

The Time-Sharing Leader

FOR GE TIME-SHARING USERS



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World Leader
In Time-Sharing
Service

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RELIABILITY TAKES A GIANT STEP FORWARD

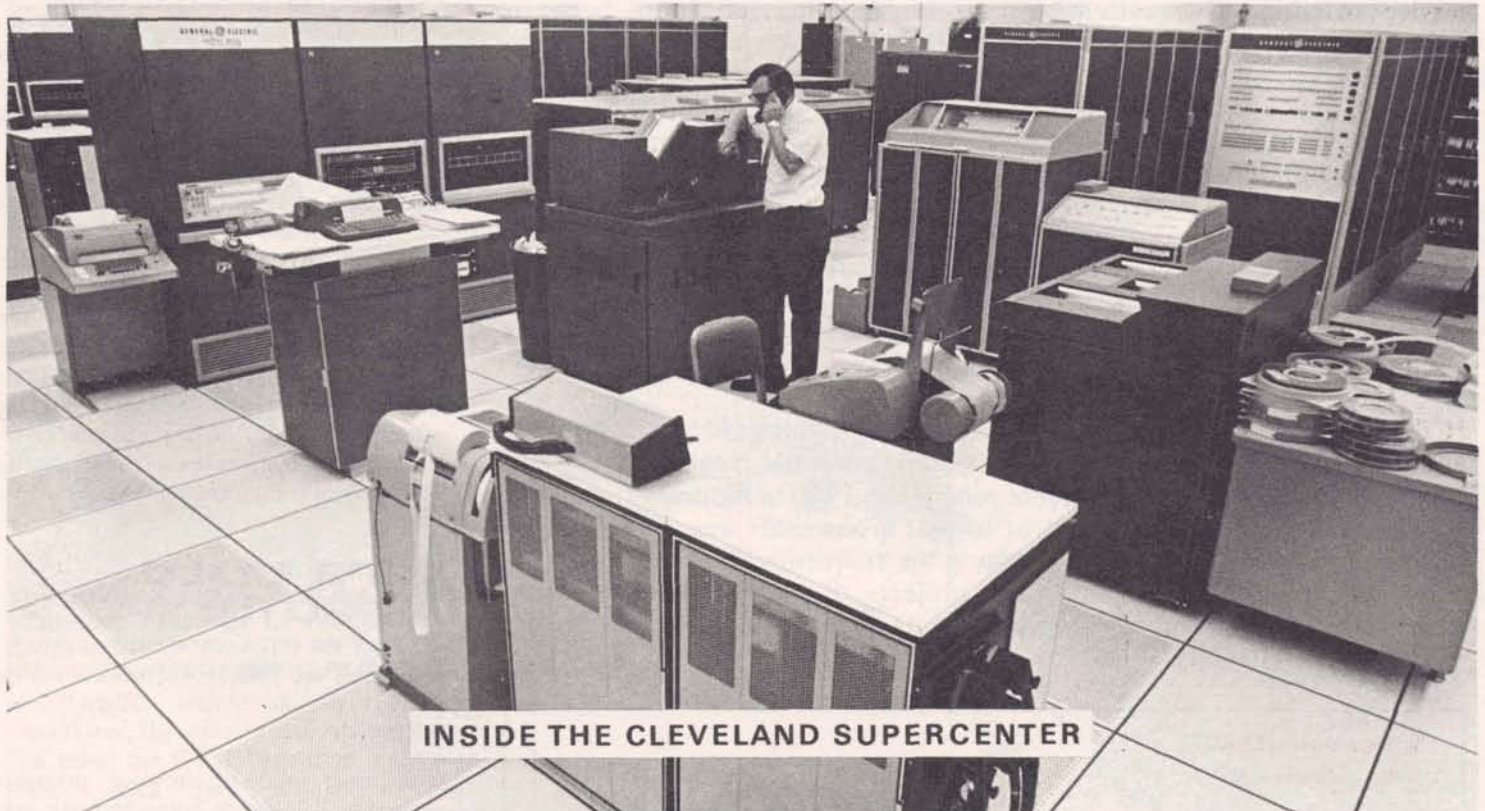
In continuing the development of the super reliability concept, General Electric Network Service becomes virtually isolated from power surges that cause component failure and file losses.

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
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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

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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

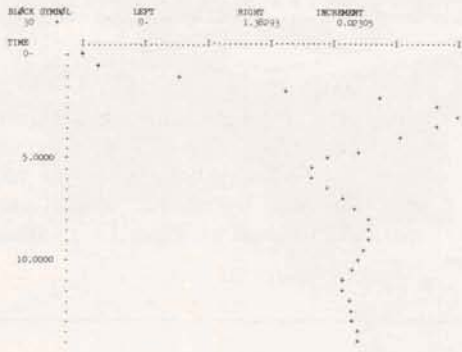
(Cont. p.3)

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.

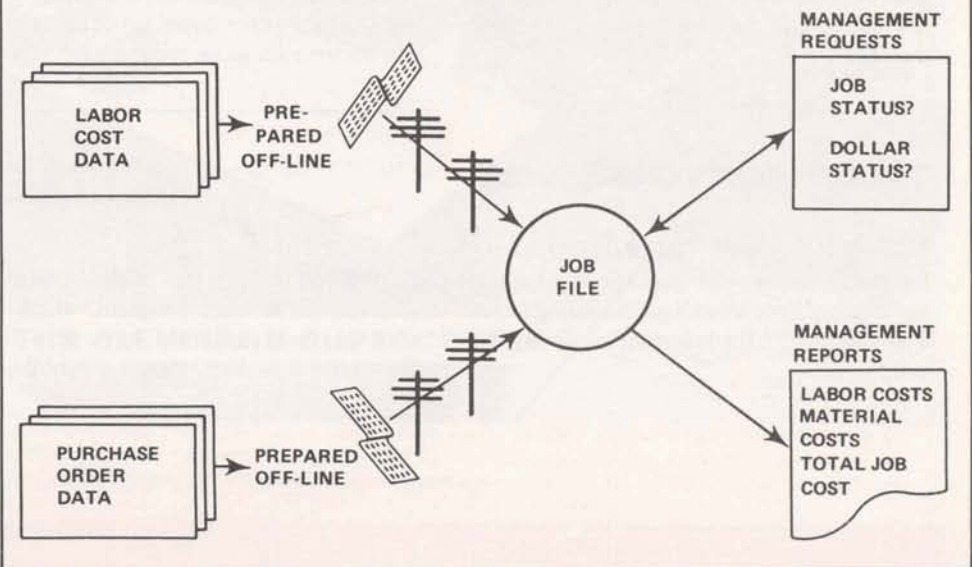
Here's how it works for project cost accounting. Purchase orders and labor reports are the source of entry data. The data from these reports is punched into paper tape in an off-line mode, and then transmitted to the system to update the job file.

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.

