

The Time-Sharing

Leader

FOR GE TIME-SHARING USERS



Information
Services

World Leader
In Time-Sharing
Service

Vol. 2 No. 2

February 1971

RELIABILITY TAKES A GIANT STEP FORWARD

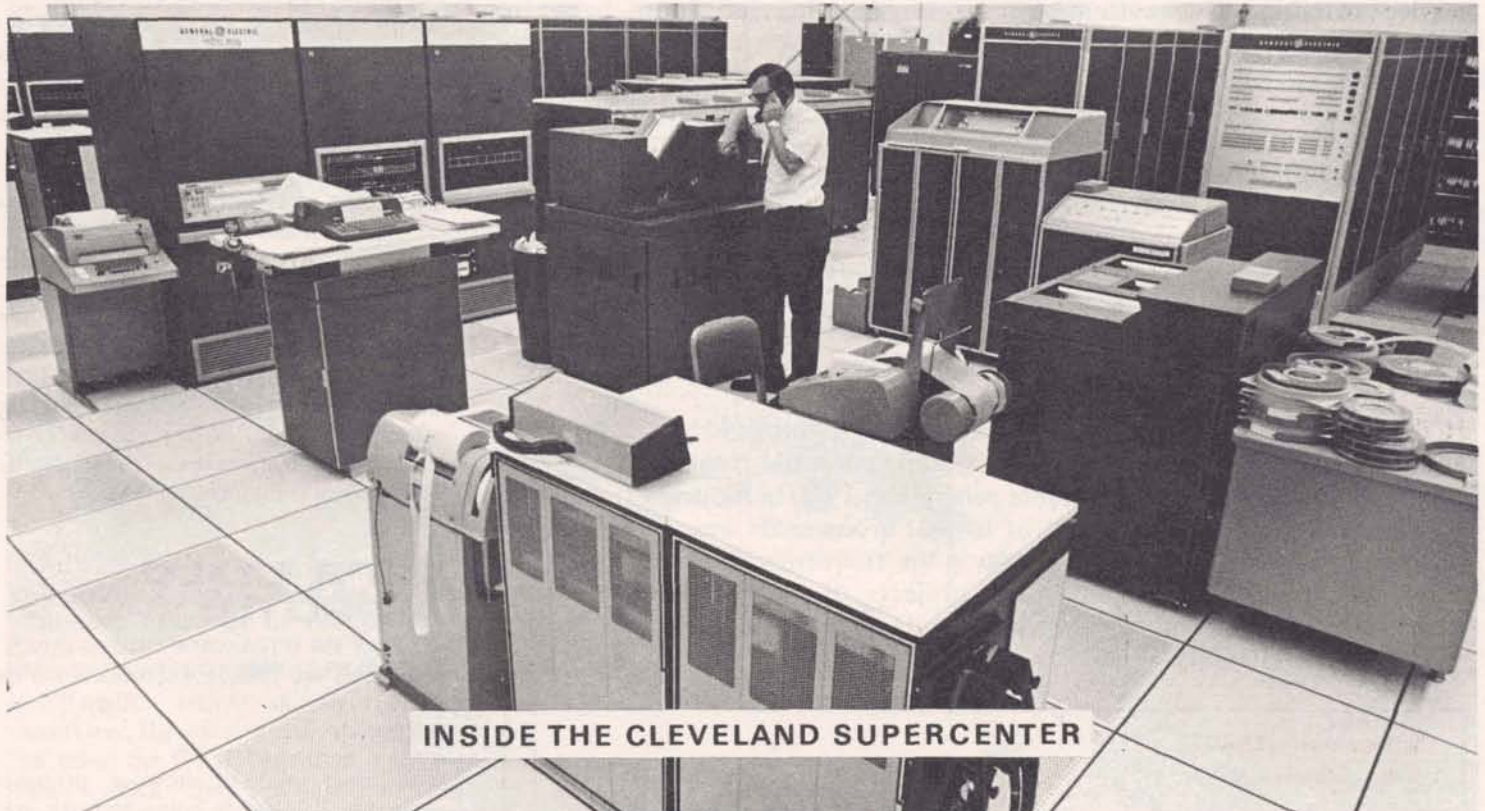
In continuing the development of the super reliability concept, General Electric Network Service becomes virtually isolated from power surges that cause component failure and file losses.

With the installation this month of a new 3/4 million dollar "uninterruptible" power system the first phase of the project will be completed at the Cleveland SUPERCENTER.

The uninterruptible power system provides a smooth constant power source, insulating the computer from millisecond "spikes" of high voltage. These spikes cause files to be shortened or truncated, and may do hidden damage to electronic components. The constantly smooth power source is provided by 35 tons of batteries that are trickle-charged from commercial power. If the utility power fails, the system can continue to operate for 15 to 20 minutes.

With the installation of the second phase, the system can be completely independent of outside power. It will operate indefinitely regardless of the length of the blackout. Diesel generators will start up automatically to trickle charge the batteries; and operate the air conditioning and lighting systems.

The next SUPERCENTER to be equipped with uninterruptible power is located in Teaneck, N.J.



INSIDE THE CLEVELAND SUPERCENTER



GENERAL  ELECTRIC

Editorial

By: Dr. James C. Castle
Manager — Engineering
Information Networks Department

Reliability is the cornerstone of successful information services. Recognizing this, two of the most fundamental goals established for the design of General Electric information service systems are extremely high service availability and very low service interruption rates. As Arthur E. Peltosalo, Vice President and General Manager of GE's Information Services Business Division observed in December 1970, "We are continuing our development of the super reliability concept. While we believe our reliability of service today is the best available, we are dedicated to achieving the degree of excellence desired by all users of computer power."

One of the most significant reliability improvement activities currently underway is described on the front page — the "Uninterruptible Power System." It is currently being installed in the Cleveland SUPERCENTER, and planned for installation next in the Teaneck SUPERCENTER. The Network system will be isolated from power fluctuations and outages that cause service unavailability through power-induced equipment failures. Simultaneously with the installation of the UPS, systems are being installed to maintain tighter temperature and humidity control. A complete common ground plane is being installed.

The principle system reliability improvement under development is the Dual MARK II System, which will be the foundation of our super reliable service offering. This system will assure an alternate route between customers and their files through an alternate processor available to do their work.

Some of the other activities underway which will provide improved service reliability are: Additional on-line test and diagnostic software packages to locate developing hardware problems before hard system failures; additional on-line file handling software packages which will allow personnel in our SUPERCENTERS to be more responsive to reported file problems or requests for special file services; and continuing improvement of the operating systems to provide more tolerance of hardware faults and eliminate remaining sources of unreliability in the software.

High service reliability can be achieved only by rigorous identification and elimination of the multiple sources and potential causes of system unreliability. We made considerable progress in 1970 in reducing the period of time during which a given set of files or a processor was unavailable to customers and in substantially reducing the frequency of service interruptions. Even more significantly, the projects discussed above are being installed, in test, or on the drawing boards and will make 1971 a banner year for high reliability.

The Time-Sharing LEADER

Lovell S. Glasscock, Editor

Published by the Information Service Department, Bethesda, Md., for General Electric Time-Sharing customers to inform them of new features and services. Communications regarding items in the LEADER should be directed to your GE time-sharing representative.

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New Teaching Aids Help N/C Part Programmers



The Numerical Control Parts Programming Language (NCPPL) manual is ideal as a reference manual in classes. It's complete, and effective because of its illustrations, examples, and "how-to's" that are shown and explained in machine shop terms. Present NCPPL users can extend their use of the system — get more out of the computer — and get more work from the machine too, with the clear instructions provided. The NCPPL manual is publication 007429.

For those part programmers who are familiar with the APT language, and want to work in a subset of the language, General Electric offers the REMAPT part Programming Manual. The manual was written for General Electric by Jim Childs, a nationally recognized consultant and educator in parts programming. The manual incorporates the experience he has gained in teaching parts programming. This manual is publication 002390.

LET'S BUILD A PROTOTYPE

You can't tell how it will work until the prototype is built. Right???
WRONG!!!

You can simulate how a proposed engineering design is going to work even before you've invested in the first prototype model. You can save schedule time by doing feasibility studies through simulation. You can save prototype

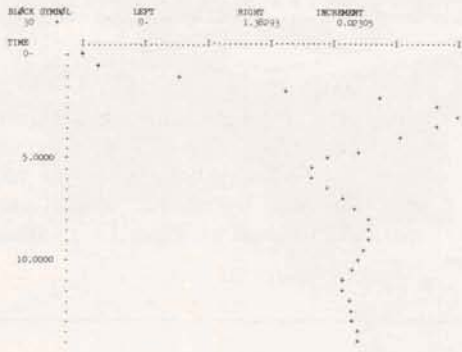
(Cont. p.3)

Let's Build A Prototype (cont.)

dollars by evaluating design alternatives through simulation. For reliability tests that require destructive test methods, you save yourself the cost of destroying the prototype — the computer will simulate the test. It's called Dynamic Simulation — or DYSIM.

The program is listed in the Electrical/Electronic Engineering Library in Mark II catalogs, and is sometimes overlooked because design engineers don't feel it applies to them. Here are some examples of what design engineers (other than circuit engineers) are doing with DYSIM.

- Analyzing the control system for a nuclear reactor
- Simulating the reflectivity caused by discontinuities in transmission lines.
- Aiding in the design of aircraft catapult systems.
- Simulating the performance of motor speed controller designs for rapid transit cars.
- Studying the effects of machine tool vibration.
- Aiding in the design of control equipment for magnetic tape drives
- Studying gear backlash
- Simulating the performance of new designs for chemical process control.



DYSIM PROGRAM OUTPUT SHOWS CONTROLLED RESPONSE OF FEEDBACK SYSTEM DESIGN SIMULATED ON TIME SHARING BEFORE THE PROTOTYPE IS BUILT.

Users say the most significant advantage of using the DYSIM program is the ease with which they can study design proposals and alternatives. A supplement to the DYSIM users Guide 005417 has just been released describing new DYSIM features such as logic modules and user-defined functions. The supplement is number 005417-1.

Cost control computerized at UNARCO's Sturdi-Bilt Division

When a company has major construction jobs around the country going at one time, good financial control requires an accurate, timely project cost control system. That's a basic problem that the Sturdi-Bilt Division of UNARCO Industries, Inc., Chicago, Illinois, is solving with its use of the General Electric Time-Sharing system.

It was Frank Bateman, Vice President of S/R Systems of Sturdi-Bilt, that decided to use the file capabilities of the System for project work. The Sturdi-Bilt Division designs and builds completely automatic material handling and warehousing equipment for manufacturing firms.

Sturdi-Bilt's services are not limited to mere construction of a warehouse, but they use the scientific approach to design and build systems and facilities that will optimize the storage and retrieval of items in stock. The Engineering Department uses problem solving capabilities of the system for calculation and optimization studies, material handling system simulation, and cost studies.

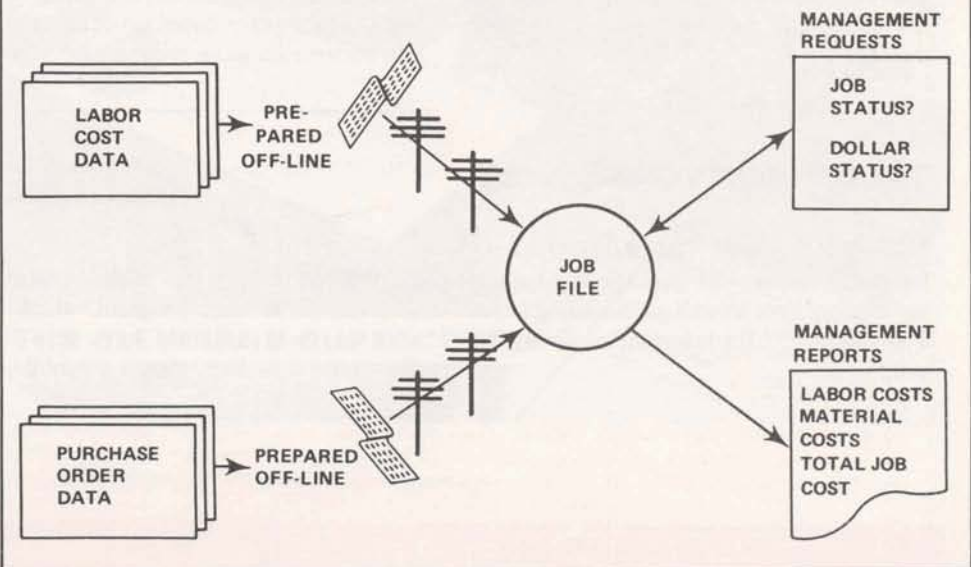
Here's how it works for project cost accounting. Purchase orders and labor reports are the source of entry data. The data from these reports is punched into paper tape in an off-line mode, and then transmitted to the system to update the job file.

With specific job numbers defining each of the data items, the files can now be queried to determine the cost picture for any of the jobs. For example, John Hart, Manager of Structural Engineering, can call up the computer and ask such questions as: What is the total amount of money spent to date on job 1620? What is the percentage completion figure on job 1500? How many purchase orders are outstanding for job 1700? What are they?

With answers to questions like these being produced in seconds, it's not hard to see that management can have strong control over the expenditure of funds for specific jobs. Production expediting can also be done by observing the relationship between percentage completion and purchase orders filled.

With access to data on purchase orders filled (which represent bills that must be paid), managers can do fiscal planning on both a short and long range basis, predicting needs for liquid assets, and maximizing cash flow position.

Keeping such operating data on an immediate access basis has helped Sturdi-Bilt keep a close check on financial expenditures. There are no great surprises when all the expenditures are tallied at the conclusion of a job. Management can learn about the financial picture on a day-by-day basis, with timely reports.



TIPS FOR USERS

Replace Command Helps When Storing Lengthy Files

When storing long files from paper tape, periodic use of the REPLACE command (instead of SAVE) will help.

As you're preparing paper tape off-line, insert a Control X-OFF character just before a carriage return after about 6,000 characters (10 char. per second) or 10,000 characters (30 char. per second). The terminal will execute the first character after the X-OFF (carriage return in this case) and then stop. Then follow this procedure:

```
You type ..... REPLACE
System responds ..... READY
You type ..... TAPE
System responds ..... READY
Turn on tape reader again.
```

There is no need to make any modification in line numbers or the program name using this method. As long as you use the REPLACE command instead of SAVE, the system will append the latest received group of lines to the existing saved file. This technique can save time, money, and anguish.

GSORT\$ NOW DESCENDS

GSORT\$*** and GMERG\$*** were modified so that this package will handle descending keys as well as ascending keys. List GSINF*** for information about the programs.

WANT TO GET FORTRAN WORK DONE IN YOUR BASIC PROGRAM?

For those who are more familiar with BASIC than FORTRAN — but want to use some of the powerful functions contained in the FORTRAN Subroutine Library, here's a way to get it done.

At the appropriate place in your BASIC program, have it chain to a small FORTRAN program that will call the various subroutines to do the required work. Have the little FORTRAN program write the answers to a binary file, then chain back to the BASIC program that will then read the file.

Both the BASIC and the FORTRAN programs must be in compiled form for this trick to work.

In BASIC, you pass the arguments needed for the FORTRAN Subroutine to an intermediate file, along with a counter. Then you chain to the FORTRAN program. The FORTRAN program reads the mailbox to obtain the values of the arguments and the counter, does the necessary calculations, and then writes the answers and the counter back to another file. Chain back to the BASIC program that reads the file to pick up the answers and the counter, branching to the appropriate place based on computed GO TO statements using the counter.

HOW TO IMPROVE EFFICIENCY OF LARGE CONVERSATIONAL PROGRAMS

When a program is large, the frequency with which the system finds sufficient core to contain it is reduced. When a large program is swapped out it typically releases enough core for several small programs to fit in. These or several other programs must terminate or swap out to provide core space for swapping the large program back in. Swap outs occur with each input statement. In conversational programs it is therefore advantageous to insure that the input statements be isolated in a "small conversational module". FORTRAN "conversational modules" may communicate to subsequent chained "computational modules" through Common. Basic "conversational modules" may use either binary or ASCII scratch files for communicating to subsequent "computational modules".

STAT1*** REVISED

The Mark II program, STAT1*** for computing 14 commonly used statistics has been revised. The new version computes confidence intervals for the mean and standard deviations, and it automatically exhaust an input file of all data sets.

MULTILEVEL CPM SORT

CPMX2A\$*** is a new multilevel (3-level) CPM sort program which will sort on three different keys at a time: first on major key, then on middle and

then on the third or minor key. The running instructions are similar to CPMX2\$*** (one-level) sort programs in publication 002394.

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Fast Turnaround of Trouble Report Improves Customer Service at GTC

A Trouble Analysis Center (TAC) was set up by the General Telephone Company of California in Santa Monica, to improve customer service through analysis of trouble reports. With analysis of the reports finding trends and patterns, General Telephone solves the immediate phone-line problems, and traces the source of related problems.

General Telephone's use of Mark II with a county-wide collection system has all the signs of a system that could be expanded into nationwide data collection by companies with offices in different states.

Computer analysis finds trends, so it was obvious that the sooner they knew about them, the better they could serve their customers. A batch computer system was considered first, but the analysis wouldn't arrive until the next day. Next they considered remote job entry, but General Telephone wanted even faster turnaround.

LARGE FILES MANIPULATED

Faster turnaround meant only one thing — time-sharing. Could a time-sharing system manipulate a 100,000 character file with fast turn-around? Could the system be expanded if needed? Could it

be done economically? GE's Mark II can do it, and that's what the TAC is using now.

Using some of the powerful file techniques of the Mark II, the TAC can now report trouble patterns to the central office, permitting repairmen to be dispatched to the source of the multiple problems within hours. Here's an example of how the system works.

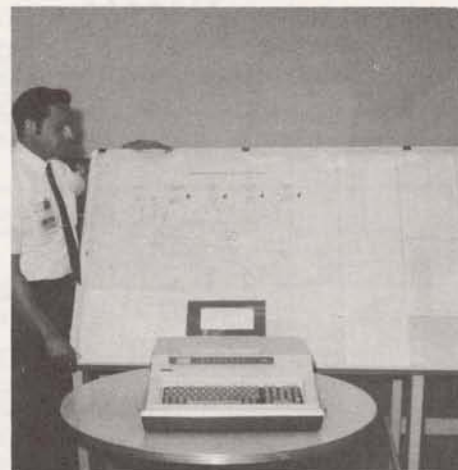
CUSTOMERS REPORT INITIATES ACTION

When a customer has difficulty completing a call, he reports the trouble to the operator, who completes the call for him. The operator then records the trouble onto a mark sense card. This data consists of date, time, caller's number, classification of the trouble, and the destination number. There are seven different offices taking trouble calls, preparing the mark sense cards, and they're scattered all over the county.

As the mark sense cards are prepared, they are placed in the input hopper of a mark sense reader. This reader is automatically polled by a calling device at the TAC. Data arriving at the TAC is punched

into paper tape as it arrives. At pre-arranged intervals, the operators call the Mark II system with a 15-character per second Model 37 teletype, and read in the accumulated paper tape in the data storage mode (no line numbers). Within three minutes after the tape is read in, the Mark II has the data sorted and ready for reporting.

(Continued on p.2)



Output data (at the right of the system diagram) from a 30 cps terminal at a TAC is examined by Marv Stecker, equipment analyst at General Telephone in Santa Monica.



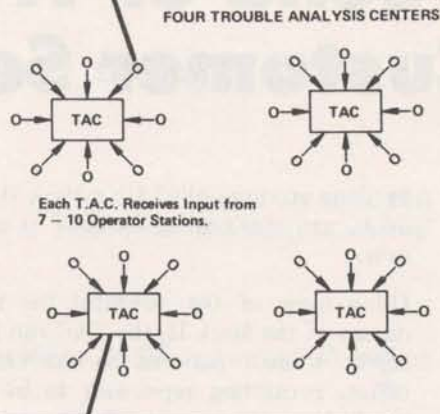
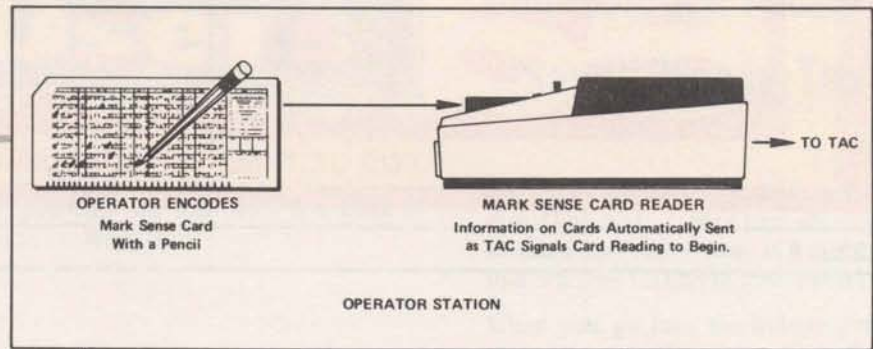
GENERAL  ELECTRIC

GTC Service Improves with TAC (Cont'd)

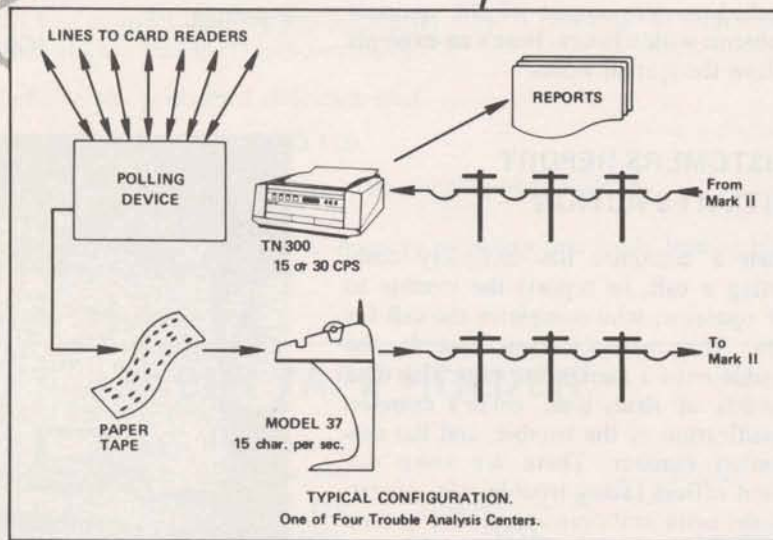
REPORTS FROM A DATA BASE

The data base averages about 8,000 characters of sequential binary storage per day, but it never stays the same size. Information moves into the data base, is analyzed, reports are produced, and then the data moves out of the base on a planned cycle.

A 30-character per second terminal is used to produce reports from the data base. Two main reports are generated, each with five options that may be called for selective printing of portions of the reports. These reports indicate relationships between customers' problems. Management can then direct service to a focal point to solve the problems faster.



LOS ANGELES COUNTY



OTHER APPLICATIONS

The Trouble Analysis Center with time-sharing is proving so successful in analyzing reports of phone line problems, the Company is preparing to apply the technique in other communication areas such as microwave and other intra-state/inter-state communications.

Quick turn-around is important when analysis can point out remedial courses of action. General Telephone proves that the Mark II file system does it successfully on a county-wide basis, and it appears workable for broader use. With terminals accessing a common system in place of mark sense readers, sales and distribution managers could analyze nationwide trends in customer buying habits - using the information to balance supply and demand with minimum inventories. Trends in heavy buying could key manufacturing start-ups for high profit items. Fast turnaround of trouble analysis reports means better customer service at General Telephone - it's interesting to project what it could mean to others.



Bob Hamilton, equipment analyst for General Telephone Co., describes the flow of a customer's call through the TAC and Mark II system.

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A Step Beyond At Harris Bank



A BOARD ROOM TIME-SHARING CLASS discussion with (l to r) William C. Bettis, assistant vice president of commercial banking; James Staes, officer of commercial banking; James W. Schnatterly, international banking; George R. Slater, vice president of commercial banking; and (standing) B. Kenneth West, vice president of corporate financial services division.

The Harris Trust and Savings Bank, Chicago, has always found a way to go a step beyond what other banks offer — a step beyond what they offered in the past. Now, the Harris Bank uses GE Time-Sharing to give its customers an extra measure of service.

The \$2 billion Harris Bank recently decided to undertake a professional educational program among the officers of the Commercial Banking Department. The bank wanted its officers to improve their ability to make better financial decisions... not for the bank, but for the bank's customers. They wanted the bank officers completely knowledgeable with all parts of services offered customers — one of which is the use of time-sharing computations.

TIME-SHARING CLASSES FOR THIRTY OFFICERS

Under the guidance of Dr. George Slater, Vice President and head of a commercial banking division, the bank embarked upon a program to have its officers become so familiar with time-sharing that each could write or modify an existing program to solve a financial problem for an individual firm. It meant that bank officers had to learn to use time-sharing terminals, and that secretaries had to be trained to access library programs on the GE Mark II system.

Tapping the power of a computer with immediate response was obviously a step

beyond what other banks were offering customers. Many banks have sufficient capability to offer money management or financial engineering programs on the batch computer, but the Harris Bank wanted its officers to go that step beyond the ordinary — to be able to answer a customer's problem TODAY with a program individually suited to his specific problem.

FINANCIAL GUIDELINES IN MINUTES

For example, a customer recently asked a Harris Bank officer his opinion of the company's intention to issue \$20,000,000 in long term debentures. A knowledgeable bank officer at Harris examined this situation, and determined with immediate time-sharing program results that this would not be the most prudent way to proceed. A time-sharing program indicated that the customer's cash flow after five years would take care of the situation.

In this way the customer was saved large financing costs and the Officer contributed to that company's profitable growth — which is the aim of the Commercial Banking Department at Harris Trust and Savings Bank.

The bank has found that the investment in the educational program and its use of GE Time-Sharing has enabled it to react faster to find better solutions to its customers' financial problems.

BASIC 1 IS CATCHING ON

Customers are validating new catalogs for BASIC 1 service for some very interesting reasons —

* A midwestern university requires all freshmen with business majors to learn time-sharing, and BASIC 1 fills the need. The new students are not sophisticated enough to require much computer power, and the university pays only for the power required.

* An instrument company wrote its own engineering analysis programs and finds that BASIC 1 is powerful enough to do the required work.

* A government agency decided to use BASIC 1 as a cost reduction. They use it for the calculation and printing of tabular data.

* A chemical company read about BASIC 1 in the LEADER and now has a user number for training its new employees.

Here's why BASIC 1 is catching on:

Terminal Time/hr.	\$ 5.75
CRU	\$.03
PSU	\$ 1.75
Monthly Minimum	\$25.00

(Educational options not shown)

When you use Learn BASIC, LNBASS***, the on-line program that tutors new students in time-sharing, there are no charges for CRU's.

Tips for Users

TEXT CAPABILITIES

For time-sharing users who like to do text manipulation, the following few lines of BASIC demonstrate some important text capabilities on Mark II.

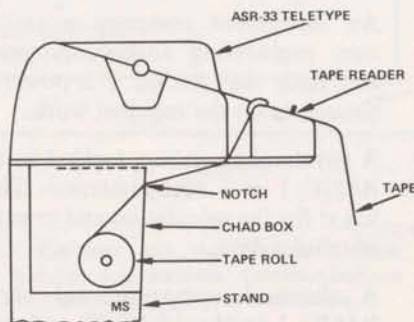
```
100 DIM AS(5000)
110 FILES INFILE
120 DELIMIT #1,( )
130 INPUT #1,AS(I=I+1)
140 IF END #1 THEN 160
150 GO TO 130
160 PRINT "THERE ARE";(I=I-1);" LINES OF TEXT"
```

Line	Explanation
100	Because BASIC strings are expandable, this allows a total of about 50,000 characters to be stored in a maximum of 5,000 lines. Maximum number of characters per line is 4,095.
110	Input data file is named INFILE.
120	Use of the null character as a delimiter allows BASIC to accept both leading and trailing blanks.
130	Reads in a complete line of text no matter what it contains. At each read the number of lines read in (I) is incremented.
140	End-of-File test performed after each read.
150	If more data in file than GO TO 130.
160	Reduce line counter by 1 in order to account for end-of-file test.

At this point the entire file, INPUT, is in memory including line feeds, leading blanks, etc.

PAPER TAPE HOLDER

From our Denver Branch office comes an interesting suggestion; The next time you are feeding a tape into the terminal and get tired holding the roll of tape, try this: empty the chad box and place the tape roll in it so the lead end of the tape can be pulled over and through the oblong notch in the front end (see sketch). Replace the chad box and engage the lead end of the tape through the tape reader. When you are ready to feed in the tape, turn on the tape reader and relax. The shape of the chad box allows the tape to feed in evenly. This method can be used for tapes up to 3" in diameter.



New Mark II

Convenience Factor

—Saves Money Too!!!

Called Independent or Deferred Execution Option, it makes time-sharing more versatile for you to use. It has an option that lets you further decrease costs.

When you go into the Independent Run status, you turn the job over to the Mark II — defining the files you want it to use for execution, receiving output, furnishing input, and when you want the job to begin. Then you may turn off the terminal or work on another program. You return when convenient and extract the results of the work. The total terminal time is obviously less because you weren't connected during the processing phase. You may obtain the output when you want it.

A MONEY SAVING OPTION

If you request that the job be started after 6 pm (computer center time) you will get the job done for 25% less. The number of CRU's printed at the end of the run will have been reduced by one-fourth. For example, a job that normally takes 12 CRU's will print out 9 CRU's.

RUN BIG PREMIUM WAIVED

Furthermore, if the job is large enough to call in the Expanded Core feature, there will be no additional charge if you specify that the job begin no earlier than 6 pm, computer center time.

Commands on how to do an Independent Run are detailed on pages 1 — 6 in publication 001461, Command and Edit Systems Manual Supplement.

Note: Some Datanet Software Service authors may choose not to offer their software on a "deferred run" basis. Each author has a software option to withhold the use of his programs from "deferred run" execution. Users may not be aware that programs are unavailable until the following day when they check for results.

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International Network Expanded Into Western Europe, UK Cities

General Electric Company, in conjunction with Compagnie Honeywell Bull, Paris, France, announced expansion of its international time-sharing service network to Belgium, The Netherlands, France, Italy and eight cities in the United Kingdom via a satellite link from the U.S.A. through London, England.

According to Paul W. Sage, general manager of Information Services Marketing Department, GE's international network services will be made available in these European countries, plus the United Kingdom, under a marketing agreement with Honeywell Informations Systems, Inc.

Local telephone access to network is available from Brussels, Amsterdam, Paris, and Milan. And in the United Kingdom, local access numbers are available in Cardiff, Birmingham, Manchester, Leeds, Liverpool, Newcastle, Glasgow, and Edinburgh as well as London.

NETWORK EXPANDED

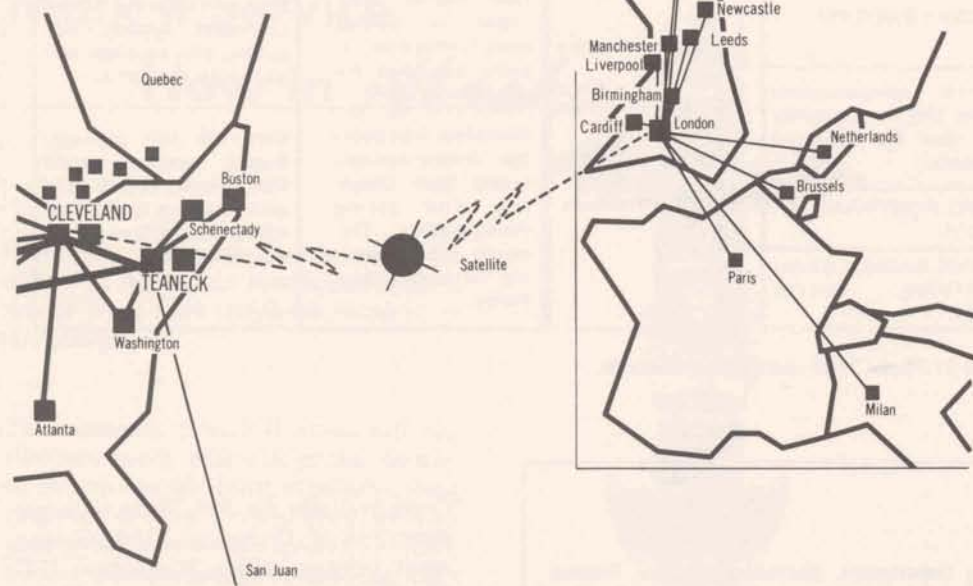
"With the addition of these new international cities to the GE network, busi-

ness with widely dispersed North American and European and/or UK operations can gain immediate access to centrally stored financial, sales, production, forecast, and technical information to help them plan, direct and control daily operations more efficiently," Sage stated.

Sage noted that subscribing firms can link as few or as many "local" operations as required to the GE network which will be extended to additional European cities later this year.

Commenting on the move to international networking, Sage said that throughout the Atlantic economic community, there is an explosive need for international companies to enable more and more of their people to work efficiently and economically with data and information associated with their central file system. Also, they can provide relevant information to key executives for day-to-day decision making.

U.S. companies which have affiliates in the UK or the Western Europe cities, may contact their local GE Time-Sharing Representative for details on where to contact the Honeywell Information System's Representative for rates, contract requirements, service hours, etc. Overseas users may be validated into catalogs used by USA parent companies, but will be subject to contract terms prevailing in each of the countries where the affiliate becomes a subscriber.



GENERAL  ELECTRIC

Are Today's Graduates Prepared for the Growing Use of Computers in the Business World?



This question resulted in an extensive study by the President's Science Advisory Committee, producing a report called "Computers in Higher Education." February, 1967*. Educators who read the report generally tended to agree with the concepts it proposed, but in 1967, commercial time-sharing service was not in a position to offer service at rates within the range of most school budgets.

An educational plan offered by General Electric beginning in 1968 made it possible for schools to have time-sharing service at reduced rates, but school boards approving budgets were somewhat concerned about time-sharing usage because it did not offer a "not-to-exceed ceiling" price.

General Electric is now offering a new Educational Access Service that offers a stable price per month, beginning at \$400. The rates include unlimited terminal connect time, and unlimited CRU's, with storage and terminal rental at standard rates. The contract period can be for as little as three months.

Students may learn to use the time-sharing computer at their own learning speed through the series of tutorial programs. The ease and simplicity of the system makes it ideal for beginning students, with on-line programming instructions and self-documented library programs.

The Educational Access Service contract validates one or more user numbers, that may be used from several terminals. The system limits access to one terminal per user number at a time. The applicable rates for the new Educational Access Service are shown in the shaded area below.

	BASIC 1	MARK I
Educational Access Service**	\$400 (secondary schools) \$600 (colleges)	\$500 (secondary schools) \$750 (colleges)
Standard Rates	\$5.75/hr; \$.03/CRU	\$8.50/hr; \$.05/CRU
Educational Rates (6 p.m. to 8 a.m., Sat. and Sun.)	\$3.00/hr; \$.03/CRU	\$4.25/hr; \$.05/CRU
Characteristics	Easy to learn, simple to use, provides all the capability that beginning students need.	Extra computational power and file capability are ideal for advanced students.
Languages	BASIC, ALGOL	BASIC, FORTRAN, ALGOL
Tutorial Programs	LEARN BASIC, DEFINE	LEARN BASIC, LEARN FORTRAN, TUTOR BASIC

	BASIC 1	MARK I
Library Programs	35 most popular programs in mathematics, statistics, and economics fields.	Over 400 programs in mathematics, statistics, engineering, economics, and management fields.
Documentation	One manual provides all needed basic instruction. Library programs are self-instructing.	Documentation covers command system, languages, edit package, and all library programs.
Other Features	Complete Edit package. Binary random access files. Chaining and string manipulation. Dynamic redimensioning for matrix flexibility.	Complete edit package. Binary random access files. Stored object code with chaining. Secondary school curriculums. Management games.

** Unlimited terminal and computer time. Storage at \$1.75 per 1536 characters per month.

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*Copy available for 35¢. Write to Superintendent of Documents, U.S. Government printing office Washington D.C. 20402. Ask for Computers in Higher Education Report of the President's Science Advisory Committee, February, 1967.

STRESS Engineer Saver

Transmission tower design has become a basic problem of concern with added emphasis by environmentalists on aesthetics of structures according to many power company engineers.

"It's not easy to design attractive structures and keep the costs down at the same time," says Florida Power & Light Structural Engineer Steve Cymbaluk.

"I have peace-of-mind like I never had before," said Cymbaluk, "Turning to the General Electric STRESS program, Structural Engineering System Solver, for computational assistance in the design and analysis of many tower structures we build has made a new man of me." he continued.

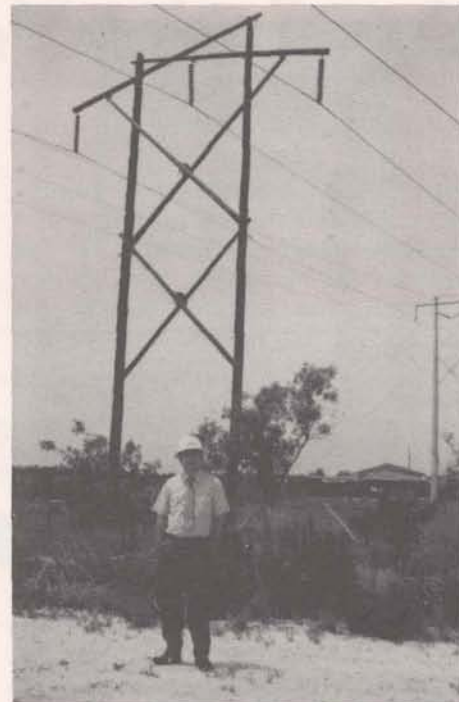
Here are some of the reasons why Cymbaluk has peace-of-mind when using the computational program in designing and analyzing structures.

- Confidence in computer calculated output produced at the terminal
- Helps to eliminate potential expense of over-designed structures.
- Shortens the cycle time for engineering calculations, meaning potentially faster installation.

- Helps to gain time for designing optimum configurations-most of the tedious calculations are now gone.
- Quick-look at "displacement and forces" printout indicates if work is in approximately the right range.
- Terminal output indicates what forces are acting on the members of the structure (tension or compression); moments at the end of each member; and reactions and displacements at various joints.
- Program determines whether each individual member is adequate to do the job.
- On-line correction service.
- Technical support available through GE.

Cymbaluk first began to use the STRESS program after attending one of the seminars conducted by GE on the use of the program. Florida Power and Light uses GE STRESS for design and analysis on many transmission towers and related structures. They design supports for substation equipment and other structures using GE STRESS.

Cymbaluk summarized the use of GE STRESS by the Florida Power and Light



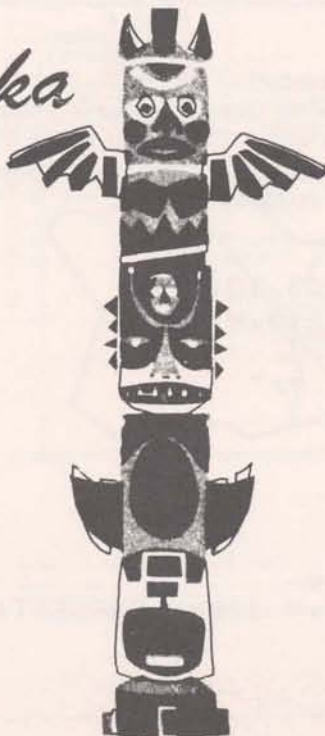
Standing before structures designed with the help of STRESS is Steve Cymbaluk, engineer for Florida Power and Light Co.

Company by saying, "I'm saving construction costs — I'm getting more work done in less time at a lower cost to the Company, but confidence in the GE STRESS program capabilities has given me real confidence in the finished product."

Mark II Service Now In *Alaska*

Companies and government agencies with offices in Alaska can now access Mark II service from local telephone numbers in Anchorage.

This extension of Mark II service will help eliminate costly delays in getting data into effective usable form, especially where data base information is utilized. Whether your problem is in oil exploration, distribution, transportation, or banking, GE's Time-Sharing in Alaska is there to help you solve your problem. For new service or extension of your present time-sharing usage into Alaska, call your local GE representative.



NAMES IN TPORT\$***

Users solving transportation and distribution problems with the TPORT\$*** program can now make sources and destinations known by 'names'. If you do not elect the new option, the program will printout the source and destination 'numbers' as usual.

For source and destination 'names':

- a) All line numbers must be three digits long.
- b) Place the names for source as well as for destination on separate lines (one name per line).
- c) Input all source names first, then all destinations

To use this input with other required data, see Users' Guide, 907342, Transportation & Distribution.

Commands for Terminal Efficiency

New TYPE commands are now available to let the Mark II system know your terminal's special requirements for line feeds and carriage returns. Using the new commands will generally increase the efficiency of your terminal. For example, CRT devices do not perform a physical carriage return or line feed. Delay characters sent with the old FRIDEN command only tended to slow down the CRT devices.

The format of the new command is TYPE N, where N is 3, 5, or 6.

TYPE 3 replaces the FRIDEN command for users having the Friden 7102 terminal.

TYPE 5 adapts the system for the UNIVAC DTC-500, Gulton, Syner-data Beta terminal, Memorex 1240 and others.

TYPE 6 adapts the system to CRT terminals.

Other TYPE commands are automatically set by the system at log-on time or when the SPEED command is given.

WHEN DO YOU INPUT THE TYPE COMMAND?

You give the command just like any other system command. A logical place for it is shown:

```
NEW ØR ØLD-ØLD JØB22
READY
TYPE 5
READY
```

SOME AUTOMATIC ADJUSTMENTS

At sign-on time, if you strike lower case "H", followed by a carriage return, the system will make some adjustments automatically. For example, if you're set at 30 cps and strike "h", the system will adjust the speed and will use TYPE 2 (for 300 baud terminals). If you sign in with a 134.5 baud terminal and strike "h" the system adjusts the speed and adjusts to TYPE 4 for best carriage return and line feed characteristics.

WHEN WILL THE FUNCTION BE AVAILABLE?

You can tell when the new commands are available by looking for the letters 'CR3' in the time/date line.

DOES TYPE COMMAND DIFFER FROM SPEED COMMAND?

Yes, the TYPE command determines how many delay characters are going to be transmitted to permit line feeds and carriage return actions, but it does not change the speed. You can move from 10 to 15 to 30 characters per second with the SPEED command, but that doesn't change the number of delay characters transmitted to accommodate the specific terminal.

BASIC 1 NEW "SIZE" FUNCTION

When converting programs to BASIC 1, a new function saves time — it's called SIZE. It helps you determine that the size of the object program is not exceeding the limitation of 3636 object words in BASIC 1. For example,

```
730 DATA 3,4,7,9
735 DATA 4.1,9,8,2
745 SIZ
750 END
RUN
```

BASIC 1 will then print the program header, the program will be compiled, **BUT NOT EXECUTED**, and the following line will be printed.

```
OBJECT SIZ 2836 IN 745
```

By deleting line 745 and typing RUN again, the program will execute.

Some BASIC 1 users place the SIZ command at frequent intervals in their coding where they may be approaching maximum size. The OBJECT SIZ print-out will tell them what line of coding produces the over-maximum condition.

TECHNICAL TIP

The following few lines of coding represent a very inexpensive method of duplicating BASIC's 'Mat Input' capability in FIV.

```
100 DIMENSION IRAY(20),L(21),M(20),IC(40)
120 EQUIVALENCE(IC(1),L(2)),(IC(21),M(1))
130 DATA M/20*" -1"/
140 DATA L/"(76H",19*" ",") "/"
150 PRINT,"INPUT VALUES";INPUT L
160 L(21)=M(1)
170 DECODE(IC,101)IRAY
180 DØ 100 I=1,30
190 101 FØRMAT(V)
200 100 IF(IRAY(I).EQ.-1)GØTØ 110
210 110 I=I-1;PRINT,"THEE ARE",I," ITEMS PRESENT:"
220 PRINT,(IRAY(J),J=1,I)
230 STØP;END
```

All in standard FORTRAN IV, this method simply takes advantage of known features as well as the present FORMAT (V). This will work for alphas, file names, etc. in any combination.

The Time-Sharing Leader

FOR GE TIME-SHARING USERS



Information
Services

World Leader
In Time-Sharing
Service

Vol. 2 No. 8

August 1971

MANPOWER PLANNING AT EASTERN AIRLINES

When Eastern Airlines serves a customer, the first point of contact is usually his call to one of Eastern's Reservations Centers. Callers get prompt answers when they dial Eastern, because Eastern forecasts the manpower requirements of its Reservations Centers on the GE Mark II System.

The total number of calls at the centers range from 2.4 million to 3.7 million per month. To handle this volume of calls promptly requires accurate and timely forecasting of requirements for personnel. Eastern Airlines's Reservations Manpower Planning Dept. Headquarters in Miami, computerized its Manpower Planning and Control System on the Mark II, and realized many benefits.

Report Preparation Time Reduced

Using the Mark II system reduced the quarterly forecast report preparation time from two weeks to two days. The forecast was done manually before putting it on GE Time-Sharing. With the added lead time available, Manpower Planning can now make optimum use of the existing service capabilities and plan for any changes that the forecast programs say is likely to happen.

Greater Accuracy

Not only is forecasting by time-sharing more accurate, but it is also more adaptable to varying budget formats.

Attrition Forecast

With historical data in the data base about attrition rates at each of the dif-

ferent geographical locations, the forecasting programs are able to determine what the likely attrition rates are going to be for each center. Each month becomes history and adds more data to the base providing an opportunity to refine the forecasting techniques by comparing actual to predicted rates.

Inputs to the System

Each of the Reservations Centers keeps records of 46 data items used as input for the forecasting programs. The Manpower Reporting System sends information to Miami on such items as:

- Number of calls received — daily & monthly
- Length of telephone calls — daily & monthly
- Experience of existing personnel — monthly
- Terminations during the previous period — monthly

Load Balancing

Rather than move trained personnel from one Reservations Center to another based on predicted loads and requirements, Eastern has the phone calls to the heavily loaded centers re-directed to the center that can handle the load. The re-direction of the calls is much simpler than moving persons around the country. The forecast makes it all very workable, and optimizes the facilities and personnel use.

(Continued on pg. 2)



"Welcome Aboard" —
Did you know that GE's Time-Sharing helped
in the planning of your reservations?



GENERAL  ELECTRIC

MINI MINI MINI TAB

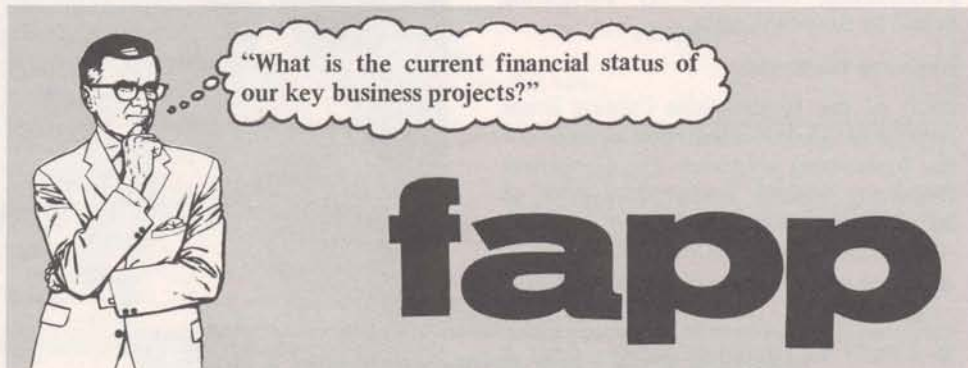
AUTOTAB's new partner

When you need to prepare a tabular report quickly and economically, let miniTAB help. This is a new offering from the CAPEX Corporation, author of AUTOTAB and AUTOGRAPH, the financial planning and control systems which prepares tabular and graphic reports from simple instructions. Now in the Mark II Network Software Services Library (DSSL), miniTAB, with many of AUTOTAB's functions, can accommodate economically a wide variety of tables and systems of tables. Using it to automate the preparation of tabular reports for management, you can easily add supplemental reports, execute monthly performance analyses quickly, and do forecasting (with updates) instantaneously.

Primarily for simple reports such as budget analysis, loan schedules, engineering reports, sales reports or similar tabular reports, miniTAB is 100% 'upward compatible' with AUTOTAB and AUTOGRAPH.

In a system of tables you can use miniTAB on the straight-forward tables and use AUTOTAB on the large or complex tables. If your miniTAB table becomes too complex, you can switch the data to AUTOTAB. With the "team approach", you can modify and rerun the "table description" with miniTAB before it reaches final form; then use AUTOTAB for the big run. AUTOGRAPH can produce graphs from any miniTAB table.

For a more complete description of miniTAB, ask your GE Time-Sharing representation for publication 376061.



Financial Analysis of Project Performance, FAPP, has the answers!! Questions like these demand specific, fast answers. FAPP provides you with these answers quickly and economically.

FAPP is a new GE Mark II time-sharing package for quick, accurate review of the financial status of your business projects. An information retrieval system, FAPP

reports actual to budget costs by total project or by items making up the project. It will give you dollar amount and percentages by which projects and/or items are over or under budget, cumulatively and by time period.

To find out how FAPP can help review the financial status of your project, ask your GE time-sharing representative for publication 381061.

The Time-Sharing LEADER

Published by the Information Services Marketing Department, Bethesda, Md., for General Electric Time-Sharing customers to inform them of new features and services. Communications regarding items in the LEADER should be directed to your GE time-sharing representative.

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(Continued from pg. 1)



Forecasting telephoned reservations loads at Eastern Air Lines are Connie Bischoff at a high speed TermiNet 300 terminal and J.K. Brown, Manager-Reservations Manpower-Planning, as Jim Upp, GE's marketing representative discusses computerized forecasting with them.

Developed at Eastern

The programs used at Eastern in Miami are not existing library programs, but are programs that were conceived, written and implemented by the Manpower Planning staff under the direction of J.K. Brown, manager, Reservations Manpower Planning. Eastern converted its data base files to binary format and made a sizeable reduction in monthly storage costs as well as significant savings in the cost of running their programs.

Results

Ticket service, baggage service, in-flight service are all part of the total service an airline provides its customers, but it all begins with a phone call — and you must have people on hand to answer phones. Eastern Airlines Reservations can't look into the future — but they do the next best thing — forecast — using Mark II Time-Sharing Service.

NC TRAINING, PLANNING AT AIRBORNE INSTRUMENTS LAB SHORTENS PRODUCTION SCHEDULES

The Manufacturing Methods Group at Airborne Instruments Laboratory Division of Cutler-Hammer, Inc., Deer Park N.Y. needed a faster more accurate way to get tapes for numerically control machines. NC allows automatic control of a machine tool by instructions from codes punched in paper tape which are produced by a computer.

A Challenge

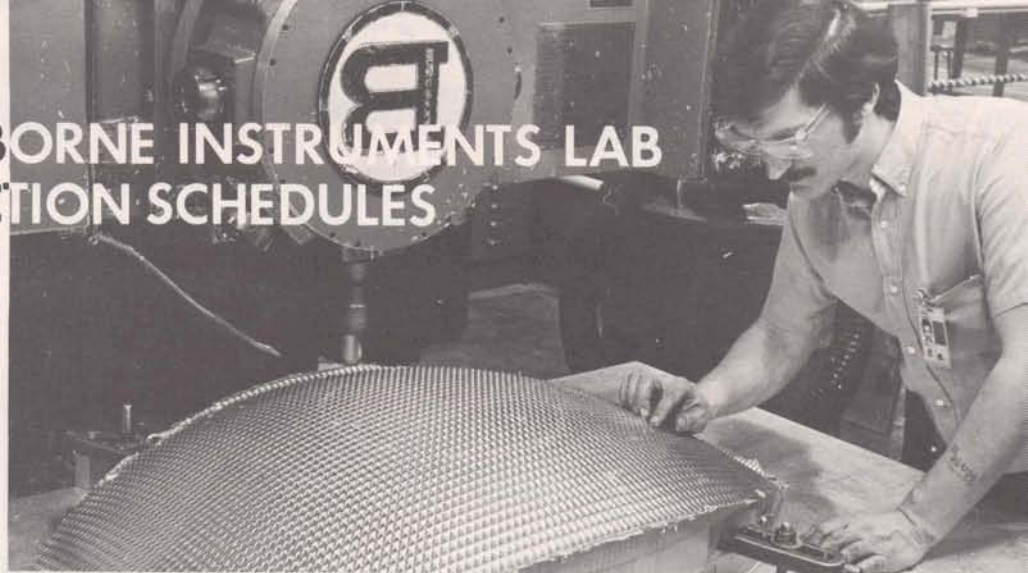
When Steve Pruitt, Supervisor of Manufacturing Methods, called in the Manufacturing Specialist from GE Time-Sharing, the problem he presented was, **GET SEVEN NC MACHINES INTO PRODUCTION USING TIME-SHARING N/C - DO IT IN FIVE MONTHS.**

"I have had many demonstrations from time-sharing companies. If you can demonstrate GE capability in saving me time and money, I am interested. Show me GE's capability for processing tapes for the Ragen Component Insertion Machine, and the Ex-Cell-o."

Following a successful demonstration that met these requirements, a schedule was drawn up that would get the Ragen, the Ex-Cell-o and other NC machines using tapes produced by GE Time-Sharing. Working as a team, AIL and GE planned the work that was to be done, setting dates when specific work was to be accomplished.

Here's the ambitious schedule the team set up as its goal.

Machines	Months				
	1	2	3	4	5
Ragen (Comp. Insert. Mach.)	Demo	Develop	Post Processor	in use	
Burgmaster (Cutler-Hammer)		Dev. P.P.	in use		
Monarch Lathe (GE100P)			Dev. P.P.	in use	
Ex-Cell-o (Slosyn Control/Spindle Wizard)			Dev. P.P.	in use	
Ex-Cell-o (Slosyn Control)			Dev. P.P.	in use	
Bridgeport (Slosyn Control)			Dev. P.P.	in use	
Burgmaster (Slosyn Control/Spindle Wizard)			Dev. P.P.	in use	



The complex radar dish, machined in record time with the aid of NC parts programming language, gets a close look to assure perfection of the final product by machine operator Ralph Aprivelo, AIL.

Classes Begin Right After Demo

The classes were very important because a thorough knowledge of NCPPL, the NC Parts Programmer's Language, would be necessary to meet or beat the schedule. The learning process didn't stop when classes were completed. Work began moving faster as the AIL team members became more familiar with the system capabilities. The GE Manufacturing Specialist worked very closely with Pruitt of AIL, providing assistance and support where it was needed.

Work Projects Assigned and Scheduled

Tasks to be performed were defined and scheduled in all cases. Each team member was aware of his portion of the total job, and what he was expected to do. Schedule checking and work reviews were the only way the job could meet the deadline.

Move Toward Self-Sustaining Status

AIL's Manufacturing Methods capability would not have been enhanced if the GE man did all the work - the AIL team improved its skills and capabilities and knowledge of the application by digging in and doing it themselves. They knew they could call on the GE man for help, but they improved their overall capability by becoming self-sufficient.

Teamwork in AIL

In any manufacturing operation, the cooperation that pays big dividends is the cooperation between Engineering Design and Manufacturing Engineering. Time-Sharing - NCPPL - and Parts Programming on the Mark II proved to be the link that accomplished this at AIL.

Engineering designed a mold for the production of radar antenna. The coordinates for the mold geometry were developed through a Fortran program on GE Time-Sharing, and written to a file. A total of 16 files were used. Steve Pruitt then edited those files (using String Edit functions) to put the required machine coding for his Burgmaster in the proper sequence. The Burgmaster has a Cutler-Hammer control. He then ran NCPPL (option 5) and produced the E.I.A. coded tape for the machine. The average tape length was 200 feet.

The time-sharing computer and the common files accessible by both team members brought about a helpful cooperation between the Design and Manufacturing arms of the business.

(Continued on pg. 4)

DATA MANAGEMENT ON-LINE ASSISTANCE

To help implement your data management system, several unique subprograms are available on the Mark II system. DATØØL, data management tools, programs available and an explanation of

their uses are listed in DATØØL*** along with an outline for implementing a data base with them. Currently among the tools are:

NAME	FUNCTION	DESCRIBED IN
PPGX***	Packing Program Generator (to reduce storage and retrieval costs)	AR001454 & NEWPPG***
SHELLI SHELLR SHELLF QUICKI QUICKR QUICKF IFIRST	6 FORTRAN IV loadable Subroutines for efficient sorting in core	DSØRTS***
GENDIR***	FORTRAN IV loadable subroutine for use with the 'page directory' technique	PDEXP***
CLEAN***	Generates a directory for a data base, whether packed or unpacked	GDEXP***
FIND FINDR	Removes "obsolete" records from a data base. Sorts data base (option) Fortran IV loadable Subroutines to retrieve any data field from any data base	CLEXP*** FINDEX***

For an explanation of the terminology used in DATØØL please list DATERM***

As new subprograms become available, they will be added to DATØØL*** the on-line index. Contact your GE representative for assistance.

MANAGEMENT'S CHALLENGE: HOW TO USE AVAILABLE RESOURCES TO THE COMPANY'S BEST INTERESTS

Many managers spend some time evaluating the available resources they can use to improve business position.

An available resource worthy of consideration takes form in the new pocket-sized International Access Directory that lists the phone numbers in the cities where Mark II Time-Sharing Service is available in the US, Canada, and Europe. It's worth the time it takes to look for a correlation between the cities that concern your business and the cities in the Network. Should someone in your company be examining the value of the correlation? Ask your GE Time-sharing representative for a copy of the International Access Directory 379061A.



REACH MARK I FROM YOUR MARK II TELEPHONE NUMBER

Accessing Mark I from the same number used for Mark II, was inaugurated with the Mark I System 20 in Teaneck, N.J. Other Mark I Systems will soon be added. With this improvement in GE Time-Sharing Service, Mark II users with Mark I catalogs can conclude a session with the Mark II, type 'HELLO' and reach Mark I or Basic 1 Service without redialing.

Now that System, 20 is connected to the network, Mark I and Basic 1 users on that system will be able to use their higher speed terminals. The 15-character per second terminals can now access Mark I and Basic 1. Some of the new commands and procedures necessary to get the 15 cps terminals connected are described in Command System Supplement 1466A.

As Mark I's join the Network, they will have the user number password option. Existing customers will not be charged for the password validation for the first month following their connection to Network.

(ALL Continued from pg. 3)

X-Y Machine Outdoes Itself

NC tapes via GE Time-Sharing expanded the productivity. One machine, the Burgmaster, with a "point-to-point" or positioning capability was never intended to produce any curved lines. The NC programs and the computer changed that by making feasible the computation and physical tape coding in small increments that the work produced was emulating a contouring machine and produced the part, curved surfaces and all the design tolerances. Manual programming virtually could not have done it.

Job Well Done

By the end of the fifth month, the 7th machine was working with the appropriate post-processor. The job was done on time — machines were producing on schedule.

The Mark II didn't do it alone obviously — it took planning, scheduling and hard work for the whole team. GE was part of that team, and AIL now has a working team in place that can tackle Parts Programming and post-processor chores to increase the output of other machine tools.

The Time-Sharing

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Vol. 2, No. 9

September-October 1971

FLEXIMIS SOLVES REPORT GENERATION PROBLEMS

Preparing a report for a manager, an executive, a board of directors or the stockholders — reporting problems are much the same: How do you gather the data into a form that tells the reader what he wants to know?

When management's business data needs to be shaped up into an informative report, GE's FLEXIMIS is called into action. The FLEXible Management Information System can easily gather a variety of data from sales, finance, marketing, personnel etc., and make it into any type of information report required.

Executives and managers in large and small firms are piecing together their business data with FLEXIMIS into useful reports for decision making. For example

FLEXIMIS WALKS THROUGH YELLOW PAGES

The Directory Operations Department at AT&T New York headquarters monitors the placement of all national Yellow Pages Advertising in the Bell System's 4500 local editions of directories. "The last time we tried to get a completely flexible information system that would give us marketing profiles by dollar volume and groupings by major client," says Bell's Arnie Goetchius, "was in 1969 and after six months we still didn't have what

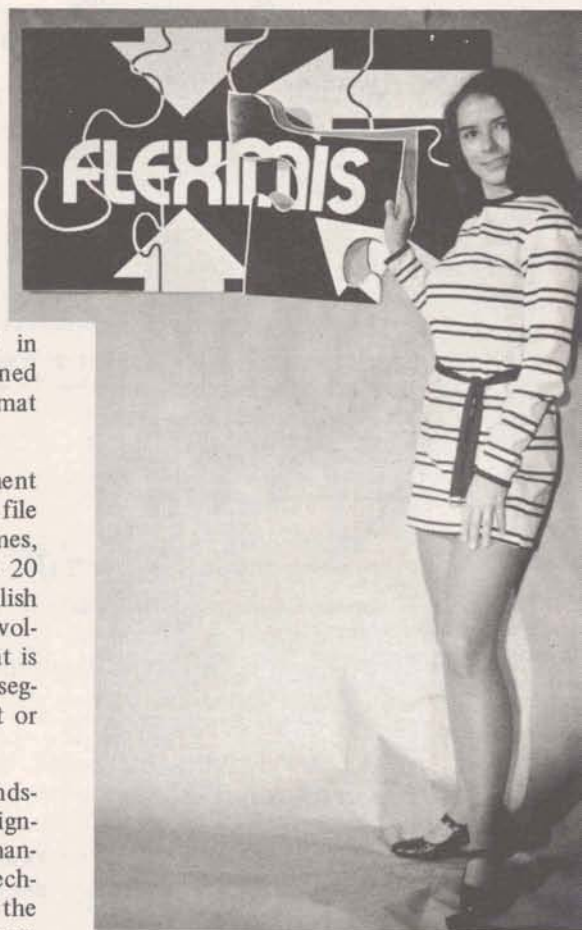
we wanted. Now with FLEXIMIS in operation, the situation has turned around. We can get reports in any format right now."

The Directory Operations Department has loaded in its private FLEXIMIS file all national yellow pages account names, numbers of their accounts with the 20 Bell operating companies which publish the 4500 directories, and the dollar volume of each account. The Department is also loading a market identifier to segregate advertisers by type of product or service.

The Department had no one with hands-on computer experience when they signed up. They were essentially a sales management function not a research or technical operation. But these are exactly the situations for which FLEXIMIS was designed. The Bell people found that FLEXIMIS let them start simply using the computer's conversational mode.

"After you see just how the system works, you grow it with you," says Bell's Goetchius. "You stream line your procedures, save time — and most importantly, can design your own reports and create your own routines, which the system can replay with only a one word command."

FLEXIMIS not only saves time analyzing data, it saves time creating report



Solve your information puzzle with FLEXIMIS, says Judi Biauce, Marketing Secretary.

formats. Over a year's time, clerical time to "set up" complex reports can mount surprisingly.

CON ED LIGHTENS BUDGET CONTROL

One of the country's largest utilities, the Consolidated Edison Company of New York uses FLEXIMIS to help control the
(Continued on p. 2)



GENERAL  ELECTRIC

TIME-SHARING LINK TO BATCH PROCESSING 'SIGNIFICANT' SAYS DIEBOLD REPORT

The Diebold Group, worldwide management consulting firm, reported that it is significant that interactive capability can be added to batch processing systems with minimum effort. Its Automatic Data Processing Newsletter of June 14 reported as follows:

"For an exploration of the possibilities of complementing in-house computer resources by linking to a teleprocessing time-sharing network with associated file processing and file maintenance services,

we report in some detail on General Electric Company's recently announced major expansion of its data processing network system," ADP reported.

Copies of this report are being made available so our readers can learn in greater detail what the Diebold Group has to report about linking interactive systems to existing batch systems.

If you would like a copy of this pertinent newsletter, check the coupon on page 4.

FLEXIMIS USES (Cont.)

status of all work order jobs. "With FLEXIMIS we hope to tell beforehand rather than after the fact, that a particular job is going to run over budget," says Con Ed's Project Manager Dennis Lynch.

The Engineering Department loads the file with the purpose, date and location of each work order. The estimated costs, actual costs to date and percentage of completion are updated often for each file item. A simple routine has been set up so that with a one-word command, FLEXIMIS will select all projects where actual costs/estimated costs exceed the value of the "percent of job complete" column.

AUDITING MANPOWER AT ERNST & ERNST

Ernst & Ernst, one of the largest accounting firms in the nation, is installing a data management system based on its 12 nationwide districts. The network is the extra in this case that provides a superior national service for executives at Ernst & Ernst. This prestigious accounting firm is in the top level executive talent business and the main application for the system is to store the qualifications, salary requirements, and geographical preferences of a highly mobile group of men. Each district office has a terminal for updating the files with new information, and scanning the file for candidates.

If an Ernst & Ernst office has a requirement for a treasurer with electronics manufacturing experience in the northeast, the FLEXIMIS system can simply be given the list of parameters from any of the 12 terminals, and it will print out all possible candidates.

DIAL A MAN AT NEW YORK TELEPHONE

The New York Telephone Company uses FLEXIMIS to screen executive personnel for promotions and rotation. They have recognized that a well-managed corporation is one which expends considerable effort on key personnel selection. Executive rotation decisions are made by senior management and more attention can be given to unusual and subjective factors in the same amount of time because key facts are immediately available upon request.

For more information on FLEXIMIS and how it can help you with your reporting problems, send in the request-for-information form on the back page of this issue.

YOU CAN LEARN ABOUT THE SEPTEMBER RELEASE OF NEW MARK II ENHANCEMENTS ON-LINE !

You'll want to know about these new features quickly, so a new HOT LINE service lets you know how the new features can be put to work TODAY.

- Highlights of the features are presented to you with a FREE user number — BBB00999,NEW
- Instructions for using the features are contained in the library program SEPT71***

Call BBB00999,NEW to find out from the "highlights" which features apply to your business problems.

Then call SEPT71*** and you can select the complete instructions about the features you'll want to use. You can put the new benefits to work for you IMMEDIATELY !!!

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the **NOW** system offers variety of solutions

Time-sharing users are finding hundreds of ways to save time and money using the international network — the NOW system. With local phone access in more than 250 US cities, the United Kingdom, Western Europe, Canada and Puerto Rico, the problems being solved are as varied as the users.

BUSINESSMEN will be able to ask for a vast array of international trade information, such as daily monetary exchange rates and air and sea freight rates for nearly any country from a new automated network of world trade information service on the NOW system.

AN INTERNATIONAL manufacturer can call the computer with a local telephone call and within minutes obtain up-to-date production reports from their plants abroad.

A MANUFACTURING FIRM is incorporating a credit checking system with the NOW system to improve a batch order entry system at its headquarters. Reducing the holds for credit information improves shipping time and reduces operating costs.

A SHIP BROKERING company can furnish detailed information instead of averages on all of the cost variables for a shipment. For example, in minutes they can compute the cost of shipment from the Persian Gulf to Bantry Bay, considering the class of ship, tonnage, speed, crew size, loading costs, port charges, etc.

A SPARE PARTS AND EQUIPMENT INVENTORY file is maintained on the network by an oil company. Production people are able to locate spares and ship them to the site immediately, reducing the necessary inventory by millions.

AN INTERNATIONAL SHIPPING concern saves 1 to 2 days in unloading time by using the NOW system. They place ship contents and ship departure data on the system in the US. Overseas receiving ports access the data, calculate arrival time, and compute equipment and labor requirements for most efficient unloading.

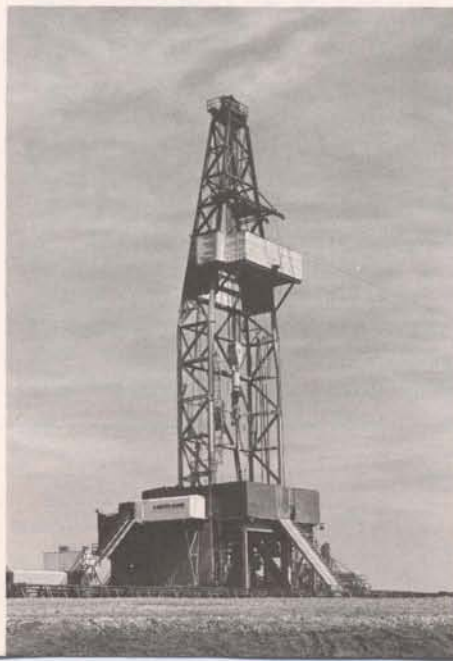
The NOW system has been producing results — it's been saving time and money for those companies who were not willing to do business the old way... "because that's the way it was always done before."



LIBERACE'S booking agent maintains schedules of many entertainers, actors, and lecturers in a booking pool on the network. Any agent may access the network and list the open performance dates for Liberace or other entertainers all within minutes. An entire season's entertainment can be planned for theatres, concert halls, or colleges within minutes, using information from this booking pool.

FOR A LARGE AUTOMOBILE MANUFACTURER, the network is expected to eliminate a proven sales-losing hazard — the "almost" customer who changes his mind and strays away because of delays in getting exactly the car he wants.

One of two Western Oklahoma wells currently being drilled could conceivably set world depth records more than 5 miles below the surface. Both of these deep tests are using Amoco's optimization program.



AMOCO PRODUCTION OPTIMIZES DRILLING

Cost and time reductions are the main benefits to oil well drillers who use Amoco production Company's drilling optimization program.

Amoco, the U.S. exploration and production subsidiary of Standard Oil Company (Indiana), has written programs to optimize background information, and programs are updated using the Mark II Time-Sharing System. The company reports overall intangible drilling costs on its own optimized wells are running from 15 to 20% below what they would be without optimization.

HOW GE TIME-SHARING HELPS REDUCE COSTS

Amoco research scientists and engineers conducted extensive drilling research and

analyzed over 95,000 bit runs. They built a data base with this information and wrote Op Drilling® programs for optimizing more than 400 company wells.

Amoco engineers at the company's Tulsa research center transmit new drilling and geological data to files on the Mark II system, then analyze and compare it with historical information in the data base. The program output at the research center may suggest bit changes, mud weight changes, certain rotary speeds or any of a number of other variables which will reduce drilling time and costs.

Recommendations are sent back to the well site via telephone or by updating limited access user files, and the drilling operator can take appropriate action. For more information, check box on page 4.

® Registered service mark of Amoco Production Company

DO YOU MANAGE THE PROJECT? OR DOES IT MANAGE YOU?

Some men are managed by the project — their role is purely reactive — deciding which fire must be put out first.

Others have the situation under control. They know how costs and schedules will be affected by today's events — and after putting out the fire, they know how to get back on the time and dollar track.

These managers have planned and scheduled. They have a reporting system that lets them see how future events will be affected by today's events. Chances are the project is planned with a Critical Path Method (CPM). CPM lets you manage the project — prevents the project from managing you.

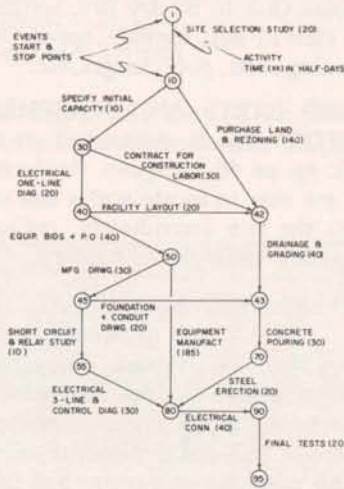
TIME AND COST CONSIDERED

When planning a project, whether its a major construction job or a massive report, CPM helps you plan its completion within a specified time and at a minimum cost. It's systematic. You can define projects in a form that can be easily understood by others in your organization.

ALTERNATIVES AND MINIMUM COST

Time-sharing CPM can tell you what happens to cost if you speed up one activity. It can reschedule all remaining activities if you use one of your planned alternatives.

CPM evaluates the project as it moves along. It reports activities by percentage completion, number of days under or over schedule, and projected completion date. This is managing — not being managed.



HERE'S HOW IT WORKS

In using the CPM system, for example for the construction of a utility substation, you first prepare an arrow diagram as in above. You can visualize the total project by the activities to be scheduled, their sequence, and their duration.

TIME/DATE ASSIGNMENTS

With the project defined by the arrow diagram, you next determine the actual dates when each activity must begin. If you specify when the first activity is to begin, or when the total project is to be completed, the program produces starting dates of each activity. CPM considers weekends, holidays, and overtime — which if done manually, could be a cumbersome task.

THE "CRITICAL" PATH

There is a certain path through the arrow diagram which tells the duration of the total project. It's the *Critical* path. Any activity on this path which cannot be completed within the specified duration causes the total project to slip!

As a manager you should focus your attention on activities along this critical path, since it is here that slippage will definitely affect on-time completion. CPM will tell you which activities are worth your time to "manage".

If you want to change your role from "being managed" to "managing the project", learn how to use CPM. And time-sharing makes it easier than you'd imagine.

FOR
MORE
INFORMATION
MAIL THIS TO:

Time-Sharing LEADER
General Electric Co.
7735 Old Georgetown Rd.
Bethesda, Md. 20014

I Would Like More Information On —

- FLEXIMIS
- The Diebold Report
- GE's International Network
- CPM PACKAGE
- AMOCO's Op Drill

Name _____

Company _____

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City _____

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The Time-Sharing Leader

FOR GE TIME-SHARING USERS



Vol. 2 No. 10

November 1971

FREE USER NUMBER ALERTS CUSTOMERS TO NEW FEATURES

Free User Number NBB00999,NEW was a busy one during October as customers accessed it to learn of the latest package of new capabilities added to the GE Network Information Service. This innovative customer information system provided a summary of the new features and detailed instructions on-line for using them, just by LISTING SEPT71***.

Customers not needing immediate documentation can request the "New Mark II Service Features" reference manual, 3000.01 from their Marketing Rep. or by checking coupon on page 4. Highlights of this package are listed below.

32K MEMORY

Doubles program size to 32,000 words of core memory. Making programming easier and faster, plus reducing cost.

LARGE FILE PROCESSING

A new unbuffered Input/Output capability enables transfer of data directly between core memory and disc files for significant improvements in system running time and file processing cost.

NEW EDIT

New edit capability, economical and easy to use. Single letter string editing commands can be used to edit anything from a character to a complete file, including source programs and ASCII data files.

Continued p. 2

GENESCO TAILORING FITS MANY FORMS

When it comes to tailoring a model, GENESCO is a stylesetter. It should be. It's the world's largest apparel manufacturer.

But tailoring financial reporting techniques to suit a \$1.3 billion decentralized and diverse corporation demanded a new kind of styling that is fast becoming another trademark of GENESCO.

From the 304 manufacturing and processing plants down through 2,452 retail outlets varying from Bonwit Teller to S.H. Kress, the company is "rewriting some of the basic concepts of apparel manufacturing and marketing", in the words of GENESCO Chairman Frank Jarman. The innovative management team doing this is described by Jarman as "decentralized for fast response, but carefully coordinated." And a new on-line financial reporting system is vital to keep that coordination.

GENESCO headquarters personnel are now accessing private and highly secure files on the GE Network for monthly, quarterly, semi-annual and yearly performance reports that go directly to its Executive Committee and the Board of Directors.

NETWORK 'CUT AND TRY' PATTERN

The man responsible for a large part of this industry-leading system, System Analyst Warren Winger, explained some of the problems involved in building a



GENESCO tailoring takes many forms.

system for a far flung company like GENESCO.

"First you must understand we're in the management reporting business, not the general accounting business. That means the figures we produce are volatile. They're tied to the performance of one man — the operating company president or group executive — and they've got to not only be correct, but analyzed and formatted correctly."

"An important requirement is flexibility. Any well run multi-divisional company like GENESCO is constantly making organizational shifts for better efficiency. Reporting formats must reflect these company structural changes and — most importantly — still make valid historical comparisons even though the structure has changed. That can get really complex, but the programs we were able to design on the GE network system are easily changed. Our business is seasonal, too,

Continued p. 4



GENERAL  ELECTRIC

YOUNG RADIATOR

KEEPING THE HEAT ON HOT PROSPECTS WITH NETWORK

For salesmen of custom-built equipment, nothing is worse than having a hot prospect grow cold while waiting for design/cost specifications. Conversely, nothing warms up a sale faster than a quick response specing for the "right" system at the "right" price.

And that's why Young Radiator of Racine, Wisconsin sales reps across the U.S. use the GE Network to help them with design/pricing specs. Young designs and builds stock and custom built heat transfer equipment for a wide range of commercial and industrial applications. To meet its customer needs at competitive prices, often thousands of combinations of components for a system are considered by sales representatives. Optimization of the combinations as well as alternative designs to reflect all pertinent operation factors and constraints are computed via GE Network Service.

TURNING ON THE HEAT

A GE information network user for more than two years, Young Radiator has expanded its accessibility to the design/pricing system to 15 different sales offices as well as inventory and manufacturing activities. "We're a step ahead of our competitors", says Fred M. Young, Jr., Industrial Division Sales Manager. "GE network services gives us fast nationwide access to one central source of current comprehensive information. The firm that can design/price fast has the competitive edge and usually gets the order. Now we are servicing customers

with greater efficiency and at less cost than we could get from a computer system of our own."

By manipulating centralized data files, Sales Reps can get rapid, accurate solutions to their customers' design/pricing problems right in the regional sales office. Customers no longer wait for days for a manual system to do the job... it's usually within an hour that they have the complete information.



Sales Engineer Robert Theison (l) and Fred Young, Jr., Sales Manager - Industrial Division, review an analysis from their network program which defines the best design and price for a custom-built order.

INVENTORY, N/C HOT, TOO

In addition to expanding its design/pricing system accessibility to 15 offices, Young Radiator also is expanding its use of GE information network to other activities. A stock list of some 130 standard items is updated constantly and a current inventory is available to all offices linked to the GE network previously. The list had been updated manually twice a month and mailed to the salesmen.

Extending the same computer power into manufacturing, the Numerical Control Parts Programming Language, a GE library package, is used with a Giddings & Lewis Numeripoint drilling machine. With NCPPL, they have been able to increase N/C parts programming and machine productivity in hole pattern machining of heat exchanger tube sheets. Various shapes - rectangular as well as circular - are easily accommodated.

NEW ON NETWORK

Autofile

Maintaining up to date records for marketing, finance manufacturing... requires timely reports. Now you can start a reporting system without a major MIS design with AUTOFILE, a new dynamic records keeping and reporting system from Capex.

You define (in English terms) the report required and AUTOFILE will update your file and produce a neatly formatted report based on your rules. Check box on page 4 for more information.

Tektronix Terminal Users

Tektronix, Inc., now provides on the GE Network, TEK PLOT. This is a set of FORTRAN subroutines which support the T4002 and 4002A Graphic Computer Terminals. For complete information contact any Tektronix field office or Jerry Ashley, Tektronix, Inc., Beaverton, Ore. 97005.

ECAP\$\$* Improvements**

Electronic Circuit Analysis Program, ECAP\$\$***, plotting and tabular output are now possible for either AC or transient analysis via ECAP\$\$***. Results are available faster and in a readable format. Details are in User's Guide, 5204.06. Check box, page 4 for more information.

NEW FEATURES (Continued from p. 1)

DEBUGGING PACKAGE

An interactive FORTRAN IV debugging package significantly improves the efficiency of on-line program development. It enables users to examine a program while it is running by halting it at predetermined points or when errors occur.

The Time-Sharing LEADER

Published by the Information Services Marketing Department, Bethesda, Md., for General Electric Time-Sharing customers to inform them of new features and services. Communications regarding items in the LEADER should be directed to your GE time-sharing representative.

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Lincoln First Banks Inc.

BANKS ON PA300

It's budget time again. Time to analyze last year and make plans for next year. Lincoln First Banks' experience with PA300 demonstrates how one business is attacking that perennial problem. Other programs available for budgeting are listed below.

Lincoln First Banks, Inc. planning committee was assigned the task of designing a forecasting planning model to be used in long range planning. Lincoln First is a \$1.9 billion registered bank holding company headquartered in Rochester, N.Y.

The model they designed will provide 10 year forecasts of balance sheets and income statements on a consolidated corporate basis. The model will be used to:

1. Quantify the effects of various economic, regulatory, industry, and corporate trends and decisions.
2. Assess probable future earnings levels under various economic assumptions.
3. Assist in establishing and evaluating corporate financial objectives.
4. Determine the most critical and sensitive variables, so as to pinpoint those areas that the Corporation should be

directing its future efforts and resources.

5. Assist member banks in projecting their probable earnings levels.

Part of the initial groundwork for such a process was the review of all computer programs suitable for bank planning and the selection of that program which could best be tailored to fit the needs of Lincoln First Banks. "Although many such earnings simulation and forecasting models are available, PA300, a GE Mark II program, was selected because its basic structure permitted us great flexibility and the opportunity to incorporate those aspects we considered most important," according to Steven A. Rothschild, Manager of Financial Planning.

Lincoln First Banks has assigned Don Gwinner as Time-Sharing Coordinator to assist in the selection of such programs and to provide programming assistance, if needed.

The company feels that time-sharing applications have potential use in most departments for both its banking and non-banking units. In some instances, member banks of Lincoln First have used these applications to counsel customers on their financial needs. The service will become a commonplace by 1975, predicts Gwinner.



Donald Gwinner, (l) Lincoln First Banks Time Sharing Coordinator and Steven Rothschild, Manager of Financial Planning check input for the ten year forecast of the holding company.

The PA300 Program allows LFB to write their own logic file, structuring the model according to the specific corporate situation and is not constrained by a standard bank format. PA300 is also conducive to inputs which can be defined by probability distributions and outputs whose results can be sensitized by changing any of the input variables. Another interesting feature of the program is that a report file can be written by LFB to provide output in any desired format.

PA300 is being used by member banks in the Lincoln First system. In Lincoln Rochester Trust Company for instance, the program is being modified to apply specifically to planning bank portfolio.

The Lincoln National Bank and Trust company of Central New York is also using the PA300 Program in the Controller's Department for its annual Budget and Profit Planning activities.

'72 BUDGETING AIDS ON GE NETWORK

When working those budgets for 1972, consider these powerful, easy-to-use GE Library programs. Check the coupon on the back page for literature on these.

FINEX — for historical analysis and subsequent projection of future results to measure budgeting impacts, spreads 16 statements.

AUTOTAB — general purpose table processor which allows user to fit the system to his budget job; excellent for evaluation various budgeting inputs and producing consol dated budgets.

PA300 — To analyze the impact of alternative decisions using probabilistic and sensitivity analysis; particularly used in capital investment decisions.

SPECIALIZED REPORTS IN MINUTES FOR GENESCO EXECs (Continued from p. 1)

and variations in expectations must be built into the reports."

Winger summarizes, "We've found the GE network information service to be ideal for our particular situation. We needed something with on-line capabilities - fast turn-around time. We can do a capital planning report on request in 2 hours or less, for instance. We also needed a system good for last minute revisions. We got it when we brought in the GE service. I've written and tested at least 50 major programs and 100 subroutines in the last year for the system. You almost have to have 'cut and try' capability right in your office to do that.



The man responsible for a large part of this industry-leading system is Systems Analyst Warren Winger of the company's Corporate Management Information Services staff.

The GE network has also been used regularly for special reports and projects by the MIS Department in the last year. For example, it has examined the lease versus buy option on computers. It has produced one-of-a-kind reports based on the regular monthly report data - like ranking GENESCO operating companies by pre-tax yield or other parameters of performance.

Laser cloth cutting is another area GENESCO has pioneered. GE Network was again the medium for special programs which predicted the characteristics of the new laser cutter.

TIME-SHARING IN THE NEWS

To help you keep up with the new capabilities of time-sharing from editors-who-know, we've secured permission from publishers to make reprints of relevant articles available. For reprints, check the appropriate box in the "For More Information" coupon below.

From AUTOMATIC DATA PROCESSING NEWSLETTER (Diebold Group, Inc.) June 14, 1971

THE LONG ARM OF TELEPROCESSING NETWORKS

Quick transition from local batch processing to multilocation - even International - interactive management information systems now possible by linkage to time-sharing information networks.

Check box #380061

From TOOLING PRODUCTION, July 1971

PAYOFF FOR T/S AT EX-CELL-O

Time-sharing provides jet-age speed for manufacturer of jet engine parts. It isn't just having NC machine - you've got to have a plan too.

Check box #384081

From COMPUTER DECISIONS, June 1971

BRINGING THE UNIVERSAL MIS DOWN TO EARTH

It can't run your business, but a good MIS can keep track of your company, your competition and national economy.

Check box #8800.04

From FACTORY, September 1971

PREVENTATIVE MAINTENANCE ASSURED WITH T/S SYSTEM

Computerized preventative maintenance isn't new, but doing it via time-sharing on someone else's computer is. Package programs let users capitalize on the know-how of an outside specialist at bargain prices.

Check box #5305.03

From IRON AGE, July 1971

N/C CAPABILITY AS NEAR AS A TELEPHONE

"Of course T/S works for small companies." Company president backs statement with 50% increase in output.

Check box #5304.34

FOR MORE INFORMATION MAIL THIS TO:

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- New Mark II Features 3000.01
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- ECAP 5204.20
- FINEX 510310
- PA300 5505.02
- 5305.03
- AUTOTAB
- 384081
- 5304.34
- 8800.04
- 380061

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