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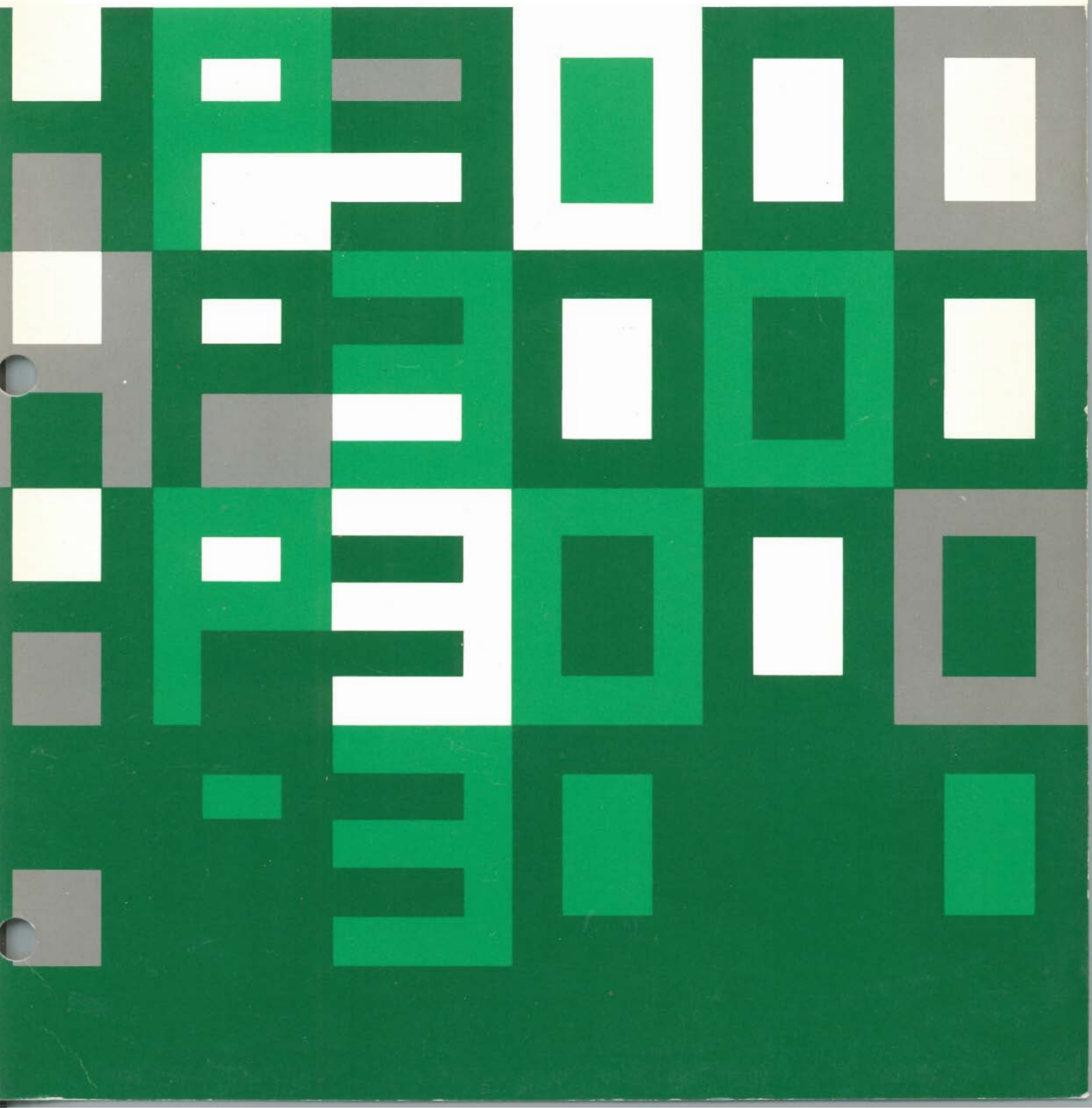

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Editor's Note

In our October 1981 IMPACT announcement, Hewlett-Packard proudly introduced twenty-seven new products, making IMPACT the largest such introduction in HP's history. This issue of the COMMUNICATOR 3000 gives you an overview of the CSY products and their associated peripherals and software which were part of the IMPACT announcement.

The lead article is an introduction to our two new systems: the powerful, top-performing Series 64, and the entry level Series 40. The following three articles describe in more detail the hardware and software for the Series 64.

Three articles discuss the 7911 and 7912 Winchester disc drives and Integrated Cartridge Tape Drive, including information on user logging to the cartridge tape. Next come two articles describing the 404 megabyte 7933 disc drive.

An article on the new terminal controller for the Series 64 is followed by a description of the changes to the DPAN4 program.

Next comes information about new Segmenter features and on configuring the 30341A HP-IB Interface Module for Series III systems. We also have articles on our new programming aid, RISE/3000; on the data management modules which comprise RAPID/3000; and on HPWORD, the new word processor designed for use by secretaries and other support personnel.

Included as well are several articles which should be of value to users with particular interests, such as RPG and COBOL.

In addition to the usual Documentation and Catalog pages, you will find a Reader Comment Sheet at the back of this COMMUNICATOR. We invite you to send us your comments and suggestions so we can make the COMMUNICATOR a more valuable medium for you.

As you can see, this issue is rich in information, and we hope it conveys the excitement all of us at HP have shared as IMPACT became a reality.

Editor
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Two New Systems Join HP 3000 Business Computer Family

by Bill Scull, Computer Systems Division

The HP 3000 family of interactive business computers now includes two new systems: the Series 64, the new top performer; and the Series 40, the new price leader. This introduction reflects and considerably enhances the HP tradition of offering a broad performance family of business computers with industry leading price/performance capabilities, while maintaining operating system compatibility. This compatibility assures that customers can upgrade to newer, more powerful systems without having to rewrite any of their applications software. Buttressing this tradition is the quality customer service and support available from HP for business computer products. In addition, HP offers guaranteed 99%-uptime service for hardware maintenance contracts on the new HP 3000 systems.

INTRODUCING THE HP 3000 SERIES 64

The HP 3000 Series 64 is the highest performance member of the HP 3000 family of compatible, interactive business systems. The Series 64 can perform a wide range of tasks as a major node in a large distributed data processing network, as a central computer in an EDP environment, or as a dedicated stand-alone system. In addition to its on-line, interactive capabilities, the Series 64 functions equally well in batch processing applications.

Performance

The Series 64 is in the 1-million-instructions-per-second (one MIP) class. It provides up to 2.6 times the processing power of the Series 44 and up to 4.5 times the power of the Series III. The system has a 32-bit data bus and memory organized around a 32-bit word, plus a new dual Arithmetic Logic Unit (ALU) that is capable of performing 32-bit arithmetic. Emitter Coupled Logic (ECL) technology is responsible for the fast, 75 Ns micro-instruction cycle time of the Series 64 CPU. The performance has been further improved by the addition of a cache memory, a small high-speed buffer that improves the effective speed at which the CPU can access main memory. In addition, the system can support over 100 active-session terminals.

Basic Configuration

The HP 3000 Series 64 basic configuration consists of a system processor unit, 2 megabytes of main memory, 12 terminal ports (including the one for the 2642A system console), a 404 megabyte

disc, and a 1600-bpi magnetic tape drive. Plug-in add-on main memory is expandable from 2 to 8 megabytes.

Reliability

The Diagnostic Control Unit (DCU) microcomputer and the microprocessor controlled power-supply control (PSC) unit combine to give the Series 64 the best diagnosability of any HP 3000 system. The DCU has the ability to "look inside" system hardware and pinpoint the location of a hardware failure using fault-locating microdiagnostics.

Compatibility & Growth Path

As part of the HP 3000 family, the Series 64 uses the MPE operating system, providing for complete system compatibility. This compatibility preserves the software investment that has been made by an installed base of more than 8,000 HP 3000 systems. Because of this system compatibility, the Series 64 provides an attractive growth path for other members of the HP 3000 family. When current users upgrade to a more powerful HP 3000 system they can receive return credit for a System Processing Unit (SPU) and main memory. Nearly all peripherals from earlier systems are compatible with or upgradeable to the Series 64.

INTRODUCING THE HP 3000 SERIES 40

The HP 3000 Series 40 is a powerful yet inexpensive entry-level computer in the HP 3000 family of compatible, interactive business systems. Designed as a small business computer, the Series 40 can meet the information handling needs of a department, branch office or small company. In addition to its stand-alone capabilities, the Series 40 can operate as a small node in a network of computers through the use of our distributed processing data communications software.

Performance

The Series 40 can outperform the well-known HP 3000 Series III, HP's most powerful business computer until less than a year ago. The Series 40 replaces the Series 30, formerly the lowest-cost HP 3000, at a 30% lower price for an equivalent configuration, while providing up to three times its performance.

Basic Configuration

The Series 40 has two models, the 40SX and the 40. The Series 40SX is a Series 40 SPU bundled with new lower-cost peripherals for customers who need up to 128 Mb of disc storage. The basic configuration for the HP 3000 Series 40SX Computer System includes the system processor, 256k bytes of main memory, a 27-megabyte sealed disc with built-in cartridge tape drive, a system console, and 4 asynchronous terminal ports.

Contributing to the low price is use of Hewlett-Packard's new lower-cost peripheral set, which includes the 27 and 64-megabyte Winchester disc drive (with an integrated cartridge tape drive that can make back-up easier to do) and a compact new video terminal, the 2382A, that can serve as a system console.

The second model, the Series 40, is suitable for larger applications, such as systems especially tailored by software OEMs for specific industries. Its basic configuration includes 512k bytes of main memory, 120 megabytes of disc storage, a 1600-bpi magnetic tape drive, four terminal ports, and a system console.

Expandability

The Series 40 is a cost-effective system even at configurations supporting as few as 4 users, yet has the performance to support as many as 56 simultaneous users. Maximum expansion of HP 3000 Series 40 systems is to 2 megabytes of main memory, 8 discs including the new 404 Mb disc drive, four magnetic tape drives, two line printers, two laser page printers, and 3 synchronous communications lines.

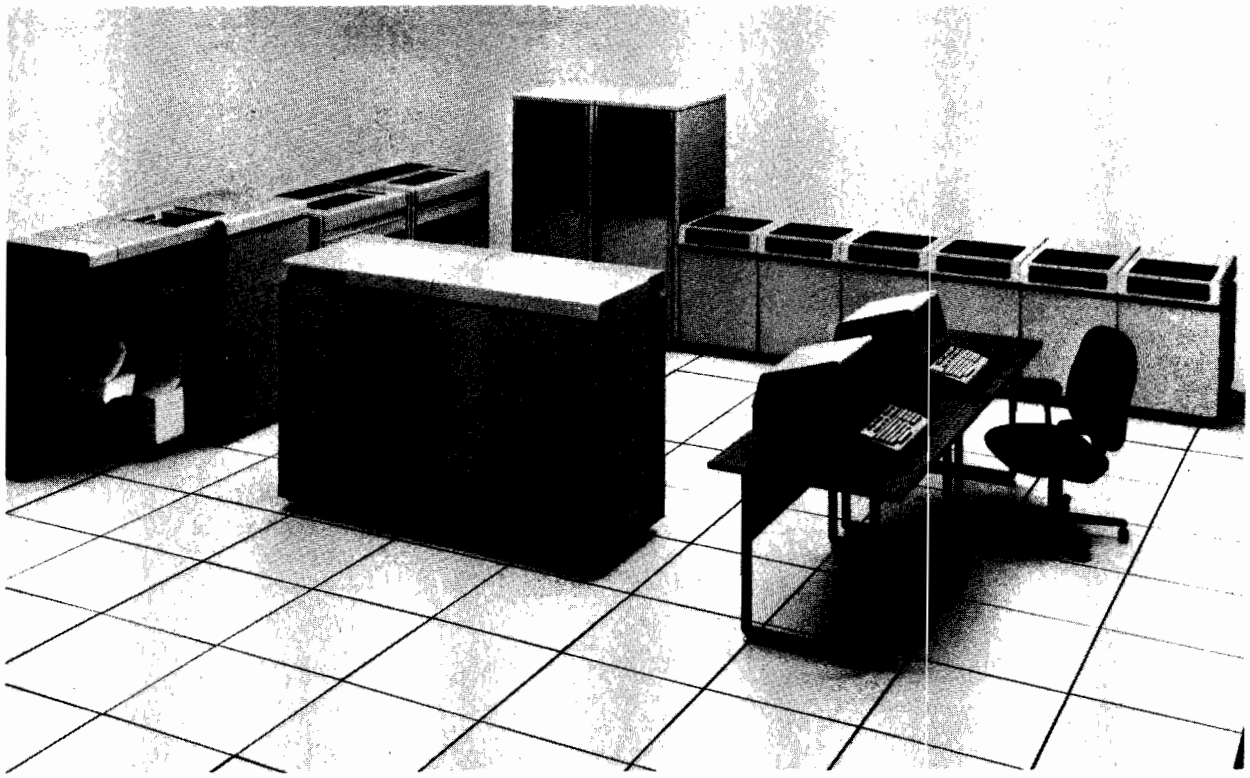
Compatibility & Growth Path

The Series 40 runs MPE, which provides complete system compatibility and ensures protection of our customer's software investments. Users that outgrow the Series 40 can upgrade to either the Series 44 or the new Series 64. Return credits are offered on the Series 40 SPU and main memory upgrade, and in addition the Series 40 peripherals are all compatible with the more powerful HP 3000 systems.

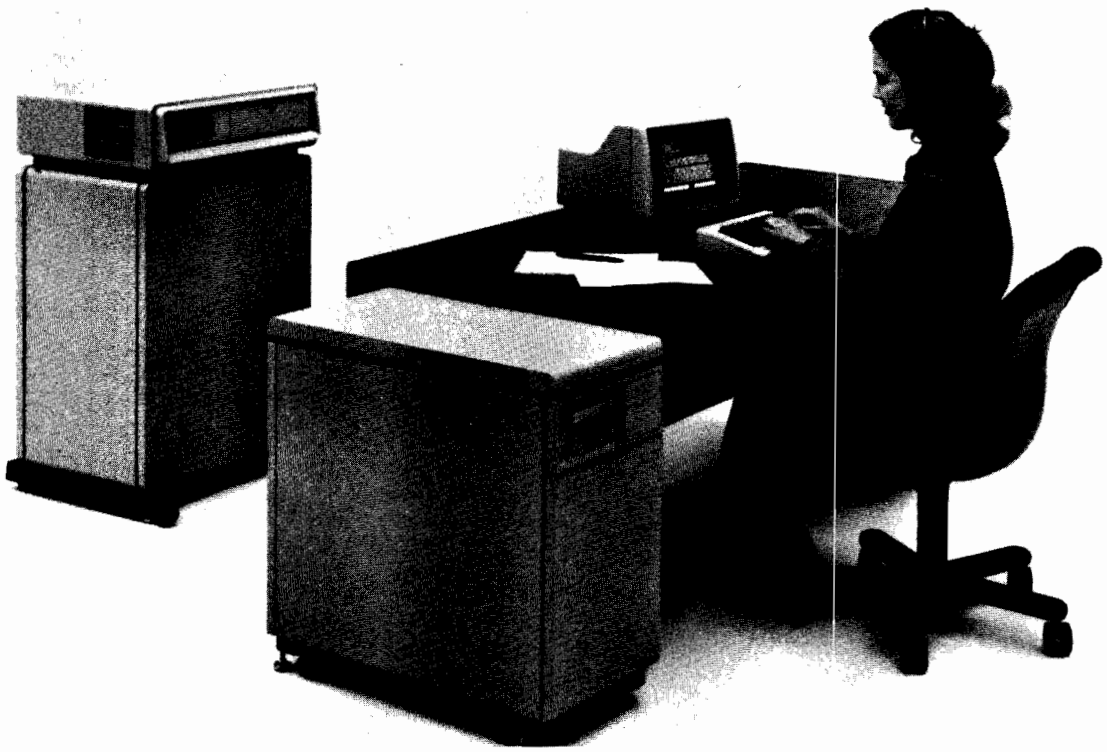
THE NEW HP 3000 FAMILY

Positioned between the two new family members, the highly successful Series 44, introduced less than one year ago, is now reduced in price and includes an expansion kit previously offered as an option. These three models, the Series 40, 44, and 64 comprise the new HP 3000 family, which offers a broad performance selection of models specifically designed to meet your varied information management needs now, while the system compatibility assures that you can upgrade to systems offering greater performance as those needs grow.

(Installation Tapes (I.T.) for the Series 64 and the Series 40SX are discussed elsewhere in this Communicator issue. A new I.T. is not required for the Series 40.)



The HP 3000 Series 64



The HP 3000 Series 40SX

Introducing the Newest Enhancements to MPE IV

by Stephanie Littell and V.Mohan, Computer Systems Division

The latest releases of MPE IV bring to you on the Series 64 more Code Segment Table (CST) entries, an expanded Device Reference Table (DRT), and support of Writeable Control Store (WCS). Also being introduced is the Advanced Terminal Processor (ATP), supported on both the Series 44 and 64.

Several enhancements that benefit the entire installed base of HP 3000 systems are also being introduced. These include enhancements to the Inter-Process Communications facility (IPC) and the SEGMENTER. New operator procedures for starting the Series 64 have also been included, resulting in a more "friendly" operator interface.

The IPC and SEGMENTER enhancements are covered in greater detail in other articles in this issue. The new operator procedures are mentioned here but discussed more extensively elsewhere.

SERIES 64 ENHANCEMENTS

As compared to existing systems, the effective number of CST entries available to users on the Series 64 has increased by approximately 40. Thus will permit customers to simultaneously execute many more applications than is currently possible.

Since the Series 64 can optionally have up to two InterModule Buses (IMB`s), it is necessary for the operator to specify the IMB number (if the system has more than one IMB), the channel number, and the device number before bringing up the system. The IMB number does not have to be specified if the system has only one IMB.

The START/LOAD/DUMP specification has been made more operator "friendly" in that it is no longer necessary for the operator to convert (from decimal to octal to decimal) and concatenate the channel and device numbers. For example, the folllowing format is used for the START command:

```
cntl B  START=<IMB#>,<CHANNEL#>,<DEVICE#>
```

Please note that the commas are required. With this new format it is now sufficient to read the decimal thumbwheel switches and use those values directly in the START/LOAD/DUMP command!

The Series 64 will now support a more flexible I/O configuration as compared to the Series 44. This is due to the expansion of the DRT from 7 to 9 bits for a two IMB system. Further, the DRT is no longer restricted to residing in bank 0 but may now reside anywhere in main memory.

The ATP is an integral part of the Series 64. The ATP will allow terminals to transmit and receive data on either a character by character basis or on a block-at-a-time basis. The control of this data transmission is handled strictly by the ATP hardware, thus eliminating CPU overhead per character.

The Series 64 uses Writeable Control Store (WCS), instead of ROMs now used in other HP3000 systems, for storing the system microcode. This will enable customers to receive the WCS as a part of each Series 64 IT. Microcode fixes and/or enhancements will thus be received easily without the inconvenience of a hardware update.

The increased I/O capability of the Series 64 system has resulted in modification to three MPE intrinsics: FGETINFO,FFILEINFO and PRINTFILEINFO. The implications of the changes for users of these three intrinsics are explored in greater detail in another article in this issue.

OPERATOR PROCEDURES

A note of interest to console operators on the Series 30/33/40/44/64. After executing the START command, it will not be necessary to hit an extra carriage return when bringing up the system. The following system message

```
HP32033C.XX.YY
WHICH OPTION <WARMSTART/COOLSTART?>
```

will now be sent automatically to the console without hitting carriage return.

The HP 3000 Series 64: The New High End System of the Hewlett-Packard 3000 Computer Family

by Mark Linsky

The HP 3000 Series 64 offers the highest price/performance of Hewlett-Packard's MPE based systems. The Series 64 provides over 2.5 times the processing power of the Series 44, HP's previous performance leader. This new high end machine now extends the performance of the HP 3000 computer family into the 1 million instructions/second class.

NEW DESIGN FEATURES

The increased system performance of the Series 64 is primarily due to faster operation and the performance of more calculations in parallel. The methods for achieving these results were the utilization of dual ALU's (arithmetic logic units), WCS (writable control store), cache memory, 32-bit memory adaptors, and ECL (emitter coupled logic) technology.

Dual ALUs

A dual ALU design is only effective if parallel operations can replace ones that were sequential and therefore took longer to complete. The rich instruction set of the HP 3000 does lend itself to more parallelism than simpler instruction sets. The traditional method of parallelism is pipelining and the design of the Series 64 CPU incorporates this traditional approach into the dual ALU design to achieve nearly twice the efficiency of a single ALU. Pipelining is a design organization that allows data to be processed as it passes through a sequence of hardware operations. A set of data enters the "pipe" each clock cycle, and proceeds to and through each "stage" or operation of the pipeline on successive clocks, until the data is finished being processed.

WCS

Writable Control Store provides faster operation than Read Only Memory (ROM) for storing and reading microcode. The static RAMs used to design the WCS are much faster than ROMs of similar and compatible technologies.

Cache Memory

For increased memory bandwidth, both cache memory and a wide memory bus are used. A cache, or small buffer memory, provides high speed local memory for the CPU while interfacing to a

larger, but slower, main store. The goal is to design the cache such that, most of the time, requests from the CPU for data or instructions will not require the cache to go to main memory to get the particular address needed. This depends very much on the software operating on the system and the actual hardware organization of the cache. For the Series 64 running what would be the expected job mix, the CPU cache, with 8 Kbytes of data store, provides the CPU with one clock access for about 95% of the requests. The rest of the time, accesses take longer because the information must come from main memory. However, the average memory access time is still less than two clocks.

Memory Adapters

The interface to the memory system, for the cache and I/O system, is through a 32-bit wide, 18-Mbyte bus. Each of the Input/Output Adapters or IOAs, which are the I/O system interfaces to CPU and memory, has a 64-byte cache. These buffers allow each of these I/O ports to match the slower, 16-bit I/O bus to the higher speed, 32-bit central system bus.

Emitter Coupled Logic

One of the highest performance logic families in wide use is emitter coupled logic (ECL). In the Series 64, both 10K and 100K ECL technologies were selected for those design areas where the speed and functions available were well-matched to the requirements of the design. This is in addition to the use of STTL (Schottky transistortransistor-logic) for the memory array and I/O interfaces. For 10k STTL, ECL, and 100K ECL, the typical delays are 3, 2, and 1 nanosecond respectively; and each technology offers functions not available in the other two.

DESIGN OBJECTIVES

Although the main objective of the Series 64 was to extend the price/performance of the HP 3000 computer family to a new high level, there were several other design objectives that were important. These included:

- Software compatibility with existing MPE based systems
- I/O System compatibility with HP 3000 HP-IB peripherals
- Availability of Guaranteed Uptime Service (GUS)

Software Compatibility

The Series 64 is software compatible with previous HP 3000 family members. MPE, the MultiProgramming Executive, is the operating system for the HP 3000 product line. Object code compatibility is preserved such that any application program written on other HP 3000s in any of six languages (COBOL, FORTRAN, Pascal, RPG, BASIC, and SPL) will run on the Series 64.

I/O System Compatibility

The I/O system is the same as that found in the Series 44 and the other HP 3000s with the HP-IB (Hewlett-Packard Interface Bus based on the IEEE Standard-488). As in these other computer systems, the HP-IB communicates to the CPU and memory through a channel controller board which is installed on the intermodule bus (IMB). For the Series 64, however, the memory and CPU are not on the IMB; communication is accomplished through an I/O Adapter which interfaces the IMB to the Central System Bus (CSB). In fact, multiple IOAs can be supported on the CSB; currently, a maximum of two is available, which significantly increases the I/O bandwidth. This I/O system design provides customers with an upgrade path for their HP-IB peripherals, HP-IB device controllers, and channel controllers.

Availability of Guaranteed Uptime Service (GUS)

In order for GUS to be available on the Series 64, high reliablility and supportability were important design goals. This Guaranteed Uptime Service is Hewlett-Packard's money-back guarantee program that insures that at least 99% of the time, the CPU, cache, main memory, and I/O system including one or two system discs are operational. In order to be able to offer GUS, it is imperative that the system have a high level of reliability or high Mean Time Between Failures (MTBF) and a high level of supportability or low Mean Time To Repair (MTTR).

Reliability

Increased reliability is the result of an improved interconnect scheme, a highly effective cooling system, system design for electromagnetic susceptibility, and careful component selection and qualification. Careful consideration of each of these areas was necessary to provide an optimal system design.

The large number of interconnections in the CPU cardcage demanded a dense, reliable, and cost-effective connector scheme. With a maximum of 8 Mbytes in the system, there are over 8000 high-speed backplane connections and over 1000 for the frontplane. For added reliability, two-piece connectors were chosen over the PC edge connectors for the backplane and frontplane, as well as for all frontplane edge connectors for cables. This choice also meant that gold-plated PC boards would not be required, which resulted in a considerable cost savings.

The design of the cooling was very critical to the reliability of the system. The results are impressive: even though the power dissipated in the CPU cardcage is three to eight times that found in other HP 3000 computer systems, the temperature rise for a system at room temperature is, on the average, 50% of that for these same systems. This reduction in temperature rise inside

the system leads to a much lower junction temperature for the components, which of course means higher reliability.

System reliability with respect to electromagnetic susceptibility requires that the system be immune to certain levels of electrostatic discharge (ESD), radiated and conducted electrical waves, power line transient noise, and magnetic waves. The mainframe and power system design must be done at the system level to guarantee that it is insensitive to these types of externally-generated interference. Grounding and shielding of the Series 64 System Processing Unit (SPU) has been designed to minimize the effect of static discharge. Immunity to power line transients is another important design objective, and the design of the Series 64 AC power system makes it possible for the system not to be corrupted by injected transients of up to 1000V delivered at either 20 usec or 100 usec in duration.

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The selection and qualification of quality components plays an integral part in the design of a reliable system. All semiconductor devices are covered by Hewlett-Packard's GSS (General Semicondutor Specification) which defines those standards and requirements that must be met by the suppliers and devices to meet minimum quality and reliability levels. Since ECL and 64K dynamic RAMs were critical to the success of the Series 64, extensive testing was done to evaluate these components thoroughly.

Three main ECL families were tested: 10K ECL, 100K ECL, and 10K ECL RAMs. These groups were further subdivided into the processes used to fabricate the devices. A representative part was chosen based on complexity and usage from each family and process for qualification. The qualification tests performed consisted of operating the components at elevated temperatures. Actual parametric measurements (variables data) were recorded at intermediate points from start to 1000 hours. This type of testing is concerned with stability and allows for trend analysis. Hewlett-Packard was then able to communicate back to the vendor any problems encountered with enough data such that proper action could be taken.

HP has developed much experience as an aggressive user of semiconductor memories. Through the co-operation of the using divisions, a corporate specification was developed; it was also possible to establish efficient and effective evaluation and qualification procedures for 64K RAMs. Aggressive soft error rates were specified to the vendor. To verify this specification, numerous RAMs were tested at the system level and at accelerated conditions. The results were the early establishment of qualified suppliers and devices for Hewlett-Packard and the Series 64.

Supportability

The other aspect of system availability is supportability: the length of time it takes to isolate a failure when it occurs and then to fix it after detection. Serviceability in the Series 64 is enhanced by a sophisticated diagnostic control processor and comprehensive fault locating diagnostics. The Diagnostic Control Unit or DCU is a separate processor that has the capability to access CPU registers, monitor line voltages and system temperature, conduct self-tests, and log errors on the system. With extensive microdiagnostics, it also can isolate hardware failures down to the functional board level. Since microcode is stored in RAM and not in ROM, there was no real limitation to the amount of storage required for microdiagnostics. Therefore, it was possible to develop tests that would perform a hierarchical diagnosis of the hardware, allowing quicker and more accurate isolation of faults. As in other HP 3000 computer systems, remote diagnosis is also provided.

With the HP 3000 Series 64, Hewlett-Packard is able to provide its customers with a 1 MIP machine which is software compatible with applications developed on other members of the HP 3000 computer family and which supports the customers' investment in HP-IB peripherals. This increased performance has been achieved through the application of high speed technology to a system design using a creative CPU architecture for implementing the HP 3000 instruction set and a hierarchical memory system. Reliability and supportability have been designed in at the system level.

Series 64 Operator Information

by Stephanie Littell, Computer Systems Division

As stated elsewhere in this issue, the Series 64 will support one or two InterModule Buses (IMBs) per system. This is an improvement over all other HP-IB systems, which support only one IMB per system.

START/LOAD/DUMP INFORMATION

The addition of a second IMB to the Series 64 means that when using the START/LOAD/DUMP command, the proper device must be specified with three decimal parameters as follows:

```
cntl B   START=<IMB#>,<CHANNEL#>,<DEVICE#>
         LOAD =<IMB#>,<CHANNEL#>,<DEVICE#>
         DUMP =<IMB#>,<CHANNEL#>,<DEVICE#>
```

These operator commands must all be executed through the console keyboard. There are no START/LOAD/DUMP front panel keys as on previous HP3000s.

Default parameter values are provided by the Computer Systems Division upon shipment of the Series 64. These values are as follows:

START device	0 , 3 , 1
LOAD device	0 , 2 , 1
DUMP device	0 , 3 , 1

If the operator should choose one of the default devices for the operation, then the three parameter values need not be specified. For example, if the system disc is configured as IMB 0, Channel 3, and Device 1, it is sufficient for the operator to type:

```
cntl B START
```

on the console in order to start the system. If the operator then wishes to designate a new START device, the new configuration will become the default through typing in different parameter values for the START command. This new configuration will continue as default unless a battery power fail should occur, at which time the HP-provided values again take effect. The current default is always displayed in the Series 64 console banner.

OPERATOR DIALOGUES

The new Initiator and Sysdump dialogues will now allow for a higher Device Reference Table (DRT) number in the I/O configuration sections. A conversion table will be provided in the Console Operator's Guide to assist the operator in obtaining a decimal DRT number, required by the configuration dialogues, from the separate parameter values existing for a given device.

OVERTEMP WARNINGS

A new overtemperature warning is also being added to the Series 64 system. If the system reaches 30 C,this will be indicated by an overtemp light on the front panel, the display of an overtemp message in the console banner, and also by the emission of a warning beep from the console every 10 seconds. The beeps will continue, either until the system temperature drops, or until it reaches 40 C. The warning beeps will cease if the temperature drops below 30 C. However, if the temperature increases to 40 C, the warning beeps will be issued every second for one minute. At the end of that time interval, the system will automatically perform a power fail.

It is advisable that the operator take advantage of the 10 second warning beeps to check for possible obstructions around the system as a potential cause of overheating. He/she should use the last minute 40 C warnings to warn users on the system of the impending halt and then shutdown the system.

WRITEABLE CONTROL STORE

With the addition of a Writable Control Store for the Series 64, microcode to support the system can now be distributed via the same mechanism as software updates. The microcode is contained in a special system program file, SYSWCS64.PUB.SYS, which is distributed on the software update media along with the new system software for the Series 64.

In order to load a Series 64 with a backup tape, the SYSWCS64 file must have been present on the system when the backup tape was created.

CURRENT INSTRUCTION REGISTER

On the front panel of the Series 64, a 16 bit Current Instruction Register now replaces the system activity indicators found on previous HP-IB 3000s. This Series 64 implementation is similar to that found on the Series II/IIIs.

For further details on the information in this article, please refer to the MPE Console Operator's Guide.

For the First Time . . . One Product that Satisfies all Peripheral Storage Requirements!

by Gary Lyons, Disc Memory Division

DMD is excited to announce the arrival of the HP7911\7912 Disc/Tape Drive. The 7911 and 7912 are two of Hewlett-Packard`s newest disc products, incorporating a Winchester disc for mass storage and a 1/4-inch cartridge tape drive for personal I/O and backup.

The HP7911 and 7912 consist of three fundamental components:

*A Winchester technology disc drive (includes the intelligent controller)
*A streaming-mode cartridge tape drive
*A compact modular package

The 7911 and 7912 offer 27 and 64 Mb of formatted mass storage and performance improvements over our top-of-the-line 7925. The average access time has been reduced to 35 msec., while the transfer rate has been pushed to 983 Kbytes/sec. In addition, the implementation of Winchester technology enhances the reliability of the 7911 and 7912 and enables them to operate in high particulate environments.

The 1/4-inch cartridge tape drive is the state-of-the-art for cartridge tape units. Hewlett-Packard is the first manufacturer to release a product with this tape device. (HP purchases this mechanism from 3M and has added the electronics.) The tape media used is the DC-600 type, capable of storing up to 67 Mb on a single cartridge. This capacity leads the industry by a large margin. There are two versions of the tape cartridge: a 16 Mb and a 67 Mb version. These high capacities are achieved by a unique 16-track recording format and make it possible to backup an entire disc on a single tape cartridge. The cartridges are sold at a price which makes their use a very economical solution for disc backup.

The final element of the 7911 and 7912 is some innovative packaging which physically integrates the disc and tape drives into a single, compact unit. The disc and tape drives share the electronics and power supply; therefore, they can share the same cabinetry. This unique packaging concept reduces manufacturing costs which, in turn, reduces the price of the finished product. At the same time, the 7911 and 7912 require much less floor space (about 1/4) than individual storage products providing the same utilities (i.e., disc, mag tape, and floppy). The 7911 and 7912 are available in a stand-alone cabinet which was designed with aesthetics and

convenience in mind and is ideally suited for office environments. Each is designed to operate very quietly, approximately 54 dBA.

To achieve the greatest system performance, an additional controller has been congifured with each of the disc/tape drives. The additional controller is offered as Option 001. It will be necessary to have this on any supporting 3000 system.

The 7911 and 7912 present an excellent opportunity for HP system users to save thousands of dollars when configuring their systems with complete peripheral storage capabilities. This unique integrated storage product will prove invaluable to you as an inexpensive, compact and attractive peripheral storage solution.

Introducing the 7911/7912 Disc Drives with the Integrated Cartridge Tape Drive

by Adrienne Frost and Shannon Thwaite, Computer Systems Division

The HP7911/7912 Disc/Tape Drives are new peripherals which house both a Winchester-technology (non-removable media) disc drive (HP7911 or HP7912) and a new Integrated Cartridge Tape Unit. (The cartridge tape drive is standard but either disc drive can be purchased without the cartridge tape drive by using a delete option when ordering.) All of the MPE changes that apply to the HP7935 also apply to the HP7911/7912. This article details the impact of the new peripheral package on the MPE operating system. For details on the new peripheral itself, see the article in this issue of the Communicator entitled "One Product That Satisfies All Peripheral Storage Requirements!", by Gary Lyons.

THE HP7911/7912 DISC DRIVES

Device Capacities

The HP7911 has a capacity of 27 megabytes and the HP7912 has a capacity of 64 megabytes.

Device Configuration

The HP7911 is configured as type 3 and subtype 1. The HP7912 is configured as type 3 and subtype 2. The driver for the HP7911/7912 is HIOMDSC2. The record width for the HP7911/7912 is 128 words and the standard device class conventions for other disc drives, i.e., DISC, SPOOL, or user-specified classes are supported.

System Support

The HP7911/7912 disc drives are supported in the system domain and also as a coldload device on Series 40/44 Systems. The HP7911/7912 disc drives are NOT supported on the Series 30/33. The Series 64 supports the 7911/7912 in the system domain but not as a coldload device.

THE INTEGRATED CARTRIDGE TAPE DRIVE

The Integrated Cartridge Tape Drive is the new serial backup medium for the low-end HP 3000 Series 40SX. Packaged in the same cabinet as the HP7911 or the HP7912, the Integrated Cartridge Tape Unit is a separate peripheral supported on its own

controller and GIC. The Integrated Cartridge Tape Unit is supported as a SERIAL disc device on the HP 3000 System Processing Units (SPUs). All SERIAL disc operations are supported with the exception of FOREIGN disc operations.

Device Configuration

The Integrated Cartridge Tape Drive must be configured as Device Type 3, Subtype 0. The driver name is HIOCTAP0. Any Device Class name may be chosen but must have the capability of being configured in as a SERIAL device class. An example of a widely-used class name is "CTAPE". (This class name is required for user logging to the tape.) The FOREIGN disc class is not applicable for the Integrated Cartridge Tape Drive. The Unit Number will always be zero (0), with Record Width of 128 words.

In summary, the Integrated Cartridge Tape Drive must be configured in a SERIAL Device Class in order to function properly.

Configuration Restrictions

The following chart illustrates the Integrated Cartridge Tape Drive configuration and its restrictions. Note that the Integrated Cartridge Tape Drive is NOT supported on a Series II or Series III, with or without an HP-IB Interface Module. The Integrated Cartridge Tape Drive can only be supported as the main coldload/backup device on a system configuration of 128 Mb of disc storage or less. The Series 64 supports the Integrated Cartridge Tape Drive for software compatibility only, i.e., as a serial device. The Integrated Cartridge Tape Drive is not to be supported as the main coldload/backup device on a Series 64.

	Coldload device	Store/ Restore	Fcopy	Sysdump	User Logging
S30/33	NO	NO	NO	NO	NO
S40/44	YES	YES	YES*	YES	YES+
S64	NO	YES	YES*	YES	YES+

* NOTE: Any Serial Disc (tape-type) supported.
\+ NOTE: Refer to the article entitled "User Logging to the 7911/12 Integrated Cartridge Tape Drive" in this issue.

Device Recognition

The Integrated Cartridge Tape Drive will be treated, in all cases, like the existing Serial Discs as far as Device and Volume recognition is concerned. The exception to this is in the response to the Operator pressing the LOAD/UNLOAD button on the Drive. With the Integrated Cartridge Tape Drive, the UNLOAD request will be accepted or denied depending on whether the Drive is free or in-use. Following are the two appropriate Console messages emitted to reflect the system's response to the request, if the Drive is configured as LDEV#2:

"Dismount Request on LDEV#2 Denied - Volume in Use" or "Dismount Request on LDEV#2" "VOLUME DISMOUNTED ON LDEV#2"

VINIT Subsystem

The VINIT enhancements for the Integrated Cartridge Tape Drive are primarily intended for the Series 40 and the 40SX, and will initially be introduced on the software installation media that supports these models. VINIT has only been expanded to allow inclusion of the Integrated Cartridge Tape Drive; the mode of operation remains the same.

With these enhancements,the following subset of VINIT commands can now be used for the cartridge tapes: SCRATCH, SERIAL, FORMAT, DSTAT and PLABEL. All other commands are disallowed for serial devices.

SCRATCH : Operates in the same manner as earlier versions. It sets or clears the scratch flag in the label sector of the serial medium.

SERIAL : Writes a valid serial label for the cartridge tape.

FORMAT : Allows on-line formatting of cartridge tapes and discs. Formatting is necessary for the initialization of new cartridge tapes. It will take approximately one hour to perform this function on a 67 Mb cartridge tape.

DSTAT : Displays the status of serial devices, including the new Integrated Cartridge Tape Device.

PLABEL : Displays the contents of the label for the cartridge tape or other serial devices.

Cartridge tapes must be formatted at least once before they can be serialized. They may be serialized in the same manner as other serial discs.

Softdump Facility

This facility is supported on the Series 30, 33 and 44, and has now been expanded to include the Series 40, 40sx and 64. No changes have been made to the user interface, and the SOFTDUMP facility operates in the same manner as it did previously.

On the Series 40, 40SX, and 44 systems, a dump of main memory can be performed to the Integrated Cartridge Tape Drive, and the Integrated Cartridge Tape can be used as the backup medium for the SOFTDUMP program.

Hewlett-Packard requires that before an Integrated Cartridge tape is used for the above mentioned purposes, it must be formatted and serialized using the VINIT subsystem. In any case, when using an Integrated Cartridge Tape Drive a long load time can be expected.

SADUTIL Utility

The Stand Alone Disc Utility (SADUTIL) has been modified to support the Integrated Cartridge Tape Device. The specifications for this device are as follows:

TYPE = 3, SUBTYPE = 0.

These specifications can now be given to SADUTIL when the question "SERIAL DEVICE CHANGES?" is asked by the SADUTIL CONFiguration command language. The CONFiguration dialogue will remain the same.

When running the SADUTIL 'SAVE' function on an HP-IB system to an Integrated Cartridge Tape Drive, the medium should already be formatted and serialized. The VINIT subsystem can be used to serialize the cartridge tapes containing the DUS/AID diagnostics subsystem.

The two versions of SADUTIL (the Series II/III version and the HP-IB version) have been merged. The interface is the same and both versions have the same commands. Therefore, SADUTIL on the Series II/III will support the COPY command. Refer to the MPE System Utilities Reference Manual for further information on this command.

Diagnostics

There are no On-line Diagnostics for the Integrated Cartridge Tape Drive.

User Logging to 7911/7912 Integrated Cartridge Tape Drive

by Kim Rogers and Greg Grimm, Computer Systems Division

MPE Serial Disc has been extended to include the concept of a labeled serial disc. Since MPE treats the 7911/12 integrated cartridge tape drive as a serial disc drive, this capability will allow MPE to treat a tape on the 7911/12 integrated cartridge tape drive as a labeled tape. MPE will also treat standard discs as labeled serial discs, allowing a serial disc to emulate a tape in an absolute sense. The File System Intrinsics will perform all tape label functions on a serial disc.

Users of the 7911/12 integrated cartridge tape drive, or any disc capable of being a serial disc, will be able to do trans- action loging to that serial disc.

A labeled serial disc works in exactly the same way as a labeled tape. The rule of thumb is that any function performed on a labeled tape may now be done on a labeled serial disc. This "rule" will include the following capabilities and exceptions:

MPE now has the ability to cause Automatic Volume Recognition (AVR) of a labeled serial disc. Console AVR messages that correspond to labeled tape will now also correspond to labeled serial disc (in addition to the standard serial disc mount message). For example, if a labeled serial disc with a volume id of "GREG" was mounted on logical device 2, the following messages will appear on the operator`s console:

```
Vol GREG mounted on LDEV# 2
SERIAL DISC MOUNTED ON LDEV# 2
```

If the serial disc is unlabeled, the appropriate messages will be displayed on the console.

MPE now has the ability for the File System to treat a serial disc as a labeled serial disc. This includes the writing of appropriate labels onto the disc. MPE supports reading and writing of ANSI type labels on serial disc as well as on labeled tape. The most visible result of this is the fact that in any MPE command in which labeled tape is supported, a device type of a serial disc may be substituted in place of device type TAPE.

A difference between labeled tape and labeled serial disc is that when a disc device goes offline the device will not appear to the system (via SHOWDEV) as though there is a volume mounted. This is not the case with a labeled tape. (Since a tape drive will not cause an interrupt when it goes offline, the Tape Label Table will not be updated until a new tape is mounted on that drive. The disc drive, however, will cause an interrupt and the table will be updated on the dismount interrupt instead of waiting for a new mount.)

Another difference is that the system will require that users mount serial discs before replying to the mount request. If the device has not been mounted before replying, the mount message will be displayed on the operator`s console again.

For system-wide compatability, user logging has been enhanced to make use of labeled serial discs.

The following is the new user logging commands syntax:

```
                                SDISC
:GETLOG logid;LOG=logfile,{CTAPE} [;PASS=password]
                                TAPE
                                DISC

                                  SDISC
:ALTLOG logid [;LOG=logfile,{CTAPE}] [;PASS=password]
                                  TAPE
                                  DISC
```

The above syntax remains as in the past with the addition of "CTAPE" and "SDISC" as the new types of logging files. Formerly, user logging required "DISC" and "TAPE" to be configured device class names for a disc and a tape device. With this enhancement, the class name "CTAPE" must be a configured name for the cartridge tape device and "SDISC" for a serial disc device. Failure to have these device class names when the logging process is started will result in an FOPEN failure of the logfile and the logging process will not be started.

From the user`s viewpoint, all User Logging and File System intrinsics will perform as in the past. The procedures for starting a serial disc logging process are identical to that for a tape logging process.

SR #16779 reported a problem whereby the logfile name was not properly stored in the Logging Identifier Table, causing the LISTLOG output to sometimes appear incorrect. This problem has

been corrected; however, the table entries must be reset before the logging process can successfully open the log file. To reset the table, enter LISTLOG to see if there are any logging identifiers. If there are, issue a RELLOG for each one. When you then reissue the GETLOG the table entries will be reset so that the logging process can open the file and successfully start.

The HP 7933 Disc Drive: Largest Capacity and Lowest Cost Per Megabyte

by Greg Hite, Disc Memory Division

For your ever-expanding distributed networks and rapidly growing data bases, Disc Memory Division offers the 7933 disc drive. With 404 megabytes of formatted storage, the 7933 provides over 300% more storage capacity than the popular 7925. It does so in roughly the same size package and at a 55% reduction in the cost per megabyte; further, the Basic Monthly Maintenance Charge (BMMC) is significantly lower for the 7933 than for the 7925M. A long list of attractive features have been designed into the 7933, making it the most powerful disc drive available.

The 7933 disc drive comes equipped with some very advanced internal diagnostics. The microprocessor-based controller designed into every 7933 uses nearly 50 Kbytes of ROM, 2/3 of which are used for extensive diagnostic routines which can be run off-line by using the 16-key keypad and the eight-character alphanumeric display on the front panel. Many of these diagnostics are run in the background during disc idle time.

Two of the automatic diagnostics have eliminated the need for scheduled preventive maintenance: filter check and automatic head alignment. The integral controller also assigns the spare sectors (one per track) and spare tracks (six per surface) as requested by the SPU, so that all logical addresses can remain physically sequential. Correctable data errors are corrected in "real-time" as data is shifted from the media to the HP-IB port through a 4K byte buffer. A programmable number of retries will automatically be initiated if the data is not correctable using the error correction code. All errors, including diagnostic errors, encountered during drive operation are logged onto the maintenance tracks. These maintenance track logs can be viewed by a C.E., allowing a complete review of the events leading up to a service call.

The chart below provides format information for the 7933.

	7925	7933
Platters	5	7
Heads (data/servo)	9/1	13/1
Sectors/Spare Sectors Per Track	64/0	92/1
Bytes/track	16K	24K
Bytes/Cylinder	147K	306K
Cylinders/Drive	815 (823 incl spares)	1321 (1327 incl spares)

Now that you know the 7933 offers large capacity and is very inexpensive to purchase and maintain, the next question must be "When can I get one?" Orders are now being accepted for use on HP3000 Series III III (with interface adapter), Series 40, 44, and 64. Contact your local sales office for availability; initial projections show a 26 week leadtime. For more immediate requirements, 7925s are available for purchase (trade-in program is in place) or lease.

sectors/track
tracks/cyl
93 * 13 * 1327
cyl/drive

Introducing the HP 7933 Product Mit Release

by Paul Latta, Computer Systems Division

The HP 7933 product MIT release brings the support of the new, large capacity 7933 disc drive. This release is part of Hewlett-Packard's continuing strategy to provide improved price/performance peripherals to the HP3000 installed base. Upon initial release, the 7933 provides Series 40, Series 44, Series 64, and Series III (with the 30341A HP-IB Adapter) with a large mass storage disc (404MB) which is supported as system disc, serial disc, and private volume.

To support the 7933, parts of MPE have been changed and enhanced to implement a new sector/track sparing strategy that provides friendlier and more efficient use of the new disc drive. Because of the disc's large capacity, the algorithm and tables used for allocating/deallocating disc space have been changed from using a free space table to a free space map. This change requires a conversion program before the installation of all versions of MPE with the VUF of C.00.06, C.00.08 or later. This article will point out the user interface changes due to the new sparing strategy and explain the scenario for the conversion of the discs.

The configuration dialog in SYSDUMP and INITIAL has not changed in sequence, but there are a few new responses. The 7933 is type 3, subtype 8, and the new driver name is HIOMDSC2.

With the 7933, the responsibility for managing spares on these discs has been largely removed from the user. From changes made to VINIT and INITIAL, this ease of use carries for both private volume/serial discs and system domain discs.

CHANGE TO DEFECTIVE TRACK/SECTOR DIALOG

The Defective Track Dialog in INITIAL has changed to a new format. The prompt "LIST DEFECTIVE TRACK TABLE" has changed to "LIST DEFECTIVE TRACK/SECTOR INFORMATION?". The new format of the table for the 7933 is:

```
NO. OF SPARE OPERATIONS =
NO. OF SPARE TRACKS USED =
NO. OF SPARE TRACKS AVAILABLE =

                    SPARED TRACKS
   LOGICAL          FIRST         LAST
  CLY   HEAD      SECTOR(%)     SECTOR(%)
-----------------------------------------
```

Other changes in this dialog include:

* When a user answers "yes" to "DELETE TRACK" in INITIAL and then attempts to delete a track on a 7933, INITIAL will reject this and print an error message.

* Since the 7933 has fixed logical size, INITIAL does not prompt with "LOGICAL PACK SIZE (CYLINDERS)=<size>. Additionally, all other prompts given by INITIAL asking the user if they wish to "DELETE", "REASSIGN", or "RECOVER" tracks do not appear and do not apply for CS80 discs. (There are no SYSDUMP CHANGES regarding defective tracks/sectors).

FST TO DFSM CONVERSION

With this software release, the Free Space Table is being converted to a Disc Free Space Map. The Free Space Table is a method of keeping track of free space on a disc that is essentially a list of free space descriptors. The Disc Free Space Map (DFSM) is a bit map where each bit represents a sector on the disc. The FST is handled by one data segment locked by the FST SIR. In the DFSM, there is a communication data segment for each disc which will now allow parallel allocation/deallocation of disc space. The new DFSM will be in effect for all versions of MPE with the VUF of C.00.06, C.00.08, or later. To UPDATE to the new versions of MPE, a conversion is involved which consists of executing a program and then running through some interactive dialog. This conversion MUST be executed when updating a system from an FST system, i.e., a system running on a version of MPE of C.00.05 or before, to a DFSM system (MPE version C.00.06 or later). Once the conversion program has been executed on the FST system and the FST system has been UPDATED to the DFSM system, the conversion program need never be run again for subsequent UPDATES, as long as the UPDATES are always to another DFSM system. Conversion guidelines and the conversion scenario are described below, followed by an expanation of how a backwards conversion is performed.

Conversion Guidelines

Private volume conversions can be done on either a FST (unconverted) system or a DFSM (converted) system. While running the Private Volume conversion program on a DFSM system, the user needs to have system manager capabilities, so the program can purge files from the specified accounts/groups to make room for the descriptor,directory (on master volumes), and/or bit map if there is not room available.

Before the conversion takes place, the system should be backed up and a coolstart/warmstart with recover lost disc space option performed (likewise, the private volumes should be backed up). This could be performed by the user before the SE/CE arrives on site.

These are the necessary conditions to run the conversion programs:

1) You must have PM capability.

2) There can be no other sessions or jobs.

3) There can be no temporary or $oldpass files.

4) For system disc conversion, there can be no spoolfiles present or currently being printed.

5) For private volume conversion, the whole volume set must be physically and logically mounted, even if only a single volume of the volume set is being converted.

6) If discs requiring IOMDISC0 are on the system, such as the 2888, 7900, 7905 etc., these systems will need to be on VUF C.00.04 in order to run the conversion program and update.(The reason for this is that IOMDISC0 would not allow a write request to Sector.)

Scenario For Converting The FST to DFSM

The scenario for converting the Free Space Table (FST) to the Disc Free Space Map (DFSM) consists of two parts:

1) converting the system discs

2) converting the private volume discs

System Disc Conversion

You will need to restore CONVP.CREATOR.SYS (the conversion program) and CCATALOG.CREATOR.SYS (the message catalog file) from the product tape. Next run CONVP and begin the console exchange:

1) The program will remind you that you should have your files backed up.

2) Next it checks for existing spoolfiles, checks that you are the only one on the system, and checks that there are no temporary or no $oldpass files.

3) The program then determines which discs in the system domain are unconverted and prints out a list of the volume names and LDEVs with a question asking if you want to continue the conversion.

4) If you say you want to continue, it checks these discs for the necessary space it needs for the conversion.

* Sectors 0-617 are now reserved for the system (other system discs will have sectors 0-11 reserved). The program moves the directory if some of the directory space is in the reserved area. Other files in this reserved space must be purged and if any exist at run time the program will search all of the directory to find them and list them on the terminal.

* There also needs to be space for the descriptors and bitmap for each disc. If not enough space is found for these or additionally for the move of the directory in the condition mentioned above, the program will search the directory for 5 candidate files (files that will individually resolve either the directory or bit map/descriptor space problems). The program then asks if you want to continue the search through all of the directory for more candidates or quit so you may resolve the space problem.

If not enough space is found the program will terminate. Thus it is explicitly up to you to purge enough files so the program can convert the discs.

5) If enough space is found the program will ask you if you want to convert.

   * If you answer yes, breaks are disabled (before this point, a control Y will terminate the program except when control Y is disabled during searching for candidate files).

6) After each LDEV is converted, a confirmation message is sent to your terminal.

   * If, in converting the discs an error is encountered, the program restores the discs so they can be used with a FST (unconverted) system without a reload, and then terminates.

7) When all the system discs are converted, a message is displayed on the system console. The program then halts the system so that an update from the product MIT can be performed to install the new version of MPE. (Note: Be sure you are performing the update from the 7933 product tape. If you update with a FST system, you will probably destroy parts of the system and will then have to reload.)

Private Volume Conversion

You will need to restore PVCONVP.CREATOR.SYS (the private volume conversion program) and CCATALOG.CREATOR.SYS (the catalog file from the product tape). Next run PVCONVP and begin the console exchange:

1) The program will remind you that you should have your files on the private volume(s) backed up.

2) Next it checks that you are the only one on the system, and that there are no temporary or $oldpass files.

3) The program then asks which LDEVs you want to convert. Each volume of a volume set must be mounted even if not all of the volumes are being converted at that time.

4) After verifying the mountings, the program looks for the necessary space.

   * Sectors 0-11 are now reserved for the system. The program will take care of the directory (on master volumes) if some of the extents are in this reserved space. Other files in this space must be purged and if any exist at run time, the program lists them on the console. These files can be stored and then restored after the conversion.

   * Also, there needs to be enough space for a descriptor and a bit map on each disc. If not enough space exists for these or the directories as mentioned above, the program will search for five candidate files (files that will individually resolve either the directories or descriptor/bitmap space problems) and ask if you want to continue the search through all of the directory for more candidates or quit because you already have satisfactory choices.

   Once all the searching is finished, if the program is run on a DFSM (converted) system and space is needed for the conversion, the program will ask you if you want it to purge files for you.

   * You must either purge files with this program or take the private volumes to an unconverted system.

   * If you :PURGE a file on a DFSM (converted) system software from the FST (unconverted) private volumes, the space purged will not be updated in the Free Space Table (this is the table the conversion program checks for adequate space to convert to DFSM).

5) When the program finds space to convert the private volume(s) to DFSM format either through the explicit purging after termination (if program is run on FST (unconverted system)) or purging during the program (if program is run on DFSM (converted system)) it then asks you if you want to convert.

* As soon as this is begun, breaks are disabled until program conclusion (before this a control Y will break the program except for during candidate file searching).

* After each LDEV is converted there will be a terminal display and a final message when all discs are finished.

What To Do If The System Fails or Program Aborts

Both of these conditions are highly unlikely, but if one should happen this is what you should do: for either condition, you can just rerun the program if the failure happens before the program explicitly asks you if you want to convert. After this time, it will be necessary to use the backward conversion program and then perform a reload.

How To Perform A Backwards Conversion

The BACKWARP program cleans up the system discs and allows a reload of a FST system. It does not convert the discs to FST format. The program zeroes out some of the DFSM words in the disc label which are not needed by the FST system. (Note: You are required to use this program to convert backwards. Otherwise, everything will work until you want to convert to DFSM, at which time you will have problems.) Again, if you have discs requiring IOMDISC0 you will need to be on the DFSM (converted) system or on VUF C.00.04 in order to be able to write to sector 0. You will need to restore BACKWARP.CREATOR.SYS (the program) and CCATALOG.CREATOR.SYS (the catalog file from the product tape). Next run BACKWARP and begin console exchange:

1) The program checks that you are the only one on the system, that there are no temporary or $oldpass files, and that there are no spoolfiles (you would lose these files during a reload).
2) Next the program determines which LDEVs will be converted and prints out a list of the LDEVs. You are asked if you want to continue.
3) You will receive a message after every LDEV completion of conversion and a message when all LDEVs are done.
4) The system will then halt so that a FST system can be reloaded.

You cannot convert private volumes backward; instead use VINIT, rebuild the accounting structure of the private volume, and restore the files on the FST system.

The backwards conversion program will work by doing a reload then running the backwards conversion program. This scenario can be used if the converted system will not stay up long enough to run the backwards conversion. (Again, the running of the backwards conversion program before the next conversion attempt is critical to the success of the attempt.)

Introducing . . . The Advanced Terminal Processor

by Jay Puri, Computer Systems Division

The Advanced Terminal Processor is designed to connect asynchronous terminals/workstations to the HP3000 Series 44 and 64 in a point-to-point configuration. This terminal controller embodies state-of-the-art LSI technology with a separate, dedicated Motorola 6801 microcomputer for each terminal port. The microcomputers perform the protocol functions necessary to maintain integrity of communication between the HP3000 and the connected terminals. Modular design of the product permits incremental increases in processing power to match your needs. Both character-mode and block-mode terminals are supported.

ENHANCED PERFORMANCE

In typical applications, the ATP reduces HP3000 CPU utilization for terminal processing by 65% as compared to the ADCC. This is accomplished by using the direct memory access (DMA) mode of data transfer, thereby eliminating interruptions of the HP3000 CPU for each I/O character. Also, the design of the ATP virtually eliminates data overruns, even in environments where many block-mode transfers occur simultaneously. The performance advantages of the ATP are therefore especially significant in the high transaction-volume, block-mode terminal environment.

RS-422 INTERFACE FOR LOCAL CONNECTIONS

The ATP has a broad range of interfaces to allow terminals to be attached either directly (for intrafacility use) or through full-duplex modems (for remote installations).

With the introduction of the ATP, Hewlett-Packard becomes one of the first companies in the industry to adopt the new EIA RS-422 standard for local connection of asynchronous devices. This allows most 262x and 264x terminals operating at 9600 bps to be connected to the computer with cables up to 1220 meters (4000 feet) long. The RS-422 interface also provides excellent noise immunity and eliminates RFI problems for adjacent equipment.

In addition to the RS-422 interface, the ATP supports the RS-232C (CCITT V.24) standard for both local and remote connections.

SYSTEM ENVIRONMENT

The ATP is mandatory for connecting point-to-point terminals to the HP3000 Series 64. It can also be used on the Series 44 in addition to an ADCC for the local attachment of terminals. One ADCC is required on the Series 44 for the console terminal.

The ATP is not available for the Series III, 30, 33, 40, or 40SX.

The New Advanced Terminal Processor (ATP) Vs. the ATC and ADCC

by Sue Thompson, Information Network Division

Each HP3000 hardware environment has its restrictions and advantages which must be considered, along with a particular applications wants and needs, when the user is going from one HP3000 system environment to the next. Following is a comparison of the differences between the three asynchronous interfaces that will be available in the HP3000 family of computers when the new Advanced Terminal Processor is released on the Series 64.

TERMINAL TYPE SUPPORT

ATC - 0,1,2,3,4,5,6,9,10,11,12,13,15,16,18,19,31
ADCC - 4,6,9,10,11,12,13,15,16,18,19,31
0,1,2,3,4,7,8,11,14,17 reserved for later use
default term type=1
ATP - 5,6,9,10,12,13,15,16,18,19

SUBTYPE SUPPORT

ATC - 0,1,2,3,4,5,6,7
ADCC - 0,1,2,3,4,5 (eliminates speed-specified, half-duplex devices)
ATP - 0,1,14,15 (eliminates all speed-specified devices and all half-duplex devices)

SPEED SENSING

ATC - performed by hardware, up to 2400 baud, resulting in a line speed generation at either even or odd parity setting.
ADCC - Performed by software, up to 2400 baud, resulting in a line speed generation at either even or none parity setting.
ATP - Performed by the hardware via the 6801 microprocessor, up to 9600 baud, resulting in a line speed generation at either odd or even parity setting.

DELAY CHARACTER REQUIREMENTS

ATC - pads are used after cr, lf, and/or ff leaving data comm line at the mark condition.
ADCC - null character is used for pads (i.e. start bit followed by seven zeros and the appropriate parity bit)
ATP - Term Type 6 provides a delay of .3 seconds after cr, lf, and/or ff during which the line is in the mark condition).

TAPE MODE SUPPORT

ATC - Supported under term type 6
ADCC - Term type 6 supported but tape mode function is not
ATP - New term type 6; however, tape mode not supported.

PARITY CONTROL

ATC - 8th output bit can be set, via fcontrol logic, to odd, even, forced to 1, or "pass thru" parity.
ADCC - Ith output bit can be set to odd, even, or "pass thru" parity.
ATP - Because of the microprocessor/port, 8th output bit can be set to odd, even, "Pass Thru", or forces to 1 or 0.

INPUT CHARACTER HANDLING

ATC - 8th input bit is forced to zero in standard and unedited mode for 7 bit terminal types.
ADCC - 8th input bit is "Pass Thru" in standard and unedited modes if parity is disabled or set to none. During "idle read" state (i.e., no write posted to the driver) xon/xoff characters are ignored.
ATP - 8th input bit is forced to zero in standard and unedited mode for 7 bit terminal types.

NOTE: For more information on the ATP, see the article "HP DSN/ATP: Subsystem Features and Usage" in this issue.

HP DSN/ATP: Subsystem Features and Usage

by Sue Thompson, Information Networks Division

The Advanced Terminal Processor (ATP) will be the primary asynchronous serial I/O interface for the series 44 and the only asynchronous serial I/O interface for the Series 64. The following information is provided to assist in the configuration and use of the Advanced Terminal Processor (ATP).

I/O CONFIGURATION CONSIDERATIONS

To add a terminal port to the system configuration, you must answer "yes" to the question "any changes?" (see System Manager/System Supervisor" manual for complete information on I/O Configuration Dialog).

A new question has been added to the I/O Configuration Dialog. For the Series 64 MIT only, the following question will be presented every time you enter the device type of either 16 or 32:

PROTOCOL? (Enter 0)

This question will not be applicable until second release of the ATP; therefore zero (0) is the only allowed response.

For the remaining questions in the I/O Configuration Dialog please read "The New Advanced Terminal Processor (ATP) vs. The ATC and ADCC" article in this COMMUNICATOR for further I/O configuration considerations as to what device type, term type, and subtype should be used for a particular terminal, etc.

To determine the DRT# for either an ADCC port or an ATP port, use the following formula:

(IMBI# x 128) + (channel# x 8) + device# = DRT#

Where: IMBI# is the I/O adapter interface for the Series 64 only. Therefore, in an ADCC environment you can eliminate IMBI# calculation from the above formula.

Channel# is the thumbwheel setting on the System Interface Bus for the ATP or the thumbwheel setting on the ADCC main.

Device# is always 0 for the ATP subsystem and is 0 through 7 (unique number for each port configured on the ADCC) in the ADCC subsystem environment.

NOTE: Since the DRT can only be 8 (channel 1, device 0) in the ATP subsystem, you must assign unique unit #'s to each port configured.

Initially there will be timing considerations dependent on the number of ports. Therefore, the user must configure in one entry in the timer request list per port and the logon time-out period must equal at least 120 seconds.

DETERMINING TBUF REQUIREMENTS

In the ATP subsystem environment each port configured has memory usage overhead plus TBUF requirements. Use the following formula to determine the amount of memory required for both overhead and TBUFS to find out if there is enough space available for the subsystem you have planned.

NOTE: It is currently recommended that you configure 1 TBUF/port and that you always configure a minimum of 30 to 40 TBUFS per subsystem.

Where: MAXDATASET - (TDSOVRHD + (#LDEVS * 26) + (#Ports * 138))
=TBUFAREA / 128 = #TBUF entries possible

MAXDATASET - the size of the largest possible data segment size as determined at SYSDUMP time by answering the questions:

ANY CHANGES? (yes)
SEGMENT LIMIT CHANGES? (yes)
MAX CODE SEG SIZE = <xxxxx>.? (Enter any # up to 32767)

TDSOVRHD - The Terminal Data Segment (TDS) overhead in words which currently equals 1,249 words.

TBUFAREA - The area remaining in the TDS that can be assigned to TBUF entries of 128 words each.

CABLING INFORMATION

Since it is expected that customers will want to add terminals from time to time and that in some instances the customer will even want to build his own cables to be used in the ATP subsystem environment, pertinent information of this nature is provided in the ATP installation manual where you can find:

- Cabling diagrams and specifications for ATP adapter cables
- Cabling connections and usage recommendations

USER SUPPORT TOOLS

An on-line diagnostic tool called ATPDSM has been provided that allows the system operator to run diagnostics on one or more ports, dump (to a disc file) I/O tables for later analysis, reset one or more ports and associated tables, display I/O tables.

In order to make ATPDSM easy for infrequent users, there will be a HELP facility to output messages on valid input and choices for the current question.

The use of the ATPDSM program is explained fully in the ATP on-line diagnostic manual to be shipped with each ATP subsystem.

In the interim, however, a brief procedure has been provided below:

ENTER:

```
Run ATPDSM.PUB.SYS
```

The system responds with:

```
Terminal Diagnostics  -- version V.UU.FF
Type the command "help" for aid.

An ATP generated dump exists. Use format to analyze it.

->  (Enter any one of the valid commands as listed below,
    including the command HELP).
```

Valid ATPDSM commands are:

Reset - to enter dialog for resetting one or more ATP ports and associated tables.

Display - to enter dialog for displaying ATP tables and terminal buffers.

Dump - to enter dialog for dumping ATP tables and terminal buffers to disc file.

Diagnostics- to enter dialog for running diagnostics on one or more ATP ports.

To exit from ATPDSM enter //.

Note: Any time you do not understand the dialog in any one of the valid commands listed above, enter "help" and an explanation of what is expected will be output.

Changes to the Dump Analysis Program (DUMPAN)

by Bob Mead, Computer Systems Division

Effective with the Series 64 I.T., several changes to the Dump Analysis Program, DPAN4, are in effect. They are primarily intended to ensure that all files necessary for thorough dump analysis are available on the dump tape, and to reduce the amount of paper to print a dump from a large memory system.

The first of these changes modifies DPAN4 to automatically append three files to the end of a dump tape, as long as the dump is processed with DPAN4 on the same machine on which the dump was taken. The three files are: LOADMAP.PUB.SYS, CONFDATA.PUB.SYS, AND MPECHECK.PUB.SYS. Once the files have been appended to the dump tape, DPAN4 will use the copy of the file on the dump tape and not the copy on disc. It should be noted that a write ring must now be inserted in the dump tape when using DPAN4, since DPAN4 now writes to the tape.

The reduction in the amount of paper required to print a large dump is accomplished with a new concept, the "mini-dump." The mini-dump is an abbreviated version of the current dump, consisting of all MPE memory resident data structures, the stack and associated segments of the current process when the dump was taken, and stacks of all other active processes. Preliminary measurements indicate that a mini-dump will require 20-25% fewer pages than the current standard dump.

Two new stream files are included in the PUB.SYS group to provide access to these new DPAN4 capabilities, in addition to the stream file DUMPJOB which already is provided in PUB.SYS. The new stream files are DUMPARCH.PUB.SYS and DUMPMINI.PUB.SYS. The actions of each stream file are as follows:

DUMPJOB.PUB.SYS - appends the three files discussed above to the dump tape and generates a standard dump.

DUMPMINI.PUB.SYS - appends the three files to the dump tape and generates a mini-dump.

DUMPARCH.PUB.SYS - appends the three files to the dump tape. NO PRINTED DUMP IS PRODUCED.

Note: the mini-dump does not format all information available on the dump tape. For complete analysis of certain problems, it may be necessary to reprocess the dump tape to generate a standard dump.

All three stream files execute DPAN4 in a mode which requires that a write ring be present on the dump tape.

Contact your local HP field representative to determine which stream file you should use and the conditions under which a dump should be taken and processed.

Microcode Changes for the Series 64

by Stephanie Littell, Computer Systems Division

With the release of the HP 3000 Series 64, it has been necessary to rewrite some of the microcode for the existing HP-IB systems to support this new machine. The stack underflow algorithms implemented on the Series 64 are identical to those used for the Series 44 but differ from the Series III algorithms. Thus, those users upgrading from a Series III to a Series 64 may experience a compatibility problem that will require some recoding. For further information regarding the code constructs which cause a stack underflow on the Series 44 and on the Series 64, please refer to the "Stack Underflow Simulation" article, Communicator issue number 26, MPE IV 2052.

Apart from the stack underflow changes implemented for both the Series 44 and the Series 64, there are no microcode changes for the Series 64 that will affect user mode programs. However, there are several changes in Series 64 microcode implementation algorithms that result in differences from all existing HP 3000s and could affect users executing in privileged mode. These changes are discussed below.

1. Executing a machine LRA instruction while in split bank mode generates a bounds violation. In other words, this problem will occur when generating a DB-relative address from a Q or S-relative displacement if DB-bank and S-bank are not the same.

2. The capability to calculate any negative fraction multiplied by 2**31 power has been added to the Series 64. This capability was not present on any previous HP 3000.

3. If a stack overflow condition should occur while executing a DIVL machine instruction, the stack may not be reconstructed correctly. However, since the stack overflow will generate an error condition, the incorrect stack reconstruction will not be seen unless a user is specifically checking S-(or Q+) relative locations in privileged mode.

4. In a stack overflow situation, if the current instruction being executed is in the right word of a double word instruction, P is still set at the current P. For all other systems in this situation, when the overflow occurs, P is already set to P+1.

In addition to these changes implemented specifically on the Series 64, there is one other enhancement for both the Series 44 and Series 64 which is not described in the "Stack Underflow

Simulation" article referenced above. Within that article, it was mentioned that performing a DDUP machine instruction when S equals Q+1 or S equals Q would cause a stack underflow. This is true for the DUP machine instruction as well.

Modifications of Existing MPE Intrinsics for the Series 64

by Stephanie Littell, Computer Systems Division

Due to the expanded flexibility in Device Reference Table configurations for the Series 64 (from a 7-bit to a 9-bit format, allowing for an increased number of DRT entries), it has been necessary to modify three existing MPE instrinsics. The modified intrinsics are FGETINFO, FFILEINFO, and PRINTFILEINFO. These changes may impact user programs running on the Series 64, but will not impact user programs running on the Series II/III,30,33,40,and 44.

When these intrinsics are used in reference to a file allocated to a device whose DRT number is less than 255, there are no changes in operation or returned values for the three intrinsics. However, this is not the case when used for those files allocated to a device with DRT greater than 255.

If the intrinsics FGETINFO and FFILEINFO are used in the latter case, care must be taken in interpreting the HDADDR (hardware address) returned argument. This argument should return the DRT number of the device in bits 0-7, and the unit number in bits 8-15. However, in the case where the DRT number is greater than 255, the 8-bit allowable field in the high-order byte of the argument is not large enough for the 9-bit DRT specification. Thus, the DRT field in the HDADDR argument will be undefined in this case, and a CCL condition code will be returned. FSERR5 will also be set ("DRT number > 255") and can then be retrieved with FCHECK.

This change in HDADDR's returned DRT value will necessitate some recoding on your part if your program uses that field or checks the condition code returned from the two intrinsics. Thus, to be assured of correct intrinsic operation, it is advisable that customer applications be simply recoded as described later in this article.

However, whether a recoding effort is specifically needed for FGETINFO will depend on which set of returned parameters are checked in your application. The FGETINFO intrinsic is structured so that once an error is encountered in obtaining a parameter value, the following parameter values are also invalid. For example, consider the following FGETINFO statement:

```
FGETINFO (FILENUM,FILENAME,,,,,LDNUM,HDADDR,FILECODE);
```

If the pertinent file is allocated to a device whose DRT number is greater than 255, the error is encountered while obtaining the HDADDR parameter value. If only the UNIT field of the HDADDR

argument is then used, there will be no need to recode the application. However, if the FILECODE parameter following is used by the application, its value cannot now be assumed to be correct, since the preceding HDADDR is in error. Thus, in this case, an application recoding effort is needed.

It is probable that almost all FGETINFO cases where the HDADDR parameter is being accessed on a Series 64 may thus need recoding. The exception is where the UNIT field of the HDADDR argument is being used rather than the DRT field, and the HDADDR argument is the last ordered parameter used by the customer application. In this case no recoding is needed.

Concerning the FFILEINFO intrinsic, it obtains the requested parameter values through an internal call to FGETINFO. Thus, the same constraints described above apply to the validity of the FFILEINFO returned values. If the UNIT field of the HDADDR parameter is the only argument used by the application in a FFILEINFO call on a Series 64, the result returned is valid. However, if several arguments are passed to the FFILEINFO intrinsic, parameter validity is constrained by the order of the internal call to FGETINFO. In view of the level of complexity added by this intrinsic through "randomizing" parameters, if information is needed from the HDADDR parameter of the FFILEINFO intrinsic, two new FFILEINFO arguments have been provided and should instead be used.

The FFILEINFO intrinsic has therefore been enhanced to allow for a more flexible DRT/UNIT format. Item number 47 will return the DRT number in a 16-bit format, type logical. Item number 48 will return the UNIT number in a 16-bit format, type logical. When recoding is necessary, these FFILEINFO arguments should now be used to obtain information previously available through FGETINFO and FFILEINFO.

To insure compatibility with all other current systems, there will be no changes to the FGETINFO intrinsic to allow for an increased DRT field. This is because FGETINFO allows only one word in an array for the HDADDR argument.

The PRINTFILEINFO intrinsic has been changed internally to allow for an extended DRT field in the file information display printed, and therefore no recoding of existing programs is required.

New SEGMENTER Features

by Jessy J. Hsu, Computer Systems Division

A new command, -LISTAUX, and two enhancements for the Segmenter are included in Series 64.

NEW COMMAND -LISTAUX

Functional Description

This command will list the names of the RBM's in the specified auxiliary USL file. The format of the list is the same as that generated by the -LISTUSL command. If a segment name is specified, LISTAUX only lists the names of the RBM's in that segment.

Syntax

-LISTAUX [segment]

Parameter

segment	(Optional) The name of the segment to be listed. If not specified, all segments are listed.

ENHANCEMENTS

1. The default index of zero in the -USE command now specifies the first inactive occurence of the specified entry or unit name. In previous versions of the SEGMENTER, the index was needed in all cases where ENTRY or UNIT was used as the USE command parameter since an index of 0 meant the first active occurence, and activating the first active occurence was of little value.

2. All entry names specified as command parameters are still truncated to 15 characters by the new SEGMENTER, just as they were by the old SEGMENTER. In the new SEGMENTER, however, a warning message is output to indicate the truncation.

Introduction to HP RAPID/3000

by Shera Mikelson, Information Networks Division

RAPID/3000 is a set of four software tools that makes it faster, easier, and more convenient to manage and use information. It interfaces with IMAGE, KSAM, and MPE files to provide greater flexibility for information management and with VPLUS/3000 to make it easy for non-programmers to enter and modify data.

The four tools are:

DICTIONARY/3000 - a data dictionary and directory facility which documents and manages the information resources on the HP 3000.

TRANSACT/3000 - a high-level application language which greatly increases programmer productivity and a processor which can be used for interactive transaction processing.

INFORM/3000 - a user report-generator which makes it simple for decision-makers to generate meaningful reports.

REPORT/3000 - a non-procedural report writer that allows customized reports to be created easily.

NOTE: DICTIONARY/3000 and TRANSACT/3000 will be available in December, 1981. INFORM/3000 and REPORT/3000 will be available in February, 1982.

DICTIONARY/3000

DICTIONARY/3000 is designed to be the heart of RAPID/3000. It stores information about data and files which is then accessed by the other RAPID/3000 products, making the actual storage and structure of the data transparent to the user. DICTIONARY/3000 also supports IMAGE, MPE, KSAM, and VPLUS forms files. Its main features are:

- Standardization of data definitions
- Built-in documentation
- Data definitions for Inform/3000, Report/3000, and TRANSACT/3000
- Utilities for database management
- Security rules

More Details

DICTIONARY/300 also supports user definitions of data for INFORM/3000. This means that users in financing, shipping, personnel, or any other end-user defined group can get the data pertinent to them regardless of where it is located in the data base or file system.

A primary feature of Dictionary/3000 is its built-in documentation. It acts as a glossary, with definitions and descriptions of data elements and files, and it records the relationships between elements and files. Defining items here helps maintain standardization of items, even if they are needed by numerous users. Several commands are available to allow users to see specific information on definitions, construction of information, and relationships.

The dictionary must be set up and maintained by a data base administrator or equivalent.

Utilities

Several utilities are included with Dictionary/3000 for data base maintenance:

DATA BASE AUDIT: Provides usage statistics and audit trail information.

DATA BASE CREATION: Creates an IMAGE schema and root file from the information in the dictionary.

DATA BASE INFORMATION: Uses the root file of an existing IMAGE data base to load definitions into the dictionary.

DATA BASE LOAD: Loads data entries into the IMAGE data base files, comparing the old schema with the new one and prompting for any necessary information.

DATA BASE UNLOAD: Copies the data entries of an IMAGE data base to disc or tape.

TRANSACT/3000

TRANSACT/3000 is a high-level language designed for use by systems analysts and programmers which provides productivity gains of three to ten times over traditional COBOL programming. It reduces the time needed for prototyping and allows applications to be developed in hours rather than days. TRANSACT/3000 accesses the dictionary for data definitions and locations, relieving the programmer of having to define all data items the program. Its main features are:

- Decreased time for developing prototypes
- Data definitions accessed through Dictionary/3000
- Access to IMAGE, KSAM, and MPE files
- High level VPLUS/3000 interface
- Interfaces with HP 3000 subsystems, including COBOL, FORTRAN, and SPL
- Automatic error-handling procedures

More Details

The TRANSACT/3000 compiler generates a code file from the TRANSACT source file. It accesses Dictionary/3000 to resolve any data definitions which the programmer has not defined within the program. The TRANSACT/3000 processor handles data specification and validation and has automatic error handling techniques. These features simplify the programmer`s task, but can also be overridden if the programmer chooses. A TRANSACT program is then executed by the processor.

A TRANSACT program consists of statements, labels, and optional comments. A built-in command interpreter is also included, which makes writing programs faster and easier.

INFORM/3000

INFORM/3000, designed specifically for decision-makers, increases their day-to-day productivity by making it easy to get current, pertinent information in a readable format with pre-formatted reports. INFORM/3000 is used with Dictionary/3000 and therefore relieves the user from needing to know anything about the data`s organization and structure. Its main features are:

- Ease of use
- Ad-hoc inquiry capability
- Menu driven format
- Pre-formatted reports
- Design which accommodates non-programmers

More Deatils

To generate a report, you merely select what you want from a menu of choices. The first menu shown lists all the Inform/3000 functions. You need only enter the number of your choice.

If you choose to CREATE A NEW REPORT, you then can choose whether you want to select the data items from a physical data base file or from a logical user's group. Inform/3000 then displays a list of all the data elements in that file or group and prompts you to select the data items you want displayed. That's all you have to do to generate a simple report, but by providing just a few more guidelines, your report can become quite sophisticated. For example you can sort data elements, set break points, subtotal

items at the break points, and request that selection criteria for an element be prompted for when the report is run (Figures 1 and 2). Inform/3000 will prompt the user for any required passwords.

Other Inform/3000 functions include saving the report to be run later, listing all saved reports, deleting a report, previewing the format of a report, and choosing an existing (saved) report to run. At each step of these processes, the user simply enters the appropriate number from the displayed menu.

```
DATA ELEMENT MENU FOR GROUP: PURCHASING

  1: ACCOUNT          4: LIST-PRICE          7: DESCRIPTION
  2: PRODNO           5: SDATE
  3: QUANTITY         6: UNIT-COST

   DISPLAY ELEMENT NUMBER(S)> 5,2,7,3,1
     SORT ELEMENT NUMBER(S)> 5,2,1
    BREAK ELEMENT NUMBER(S)> 5
      SUBTOTAL ELEMENT(S) FOR 5: SDATE> 3
     GRAND TOTAL ELEMENT(S)> 3
 SELECTION VALUE ELEMENT(S)> 5
               REPORT TITLE> PRODUCTS SORTED BY SHIP DATE
```

Figure 1. Inform/3000 Menu

```
PRODUCTS SORTED BY SHIP DATE

SHIP-DATE PROD-NO  DESCRIPTION              QUANTITY ACCOUNT
-------------------------------------------------------------
03/11/81  6482TH/F 26 INCH 12 SPEED RACER         32 4082453350
          6482TH/F 26 INCH 12 SPEED RACER         26 4083677981
          6482TH/F 26 INCH 12 SPEED RACER          3 4087326094
=>                                                61*

03/15/81  26881H/F SANTA FE 26 INCH               34 4082452705
          6482TH/F 26 INCH 12 SPEED RACER         18 4152591283
```

Figure 2. Inform/3000 Report

REPORT/3000

This product is a report writer with the flexibility and power to generate complex, formal business reports. It is designed to provide extensive formatting capabilities with just a few lines of code. REPORT/3000 accesses DICTIONARY/3000 for data definitions and locations, relieving the programmer from having to define these items within the program. Its main features are:

- Free format language
- Access to IMAGE, KSAM, and MPE files
- Arithmetic functions
- Powerful selection criteria
- Extensive formatting capabilities
- Customized reports

The best way to get an idea of what Report/3000 can do is to see some sample programs and reports.

Default Report: This report specifies the minimum amount of information required to generate a report and lets all the optional specifications use the default.

```
REPORT DEFAULT;
DETAIL LAST-NAME:ACCOUNT:CITY:STATE:CREDIT;
```

```
LAST-NAME   ACCOUNT       CITY          STATE        CREDIT
-------------------------------------------------------------
KENNEY      4158517023    WOODSIDE      CA             A3
MARTIN      4153702295    PALO ALTO     CA             A2
GUNNAR      4159099542    PASO ROBLES   CA             A2
```

Complex Report: This report uses more formatting features.

```
REPORT RPT3;
OPTION NOHEAD;
PAGE HEADING "CUSTOMER ORDERS, JUNE, 1981",COL=40;
PAGE FOOTING "ORDER PROCESSING REPORT",COL=40
REPORT TITLE "CUSTOMER ORDERS--JANUARY-JUNE, 1981",COL=18,LINE=4;
"PRODUCT     DESCRIPTION                    QUANTITY  TOTAL SALES",
   LINE=2:
"------------------------------------------------------------ ",
   LINE=1:"",LINE=2;
SORT(1)LAST-NAME:ACCOUNT:PROD-NO;
GROUP(1)TITLE "NAME:", LINE=3:FIRST-NAME:LAST-NAME,JOIN=2:
              "ACCOUNT#", LINE=1: ACCOUNT:
              "ADDRESS:", LINE=1: STREET-ADDR:
              CITY, LINE=1, COL=10: STATE, JOIN=2: ZIP, JOIN=2:
DETAIL PROD-NO: DESCRIPTION: QUANTITY: TOTAL, HEAD="TOTAL SALES",
   SPACE=4, EDIT="$$$,$$$^ ^";
GROUP(1)SUMMARY "TOTAL SALES FOR THIS ACCOUNT", LINE=2:
                TOTAL(TOTAL), EDIT="$$$,$$$!^ ^";
REPORT(1)SUMMARY "GRAND TOTAL OF ALL SALES:", LINE=3
TOTAL(TOTAL), EDIT="$$$,$$$!^ ^";
SELECT PURCH-DATE >810101 AND PURCH-DATE <810630:
```

```
                CUSTOMER ORDERS--JANUARY-JUNE,1981

NAME: MICHAEL ALLAN
ACCOUNT # 4153288842
ADDRESS: 47 LAGUNITA COURT
         SUNNYVALE   CA  94086

PRODUCT      DESCRIPTION                      QUANTITY  TOTAL SALES
-------------------------------------------------------------------
0648CU/F GIRL`S DREAM MACHINE 10 SPEED            35     $6,449.80
26701H/M 26 INCH MEN`S 3 SPEED BIKE               16     $1,439.52
27981H/F GIRL`S 27 INCH 15 SPEED                  18     $3,735.72
6476TH/F GIRL`S 26 INCH RACER 10 SPEED            44    $12,346.40
6476TH/M BOY`S 26 INCH RACER 10 SPEED             26     $2,599.22

TOTAL SALES FOR THIS ACCOUNT: $26,570.66
```

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.
.

Introducing HPWORD

by Eleanor Bassler, Information Networks Division

Overview of HPWORD

HPWORD is a word processor designed for use by secretaries and other office support personnel. Its simple interface makes it easy for secretaries to enter and edit general business documents such as letters, memos and reports.

HPWORD is a subsystem of MPE-IV and runs on any HP 3000. It is designed for easy use by non-technical personnel and is keystroke interactive - providing immediate feedback on a keystroke-by-keystroke basis. HPWORD uses screen-labeled function keys and menus for task selection and word processing functions which means there are no commands to remember. HPWORD has a comprehensive set of editing and formatting features including a syntactic awareness which allows it to operate on words, sentences, phrases, lines and paragraphs.

HPWORD works in conjunction with the HP2626W, a special word processing terminal. Part of the HPWORD software is located in the terminal memory and the word processing workload is shared between the HP2626W and the HP 3000. HPWORD can print to HP 3000 system line printers and the laser printer. It also provides spooling of documents to letter quality HP2601A printers located at user workstations.

Features

* Automatic carriage return (auto word wraparound)

* Optional automatic hyphenation by algorithm or exception dictionary.

* Automatic margin adjust - when characters are inserted or deleted in the middle of a paragraph, text following these characters is wrapped around so that all lines in the paragraph except the last extend to the right margin.

* Document formatting - format specifications such as page size, inside/outside margins, pitch (character spacing), header and footer size, tabs and line spacing may be specified for the whole document.

* Paragraph formatting - format specifications such as margins and tabs may be specified for individual paragraphs.

* Center, left, right and decimal tabs

* Subscript and superscript

* Automatic centering of text - a single keystroke can center a paragraph of one or more lines.

* Automatic page numbering and repagination

* Normal, italic, bold and bold italic character sets

* Character spacing - 10 pitch, 12 pitch and proportional spacing

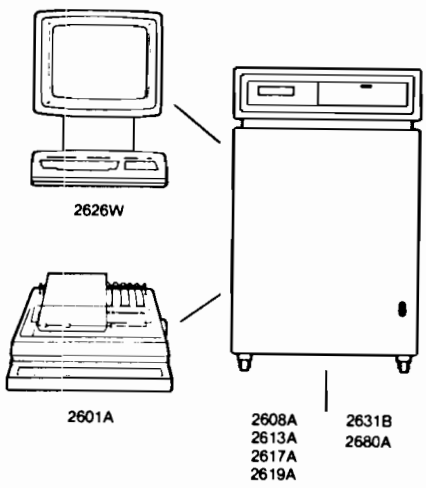
* Automatic underline - text is underlined as it is entered when the underline mode is selected.

* User-defined variables - allows the substitution of externally defined data when an HPWORD document is printed. This can be used for mass mailing of a letter or report production.

* Faithful screen presentation - hyphenation, line endings, pagination, bold, italic, etc, are shown on the display exactly as they will be printed.

Hardware Information

HPWORD can only be run from a HP2626W. Each terminal is connected to a port on the HP 3000 via standard asynchronous hardware, the ATC, ADCC or ATP. Each HP2601A that is to be a HPWORD printer is also connected to a port on the HP 3000. An HPWORD 2626W workstation can access up to 8 different HP2601 printers. Multiple workstations can share a HP2601A. HPWORD recognizes an HP2601A that has been configured with a sheet feeder or a tractor feeder and will print a document to these devices without operator intervention between pages.



The HP2626W terminal has all the capability of a HP2626A plus additional memory and differences in keyboard key caps to handle the word processing chores.

Thus the terminal can also be used as block mode display terminal for data processing functions.

HPWORD can print documents to the following system printers: HP2608A, HP2613A, HP2617A, HP2619A, HP2631B, HP2680A.

Software Information

Part of the HPWORD software resides in the HP 3000 and part in the HP2626W terminal memory. Keystroke-level operations, such as entering text or editing within a paragraph, are handled by code which is downloaded to the terminal when HPWORD is run. Code in the host HP 3000 is called upon when a new

paragraph is accessed or when global operations such as search and replace, repaginate or printing are performed.

Document Conversion

HPWORD will convert documents from ASCII files to HPWORD format and from HPWORD format to ASCII files. It is thus possible to convert documents from HPSLATE, TDP and WORD/125 to HPWORD and vice versa.

Support

It is recommended that each customer site have a person assigned to a function called the Office Products Coordinator. This person should be responsible for training the end-users of HPWORD, for determining the HPWORD configuration and for coordinating the use of HPWORD at the site. HP will provide support to the Office Products Coordinator and the customer system manager thru the existing field Systems Engineering Organization.

A course is available to train the Office Products Coordinator. This class, Office Products Operation, may be ordered as product number 22811A.

Customer Training

An HPWORD self-paced training course is available for users of HPWORD. This course should be used by the office products coordinator to train personnel in the use of HPWORD. It may also be used by individuals for self-paced training. The product number of the course is 22839A.

Documentation

HPWORD Reference Guide (32120-90001)

HPWORD Quick Reference Guide (32120-09002)

Performance Information

When HPWORD users are entering text or doing light editing, the system response time is very good and the impact on the system is minimal since most of the work is done in the terminal memory.

When several HPWORD users are doing a mix of light usage operations (text entering and editing) and heavy usage (i.e. global search and replace) the response time is good unless the system is heavily loaded with other tasks.

When several HPWORD users are all doing simultaneous "heavy usage" operations such as reformatting a document or global search and replace, a significant degradation in performance may be experienced. This should occur rarely.

In general, the addition of several HPWORD users to a system will not seriously impact the other users of the system and HPWORD users should find the response time acceptable unless the system resources were completely utilized before the addition of the HPWORD sessions.

Note: The article above, except for the diagram, was created using HPWORD and printed on an HP2601A printer.

An RPG Interactive System Environment

by Nancy Lucas and Mariann Tymn Ososkie, Information Networks Division

The RPG Interactive System Environment, referred to as RISE/3000, is a specialized editor designed to create and modify programs written in the column-dependent language, RPG.

RISE/3000 presents RPG programmers with a single working environment in which they may easily develop/edit RPG source code using special forms that resemble the RPG Specification Record forms. RISE/3000 can be used for simple, quick programs or for jobs which require interfacing with KSAM, Image, and V/3000. Furthermore, RISE/3000 allows users to compile, prepare, and run programs as well as execute many MPE commands and execute any program file.

RISE/3000 offers these features:

* Visual editing with images that represent the RPG Specification Record forms.

* Command menu and special function keys (softkeys) for a broad range of uses.

* Page-at-a-time direct screen editing.

* Ability to call the RPG compiler as well as the segmenter and to manipulate the compiled listing using a split screen.

* Choice of editing a file directly or editing a copy of that file.

* Ability to execute MPE commands and run any program file.

* Help facility.

* Ability to create a comment banner in which a user may type documentation.

* Renumbering command which also allows a user to renumber the lines of the RPG source program in columns 1-5.

* Add mode which allows a user to change RPG Specification Record forms, and to DELETE, LIST, or MODIFY lines while in Add mode.

* Recoverability feature to restore deleted lines.

* Automatic instructive guided tour to quickly acquaint a new user with the system.

RISE/3000 presents RPG programmers with a single, coherent program development environment dedicated to their production needs. The RPG Specification Record forms allow users to edit their source code in a friendly and easy manner. Direct screen editing further simplifies the editing procedure. However extensive the programmer`s experience, however technical the job at hand, RISE/3000 will provide a useful, productive, and convenient tool for RPG programming needs.

RISE/3000 documentation will be released as an update to the RPG Utilities manual, part number 32104-90006.

Introducing HPSLATE

by Shirish Hardikar, Information Networks Division

On August 1, 1981, Hewlett-Packard introduced HPSLATE, a new HP3000 software package which broadens the text processing solutions available for a wide range of users in your organization. It complements HP`s successful Text and Document Processor/3000 package.

HPSLATE has been in use in over 80 Hewlett-Packard offices world-wide since 1978. We have found it an effective tool for business professionals and other office personnel requiring access to simple text processing. Based on this experience, we have introduced and will fully support HPSLATE for all our HP3000 users.

HPSLATE is a friendly text processing package optimized for casual use. An easy-to-learn, menu-driven interface allows fast, straightforward preparation of simple documents.

The major functions of HPSLATE are utilized through function keys. Each is labelled on the screen with the function identity, for example, MOVETEXT or JUSTIFY. Further, HPSLATE offers page-oriented editing: 66 lines per page (11" x 8 1/2" paper) can be typed in, edited and printed. Full use can be made of the editing and cursor control keys on the terminal keyboard to go to any part of the screen and make changes as necessary.

For those tasks with sophisticatd formatting requirements, such as manuals, large reports, or proposals, HPSLATE also provides a front-end capability for TDP/3000.

HPSLATE currently supports a wide-range of HP terminals: the HP2624, HP2626, HP2642, HP2645, HP2647, and HP2648. Once the software is resident on your HP3000 system, it can be accessed by several users through this range of HP terminals.

Documents can be easily printed on the HP2601 letter-quality printer, system line printers, or the terminal. The HP2601 may be connected to the terminal or to a system terminal port for shared access.

If you have a need for simple, friendly text processing capability for your HP3000, please contact your local HP office and ask about HPSLATE.

HP Standard Pascal and Pascal/3000

by Ann Tse, Information Networks Division

WHAT IS PASCAL?

Pascal is a widely-known, highly-structured language that is especially well-suited for use in many applications programs and in the development of systems and sub-systems, especially where supportability is a major concern.

An Algol-like (SPL similar) language, Pascal has a number of features (such as strong typing, records and pointers, sets and set operations) which allow the programmer to write much more concise, readable, and self-describing programs and routines than is possible in most other languages, particularly SPL and Fortran.

Virtually all universities teach Pascal as an integral part of their computer science curricula. Also, a wide variety of machines from micros to mainframes support the language. Thus, the pool of Pascal programmers continues to grow.

Since Pascal directly implements the concepts and techniques of structured programming, using structured programming techniques with Pascal is easy and natural. This greatly facilitates the development of large, maintainable programs.

Pascal code is readable. The concepts of user-defined types, sets, and records not only help ensure accurate code, but allow the programmer to say what is meant and thus let the casual reader easily follow the program. For example, the programmer can write 'RED' where 'RED' is intended instead of using the more cryptic and error-prone integer representation typically found in programs coded in SPL, FORTRAN, BASIC, or COBOL. The following lines illustrate some of these features.

```
TYPE Color =(Red,Orange,Yellow,Blue,Green,Purple);

VAR  Paint:Color;
     Tone:(Warm,Cool);

CASE Paint OF
   Red . . Yellow:Tone:=Warm;
   Blue . . Purple:Tone:=Cool;
END;
```

Pascal has built-in limit checking. The compiler automatically checks limits while the program is compiling or running. This is

a great debugging aid. (For example, in the program fragment above, if you tried to set Paint:=Black, you would get an error.) And when a program is stable, the programmer can turn off these limits or checks for improved performance.

These features, and many others, make Pascal the ideal language for the EDP department determined to increase program reliability. Using Pascal, the programmer makes fewer coding errors, the compiler will catch the common errors that do occur, and the programmer can easily detect and repair run-time problems.

HP supports three standard levels of Pascal:

- ANSI standard : a standard definition for Pascal (follows Wirth).
- HP standard : a superset of the ANSI standard with added language features.
- Pascal/3000 : follows the HP standard, but allows machine dependent interfaces to subsystems, other languages, and intrinsics.

The ANSI standard for Pascal is defined and is in the public comment phase prior to adoption. The HP Standard Pascal adheres to this standard, and includes some added language features that increase the power of the language while maintaining the stucture. The only additions to these fea- tures on the HP 3000 implementation of the HP standard are ma- chine dependencies, such as calls to subsystems, other languages, intrinsics, and compiler options.

There is a compiler option which allows you to flag features not in any one of these levels.

HP STANDARD PASCAL

HP Standard Pascal is the first Standard language Hewlett-Packard has developed. It is a superset of the proposed ANSI standard Pascal as it is currently defined. The Standard was first implemented on the HP 1000 one and a half years ago. HP recently announced Pascal on the 9826 and we are now releasing it on the HP 3000.

The important capability that a standard language offers you is transportability of software between Hewlett-Packard machines. Remember, however, that a language can only be transportable to the point where it begins to use machine dependent features. Each machine has its own sub-systems, other languages, OS inter- faces, and implementations of machine-dependent features.

HP Standard Pascal provides many powerful additional features to the ANSI standard Pascal. These extensions include:

- Longreal numbers
- String literals
- Constructors (Structured constants)
- Constant expressions
- Type STRING, as well as several standard procedures and functions to manipulate strings.
- OTHERWISE clause in a CASE statement
- I/O: Procedures to do direct I/O to files, interactive input, and certain functions involved with printing text files.
- Numeric conversion functions
- Compiler options, including the ability to flag source code which is not part of the ANSI or HP standards.

PASCAL/3000

Extensions to the HP Standard Pascal for the HP 3000 include the ability to call MPE Intrinsics, other subsystems, and procedures written in other languages; functions for finding the size and address of variable storage, and a fairly sizeable number of additional compiler options.

Interactive Mainframe Facility: Freedom of Choice

by Lisa Di Nicola

In an effort to enter into the Systems Network Architecture (SNA) environment and allow support of IBM's Synchronous Data Link Control (SDLC) protocol, Hewlett-Packard has made enhancements and design changes to the existing Interactive Mainframe Link/3000. Under it's new name, DSN/Interactive Mainframe Facility, IMF allows the HP3000 to emulate an IBM 3271 Model 11 or 12. (Within SNA, this is a Physical Unit Type One node.) Emulation of the bisync controllers currently supported is continued with IMF, to maintain user interface compatibility between the existing and the new versions of the product.

Along with improved security of data transmission and ease of support on the host side if an SNA network exists, the SDLC protocol allows unlike devices to function on the same multidrop line. Users with the existing IML/3000 are required to buy nothing new in order to take advantage of the SDLC implementation in DSN/IMF. A new parameter to the configuration file Control Unit statement specifies the choice of protocol, allowing the customer to run either BSC or SDLC, the default being BSC. IMF will now have two download files to the Intelligent Network Processor (INP), one for each protocol.

An internal redesign has relieved the space problems on the INP by moving the read and write procedures to the 3000. CTRANSLATE is now used to decode the 3270 data stream into the internal screen image. This process, as well as the construction of the data stream for transmission to the host, is done on the 3000. Because the high order bit is no longer used to denote a 3270 attribute character, users with this convention in their IML applications should recode to call the IMF 'ATTRLIST' intrinsic to find the attributes, rather than searching through the screen image for any high order bit set. There is no longer a restriction on the size of the incoming data block with IMF. By implementing a new segmentation scheme in the BSC driver, unlimited amounts of data may be received and are broken up into IMF buffers of 256 bytes, similar to SDLC frames. Therefore, BSC no longer has a block size restriction of 2K bytes for incoming data. Screen sizes supported continue to be 480 and 1920 characters.

Full support for Conversational Monitor System (CMS), unavailable in the old version of the BSC driver, is now verified for both protocols.

A new mode of operation, called "Data Stream Mode", can be specified for SDLC lines only by setting a parameter in the 'OPEN3270' intrinsic. This mode will then facilitate file transfer because it retains the 3270 untranslated data stream and does not create an internal screen image. Data Stream mode applies only to SDLC, as the BSC protocol is not transparent and does not allow binary file transfer. Though the intrinsics dealing with the internal screen image (READSCREEN, etc.) are not allowed in Data Stream mode, two new intrinsics have been added. These are: READSTREAM, which allows the user to receive and read the untranslated data stream sent by the host; and WRITESTREAM, which creates a data stream and transmits it to the host. Only users specifying Data Stream mode may access these new intrinsics.

The Inquiry and Development Facility (IDF) has been renamed "Pass Thru". All users of Pass Thru will enjoy a new capability, with the help of two new intrinsics. Interactively, a user can get a copy of the internal screen image by depressing the f7 function key. The format of the hard copy provided by this new soft key is determined upon initiation of Pass Thru, specified in the new FORMAT parameter in one of the following ways:

1 = When the PRINT key (f7) is depressed, the internal screen image as well as the location and characteristic of each attribute character are printed. Programmers will find this debug format very helpful.

2 = The internal screen image is printed in the same way as it would appear to the user on the terminal, with attribute and null characters appearing as blanks. This is very useful for logging of screens.

3 = Same form as FORMAT=1, automatically printed whenever the TRAN3270 and RECV3270 intrinsics are called by Pass Thru.

4 = Same form as FORMAT=2, automatically printed whenever the TRAN3270 and RECV3270 intrinsics are called by Pass Thru.

In each case, the value of the FORMAT parameter will inform Pass Thru of the form of the internal screen to be printed. Local copy (FORMAT=2) will be the default for the PRINT key (f7). A terminal user logged on to MPE can enter Pass Thru with the :IMF command. If communication with the host has been established, the ACQUIRE command under the IMFMGR will also start up the Pass Thru capability; and programmatically, an application may start Pass Thru on an HP3000 terminal or printer by using the new intrinsic ACQUIRE3270.

To provide a copy of the screen image in the spool output file programmatically and replace the unsupported routine DUMPSCREEN, a new intrinsic, PRINT3270, has been added. Since DUMPSCREEN was using the notation of the high order bit being set to denote an

attribute character, it will no longer work with the new version of IMF. Customers who are currently using the DUMPSCREEN utility must replace it with a call to PRINT3270. (Since DUMPSCREEN existed in its own SL segment, this segment may now be deleted. This will free up a Code Segment Table (CST) entry.) With the ACTION parameter to PRINT3270, two types of display can be specified. ACTION=1 and ACTION=2 will give the same form as FORMAT=1 and FORMAT=2, respectively, as described above. Additional information provided in the new reference manual further explains the uses of these features.

The following information is necessary for both current and new customers to be aware of.

The CSDUMP program will interpret CSTRACES to show a complete breakdown of SDLC headers and significant bits within the frames.

The Receive Data timer has been extended to cover TRAN3270 as well as RECV3270. The user no longer needs to use NO-WAIT I/O for the case in which the host stops communicating and there is an outstanding TRAN3270.

Current applications with printer devices defined that previously expected an ASCII translation of EBCDIC Newline (NL) to be an octal 12, should be recoded to expect an octal 205, as the use of CTRANSLATE gives this new representation.

In order to be more resiliant when host communication goes down, expiration of the Connect timeout (specified in the INP I/O configuration,) will only bring down the Pass Thru terminals, allowing the IMF subsystem to remain active. To prevent Pass Thru terminals from hanging, assign a small value (60 seconds) for the Connect timeout.

In old IML/3000, when the INP had the burden of decoding the 3270 data stream, a RECV3270 call was completed when the BSC Select sequence from the host had completed. Consideration needs to be given to current applications, as the RECV3270 intrinsic will now complete after every text block (BSC) or after every BIU (SDLC).

Of interest to our current customers, a DS patch for continuation records was successfully added to the D Delta One MIT. This allows Pass Thru to be run on DS over an INP. Also available in this MIT are the changes to the MPE Command Interpreter: the "IML" command becomes "IMF", the "IMLMGR" command becomes "IMFMGR", and the "IMLCONTROL" command becomes "IMFCONTROL". The old "IML" commands will still function for now and will later be removed.

Major Enhancement to HP 3000 DSN/DS!

by Beau James, Information Networks Division

The Information Networks Division (IND) has developed several major enhancements to DSN/DS, the Distributed Systems communication product for HP 3000 computer systems. These product enhancements are provided at no additional cost to current DSN/DS customers and will be included in all future purchases of the product. Further, all are implemented with no change to the user interface to DS, so no application programs require modification.

X.25 SUPPORT

Support for the X.25 protocol for connection to Public Data Networks (PDNs) allows DSN/DS system-to-system communications through X.25-compatible packet-switching networks such as Telenet in the United States and Transpac in France. X.25 support is especially important for European and multinational customers both because of their need for compatible communications and because of pressure to use the national PDN in many countries.

With the possible exception of the ":DSLINE" command, users need not be aware of the type of transmission medium (dial-up or leased telephone line, hardwired connection, or X.25 network) across which they are utilizing any high-level DS service (such as file transfer or terminal access). In other words, programs using DS require no code changes!

In addition, X.29 (PAD) protocol support has been added, providing for terminal-to-system communication through an X.25 packet-switching network. With this enhancement, customers will be able to connect an asynchronous character-mode terminal via dial-up line to a local PDN computer called a PAD. From the PAD they can connect through the network to any of their HP 3000 computers on the network and log on to that system. And this capability can operate simultaneously over the same system-to-PDN link with other terminal-to-system and system-to-system conversations.

PLEASE NOTE! Block-mode applications do not now run on terminals attached to PADs. The X.29 standard provides for character-mode support only. YOU MAY NOT USE THE PAD FOR VPLUS/3000, NOR ANY OTHER BLOCK-MODE APPLICATION! The Information Networks Division (IND), for X.25 and X.29,

Data Terminals Division (DTD), for terminal support, and Computer Systems Division (CSY), for VPLUS, have lab personnel working on the very difficult problem of grafting some type of block-mode support onto a charater-mode protocol. We will announce any future developments when they are available.

X.25 networks charge a fixed monthly connection fee and variable charges dependent primarily on the volume of data transmitted, not the distance it is transmitted nor the time the connection is maintained. (For dial-up terminals there is a time charge for the connection to the PAD.) This provides the customer with an alternative to leased or dial-up telephone lines. Cost-effectiveness is especially likely for geographically dispersed terminals and/or infrequent access.

The X.25 enhancements will be released on a controlled availability basis beginning in February, 1982. Installation for a particular customer will be subject to certification testing of the product on the public network which the customer plans to use, and to availability of X.25-trained HP support personnel for each site at which the customer wishes to run X.25 connections.

At release the product will be certified on the Telenet (U.S.) and Transpac (France) networks. Tymnet (U.S.), DATAPAC (Canada), PSS (United Kingdom), and DATEX-P (Germany) certification is planned for 1982.

ADDITIONAL ENHANCEMENTS

Two important additional enhancements to DSN/DS are being released at the same time for all DS users. A new data compression algorithm provides improved performance when using compression on a transmission. And the generalization of continuation records removes message size restrictions based on communication line buffer size - so remote block-mode terminal applications (e.g. VPLUS/3000) may use large screens.

In the countries of Norway, Sweden, Denmark, and Finland, a new digital circuit-switching data transmission network is under development by the PTT administrations. Called the Nordic Data Network, it uses a new physical interface named X.21. An additional enhancement to DSN/DS and an enhancement to DSN/RJE allow these products to operate over this new network, using the BSC communication protocol. Both products provide the same user interface as before the enhancement and offer the same features as before, regardless of the type of physical transmission facility used.

No program code modifications are needed; only the ":DSLINE" or ":RJLINE" commands may be slightly different when connecting to an X.21 network.

Support for X.21 is automatically included in new purchases of either DSN/DS or DSN/RJE, and existing customers on CSS or SSS will receive the enhancement in the next product tape or MIT.
To physically connect an HP 3000 to the network's DCE-X modem, use the standard INP with a new INP cable.
For Series II and III systems, the cable part number is 30222H.
For Series 30, 33, 40, 44, and 64 systems, the cable part number is 30221H.

The X.21 support enhancements were developed and will be supported by Hewlett-Packard CSP (Commercial Systems - Pinewood) in the United Kingdom.

Auto Call Enhancement

by Donna Merlino, Independent Networks Division

The INP software and hardware has been enhanced to include auto call capability. Now you have the ability to connect a modem and an auto call unit to the DSN/INP-B. By adding the appropriate phone number to the system configuration file, a remote connection in a dial-up environment can occur anytime without the intervention of an operator. This enchancement will work with the HP 3000 Series 3X, 4X and 64.

In order to configure the INP for auto call, it is necessary to do a system dump and reconfigure the I/O configuration file. When this is done, the system prompts the operator with a series of questions. The following listing show those prompts relevant to auto call and the appropriate responses.

SUBTYPE ? 0 (Synchronous Switched Lines)

DIAL FACILITY ? Logical Device Number of INP

ANSWER FACILITY ? Yes or No

AUTOMATIC ANSWER ? Yes or No

PHONELIST ? Yes

PHONE NUMBER ? XXX-XXX-XXXX

NOTE: European modems and auto call units require a delay character to be configured into the phone number. Using the letter "D" achieves this delay.

The configurator file will receive only one phone number. The phone number is configured with hyphens,not parentheses.

The character set allowed for the phone number is:
--0 through 9
--/ (separator used for ACU's that have a second dial tone detect)
--E (end of number)
--D (delay of 1 second)
--# (defined by the local telephone system)
--* (defined by the local telephone system).

Using auto call is a simple procedure. Simply open the DS, RJE, or MRJE line in the usual way. For example, suppose the operator would like to open a DS line.

USER ENTERS: DSLINE Logical Device Number

RESULTS: The system phones the number listed in the I/O Configuration file for that INP. If the connection is made, the DSLINE is opened. The system responds: DSLINE NUMBER = Line Number.

Users can override the phone number configured in the I/O Configuration File with the appropriate system command. For example, if the operator would like to open DS line overriding the configured number,
USER ENTERS: DSLINE Logical Device Number:PHNUM=XXX-XXX-XXXX

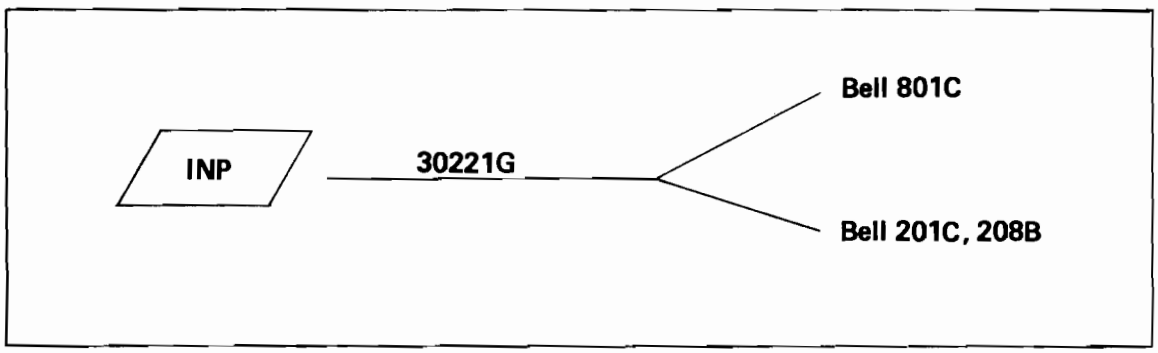
RESULTS: The system phones the number in the DSLINE Command. If the connection is made, the DSLINE is opened. The system responds: DSLINE NUMBER = Line Number.

This procedure remains the same for RJE and MRJE operations. MRJE auto call capability will be available in the next MIT (approximately February, 1982).

The hardware needed to configure the auto call capability is:

30020B -- Intelligent Network Processor
30221G -- Auto Call Cable
Modems Supported-- Bell 201C, 208B
Auto Call Unit-- Bell 801C

The hardware is configured as follows:



For more information about auto call configuration and installation, consult your System Engineer or 30020B installation manual.

Changing the Environment File in a Spoolfile

by Jon Cohen, Computer Systems Division

To change or add an environment file specification to an already existing spoolfile, you need a :FILE equation and some proficiency with SPOOK.

In order to add to or change the environment file, you would need a file equation that specifies the EPOC as the target DEV and that also specifies the desired environment file. For example:

```
:FILE PP;DEV=EPOC;CCTL;ENV=PAYROLL.BSNS.PRSNL.
```

In order to add an environment file to a spoolfile that does not yet contain an environment file, you only need to copy the spoolfile to the specified formal file designator in the :FILE equation. Thus, in SPOOK, you would enter a command like this:

```
>COPY #Onnnn;ALL,*PP        where "nnnn" is the
                            spoolfile's device file id.
```

If you want to change the environment file in a spoolfile that already contains an environment file, the above strategy wouldn't work. The resulting spoolfile would have first the new (desired) environment file followed by the old environment file followed by the data; the data would be printed using the last environment downloaded (e.g. the original environment file). What you need to do is to copy only the data and not the environment file to the new spoolfile.

Thus, in SPOOK, find the text line on which the data begins:

> M C=ON	Turns on the printing of the device controls.
> T #Onnnn	where "nnnn" specifies the spoolfile you want to change.
> (L rrrl/rrr2)	List a range of record numbers until you find the beginning of the data. NOTE: not all environment files are the same size, but most are about 50-70 lines long.
> C *;rrr/last,*PP	where "rrr" is the first line of data.

Configuring Devices on a Series III Using the 30341A HP-IB Adapter

by Keith Johnson, Computer Systems Division

The 2680A Laser Printer, the 7976A magnetic tape drive, and the 9895A Flexible Disc Drive are HP-IB devices that are available on a Series III via the 30341A HP-IB interface.

The device on the HP-IB interface has its own DRT #, which is derived from the HP-IB channel and device number. This must be a unique DRT # on the Series III. Should this duplicate the DRT of a device already configured on the Series III, the Series III device must be reconfigured. In many cases, the thumbwheel switch on the 30341A's GIC can be adjusted to a channel which will eliminate conflicts with the Series III devices.

COBOL II/3000 Programs: Tracing the Illegal Data Using Error 710/711 Documentation

by John A. Pavone, Information Networks Division

This article provides some information to assist users in tracing the identity of the illegal data item when reported, at run time, by the object program. Some examples are included to illustrate how the MAP, VERBS and PMAP listings are utilized along with the run-time error 710/711 information provided for tracing purposes.

WHAT IS ILLEGAL DATA?

Simply stated, illegal data is any data which when operated upon by the object program code does not conform to its defined type.

How is it Detected?

The illegal data is detected by the hardware trap system as a function of executing some type of data conversion, comparison, arithmetic, shift or move instruction which involves decimal or ASCII data . To fall within the scope of legitimacy the data must be within the digit range of 0-9. In some special cases, e.g., conversion of ASCII to decimal (CVAD), blank characters are allowed provided they are leading blanks. These operations are controlled by the Extended Instruction Set and Language Extension Instructions which are part of the Decimal Firmware and Microcode hardware for COBOLII. Users desiring more details on these instruction capabilities are referred to the HP 3000 Machine Instruction Set Manual, HP Part Number 30000-90022.

Where Does The Illegal Data Occur?

Actually the illegal data can occur anywhere within the scope of the object program's environment, and can thus appear in an input file, working-storage, or linkage section data item which can itself be a part of a main program, segmented main program, dynamic/non-dynamic subprogram, segmented dynamic/non-dynamic subprogram and/or user's group/public library.

Typical Error 710/711 Message Output Formats:

Format 1:

```
*** ERROR 711  ILLEGAL ASCII DIGIT
   SOURCE ADDRESS = %001034
   SOURCE = '12=4'
   STATUS = %060705   P REGISTER = %000112   INSTRUCTION = CVND
```

Format 2:

```
*** ERROR 710  ILLEGAL DECIMAL DIGIT
   SOURCE ADDRESS = %000624
   SOURCE = '3F2F3D5+'
   STATUS = %060310   P REGISTER = %000212   INSTRUCTION = CVDA

   FIXUP, RESTART ATTEMPTED:
   NEW SOURCE = '3020305+'
```

Format 3:

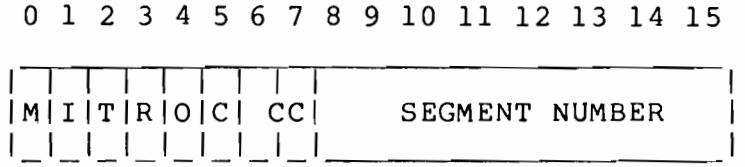
```
*** ERROR 711  ILLEGAL ASCII DIGIT
   SOURCE ADDRESS = %000215
   SOURCE = '1A4E'
   STATUS = %060627   P REGISTER = %000116   INSTRUCTION = CVAD

         ***  STACK  DISPLAY     ***

                   S=001254   DL=177644   Z=003252
      Q=001260 P=001202 LCST= P012 STAT=U,1,1,L,0,0,CCG X=000004

      Q=001116 P=000115 LCST= G004 STAT=U,1,1,L,0,0,CCL X=000005
      Q=000577 P=000126 LCST=  002 STAT=U,1,1,L,0,0,CCG X=000006

   FIXUP, RESTART ATTEMPTED:
   NEW SOURCE = '114E'
```

NOTES PERTINENT TO ALL FORMATS:

SOURCE ADDRESS - This field provides the octal byte address of the source field, traceable via the compiler MAP listing, which contains the illegal data.

SOURCE - This field displays the contents of the illegal data item between the single quotes. Unprintable characters would appear as blanks. Examination of this display will usually reveal the characters which are illegal, e.g., non-digits between 0-9 or leading blanks, in some cases.

STATUS - This field displays the value of the hardware status register and is useful for determining the segment number being executed at the time of the error trap. The format of the status register is:



Where:
M = Mode User Priviledged
I = External Interrupts Enabled
T = User Traps Enabled
R = Right Stack Op Pending
O = Overflow
C = Carry
CC= Condition Code
CCL = 1
CCE = 2
CCG = 0

SEGMENT NUMBER = Segment number of executing module. Note that the condition code bit 7, if on, can affect the octal interpretation of the segment number. If you recall, when a program is loaded with the LMAP option, on the :RUN command, the Loader lists the Code Segment Table (CST) numbers to which the program file segments were assigned. Since these assignments begin with octal 301, 302 etc. the values within the status register for program segment numbers can be octal 3xx or 7xx. If the value is not 3xx or 7xx it indicates a user or system library procedure segment. For user segment numbers, a subtraction of %301 or %701 will yield the segment number of the user segment, traceable from the PMAP listing of the program. If the segment is a library segment, COBOLII provides a stack display which indicates the specific logical code segment number (LCST) and library (G,P,S) involved. Reference to the PMAP of that library will be necessary for further tracing, as explained in the examples below.

P REGISTER - This value displays the address of the instruction+1 which was executing when the trap occurred and is useful to determine the specific COBOLII statement which is attempting to operate on the illegal data item. The source program VERBS listing of the respective segment, obtained using the $CONTROL VERBS option, is used to determine the COBOL statement involved with the illegal data item.

INSTRUCTION - This value displays the particular machine instruction which is operating on the illegal data. The instructions which can result in illegal data traps are:

Extended Instruction Set

CVAD - ASCII to decimal conversion
CVDA - Decimal to ASCII conversion
CVDB - Decimal to binary conversion
ADDD - Decimal add operation
SUBD - Decimal subtract operation
CMPD - Decimal compare operation
SLD - Decimal shift left operation
NSLD - Decimal normalizing shift left operation

SRD - Decimal shift right operation
MPYD - Decimal multiply operation

Language Extension Instructions

EDIT Subinstructions:

MA   - Move alphabetic operation
MN   - Move numeric operation
MNS - Move numeric with zero suppression operation
MFL - Move numeric with floating insertion operation
MDWO - Move digit with overpunch operation

Numeric Conversion Operations:

ALGN - Align numeric
CVND - Convert numeric display
ABSN - Absolute numeric

NOTES PERTINENT TO FORMAT 1 DISPLAYS:

This display indicates that the illegal source data cannot be fully processed by the specific command and the results of the operation are unpredictable. Data errors of this type must be corrected and the program re-run for valid results.

NOTES PERTINENT TO FORMAT 2 DISPLAYS:

This display indicates that the operation has performed a FIXUP of the illegal data and the NEW SOURCE display shows the result of the fixup. The fixup operation occurs in a temporary cell so that the modification only affects the target location and not the source data. If, upon examination, the user decides the modification is acceptable, the program results can be considered valid. If not acceptable the data should be corrected and the program re-run. The fixup operation is performed to accommodate those users who deliberately use overpunch characters within numeric fields, for some type of program data control, and wish to have the overpunch ignored when the data is processed numerically. This capability was extended in COBOLII to allow user program compatibility from COBOL 68. We do not recommend usage of this capability in new application designs as it is now defined as illegal by the ANSII 74 STANDARD. It is also noted that because of the standards violation COBOLII must issue the error message. The algorithm used for the fixup operation is:

1) If the illegal character is a lower case alphabetic character, it is upshifted before continuing with the algorithm.

2) The resulting character is converted according to the following table:

```
0 thru 9 = No conversion
A thru I = 1 thru 9
J thru R = 1 thru 9
S thru Z = 2 thru 9
{        = 0
}        = 0
/        = 1
-        = 0
+        = 0
&        = 0
Space    = 0
```

All other characters are replaced by a zero.

NOTES PERTINENT TO FORMAT 3 DISPLAYS:

This stack display has been added, as of library version A.00.05, to facilitate tracing errors which are detected within segmented library procedures. It is only provided for traps which occur within segmented libraries.

The information in the stack display is as follows:

The first line indicates the top of stack and stack boundary when the trap occurred.

The second line indicates the location of Q after the four-word marker has been placed at the top of the stack. Note that Q is four words greater than S. This line reflects the call to the STACKDUMP procedure by C'TRAP.

The third line identifies the procedure which was executing when the illegal data trap occurred and is the key line of information needed when tracing the error source segment, as illustrated later.

Any additional lines shown in the stack display can be used to follow a series of segment calls leading to the detection of the illegal data. In the stack display shown above in format 3, you can note that the calls involved LCST 002 (user pgm) to LCST G004 (logical segment in a group library) to LCST P012 (logical segment in a public library),where the COBOL LIBRARY existed.

TRACING EXAMPLES

The following examples illustrate the trace paths to follow in locating an illegal data item resulting from a main program, a non-dynamic subprogram and a dynamic subprogram residing within a Segmented Library (SL). The partial listings of MAPS, VERBS & PMAPS are provided, for reference purposes, in following the analysis of each trace.

Trace Example 1: A simple trace - a non-segmented main program

Given the following error 711 message:

```
*** ERROR 711  ILLEGAL ASCII DIGIT
   SOURCE ADDRESS = %000014
   SOURCE = '1/5A'
   STATUS = %060701  P REGISTER = %000012   INSTRUCTION = CVND

            SYMBOL MAP (MAIN PROGRAM)
LINE#  LVL   SOURCE NAME      BASE DISPL     SIZE     USAGE

WORKING-STORAGE SECTION

00008  01     A               Q+2: 000010   000004     DISP
00009  01     B               Q+2: 000014   000004     DISP
00010  01     C               Q+2: 000020   000004     COMP-3
00011  01     D               Q+2: 000024   000004     DISP

            PROCEDURE/VERB MAP
LINE #    PB-LOC    PROCEDURE NAME/VERB       INTERNAL NAME

00013     000003    START-IT                 STARTIT00'
00014     000003        MOVE
00015     000012        MOVE
00016     000031        STOP

            PROGRAM PMAP
STARTIT00'         0
   NAME             STT  CODE ENTRY SEG
   STARTIT00'         1     0     0
   TERMINATE'         3                 ?
   QUIT               4                 ?
   COBTEST            2    34    34
   DEBUG              5                 ?
   COBOLTRAP          6                 ?
   SEGMENT LENGTH        144
```

Analysis and Trace:

1. Since no fixup information is displayed we immediately know the resulting target field is undefined and therefore the illegal data must be corrected and the program re-run.

2. The illegal data is the / character shown in the SOURCE = display and the length of the field is 4 digits. The STATUS = display shows a segment number of 0 (%701-%701=0); therefore, we know the problem is within segment 0 of the user program. The P REGISTER tells us the location of the instruction CVND is at P-relative address 11 in segment 0 and the instruction CVND tells us the problem is occurring when we are trying to convert a numeric display item.

   Remember the P REGISTER value shown is the next location; hence, the location 12 is actually 11, the address of the instruction CVND.

3. To locate the item:

   a. The PMAP of the source program compilation tells us that the P REGISTER address 11 is within the CODE for the relocatable binary module (RBM) STARTIT00' within segment 0.

   b. The VERBS MAP of the source program compilation tells us that the P REGISTER = address 11 maps to the MOVE statement, at line # 14, within relocatable binary module (RBM) STARTIT00', in segment 0.

   c. The SYMBOL TABLE MAP of the source program compilation tells us the name of the data item by locating the SOURCE ADDRESS within the DISPL field.

      In this example, the item is found to be "B" in the working-storage section displacement location 14.

Trace Example 2: A Segmented Main and Segmented Subprograms

Program Environment: A main and 2 non-dynamic subprograms

Given the following error 711 message:

```
*** ERROR 711  ILLEGAL ASCII DIGIT
   SOURCE ADDRESS = %001426
   SOURCE = '3243 1E'
   STATUS = %060705  P REGISTER = %000022   INSTRUCTION = CVAD
   FIXUP, RESTART ATTEMPTED:
   NEW SOURCE = '324301E'
```

```
                SYMBOL MAP (MAIN PROGRAM)
LINE#  LVL   SOURCE NAME       BASE DISPL       SIZE     USAGE

WORKING-STORAGE SECTION

00008  01     A                Q+2: 000146    000004      DISP
00009  01     B                Q+2: 000152    000007      DISP
00010  01     C                Q+2: 000161    000004      DISP
00011  01     D                Q+2: 000165    000004      DISP

                SYMBOL MAP (SUBA & SUBB SUBPROGRAMS)
LINE#  LVL   SOURCE NAME       BASE DISPL       SIZE     USAGE

LINKAGE SECTION
00009  01     A                Q+21 000000    000004      DISP
00010  01     B                Q+22 000000    000007      DISP
00011  01     C                Q+23 000000    000004      DISP
00012  01     D                Q+24 000000    000004      DISP

              PROCEDURE/VERB MAP (SUBA)
LINE #    PB-LOC    PROCEDURE NAME/VERB        INTERNAL NAME

00014     000070    SUBA-SEC1A                 SUBASEC1A01'
00015     000070        SUBA-PARA1A
00016     000070            DISPLAY
00017     000003    SUBA-SEC2A                 SUBASEC2A02'
00018     000003        SUBA-PARA2A
00019     000003            DISPLAY
00020     000003    SUBA-SEC1B                 SUBASEC1B01'
00021     000003        SUBA-PARA1B
00022     000003            ACCEPT
00023     000007            COMPUTE
00024     000003    SUBA-SEC2B                 SUBASEC2B02'
00025     000003        SUBA-PARA2B
00026     000003            CALL
00027     000010            EXIT PGM

              PROGRAM PMAP
SUBA                4
   NAME              STT  CODE ENTRY SEG
   SUBASEC1B01'        1     0     0
   C'ACCEPT            4                 ?
   SUBA                2    47    52
   SUBA'               5                 3
   C'DISPLAY           6                 ?
   C'DISPLAY'FIN       7                 ?
   C'DISPLAY'INIT     10                 ?
   SUBA'S              3    47    47
   SEGMENT LENGTH         214
```

Analysis and Trace:

1. Since a fixup information display is included in the error display we immediately know the resulting target field has

been modified, as shown in the NEW SOURCE = field. If, upon examination of the data modification, the user decides to accept the modification the resulting processing can be considered valid; otherwise the data should be corrected and the program re-run.

2. The illegal data is the space or unprintable character shown in the SOURCE = display and the length of the field is 7 digits. The STATUS = display shows a segment number of 4 (705-701=4); therefore, we know the problem is in segment 4 of the user's program file. The P REGISTER tells us the location of the instruction CVAD is at P Relative address 21 and the instruction tells us the problem is occurring when we are trying to convert an ASCII value to decimal.

3. To locate the item: Tracing the illegal item in this environment is quite similar to the simple main program trace. Additional considerations are the non-dynamic subprograms and whether the data item is within the working-storage area of the module causing the trap message or is being passed, as a parameter, via the linkage section.

   a. The PMAP of the source program compilation tells us that the P REGISTER address 21 (22-1) is within the code for the relocatable binary module SUBASEC1B01' within segment 4.

   b. The VERBS MAP of the source program compilation for the SUBA subprogram tells us that the COBOL statement COMPUTE, within the RBM named SUBASEC1B01', maps to the P REGISTER = address 21.

   c. The SYMBOL TABLE MAP of the source program compilation tells us the name of the data item by locating the SOURCE ADDRESS within the DISPL field, provided that the item belongs to that module`s working storage area. If the address is not locatable on the MAP it indicates the item has an origin elsewhere and has most probably been passed, as a parameter, to the detecting module.
   In this example, the MAP for SUBA does not show any working storage area; hence, the bad data is coming from another area.

   d. In order to determine the actual item address from the logical linkage address we must compute it using information from the PMAP and the source listing "DATA AREA IS %nnnnnn WORDS." for each module. An example of this computation is as follows, given the information:

PMAP PGM SEQ	PGM DATA AREA (%WORDS)	W-S MAP ADDRESS (%BYTE)
SUBP B	260 X 2 = 540 %BYTES	1426
SUBP A	246 X 2 = 514 "	1426 - 540 = 666
MAIN	252 X 2 = 524 "	666 - 514 = 152

By using the SOURCE ADDRESS = %1426 in the above error message and the PMAP sequence of the main and subprogram modules along with the DATA AREA values for each program unit we can calculate the possible W-S MAP ADDRESS for each program unit for the item we are looking for, e.g., adddress 1426 for SUBP B, 666 for SUBP A and 152 for MAIN. By looking at the MAP for each program module we should now be able to identify what the item is, and the program module where it was defined by locating the working storage area containing the matching calculated address.

In this example, the item is found within working storage of the MAIN program, as item "B".

Trace Example 3: A Segmented Main and Segmented Library

Program Environment: A main and 2 dynamic subprograms in an SL

```
Given the following error 711 message:
*** ERROR 711  ILLEGAL ASCII DIGIT
   SOURCE ADDRESS = %000374
   SOURCE = '123 '
   STATUS = %060627   P REGISTER = %000016    INSTRUCTION = CVAD

        ***    STACK DISPLAY    ***

                 S=001254    DL=177644    Z=003252
   Q=001260 P=001202  LCST= P004  STAT=U,1,1,L,0,0,CCG  X=000004

   Q=001116 P=000015  LCST= G002  STAT=U,1,1,L,0,0,CCL  X=000005
   Q=000577 P=000007  LCST= G000  STAT=U,1,1,L,0,0,CCG  X=000006
   Q=000306 P=000013  LCST=  001  STAT=U,1,1,L,0,0,CCG  X=000006

  FIXUP, RESTART ATTEMPTED:
  NEW SOURCE = '123{'

            SYMBOL MAP (MAIN PROGRAM)
LINE#  LVL   SOURCE NAME      BASE DISPL      SIZE    USAGE

WORKING-STORAGE SECTION

00008  01    A               Q+2: 000370   000004     DISP
00009  01    B               Q+2: 000374   000004     DISP
00010  01    C               Q+2: 000400   000004     DISP
00011  01    D               Q+2: 000404   000010     DISP

            SYMBOL MAP (SUBA & SUBB DYNAMIC SUBPROGRAMS)
LINE#  LVL   SOURCE NAME      BASE DISPL      SIZE    USAGE

LINKAGE SECTION
00009  01    A               Q+21 000000   000004     DISP
```

```
00010  01    B                Q+22 000000   000004     DISP
00011  01    C                Q+23 000000   000004     DISP
00012  01    D                Q+24 000000   000010     DISP

            PROCEDURE/VERB MAP (SUBB)
LINE #    PB-LOC    PROCEDURE NAME/VERB        INTERNAL NAME

00014     000102    SUBB-SEC1                  SUBBSEC101'
00015     000102        SUBB-PARA1
00016     000102            DISPLAY
00017     000003    SUBB-SEC2                  SUBBSEC202'
00018     000003        SUBB-PARA2
00019     000003            DISPLAY
00020     000042        SUBB-PARA2A
00021     000042            DISPLAY
00022     000076            ACCEPT
00023     000003    SUBB-SEC3                  SUBBSEC303'
00024     000003        SUB-PARA3
00025     000003           COMPUTE
00026     000056           EXIT PGM

        SEGMENTER SL PMAP
SUBBSEC303'       2
   NAME             STT  CODE ENTRY SEG
   SUBBSEC303'        1     0     0
   QUIT               3                 ?
   SUBB'              2    72    72
   SUBB'S             4                 ?
   SUBBSEC202'        5                 ?
   SEGMENT LENGTH         350
```

Analysis and Trace:

1. The appearance of the fixup information display requires a user decision to either accept the modification made or re-run the program, after correcting the data item.

2. The illegal data is the trailing space or unprintable character and the length of the field is 4 digits. The STATUS = display shows a segment number of 627 (not 3xx or 7xx) which immediately indicates the segment is within some segmented library. The P REGISTER tells us the location of the instruction CVAD is at P Relative address 15 and the instruction tells us the problem is occurring when we are trying to convert an ASCII value to decimal.

3. To locate the item in this environment we make use of the STACK DISPLAY information to identify the dynamic subprogram where the error was detected and then use similar procedures, as described above, to locate the data item and location source address.

   a. The top entry in the stack display (LCST=) field tells us that the C'TRAP procedure is in segment 4 of the PUBLIC

LIBRARY of the account (LCST= P004) and the dynamic subprogram, causing the trap, is in segment 2 of the GROUP LIBRARY of the account (LCST= G002).

b. The SL PMAP of the library (Segmenter ADDSL n;PMAP) for segment 2, tells us that the P REGISTER address 15 (16-1) is within the code for the RBM named SUBBSEC303'.

c. The VERBS MAP of the source dynamic subprogram tells us that the COBOL statement COMPUTE, within the RBM SUBBSEC303', maps to the P REGISTER = address 15.

d. The SYMBOL TABLE MAP of the source program compilation tells us the name of the data item by locating the SOURCE ADDRESS within the DISPL field, provided that the item belongs to that module`s working storage area. If the address is not locatable on the MAP it indicates the item has an origin elsewhere and has most probably been passed, as a parameter, to the detecting library module.

e. In order to determine the actual item address we can refer to the STACK DISPLAY:

e.1 The stack trace indicates the program flow to be a MAIN (LCST= 001) calling a procedure in a group SL (LCST= G000) which called another procedure within the group SL (LCST= G002), in which the trap procedure C'TRAP was called from the pub SL (LCST= P004).

e.2 Examination of the Q= values (base word address of the next procedures data area, if dynamic) tells us the SOURCE ADDRESS = %000374 (source byte address = word address %176) falls inside the data area for the Main procedure, since %176 is less than %306. This defines the illegal data as a passed parameter.

e.3 The actual data item can now be determined by locating the source address within the working storage section, of the main program's source compilation.

In this example, the item is "B" at displacement location %374.

SUMMARY

I hope the above information will help you to trace the illegal data items documented at run-time by ERROR 710/711 error messages. If you have had difficulty in the past attempting to perform the trace, hopefully this article has not added to the confusion. If, however, it has been reasonably successful, you should no longer find it difficult to trace down an illegal item regardless of where it originates. The only remaining difficulty I can perceive is those situations where the illegal data is coming from an

input file. Unfortunately the compiler cannot provide us with information relative to records within a file; however, with the ability to trace the item to a file you should be able to programmatically trap the record containing the illegal data item by inserting a `NUMERIC` class condition test within your program for the item.

Change to Write-Only Access for Tape/Serial Disc

by Madeline Lombaerde, Information Networks Division

As of the MPE C.00.03, a change has been made to the File System such that if a tape or serial disc file is opened with write-only access (aoptions bits (12:4)=1), an EOF mark is automatically written to the tape (serial disc) file even if no FWRITE is done to the file. Thus, at FCLOSE time the previous contents of the file are essentially "scratched" whether or not new data was written to the tape.

The reason for the change is to make the File System consistent in dealing with random disc and tape (serial disc) files that are opened write-only. Previously, if a disc file was opened write-only, the EOF was reset immediately to zero. If an FCLOSE followed (with no intervening FWRITE), the file was "scratched" since EOF was 0. If the same disc file had been opened with the write-save aoption (bits (12:4)=2) the EOF would not have been reset. However, with tape and serial disc, write-only access behaved the same as write-save: no EOF was written unless an FWRITE was done. Therefore, the file was not scratched. This inconsistency was a problem for several users and had been reported on a number of SR`s.

FOPEN`s with write-save access should replace FOPEN`s with write-only access wherever appropriate to protect from accidental loss of data. If deleting the data is occasionally desirable, a :FILE command could be used to change the access. Of course, wherever "scratching" the tape is always desirable, no change need be made.

Additional RPG Fix Information

by Bill Horst, Information Networks Division

The following information is provided to further clarify several fixes made to RPG in versions A.05.00 and A.05.01. Please refer to the IT-2146 SRB (Software Release Bulletin) for full descriptions of all RPG fixes.

SR-7041 Cannot use a user-supplied ISAM residing in a GSL or PSL. The program always binds to R'ISAM in the SSL even if LIB=G is specified.

No fix to RPG is planned at this time. The user's R'ISAM procedure must be substituted for the R'ISAM procedure located in segment RPG'ISAM in the SL file (GSL, PSL, or SSL) being referenced at runtime. The RPG library procedures must also reside in that SL file.

SR-10248 Each use of the DSPLY operator causes a file open (FOPEN) to occur. The cumulative effect of many of these may cause a runtime abort. Also, there is no way to suppress the "DSPLY" literal from printing on each use of DSPLY.

Fixed in A.05.01:
The FOPEN and FGETINFO of $STDLIST are now done only once (during program initialization), and the FCLOSE is done only once (at program end).

Use of this new DSPLY operation requires recompilation and running under version A.05.00 or later. The new compiler generates calls to the new runtime library (SL) procedure R'DSPLY'NEW instead of the old R'DSPLY. Therefore, if any program that uses DSPLY operations is recompiled under version A.05.00 or later, it **MUST** be run using the A.05.00 or later runtime library or an SL BINDING ERROR will occur. (See "S" below for a way to avoid this.)

Header column 48 (DSPLY options): New Header column Usage

S - Suppress new DSPLY operations
If it is necessary to recompile a DSPLY program using the A.05.00 or later compiler, but you need to run it using a pre-A.05.00 runtime library, you can avoid an SL BINDING ERROR by putting an "S" in Header column 48 to suppress the call to R'DSPLY'NEW and instead force RPG to call the old procedure R'DSPLY. (This, of course, causes DSPLY to operate as it formerly did, before A.05.00.)

N - No "DSPLY" literal; Input on same line
Suppress printing of the "DSPLY" literal on each use of DSPLY and enter new Result Field value on the same line as where the old value is displayed instead of on the next line, below the old value.

D - Use "DSPLY" literal; Input on same line
Print the "DSPLY" literal on each use of DSPLY and enter new Result Field value on the same line as where the old value is displayed instead of on the next line, below the old value.

B - No "DSPLY" literal; Input on line below
Suppress printing of the "DSPLY" literal on each use of DSPLY and enter new Result Field value directly below display of the old value.

blank- Use "DSPLY" literal; Input on line below (Default option)
Print the "DSPLY" literal on each use of DSPLY and enter new Result Field value directly below display of the old value.

SR-18478 When attempting to read a KSAM file using SETLL and READ operations, a runtime INTEGER OVERFLOW abort occurs.

Fixed in A.05.00:
Integer Overflow will no longer cause an abort at runtime.

SR-18727 RPG program aborts with "STT VIOLATION" or other errors after multiple responses of 0 (to "continue") to runtime error #2 - "UNIDENTIFIED RECORD".

Fixed in A.05.00:
Note that the RPG Reference Manual, page 3-27, was corrected in manual update #4 to state that option 0 IS a valid response for error #2.

SR-21110 The compiler appears to format lines longer than 132 characters for listing, but then truncates them to 132 on actual print.

Fixed in A.05.00:
Maximum line length will be 66 words, or the listing device's configured width, whichever is less.

SR-23074 The RPG V/3000 interface includes no way to enable the display of FORMSPEC-defined function key labels.

Fixed in A.05.00:
Entry of "L" in column 50 of the WORKSTN file description spec now causes enabling of V/3000 function key labels. RPG does this by setting word 10 (relative to 1) of the V/3000 commarea to 1 prior to calling VOPENFORMF.

Obtaining Printed Copies of the Series 64 Console Dialogue

by Stephanie Littell, Computer Systems Division

Many of our users have expressed a desire to obtain a hard printed copy of the ongoing system console dialogues. This can be accomplished in several ways.

The system console may be reallocated to the 2635, which is a printing terminal. This is accomplished by using the "CONSOLE LDN" command to alter the location of the movable console. The original system console will then be free for session activity, but must remain attached as installed because the Series 64 Diagnostic Control Unit must use the console's flexible discs for diagnostic loading.

Another means of obtaining a hard copy is to affix a supported character printer to the existing system console (which must be in the 264X series). The console will remain active, but as information rolls off of the terminal (out of the terminal memory), it will be printed out on the character printer. This applies equally to console and session type messages appearing on the console screen.

The supported character printer, such as the 2631B with an HP-IB option, is connected to the console with a 13250B interface board and 13232G cable between the printer and terminal console. An appropriate device number for the printer on the terminal's HP-IB bus must be set with the thumbwheel switch on the printer.

Then the console must be placed into Command mode. A prompt,"*", will appear, and the following sequence should be executed.

```
*Assign Source Display

*Assign Destination HP-IB#7 (The HP-IB device number can be
      defined 0-7)

*Tell HP-IB "Hello" (At this point, the characters "Hello"
      should appear on the printer as a verification of
      correct printer operation)

*Enable Edit
```

At this point, the light should appear over the terminal's edit key and the Command mode key should be pressed again to resume normal console execution. Now anything that rolls out of the console memory will print on the character printer.

If it then becomes necessary to start the system or otherwise access the Diagnostic Control Unit through the cntl B operator function, it may be desirable to send everything appearing on the console screen to the printer. This must be done by entering Command mode, then typing the following:

```
*Enable record
```

This will clear everything on the screen to the printer. Otherwise, the console information may be lost before a hard copy is made.

Please note that if the system should happen to go down unexpectedly, or if the terminal console is reset, the printer "logging" feature must be re-established with the same sequence.

Correction to Enhanced STREAM Command Article

BY Greg Grimm, Computer Systems Division

In the MPE IV Communicator (Issue Number 26) an inaccuracy was reported concerning the enhanced STREAM command. In order to STREAM a file to which you ave READ access, you must also have LOCK access to the file. In addition, APPEND or WRITE access implicitly allows LOCK access to that file. Therefore, to stream a file you must either have READ access and LOCK access (implicitly or explicitly) or you must have EXECUTE access.

Opt/3000 Changes

by Jon Davis, Computer Systems Division

OPT/3000 has been enhanced to handle the larger memory capacity and I/O throughput capacity of the Series 64. One external feature has changed.

Previously, the Memory Contents Display of the Memory Context Display displayed 2 megabytes per terminal screen. If the system had more than 2 megabytes of main memory, 2 displays were stored in the terminal and the "NEXT PAGE" and "PREVIOUS PAGE" terminal control keys were used to move between the two displays. This approach became infeasible with the introduction of the Series 64, which supports more than 4 megabytes, since it can no longer be assumed that the terminal has enough memory to store the displays.

OPT/3000 has been changed so that memory displays are no longer stored in the terminal. Instead, OPT/3000 now cycles through memory in 2 megabyte displays. Cycling to the next display is triggered by a timeout or a carriage return (the timeout interval can be specified but defaults to 15 seconds). In addition, the "K" key of the terminal has been defined as a toggle which suspends or resumes the cycling of the memory displays. While a memory display is frozen on the terminal screen, it is updated at intervals specified by the timeout.

Documentation

The catalog of customer publications at the end of this section lists the currently available customer manuals for HP 3000 Computer Systems products. This list supersedes the catalogs in previous issues of the COMMUNICATOR.

Purchasing

Customers may purchase copies of new manuals, new editions and updates by either Direct Phone Order or by placing orders through their local HP Sales and Service Office.

The Direct Phone Order numbers are (800) 538-8787 (toll free) and, in California, (408) 738-4133 (collect). Calls should be made between 9:00 a.m. and 5:00 p.m. in the caller's time zone. Most orders will be shipped within 24 hours.

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To obtain a manual update, the customer must purchase the manual to which it pertains. The latest edition of the manual, along with the update, will then be sent to the customer. If the customer has purchased Customer Support Service (CSS), Software Subscription Service (SSS), or Manual Update Service (MUS), they will automatically receive new editions and updates to the appropriate manuals.

Computer Documentation Index

The Spring 1981 Computer Documentation Index available from Hewlett-Packard includes manuals, binders and a variety of non-promotional publications for HP computer systems (from the HP-85 through the HP 3000, and for terminals and peripherals, including plotters).

The Index is arranged "By Subject (model number)", which is useful when searching for documentation items where the specific part number is not known; and a "Numerical" listing which provides a fast way to find documentation when the part number is already known. Both listings include description, print date, latest update, and (U.S. Edition only) the current list price.

To receive a copy of this useful reference, please mail your request to:

Hewlett-Packard Computer Supplies Operation P.O. Box 60008 Sunnyvale, California 94008

Terms

A few words about documentation terms and procedures:

NEW — The first printing of the first edition. When first printed, a manual is assigned a part number that is retained for the life of the manual.

UPDATE — A supplement to an existing manual which contains new or changed information. Manual updates, which are issued between editions, contain additional or replacement pages to be merged into the manual by the customer.

Updates are generally issued at the same time Installation Tapes (ITs) are issued. However, THERE IS NO DIRECT CORRELATION BETWEEN SOFTWARE FIXES AND MANUAL UPDATES. Software enhancements that require documentation changes will be accompanied by manual updates, but software fixes and manual corrections may be made independently.

Updates are retroactively inclusive; that is, whenever successive updates are issued, the later update will contain the previous one(s). This means that you need obtain only the latest update to have all the information added or changed since the last printing of the manual.

Manual updates do not have part numbers. They are numbered sequentially from the time the last edition was issued.

NEW EDITION — A complete revision of a manual; obsoletes all previous editions of the manual and its updates.

A new edition is issued when, due to the scope of the changes involved, it is impractical to issue a manual update.

The date on the title page and back cover of every manual is the printing date of the current edition. This date changes only when a new edition is published. A list of the dates of the manual's previous editions and updates (if any) is kept on the Printing History page of every manual. Publication of a new edition does not affect the part number of a manual.

If further updates are required, they are made to the new edition. The update numbers run sequentially, starting from the latest edition.

Production Management/3000 Documentation

Production Management/3000 is an interactive, customizable application software product that assists manufacturers with the following tasks:

- Shop Floor Control
- Capacity Requirements Planning
- Factory Data Collection

The documentation for Production Management/3000 consists of six manuals and a set of keyboard overlays for the HP3075 and HP3076 Data Capture terminals. The manuals, which describe how to use Production Management/3000, have been written to three classes of users at a typical installation: shop personnel, scheduling and production control personnel, and the administrator of the system.

This documentation can be ordered as a set or individually.

Production Management/3000
Manual Set (including overlays)
Part Number 322702
July 1981

Complete documentation for Production Management/3000.

Defining the Shop
Part Number 32270-90001
July 1981

This manual is written to the scheduler and production control personnel at an installation. It describes how to use the shop floor control functions of Production Management/3000. The manual describes the different items (such as workcenters, workstations, routings, and the shop calendar through which a user can describe a manufacturing facility to Production/Management 3000.

Managing the Order
Part Number 32270-90002
July 1981

Like Managing the Order, this manual is written to an installation's scheduler and production control personnel. It further describes shop floor control functions of Production Management/3000. Managing the Order describes how a user can initiate, monitor, and adjust the passage of a work order through a manufacturing facility.

Capacity Requirements Planning
and Input/Output Analysis
Part Number 32270-90003
July 1981

This manual describes how to interpret the reports generated by this module of Production Management/3000. Information provided on the reports helps users evaluate recent production performance and anticipate future labor and equipment requirements.

A User`s Guide to the Data
Capture Terminal
Part Number 32270-90004
July 1981

This is a tutorial on the HP3075 and HP3076 data capture terminals. Written for users who are not familiar with computers, this guide steps the reader through each of the five data collection transactions in Production Management/3000.

System Customization
Part Number 32270-90005
July 1981

This manual is intended for the system administrator at a Production Management/3000 installation. It describes how a user can modify the standard Production Management/3000 system to suit the particular needs of a manufacturing facility.

System Operation
Part Number 32270-90006
July 1981

Like System Customization, this manual is designed for the system administrator at a Production Management/3000 installation. It details the daily functions of a system administrator such as scheduling, selecting, and running batch jobs; and performing backup and recovery jobs.

Set of ten keyboard overlays
(Five for HP3075 and
five for HP3076)
Part Number 32270-60003
July 1981

The keyboard overlays are pre-printed labels that fit the

HP3075 and HP3076 keyboards. These overlays redefine each key on the terminal to correspond to its use in Production Management/3000. Both the overlays and the terminal guide are color-coded. Using this coding, the guide visually leads the reader through a transaction by actually showing (using colored pictures of keys) which keys are to be pressed at each stage of a transaction.

DSN/ATP Documentation

The Distributed Systems Network/Advanced Terminal Processor (DSN/ATP) is an intelligent asynchronous device controller which is used on an HP3000 Series 44 or an HP3000 Series 64 computer system. It decreases CPU time required for terminal processing and can support up to 96 asynchrounous ports directly connected or through a full duplex modem.

Documentation for the Advanced Terminal Processor consists of an installation and service manual, an off-line diagnostic manual, and an on-line diagnostic manual. These are described below.

Distributed Systems Network/Advanced Terminal Processor Installation and Service Manual
Part Number 30144-90002
February 1982

This publication provides detailed installation, troubleshooting, and service information. It also provides information on the ATP`s theory of operation. This document is written for an HP Customer Engineer (CE) or System Engineer (SE) with the assumption that the reader has a good working knowledge of the HP3000 system environment and is specifically trained in installing HP3000 products.

Distributed Systems Network/Advanced Terminal Processor Off-Line Diagnostic Manual

This pubication provides information and instructions for diagnostic testing. It supplies general information, operating instructions, test descriptions, and error interpretation. This manual is written for the HP Customer Engineer (CE) with the assumption that the reader has a good working knowledge of the HP3000 system environment and is specifically trained in trouble shooting HP3000 products.

Distributed Systems Network/Advanced Terminal
Terminal Processor On-Line Diagnostic
Manual
Part Number 30144-90004

This publication provides information explaining the use of the on-line diagnostics, including the dialog, help messages, and error messages. This manual is written for the System Manager (SM) or HP System Engineer (SE) with the assumption that the reader has a good working knowledge of the HP3000 system environment.

NOTE: The following manuals are arranged in alphabetical order by title.

Dictionary/3000 Reference Manual
Part Number 32244-90001
December 1981

This new manual documents Dictionary/3000, a set of software programs for creating and maintaining data dictionaries and IMAGE data bases. The manual is intended for the technical person who will be documenting an organization's data processing environment in the dictionary.

The manual contains comprehensive reference material on Dictionary/3000. It is organized primarily along functional lines (the functional sections are preceeded by feature and general use information). A major section is devoted to the Dictionary commands, and one to the utilities. Each command and utility is illustrated by an example. Additionally, a complete example of defining a data base in the dictionary and then creating the root file is included in an appendix. Other appendices are a glossary and error messages.

HPWORD Reference Guide
Part Number 32120-90001
December 1981

This reference guide is designed for users who have completed the HPWORD Self-Paced Study Course or are familiar with a word processor. The guide is organized according to basic word processing functions. The main part of the guide is divided into the three most common functions that the user performs: creating, printing, and editing a document. Also included are a glossary, a comprehensive index, and a table of contents arranged aphabetically by function and operation.

HPWORD Quick Reference Guide
Part Number 32120-90002
December 1981

This quick reference guide lists in alphabetical order each function and operation of HPWORD. The steps necessary to perform each word processing operation are presented so that the user can quickly review how to perform a function or operation. Also included are examples of the keyboard and definitions of specific HPWORD operations, such as highlighting, word wrap, and format indicators.

ID/CHAR Reference Guide
Part Number 36581-90001
August 1981

The new Interactive Design System, Character Font and Logo Design Reference Guide is primarily for graphics designers who have a basic understanding of typesetting. This manual shows how to design characters and logos for forms design.

IDS/FORM Reference Guide
PartNumber 36581-90002
August 1981

The new Interactive Design System, Forms Design Reference Guide, shows how to design forms incorporating specified character fonts, logos, and other artwork. The primary focus of the manual is the design of forms that can be filled in manually or by an application program.

IFS/3000 Reference Guide
Part Number 36581-90003
August 1981

The Interactive Formatting System Reference Guide documents how to electronically format documents to be printed on intelligent output devices. IFS/3000 combines the electronic character fonts and forms you specify with additional device printing instructions. This manual also includes the Programmatic Interface which enables a programmer to gain additional control over document format. In addition, the IFS/2680A program is defined and lets documents be printed on the HP2680A Laser Printer.

HP 30020B
Intelligent Network Processor (INP-B)
HP-IB Version
Installation & Service Manual
Part Number 30020-90005
January 1982

This new manual introduces support of an automatic calling unit on the INP-B. In addition, a section on cable diagrams has been included to aid in troubleshooting.

MPE File System Reference Manual
Part Number 30000-90236
December 1981

Almost every facet of modern society is concerned in some way with information. The File System is the part of the MPE operating system which manages information being transferred or stored with peripheral devices. Information is arranged as data elements within records; each record is input, processed, and output as a single unit. Logically related records are grouped into sets called files, which may be kept in any storage medium or sent to any input-output peripheral.

The MPE File System Reference Manual describes the structure of records and files, the way your files operate, the security features of the File System, interprocess communication (IPC), the use of magnetic tape for storage, and much other information about the operation and use of the MPE File System. It is designed to be a valuable reference tool.

Pascal/3000 Reference Manual
Part Number 32106-90001
December 1981

This manual describes Pascal/3000, the newest addition to the HP3000 family of programming languages. It offers a complete description of the various features and options of this implementation of Pascal, a well-known language widely used in computer science courses and of increasing importance in systems programming. The manual is a reference guide rather than an introduction to Pascal/3000. However, the experienced Pascal programmer will be able to use the summary of extensions to ANSI Standard Pascal presented in the first section as a convenient guide to the study of unfamiliar features.

Transact/3000 Reference Manual
Part Number 32247-90001
December 1981

This manual describes Transact/3000, a new HP 3000 product that consists of a compiler, a processor, and a high-level programming language. This new product was developed specifically for use on the HP 3000 and is particulary well suited for interactive command-driven processing. The manual is a reference manual intended for experienced programmers.

The manual begins with an overview of the entire product, including a description of how to use the compiler and processor with examples of typical applications. These introductory sections are followed by a full description of the syntax for the

Transact Programming Language (TPL). The verbs that comprise this language are discussed in alphabetic order for easy reference and include examples of their use. The appendix sections contain documented error messages and flow charts showing how the processor manages data base and file operations.

NEW EDITIONS

Note: Manuals are arranged in alphabetical order by title.

DS/3000 to DS/1000 Reference Manual for HP3000 Users — Third Edition
Part Number 32190-90005
January 1982

This new edition of the DS/3000 to DS/1000 Reference Manual contains many changes and additions associated with MPE IV. Among the changes are the use of the HP91750 modem link and the use of DEXEC calls.

DSN/RJE 2780/3780 Emulator Reference Manual — Fourth Edition
Part Number 30000-90047
February 1982

This product, previously called RJE/3000, is being reidentified as Distributed Systems Network/Remote Job Entry (DSN/RJE), and the title of the manual now reflects the new name. This new edition documents the following changes: x.21 access to public data networks, autodial capability, programmatic control, and performance measurement.

MPE System Manager/System Supervisor Reference Manual — Fifth Edition
Part Number 30000-90014
December 1981

This new edition of the System Manager/System Supervisor manual incorporates the changes resulting from the introduction of the Series 40, Series 40SX, and Series 64 systems, the HP7911/7912 tape drives and the HP7935H disc drive. numerous errors and omissions are corrected in this new edition.

QUERY Reference Manual — 2nd Edition
Part Number 30000-90042
December 1981

The second edition of the QUERY Reference Manual documents several major enhancements to QUERY/3000, HP`s inquiry facility that is used in conjunction with the IMAGE/3000 data base management system. With this new version, users will now be able to retrieve and report on data from multiple data sets, and access multiple data bases.

RPG Utilities Reference Manual 2nd Edition
Part Number 32104-90006
November 1981

The new specialized editor, RPG Interactive System Environment/3000, has been added to the second edition of this manual. RISE/3000 is designed to create and modify RPG programs visually by bringing specification forms to the screen for interactive convenience. Among the features are menus and special function keys for a broad range of uses, page-at-a-time direct screen editing, and the ability to call the RPG/3000 compiler as well as the segmenter and to manipulate the comiled listing using split-screen. The reference manual for Extra Function Sort for RPG/3000 (XSORT), which comprised the contents of the first edition, is also included.

NOTE: Manuals are arranged in alphabetical order by title.

Console Operator's Guide — Update #1
Part Number 32002-90004
November 1981

This update reflects changes made for the Series 40, Series 40SX, and Series 64 systems as well as the new HP7911/12 tape drives and the HP7935H disc drive.

DSG/3000 Reference Manual — Update #1
Part Number 32250-90001
September 1981

The first update to this manual reflects changes in the terminals and plotters supported by DSG/3000. Also, the colors accepted by the intrinsics have been expanded from values 0-4 to 0-16. Other enhancements and clarifications have been incorporated for the convenience of the user.

MPE Commands Reference Manual — Update #2
Part Number 30000-90010
November 1981

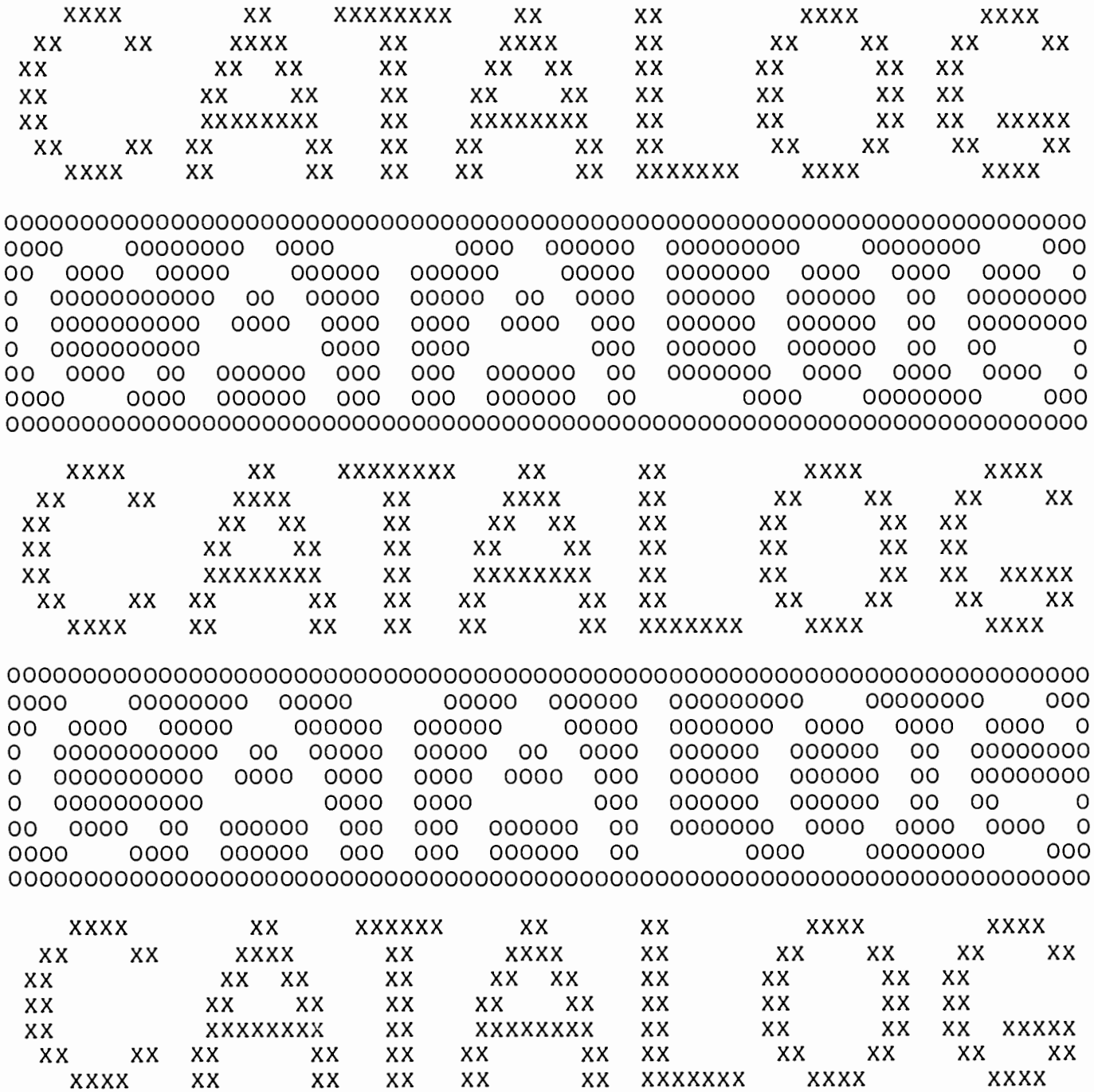
This second update to the Fourth Edition is for the most part corrections and enhancements made as a result of numerous Service Requests.

MPE Intrinsics Reference Manual — Update #2
Part Number 30000-90010
November 1981

This update consists of clarification of and corrections to the Third Edition, in response to Service Requests. A new intrinsic, PROCINFO, has been added; it provides access to process information.

MPE System Utilities Reference Manual — Update #8
Part Number 30000-90044
January 1982

This 8th update to the Second Edition consists primarily of changes made for the Series 40, Series 40SX, and Series 64 systems as well as the HP7911/12 tape drives and the HP7935H disc drive. It reflects the merger of the Series II/III and HP-IB versions of SADUTIL and includes FIND, a new SADUTIL command. New capabilities for DPAN4 are documented. The update also contains corrections in response to Service Requests.



KEY

Manuals that are new or have changed since the last edition of this catalog are noted by an asterisk (*) in the leftmost column. An at sign (@) in the "Price" column indicates that the price of the manual was not available at the time the catalog was printed.

If the "V" (version) column contains a #, the manual is applicable to systems running MPE IV and to those running MPE C. Three such signs (###) in the "Print Date" column indicate that the manual has been temporarily removed from circulation.

Manuals which apply to MPE C systems only are listed under "MPE C NANUALS".

HP 3000 COMPUTER SYSTEMS

SYSTEM MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
Using the HP 3000* An Introduction to Interactive Programming	#	03000-90121	10.00	4/79	
*MPE Commands Reference Manual		30000-90009	16.75	1/81	11/81
*MPE Intrinsics Reference Reference Manual		30000-90010	19.25	1/81	11/81
*MPE File System Reference Manual		30000-90236	@	12/81	
MPE Segmenter Reference Manual	#	30000-90011	3.50	2/77	

SYSTEM MANUALS (continued)

Manual Title	V	Part Number	Price	Print Date	Up-dated
*System Manager/System Supervisor Ref. Manual		30000-90014	17.20	2/81	12/81
MPE Debug/Stack Dump Reference Manual	#	30000-90012	5.60	9/76	10/80
*Console Operator's Guide Supervisor Manual		32002-90004	17.50	5/81	11/81
Error Messages and Recovery Manual		30000-90015	18.50	###	
HP 3000 Computer System Machine Instruction Set		30000-90022	8.75	2/80	
*MPE System Utilities Reference Manual		30000-90044	4.50	3/77	12/81
Index to MPE Reference Documents		30000-90045	4.00	5/81	
Software Pocket Guide		30000-90049	13.55	2/80	4/81
Using Files	#	30000-90102	15.50	4/78	

SUBSYSTEM MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
*EDIT Reference Manual	#	03000-90012	7.25	8/80	
Trace Reference Manual	#	03000-90015	4.50	6/76	
FCOPY Reference Manual	#	03000-90064	4.75	7/80	
Scientific Library Reference Manual		30000-90027	6.65	6/76	2/77
Compiler Library Reference Manual		30000-90028	13.50	11/76	
FLEXIBLE DISCCOPY/3000		32199-90001	6.00	8/80	

*SORT Reference Manual		32214-90002	@	9/81	

HP 3000 COMPUTER SYSTEMS

LANGUAGE MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
BASIC for Beginners	#	03000-90025	6.00	11/72	
BASIC/3000 Pocket Guide	#	03000-90050	1.25	9/74	
System Programming Language Reference Manual	#	30000-90024	12.00	9/76	2/77
System Programming Language Textbook	#	30000-90025	11.50	6/76	1/77
BASIC Interpreter Manual		30000-90026	14.66	6/76	8/78
FORTRAN Reference Manual		30000-90040	13.00	6/76	5/79
SPL Pocket Guide	#	32100-90001	2.45	11/76	
FORTRAN Pocket Guide	#	32102-90002	5.00	5/79	
BASIC Compiler Reference Manual	#	32103-90001	3.00	11/74	6/76
RPG/3000 Compiler Reference Manual	#	32104-90001	49.70	2/77	5/80
*RPG Utilities Reference Manual	#	32104-90006	@	10/81	
RPG Listing Analyzer	#	32104-90003	.50	2/77	
APL Reference Manual		32105-90002	35.00	1/79	
APL Pocket Guide		32105-90003	4.50	11/76	
*PASCAL Reference Mnl.		32106-90001	@	12/81	
COBOL Reference Manual	#	32213-90001	12.00	7/75	1/79
Using COBOL: A Guide for the COBOL Programmer	#	32213-90003	13.00	3/78	
COBOL/II Reference Mnl.		32233-90001	19.00	12/79	7/80
COBOL/3000 to COBOL II/3000 Conversion Guide		32233-90005	3.95	12/79	

*TRANSACT/3000 Reference	32247-90001	@ 12/81

SOFTWARE PRODUCTS

Manual Title	V	Part Number	Price	Print Date	Up-dated
*DSG/3000 Manual		32250-90001	24.00	11/80	
*DSG/3000 Guide		32250-90002	4.25	11/80	
*TDP/3000 Reference Manual		36578-90001	30.00	4/81	
*Using TDP/3000		36578-90002	30.00	11/80	
*TDP/3000 Quick Reference		36578-90003	12.00	11/80	

HP 3000 COMPUTER SYSTEMS

DATA COMMUNICATIONS MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
Guidebook to Data Communications	#	5955-1715	3.00	1/77	
DSN/RJE 2780/3780 Emulator Ref. Manual		30000-90047	12.75	2/82	
Communications Handbook		30000-90105	21.75	4/81	
HP 30010A Intelligent Network Processor (INP) Installation & Service Manual		30010-90001	10.30	10/79	6/80
HP 30010A/30020A Intelligent Network Processor Diagnostic Procedures Manual		30010-90002	4.25	10/79	6/80

HP 3000 COMPUTER SYSTEMS

DATA COMMUNICATIONS MANUALS (continued)

Manual Title	V	Part Number	Price	Print Date	Up-dated
DS/3000 Reference Manual		32190-90001	19.00	3/77	5/81
HP 30020A Intelligent Network Processor (INP) Installation & Service Manual		30020-90001	6.20	10/79	6/80
HP 30020B Intelligent Network Processor (INP-B) HP-IB Version Installation & Service Manual		30020-90005	@	1/82	
HP 30032B Asynchronous Terminal Controller Instl. & Serv. Manual		30032-90004	14.00	1/74	7/76
HP 30055A Synchronous Single-Line Controller (SSLC) Instl. & Serv. Manual	#	30055-90001	8.50	12/77	4/79
HP 30018A/30019A Add-On ADCC Installation Manual		30070-90023	1.25	3/81	6/81
Hardwired Serial Interface (HSI) Instl. & Service Manual		30360-90001	6.00	3/77	5/79
*DS/3000 to DS/1000 Reference Manual for HP 3000 Users		32190-90005	7.25	1/82	
DSN/MRJE Multileaving Remote Job Entry Reference Manual		32192-90001	10.50	8/81	
DSN/MTS Multipoint Terminal Software Reference Manual		32193-90002	7.00	8/81	
DSN/IMf Interactive Mainframe Facility Reference Manual		32229-90001	18.50	9/81	

*DSN/ATP Installation and Service Manual	30144-90002	@	2/82
*DSN/ATP On-Line Diagnostic Manual	30144-90003	@	2/82
*DSN/ATP Off-Line Diagnostic Manual	30144-90004	@	2/82

MANUFACTURING APPLICATIONS MANUALS

Manual Title	V Part Number	Price	Print Date	Up-dated
EDC/3000 User Reference Manual	32380-90001	20.00	3/78	4/79
EDC/3000 System Admin. Reference Manual	32380-90002	8.50	3/78	4/79
EDC/3000 Programmer's Reference Manual	32380-90003	20.00	3/78	
IOS/3000 User Reference Manual	32384-90001	25.00	3/78	
IOS/3000 System Admin. Reference Manual	32384-90002	11.00	3/78	
IOS/3000 Programmer's Reference Manual	32384-90003	23.50	3/78	
MRP/3000 User-Admin. Reference Manual	32388-90001	19.50	8/78	11/79
MRP/3000 Programmer's Reference Manual	32388-90002	13.00	9/78	
SPC/3000 User Reference Manual	32392-90001	11.00	4/79	
Materials Mgt/3000 Manual Set	32263A	165.00	7/80	
Master Production Scheduling and Rough Cut Resource Planning	32260-90001	17.00	7/80	
Maintaining Parts and Bills of Material	32260-90002	17.00	7/80	

HP 3000 COMPUTER SYSTEMS

MANUFACTURING APPLICATIONS MANUALS (continued)

Manual Title	V	Part Number	Price	Print Date	Up-dated
Maintaining Routings and Workcenters		32260-90003	11.00	7/80	
Material Issues and Receipts		32260-90004	14.75	7/80	
Maintaining Work Orders		32260-90005	15.00	7/80	
Managing Inventory Balances		32260-90006	12.00	7/80	
Maintaining Purchase Orders		32260-90007	14.00	7/80	
Material Requirements Planning		32260-90008	7.25	7/80	
*Standard Product Costing		32260-90009	8.00	7/80	2/81
*System Customization		32260-90010	25.00	7/80	2/81
System Operation		32260-90011	8.00	7/80	
*Production Mgt/3000 Manual Set (including keyboard overlays)		32270Z	120.00	7/81	
*Defining the Shop		32270-90001	22.00	7/81	
*Managing the Order		32270-90002	23.50	7/81	
*Capacity Requirements Planning and Input/Output Analysis		32270-90003	17.00	7/81	
*A User`s Guide to the Data Capture Terminal		32270-90004	26.00	7/81	

*System Customization	32270-90005	32.50	7/81
*System Operation	32270-90006	18.50	7/81
*Set of ten keyboard overlays (five for HP3075 & five for HP3076)	32270-60003	23.00	7/81

HP 3000 COMPUTER SYSTEMS

TRANSACTION PROCESSING MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
*QUERY Reference Manual	#	30000-90042	14.00	11/81	
KSAM Reference Manual		30000-90079	14.50	5/79	5/81
*HP V/3000 Ref. Manual		32209-90001	14.50	2/81	
HP V/3000 Entry Program		32209-90003	2.50	1/80	
Using HP V/3000		32209-90004	17.00	1/80	
*IMAGE Data Base Management Reference Manual		32215-90003	13.58	9/79	8/81
*DICTIONARY/3000 Reference Manual		32244-90001	@	12/81	

EDUCATIONAL APPLICATION MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
Student Information System Reference Manual	#	32900-90001	13.00	9/74	8/76
Student Information System Technical Mnl.	#	32900-90005	32.00	3/75	

Student Assignment System Reference Manual	#	32901-90001	15.50	8/78
Student Assignment System Technical Manual	#	32901-90005	9.75	8/78
College Information System Reference Manual	#	32902-90003	13.00	1/78
College Information System Technical Mnl.	#	32902-90005	10.50	2/78

HP 3000 COMPUTER SYSTEMS

ADDITIONAL MANUALS

Manual Title	V	Part Number	Price	Print Date	Updated
HP 3000 Series System Support Log		03000-90117	20.00	2/80	
HP 3000 CX to HP 3000 Series II Program Conversion Guide		30000-90046	3.50	6/76	
Guide to a Successful Installation	#	30000-90135	7.00	12/79	
Technical Writer's Survival Kit		30000-90171	2.50	7/79	
HP 3000 Computer System Site Planning Set (Encompasses the 2 manuals below)		30000-60029	15.75	6/80	
HP 3000 Computer System Site Planning and Preparation Guide		30000-90206	5.75	6/80	9/80
HP 3000 Computer System Site Planning Wkb		30000-90207	9.75	6/80	
*Series 30/33 Diagnostic Manual Set		30070-60068	86.06	7/80	

ADDITIONAL MANUALS (continued)

Manual Title	V	Part Number	Price	Print Date	Up-dated
HP 2894A Card Reader Punch Operating Manual		30119-90009	11.50	10/76	
IBM System/3 to HP 3000 Conversion Guide	#	32104-90004	10.75	7/78	

MPE C MANUALS

Manual Title	V	Part Number	Price	Print Date	Up-dated
BASIC Interpreter Reference Manual		03000-90008	9.75	7/75	
Compiler Library Reference Manual		03000-90009	11.50	2/76	
Scientific Library Reference Manual		03000-90010	5.75	7/75	
Software Pocket Guide		03000-90126	4.60	7/78	
IMAGE Data Base Management Reference Manual		30000-90041	7.00	12/76	5/78
MPE Intrinsics Reference Manual		30000-90087	20.00	4/77	4/78
MPE Commands Ref. Mnl.		30000-90088	20.00	4/77	4/78
System Manager/System Supervisor Manual		30000-90089	12.50	4/77	4/78
Console Operator's Guide		30000-90090	11.00	4/77	4/78

MPE C MANUALS (continued)

Manual Title	V	Part Number	Price	Print Date	Up-dated
General Information Manual (Series I)		30000-90091	9.25	4/77	
INDEX/3000 Reference Mnl		30000-90095	10.50	6/77	4/78
RJE/3000 (2780/3780 Emulator) Ref. Mnl. for Pre-Series II Systems		30130-90001	9.00	12/74	1/80
MPE System Utilities Reference Manual		32000-90008	2.05	10/75	
FORTRAN Reference Manual		32102-90001	10.00	3/76	
IBM 1130/1800 to HP 3000 FORTRAN Conversion Gd.		36995-90013	4.70	2/75	5/75
*SORT Reference Manual		32214-90001	8.50	3/80	

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