uniscope 100 Emulation with 31 Displays of 960 characters	4,015	136,810	646
8220	Burroughs TD 820 Emulation with 24 Displays of 1024 characters	2,705	104,460	495
8770	Honeywell 775 VIP Emulation with 10 Displays of 1024 characters.	1,355	48,600	220
8100	8108 Remote Data Entry System with 8 Displays of 960 characters and 5M byte Disk Storage	1,395	43,900	248

*Includes monthly maintenance.■

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