The major question today is how far will appear on the scene definitely in the revolutionary movement.”

Different from today’s,” Kornel Spiro, manager of market analysis for Amdahl for massive reprogramming, panelists at an Info ’74 session on “Future Considerations for Configuration Planning” agreed last week.

Now SDLC becomes the common protocol for “Advanced Functions for Communications” (AFC) networks with VS 370 host processors. Underlying the AFC concept is a “Systems Network Architecture” (SNA) that employs a common network control program and a common access method (Viam), IBM said.

The all-embracing telecommunications structure distributes network control functions throughout networks, cutting communication costs and host processor overhead, IBM claimed.

The integrated plan consists of: • Unchanged terminals with integrated control links or to programmable controllers that automatically handle such tasks as scanning and ending transmissions.

IBM introduced a new System/3 last week — the Model 8 — that features an integrated Communications Adapter (ICA) and no provision for card I/O, unlike earlier models in the series.

The General Systems Division here said also that the 3340 Direct Access Storage Facility and 3348 disk module can now be attached to the System/3 Model 15. The Model 8 can be used either for batch processing or for on-line line data entry and inquiry.

IBM semiconductor memory is available in four sizes ranging from 16K to 64K bytes. Memory operates with the same instruction sets, cycle time and access speed as the larger System/3 Model 10, IBM said, though the memory on the older model is core.

The ICA permits one remote and two local communications lines to be connected to the Model 8. Standard binary synchronous communications is also offered.

A minimum practical configuration including a 16K CPU, 2,45M byte disk, single 3741 data entry station and 100 line/min printerrents for $1,584/mo. A typical configuration would have a monthly rental of $1,849 and purchase

IBM Has Cardless S/3; 3/15 Users Get 3340 Disk

Scanning, Program Status Delay D-C Primary Tally

Need for Compatibility to Temper 1984 Systems, Info Session Told

By Ronald A. Frank

WASHINGTON, D.C. — Hardware and software multifunctions combined to cause a serious snafu in vote talling in the primary elections here last week. More than 10,000 rejected ballots had to be counted by hand and the final election totals were still not available 22 hours after the polls closed Tuesday night, an election official said.

The plan called for the hand-marked paper ballots from local polling places to be sent to the Board of Elections and other local contests were to have been processed by a CDC (Computer Center) system leased by the Board of Elections. Officials expected to have the final vote count available for public announcement soon after the polls closed at 8 p.m.

The plan called for the hand-marked paper ballots from local polling places to be scanned by three optical scanners installed in the District Building. The scanners were to process the ballots and then generate magnetic tapes. These tapes were then to be processed on a CDC 1700 for the final totals. However, early on Tuesday afternoon, the scanners began to reject many paper ballots because they had not been marked properly.

Apparently the scanners had been set up to recognize only shaded-in blocks alongside candidates’ names in each contest. But some voters put an “X” or a checkmark. Others voted only in a portion of the races, leaving some choices blank.

The scanners had apparently not been programmed to accept these ballot exceptions and as a result between 10,000 and 12,000 ballots had to be counted by hand.

To compound the difficulties, a malfunction in the vote counting system processing the tapes at the District Building forced officials to transfer the tapes to a second CPU.

But programming for the second main frame has been accomplished in part with the extensive use of large-scale integration (LSI) methodology for buffers and transmission controllers inside remote terminals, the company said.

IBM also claims users can install additional terminals at remote locations with little or no modifications to existing applications programming. The unified communications structure is said to simplify connections among controllers, lines and terminals in addition to standardizing line control methods, line speeds and access methods.

SDLC under SNA permits as many as six users per line, IBM said, even though a response is required from the receiving device before a response is required from the receiving device.

(Continued on Page 4)

Action Week

While three national conferences for computer builders and users were going full swing on both coasts last week (Wescon and Compcon coverage in issue), quiet announcements from Atlanta and White Plains brought a raft of new or enhanced IBM products into the world.

Most importantly, IBM’s Synchro- nous Data Link Control (SDLC) communications discipline came to the fore.

The news in brief: • System/3 Model 8 — a cardless System/3.
• A 3340 disk drive attachment to the System/3 Model 15.
• A unified telecommunications scheme based on SDLC — “Advance Function for Communications.”
• Brief details of the SDLC systems network architecture (SNA).
• SDLC models of the 3727 interactive SDLC keyboard/printer terminal.
• SDLC models of the 3730 information display system controllers.
• 3771 remote batch terminal with card I/O only.
• 3775 remote batch terminal with diskette storage only.
• 3777 remote batch terminal with card I/O and diskette storage.

On the Inside This Week

Remote Processor Designed To Handle IBM’s SDLC

360/370 Architecture

Poorly Suited to VS —Page 23

Poorly Suited to VS —Page 29

Computer Industry —Page 33

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User's Needs to Temporize '84 Revolution

(Continued from Page 1)

cate real memory in larger units, provide a large lifetime for data in real memory, and simplify control and address translation.

Other technological developments in the next decade will include the obsolescence of disk systems by faster nonremovable technologies, he said, even though cheaper and slower disks will still be in use for archival purposes.

Other progress in archival storage will include huge price-byte discounts and new automatic systems for mounting archival storage.

In software is less clear than the outlook for hardware, he said. Today there is an enormous amount of third-generation software characterized by large programs, large development costs and large maintenance costs. In addition, there are not very well-defined interfaces between software.

Fourth-generation software will be marked by more engineering development, he said, including structured programming and top-down design, which should lead to shorter development times. Operating systems will be simpler, therefore more error-free, he said, and more resistant to protection penetration.

At the same time, more of the functions that are presently in operating systems will be embodied in hardware in the future, such as resource switching, auxiliary storage management and I/O super- vision.

In addition, the interface within a pro-

gram will be better defined and programs will be more machine-independent than at the present.

Computing will be a seamless function in the future, he added, with new application packages for producers of speci-
fic tasks or applications.

Scanning, Programming Status
Delay D.C. Primary Vote Count

(Continued from Page 1)

frame was also incomplete and another
processing failure occurred. Finally fore-
ted for operational vote counting.

The source of the problem couldn't be
isolated immediately, according to a CDC
spokesman. A Board of Elections official
explained simply that "the computer broke
down, that's all." And a telephone operator
at the District Building told the DP
memorandum was on the phone.

At about 3:30 a.m. Wednesday morning
one local TV station finally abandoned its
programming attempt.

"Viewers to get some sleep since it would
be impossible to get final vote totals until
the day," the operator said. At 5 a.m., an
official of the Board of Elections
announced that further technical
difficulties made it impossible to process
the last two tapes. In addition, it was reported that between 0% and 10%
of the ballots cast were rejected by the
scanners.

Late on Wednesday, a CDC spokesman
described the vote counting system as
"something we put together very fast,"
adding that the system was never in-
tended for operational vote counting.

Latter, CDC spokesman Ralph Sheedy
retracted this statement and said the
system had been checked out successfully.

One area of debate was the size of the
ballots cast which the public had been
heavily criticized for.

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that are presently in operating systems
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in the future, he added, with new applica-
tion packages for producers of speci-
fic tasks or applications.
PHASE 2 OF SYSTEM LIFE: IMPLEMENTATION

When did you last finish a programming project on time? Or within the budget?

You’ve got good people. Your time and cost projections are reasonable.

But implementation — that long pull from freezing the specs to start of verification testing — eats up more time with each new application.

Can we interest you in a major boost in programmer productivity?

System implementations don’t seem to be improving much. Most projects still come in late, and over budget.

They bog down in detail work. Programmer errors cost a few man-days here, more there.

Programmers spend months writing repetitive code for similar or identical procedures.

Bugs fail to show up in unit test, then crop up later in time to idle ten people instead of two.

Five useful software packages — the Talent Amplifiers — from ADR, attack these delay factors. They catch errors, automate repetitive detail work, and handle the clerical chores of implementation. They free programmers and analysts for their professional work.

First, there is MetaCOBOL. It automates such routine programming functions as input-output, report writing, file accesses, and data-base manager calls. MetaCOBOL can eliminate two-thirds of the manual coding in large projects. One parameterized MetaCOBOL statement input to the Translator can produce output of a dozen or a hundred lines of COBOL.

Procedures provided with the translator generate standard COBOL for such functions as IMS calls. Or you can easily write your own procedures to meet unique needs, using macro-writing facilities in the Translator.

The Translator diagnoses syntactical errors, and identifies inefficient COBOL — using ADR’s criteria or yours. The other MetaCOBOL modules, the Test Data Generator and Run-Time Debugging Aid, simplify and improve test procedures and the elimination of logical errors.

And the COBOL Performance Monitor can provide a short-cut to finding production execution inefficiencies.

Before any code exists, use Autoflow II’s language Module Analysis Processors to tabulate all data-name references and statement labels. And to summarize all statements which alter selected data, grouped by data name.

Use Autoflow II’s Extended Text Compositor (ETC) to update textual system documentation and produce clean, revised text automatically.

Then take advantage of diagnostic facilities in Autoflow II to identify syntactical and logical errors in source code.

Throughout the implementation phase your programmers will be making constant revisions to their source code. Each successive compilation and test will turn up coding flaws that must be corrected. ADR’s source program management system, The LIBRARIAN, expedites this task. Programmers can scan, edit, update and restructure programs with little risk of error. Managers enjoy peace of mind knowing that valuable source libraries are protected, documented and processed using the most modern of techniques.

For major productivity gains, switch to conversational programming. ROSCOE is ADR’s cost-effective alternative to IBM’s TSO: a lot less expensive, a lot faster in response, and a lot smaller, as well as easier to learn and more convenient to use. It’s the way to minimize compilations, reduce turnaround time, cut job failures, and improve programmer productivity.

Each ADR product is a complete package — not just a program. It includes full documentation and on-site support. No matter where you are in the world, there is an ADR-trained representative to help you install your product, train you in its use, and ensure its continued effectiveness. ADR products are installed in over 4,000 installations worldwide.

Write for ADR’s new booklet “New Directions in EDP” which describes how ADR products can contribute to the effectiveness of your installation — or contact any ADR office.
IBM Unifies' Network Structure Under SDC

(Continued from Page 1)

vice. Buffers of 256 bytes can store the transmitted data at the terminal and can provide automatic self-recover from most communications errors, allowing processes to proceed without interruption, IBM said.

The 3774 and 3705 controllers, when equipped with the Partitioned Emulation Program Extension, allow application programs to operate over existing 2741-type or binary synchronous transmission lines, while Viam uses the communications modules to control SDC lines.

The 370X controllers can also be used as remote concentrators to collect messages from low-speed lines and transmit them over higher-speed lines to the terminal.

The Network Control Program/VS works in conjunction with Viam to handle SDC communications terminal and key to SDC Application

By Vic Farmer

IBM System/370 Virtual Storage Models

IBM Systems/370 Virtual Storage Models

Controller

3994 or 3985

Advanced Function Terminal Options

3770

3780

3790

3800

3900

DOS/VSE

Application

Program

OS/VSE

V T M A

System/370

NCP/370

IPL/370

SDLC Duplex

Line

4000

P E P

3767

3790

3800

3900

IBM 3767 Communications Terminal

The 3775 terminal combines with 2520 card reader and 3521 card punch.

NASHUA, N.H. — Sanders Associates, Inc., posting a $19.1 million loss for the past year, said last week it will claim triple damages in an antitrust suit against IBM. The independent terminal maker, which sells 80% of its terminals for use on IBM systems, pegs the entire blame for its loss on "IBM's monopolistic marketing practices."

In a one-sentence response, IBM said, "it is regrettable that Mr. Sanders would explain his company's losses by alleging that responsibility lies elsewhere."

Royden C. Sanders, president of the New Hampshire-based manufacturing company, said his firm will file an antitrust complaint against the industry leader within 30 days. It will seek to recover three times its current losses as well as "previous losses and lost profits."

Sanders claimed IBM "retailed" against its subsidiary, Sanders Data Systems, because it became "one of the early leaders in the terminal-oriented distributed processing market, the fastest growing segment of the computer market."

Among its "discriminatory marketing practices," Sanders charged, was IBM's refusal to support existing IBM interfaces used by independent equipment.

Sanders referred specifically to IBM's by teleprocessing lines and a 3704 or 3705 communications controller, or through an integrated communications adapter on the 115, 125 and 127 cards.

The four terminals are available with features that permit communications over both synchronous and nonsynchronous lines at speeds up to 4,800 bit/sec, IBM said. Two 256-byte buffer memories are optionally available for temporarily storing keyed data.

The 3771 terminal offers the same basic matrix printer used in the 3767, but with optional 40, 80 or 160 char./sec print speeds and a 120 line/min belt printer. The 3780 carries the same capabilities as the 3770 but incorporates the belt printer as an optional attachment.

The 3775 has the same capabilities as the 3774 but incorporates the belt printer as an optional attachment instead of the matrix printer. ETP monthly rental for this unit ranges from $443 to $668; MAC, $509 to $768; purchase, $17,320 to $26,720.

Readers and Punches

The new 3521 card reader and 3521 card punch are desktop units that run at 50 chars/line. The 3521 also available, with features that allow it to print information on a card and to function as a card reader. A 3780 or 3782 card controller is necessary for attachment of a 3521.

The new 3784 line printer, when equipped with a print belt of 64 characters, prints up to 120 line/min.

ETP monthly rentals for the 3501, 3511, 3782 and 3784 are $7,000 and $3050 respectively; purchase, $3,400, $7,000, $1,400 and $12,200. First shipments are scheduled for the fourth quarter.

IBM has doubled the number of terminals that can be attached to its 3790 communications system. The 3790 communications system is SDC-oriented. Instead of a maximum of eight 480-character displays, the user will be able to attach 16 and, in some cases, a maximum of four 1,920-character displays, the users will be able to attach 16.

IBM changed its strategy to avoid threats of legal action from Sanders and agreed to support 2264-type terminals on new mainframes.

"But to a large degree the damage had already been done," Sanders said. "The damage to our expectations in 1974 and lease terminations increased significantly."

Sanders also cited IBM's withholding of interface specifications for new equipment as an anticompetitive marketing practice. The result of this policy is a shorter life for independent equipment and financial problems for manufacturers, Sanders said.

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Consultant Sees General Satisfaction

Few Faults Found by Users of Specialized Carriers

By Ronald A. Frank
Of the CW Staff

NEW YORK — Data communications users with lines supplied by the specialized common carriers are generally more satisfied than they were with their previous carrier, according to Harry Newton, a telecommunications consultant who spoke at an Info '74 session on "Advances in Data Communications."

In general, the users are receiving good service, saving money and are especially pleased with the new-found spirit of innovation on the part of the specialized carriers, he said.

With competition among the new carriers, the price of private-line facilities has been going down rapidly while the price of dial-up calls is rising, Newton explained.

Because of this trend a user now needs only a few hours of communications each day between two points in order to justify the installation of a private line, he said. "The economics are switching unbelievably fast to leased lines," he added.

The major limitation to the facilities available from the specialized carriers are the local loops provided by local telephone companies.

Since these are usually analog, the new carriers are forced to use modems and this adds to the user's cost. It also reduces the user's flexibility and can impair overall transmission quality, Newton said.

The consultant called Data Transmission Co. (Datran) the most expensive, most technologically advanced and the "most hyped" of the new carriers. Although at present Datran offers only private-line point-to-point services between Houston and St. Louis, the latest plans call for Datran to complete its first all-digital switch in Brunswick, Ill., within the next few months, he said.

The largest of the new carriers is MCI Telecommunications Corp., which has more employees than the other specialized carriers combined, has the largest number of data users as customers and is now serving the most cities (20) in the country, he said.

Another potential contender is U.S. Transmission Systems, an ITT subsidiary, which will get FCC approval to construct its first sites very soon, he predicted. He described the firm as keeping a very low profile and said little had been done since the company first applied for approval from the FCC last July to operate between Houston and New York.

IBM has applied to enter the satellite carrier field, Newton remarked, because it recognizes the growth of dispersed computer networks is "increasingly limited by the high cost and poor quality of the nation's communications network."

IBM's own communications technology in many cases is far superior to that being used by the telephone industry but IBM's growth is being limited by AT&T's "stubbornness and unwillingness to innovate," Newton told the conference.

Even with FCC approval IBM's current satellite plans talk about the late 1970s, and this is not soon enough for satellite facilities, he said.

Speaking about design criteria for configuring networks, Ralph Berglund, session chairman and communications consultant, said the lower cost of private lines now makes marginal applications "more attractive." The user must consider system performance and be sure functional requirements of a network are met before the question of costs can be addressed.

Communications systems don't require the latest tariffs in order to be effective, Berglund said, and a change in network specifications from five to six seconds response time in an inquiry application could save a company as much as $50,000 annually.

Echoing the call for proper planning by the data user, R.V. O'Brien of the Western Union Data Services Co. advised attendees to carefully identify system requirements before making a selection from the many types of communications terminals currently available.

The manager of market planning urged users to pay special attention to the man/machine interface and the requirements for the remote transmission of data.

"To cushion the impact of technological overchoice, we are forced to spend more time defining the problem," he cautioned.

Software Closing Management Gap

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK — The chasm still yawns, but a bridge built on the foundation of software is slowly being erected between top management and the data processing departments in many areas, last week's Info '74 show indicated.

Software was clearly the key to the management audience for both the show's technical sessions and exhibits although the arrangement of the exhibits and sessions itself showed serious "system" design problems.

Since the exhibits and technical sessions were spread between three separated facilities in a muggy New York, attendees were forced to spend a great deal of time walking — or else missing parts of the overall program.

Many chose the latter, either sticking with the technical program or a quick visit to the exhibits. But in each area software was prominent.

More software vendors participated than in any show in recent memory, but with few new products. The emphasis was clearly on using older products and systems more efficiently to meet management objectives.

The same was true in the technical sessions area — few spanning new developments, but new implementations of older ideas and techniques and emphasis on case histories of such applications.

The American Management Associations, sponsor of the technical side of Info '74, clearly planned for this type of show and audience — not for the technical experts, but rather the implementers.

Success in Data Processing is predicated on how effectively and efficiently management uses its resources: both machines and people/skills.

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The Berton Group can help your company succeed in the human side of Data Processing! Call us.
IBM Software Announcements Indicate VS ‘Inevitable’

By Don Leavitt

NEW YORK — All generalized data base management systems (DBMS) "fall flat on their faces in the area of setting up real controls" and that is why users should "build" data base administrator (DBA) first before the decision to buy DBMS in made, according to Lee R. Prescott, systems director of Travelers Insurance Co.

Speaking to an Info '74 session on data base concepts, Prescott noted the adm inistrator might be an individual or a group.

"But it needn't be a small army," he said, adding Travelers has only 10 people on the DBA staff serving two divisions.

Most systems staffs have at least one real byte-chasing hotshot, the session's panelists agreed, "but at Travelers they've been considerably washed" to work with real problems for the users, "not just elegant solutions to unreal problems," Prescott added.

The basic problem, he went on, is to be ready to deliver something fast. Many end-user departments remember the unfulfilled promises of the management information systems of the mid and late nineties.

"If you can't show something in a year, forget it," he advised.

On the other hand, he noted, users are getting more sophisticated in their expectations. Although the DP staff certainly shouldn't tackle a complete convers to DBMS at one time, or even the toughest application first, "putting too simple a project on the system first will lead to nothing but scotching even when it works well," the insurance man said.

"But it is very important that the view that users must define their current and future DP requirements before they can realistically choose a DBMS be — quipped the best he could hope was that his staff could somehow divine what that view was." The impact of the use of DBMS might be "dif ferent depending on what anything more serious than a guess would be foolish," he said.

"We are now in the prescient discussion of the possibilities, good and bad, of purchased and home-grown generalized DBMSs, Dr. Jack R. Buchanan of Carnegie-Mellon University urged the over capacity to 'at least consider' the use of a specialized data handling system, especially if their needs are unusual.

He spelled out the objectives of the generalized systems and admitted they have "very definite value — if you need them" but they impose various elements of overhead that might well be unjustifiable in a preprogrammed to be done.

Part of the overhead, he noted, would unquestionably be a revision in the data flow through an organization. Beyond that, however, the new data flow could lead to a "tension" between the user's company itself, Buchanan said.

As an example of a specialized task not requiring all the facilities of a generalized DBMS, the professor described various forms of litigation management systems. "With these to be noted, the user wants to be able to get at a mammoth data base on a key-word-on-context or a specific word basis, with no calculation or compu tation facilities involved.

This search-texting type of operation became prominent with both the Control Data Corp.-IBM antitrust suit and in the Senate Watergate Committee deliberations.

Though most of the systems utilize indices to find the desired data, the material actually stored on the computer may range from lists through abstracts and down to the indices only. Buchanan also noted that these apparently is now marking the indexing schema is worked out during its court fight with IBM. With it, users can identify not only the keyword data but where and where it was entered and where in the area of being used in current litigation, according to the professor.

Although specialized approaches overcome some problems inherent in the general ized DBMSs, Buchanan admitted they can "multiply layers of system software."
**Progress Report:**

**370/STOR 155 & 165**

**THE MOST SUCCESSFUL INDEPENDENT MEMORY EVER. CAMBRIDGE KEEPS IT THAT WAY.**

When first introduced, 370/STOR expansion memory for IBM Model 155 and 165 processors was considered innovative. It had up to twice the capacity. Was installable very fast. Had a unique fail-safe feature to assure maximum uptime. And offered unheard-of economy — with savings of more than $1 million possible. It became a big hit with users — and Cambridge has kept it that way. First by adding a feature that eliminated the need for extra storage adapters when expanding beyond one megabyte. Then by adding DAT compatibility. And most recently, by adding a memory Excelerator. 370/STOR 155 and 165. The record speaks for itself.

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370/STOR memory costs less than half what IBM charges. You save over $200,000 per megabyte. Throw in storage adapter cost savings. Another $120,000. And model change savings. As much as $30,000 more. With our Excelerator, you can speed up your purchased or leased IBM storage units. That's even more savings.

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IBM System/3 Users Greeted
By 5 Peripherals Announcements

By Vic Farmer

NEW YORK — IBM System/3 users reaped a good share of the new product activity at Info '74 with the announce-
ment of five new peripheral products.

Decision Data Computer Corp. demonstr-
ated its CS 200 96-column card-
oriented data communications system. With the CS 200, the System/3 user can punch and verify data onto cards at a remote site and then transmit the card data directly to the central CPU or to another CS 200 over standard communica-
tion lines.

In turn, data can be transmitted to the CS 200 from the System/3. In addition to punch and verify, the unit can reproduce, interpret, gap-punch and sort 96-column cards.

Synchronous data transmission speeds up to 9,600 bits/sec are supported. Cards can be punched at up to 120 card/min and read at up to 300 card/min.

The CS 200 is available with either an Asci or Ebcdic data code structure. Options available to the user of CS 200 include integrated modem, automatic an-
swering, modulus 10 or 11 self-checking number, an 80- to 96-column card con-
verter and a new 100 char/sec printer, the 1070 Data Recorder Attachment.

With the printer, the user can call for a printed copy of the data transmitted and sequence of transmission. The printer can also be used to receive messages and data from the central computer site, the firm said.

Both 80 and 132 print position models are available.

A third product introduced by Decision Data at Info '74 was a direct attachment Feature 1062 and a related software util-
ity routine that permits a System/3 Model 6 user to read and punch card files in a manner similar to that of the Sys-
tem/3 Model 10.

Through this interface feature users can attach Decision Data punch card equip-
ment to their CPU to gain an input reading rate said to be 10 times faster than the IBM 4400, in addition to output punching speeds up to 120 card/min.

The firm said no reprogramming is re-
quired to implement existing card appli-
cations originally designed for the 5496. The Data Recorder Attachment is avail-
able as an optional feature on the firm's 9601, 9610 and 9660 card-handling stations and is priced at $130-
to $200/mo. A 122 print position unit costs $5,550.

Monthly rentals for the CS 200 range from $195 to $498 depending on the con-
tract term and configuration. Pur-
chase prices range from $10,150 to $19,460. Decision Data is at 100 Witmer Road, Horsesham, Pa. 19044.

Printers Unveiled

Digital Associates Corp. (DAC) unveiled 400- and 700 line/min printers that are said to operate under the standard Sys-
tem/3 supervisor and normal I/O support routines.

The equipment is basically a Data Printer Corp. Chaintrain printer inter-
faced to System/3.

The DAC/3 printer uses an Ebcdic 48-character set and prints 10 char./min at 6 line/in. over 132 columns. The Chaintrain is composed of character links riding on a monorail track which insures alignment, DAC said.

The DAC/3 400 line/min printer rents for $415/mo on a three-year lease and is priced at $15,000. The 700 line/min printer leases for $725/mo and is priced at $19,600.

DAC is at 24 Old Kings Highway S., Darien, Conn. 06820.

Kybe Corp. announced a tape cassette drive in four models that span a com-
pletely RS-232C or Digital Equipment Corp. PD-4 interface model to a bare-ones transport-only configuration.

The CT-105 contains buffer and control electronics to read, write, edit, search and rewind and is priced at $15,000. The 700 line/min printer leases for $725/mo and is priced at $19,600. 

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By Don Levitt
NEW YORK — "You can probably give a good B+ to most data base management systems (DBMS) and most vendors in the market today," according to James Tillinghast, Wharton's chair of DBD Systems, Inc., a Long Island-based consulting firm.

Speaking to an Info '74 session on Acquiring a DBMS, he added, however, that most current systems are too strongly oriented toward indexed sequential data storage.

Such a bias works fine for retrieval of small pieces of individual data, he added, but doesn't make any real sense for large-volume data processing tasks such as payroll, which logically belongs on a hierarchical and network-oriented system.

The DBMS vendors are beginning to recognize their need for more support, but it's slow in coming, he added.

Study Needs
Earlier in the session, Dr. Peter Hill of Burroughs' Federal Systems Group set the stage for the overflow audience by noting the study of user needs — in terms of data — and features that are available on the packaged DBMS should be essentially parallel operations.

"There's no use defining the user needs in a complete vacuum; nor should the second step be to look for data processing workarounds to any preconceived ideas. Bringing the two search efforts together is a later part of the process," he said.

Hill stressed that the organization's needs must be the basis of data base design, and that certainly one of the basic issues must be a determination of whether a full-blown DBMS is really needed. Even if a generalized DBMS isn't needed, or if the user's needs are so cloudy a determination cannot be made, "the use of data management principles is vital" to any organization, he said.

The requirements analysis process outlined by Hill covers four areas beyond the organization, he went on.

1. Best for the Money
2. Operating efficiency and how to get the best cost/benefit out of each processing dollar
3. Flexibility
4. Effectiveness of output, age or timeliness of output

The stamp of approval from top management out front is in a good way of assuring style, he said.

Best for the Money
Operating efficiency and how to get the best cost/benefit out of each processing dollar was of keen interest to James C. Emery and Harvey Poppel, also on the program.

Chairman of the Decision Sciences Department at the University of Pennsylvania's Wharton School, Emery recommended the cost/benefit view as the most practical way of deciding how to develop a good information processing system.

He mentioned, however, that many decisions are made for the user in the area of cost and design by the needs of his information system.

High on the list of design decision-makers cited by Emery were functions performed, content of output, selectivity of output, age or timeliness of output, accuracy of output and security of the system.

The objective of planners must be to bring value and cost together, Emery explained.

When the amount of return per dollar spent begins to level off, a system is probably good enough, he said.

"Innovation is too expensive," Emery pointed out. "Why buy a Rolls Royce when you used Volkswagen bug will do the job?"

To help determine priorities, Emery suggested planners solicit a list of priorities from users.

"Must they have it? Should they have it? or would it merely be nice to have it?" all provide good insight in making the final cost/benefit choices, Emery explained.

"Efficiency is important when it means saving money," Emery pointed out.

In making recommendations for funding choices, Emery suggested the responsibilities of information processors lay in identifying the need for a new system.

"Identify alternative approaches, listing trade-offs," he said. "Then let top management make the more subjective judgments."

Approaching the matter of operations resource planning and improved productivity, Poppel said "DP exists solely as a support function and those functions which generate the revenues and control the costs of doing business and should be evaluated by how well it performs that function."

The Boo-Allen & Hamilton, Inc., senior vice-president suggested zeroing in on a complete DP operations strategy consisting of database management, productivity measures and a management plan.

As an example of productivity measurements, the information processing manager should determine unit costs, Poppel said. Then, because it is not really possible to reduce costs in absolute terms, "the principal objective of DP operations managers is to meet specified service objectives at the lowest unit cost," he stated.

To accomplish this requires continued reporting on machine/service and productivity measurements and a thoroughly developed problem/solution matrix for taking action on these indicators.

"Service and productivity measurements and actions are vital feedback into re- source strategy development and planning function," Poppel explained. "Through successful resource planning and control, a company can save from 10% to 40% on information processing," he said.
Job Description Crucial to Career Pathing

NEW YORK - Insisting that job descriptions for DP people be written by DP people, Dr. Frank J. LoSacco, a vice-president of Advanced Computer Techniques Corp., provided DP managers with yet another guideline for managing their professionals at an Info '74 session.

Sharing the podium with Philip C. Cross, LoSacco declared accurate job descriptions essential to any kind of organized career pathing or advancement for DP professionals.

He and Cross noted every job description should define certain variables: job responsibilities, job prerequisites and the degrees of supervision received and given by the position. When applied to a particular employee, he suggested the description also include where the person was recruited and what his or her expectations are, depending on the normal possibilities for advancement.

While his company writes job descriptions for individuals, LoSacco said these are not contracts, but rather vague guidelines indicating a person's interest in career development. Contracts for such development do exist at Advanced Computer Techniques, but these are made under the particular direction of a career development officer, LoSacco remarked.

A new staff position, the career development officer, is charged with guiding and insuring the professional growth of the data processing staff, in addition to this responsibility, the officer controls funds devoted to training and assumes the defense of career development programs.

"We have created a situation in which a high-level person must be responsible to each individual staff member and to the needs of the organization as a whole," he said.

If someone fails to advance or a program flops, close attention to individual progress makes the reasons for failure "easier to determine."

Managers Can No Longer Excuse Lack of Performance Measures

By Edith Holmes Of the CW Staff

NEW YORK - No more excuses remain to support the DP profession's claim that it can't measure the performance of its professionals, Philip C. Cross, senior director of operations at Educational Information Services, Inc., New Brunswick, N.J., informed an audience at Info '74 here last week.

In a room filled to capacity, Cross told the session on managing the DP professional that traditional arguments for making performance measurement someone else's responsibility would no longer suffice.

"Many in the profession continue to claim that either DP management lacks the necessary related education and experience to effectively control and manage its people, or DP types have taken advantage of the shortage of their skills to keep management at bay, or management throughout the company has not paid due attention to the increasing importance of DP in much of the company's management and product decision-making processes," he said.

But, according to Cross, while these conditions may have existed in the past, the profession should have outgrown them by now.

"DP has been around long enough for its functional management to develop and apply DP personnel resources more effectively," he noted.

Secondly, he argued, the tag "sellers market" no longer applies to DP personnel.

Finally, "DP costs, failures and accomplishments have taught management in most companies the value of proficient and competent DP personnel," Cross contended.

Describing the task he asks the profession to perform as "a bottoms-up management process dependent on perseverance," Cross urged managers to apply performance measurement to all levels of DP personnel.

"Professionalism is a level of performance, an attitude and dedication in performing within and beyond the requirements of a job assignment," he explained.

"Degrees, certificates, years of experience or titles do not in themselves make a professional." What matters is "how a person does his job."

Standards Essential

The development of a performance measurement system rests on the establishment of standards which will "enable a manager to construct a performance matrix allowing him to evaluate the work of each individual," Cross commented.

Whether the standards emphasized are methodology-oriented, results and accomplishment-oriented or a combination of these depends on the kind of job to be performed.

For its part, management must assume responsibility for continually maintaining the performance measurement system by providing up-to-date and accurate job descriptions that should define job title, job functions, skills and abilities, administrative authority, educational requirements, experience requirements and promotion requirements.

In addition to making descriptions of jobs available to personnel, Cross concluded management should attend to the following tasks:

@ "Identify and provide training and development which is in tune with work assignments and career opportunities." For its part, management must assume responsibility for continually maintaining the performance measurement system by providing up-to-date and accurate job descriptions that should define job title, job functions, skills and abilities, administrative authority, educational requirements, experience requirements and promotion requirements.

@ "Identify and define any performance measures which are to be accomplished."

@ "Identify and define departmental and individual performance objectives which are in keeping with corporate goals, objectives and policies.

@ "Establish and maintain an organizational structure that clearly identifies and properly places all work functions within functional areas in relation to each other."

@ "Develop and update an operational strategy that takes full advantage of personnel expertise and capability while anticipating and building to meet future requirements.

@ "Establish an appraisal system that clearly communicates to the employee what his performance rating is, what his strengths and weaknesses are and how his future development will proceed.

@ "Identify and provide training and development which is in tune with work assignments and career opportunities."

@ "Reward or punish performance or lack of performance either through merit increases or promotions, or through withholding merit increases, demoting or discharging."
NEW YORK — Data communications was emphasized at a majority of the Info '74 exhibits, but few firms were using new products to demonstrate their communications software and services.

Among the terminals introduced at the show, Sanders displayed two CRTs which it said can be plugged directly into IBM 3270 applications without modification. Called the 8171 and the 8172, the CRTs include a 12K microprocessor, emulation software and system configurations which range up to 32 terminals and eight printers.

The Model 8171 is used for remote cluster configurations while the 8172 is used for local mode systems. Standard IBM 3270 terminal control functions are performed with the display and keyboard and the binary synchronous line control in the CRT systems is provided by control programs in the controller memory portion of each system.

In addition to 3270 compatibility, the Sanders CRTs have such features as dual intensity displays and a "photopen" option. They are designed to operate as on-line displays in inquiry/response, data entry, order distribution and similar user applications.

Com-Data Corp. introduced a modified Model 33 TTY. The modification allows the machine to operate on either a dial-up or TWX network.

Datapoint added a 360/20-compatible Hasp workstation to its earlier remote batch terminal emulators. Using a 300 card/min reader, the workstation operates on-line to a 360/370 in a synchronous data format matching the line discipline of existing IBM CPUs, the company said.

Com-Data demonstrated a modification for the Model 33 TTY which enables the machine to operate on either a dial-up or TWX network. The auto-answer unit will handle a message on either service and "busy out" the unused circuit, a spokesman explained.

When used in conjunction with two Bell CBT Data Access Arrangements, the modification, which fits directly into the Model 33, allows dual service from one terminal instead of two TTYs from the phone company, the spokesman said. The complete Model 33 with either rotary or Touch-Tone dialer costs about $1,585.

Com-Data also showed a self-installed acoustic coupler kit for the Texas Instrument Series 733 portable terminal. Installed with a screwdriver, the kit costs $315 compared with $395 for a similar coupler unit from TI, according to a Com-Data source.

Datapoint Corp.'s Hasp Workstation

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CW at Info

An optional data validation feature in local mode can be programmed into the terminal using additional memory and software routines in the control program, the company said.

A cluster of five 8171 remote terminals with a 1,920-character screen, keyboard, microprocessor and modem interface cost $637/month on a four-year lease or $28,925 purchase. First deliveries of both models are scheduled for March 1975.

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'Management Gap' Can Be Bridged, Keynoter Assesses

By Edith Holmes

NEW YORK — Information produced for management must be both timely and actionable if "the management gap" between top executives and systems people is to be closed, Peter G. Scotese, president of Spring Mills, Inc., and former executive with IBM, told the opening session of the American Management Associations' Info '74 here last week.

Management holds the responsibility for telling its information people "what kinds of data are timely and actionable," the keynote speaker told his audience of 250. "Then it is up to the information people to produce it, in acceptable form and within acceptable economic constraints," he added.

Scotese asserted effective management of information systems depends upon this kind of communication between the data processing function of an organization and its users. But these lines of communication are often nonexistent or are obscured by other concerns. He suggested that management must think about the various "audiences" it is trying to reach.

Perhaps first among those impacting DP activity are the hardware and software suppliers, Scotese said. Characterizing such suppliers as "the highly effective salesmen whose stock in trade is frequently overkill," he emphasized the need for management to be able to "separate fact from hyperbole."

CW at Info

Programmers and systems analysts form another group of people whose capabilities determine the efficiency of information systems, according to Scotese. The responsibility for harnessing the creativity of these people, whose interests may tend more toward increasing the level of DP sophistication than making programs timely and actionable, must fall to the DP manager in an organization as well.

While the controller-treasurer-accountant group may look upon the DP department as a "supercalculator," Scotese remarked, its need for "fast numbers" enormously complicates the records and documentation task of a systems group.

The fourth audience — the various operating divisions and staff areas of a company — provides the DP department with perhaps its "most persistent problems of communications and mutual suspicion," he said.

Because each division and department has its own information needs and because these must be handled largely on an individual basis, the challenge to DP management, according to Scotese's view, is to make "everyone in the organization feel that the DP service is its service."

"Systems people must understand the business, the objectives and the organizational structure of each division," he continued. They can also be expected to be "hard-nosed and objective in evaluating information.""}

Those in DP must "determine the feasibility of making use of a system and should continually challenge existing systems," he added, suggesting that the ability of DP to help top management with a means of evaluating their performance.

The final audience, corporate management, acts as both evaluator and user of its business' DP capability, Scotese said. And top management must learn to evaluate "this tool on how well it serves all its audiences, not just one."

Three Ways Available For Presenting COM As Legal Evidence

By Toni Wiseman

NEW YORK — As many users caught between the "paper explosion" and the "paper crisis" turn to computer-output-microfilm (COM), the problem of COM's evidentiary status in court arises more and more frequently.

In a micrographics session at Info '74 here, users learned what particular stipulations they must meet in order to present COM as evidence in legal action.

There are three bases for admitting microfilm as evidence in court in lieu of an original document, according to Robert Williams, president, Cohasset Associates, Inc. These include the Uniform Photocopies Act, the Best Evidence Rule and Common Law and the Best Records Exception to Hearsay Rule.

The Uniform Photocopies Act, Williams said, states that if any business, in the regular course of business, has had any or all accounts filmed, the originals may be destroyed, unless their preservation is decreed by law.

The microfilm is then admissible in court in the place of the original, whether or not the original is in existence.

However, he cautioned, the law must be followed specifically. For instance, the phrase "in the course of business" must be a firm cannot microfilm documents simply because it is going to court; it must be the specific course of business.

The microfilm all such documents at all times.

The law also states that the microfilm will be admissible when such reproduction is "satisfactorily identified."

Williams proposed that firms considering microfilming include, at the beginning and end of each tape, a statement by the operator testifying as to the completeness of the file.

Another point to keep in mind, particularly if using microjackets or microfiche, is that these techniques require that the film be cut or manipulated. This, he said, leaves the film open to the charge that some data has been tampered with. This charge can be avoided if two films are made, and one kept in roll form.

The Best Evidence Rule allows microfilm as evidence if the original document has been lost or destroyed, if it is in the possession of a third party who cannot be subpoenaed by the court, if an adversary failed to produce the original when notified or if the document is public record and therefore not available for presentation in court.

Finally, Williams explained, the Best Records Exception provides that a record shall be admitted as evidence if the presenter testifies to its identity, the mode of its preparation, that it was made in the course of business and was made near the time of the event.

This rule is particularly applicable in the case where there is no original document as such, as in the case of a bank where the source document, a check, is actually only passing through the organization and not retained, he noted.

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Reliability the ‘Stumbling Block’ To Wider DP Applications Usage

By Ronald A. Frank

WASHINGTON, D.C. — System reliability is still a major “stumbling block” in advancing the progress of computer usage. Many applications cannot be run today simply because computer systems are not reliable enough, according to William Davidow, manager of microcomputer systems at Intel Corp.

Reliability problems have been significant in telecommunications, point-of-sale, hotel and banking applications, Davidow told a keynote session at Compon ‘74 at Compon here last week. These applications will require systems with a reliability “10 to 100 times greater than that available today,” he predicted.

But this required reliability will be achieved soon. Advances in LSI technology will make low-cost redundant systems economically feasible, he told the attendees.

Powerful Savings

One of the greatest areas of advancement has been in the power consumption of the microprocessor, Davidow said. A typical vacuum tube flip-flop circuit in the past used to consume about 5 W of power. But today, integrated circuit equivalents of the same function dissipate less than 50 mW. And high-speed bipolar RAMs today consume only .5 mW/day, he said.

Productivity has been increased in programming with the advent of the assembler and the compiler, but even with these improvements many people are surprised to learn that the average programmer today “produces on the order of 10 to 20 debugged and documented instructions per day,” Davidow said. Without the major software improvements, the average programmer would be producing less than one instruction per day.

For most businesses the cost of operating a DP installation runs between 1.5% and 2% of sales. And the expenses of running this installation are distributed equally with about one third allocated to hardware, one third to operations and one third for program development.

The development of the microcomputer since it was first introduced in 1971 has reduced the cost of computation in the areas of power consumption, system reliability and speed. The latest improvement microprocessor, he said, “swallowed his pride” and accepted de facto microcomputer standards. Because he has accepted basic processes designed by others, the engineer is free to concentrate on other problems, thus the cost of hardware development is lower, Davidow implied.

This standardization has created an applications gap. The need has developed not for circuit design engineers but for those who apply the micros to solve practical problems. What is needed are experts who can expand the programmable logic technology to end-user applications.

One of the end results of these advances may be that users will forsake sending written messages for the telecommunications offered by CRT’s. A 13 cent annual stamp put on a one cent paper enclosed in a two cent envelope is rapidly becoming less cost-effective than a message transmitted across the country at $1.20 bit/sec for delivery the next morning, Davidow suggested.

Since this type of user has no DP staff, it is very difficult for him to evaluate a mini-based system. There is invariably a comparison with earlier manual systems where a hard-copy record was generated and the user is skeptical about having to do away with the ledger in favor of disk records, Gardner told a Compon ‘74 session on the business applications of minis/micros.

Because these users look for total systems support on both the hardware and software level, they are usually hesitant to stray into mixed vendor environments. This means the system supplier must provide the user with a complete turnkey system, Gardner said. “They want to interact with one supplier that allegedly knows their business.”

Another type of user for these systems is the branch office of a larger company. In this case, users do not have the same local problems as the small business but in addition, the branch usually is bound to follow the procedures established by the parent company which operate on a central mainframe. For most of these business-oriented systems, a large amount of software is required because the procedures have exceptions for everything. And even though order entry and inventory control sound simple, it is not unusual to see huge amounts of code written for these systems, Gardner said.

One way to get around these exceptions is for the user to dedicate a specific terminal to each procedure suggested. However, a disadvantage of this approach is that the dedicated terminal may be utilized only a small portion of the time depending on how often its assigned task is required in the course of the business day.

Most of the branch office systems use operating systems supplied by the vendor. In many cases, this software is a spinoff from an earlier process control operating system and may not be suited for the business usage, Gardner told the attendees.

The majority of the mini-based systems operate in stand-alone mode or at most they transmit or receive data in batch. This means they obviously are not for circuit design engineers but in addition, the branch usually is bound to follow the procedures established by the parent company which operate on a central mainframe. For most of these business-oriented systems, a large amount of software is required because the procedures have exceptions for everything. And even though order entry and inventory control sound simple, it is not unusual to see huge amounts of code written for these systems, Gardner said.

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Potential ‘Catastrophe’

Few states seem to have initiated any type of security system to safeguard their computer processing activities and a report published recently by the National Association of State Information Systems (Nasis) revealed just how lacking most states’ security and privacy practices are.

Of 42 states that replied to survey questions on security and privacy systems, only 20 said they had implemented even a plan to protect their installations against physical attack or damage. Only nine said they audited their systems. Eighteen have no auditing plans.

Only 15 states require even a simple ID badge for those who enter the DP center. As for data security, 12 states said they have issued a data security plan. Twenty-five have not. Of the states with a plan, only nine have been implemented and only six include an audit.

While 24 states reported increasing public concern over the issues of confidentiality and privacy of computerized data, public concern appears to have been largely overlooked by their elected officials. Only 14 states reported legislation in effect, and in each case, statutes were only "partial."

Two states considered their legislation “sufficient.” Not a single public conference has been held to discuss privacy and security legislation in as many as 23 states. In 17, no legislative action has been initiated, and 19 reported no action by their governors.

Nasis has been deeply involved in developing security standards and model legislation to limit access to data in governmental files. Its ideas, it would seem, could be used to great advantage by those states which haven’t taken their own first steps.

State officials owe it to themselves and their constituents to head the warnings of their DP employees’ professional association that poor security threatens a "catastrophe of great magnitude" to state governments.

EFTS Stampede

Proceed with caution in the move to electronic funds transfer systems (EFTS), Canadian bankers were advised recently by an executive of the Royal Bank of Canada. That warning applies doubly to the fragmented U.S. banking industry, which is suddenly feeling stiff competitive pressure from innovative savings and loan outfits to jump into the electronic money game.

The embryonic movement toward EFTS will eventually mean great changes in government regulation of banking, banking standards and the financial power structure. It will also raise new and bigger problems of security and individual privacy.

The main reason for EFTS to be saved money in the back rooms of the banking system, where the flood of paper is still swelling fast. Meanwhile, the checking account system continues to serve remarkably well. Most consumers are satisfied with it.

because of the size of our business and computer, but this should not classify me as an inexperienced DP manager. Some consideration should be made for the little guy.

Fred Twepesta

Newton, Mass.

Remote Mainenance is Good for User

Re "Remote Mainenance: Trend of Future?" in the Aug. 21 issue:

I heartily disagree with Ronald A. Frank's prognosis of the implication of remote maintenance. Compare for yourself:

Problem occurs.
Call service.
Thirty second machine to machine.
Pause.
Arrival of parts and installation.

Problem occurs.
Call service dispatch.
Pause.
Confirmation call from engineer.
Pause.
Arrival of engineer and diagnosis.
Pause.
Arrival of parts and installation.

I concede that this progressive step creates some problems for non-IBM hardware vendors, but I do not accept Frank's sweeping conclusion of doom to these parties. I believe a more reasonable conclusion would be that IBM recognizes the difficulties involved in remote testing of its many multi-vendor customers.

Furthermore, I expect any unilateral move by IBM which would downgrade service to multi-vendor shops would be actionable by both the user and the non-IBM vendor.

Frank goes on to say that the user will have “less information about his system.” I submit users will have vastly more practical information about their systems, substantially less downtime, and may even find maintenance costs reduced.

Robert R. Miles

Arlington, Va.

Tests Don’t Consider ‘Little Guy’

Each week I read Computerworld and follow the pros and cons of certification. And it seems to me that one point has never been brought up. I am the DP manager for a small firm which has a tape system. I keep current with all the hardware and software advances but do not have an inherent knowledge of all these changes.

I concentrate solely on my company’s needs and improve the system as I gain more experience through time and effort. As our computer system expands, I implement new techniques even though they may have been around for four or five years.

In looking over certification booklets, I find half of what the tests are based on I have no need for

Raymond S. Gould
Corporate Director
Systems & Data Processing
Tecumseh Products Co.
Tecumseh, Mich.

He’s Not Buying Anything

The irresponsibility of Herb Grosch’s July 3. column entitled “The Honeywell Mess” and Computerworld’s response to criticism for having published it, as expressed Aug. 21, is inexcusable.

I have decided to decline renewal of my subscription.

Robert R. Miles

Arlington, Va.

Letters to the Editor
Programmers as Easy to Lose as Needle in Haystack

By Paul Torell

September 18, 1974

The Availability Problem: Who Pays for Downtime?

The Taylor Report
By Allen Taylor, CDP

Some weeks ago, in discussing the various "Bait and Wait" techniques used in selling systems support software with standard peripherals, a breakdown in systems support software gives the user only a portion of his total system is unusable at that time. This total system.

A breakdown in the hardware as far as the software is concerned can immediately bring about the disconnection of the entire system. Saville, however, took time out to speak out, it will allow me to get going. And, in my experience, that was unusual.

I have many letters from people who are annoyed about various aspects of the DP profession, many without exception the writers call a system that is to lose programmers.

Frankly, I would like to see efforts to deal with constructive matters, rather than to air the opinions of those who are dissatisfied.

Many other readers wrote in confirming Saville's point. I like his equating the 95% plus is a good problem.

Philosophy that each programmer should do his deplete his savings in the equivalent IBM unit. R.W. Bridge, district DP manager, Port Huron, Mich.

It could be said for instance, that a "local maintenance facility" for independent disk drives with adequate parts and support is the last possible moment.

Looking at his description it appears that this many be a consequence of poor performance after an independent manufacturer had the last possible moment. I don't see how a financial set-up would work with any of the vendors to make up such losses, and yet I do use Saville's point. I would just try to avoid stating the problem in terms of actual losses and try to state it in terms of potential losses.

Looking at his description it appears that this may be possible, he talks about a system lamed by the loss of one of two memory units that have been alternately offered alternative ways that you have disregarded ceases to function due to a further malfunction. If a programmer assumes he no longer cares about the job he has assumed the posture of a worker.

"Assume he's a worker, not a money. Do not concern yourself with the suddenness in bonuses or promotions. If a programmer asks about them, say he's "lucky to get his salary. Exude a philoso-

"Despite this, the manufacturers do not agree that each programmer is best regardless of salary, automatically, just the way a machine does.

No Proof

4. Single programmers out for negative comments only. Do not praise privately or in front of others. A programmer in whose work you have shown a positive interest will be more difficult for someone.

5. Place the entire staff in lock-step in terms of salaries. Fight merit increases. Be as parsimonious with money as you are with praise. Remember, money speaks louder than words, accords evident.

6. Preserve status quo in terms of equipment. Avoid upgrading hardware for the sake of it, but when you are forced to by powers beyond your control, prevent members of your staff from learning of the advent of new equipment that may last a season.

7. Provide total staff with full access to personal phones. Make it easier to monitor or screen incoming calls even by just having a telephone receptionist ask, "Whom may I say is calling?" To further assist recruiters, publish and widely disburse lists of employees giving their departments, extensions, job titles and home addresses.

Be Insensitive

8. In what had been all or predominately male departments, do not alter the physical environment or your behavior in any way to adjust to the sensibilities of women programmers. Continue to display in prominent locations those calendar nodes you get from the traffic department. Maintain old-time pool hall atmosphere, including spitoons, if possible, and dirty jokes.

9. Keep the programming staff space as it was when used by accounting. Disseminate changes. For example, when a programmer

10. Always be impartial. If a programmer has completed a job, make no special efforts to have it promoted. Try not to let the programmer know when work will run. He might be able to accelerate the debugging process. Do not give the programmer any additional tasks while he is waiting. It might take the best of the program and alleviate his anxiety.

11. Keep staff operating well below ca-

12. Stand fast in the face of innovation. Refuse to discuss job security. Say contracts are unthinkable. Take no action to protect their jobs when that new manager takes over from you on your well merited salary increase.

Paul Torell was a programming and systems manager before opting for the personnel business with Douglas Personnel Hackneak, N.J.
Structured Programming the New 'Universal Elixir'?

By Miles Benson
Special to Computerworld

You've all heard of structured program-
ing, right? 

It's the new approach to design and programming. Its main components are: effective design, speeds coding, drastically reduces checkout time, supports Motherhood and Apple Pie and leaps tall buildings in a single bound. 

In short, it's computing's Universal Elixir, circa 1974. 

Once you discover an elixir, can an elixir salesmen make you find it? I hate to answer my own question. I hate the answer even more. The answer is positive. Elixir salesmen abound. 

Remember back, if you're a computing "old-timer" (30 or older), to when computing was an exciting new field which exploded into prominence? That rapidly rolling stone seemed to move too fast to attract the mass of those more interested in money than quality products. Oh, there were a few stock manipulators and paper product touts. But mostly, there were people who found the field satisfying enough that doing a technical job well was a goal in itself. 

But beware. As the rolling stone slows into stability, the profits-over-profession- alism crew are moving into the field. I'd like to illustrate what I mean by a story about structured programming. 

Acme Chemical Co. (a pseudonym) has a strong computing department. Its appli-
cations range from process control of some pretty exotic equipment to accounting for fertilizer sales. If there's a way to improve the programming process, Acme would like to know about it. Lots of bucks in lots of departments are at stake. 

The Universal Elixir hit Acme like it hit everyone else. Who can turn down "cheaper and better"? Structured pro-
gramming, the computing folks at Acme decided, needed to be investigated. 

There are lots of ways to look at a new technique. Acme chose a straightforward, conservative approach. It chose a team of 

The Project That Failed 

reasonably innovative programmers to im-
plement a standard business system using a structured programming approach - as an experiment. 

The Acme structured programming team studied the literature, studied the problem area, studied the languages available. The language which was most suit-
able for the application locked the block structure capability structured program-
ning demands, so they defined some revisions to the language and built a translator to convert from the structure-
 augmented language to the base language. So far, Acme's approach to getting aboard structured programming is impec-
sively experimental. And the people with those budding skills, of all people, are the only ones in Acme with enough background to even consider teaching a course in struc-
structured programming. 

That's the practical dilemma. Then there's the moral dilemma. Should a company -- in fact, should people - which doesn't know anything conclusive about a subject teach it? 

The moral answer is a resounding "No." But ALI didn't take "No" for an an-
swer. Like the elixir salesmen of yore, ALI moved ahead with plans to offer the course. Strictly on the basis of demand. With no thought for instructional quality. I have a term for the ALI folk who made that decision. Institutionalized Charlatans. They're elixir salesmen, but with rented hotel suit the brand of wa-
gone-based tent shows, with clean shirts and shined shoes instead of frayed collars and dusty suit coats. 

ALI included the course in its catalog last spring. It's already taught a few sec-
tions of it, with the help of some reluct-
tant Acme computer types who couldn't say "No" when the chips were down either. 

I've called this story a project that failed. Actually, that's more of a predic-
tion than a statement of fact. For all I know, ALI is turning out a bunch of satisfied students who feel they got their structured programming money's worth. Knowing the people doing the teaching, I believe they're getting the basic facts about the subject, with some good inter-
pretations to fill in the gaps. 

But they're not getting the benefits of experience. And one other thing. I wonder how that experiment came out? 

A two-and-a-half-day seminar that can help you protect your EDP investment--and your system. 

Conducted by Roy N. Freed, the well-known expert in computer-related law, this unique seminar can give you the information you need to get good, effective contracts from the vendors that supply your EDP installation. And in an industry that's famous for its "promise anything" attitude, this information can be invaluable. It can save you money. It can save you time. And, most important of all, it can help you protect your installation from disruptive discontinuities. 

Here are some of the subjects covered in the seminar: 

- The lease or purchase of computer systems. 
- The lease or purchase of separate hardware or software. 
- The purchase of time sharing, data processing services and consultation. 
- The use of facilities management. 

And here are some of the things you'll learn: 

- How to recognize opportunities to negotiate. 
- How to establish goals and state conditions--before it's too late. 
- How to place yourself in a strong bargaining position. 
- How to understand the language or even be bargained for. 
- How to reach an agreement that protects the security of confidential data. 
- How to set reasonable performance standards for warranties. 
- How to provide tax savings through proper wording of contracts. 

Free Resource Notebook 

You'll also receive a valuable reference notebook which will back up the information you'll receive at this meeting. The notebook will include sample vendor contract forms. 

Roy N. Freed, a leader in this field. 

Roy Freed has specialized in computer-related legal matters for many years. He has served as inside counsel for a major manufacturer of digital computers, and is currently engaged in private practice with a prominent Boston law firm. 

Roy has written articles on the various legal problems of computers including "Computer Frauds A Management Trap" (Business Horizons) and a book entitled "Computers and Law: A Reference Work." Mr. Freed will personally conduct the entire seminar. 

Should you attend this seminar? 

If you're involved in the purchase of EDP equipment or services, the answer is a resounding "Yes!" Whether you're a corporate counsel, contract administrator, DP manager, consultant or officer of a using firm, this seminar will pay for itself many times over. 

You just have to read the pages of Computerworld to realize how frequent supplier problems are and how costly and disruptive they can be. This seminar can help you get what you want when you want it. It will help your company, your industry and you!
Electronic measurement and evaluation, follows a more theoretical bent in its considerations, looking to the future for solutions.

The test run will be brought to play whenever the program being debugged reaches a specified storage address, GBA said.

Repairs
The inserted statements can be invoked by all tasks to effect emergency repairs or be linked to a specified terminal for test purposes without affecting the processing of production tasks. When ADS detects an error, the offending test is suspended before damage occurs and is routed to a terminal for manual inquiry and further debugging. An interrupted task can be resumed at any point; a given set of conditions is satisfied, thus postponing when changes in registers or data fields take place, the vendor said.

No Kitting more than 7K of storage plus I/O areas, ADS is available for a one-time charge of $8,900 or $500/mo. Rental charges are waived after 24 months, the company noted from 19-22 202 St., 11360.

The enhanced APL.SV is available on the PCS net with charges based on re- sources used. The in-house package can occur in a few days.

The language processor can be leased from PCS for $2,000/mo and the library can be added for a like amount. Users would also need IBM's APL program package to make the system operational, the PCS source noted from 16625 Satcity St., 91406.
So you think you know the SCORE?

Sure, you've heard of SCORE. There are over 300 users. But this non-procedural file management system now has a lot of enhancements that make it more than ever the easiest software system to cost justify. Coding and testing efforts are drastically reduced.

Report generation is easy and flexible. Anybody can learn to use it—and we provide training programs to make sure.

Data selection criteria are flexible and simple.

You can process multiple files in a single pass.

You can easily add your own codes for specific needs.

You can generate efficient and self-documented COBOL programs in hours instead of days.

SCORE interfaces with data-base management systems including DL/1 and Total.

And it offers simple access to tabled data, and comprehensive sampling capabilities.

Until you look into today's SCORE, you don't really know the score. For more facts, call Ed Opengart, at 212-489-7200. Or mail the coupon, or contact any of our offices around the world.

GTE INFORMATION SYSTEMS

Datapoint 2200 Runs Text Work

NEW YORK — Datapoint terminal users in stand-alone mode should be able to run text editing functions with the Cytex-5 software just introduced by Base, Inc. The package allows the user to generate, edit and store large documents with semiskilled operators.

Originally developed by Ebasco Services, Inc. for internal use in the typing and editing of engineering and government specifications related to building nuclear power plants, this system has now replaced Ebasco's conventional typing pool and MTST operations, according to Base.

Working with the typewriter-style keyboards of Datapoint 2200-II or 1100 terminals, clerks enter textual material, mathematical equations or tabular data as they might on "normal" office machines.

As they are entered, the materials are displayed on the unit's CRT screen and recorded—with generated page and line numbers—on a magnetic tape cassette. When the user is ready, the cassette is moved to a printer station (Datapoint "terminal" and Diablo printer) to generate a hard copy of the text.

For editing work, the operator moves the cassette to a work station and keys in the number of the line requiring attention; the system retrieves and displays that line.

No command language is required, Base stressed. The system is designed to prompt the operator who answers the displayed "what do you want to do next?" style questions with English answers.

Editing under Cytex-5 is said to be easier than under IBM's Administration Terminal System (ATS) since line numbers are fixed for the life of any edit run. Revisions can be planned in detail as soon as the first part of the user's hard copy comes from the print station.

Under ATS, line numbers are immediately altered as soon as a line is added or deleted. This meant, users discovered, that corrections had to be planned—and executed—from back to front, and the entire process had to be delayed until the last part of a draft was printed.

Cytex-5 can be used on any Datapoint 2200-II or 1100 with 8K of memory. Although Base can install the editing system on a turnkey basis, the software is available separately for current Datapoint users for "about $100/mo" per station. The firm is at 437 Madison Ave., 10022.

SYMBUG-C Interactive COBOL Symbolic Debugging System
SYMBUG-F Interactive FORTRAN Symbolic Debugging System
SYMBUG-A Interactive ASSEMBLER Symbolic Debugging System
VM-370 ISAM CMS Simulation of OS ISAM

VSORT Integrated CMS Sort System
EXECMOD Conversion of EXEC Files to Assembler Code
D-SAVE CMS File Compression
CMS DEBE File Utility for CMS

STANDARD DATA CORPORATION
1540 Broadway, New York, N.Y. 10036 212/586-3100
Why Leaders Win Price Wars

Part of being a leader is to overcome price competition. A leader need not be the largest or the oldest company in its field, but it is the one that stands out because it is recognized as the best. It wins price wars because its proven performance for excellence is not vulnerable to price-cutting.

A leader is also a living — and very healthy — testimonial to the effectiveness of an important marketing principle: Nothing will replace proven reliability of product.

Perhaps the main reason more manufacturers do not sell on value is that it requires a product that has value.

It requires something else, too — the lonely courage to stand out from the crowd, to make your products even better, year in and year out, regardless of the opportunistic competition. Perhaps this is the rarest quality of all. It can only be called Leadership.

GRAHAM MAGNETICS
High-performance "Silent 700" Automatic Send/Receive Data Terminals now offer powerful new options.

New Binary Data Format option permits recording and transmission of data in 8-bit binary code format ideal for loading and storing data in 8-bit binary code format.

Additionally, Automatic Device Control and Automatic Search Control options give you powerful capabilities for preparing, editing and manipulating cassette files locally.

And all "Silent 700" ASE terminals feature twin magnetic tape cassettes along with quiet, non-impact printing at speeds up to 80 characters per second and offer transmission rates to 120 characters per second. Then there's proven reliability and freedom from scheduled maintenance that cut data handling costs and maximize "up-time" for you. And, deliveries of standard ASR models and options can be planned to meet your installation schedules... deliveries are faster than ever.

For more information on "Silent 700" ASE terminals, contact the nearest TI office listed below or contact Texas Instruments Incorporated, Digital Systems Division, P.O. Box 1444, Houston, Texas 77001, phone (711) 494-5115, extension 2126.

Texas Instruments
INCORPORATED

DCD...the only roadmap to faster, easier program debugging and maintenance

Debugging a new program or maintaining an old program can be like finding your way around a new city...you get lost.

DCD (Data Correlation and Documentation System) is the first and only roadmap designed especially for programmers. It's a clean, straightforward, easy-to-follow path that guides you from input, through working storage, to output, and back again. DCD provides data flow, logic flow documentation and listings, all on a single, compact report.

You debug faster because all of the information is right in front of you. For program maintenance, DCD is a must. It eliminates source listing searches...reduces desk checking time...and eliminates time-consuming, expensive recompiles.

If debugging and program maintenance are keeping you lost, find out more about the programmer's roadmap.

Texas Instruments Incorporated

Program Checks
Tape Surfaces

CLIFTON, N.J. - IBM 360-370 users can check the writing surface of scratch tapes and the data recorded on active files with the Fast Analysis of Tape Surfaces (Fats) package from Innovation Data Processing, Inc. The test functions can be performed independently and concurrently, and the utility can handle up to nine tests at a time, all at tape speed, the company said. The tests are run on the user's normal tape drives and can be used with 7- or 9-channel tapes including the recently announced 6,250 bit/in. recording density.

Most IBM-compatible tape drives and independent tape reels can use Fats. Fats uses a unique character set to certify new or old scratch tapes. With this character set, Fats can in most cases detect one- and two-bit recovery, ensuring complete identification of problem tapes, Innovation claimed.

For new tapes, a standard label can be written by Fats prior to certification of the surface. Fats can also be used to label tapes bypassing the certification process altogether. The standard label will be preserved, where specified, when certifying old scratch tapes, a spokesman added.

All temporary data checks are reported by Fats. A permanent data check level can be specified by the user or Fats will default to 10 retries as the definition of a permanent error. Fewer retries might be more appropriate in situations where extreme high quality is a necessity, the company noted.

Fats provides a permanent record in the form of a comprehensive detail and summary report on each tape tested. The detail portion of the report would show the approximate location of an error as well as its type so that users can determine what action could most easily resolve the problem, Innovation said.

Fats operates in 50K bytes, regardless of the number of tapes being tested concurrently. The system has been implemented under DOS, OS and V5 environments and can be acquired for $750.

An enhancement option, Fast Analysis of Tape and Recovery (Fats) will permit records containing data checks to be corrected, replaced or eliminated. This option should be ready in November for an additional $250, Innovation said from 925 Clifton Ave., 07013.
If you think all System 3 disks are alike, take a closer look at the BASF 130.

Because all single disk cartridges conform to certain industry standards, you might think they’re all equal. They aren’t. The important difference is the extent to which a manufacturer is willing to go in order to exceed industry standards. It’s a matter of making a disk cartridge better than you really need, because there could be times when you need it. Let’s look at a few superior points of the BASF 130 System 3 disk cartridge:

The binder that won’t quit
As you probably know, magnetic coating doesn’t just stick to the aluminum disk all by itself. We use a special binding agent to produce an incredibly strong bond. The disk is sealed to prevent oxidation, so you can be sure the coating won’t peel or flake off.

Our own coating process
As the trend toward higher packing densities continues, it becomes increasingly important to monitor the thickness of coating deposited on the disk. The problem is compounded by the necessity for progressively varying the coating thickness from the outside toward the inside of the disk, because packing density is greater as the circumference decreases. For those reasons, we’ve discarded conventional coating methods in favor of an exclusive process using our own BASF-designed equipment.

A polished performance
Following the coating operation, we use our own exclusive polishing process to achieve optimum surface regularity. We’ve been able to achieve a surface so flat, that the possibility of a head crash being caused by an uneven disk is completely eliminated. We might mention that the coating and binder formulation, combined with coating and polishing techniques, are all important factors in achieving surface hardness, which is the ability of the coated surface to survive excessive or extended head loading.

And to make sure...
We test our 130 disk cartridges to standards much tighter than those of the leading equipment supplier. If anything unpleasant should happen, we’d much prefer it happen here than on your drive. As a regular procedure, we do scratch tests to check coating thickness, impact tests to determine head crash resistance, detergent tests to check resistance to wear and temperature variations, and drop tests to make sure balance and alignment don’t shift during shipment. We test to make sure our 130 disk cartridges are error-free.

Finally
Our 130 costs no more than other System 3 disk cartridges. You’re already paying for BASF quality, ...you might as well have it. For more information on the 130, or BASF’s line of computer tape, disk packs and flexible disks, write to BASF Systems, Crosby Drive, Bedford, Massachusetts 01730.

You’re already paying for BASF quality, you might as well have it.
SDI Extends Procedure Library, Billing With 'Grasp' Features

BURLINGAME, Calif. — Users of Grasp and Fmaint from Software Design, Inc. (SDI) gain more flexibility and some new facilities, free or at little additional cost, with updates just announced by the vendor.

Grasp is a DOS/360 enhancement pack-

age that was first introduced as an I/O

spooler. The latest edition includes an

extended procedure library feature

(Eprocs) which supports stored source

programs as well as JCL.

Eprocs differs from similar facilities in

other spoolers, SDI said, in that it handles

the retrieval of JCL procedures at execu-
tion time rather than at spool-in-time.

The ability to use temporarily assigned

partition private Eprocs libraries ties in

with a change in SDI's Fmaint package to

support source programs, the vendor add-

ed.

Appropriately in response to request for

software that would summarize job ac-
counting data collected by Grasp, and

reducing to other vendors interfacing with

the Grasp records, SDI has now released

Grasp. This interpretive compiler al-
lows user-coded billing or charge-back

routines but also includes a library of

basic routines.

The Grasp tape spooler facilities have been enhanced with a command that

allows spool tapes to be read back and

printed through Grasp's own partition,

rather than through a separate parti-

tion — and separate utility program — as

previously required.

The new support allows multiple reports
to be spooled to the same tape, SDI added.

Each of the enhancements except Grasp is available without cost to cur-
rent Grasp users. The hobbyist support costs
$26/mo, SDI said from 880 Mitten Road,
94010.

Computers and communications seminars
September 18, 1974

Nerem-74 Seminars in Boston

Boston Convention Hall, Boston Proper Hotel

10:30 am — Thursday

5-9 COMPUTER CONTROL IN SUPERVISION OF COMMUNICATIONS SYSTEMS

Chairman: J. F. Pfeiffer, Near East Telephone Co., Boston, MA

W. C. Wolf, Bell Northern Research, Ottawa, Canada

BURLINGAME, Calif. — Digital Equipment Corp. (DEC) PDP-11 users with cartrifile cartridge tape peripherals are offered a wide range of software support, including a PDP-8 to PDP-11 cross-assembler, in a new version of the PDP-11 program package from Tridata Corp., the Cartrifile vendor.

The PDP-8 to PDP-11 cross-assembler is now a part of the PDP-11 program package supporting the PDP-11 installation of the University of California, Berkeley. The cross-assembler accepts PDP-11 source code as input and produces comparable assembler code for the PDP-8, which is output, Tridata said.

A Cartrifile editor, PAL-11A assembler

and several utility programs (I/O drivers and the like) included in previous PDP-11 software from Tridata are also part of the new packaging, which is a stand-alone system requiring no operating system software from DEC.

The package can be used on any PDP-11 with a minimum of 4K memory, a tele-

eyewriter terminal and a Cartrifile 10-

20 or 40 tape system.

The PDP-8 package is available now at $250, a spokesman said from 800 Maude Ave., 94040.
Swedish Firm Implemtes 'Mixed Bag'

By Ronald A. Frank

STOCKHOLM - When a company uses an IBM 370/158 to keep track of an insurance data base on more than 700,000 motor vehicles, it might be assumed that the rest of the configuration includes IBM equipment. But this is decidedly not the case at Skandia Insurance Co. Ltd.

The company, one of Sweden's largest insurance firms, utilizes much independent equipment, though it does not ignore IBM hardware. According to DP manager Johannes Norrby, the most important consideration in installing devices is whether they will best fit the needs of the company.

And in implementing Norrby's policy, Skandia's 200-plus DP staff has configured a truly mixed system.

The mainstay of the vehicle registration inquiry system is a network of 180 Alphascope CRTs which operate in IBM 2260 emulation mode under Bitam on the 158. The terminals are dispersed among 40 remote offices located throughout Sweden and the system includes more than 400 CRTs which help in excess of 200,000 insurance claims yearly.

The CRT network was implemented by Anders Elwin, data communications manager, using Univac 3760 programmable front ends and an in-house developed teleprocessing handler. This handler runs under MVS and is known as Secon, which Anders explained is an acronym for Skandia's sequential access method.

The in-house software was necessary because the vendor access method was "not adequate," Elwin said. Further, the company felt it would have cost as much to implement a full version of CICS as it did to develop the teleprocessing software with Skandia's own staff.

Programming for the vehicle inquiry/response system took "seven to eight man-years," Elwin estimated, but it was completed in two and a half months using 20 Skandia programmers.

Half of the time was spent on programming and the remaining time devoted to system debugging, according to Ingvar Lofdahl, software product manager.

The Alphascope CRTs produced by Stannas in Sweden cost about the same as 2260s but do more, Elwin explained. Among the added features are a larger display which is easier to read, five program keys which can be user-defined along the bottom of the display, an adding machine numeric keypad and an underline capability.

Terminal inquiries access a sequential file on 3330 disks. Each record can be accessed according to account number, due date or machine address.

Individual records can be searched according to vehicle identification number or personal identification number, Elwin said. A four-year history is kept on all vehicles including taxis, buses, trucks, cars, etc.

The 739,000 vehicles in the system include about 28% of all the vehicles in the country. And a typical inquiry is answered in less than a minute, depending on the traffic load on the network.

Data is transmitted at either 2,400 or 4,800 bits/sec using lines and modems supplied by the Swedish Telecommunications Administration.

The central DP site, located here, includes 3330s, Memorex 3670 disks (3330-equivalent), IBM 3420-T tape drives, an IBM 2701 controller in addition to the Univac front ends, 3270 CRTs from IBM for another application and a Qutron COM unit.

As backup for the 158 mainframe, Skandia uses a 155 attached in a multi-processing configuration to the 158 for easy switchover. The 155 includes 512K memory, 300 line/min printer, two remote readers, 300 to 1,500 line/min printers, a 200 card/min punch, magnetic tape and disk subsystems.

The 1600 will be compatible with IBM 370x devices installed at central DP sites handling SDLC full-duplex links, Harris said. Binary synchronous terminals can be controlled from a remote 1600 in which the turn could transmit the data in SDLC mode to the 370x. The front end could also be installed at a central site connected to a 360 to support an SDLC transmission link, the spokesman added.

A basic 1600 including 300 card/min reader, 300 line/min printer, two remote batch emulators and basic software will cost about $1,400/mo with maintenance.

The SDLC capability will be available about two months after IBM releases full specifications on the protocol and will add about $300/mo to the system cost, the spokesman estimated.

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Dr. Dixon Doll, the highly respected teleprocessing consultant, leads the expert faculty at this seminar. Dr. Doll has his PhD in Systems Engineering from The University of Michigan, and many years of experience in this field as a consultant and educator. He has taught graduate level computer systems design, and has served as a professional consultant to such firms as IBM, Raytheon, ICC and MCI. Dr. Doll takes an active part in the entire seminar.

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September 18, 1974
IBM announces a comprehensive new approach to teleprocessing.

Teleprocessing—communicating with a central computer through remote terminals—has evolved rapidly in recent years. With it, numerous communications devices have come into use, including a variety of terminals, line control methods and programming support. Many of these elements are incompatible with one another, often requiring costly duplication of facilities.

Now IBM announces a landmark development for teleprocessing. It’s called Advanced Function for Communications. And uses IBM System/370 computers with virtual storage, of which it is a logical extension.

This communications capability was formerly available only for specific industries. Now it is offered for use throughout business, industry, education and government to improve productivity and simplify the development of new applications.

The concept.

This new approach applies a unifying design to the entire teleprocessing function as System/360 did for the computer ten years ago. A combination of equipment and computer programs, Advanced Function for Communications permits users to move freely from one IBM terminal-based system to another with a minimum of application programming changes.

And since this approach establishes a clear separation between network management and user application functions, improved use of the network and a more economical framework for application growth become possible.

The programming.

With Advanced Function for Communications, one teleprocessing network is available for many uses. The network handles multiple on-line applications in a broad range of user environments. Terminals and equipment, on any line, can be shared among many different applications in the computer.

As a result, it is now possible for multiple terminals, on any line, to talk with different programs in the System/370.

This is accomplished by three major programming elements: the virtual operating system; the Network Control Program (NCP/VS) resident in the IBM 3704/3705 Communications Controller; and VTAM, the teleprocessing access method for System/370 virtual systems.

These programs work together to build a comprehensive terminal system on a single line—using a common line discipline, a common network control program and a common access method. Networks can become easier to develop, easier to maintain.

Communications control functions are moved from the central computer and distributed into the network. This can reduce line traffic and thus lighten the load on the computer.

And because you can process more than one application on a single terminal, as well as have numerous terminals sharing a common communications line, you may be able to operate with fewer terminals and lines.

The equipment.

A family of terminals and communications products—most of which use advanced Large Scale Integration (LSI) technology—is available for use with Advanced Function for Communications. All utilize Synchronous Data Link Control (SDLC), a flexible, more efficient line control method. The 16 latest additions comprise the IBM 3767 Communication Terminal, the IBM 3770 Data Communication System and new models of the IBM 3270 Information Display System.

The 3767 is a bidirectional keyboard-printer with a speed of 40 or 80 characters per second. It can be readily incorporated into existing configurations. Some of its uses include inquiry, inquiry and update, low-volume data entry, program test and debug, and problem solving. It is equally at home in the sales department, an insurance agency or engineering office, or in the programming department.

The 3770 is a group of four different operator-oriented remote terminals, combining a keyboard and printer with a modular selection of input/output devices and communications features. For example, the 3774 Communication Terminal, with a bidirectional printer with speeds up to 80 characters per second, can become a multimedia batch terminal by adding such optional units as a card reader, a card punch, one or two Diskette® storage devices, and a line printer.

Advanced Function for Communications. It can be an immense step toward fulfilling the computing potential of the Seventies, with its emphasis on data base/data communications systems.

For more information, contact your local IBM Data Processing Division office. Or write IBM Corporation, Dept. 83F-C, 1133 Westchester Ave., White Plains, N.Y. 10604.
Modem Has Adaptive Equalization

By Ronald A. Frank

BURLINGTON, Mass. — Intertel has introduced a 4,800 bit/sec data set with adaptive equalization. At the same time, the company has upgraded its modem-oriented network control system to include the higher transmission speed. The data set, designated the MCS 4800, can operate on multipoint or point-to-point lines on "unconditioned" 3002 private lines. It can handle either serial, synchronous or binary data formats and is compatible with simplex or half-duplex transmissions on two-wire lines, and half- or full-duplex transmissions on four-wire lines.

The 4,800 bit/sec data set utilizes quadrature amplitude modulation and it has what is claimed to be "100 times better performance" on degraded lines than what is claimed to be "100 times better performance" on degraded lines than most 4,800 bit/sec modems now available. The company quoted one error per million bits transmitted compared with the one per 10,000 bits transmitted said to be a current standard.

The increased performance is attributed to an automatic adaptive equalization that trains in 50 msec, improved signal structure and a coherent demodulation procedure.

Four test mode switches are included on the data set to control analog and digital loopback, to control the test pattern generator and error detector, to force the transmitter on or off and to test the unit's LEDs.

The data set includes a modem sharing option that allows up to four terminals to be shared one at a time on the MCS 4800, an auto-dial backup option which can be utilized through a Bell Data Access Arrangement, and a four channel multiplexer that allows the user to attach two 4,800 bit/sec lines on a 9,600 bit/sec facility from the phone company.

Faster Network System

The higher speed data set allows users of the Intertel network control system to expand their systems from 2,400 bit/sec to the higher transmission rate as required.

The control system essentially combines modem functions from a group of lines into one physical cabinet and controls them through common test and monitoring capabilities. A network system including one 4,800 bit/sec line, two 2,400 bit/sec lines and four 1,200 bit/sec lines in a multidrop configuration with 10 drop/line would cost about $4,800/mo or $102,000 purchase, a spokesman estimated.

Prices for the network control system range from about $1,200/mo for a three-line system to about $30,000/mo for a system with 36 lines and 320 drops. The MCS 4800 data set costs $120/mo on a two-year lease without maintenance. Purchase on the unit is $4,700 and deliveries begin this month from 6 Vine Brook Park, 01803.

Cassette Recorder

ROCHESTER, N.Y.—A buffered digital cassette recorder that can operate as a terminal has been introduced by Techtren Industries, Inc.

Known as the 8400 Datascatter, the recorder includes: high-density tape storage of 145K char/cassette; switch-selectable 110, 300, 1,200- and 2,400 bit/sec speeds; full remote control of all machine functions; automatic high-speed search at 1,000 char/sec; plus data edit access with both character and line correction capability, the company said.

The 8400 also offers an MOS buffer and provides a code-controlled partial rewind feature to allow partial backup on tape for editing and retransmission purposes.

Storage or Terminal

The magnetic tape unit is designed as an add-on data storage peripheral or as a communications terminal. It is plug-compatible and speed-selectable for connection with operator-oriented keyboard printers, CRT terminals and other send/receive devices employing serial data interfaces.

The recorder is compatible for on-line connection to CPUs through data modems or acoustic couplers. It also can function as a stand-alone data collection/communications terminal, operating in either a manual or unattended mode.

The OEM price is $899, with delivery in 45 days.

Techtren Industries is at 580 Jefferson Road, 14623.

Tektronix Hard-Copy Unit

GETS MULTIPLEXER OPTION

BEAVERTON, Ore.—A four-channel multiplexer enables the Tektronix 4632 video hard-copy unit to make facsimile copies from up to four standard compos- ite signals and from digital video signals of refreshed alphanumeric/graphic termi- nals.

The user can switch on any one of the four terminals for copying from a single terminal or can select the multiplex mode and copy all four in a four-channel queue, the firm said.

The 4632 is plug-to-plug compatible with most of the video, alphanumeric and graphic terminals in use today, the company said. Within 18 seconds, the 4632 can produce a clear 8-1/2 in. x 11 in. copy of a display, gray scale or black/white characters or graphics.

Price of the 4632 multiplexer, installed at the factory, is $500. It will be available in mid-October. Price of the 4632 video hard-copy unit is $3,395 from Tektronix, Box 500, 97005.

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Auerbach Study Claims
360/370 Design Poorly Suited to VS

PHILADELPHIA, Pa. - IBM's basic 360/370 architecture is poorly suited to virtual storage and interactive applications, a team of Auerbach analysts concluded recently.

The conditional "channel to central processor" architectural scheme still used in almost all IBM machines is the most economical approach to batch processing, but it tends to bogged down when it has to handle many unscheduled interrupts or disk memory accesses, their report said.

For each study - aimed mainly at determining the effects of mainframe architecture on computer performance - concluded that there are really only three basic architectures used in general-purpose computers today.

Within these basic types, differences in performance are due mostly to minor variations in the implementation of the fundamental theme.

Users, the analysts commented, may lose sight of this fact as they listen to the claims of mainframe salesmen who try to pass across the idea that their machine's "unique architecture" is especially suited to a certain environment.

Vendors are actually putting less and less emphasis on the details of system operations when they talk to prospects these days, the report stated. The trend is to stress the usability and adaptability of machines - and how they can "run themselves" under the supervision of sophisticated operating systems and high-level language instructions.

The importance of the underlying machine architecture is its efficiency in handling this burden of operating system interrupts.

"If a system promises an application or capability not inherent in its architecture, you can bet its operating system suffers extensive overhead in applying that application to the architecture," said the Auerbach study, citing the IBM virtual storage system as "a famous example."

In that instance, "the overhead is such that as many as 20 instructions (worst case) may be required in a VS system for every one instruction needed to perform a task in a real memory system," the report said.

The study, "Computer System Architecture: Identifies the three basic architectural schemes as:"

• Channel to central processor, in which information is fed directly over I/O channels to the processor.
• Channel to memory/system controller, in which all access and transmission to or from devices, the central processors and main memory are controlled by the system memory controller.
• Channel to main memory, in which all data is required to be transmitted directly to a port of main memory where it can be stored for later access by the central processor or by other devices.

The channel to central processor architecture is found in all IBM CPUs except the 370/115 and 125, all NCR CPUs, the Honeywell 2000 series CPUs and the Unisys 90/60 and 90/70 CPUs.

While this architecture is relatively inexpensive, Auerbach found that central processors must be extremely fast to overcome a major weakness in this architecture type, "specifically an inability to respond quickly to frequent unscheduled interrupts."

In-ease weakness is the parent cause of several related weaknesses: first, only a limited number of I/O channels can be attached and serviced simultaneously.

The central processor otherwise would spend most of its time servicing I/O interrupts.

"Second, a large number of unscheduled I/O requests are normal in interactive processing and in virtual memory systems. The channel to central processor architecture type is therefore wanting in such environments, since the operating systems suffer extensive I/O processing time trying to compensate for the architecture."

The problem with CPUs of the channel to main memory architecture, according to Auerbach, is such distributed processing systems offer more options, such as additional memory ports and independent I/O controllers and processors. "All of these items, while capable of extending the power of a system, add significantly to the cost of the system," the report stated.

Systems using this architecture include the larger Burroughs CPUs, Control Data Corp. Cyber 70s, Digital Equipment Corp. Decsystem-10s, and Xerox units.

Other topics discussed in the report include device controller channel arrangements, including a discussion of the tendency to integrate and its effect on systems performance, I/O channel types; modes of channel selection; and system enhancements, such as control memory, buffer memory and peripheral processors.

Comparison charts summarize the architectural details of each major general purpose CPU and in the report the charts are supplemented with tables giving performance characteristics.

The report is available for $25 from Auerbach at 121 N. Broad St., 19107.

Datatype Ups Page Reader Speed, Releases Model 500 With Micro

MIAMI - Datatype Corp. (DTC) has added two optical page readers to its present line.

The Model 400 is a direct replacement for DTC's present models 100, 200 and 300, but has:
• Increased reading speed from 54- to 110 char/sec.
• Elimination of all mechanical adjustments after the unit leaves the factory.
• Existence of only two electronic adjustments.
• Absence of mechanical clutches and brakes to advance the paper through the machine.
• Return of paper to the front of the unit.

The Model 500 is a Model 400 with a microprocessor added. The processor is a 45 generalized computer instructions for tailoring the unit to each application's specific requirements.

When parity errors are present on the OCR document, the unit will read typed lines in order to correct the error. The microprocessor's memory provides the capability to output all coding formats (TTS, Baudot, ASCII, BDC, Ebdloc), according to DTC.

The 500, programmable groups of characters are stored in the microprocessor memory for outputting commonly used messages and control codes as a result of one keystroke on the typewriter. Practically any standard CRT terminal can be connected to the unit to provide a variety of different operational modes, DTC added.

The units read a special font printed from an IBM Selectric type ball which consists of the character with a small bar code directly underneath the character. The units can be purchased as stand-alone or with an RS-232C interface. The 400 with a 7- or 9-track 600 bit/in. tape drive is priced at $21,100; the 500 at $23,100. With the RS-232C interface the prices are $15,900 and $17,900. The firm is located at 1050 N.W. 163rd Drive, 33169.
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Mo. Officials Take Crash Course
To Implement Consolidation Law

By Nancy French

JEFFERSON CITY, Mo. — Key state
officials here, including the governor and
selected legislators, have gone back to
school to learn about the mysteries of
computer technology as a result of a new
statute reorganizing the state's DP man-
age.

The statute, which became effective this
summer, has consolidated the responsi-
bility for coordinating the state's entire
DP effort within the Department of Ad-
mistration.

And state officials agreed they needed a
crash course to help them make the
choices that would make consolidation
work.

To a five-man task force, pro-
vided to the state at no cost by South-
western Bell Telephone Co. under the
Loaned Executive Action Program (Leap), a five-year plan has been drawn up
to implement the consolidation.

Rather than getting into questions con-
cerning specific department applications, the
team concentrated on assisting the Department of Administration in planning
implementation of the statute.

According to Ellis Bick, Southwestern
Bell's mechanization supervisor and head
of the five-man team, their efforts were
invested in three general areas: tech-
nology, personnel and organizational
matters, center planning and job ac-
counting.

In the technological area, the team rec-
ommended systems and programming
standards, suggested new procedures to
upgrade security in the various DP centers and drew up guidelines for data
communications, time-sharing, data man-
agement and operating standards.

Government Borrows
Executive Talents

JEFFERSON CITY, Mo. — The Loaned
Executive Action Program, known to Mis-
sourians under the acronym Leap, is a
time-one-time, six-month program de-
signed to encourage citizens to contribute
business expertise to the executive branch of the state government.

Under Leap, executives employed by
businesses in the state are loaned to the
government for renewable periods of one
week to three months.

While serving in Jefferson City, their
salaries and living expenses continue to be
paid by their companies.

Budgeted by the legislature, Leap is
nonpartisan, nonprofit and tax-exempt,
and companies who contribute manpower
and/or funds to the program can deduct those expenses from their income taxes.

Ellis Bick, who under the Leap program
served three months in the state's Depart-
ement of Administration, explained that 45 executives assigned to projects throughout the government started the
program with him.

After the first three months came to an
end, many stayed on for the second
three-month term and others were
brought in, bringing to about 80 the
number who served.

Bick stated that, in his view, a key to the
success of the program is total support
from Governor Christopher Bond.

He identified as crucial to its long-range
success, however, the ability to com-
municate funding needs to the legislature
which controls the budget.

"If the legislature is not on board, we've
missed the final link in the chain," he
said.

The program is headed by John Fox,
a senior management analyst from the Of-
"Continued on Page 31"

REGISTRATIONS REC'D BY OCT. 15TH
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The Northeastern University High Energy Physics Data Acquisition System - D. Caso, Northeastern University, Boston, MA.
Micro and Minicomputer Applications in Biomedicine - A. Gottschall, MD, Westport Labs, Denver, CO.

IEEE REGISTRATION FEE INCLUDES ONE COPY OF SEMINAR PROCEEDINGS AND FREE REGISTRATION TO GENERAL PROGRAM AND EXHIBIT.
ORLANDO, Fla.—When it came to teaching systems programming to advanced graduate students in computer science, the professors at Florida Technological University here opted for a minicomputer.

A major reason for the selection of a minicomputer specifically for teaching, according to Prof. Charles Lindahl, was the need to stop the machine frequently to examine the internal state of programs, tables and files.

This requirement made it impossible to use the university's central time-shared system as an instruction device.

Prof. David Falconer explained that the department selected a Varian 73 minicomputer because its microprogramming capability allows the user to change his instruction set "on the fly" and to experiment with different sets for different applications. Falconer believes that this is an important trend in current computer science.

The specialized controllers being used to run intelligent peripheral devices, he observed, are actually microprogramming units that carry specific instructions for such functions as file-handling and message-switching. He expects the use of such units to become increasingly widespread.

Another advantage of the Varian 73, a capability which permits the use of multiple processors on the main memory, allows Falconer and Lindahl to use the small computer to demonstrate all of the important characteristics of large machines now in general use.

The system currently consists of the Varian 73 (with 24K memory), two teletypewriter terminals, one CRT, two cassette-tape units, disk memory with a total capacity of 2.5M words and a general-purpose I/O register which accommodates special-purpose logic modules.

State Officials Take Fast Course (Continued from Page 31)

they've approved every one they've discussed," Bick said.

Before the new statute, each department had its own computer, according to Bick.

Under the new system, "some are going to lose them," he said.

Bick noted that many managers believed giving up departmental control of the computer was synonymous with deteriorating service.

The team had to work hard to convince DP managers that "deteriorating service is not a result of consolidation but rather of poor management or mismanagement," he said.

"It does take better management to run a consolidated program where you have to resolve scheduling conflicts to satisfy many more users," he remarked.

The overall program will reduce not only the number of computers but more importantly, the cost to taxpayers.

Avoided Naming Vendors

Bick said the team did not make any recommendations as to which centers should be combined.

"What we did was lay down the guidelines the state should use in looking at this problem in more depth," he explained.

As for vendor considerations, Bick said the team "avoided that like the plague."

"It wasn't our role to get into vendor analysis or vendor performance; that's a very political thing," he explained.

He did agree, however, that consolidation was bound to favor some vendors "that can meet large-scale processing needs."

"It's a matter of survival of the fittest," Bick said, "but I don't think it's going to give anybody a monopoly."

Citing the high turnover rate in the state's DP jobs, Bick said "attrition" would even out any staff reductions.

"We don't want to happen here what's happened in other states where consolidation has gotten off to a bad start by solidifying resistance to it within the operating departments," he said.

Bick emphasized that the state was by no means "stumbling and fumbling" in its move toward consolidation.

"The state's DP management had a lot of strength," he explained, "but like any other consultants, we concentrated on its areas of weakness."
It's called Computerwoche, (woche is pronounced voh-kuh), and it's Computerworld's new sister in Germany. Modeled after its parent, Computerwoche will serve key computer users in Europe's largest EDP market. It will have an initial circulation of 22,000 including company officers, managers and top technical people at user sites throughout the German market, as well as officers and planners at computer equipment producing companies. Publication begins in October 1974 and will be weekly starting in January. Computerwoche is published by Computerworld GmbH, with a full editorial and production staff based in Munich, and it will serve the German market with the same editorial excellence that has made Computerworld a leading EDP publication in the United States. A recent readership study by IDC Deutschland has shown that German users give highest readership priority to information on new products and services and new techniques for the application of computers. And Computerwoche will focus on serving those needs. The market which Computerwoche serves is large and growing. At the end of 1973, there were 11,000 computer systems in Germany, valued at just over $4 billion, and recent market studies indicate that expenditures will be growing rapidly over the next four years. Overall user spending is expected to grow at 14% a year, and areas like terminals and communications equipment and software and services are expected to average growth rates of 25% - 30% a year.
Software Design Major Hurdle
In Developing, Selling Systems
Spawning ‘Component’ Computer

By Molly Upton

LOS ANGELES – Software design is the major hurdle to the advancement and acceptance of microcomputer-based systems, Gary A. Kildall of the Computer Science Group, Naval Postgraduate School, told attendees at the Wescon session on “The Microprocessor Revolution.”

“Never before has software design been as important. Reliability and correctness of programs directly determines the quality of a product manufactured in the thousands,” he said.

Kildall urged attendees, as customers, “to encourage the industry to offer and support the tools necessary for effective program development and adaptability. “Although there are tremendous savings in software development, when compared with hardware breadboarding, there are also inherent difficulties in controlling the evolution of a software-based product,” he remarked.

The microprocessor, he said, can reduce time and cost in product specification, development and production in many designs by providing central and peripheral control and processing.

As a critical part of the microprocessor, the software must give the product adaptability to new environments. “A product must be planned with change in mind in order to extend its sales window beyond the next unpredictable technological breakthrough,” he reminded attendees.

Principal Elements

The principal elements of software adaptability are maintainability, expandability and portability, Kildall said.

“In this rapidly moving industry, the ease with which programs can be efficiently moved between machines of different design while being readily understood by a number of different programming languages may be the most important single influence upon the software evolution cycle,” he noted.

Kildall endorsed high-level systems languages as a means to “produce quality software systems for supporting a constantly evolving product definition.”

High-level systems languages promote the enforcement of subroutine linkage and slicing as a means to “produce quality software systems for supporting a constantly evolving product definition.”

By Molly Upton

LOS ANGELES – The cost of a second generation MOS microprocessor will be $10 or less – in two to four years, according to Mona M. Saba and Jack D. Grimes of Tektronix, Inc.

Speaking at a Wescon session on “The Microprocessor Revolution,” they explained that price/volume estimates over time are used to project price information.

Since 8080s and 6800s have not been produced in sufficient volume for the manufacturers to be confident in price/volume predictions, any long-term estimates “are guaranteed to be high and not reflect the second sourcing completion likely to occur in this generation of microprocessors,” they said.

They deduced that those chips are “about the same size as the 2102-type random-access memory (RAM) which is less than $10 in large quantities today and the 4K RAM which is headed for $4 in 1976.”

Real Expenses

Saba and Grimes advised designers that “both ROM (read-only memory) and RAM should be considered free when approaching a microprocessor-based design.”

More attention should be focused on those elements that cost money, such as power supplies, packaging, electro-mechanical areas and analog circuits.

Their projection of semiconductor RAMs shows the cost/bit as 0.1 cent in 1976 for a 4K by 1 device, dropping to half that, or 0.5 cent, in 1978 for a 16K by 1 device. In 1980, they predicted, the cost/bit for a 16K by 4 device will be 0.02 cent, or $2 per megabit.

“Considering only the price of the individual microprocessor could be very misleading in most cases,” they added, stressing that the system as a whole is more important.

Designers need to do a complete system design before a single run is laid out on the circuit board, they added.

Microprocessor vs. standard MSI andSSI logic packages, custom or off-the-shelf microprocessor, mask-of-field programmable ROMs are only some of the advantages of the microprocessor, they said.

Teicher and Bell foresee widening use of specialized microprocessors cutting the number of customer interface transducers and programs.

“The range of transducers will be greatly increased due to the vastly increased applications base,” they said.

With higher capability tools, engineers now can move to different-oriented problems instead of the details of implementation lying across a multi-level, multidiscipline design,” they noted.

Although larger modules resulted as chips became more complex, the trend will be toward smaller microcomputer modules, they said, noting testing and repair costs will help promote the smaller modules.

“In the long run, we believe computer packages will become more application-driven.

“Network systems could be more reliable than traditional computer systems, because the number of critical nodes can approach zero, while providing much redundancy,” they said.

“The cost of incremental processing power will be small, therefore, systems will be better tuned to applications than they are today,” observed Teicher and Bell.

Universal Part?

In the same session, David Chung of Fairchild Semiconductor outlined what the microprocessor needs to become a truly cost-effective “universal part.”

Currently, microprocessors are a cost minus are cost-effective only in limited applications, he noted, because they require at least 20 chips to implement a useful function. Even then the performance level is lower than that of a multi-chip CPU, he said.

Microprocessors need:

@ Minimum parts count for a useful system
@ Ability to interface to a wide range of devices without special circuits.
@ Ease of programming and debugging.

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Data Base Management。

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The upper limit of a microprocessor's performance, defined by its most demanding task, can be defied, Chung claimed.

"The architecture of the microprocessor be such that an indefinitely number of similar microprocessors can be grouped together to solve a complex problem in a piece meal fashion, then the application horizon of the microprocessor becomes unhounded," he said.

'Seminar' Computer Advancing

Programmable read-only memory (PROM) are "reasonable facsimiles."

MOS Costs Seen at $10 or Less

(Coined from Page 33)

\(10\) decision that must be made.

Saba and Grimes have updated the rule of thumb that a microprocessor is feasible if more than 50 MSI andSSI packages are necessary to implement the controller with random logic. The figure is now between 30 and 40, they said, and is expected to drop to the low 20s in a year. Also, by using a microprocessor, 1K bytes of ROM replace about 50 to 100 integrated circuits, saving about $75 to $300, they said.

Robert F. Wickham of Creative Strategics, Inc. listed the three types of microprocessor architectures in use or development:

- The one-bit serial approach, used for calculators and small controllers, is applied to relatively high-volume products.
- The parallel bit machines are on the market with data word sizes of four, eight and 12 bits. Sixteen-bit devices will soon be available, he predicted.

The third approach involves "sub-dividing the processor into slices with each slice containing two or four bits of a parallel processor." These can be cascaded to build parallel processors up to 32 bits wide, he said.

The earlier one-, four- and eight-bit machines used P-channel MOS with relatively slow instruction execution times, he said. The second generation, using N-channel MOS, will increase speed by a factor of five to ten.

Chip designs using CMOS are rare at present, he added. In addition, the "dark horse" silicon-oxide-sapphire (SOS) offers increased speed and circuit density.

The list indicated "there are enough different devices now available that no single device should be considered the universal microprocessor," Wickham said.
Micro-Mini Market Distinctions
Hazy as Single-Chip Sales Soar

LOS ANGELES — Once considered distinct by most observers, the line between the markets for microcomputers and microprocessors is now blurring in some analysts' eyes.

Sales of U.S.-produced microprocessors, or single-chip CPUs, will jump from 200,000 sets worth $15 million in 1973 to about 500,000 sets worth about $65 million in 1974, Robert F. Wickham of Creative Strategies, Inc. told a Westcon session on "microprocessors — market, design, applications.

"The sales should double again in 1976," he said. These figures exclude captive production of custom devices by companies like IBM and NCR.

The average selling price of the set of devices used in microprocessor applications should increase as the production shifts mix toward larger, 12- and 16-bit processors.

"By 1976, the average price of a microprocessor set could be close to $150 despite the use of lower cost four-bit units in the calculators, appliances and automobiles," he said.

In 1973, most microprocessors were four-bit with relatively small amounts of read-only memory (ROM) and random-access memory (RAM) and were used in calculators, point-of-sale (POS) systems and small industrial control systems.

This year, the electronics industry contains a "significant percentage" of eight-bit processors which go into terminals, calculators, word processors and small business accounting systems.

"The growth of the market is limited by the rate at which the engineering community can include microprocessors in new equipment designs, Wickham observed. The question of whether the semiconductor companies are competing with the microcomputer houses is "far more complex than it appears," he said.

"The sale of minis and subminis equipment now have a greater range of sources, "depending upon the degree of risk and amount of applications expense they want to shoulder," he added. "A very high percentage of the stripped down mini sold are "overkill" for their applications.

"In spite of the low cost there is definitely a need to complete the range of processor capabilities available for use in small systems," he said.

In another microprocessor session, Mona M. Saba and Jack D. Grimes of Tektronix, Inc. echoed Wickham: "Microprocessors are very viable [microprocessor replacement] candidates in systems which originally included a mini to perform some limited computation and control, and where speed is not a critical design consideration. In such cases, the mini is an overkill and replacing it with an off-the-shelf microprocessor offers great economic advantages."

"Where do microprocessors really fit?" According to Wickham, "the true role of the this new microprocessor-based computer/control capability appears to be in the area of small, dedicated systems in which the microprocessor is an integral part of the system and is buried in the small electronics packages."

"In a paper entitled "Microprocessors for a Dedicated Control," Mat Bierwer of Pro-Log Corp. pointed out that new developments in microprocessors are being dictated by the computer industry, while the dedicated control market is silent in demanding a better microprocessor as a logic processing element."

"Microprocessors are thought of as components, and without any challenge to this thought, it is only natural they should evolve to be better computers," Bierwer said.

"The same design documentation disciplines exercised in hard-wired logic devices" and "learn to partition programs with a view toward flexibility."

Sophisticated tools such as the higher-level computer-aided design techniques of assemblers, compilers and simulators "have not yet been fully developed to service the requirements of the hard-wired logic replacement market," he said.

Bernard W. Jordan Jr. of the Departments of Electrical Engineering and Computer Sciences, Northwestern University added that in training logic designers educators must be sure that students "become more competent in what have traditionally been software notions."

"Simulations between hardware and software should be stressed and students should be aware of trade-offs between a "hardware" and a "software" approach to a problem, he said.
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ROY LOMICKA, design engineer, and John Wollaver, product manager, load demonstration program for Decwriter II Printer.

DEC Matrix Printer Maintains 'True 30 Char./Sec' Output Rate

LOS ANGELES — A "true 30 char/sec" matrix printer that maintains 300 hit/sec through output was unveiled by Digital Equipment Corp. (DEC) at Wescon last week.

Priced at $1,250 in quantities of 100, the keyboard printer features 128-character upper- and lower-case Ascii set with characters formed in a 7 by 7 dot matrix.

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The Decwriter II maintains a true 30 char/sec printing rate through the use of a buffer and a "true 30 char/sec "catch-up speed" for printing immediately after a carriage return or line feed. This eliminates the need for fill characters, the company said.

The printer accommodates standard computer forms 132 columns wide and has atractor-driven paper feed and a pin feed and can print six-part forms. The paper width is variable from three in. to 14-7/8 in.

Delivery is scheduled for November from the Components Group, 1 Iron Way, Marlboro, Mass. 01752.

STRAIGHT FROM THE SOURCE 2100

Wang exhibit manager Robert Cunningham puts together a disk.

Behind the Wescon Scene

LOS ANGELES — A tour around the floor of the Convention Center here 24 hours before the opening of the Western Electronic Business show and Convention found the usual shirt-sleeve excitement of getting DP equipment installed, up and running.

Amidst the hubbub, the calculator group at Hewlett-Packard (HP) enjoyed the reward of unpacking early and played what was sure to be a hit with attendees, an interactive lunar landing program run on a 9621A calculator and drawn on a 9626 plotter.

But the heavy hardware was upstairs, where systems analysts were working to bring up several HP100-based data acquisition systems from HP's Automated Measurement Division and a System 3000. A company spokesman explained that people interested in these systems would ask at the downstairs booth and be referred upstairs, where at least four systems were on display.

Data General also had a room upstairs, in addition to its Dual Nova on the exhibit floor.

Steve Stark attends HP data acquisition system.

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COMPUTERWORLD

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