

SOURCE DATA

THE DATAPOINT SYSTEMS NEWSLETTER

No. 10

December 1980/January 1981

Resource Management System - a new view of computing

On November 14, 1980, Datapoint® announced a new operating system called RMS™ - the Resource Management System™. It is designed to allow you to tailor computing power, capabilities, and resources to fit demanding and changing business needs. The RMS system provides efficiency, flexibility and security for both stand-alone and Attached Resource Computer™ (ARC)™ systems. Processors in Datapoint's 8800 (see adjacent article), 6600, 6000, 5500, 3800 and 1800 series can all participate in a single RMS network. 3600 and 8200 series workstations and a variety of printers, disks and other peripherals all function together under RMS.

To give you a look at the RMS view of computing, its features are highlighted on pages 2 and 3.

8800 Processor Offers Power, Versatility

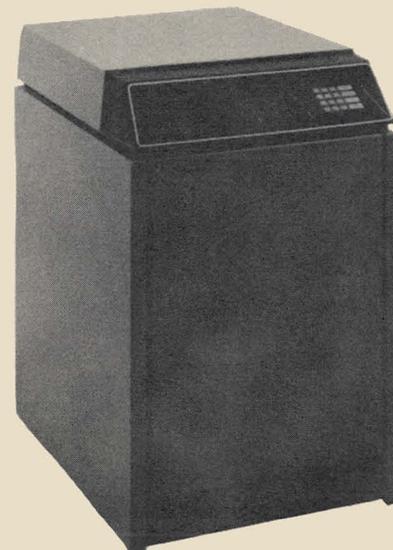
The newly announced 8800 processor is the most powerful in the family of Datapoint's business information systems. Power and versatility are expanded through the use of a multiprogrammable central processor, multiple peripheral processors and up to a megabyte main memory with Direct Memory Access (DMA). Modular flexibility allows the system to grow with your computing needs as they change and increase.

The 8800 processor uses the new RMS operating system (see adjacent article). In a stand-alone environment it provides the full range of data processing capabilities including communications and spooling. As part of an ARC environment, the 8800 functions as a data resource processor or applications processor. The 8800 enhances existing configurations since it is compatible with 6600, 6000, 5500, 5000, 3800, and 1800 processors; 3600 and 8200 workstations; and existing Datapoint printers and peripherals.

Features of the new processor are on page 4.

Inside this Issue

<i>Data Processing Section</i>	
<i>Resource Management System - a new view of computing</i>	1
<i>8800 Processor Offers Power, Versatility</i>	1
<i>FORTRAN Language Added to 1500</i>	4
<i>1800 as a File Processor-How Does it Rate</i>	5
<i>DATABUS/DATASHARE Optimization Techniques</i>	6
<i>Voice Communication Section</i>	
<i>Communications Management System Enhancements</i>	8
<i>Format Report Feature of SHARE/LDCS</i>	10
<i>Integrated Electronic Office</i>	
<i>SORT and WP: Sorting, Swapping & Selecting</i>	10
<i>SCRIBE to IEOS Conversion</i>	13
<i>Word Processing's INVALID FALSE ASSERTION</i>	14
<i>Customer Education</i>	7
<i>Software Releases</i>	15
<i>Advertisements</i>	17



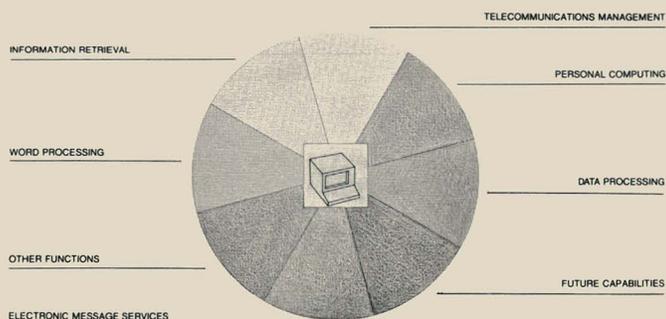


DATA PROCESSING

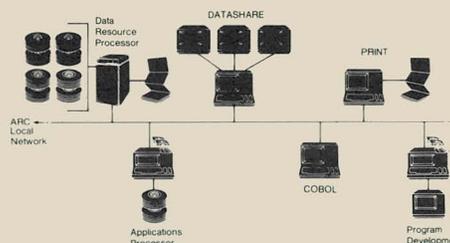
RMS continued...

The key word for this operating system is **MULTI** -- it applies to users, languages, functions, processing.

Full-function workstations allow inexpensive 8200s or 3600s to program in multiple languages, perform any function, and make use of any resource available in your entire system.

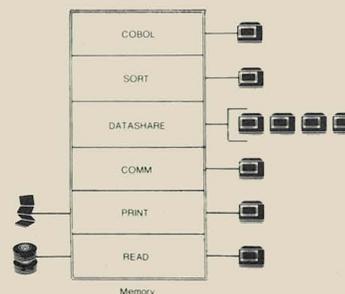
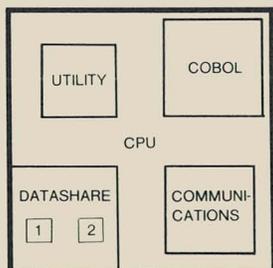


In an Attached Resource Computer (ARC) configuration, the key is **multiprocessing** which lets you match processing power to performance so no task gets bogged down.

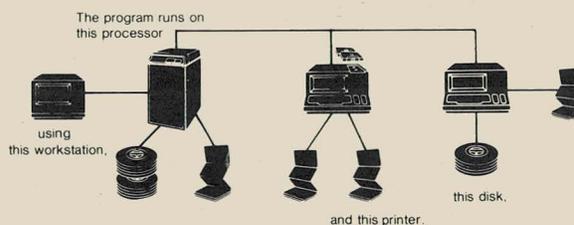


In a stand-alone configuration, the RMS design provides you with **shared logic** which lets you multiply users and functions simply by the addition of processor memory.

Multi-tasking allows you to perform a variety of concurrent functions within the same processor.



Under the RMS operating system, each time you use your system, you tailor it to your specific needs through a unique approach called **dynamic resource sharing**. This approach makes optimum use of any or all system components regardless of their location right at hand or in another city.



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Dated Material: Techniques or facilities described in each issue are accurate as of the publication date; however, computing changes rapidly so please rely on up-to-date permanent documentation such as user's guides for details of software or equipment features.

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The RMS operating system simplifies your business information processing by providing features like these:

- A logical data structure helps you organize files in parallel with your business organization.
- System security gives you control over access to resources and files. A multi-level scheme of access levels and passwords preserves the integrity of data.
- Dynamic memory allocation puts power where it is needed as you make demands on varying parts of the system.
- Comprehensive utilities offer a wide range of data processing functions, file manipulation capabilities and system control facilities. A HELP option makes the utilities easy to use.

The RMS system can be the hub of a multi-user, multi-function stand-alone system; or, within an RMS/ARC network, your system can be composed of up to 255 processors and over 6,000 terminals. With RMS and ARC working together, you can grow to meet changing business needs.

Glossary

Here are a few of the new terms the RMS operating system has introduced to the world of dispersed processing:

network - a group of interconnected processors (ARC)

node - a processor under RMS

data resource processor - an ARC processor with online disk storage that, as one of its tasks, handles disk management functions

applications processor - an ARC processor that performs applications functions such as terminal management, resource management, and tasks other than disk handling

resource - any part of the system you need to perform a specific task

single-file resource - a printer, magnetic tape, communications line, etc.

multi-file resource - disk media

environment - a window for resource access to the network, the node, the resource, the catalog, and the file

catalog - a disk file containing hierarchical structured information

HSI - Hierarchical Structure Information to build a tailored data organization

pipe - a memory path for inter-task communication

DOS to RMS - The Conversion Question

Announcement of the new RMS operating system seems incomplete for Datapoint customers without some notes on conversion. To quote from the RMS customer seminars held in November: "Every effort has been made to reduce conversion problem areas to the minimum required to still take advantage of the new capabilities and improved approaches to user problems. Still, conversion from DOS to RMS requires significant user investment of time and resources." As a Datapoint customer with an established investment in DOS, you can have the best of both worlds. DOS and RMS work together in an ARC environment. Add RMS to your DOS/ARC and you can gradually take advantage of the new features most attractive to you. Instead of going through a conversion process, your system can gradually evolve in the directions you choose at a pace that is practical.

If you still want to consider an actual conversion, ask yourself these questions:

1. **SHOULD YOU?** It is really required? DOS (or DOS plus RMS within an ARC network) may be fine for your applications. Is the timing right? Later versions of RMS may offer things you particularly want or your application may be in a crucial stage right now. Are the resources available? Conversion is rarely simple. Software changes and investments in education will be required, and hardware changes/additions may be necessary. These commitments of time and financial resources should be considered in light of the benefits to be gained by a conversion.
2. **HOW CAN YOU DECIDE?** Read all the available documentation (see the list at the end of this article). Attend RMS customer training classes (see Customer Education in this issue). Thoroughly analyze the necessary conversion effort - what do you plan to do, where will you get help, how will you schedule the phases?
3. **HOW DO YOU PROCEED?** If stages 1 and 2 have resulted in a decision to proceed with conversion then consider these necessary steps: Identify the hardware impact. Evaluate and plan the conversion process. Modify the application to operate under RMS, accomplishing what is now operating under DOS. Prepare your users with documentation and training and educate them to the future benefits attainable by the conversion effort. Plan to run parallel until things are smooth. Later, add to the software to further take advantage of the facilities available under RMS.

Since DOS will remain a viable supported product from Datapoint for many years and DOS and RMS can coexist in an ARC network, conversion may be unnecessary. If you do embark on a conversion, remember that planning and education are absolute musts.

RMS continued...

CONCEPTS

OF THE RESOURCE MANAGEMENT SYSTEM



Documentation available for RMS includes:
Resource Management System (flysheet), Document No. 60994 \$.50

The RMS Operating System - System Growth as Unlimited as Your Imagination (brochure), Document No. 60992 \$4.00

Concepts of the Resource Management System - Simplified User's Guide, Document No. 50592 \$4.00

8800 continued...

* Memory size begins at 256K bytes and is expandable to one megabyte in 128K increments according to your needs.

* Online storage begins with 202MB and is expandable to one billion bytes according to your needs.

* Multiple processor architecture can expand to meet changing needs in cost-effective increments.

* Internal configurability can tailor the 8800 to current needs then change and add capabilities in the future.

* Sophisticated memory control system incorporates error correction and contention resolution for multiple peripheral processors and CPUs.

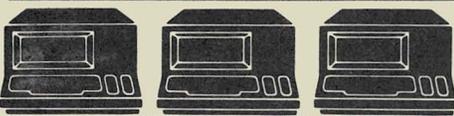
* Multiple processor interrupt control efficiently manages I/O operations in the CPU and peripheral processors.

* Multiple processor direct memory access multiplies system throughput with concurrent and independent data transfer.

* 16-bit architecture in which the high-speed 6600 instruction set is optimized.

To learn more about the new 8800, reference these documents: Datapoint 8800 Processor (flysheet), Document No. 60996 \$.50

The Datapoint 8800 Processor - Power for a new decade of business computing needs (brochure), Document No. 60993 \$4.00



FORTRAN Language Added to 1500



ANSI FORTRAN is now available to Datapoint 1500 users. A significant addition to Datapoint's library of programming language software, the language provides the benefits of extensive computational and statistical data processing capabilities.

Datapoint's FORTRAN is designed for use on any 1500 dispersed processor with 60K of user memory, using the DOS.H operating system. It meets ANSI X 3.9-1966 standards less complex data type and plus several important extensions for improved programming productivity and program execution speed.

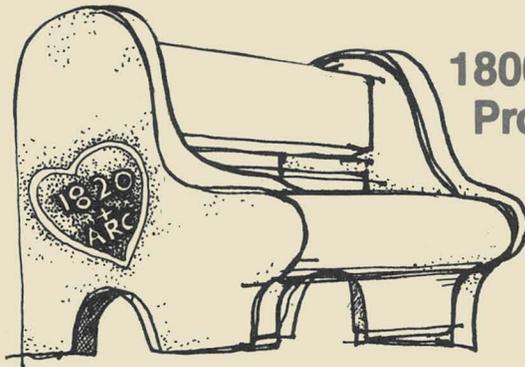
Wide application of FORTRAN can be found in engineering, science, government, education and business. Financial institutions, for instance, will find Datapoint's enhanced ANSI FORTRAN an especially useful programming tool in the development of lease/loan amortization, forecasting, investment banking and a variety of other financial applications. Research organizations can use it in operations research, modeling, decision theory and other statistically oriented programs. The language is also

well suited to many insurance applications and is used extensively by colleges and universities in research programs and as part of the teaching process.

The model codes you need for ordering are:

	Model Code	Charge
1500 FORTRAN 1.1 Software	9816	see below
1500 FORTRAN 1.1 User's Guide	50526	\$10.00
LINK15 1.1 Diskette (1)	20663	\$15.00
DOS.H 2.5.2 Diskette (1)	20779	\$15.00

If the FORTRAN order accompanies an order for a 1500 processor, the license fee is bundled with the processor cost. However, the \$15.00 media charge and set-up fee still apply. If FORTRAN is ordered separately, there is a \$1500 one-time license fee and the appropriate media and set-up charges apply. In all cases, the maintenance charge is \$10.00. 1500 FORTRAN 1.1 requires LINK15 1.1 and DOSGUP/REL which is included in the DOS.H 2.5.2 maintenance release.



1800 as a File Processor

Benchmark on how it rates!

Several inquiries concerning the relative performance of the 1820 as an ARC file processor (FP) prompted some benchmarks and tests in an effort to provide information in that area.

The first test involved exercising the 1820 with a heavy I/O load. A DATASHARE® program was written and executed on 3800s in a stand-alone, port 1 on console environment. The number of 3800s used started at 1 and was increased to 5 in an attempt to find the point at which the 1820 FP would "break".

The fact was that the 1800 held up well; the performance was strictly linear. It was possible to predict almost exactly what the timings would be with each 3800 added to the ARC.

Performance with Sequential I/O

The program involved was a fairly simple one which executed only I/O - there were no computations involved, since they would use only the resources of the AP and would have absolutely no concern for what type of FP was being used. By executing a loop that performed 100 sequential reads and writes, the 1820 was exercised fairly well in the I/O area. The table below shows the number of 3800s used in each step of the test. The figure shown is the time that it took to execute the program on a single 3800 with the different AP configurations. For the sake of comparison, the same test was also performed using a 4735 (256K 6600 with 20MB) as the FP.

No. of 3800s	Execution time per 3800	
	1820 FP	4735 FP
1	14 sec.	12 sec.
2	16 sec.	13 sec.
3	18 sec.	13 sec.
4	19 sec.	14 sec.
5	19 sec.	15 sec.

As you can see, the results were linear with no difference between the results at four 3800s and at five 3800s with the 1820. Also worth noting is the fact that the timings were not dramatically different between the 1820 and the 4735.

Performance with ISAM I/O

A similar test was run which involved reading 300 records sequentially from an ISAM file, and then writing each of those records to a sequential output file. As in the first test, the results were linear, and again, the test was run on a 4735 FP for comparison.

No. of 3800s	Execution time per 3800 (minutes:seconds)	
	1820 FP	4735 FP
1	1:38	1:12
2	2:03	1:14
3	2:22	1:18
4	2:55	1:30
5	3:25	1:36

The results show about 25 seconds added to elapsed time for each additional 3800 on the 1820. However, the nature of the I/O load was such that a more dramatic difference was seen between the 1820 and the 4735. Where they were nearly identical at one AP, the timing on the 1820 was double that of the 4735 at five APs. This was a worst case example, involving the reading of five separate sequential output files (each AP was reading and writing in its own unique subdirectory). The timing delta can probably be directly attributed to the memory size of the 4735 (256K), which allowed the ISAM trees to be retained in memory. The 1820, with only 128K of memory, had its LRU buffers filled and flushed, resulting in significantly increased run time. But consider these results in light of comparisons between an 1800 and 6600. Performance of a 6600 is nearly triple that of an 1800 and price difference is nearly double.

SURPRISED YOU, DIDN'T IT?

These benchmarks show the 1820 to be an effective FP in an introductory sized ARC system, especially suited to the site that needs the features and capabilities of an ARC network but doesn't need, or can't afford, one the size of an ARCPAC. This system allows the site to install an ARC system and enjoy all the advantages that it entails without great initial expense. And all of the upgrade and expansion features of the ARC system are available to accommodate future needs. Nothing is lost in software or hardware investment because everything continues to work in the expanded configuration.

DATABUS® /DATASHARE

Optimization Techniques

an offering and a solicitation



Following are some ideas to assist a programmer in creating efficient DATABUS code. As usual, hints such as these are subject to interpretation and dependent upon their application for viability. Before you use a hint, know your own application. Some of the questions you should keep in mind about your application are:

- How much data area is available?
- What is your environment? (ARC, stand-alone hard disk, diskette)
- What response time is acceptable?
- For DATASHARE applications, how loaded is the system already?
- How critical are efficiency and ease of maintenance?

Use the listed techniques if they are appropriate for your application - they may at least lead you to some ideas of your own. We would also like to hear additional ideas from you. Regular space could be set aside in each issue to let you share your ideas with others. Use the Reader Reply form at the back of this issue.

Coding Techniques

- Use FILEPI and PI only when necessary - under ARC use FILEPI only.
- Use single instructions instead of multiple instructions. Example: Use LOAD, STORE, SEARCH, REPLACE, SETLPTR, and other version 2 verbs.
- Write in-line code for usual flow. The branch should occur for the exception situation. That will keep paging down.
- In loops, avoid page faults. Try to keep loops on one page.
- In multi-user environments, use calls to active subroutines. Subroutines preceded by TABPAGE may already be in memory. In single-user environments, calls may cause excessive page faulting.
- Reduce the number of instructions required to perform a task. Example:

LINE	DIM	127
VAR1	DIM	10
VAR2	DIM	10
BL5	INIT	"66666"

BAD

GOOD

```
RESET LINE TO 5
APPEND VAR1 TO LINE
RESET LINE TO 20
APPEND VAR2 TO LINE
RESET LINE
PRINT LINE
```

```
PRINT BL5, VAR1, BL5, VAR2
```

- Reduce foreground/background interrupts. A single KEYIN requesting 10 variables is more efficient than 10 KEYIN statements requesting a single variable.
- Use built-in KEYIN edit checks, such as *SF, *DF, *JR, *JL rather than editing with DATABUS instructions, which require more object code.
- To advance to end-of-file in a sequential file with records shorter than 250 characters, use random instead of sequential reads to find EOF. Reading randomly will cause fewer reads.
- Use "-2" as the value of the SEQ writes. Write pending is faster than no write pending.
- CMATCH, CMOVE are faster than MATCH and MOVE. If using CMATCH and CMOVE, always be sure that the formpointer is not "0", or CMATCH and CMOVE will not work.

Program Size/Data Area Size Trade-Offs

Many times, execution speed can be affected by modifying the size of the user data area (UDA). The smaller the configured data area, the more virtual program pages (VPP) available. But, shrinking UDA by moving data to literals in the program can cause degradation by increasing program size. A rule of thumb is the more users on a DATASHARE system, the more valuable virtual program pages become.

- Using variables for often-used literals will reduce executable program size and paging.

Example:

```
ADD "1" TO COUNT    -increases program size
ADD ONE TO COUNT    -reduces program size
```

- Consider program size. Sometimes large programs are faster, sometimes small ones are. Usually it is best to attempt to design the system to use small programs. That keeps the UDA small.
- Using large literals in DISPLAY and PRINT statements will cause more page faulting.
- Keep in mind that each DIM's length is 3 overhead bytes plus the length. Each form is 2 bytes plus the length. UDA can be made smaller by using several large variables, rather than many small variables.

I/O Speed Considerations

- Random access is generally fastest. Sequential is faster than ISAM.
- Only READ or UPDATE as much of the record as necessary.

ISAM Considerations

- ISAM accesses cause automatic enqueue. Perform ISAM accesses as little as possible.
- READKS is faster than a keyed read.

continued page 7

- Design the system with few large records rather than many small ones. That will cut down on reads.
- When adding sorted transactions to an ISAM file (in a batch environment), it will increase performance if the transaction keys are in descending sequence.
- If the keys of the ISAM file are known, set up skeleton records with keys in advance. An ISAM add is slower than an ISAM update.
- Keep keys as small as possible.
- With some systems, putting the /ISI file on a different drive from the /TXT file will increase performance.
- When building the /ISI with a dummy record, use the highest possible key. This will avoid the system having to recreate the highest level index each time a record is added.

File Placement Considerations

- Insure that all heads are being used equally. To do this, spread active files to all drives.
- On MIDS disks put frequently-used files on center logical drives.
- When possible, drive direct all OPEN, PREP, and CHAIN statements. Directing by number is fastest; void is better than nothing.
- When possible, keep frequently-used software on the booted drive.

ARC Considerations

- Use ARCSTAT to determine percent LRU use and FP saturation.
- Use FILEPI.

- Consider moving terminals around to get best terminal/processor/application mix.
- Do not overload a processor.

Foreground/Background Tricks

Many times, a program can be made to appear to perform better by moving the logic around. For instance, if a routine keyed in 30 fields, then wrote 10 records, it might be better to intermix the writes and keyins. A DATASHARE feature that aids this is the 80 character circular buffer.

Configuration

- Configure DATASHARE for the smallest User Data Area and as few ports as are really used so all unused memory can be used for buffering.
- Only configure baud rate for non-keyboard devices.
- Avoid configuring any options (new verbs) which are not used.

For a definitive guide to the use of the DATABUS language, see the three-volume Concepts of DATABUS Programming - Simplified User's Guide, Document No.s 50004, 50516, and 50049 respectively.

Let SOURCE DATA hear from you about your hints on optimizing DATABUS/DATASHARE!

Customer Education

As this issue of SOURCE DATA goes to press, the new schedule for Customer Education in 1981 is just being finalized and so is not quite ready for publication. We can tell you that classes will be held in RMS January 26th in San Antonio and two classes will be scheduled each month thereafter.

Early enrollment in these classes is urged since space is limited.

A revised Customer Education Course Catalog (Document No. 60269) is available that describes course content, prerequisites, education center information and cost. Copies should be available at your local

Datapoint office in early January along with the final schedule of classes for January, February, and March. Questions about courses may be directed to the San Antonio Education Center at (512) 699-7039.



VOICE COMMUNICATIONS

Communications Management System Enhancements

The Communications Management System (CMS) is a family of interactive turnkey software packages that runs under DATASHARE. Currently this family consists of two members: the Telephone Directory Package™ (TDP), and the Equipment Billing Package™ (EBP).

Based on valuable input from our users, both of these packages have been greatly enhanced for Version 2.1. That version should be available in early 1981.

The Voice Communications section of the August/September issue of SOURCE DATA (No. 8)

featured a scenario on the Telephone Directory Package. Essentially, this product serves two functions:

Through an 8200 workstation located at the PBX or reception area, the TDP allows the operator to locate employees within an organization quickly and easily. It provides information such as telephone number, location and department. Because it uses AIM™ (Associative Index Method™) techniques, it can access database information with as few as three characters for a search key.

TDP can also be used to print the corporate telephone directory as frequently as you like.

TDP Version 1.1 users may be interested in the improved features already implemented in Version 1.2.

- Searches are no longer limited to 8,000 employees. AIM search techniques allow access to all employees in the database (maximum of approximately 25,000-32,000 on a 20MB system).
- Functions can be configured by user rather than by port for more security.
- Modes have been removed to allow an operator to execute any valid function without changing modes.
- Employee records now have fields designating the employee as inactive and specifying a date on which he or she becomes active. That means

records can be keyed in prior to the actual start date of employment.

- Systems control is handled by a separate package of modules. That package handles database management for the Location, Division, Department, and Employee files and also has system utilities. The Systems Control Package (SYS) is included on the same disk pack with any order of TDP or EBP and is not charged for separately.

- Conversion programs allow users to convert existing TDP or EBP files for Version 1.2 and to convert user files for the SYS package use.

The Equipment Billing Package allows the creation, updating, inquiry, and printing of a user's database for telephone equipment as well as any other equipment to be managed.

Special costing procedures allocate the direct and prorated bulk expenses for equipment and services to user organizations. Other costing procedures determine the cost value of the inventory on file to allow comparison to vendor billing statements for determining billing accuracy.

An innovative, functional "moves & changes" work order management package allows the user to rapidly

estimate the cost of proposed equipment installation, de-installation, or rearrangement. A work order is then established on disk for such service and its progress through approval, commitment, performance and billing cycles is recorded.

CMS Version 2.1 Features

Version 2.1 will have extensive feature changes. (The enhancements will necessitate a minimum of 120K processor memory.)

continued page 9

SYS Features

1. DATASHARE 6 with AIM is used; therefore, all previously INDEXed files can also be AIMed. You define which fields to AIM in any file and can select other AIM fields after the system is configured (using the AIM update command).
2. Files can be updated by any AIM field. You can upgrade an employee's record by name rather than number if the name was selected for an AIM field.
3. Group updating nearly automates massive updates.

TDP Features

1. The update for the search capability is immediate. That means employees added can be SEARCHed for the same day instead of after maintenance is performed.

2. There are three pre-defined formats for the SEARCH screen. In addition, since files are AIMed if you desire, you can SEARCH on any AIMed field, even though that field may not show on that particular SEARCH screen.

3. An operator using the SEARCH routine can display any record in a file (except the Division file) to see information not presented on the screen.

4. A "note pad" is available for use in various ways. An 8200 workstation operator can keep emergency information (phone numbers, names, etc.) readily available. The note pad can be used as a sophisticated method of message taking, retrieval, and delivery. Any user who has a need for a central or several focal points of message handling (such as guard's desks or reception areas) should appreciate this feature. For example: Bob Jones tries to reach Sam Smith by phone. Sam is out of the office. Bob can ask the operator or receptionist to please leave a message for Sam. The operator enters a message (automatically time and date stamped by

the system) which can be requested by Sam when he returns to the office. Or, when Sam checks in with the operator, the operator can search for his messages and read them to Sam (the system time and date stamps this "delivery" also). Sam can also have a hard copy of the message. Delivered messages are automatically deleted during maintenance.

EBP Features

1. You define fields you wish to AIM in the inventory file. Thus, updates or display of the inventory file could be done by type of equipment for example.

2. Each inventory record has a comment field to accommodate information such as Call Pick-up detail, other features, etc.

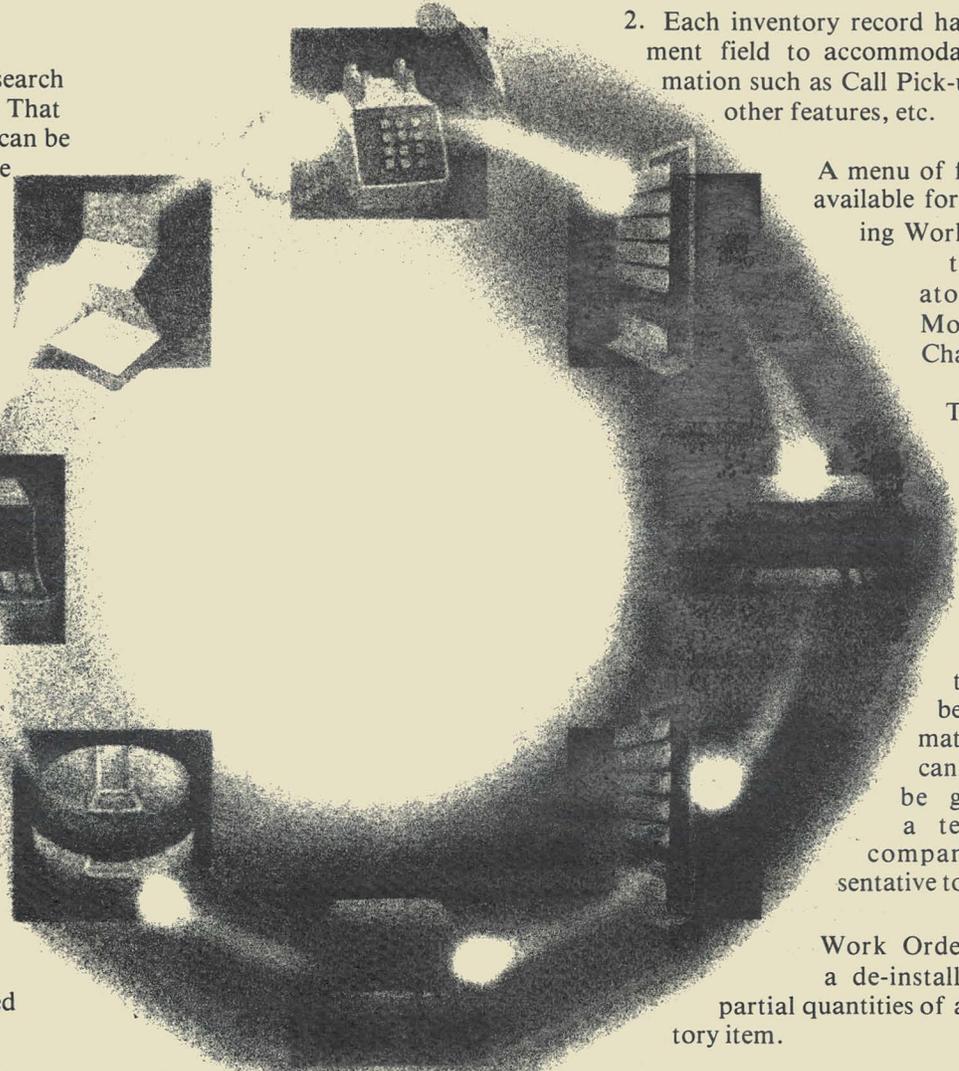
A menu of functions available for processing Work Orders the operator in the Moves and Changes.

The Work Order reports are expanded to provide more information in a better format so they can actually be given to a telephone company representative to execute.

Work Orders allow a de-installation of partial quantities of an inventory item.

Conversion programs take care of SYS and EBP files from previous versions or another system. Those are the major (and most requested) changes to these packages in this Version. Response time, especially during the SEARCH routine, is also considerably improved.

If you are not familiar with the Telephone Directory Package or Equipment Billing package and would like some background, the 11-page product descriptions (Documents 60749 and 60757 respectively) may be helpful.



Format Report Feature of SHARE™/LDCS™

The Format Report feature of Datapoint's Infoswitch™ SHARE/LDCS Version 4 is a valuable tool which provides the capability of creating unique reports for specialized needs.

Any text file with records having a maximum length of 100 characters can be used as a source of data. While the system is on-line, you can selectively print specific

parts of a file, based on your own criteria to produce a nonstandard report.

For instance, the following sample report was produced to show the April callers with calls exceeding 120 minutes in duration and \$50 in cost. This particular information was taken from the Caller ID file with the system accessing record fields containing the required information.

User Format Report

User-defined headings, columns and format.

NATIONAL OFFICE PRODUCTS CORPORATION							
APRIL CALLERS WITH MORE THAN 120 MINS. AND \$50.00							
AS OF 09:10:40 MAY 02, 1980							
CALLER NAME	CALLER I.D.	EXTENSION	COST CENTER	NO. OF CALLS	MINUTES	COST - \$	
Baxter, Bill	2300	5191	103	0176	306	068	
Carson, James	1309	7290	543	0105	334	089	
Delbert, Louise	8003	7414	049	0079	258	058	
Easley, Ed	2137	7871	229	0118	696	161	
Jackson, Donna	3111	5009	103	0424	367	093	
Martin, Kenneth	0235	5534	626	0031	219	050	
Parsons, Barbara	4353	7283	581	3880	951	205	
Schultz, Frank	5435	7166	103	0144	872	194	
Watson, Gloria	5013	7443	981	0049	251	059	

RECORD SELECTION CRITERION FOR CALLERID/TXT:SHARESYS:			
LOGICAL OPERATOR	MATCH LOCATION	CRITERION	MATCH VALUE
-AND-	48-50	GT	120
	54-56	GE	050

000009 RECORDS SATISFY SELECTION CRITERIA
000493 RECORDS DO NOT SATISFY SELECTION CRITERIA

Specialized report generated because of management concern over unauthorized calling.

Up to eight selection criteria.

Stipulated selection criteria.

Shows comparison of total sample and selection records.

A wealth of information can be stored on your system disk. With Format Report, you can produce a variety of reports from that data limited only by your imagination.

Detailed instructions for the use of this feature are contained in the Infoswitch/SHARE User's Guide Version 4.1, Document No. 50476, \$25.00.



INTEGRATED ELECTRONIC OFFICE

SORT and WP Sorting, Swapping & Selecting

Continuing the saga of the DOS SORT utility that began in the last issue (October/November), this article shows you how to 1) select only a portion of your file to sort, 2) select only portions of it to output, 3) swap positions of the data to be output, 4) supply additional text to be output with the sorted data and, 5) sort the

data by multiple fields. You can choose to do any one of these things separately but our example illustrates all of them.

First, let's take a look at a piece of a personnel file that resides in a word processing document and a new file we want to create from it.

continued page 11

PERSONS

28

63

125

EMPLOYEE	EMP.NO.	CLASS.	RANGE	EDUC.	LOC.	SKILLS CATEGORIES			SEX	S.S.NO.	RACE	D.O.E.	T.I.G.
						CURR.	PAST	PAST					
Ableson, Albert	23417	MGC03	029	180	MX22	PCh	Chem	Chem	Mal	007340523	Cauc	032037	06yr
Appleby, John	25021	MGC03	027	180	PX24	Exe	Mgr	Sup	Mal	234679540	Negr	091272	02yr
Anders, Daniel	35578	MGC05	020	180	ZX27	Exe	Mgr	Sup	Mal	456039238	Cauc	073170	07yr
Ayers, Charles	35690	ENC02	025	200	AX03	MEh	Eng		Mal	354984653	Cauc	092345	15yr
Bailey, William	68574	MGC01	023	180	AX58	Exe	Mgr	Mgr	Mal	257483904	Cauc	042164	05yr
Beasley, Thomas	56493	ENC03	024	180	ZX27	Eng	Exe	Exe	Mal	349685740	Othe	042149	25yr
Braden, Benjamin	58463	MGC01	026	200	AX05	Dir	Mgr	Sup	Mal	574849932	Othe	052467	07yr
Brown, William	68594	MGC20	018	180	AX01	Eng			Mal	384635490	Cauc	082865	08yr
Burton, Elizabeth	00046	SEC46	012	120	ZX11	Eng	Rec	Fil	Fem	574978493	Negr	091260	15yr
Burke, Patricia	85715												
Cearley, Jason													
Torrvalva, Carlos	66843	SAC06	025	160	EX46	Sal	Sup	Sal	Mal	845563736	Cauc	042067	05yr
Uribe, Cynthia	14785	SEC01	010	120	DX10	Sec	Sec	Rec	Fem	956567357	Othe	020866	03yr
Urritia, Joyce	30786	MGC01	018	160	CX02	Mgr	Mgr	Sup	Fem	453876382	Othe	030466	05yr
Vaden, Charles	88842	MGC02	020	180	CX04	Adm	Adm	Mgr	Mal	945658499	Othe	122461	08yr
Wilkes, Robert	90356	ATC01	024	220	SX62	Att	Att		Mal	123736207	Othe	042357	15yr
Whitson, Bebe	64254	SAC03	014	160	EX56	Sal	Sup	Sal	Fem	847125646	Cauc	042167	05yr
Woodworth, Jean	25664	REC01	008	120	CX06	Rec	Rec	Fil	Fem	943433965	Negr	022263	07yr
York, Charles	26457	ATC01	022	200	SX52	Att	Att		Mal	584547557	Cauc	031457	15yr
Young, Fred	26773	SAC03	015	160	EX45	Sal	Sup	Sal	Mal	574765444	Cauc	042567	05yr
Yuhas, Robert	84200	CNC04	019	180	EX29	Cons	Mgr	Mgr	Mal	833863589	Cauc	052565	08yr
Yunger, Daniel	06789	FIC03	009	130	CX02	Fil	Fil	Clr	Mal	354734590	Othe	011167	04yr
Zamora, Victor	54764	ENC03	023	180	EX25	ChEn	ChEn	Eng	Mal	938657660	Negr	071465	15yr

Marquez, Janie	In grade	20yr	Location	AX03
Burton, Elizabeth	In grade	15yr	Location	ZX23
Richardson, Amy	In grade	15yr	Location	CX25
Norman, Agatha	In grade	10yr	Location	ZX47
Gugenheim, Marion	In grade	09yr	Location	ZX47
Odom, Octavia	In grade	08yr	Location	EX23
Davis, Bertha	In grade	07yr	Location	CX01
Hayes, Elisa	In grade	07yr	Location	DX09
Jackson, Alfreda	In grade	07yr	Location	CX02
Woodworth, Jean	In grade	07yr	Location	CX06
Burke, Patricia	In grade	06yr	Location	PX24
Maldonado, Janc	In grade	06yr	Location	MX22
Perminter, Janice	In grade	06yr	Location	MX25
Evans, Susan	In grade	05yr	Location	DX01
Flores, Marie	In grade	05yr	Location	BX46
Garcia, Maria	In grade	05yr	Location	CX01
Haston, Marie	In grade	05yr	Location	BX46
Quezada, Maria	In grade	05yr	Location	CX04
Redding, Peggy Ann	In grade	05yr	Location	DX17
Urritia, Joyce	In grade	05yr	Location	CX02
Whitson, Bebe	In grade	05yr	Location	EX56
Cryer, Susan	In grade	04yr	Location	BX23
Howell, Adrian	In grade	04yr	Location	CX01
Inclan, Olivia	In grade	04yr	Location	DX02
Ivan, Marion	In grade	04yr	Location	BX22
Norvel, Susan	In grade	04yr	Location	BX23
Taylor, Margaret	In grade	04yr	Location	BX23
Gab, Jennifer	In grade	03yr	Location	EX46
Ganez, Lucille	In grade	03yr	Location	DX09
Karger, Lucille	In grade	03yr	Location	DX09
Uribe, Cynthia	In grade	03yr	Location	DX10
Pyramid, Janice	In grade	02yr	Location	PX28

PERSTIG

The objective is to create a subfile of the main file. We want a listing of all the females in order by their time in grade and with their name, time in grade and location listed. We're going to use the Limited Output Option on the SORT command both to specify the selection criteria (female) and to specify the data to output (name, time in grade and location interspersed with some text we will define).

Building on the basic principles described in the last issue, the first step is to copy the data to DOS by issuing the command:

```
PRINT ON TXTFILE
```

Assuming the name of your word processing document was PERSONS, the above command creates the file PERSONS/TXT in DOS.

Now, return to DOS and you are ready to give the SORT command:

```
SORT PERSONS/TXT,CUT9/WP;L,D125-126,A1-20
```

PERSONS/TXT

is the DOS file containing the data you want to sort (and swap and select in this case)

CUT9/WP

is the output file name for the new DOS file to contain the sorted, selected data. You can name it CUT0 through CUT9. (See the issue 9 article for more information on this "CUT" file.)

L

is a SORT utility option requesting Limited Output. Specifying this option will cause another prompt from the SORT utility. See below.

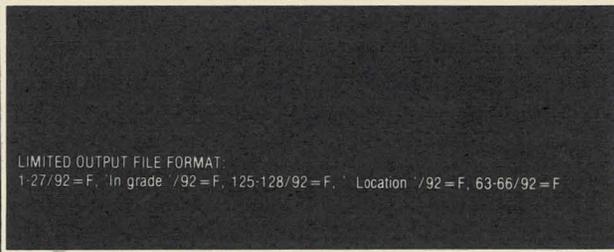
D125-126

requests a sort of the data in descending order based on columns 125-126, (that is the number of years in time in grade - T.I.G.)

A1-20

requests a secondary sort (within time in grade) in ascending order based on columns 1-20 (that is enough of the name to sort on).

Now, because you have specified the L option, SORT will prompt and you will respond as shown below:



Notice the pairs:
output data/criteria, output data/criteria,...

Each pair is separated from the next with a comma. The criteria (92=F meaning column 92 must contain an F to select the females from the file) must be repeated for each piece of output data. The output data may be a range of columns from which to get data (1-27 for name, 125-128 for years in grade, 63-66 for location) or it may be a string of characters enclosed in single quotes (like 'In grade ' and ' Location ' - notice the blank spaces included in the strings to separate text from subsequent data). Your response is limited to 80 characters.

Let's separate that long command line and see what each section does:

- 1-27/92=F Employee name is obtained from positions 1-27. If position 92 equals an "F" then employee is female and is selected for the sort.
- 'In-grade '/92=F This is a string of characters to be written out as data in the new file. 92=F is the same as above.
- 125-128/92=F The number of years in grade is obtained from positions 125-128. 92=F is the same.
- ' Location '/92=F This is a string to be written out as data in the new file. 92=F is the same.
- 63-66/92=F Location or mail stop is obtained from positions 63-66. 92=F is the same.

Once you have completed your response and pressed the ENTER key, the SORT utility will follow your instructions and produce CUT9/WP which would look like the "subfile" illustrated earlier.

It might be handy to look at this file before putting it into IEOS to make sure you achieved the desired results. Just issue the DOS command LIST, giving the file name. For example:

LIST CUT9/WP

(The line numbers that appear in the DOS listing will not be included in your document after you place it into IEOS. You can pause during a listing with the DSP key or terminate a lengthy listing by pressing the KBD key.)

Now, to get the DOS file into word processing, return to IEOS, open your library and:

CREATE DOC PERSTIG

using any document name you choose. You may want to modify the format for narrower or wider margins or may need to eliminate any blank or "header" lines interspersed in your data. Then enter the command

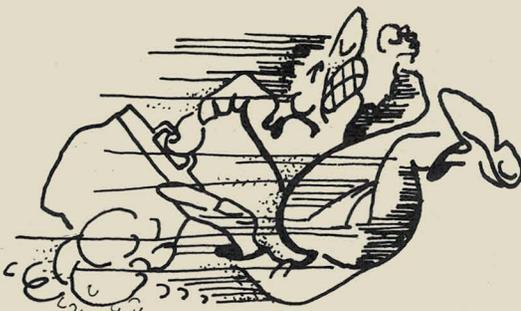
PLACE 9

You now have a word processing file to work with.

Several functions have been shown in this one example but you can extrapolate from this to apply just the functions you need for your application. For example, to produce a similar subfile that includes both males and females, you would give the same SORT command but alter your response to the LIMITED OUTPUT FILE FORMAT to eliminate the /92=F criteria. Read the DOS User's Guide to learn more techniques and requirements of the limited output format option. Because the SORT is accomplished quickly, you can experiment a bit to come up with the exact results you want. You can SORT and LIST several times to "perfect" your results or to create several different "subfiles" before putting them into IEOS. Once in IEOS, you can modify the new document to delete any extra lines (like blanks) or add new headings. When you are finished, KILL the DOS files that were your input and output from SORT to keep disk space free.

References:
On the SORT and LIST commands, Disk Operating System DOS User's Guide, Document No. 50432.

On the IEOS commands, especially CUT, CREATE, PLACE, Word Processing Simplified User's Guide, Document No. 50502.



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Use the Reader Reply Form at the back of this issue to tell us any news to keep your subscription coming. See you again in early March.

SCRIBE to IEOS Conversion



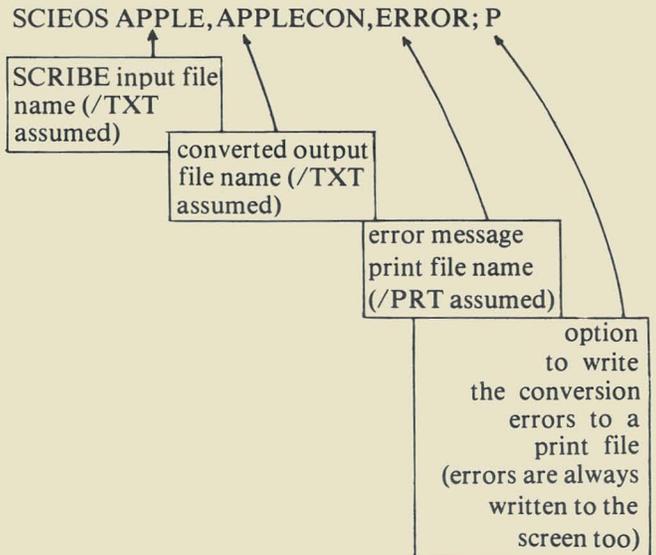
The long awaited SCRIBE to IEOS conversion is finally available. The SCIEOS utility enables you to convert a SCRIBE file into an "unformatted document" file acceptable to the Integrated Electronic Office™ Station (IEOS) editor. SCIEOS will successfully convert most files; however, since no one-to-one correspondence between SCRIBE and IEOS commands exists, SCIEOS may not perfectly convert a given file. Thus, SCRIBE files converted by SCIEOS must be modified within the IEOS editor to ensure that the printed copy generated by IEOS is an exact reproduction of the SCRIBE output.

Problems in converting SCRIBE commands fall into four general areas:

- 1) Print Control - SCIEOS simply discards most print control commands since IEOS does not have parallels. Modification in IEOS after conversion can restore any print control needed.
- 2) Headers, Footers, Paging - Margins established in SCRIBE are retained after conversion as IEOS secondary format changes; however, SCRIBE headers, footers and paging are placed relative to IEOS default primary format so those items may end up misplaced on converted pages. It is a good idea to adjust the SCRIBE headers and footers appropriately before conversion.
- 3) Tabulation - SCRIBE tabs can be quite flexible but are converted to IEOS typewriter-style tabs and are all left-justified. Some after-conversion modification to remove erroneous tabs or convert a field to right justification may be needed.
- 4) Blank Lines - Certain SCRIBE command sequences that are not translatable may cause an IEOS new line to be inserted. Those extraneous lines can be easily removed in IEOS.

The SCIEOS utility command is very straightforward, allowing you to specify your input file, name your output file, and designate the name and output device of error messages from the conversion.

For example, a "complex" command might look like this:



Or, as another example:

SCIEOS ORANGE

would result in the use of ORANGE/TXT as the SCRIBE input file, ORANGE/CSD being produced as the converted output file, and errors being written only to the screen.

The documentation gives a complete description of the utility and its use, and procedures to complete the conversion of the file into an IEOS document. SCIEOS is compatible only with DOS.D and DOS.G (3800 and 1800 series processors). PSCLIO01/REL is required for execution of SCIEOS/CMD.

Documentation and media for the conversion utility are:

	Model Code	Charge
SCIEOS SCRIBE to IEOS Conversion		
Command User's Guide	50530	\$ 1.50
1 Double Density Diskette	40438	\$15.00
1 Cassette	20766	\$15.00

Word Processing's INVALID FALSE ASSERTION

Some IEOS Word Processing users may have unfortunately encountered the problem of having to recover documents because they "bombed out" in the middle of a modification or creation of a document. Coming up with an error message: INVALID FALSE ASSERTION, followed by about eight more lines of text, you may be baffled.

This mishap is often caused by more than one person operating out of the same subdirectory at the same time. It is usually happening when someone does not have his/her own subdirectory, so therefore, when they want to work on one of their documents, they sign on to another person's subdirectory and open that library. While the two (or more) people are creating or editing a document, they are both writing to the same scratch files (OUTFILE/WP and STKFILE/WP) which causes them to "bomb out" or end up with garbage as text.

[As a user edits a document through either CREATE or MODIFY, a copy of the document is written to OUTFILE/WP. When editing is successfully completed by either the END or PRINT command, the document contained in OUTFILE/WP is written at the end of the library (and becomes your current document). STKFILE/WP contains a mirror image copy of the document in OUTFILE/WP, if the user has scrolled from the end to the beginning of the document during editing.]

One OUTFILE/WP and STKFILE/WP exists per subdirectory, not per library. This problem may not show itself for a few days. For instance, two people may have been working in the subdirectory on Friday, but the problem doesn't become apparent until Tuesday because that is the next time one of them gets back into that subdirectory.

For ARC users, the problem has also occurred when more than one person uses a special sign-on (e.g., to

mount all drives, allow the use of the spooling function, etc.) as an initial entry into the system, and then MOUNTs his or her own subdirectory. OUTFILE/WP and STKFILE/WP default to drive 0, which is also the location of the initial sign-on subdirectory. If a special MOUNT function or CHAIN function is needed, make sure it is the second function performed, after you sign on to your own subdirectory.

Here are some ways of alleviating this problem:

1. The ideal solution is to assign everyone his/her own subdirectory and encourage them to use that subdirectory only. That gives each person his own OUTFILE/WP and STKFILE/WP thus avoiding the "unfortunate happening" described earlier.
2. If you must sign on to someone else's subdirectory, check with other users to be sure no one is signed on to that subdirectory.
3. If you need to use a special sign-on to perform a MOUNT or CHAIN like function, sign-on to your own subdirectory first, then mount the special sign-on.
4. If you work on a processor shared by others and find it in READY mode, re-boot and sign on with your own subdirectory.

If you should happen to come up with the message INVALID FALSE ASSERTION after taking these precautions, before you do anything else - anything at all (i.e., re-boot, sign back on, etc.), please contact your appropriate support person for Word Processing (your Datapoint MSS/MSR, the toll-free number in San Antonio 1-800-531-7131, or your Datapoint Rep).

For more background on OUTFILE/WP and STKFILE/WP, see the Word Processing Supervisors User's Guide, Document No.50547. You might also want to review the subdirectory article in SOURCE DATA Issue 9 (October/November 1980).



Author's time commitments and SOURCE DATA's publication schedule didn't mesh for our MULTILINK follow-up article. Watch for it next issue.

Software Program Releases

<i>Name/Date</i>	<i>Description</i>	<i>Purpose</i>	<i>Model</i>	<i>Media*</i>
ACAL3270 1.1 Released 20 Oct 80	ACALL for DATASHARE V to facilitate 3270 emulation	New software package	50598 20780	User's Guide \$1.50 1 DMF Cassette
AC3271B 1.3 Released 27 Oct 80	ARC communications & emulation software: binary synchronous 3271 emulation. (Combines with AP3270 for model 9817.)	Corrects problems Cancels AC3271B 1.2	50507-1 ** 50506 ** 20736	User's Guide \$2.50 Systems Guide \$1.50 1 DMF Cassette
AP3270 1.1 Released 27 Oct 80	IBM 3277 or 3278 terminal emulator used in conjunction with AC3271B or AC3274S ARC communications software. (Combines with AC3271 for model code 9817.)	New software package Cancels AP3277 1.1	50599 20781	User's Guide \$1.50 1 DMF Cassette
CHAINPLS 3.1 Released 21 Oct 80	CHAIN file compiler and executor.	Corrects problems Cancels CHAINPLS 2.1	50386 20531 20532 40352	User's Guide \$10.00 1 DMF Cassette 1 Diskette 1 DDD
DBCPLUS 3.1 Released 20 Oct 80	5500 DATABUS compiler with AIM, text file library support and other additions.	Adds new features Cancels DBCPLUS 2.2	50321 20458 20459 40331	User's Guide \$25.00 1 DMF Cassette 1 Diskette 1 DDD
DF15SYS 2.2 Released 06 Aug 80	A set of DOS programs designed to provide a personalized data entry system for use in Datapoint 1500s.	Corrects problems Cancels DF15SYS 2.1	50305 ** 40275	User's Guide \$7.00 1 Diskette
DOS.C 2.4.2 Released 16 Oct 80	Disk Operating System for 1130, 1150, 1170 processors for 9380 disk drives. Maintenance release replaces the INDEX/CMD.	Corrects problems	50216 ** 20777 20778	User's Guide \$16.00 1 DMF Cassette 1 Diskette
DOS.D 2.6.1 Released 17 Oct 80	Disk Operating System for 1800, 5500, 6600 processors and 932x/937x disk drives or 939x storage module disk. Includes AIMDEX.	Corrects problems Adds new features	50432 *** 50500 ** 50595 20776 40444	User's Guide \$2.50 932x Addendum \$2.50 AIM Addendum \$1.50 2 DMF Cassettes 1 DDD
DOS.E 2.6 Released 23 Oct 80	Disk Operating System for 5500 and 6600 processors and 935x/936x disk drives. Includes AIMDEX.	Adds new features Cancels DOS E 2.4.3 and earlier	50432 ** 50595 20305	User's Guide \$2.50 AIM Addendum \$1.50 4 DMF Cassettes

**Media charge - \$15.00 for one cassette, diskette, or double density diskette **Documentation previously released*

<i>Name/Date</i>	<i>Description</i>	<i>Purpose</i>	<i>Model</i>	<i>Media*</i>
DOS.G 2.6 Released 22 Oct 80	Disk Operating System for 1800 processor and double density diskettes. Includes AIMDEX, 14xx support.	Adds new features Cancels DOS.G 2.4 DOS.G 2.4.1	50432 ** 50595 50596	User's Guide \$2.50 AIM Addendum \$1.50 14xx Addendum \$1.50
DOS.H 2.5.2 Released 22 Oct 80	Disk Operating System for 1500 processor. Maintenance release replaces PUTIPL command and adds file DOSGUP/REL to define quantities and external symbols.	Corrects problems Adds new features	20779	1 Diskette
DSSLAVE 1.1 Released 31 Oct 80	Remote station interpreter for use with DATASHARE. Uses newly-revised asynchronous protocol available in DS5 3.3 or DS6 1.1.	New software package Cancels DS5SLAVE 2.1	50537 20771 40439 20772	User's Guide \$1.50 1 DMF Cassette 1 DDD 1 Diskette
DS5 3.3 Released 03 Nov 80	DATASHARE V Version 3 - options added include memory-resident trap handler, four new list controls on KEYIN and DISPLAY statements.	Corrects problems Cancels DS5 3.2	50450 ** 9812 -001 -002 -003	User's Guide \$4.00 3 DMF Cassettes 2 Diskettes 1 DDD
DS6 1.1 Released 24 Oct 80	DATASHARE VI - high-level, multi-user, interactive program to interpret DATABUS language. Operates on 6600, 6000, 5500, 5000, 1170, 1800, or 3800 processor with DOS, ARC, or UPS. Capable of local or servo printer support, indexed-sequential, associative-index, random-accessed, or sequential file I/O, central/slave operations and up to 24 port multi-processing. (See SOURCE DATA #9.)	New software package	50536 9828	User's Guide \$10.00 4 Cassettes 2 Diskettes 1 DDD
FORTTRAN 1.1 Released 20 Oct 80	FORTTRAN compiler for 1500 processor. ANSI Standard (1966) compiler. (See story in this issue.)	New software package	50526 9816	User's Guide \$10 1 Diskette
MD378015 2.1 Released 26 Sep 80	Emulates the online characteristics of an IBM 3780 Data Communications Terminal in point-to-point or multipoint environment on 1500. May also emulate IBM 3741 terminal.	Corrects problems Cancels MD378015 1.2	50478 20671	User's Guide \$4.00 1 Diskette
ML15VIP 1.1 Released 27 Aug 80	Honeywell VIP 7700 line handler for DATABUS MULTILINK™ interpreter for 1500. Simulates single terminal.	New software package	50532 20770	User's Guide \$2.50 1 Diskette
UNITRM18 2.1 Released 09 Oct 80	Terminal emulator for 1800/3800. Handles full duplex communications in teletype discipline at various baud rates or half duplex commun. over a 202 type modem at baud rates up to 1200.	Corrects problems Cancels UNITRM18 1.1	50354 20489 40320	User's Guide \$2.50 1 DMF Cassette 1 DDD

**Media charge - \$15.00 for one cassette, diskette, or double density diskette **Documentation previously released.*

<i>Name/Date</i>	<i>Description</i>	<i>Purpose</i>	<i>Model</i>	<i>Media*</i>
UNSPPOOL 1.2 Released 05 Nov 80	Print unspooler provides deferred printing of Datapoint standard print files from shared disks at a File Processor. 45 CPS word processing character printer now supported.	Adds new features Cancels UNSPPOOL 1.1	50462 ** 20637	User's Guide \$2.00 1 DMF Cassette
UPS 2.1 Released 23 Oct 80	Utility Partition Supervisor allows efficient concurrent running of DS5 3.2 or DS6 1.1 with utilities such as DBCMPLUS, FASTSORT, INDEX.	Corrects problems Cancels UPS 1.2	50401 20557	User's Guide \$1.50 1 DMF Cassette

Diagnostic Programs

TSTUBE55 1.2 Released 30 Jun 80	Diagnostic program for DATASHARE systems supporting Datapoint Datastations - 3601 or 8200 type. Supports 9408 modems, serial printers connected to remote terminals and displays transmit baud rate of all ports.	Adds new features Cancels TSTUBE55 1.1	50448-1 20604 20605 40402	User's Guide \$2.00 1 LGO Cassette 1 Diskette 1 DDD
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**Media charge - \$15.00 for one cassette, diskette, or double density diskette **Documentation previously released.*

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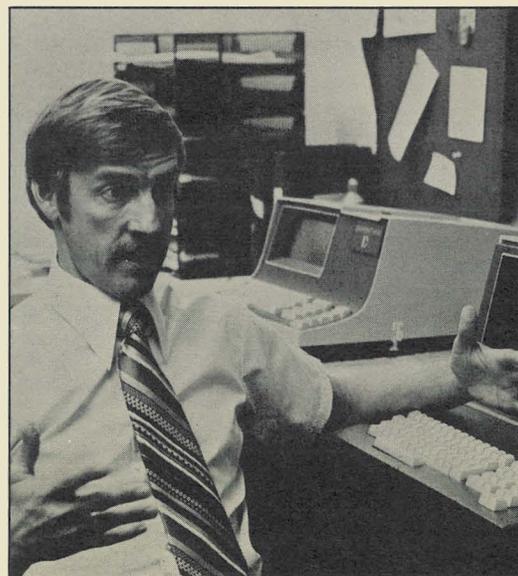
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