

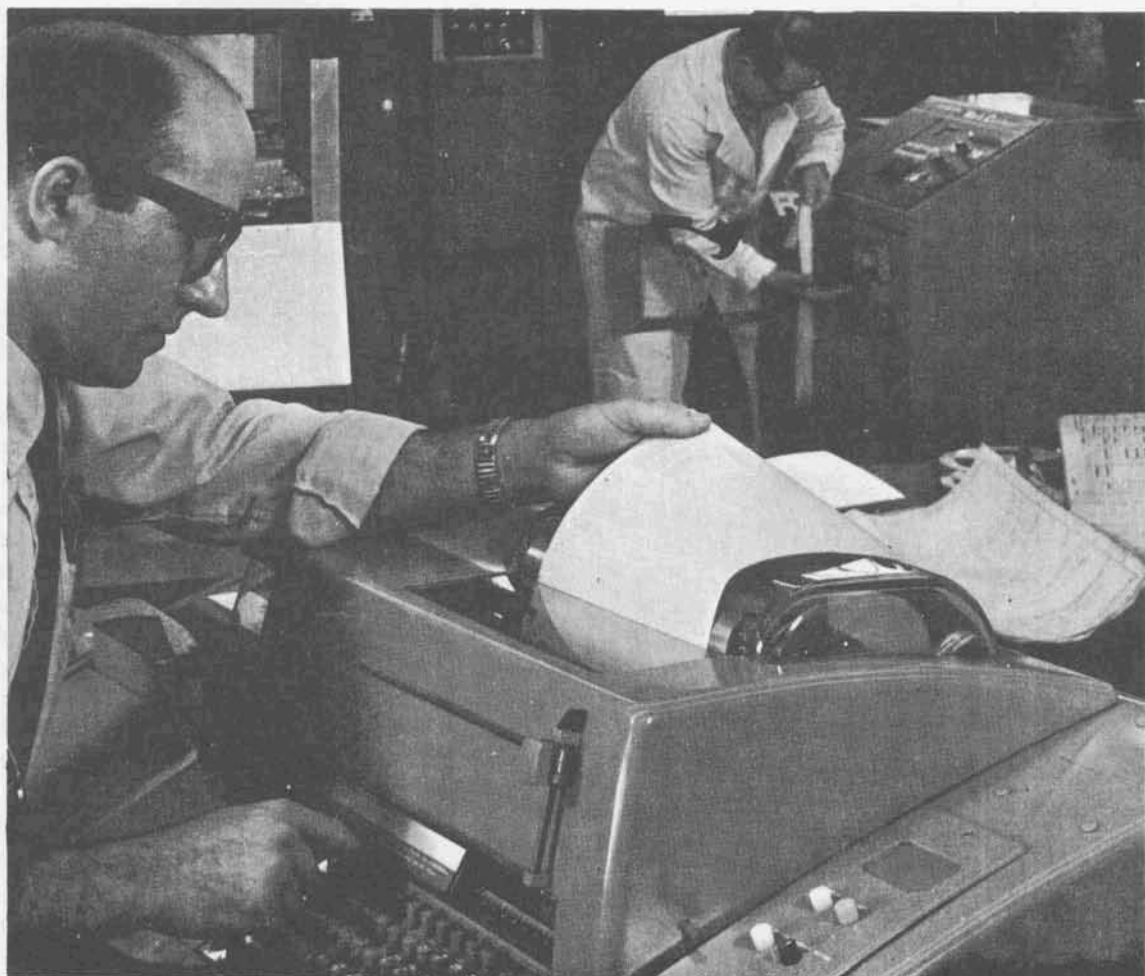
# GE TIME-SHARING SERVICE MAKES NEWS

## The Field of Metalworking



# IRON AGE

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*Numerical Cutting, Inc. prepares N/C tapes in half the time through use of GE time-sharing service.*

## Conversation with a Computer

*Reprinted by General Electric from Iron Age Magazine, August 22, 1968, Copyrighted 1968, Chilton Company*



# Time Sharing: The Swing to Service

Everyone who talks about computers today, talks about time sharing. The time-sharing computer industry, brand new two years ago, now boasts some 40 companies. The capabilities and potential of this service will have a significant impact on metalworking.

By A. M. Greene

■ This fall there will be at least three new N/C programming packages on the market specifically designed for time-sharing computers. By the beginning of next year, at least two major computer companies will announce greatly expanded time-sharing services.

Experts predict that within six to eight years, 50% of all data processing will be done on a time-sharing basis.

Applications are everywhere. A small machine shop cuts the cost and the time required to prepare N/C tapes in half. An engineer prepares cost studies for products using various grades of manganese ores.

A management consultant won't take an assignment unless he is provided with a time-sharing terminal. And this year, a leading business school will spend \$250,000 on time-sharing service, compared to nothing two years ago.

**Computers Undergo Change.** The time-sharing concept—that of many people using the same computer at the same time from remote locations—has changed the computer industry. And, it's starting to change other industries as well.

Metalworking is no exception. In fact, metalworking can serve as a model through which to



IBM's latest entry in the time-sharing picture, CALL/360:BASIC, combines the BASIC language with telephone access to a System 360 Model 50.

study the growth of time sharing, since it offers as broad a range of computer applications as that serviced by the entire data processing industry.

Metalworking offers small, one-shot calculations and huge critical path studies; it offers technical jobs and business-oriented jobs; computations and control



Reels of magnetic tape on file at Univac hold customers' programs and file information. The firm's remote batch operation tackles lengthy problems.

functions and everything in between.

**Faster, Cheaper, Easier.** And the computer industry is in a rush to keep up with the needs of metalworking. Time sharing is certainly a big part of this rush—for good reason. It's faster, it's cheaper and it's easy to use.

But, there are a lot of different kinds of time sharing.

As the concept of sharing the operation of a computer became practical through advances in technology, different computer manufacturers saw different approaches to marketing this phenomena. And, at this point in time, there is great variety in the time-sharing capabilities available.

**In-House or Out.** The first division separates the time-sharing computers sold for in-house application from the time-sharing service centers. The time-sharing service center appears to be ahead right now, but as users install more and more terminals to keep up with new-found applications, the decision to go "in-house" gets closer.

In fact, using a time sharing service center can help a user make the right decision in buying an in-house time-sharing system by telling him exactly what his computer time and cost re-

quirements are, according to S. H. Michael, president, Columbus Metal Products Co., Inc., Burlington, N. J.

The time-sharing computer service center itself has many different faces. Some are big and some are small, and both make their size an advantage. IBM the largest computer manufac-

turer, entered the market with their QUIKTRAN, a simplified version of FORTRAN.

General Electric, another giant and one of the first to offer remote time sharing from a remote center, provides general purpose computing capability with special purpose programming packages to meet specific industry problems, including numerical control.

Then, there are the smaller companies solely dedicated to time sharing—Com-Share Inc., Tymshare and many others. They offer a range of computing capability and software support.

**Emphasis on Service.** Westinghouse, in the first of a series of time-sharing service centers to be announced this fall, will take a more specialized approach—to the numerical control industry. As Frank Carr, director, Information Systems Laboratory, Westinghouse Electric Corp., puts it, "We don't look at our busi-

## The Problems Facing Metalworking's Computers

### Aerospace

1. Matrix Algebra
2. Data Reduction
3. Curve Fitting
4. Performance Analysis
5. Solution of Differential Equations
6. Simulation
7. PERT
8. CPM
9. Plotting
10. Fourier Analysis
11. Statistical Analysis
12. Trajectory Analysis
13. Fluid Dynamics
14. Circuit Analysis
15. Reliability Analysis
16. Structural Design
17. Aerodynamics
18. Vibration Analysis
19. STRESS Analysis
20. Kinematics Problems
21. Thermo Dynamics and Heat Transfer Analysis
22. Electric Load Flow

### Construction

1. Critical Path Scheduling

2. Job Cost
3. Estimating
4. Payroll and Labor Distribution
5. Structural Design
6. Coordinate Geometry—Cut & Fill
7. Project Control

### Engineering—Civil & Consultants

1. Traverse Analysis, Closure, Sub-division
2. Plotting
3. Job Cost
4. Network Analysis—Hardy Cross
5. Highway Bridge Design
6. STRESS Analysis

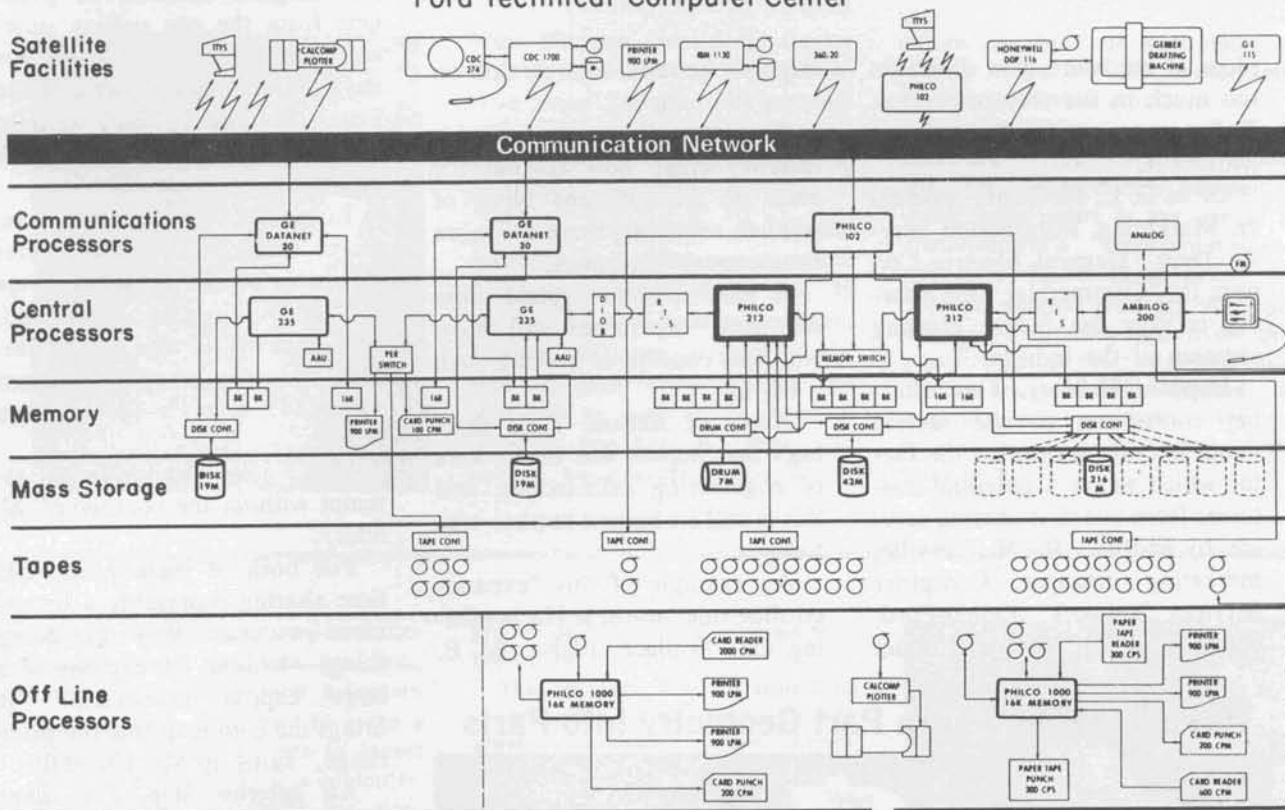
### Machinery and Electrical

1. Gear Design
2. Numerical Control
3. Drafting (plotting)
4. Electrical Network Analysis
5. Vibration Analysis
6. Moment of Inertia
7. Transformer Design

Source: Univac

# A Large Computer Center Extends Its Commitment to Time Sharing

## Ford Technical Computer Center



■ The engineering staff of the Ford Motor Co. operates one of the largest technical computer complexes in the world. The computer facility serves Ford operations throughout the United States and overseas via a trans-Atlantic line. A number of suppliers and universities also have access to the center in cases where

their efforts are of mutual interest to the company. An advanced time-sharing system is presently being implemented using the two Philco 212 scientific processors and a Philco 102 communications processor. This system will allow users to run larger programs, access private and common data files, save programs and initiate background jobs from foreground. ■

ness as a time-sharing service, we look at it as filling a machine tool user's need, using time sharing as one part of the total service. As we see other areas of customer need, we will offer similar sets of services."

**The Big Box and the Small.** Hewlett-Packard, for one example, claims its low-cost HP 2000A system will reduce user terminal costs considerably below other services "by restricting itself to one programming language—Conversational BASIC—and by using a relatively small computer."

And, on the other hand, Philco-Ford is converting its large 102-212 system to time sharing.

The announcement, expected to be made around January 1969, will put a heavyweight scientific computer, the 212, at the end of a telephone line from users. In this setup, the 102 will handle the input-output functions.

This system will allow customers to use the computer in either the time sharing or the remote batch mode of operation from the same terminal.

**The Other Side.** Univac's Information Services Div. has stayed out of conversational time sharing so far, because they feel that the present state of computer technology is used most efficiently and effectively on a remote batch basis. However, they

are offering special purpose systems which serve selective industry groups on what is very close to a time-sharing basis.

Univac's approach serves as a caution sign to users in a rush to time share. Make sure you don't sacrifice efficiency, power and cost for the convenience of immediate response. Many computing jobs need a very large computer and are best suited to a batch mode.

**The Service Trend.** If there is one trend that stands out, despite all the variety in the computer industry today, it is the emphasis on service.

As one industry in-sider said, "Years ago, when you sold a

## ***"The 30-day contract imposes honesty and service on computer people."***

piece of hardware, you didn't do too much in the way of service. Today, you can't sell hardware without it."

Or as E. L. McCleary, manager, Marketing, Information Service Dept., General Electric Co., puts it, "Commercial time sharing is now the fastest growing segment of the industry."

**Imposes Honesty.** Time sharing contributes to the service quota because it is often the factor which sways a potential customer from one time sharing service to another. R. N. Verville, marketing manager, Computer Services Network, Philco-Ford, explains, "The 30-day contract

imposes honesty and service on computer people."

The interesting aspect of this industry right now is that for each of the different types of services available, there are more than enough customers.

A look at some typical users and their experience will show why this concept is making such a big hit.

**Areas of Action.** Time sharing's first impact was in the area of engineering calculations, and this is still its biggest market area today.

An example of this "expanded slide rule" usage is Hecla Mining Co., Wallace, Idaho. W. E.

Crandall, chief engineer, reports that calculations to determine the metallurgical balance of products from the ore milling process used to take one man two days. Now, it can be done in the length of time it takes to pose the problem to the computer—11 minutes.

In another application area, newer and growing fast, Peter Witzman, president, Quality Gage & Manufacturing Inc., Cleveland, can cut an N/C tape for a complex radius generation problem using 243 seconds of computer time.

"It's a job I wouldn't even attempt without the computer," he adds.

For both of these users, GE time sharing represents a better, more accurate way of doing things—without the expense of a large capital investment. "It brings the computer into our price range," sums up Mr. Crandall.

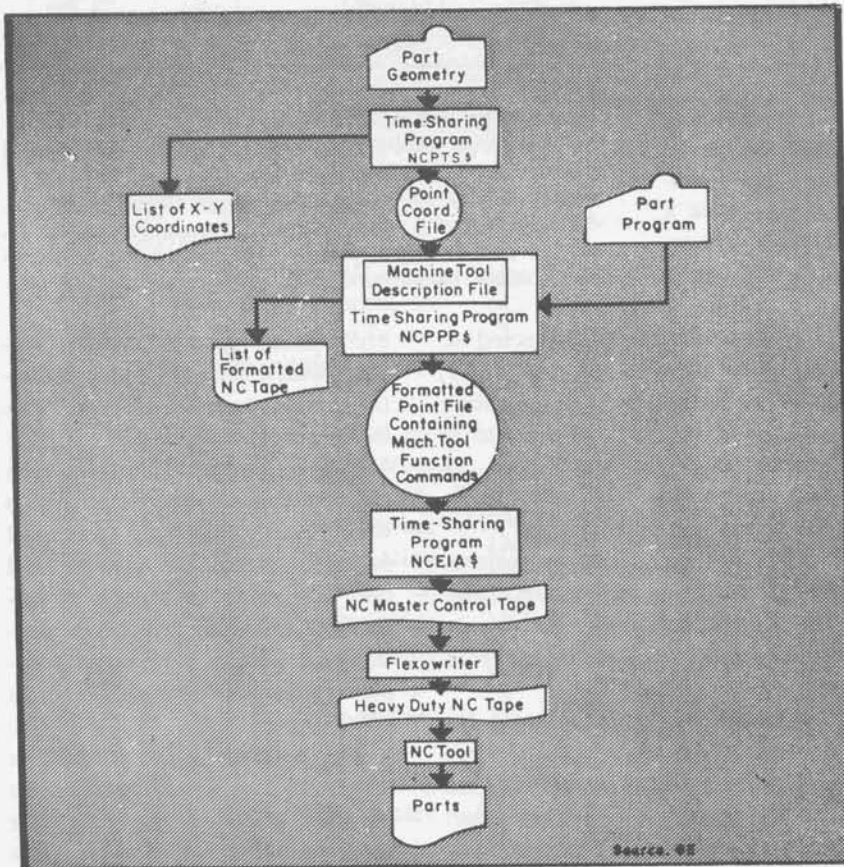
**An Interim Step.** For other users, time sharing from a time sharing service center is an interim step until in-house time sharing becomes feasible.

Alcoa, for example, rents time sharing capacity at locations throughout the country. Applications include engineering calculations, cost analysis of forgings and furnace temperature balancing. But the company anticipates regional in-house time sharing centers owned or leased by Alcoa. This idea will group three or four Alcoa plants together in a time sharing complex.

Lockheed-California Co. will go from 9 to 25 terminals when they switch from buying time to an in-house system this fall. Terminals are divided among the engineering, marketing, quality control and finance areas of the company.

The biggest advantage of time sharing at Lockheed, a company with 22 in-house computers, is

### **Three Programs Turn Part Geometry Into Parts**



Three N/C programs in the General Electric Time-Sharing Service Library can quickly and easily translate workpiece geometry and machining operations into an EIA-coded control tape at the user's remote terminal.











