WATT'S CURRENT

MAY ISSUE, 1963

WATT'S CURRENT

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Laboratory Instruments for Speed and Accuracy

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This Month's Front Cover . . .

Project Engineer Bill Berte is shown checking output tape of DY-2010D, one of seven standard models in Dymec's new family of digital data acquisition systems. Standardization provides many advantages for the Division and its customers, as explained in the feature article starting on page 4. The systems are used by aerospace industries, government agencies, and numerous laboratory and manufacturing operations. The units acquire analog information, convert it to digital form, and then measure it with a digital voltmeter. This information is finally recorded on punched cards, perforated tape, or printed strips, depending on the model.

-hp- Organizational Changes

Jim Ferrell transferred from Microwave Lab to Supervisor of Microwave Manufacturing Engineering.

John Doyle has taken up duties as Production Manager with the Microwave Division upon return from his overseas assignment with HP Limited on May 20, 1963.

Milo Pitcher, formerly with the Service Department, has transferred to Loveland Division.

Gordon Brandt, former Manager of Microwave Quality Assurance, transferred to Waveguide Department as Supervisor of Assembly & Test Sections.

Lloyd Vaughan, former Supervisor of Waveguide Assembly & Test Sections, transferred to Waveguide In-Plant Production Engineering.

Dave Weibel transferred from Central Quality Assurance to Manager of Microwave Quality Assurance.

Darrell Coble is transferring from HP Environmental Test Department to Loveland Division as of June 1, 1963.

May Features

From Our President's Desk

LAST MONTH we officially announced our intention to proceed as soon as possible with a new facility in Colorado Springs for the Oscilloscope Division. We are also planning to transfer more of our transformer production from Paeco to Loveland.

On the surface these actions may appear as part of a master plan to move our company activities away from Palo Alto, and indeed many people have asked me whether we intend to move the Hewlett-Packard Company out of Palo Alto and out of California. I assure you we plan to do neither. In fact, these moves are designed to enable us to expand activities in our Palo Alto facilities.

It became apparent some time ago that we would not be able to provide additional space for our growing operations by just making accommodations for a department here, renting another building for a division there, and in general going about our expansion without a long-range plan. Consequently we asked some of our people to study carefully the possible future trends of our business, and to develop an orderly program to meet our anticipated space requirements over a period of several years.

One important result of this study was the realization that we would soon outgrow the building area on land we have available in the Stanford Industrial Park. This raised some important questions. Should we acquire more land here and keep all of our activities in Palo Alto? Should we acquire land in the general vicinity of our existing plants and keep all of our activities in California? Or should we take a broader approach and consider the advantages of locating additional plants in other states —even in other countries?

After careful evaluation of the various possibilities, we decided that the company's long-range future would be enhanced by locating some of our facilities in other parts of the country, and some in areas outside the United States. We have, as you know, made a number of moves in this direction, and feel that our experience thus far has confirmed the wisdom of this decision. All this, of course, is in addition to our acquiring going concerns in New Jersey (Boonton and Harrison Laboratories), Massachusetts (Sanborn), and Southern California (F. L. Moseley).

At the time we decided to build plants in other areas, we made another important decision affecting our future growth. We concluded that many phases of our company activity could best be carried on at the corporate headquarters in Palo Alto. This is one of the reasons we are moving some of our operations to Colorado—to make more space available for our Palo Alto–based activities. In other words, we expect in time to expand our operations here in Palo Alto as well as in other locations.

We are giving the personnel problems involved in these moves a great deal of attention. For those people whose departments or divisions are being relocated but who prefer to remain in Palo Alto, we plan to do everything possible to reassign them to positions of equal responsibility. Certainly there are no borders on opportunities within our company—they exist in Loveland, in Colorado Springs, in Palo Alto, any place we have a laboratory, a plant, or a sales office. As we continue to grow, our aim is to provide ample opportunities for all our people. With your understanding and cooperation we are confident this aim can be achieved.

Orders during the past month have shown some strength. We are encouraged, too, by the number of quotations outstanding. These indicate that we may well receive some large orders within the next few months and that our over-all operations will continue to grow at a steady pace. If so, it may not be too long before we require additional facilities here in Palo Alto.

David Packard

Measure IS COMING!

Yes, "measure" is an important word in our business . . . and that's one of the big reasons it's been selected as the name for Hewlett-Packard's new corporate-wide employee magazine.

Measure, a monthly publication to be launched July 1, will keep you posted on people, products, programs, and all of the important events occurring within the HP corporate family. It will cover the news from Palo Alto to Geneva, from Pasadena to Waltham, from West Conshohocken to Boeblingen.

With this issue, *Watt's Current* gracefully bows from the corporate scene after 22 years of service. Like an old and comfortable friend, however, the name won't be allowed to go into retirement. It will be used for the monthly newspaper for Palo Alto employees (now known as *Local News*).

Measure will adhere to the same basic policies and retain the same editorial staff and format as *Watt's Current*. But it will feature more corporate-wide news, more pictures, and a totally new and modern look.

As HP has grown into an international complex of divisions and affiliates — a truly worldwide corporation — the need for a magazine with broader scope and interest has become more and more evident. So . .*Measure* is coming. Look for your copy around July 1.

Operations News

BY NOEL E. PORTER
Vice President, Operations

ORDERS ARE ON THE UPSWING and we've a generally optimistic outlook for the second half of our fiscal year. Dymec is really rolling, with April representing the best month in the division's history. Moseley's orders continue at a brisk pace, while business has picked up markedly at Harrison and Sanborn.

Since most of our people are involved in profit-sharing programs, it's only fair to everyone that our various operating costs are charged to the proper accounts. Up until May 1 (beginning the second half of fiscal 1963), the cost of operating our corporate offices has been borne entirely by the parent company divisions and has not been spread over all operations.

So, effective May 1, a corporate surcharge representing a nominal percentage of net sales is being charged all domestic operations. This more equitably distributes costs associated with the corporate marketing, R&D and manufacturing functions, and the corporate administrative offices and services (president, executive vice president, operations, legal, finance, public relations, directors' fees, donations, stock registration fees, etc.). These costs apply to strictly corporate functions and services; special services, such as plant engineering and specific advanced development projects, are charged directly to the operation involved.

Some of our corporate programs are shaping up well and will have a major effect on our over-all efficiency and customer service. For example, our corporate traffic department is developing a unique system of consolidating air shipments from our Western plants to customers in thirteen Eastern states. Shipments formerly requiring as much as two weeks will be made within two to four days from receipt of order, and at a cost as low or lower than present minimum freight rates. This will save money and time for the corporation and customer alike. As another part of our continuing effort to speed deliveries and reduce shipping costs, we're moving ahead rapidly with our plans to set up an East Coast service center. This center will eventually handle all shipments of both instruments and parts to Europe, will serve as a service parts depot and provide special instrument service for our Eastern customers, and administer the warehousing and shipping of certain finished goods inventory for East Coast distribution.

Also on the subject of customer service, our new order-processing system is currently being tested through an experimental network among our Neely, Loveland, and Palo Alto offices. Preliminary results are most encouraging, and indicate that we'll eventually have field order-processing centers in all major markets in the U.S. When fully developed, this system will enable customers to call only their local sales office to obtain all the information and service they need for any and all products in the HP family.

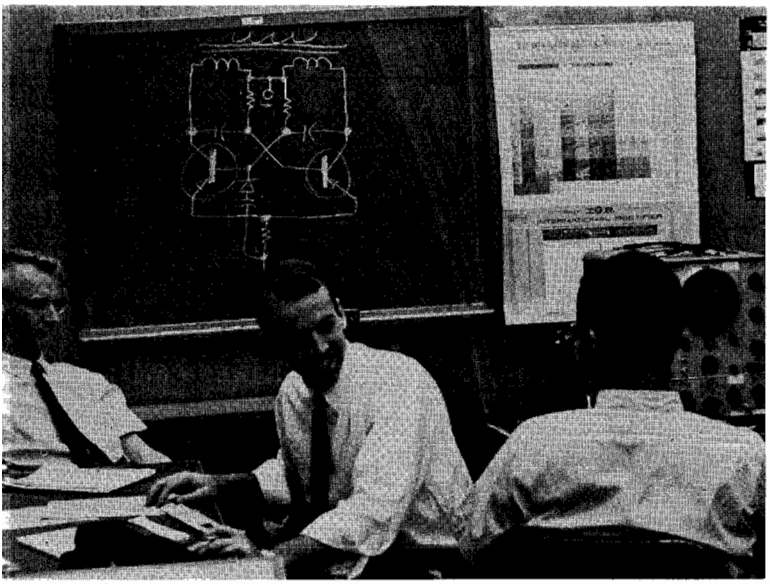
Tied closely to these programs is the matter of corporate-wide communications. Our Systems and Analysis group has a project under way to determine the most effective and economical system of communication among all our domestic operations.

On a recent trip East we were most gratified to see the high morale and top performance of the Boonton personnel. We also had an opportunity to have lunch with all the Harrison Labs people, another highly motivated, enthusiastic, and efficient group. Harrison is laying plans to eventually develop a transformer facility capable of fulfilling the needs of all our Eastern operations.

Next month, as announced in this issue, we'll be introducing our new corporate magazine, MEASURE. Considerable thought has been given to this publication and we're confident it will be of truly corporate-wide interest and enjoyment. Since we want to key the magazine to the needs of all our people, your comments and suggestions—directed to our public relations department—will be most appreciated.

Standardization of Data Acquisition
Systems Proves a Boon to an HP Division
And Its Customers . . . Another Dymec First!

DYMEC 2010's LEAD IN DIGITAL SYSTEMS



Analog/Digital Engineering Group was responsible for development of the DY-2401A, the heart of all DY-2010 series systems. Left to right: Bob Andersen, Dick Moss, Dick Cook.

THIS IS A STORY about a lot of people with diverse skills who have worked together to make and market a better "mousetrap."

Only in this case it isn't literally a mousetrap. It's a standardized digital data acquisition system which can be delivered quickly and at important cost savings to customers.

Actually, there are seven models available and they all belong to the DY-2010 family. Each system is designed to meet the special needs of various users, but in general they all serve the same purpose: to acquire analog information from a multiplicity of sources, convert the data to digital form, and measure it with a digital voltmeter. The systems then record the information in permanent form such as on punched cards, perforated tape, or printed strips.

Formerly, the equipment to do this work had to be assembled by customers from "building block" modules, or systems had to be specially designed, engineered, and manufactured to meet particular needs. Now, Dymec is first in the industry with standardized, completely assembled units which satisfy specific requirements, and eliminate lost time for the customer as he waits for the quote, for the design and development of his system, and finally for it to be specially produced. Obviously, the cost of a standard DY-2010 is less than a specially engineered system, just as a store-bought suit is less than a tailored model.

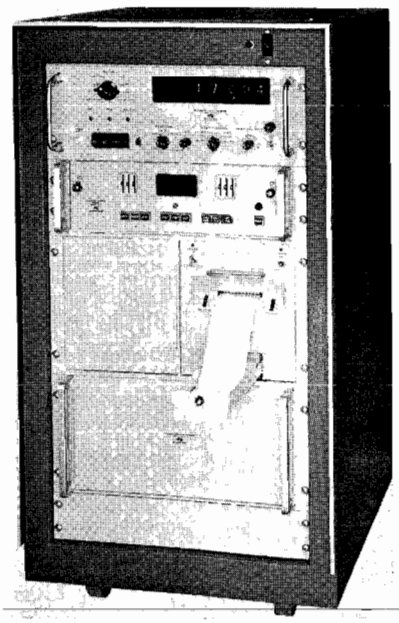
The market for the new systems is extensive, covering the aerospace industry, government agencies, and many applications in environmental testing, industrial quality control, and final product check-outs in manufacturing operations. Proof of the 2010's acceptance is exhibited by the fact that Dymec digital system sales are at an all-time high, while quote time per system is at an all-time low. The Division's entire systems sales forecast for fiscal year 1963 was sold in the first six months!

MIND OVER MATTER

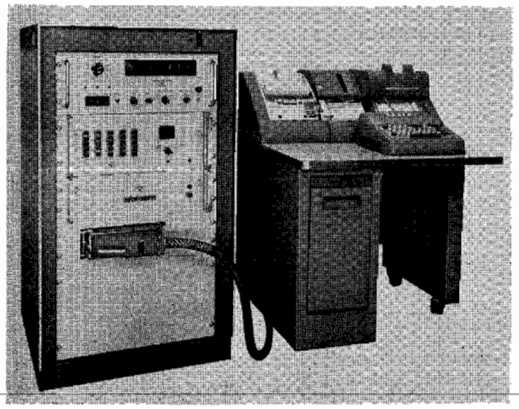
But this started out to be a story about people. Without question the 2010 would be little more than the twinkle in an engineer's eye if it weren't for the brains, ingenuity, and hard work of a great many people and departments.

The standard systems family was made possible by the development of the DY-2401A digital voltmeter. Dymec's Analog/Digital Development group, headed by Bob Andersen, designed the 2401A for complete systems compatibility. Additionally, a noise rejecting capability opened the door to accurate measurements in areas previously impossible to measure with precision. Dick Cook, Dick Moss, and Rod Cooley also contributed greatly to the voltmeter design. Addition of the DY-2410A AC/Ohms Converter allowed two more types of input parameters to be measured.

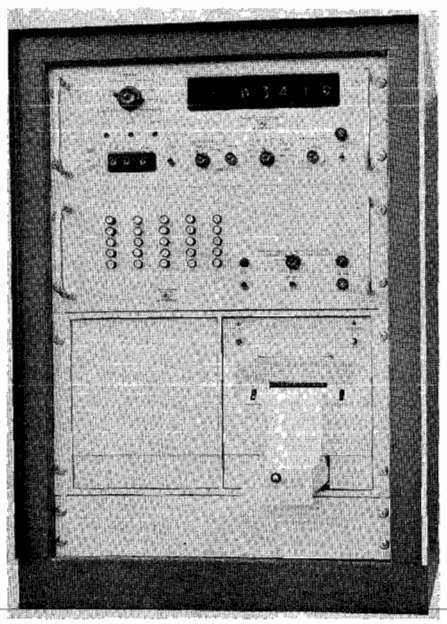
DY-2010C



DY-2010F



DY-2010A



Don Loughry, Digital Engineering Manager, headed the Digital Systems Engineering Group during 2010 infancy. Don is shown here dictating memo to Bee Doebler, engineering department secretary.

The Digital Systems Engineering Group, left to right: Don Vandenberg, Don Loughry, Bob Knapp, and Bob Carlstead. Not shown, George Boyle.

Dymec Sales Manager Bill Gross (then digital engineering manager) foresaw the need for a group of systems built around the 2401A to provide a variety of input and output characteristics. Don Loughry, digital engineering manager, presently has an energetic development program going to insure expansion of capability. Meanwhile, Bill Berte, head of the logic design group, and Ed Johnson are working to produce input and output devices to complement the 2401A.

Even though the DY-2401A offers higher sensitivity than any other digital voltmeter on the market (100 mv full scale), project engineer Don Jenkins developed a data amplifier (DY-2411A) which increases sensitivity by a factor of 10 to 10 mv full scale. This instrument is also fully compatible with all other Dymec system modules.

Interface problems adapting instruments to the system were ironed out by Bob Knapp's digital systems group with the support of George Boyle, Bob Carlstead, and Don Vandenberg.

As news of the standard systems spread to the field sales force, interest in its availability became obvious. To assure a full understanding of systems operation and sales advantages, a field training program was conducted. Bill Nilsson, Dymec's sales promotion manager, and Peter Johnson and his publications group teamed up to produce a comprehensive training manual which the sales department has used to train field engineers at all domestic rep organizations. The seminar also is being conducted in Geneva, Switzerland, to brief members of HP's European operation on systems capabilities.

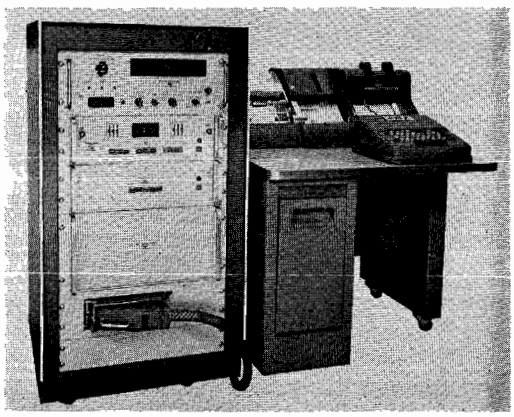
FIRST MODEL IN '62

Dymec introduced the first system in the fast-growing 2010 family late in 1962. Designated the DY-2010A, the system combines the DY-2401A integrating digital voltmeter with a 25-channel input scanner and HP printer. Since all instruments making up the system are standard, the performance of the combined instruments can be fully specified, it can be priced, and instrument delivery can be estimated from production runs. To expand system versatility, instruments have been developed to provide optional system characteristics such as time of day, ac voltage, resistance, and microvolt dc measuring ability.

The 2010 series is now expanded to satisfy a wide variety of input and output requirements. The original 25-point input scanner programmer has been augmented by a 600-point crossbar scanner. Additionally, a line of output couplers has been developed to enable recording on perforated tape or punched cards.

Other system modules are forthcoming to further enlarge the capability to satisfy specific customer requirements with "off-the-shelf" systems—and Dymec systems sales roll merrily along.

DY-2010E



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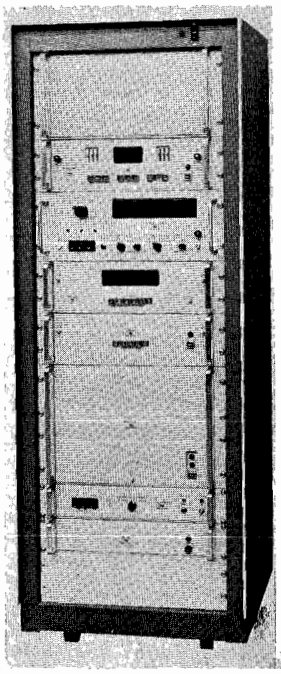

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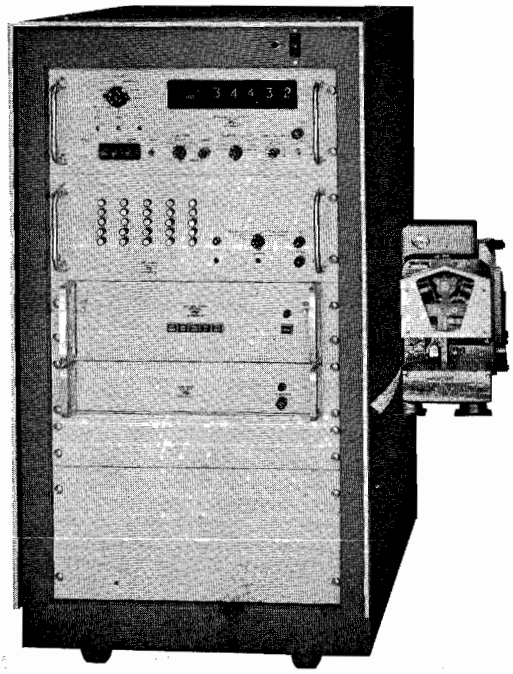


NEW DIVISION TACKLES NEW YORK STATE

WATT'S CURRENT Visits Syracuse During the Magazine's Nationwide Tour of the Field Sales Organization

A 175 scope is topic of conversation for Jim Prestridge (left), Rochester Branch Manager, and Al Kennedy, Field Engineer.

MOST OF WHAT YOU SAY about the Syracuse Sales Division has to be in the present and future tenses, because, unlike the shady lady, the Division is practically without a past.

In fact, the official founding date was March 1 of this year, although eight or nine months of groundwork preceded. For the records, Syracuse was the first sales division created from scratch by the company.

With headquarters in a modern new building in Syracuse, there are also branches at Rochester and Poughkeepsie, enabling the Division to cover all of the state with the exception of metropolitan New York City.

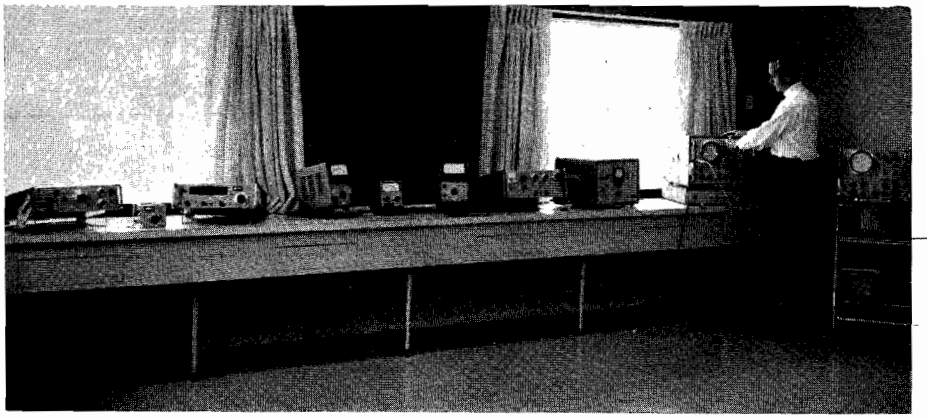
The Division's list of customers reads like a dozen pages from the Thomas Register of American Manufacturers. Standouts among them include Eastman Kodak, IBM, Stromberg-Carlson (General Dynamics), Sylvania, and major General Electric operations for each of the Division's three offices.

However, being strategically located in a highly industrialized state does not mean the area is without its problems from the electronics salesman's standpoint. Industry for some years in New York and New England has been moving West and South. The rate of industrial growth has not continued upward at the rapid pace enjoyed in some other states.

As pointed out by Bill Terry, Corporate Sales Manager who spearheaded the successful formation of the new Division, "this is a good example of management's conviction that you can send capable people to new locations—bigger responsibilities—and they rise to meet the challenge." Terry cites Bob MacVeety as one example. MacVeety had been Branch Manager for RMC Associates at Englewood, N.J., and is now head of the Syracuse Sales Division. Sid Case, a former Field En-

Poughkeepsie branch personnel are, left to right: Cindy Williams, Bob Capps, Branch Manager Sid Case, and Glenn Muller. Capps is Field Engineer and Muller is Staff Engineer. Fifth member of the group, Shirley Minholz, was on her honeymoon when picture was taken.

Division's service departments at each location boast the latest test equipment. Shown here at Syracuse are, left to right: Clyde Powers, Service Technician; George Tamaki, Service Manager; and Andy Tuttle, Service Technician. Large parts inventory is kept here, and branch at Poughkeepsie also stocks many of the commonly needed items.



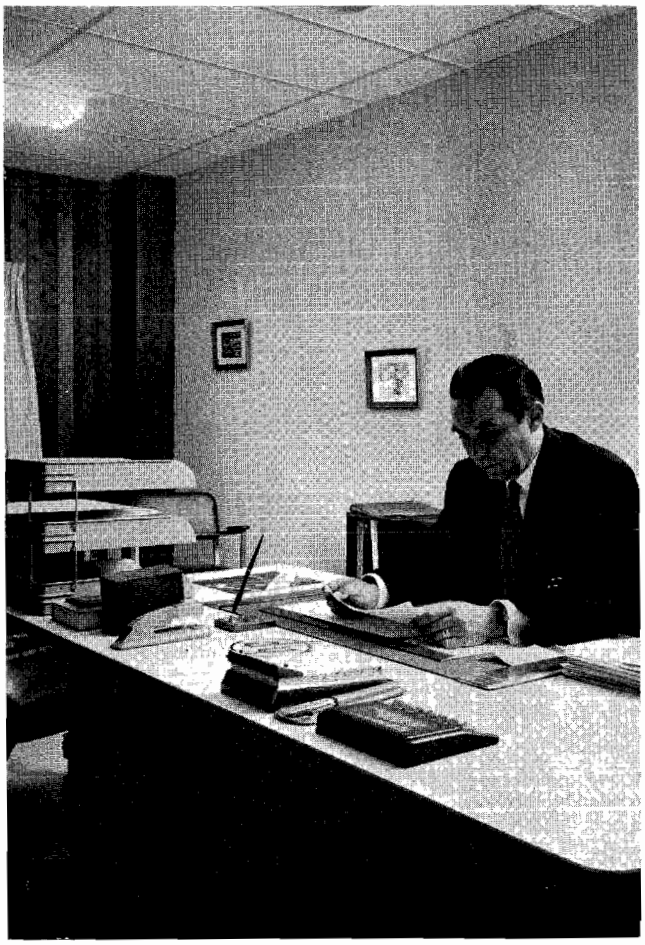
Chuck Innes, Staff Engineer at the Syracuse main office, is shown in the spacious room used for instrument demonstrations and conferences.

gineer for RMC in Long Island, has advanced to Manager of the branch at Poughkeepsie. And George Tamaki is now Service Manager in Syracuse, having moved up from Service Technician for RMC in New York.

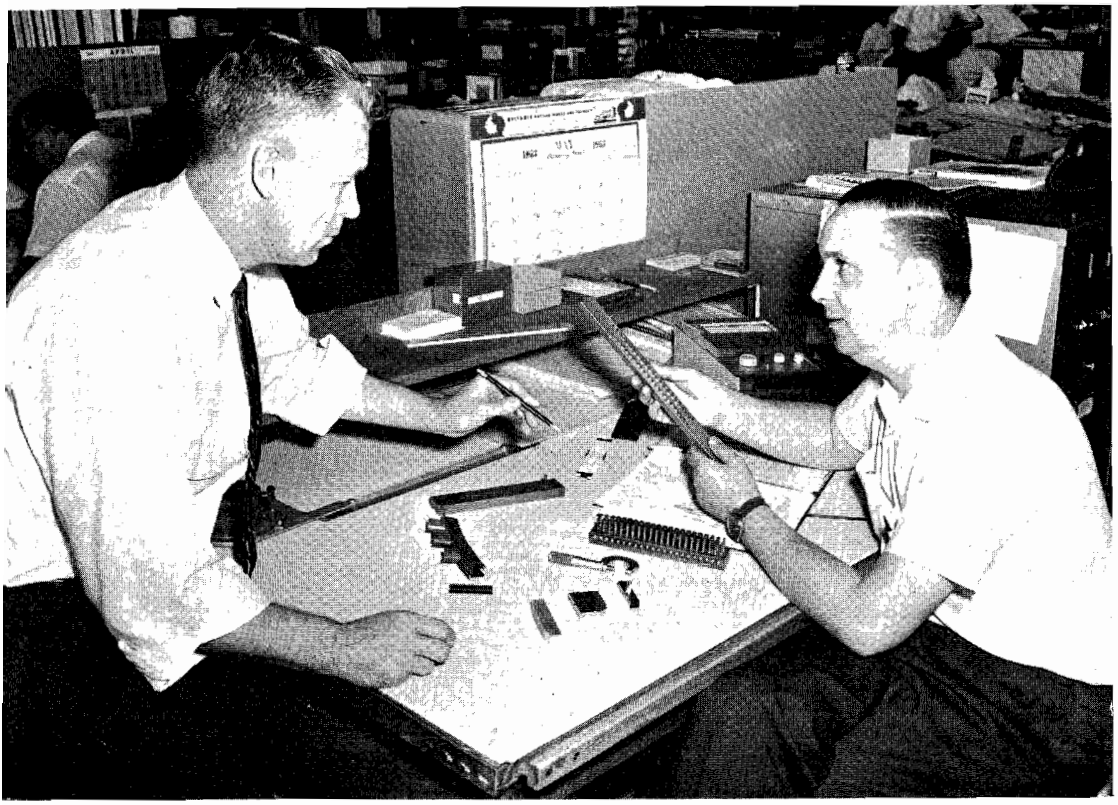
These men are just examples, and they themselves are the first to admit that credit for the Division's fast formation into a smooth-running team belongs to all 23 employees at the three locations. At Syracuse these people include—in addition to MacVeety and Tamaki—Ann Ash, Chuck Hults, Tom Montella, John Dylis, Bill McElroy, Chuck Innes, Andy Tuttle, Clyde Powers, Kaaren Meloling, Mildred Murray, Anne Berry, and Marcia Smyth.

The Poughkeepsie staff includes Sid Case, Bob Capps, Glenn Muller, Shirley Minholz, and Cindy Williams. Manager Jim Prestridge at Rochester is backed up by Al Kennedy, Mani Pires, and Marie Embury.

The New York territory is big—with big problems and big opportunities. HP people there are showing that they are big enough to meet the challenge.



Division Manager Bob MacVeety served Sperry Gyroscope for three years immediately after receiving his Electrical Engineering degree from the University of Michigan in 1949. Next he went with Burlingame Associates, an HP sales representative in the East, and when that group disbanded, he joined other former employees as an engineer with the newly formed RMC Associates. During nine years with RMC he advanced to Branch Manager at Englewood, N.J., and recently was appointed Manager of HP's new Syracuse Sales Division.



Larry La Barre (left) and Bill Wesolowski, of Palo Alto–Stanford Plant, talk over electrical erosion electrodes, universal electrode holding fixtures, efficient operational charts, and time studies for most efficient operation of new Spark Erosion Machine.

ELECTRICAL EROSION PUT TO WORK

A Spark That's Hotter Than the Proverbial Hinges of Hades Is Helping HP Machine the "Impossible"

A NEW MACHINE in the Stanford Plant Model Shop is doing some pretty amazing things to pieces of metal—like machining holes that are star-shaped, or square, or practically any configuration.

The process is known as electrical discharge machining, which takes advantage of the long-known fact that a properly controlled spark will remove, or erode, metal.

As explained by Larry La Barre of the Special Machines Department, "milling and grinding are traditional ways of removing metal in order to obtain desired shapes and they will continue to be important machining methods. But electrical erosion can help do some difficult jobs better, cheaper, and faster. For instance, the new table model electrical discharge machine in Building 1L has already been used to make dies for stamping the lettered and numbered portions of HP instrument panels. The cost of engraving a front panel by conventional means sometimes runs as high as $5. Using a stamp produced by electrical erosion, the cost is reduced to about 50 cents."

Jack Fox, who operates the machine, has made many complicated mold shapes, including one for a molding die which took only four hours to complete instead of the forty hours required by conventional methods.

HP's electrical erosion machine is not as complex as one

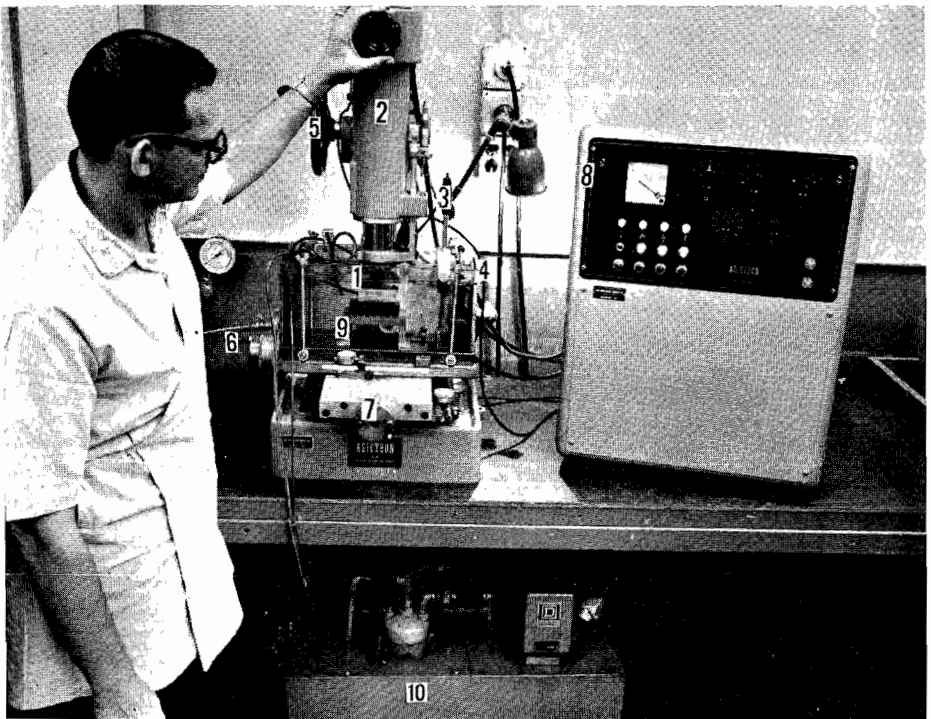
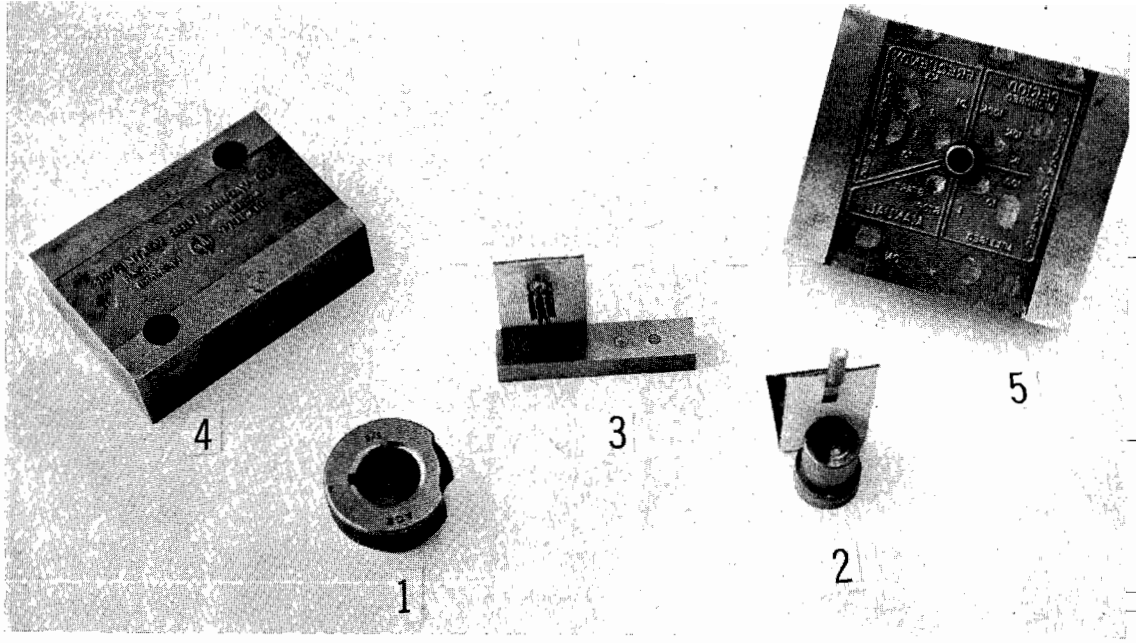


Photo at left demonstrates erosion of a stamp in actual process. Here Jack Fox operates the new Spark Erosion Machine in Stanford Bldg. 1L (Jig Bore Room). At Figure (1), tool holder supports electrode submerged in oil and is in the process of eroding stamp which will be used for imprinting markings on dials. (Reproduction of parts can be obtained to an accuracy of ± .0001".) Figure (8) shows electronic controls which supply power to unit and control servo-feed motor; (10) oil reservoir with filter and pump. This unit circulates oil, keeps tank (9) filled to desired level, and filters out eroded steel particles, thus delivering oil clean and clear for efficient operation of machine.



Shown at right are typical products produced by new Spark Erosion equipment. Figure (1) depicts keyway eroded into hardened steel bushing. At (2), a half-moon-shaped tool made of copper was used to erode hole into extrusion die. (3) Gear-shaped extrusion hole in tool steel. Brass electrode used to erode hole is positioned above. At (4) and (5) are hardened stamping dies into which raised lettering has been eroded. They will be used for stamping their configuration into HP instrument panels.

might expect, considering the work it performs. It has a power unit and electrical circuitry capable of generating and transmitting 1,500 watts. The "business end" of the machine is the electrode, which emits sparks at about ten times the temperature of molten steel (20,000 degrees F.). The sparks erode the metal in the exact shape of the electrode. For example, if the Model Shop needs a mold with a half-moon shape, it would select the proper electrode material, such as copper or brass, and machine it conventionally into the required configuration. Then this electrode becomes the "tool" which erodes the mold.

Bill Wesolowski is supervising the building of universal tooling for the adaptation of various electrodes. Eventually a great variety of shapes will be available quickly in a wide number of electrode materials.

The electrode never touches the material being worked on. A spark gap of about 0.0005 inch is automatically maintained. The electrode head vibrates at a magnitude ranging from 0 to 0.0009 inch at a frequency of 200 cycles per second.

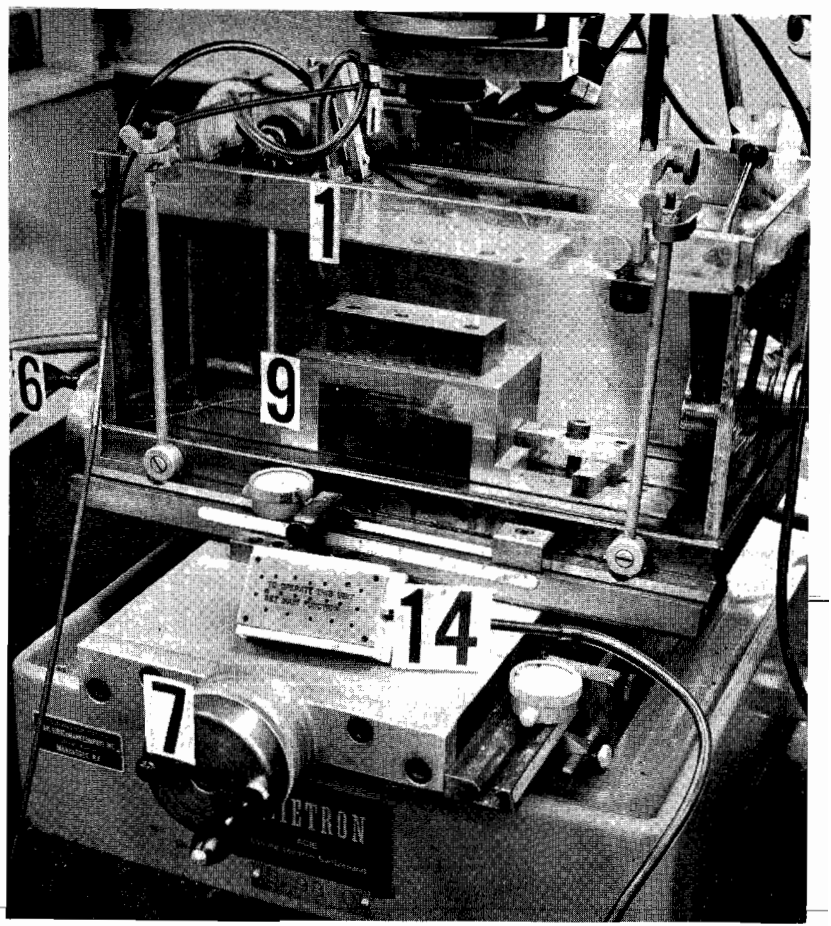
Erosion of metal is carried out while the electrode and workpiece are suspended under a fluid such as kerosene. The liquid medium and the vibration of the electrode head serve to disperse the eroded metal particles. Kerosene is one of several fluids which can be used because it is clear and has a low flash point.

The entire operation is highly automatic. Once it is set up, the machine operates unattended until erosion is complete and then turns itself off.

This new equipment enables HP to erode shapes in a single piece of metal which previously could only be achieved, if at all, by machining and joining two pieces.

Just as important is the fact that the very hard metals can now be worked at the same low cost as softer metals. For instance, a carbide die is eroded just as quickly and easily as a common steel die.

Use of the new electrical erosion machine in the Stanford Plant Model Shop is just one more of many ways the company is keeping up-to-date with the best and latest in equipment.



Holder with copper electrode removed and mounted next to No. 14. Notice holes surrounding lettering through which flushing oil is pumped during eroding process. Purpose—to wash away eroded steel particles.

The "autocross" in Pleasanton, California, April 21, may have been the "best timed" race in history. An assembly of HP instruments made it all possible. "Autocross" is the term for a sports car driving-skill test where a winding course is laid out on an open paved area. As the car crosses the finish line, the HP printer records its time. No time is required to read the timer or to reset it. The operator merely has to tear off the tape and give it to the timing committee for posting.

RACE CAR TIMING COMES OF AGE WITH HP EQUIPMENT

There Was No Room for Argument On Elapsed Time for the Little Bombs That Ran at Pleasanton

THE BLUE 1600 Super Speedster Porsche roared down the short stretch at the end of the third lap and flashed across the finish line in the day's best time.

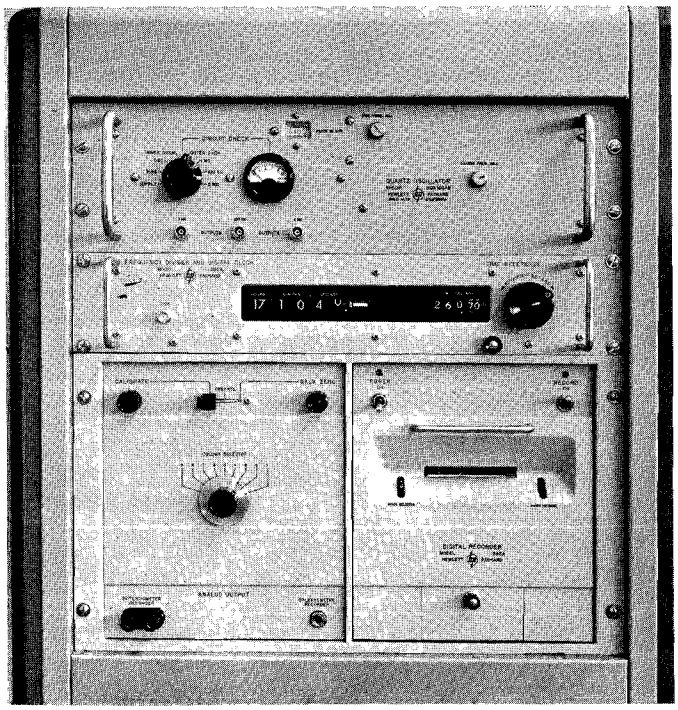
The race had been close—only a fraction of a second separated the first three cars. But no one questioned the accuracy of the timer, because in this case it was a new system of electronic instruments capable of measuring to the 1/1,000th of a second.

The traditional stop watch used years ago in such races was just about as good as the reflexes of the man holding it. Then came electric and electronic timers with photocells which brought timing accuracy to 1/100th of a second. Now, HP equipment provides the ultimate: a system utilizing a 103AR Oscillator, a 115CR Frequency Divider and Digital Clock, a 562AR Printer, and a 725AR Power Supply (see photo below).

On this particular sunny Sunday afternoon in April the advanced method of timing received its first big test in an important racing event. Two hundred and seventeen sports cars were timed at the Alameda County Fairgrounds in Pleasanton, California, during an "autocross" sponsored by the Porsche Club of America.

An autocross is a sports car event designed to test the ability of the driver and the automobile. The course is carefully laid out on a parking lot or other large, paved area, the requirements being a twelve- to fifteen-foot wide road outlined with chalk lines and rubber pylons. The object of the event is to traverse the course in a minimum of time, with penalties added to one's time if the car leaves the course or hits a pylon. Usually a car will make three consecutive laps of a given course. The first lap will be for practice and the second two will be timed laps. Autocross courses vary in size, with some courses run entirely in first and second gear, while other courses will allow speeds up to 70 or 80 mph. In all, the cars compete in twelve classes. These classes are standardized and are determined by the performance of the automobile.

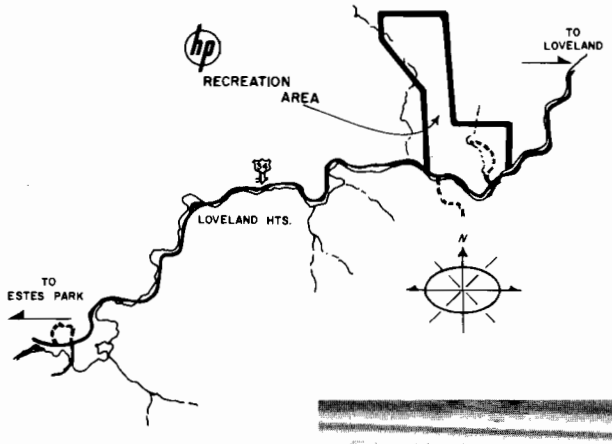
The accuracy of the Hewlett-Packard timing system for these events is an obvious advantage. But equally important is the fact that each racer's time is printed on tape, thus eliminating reading and transcribing errors. And there were no errors at Pleasanton.



The HP timing system includes four units consisting (from top to bottom) of the 103AR Oscillator, 115CR Digital Clock, and the 562A Printer. The clock and oscillator provide time information with an error of less than one second in thirty-two years. Not shown is the HP Model 724AR Power Supply.

240-Acre Recreation Area For Loveland

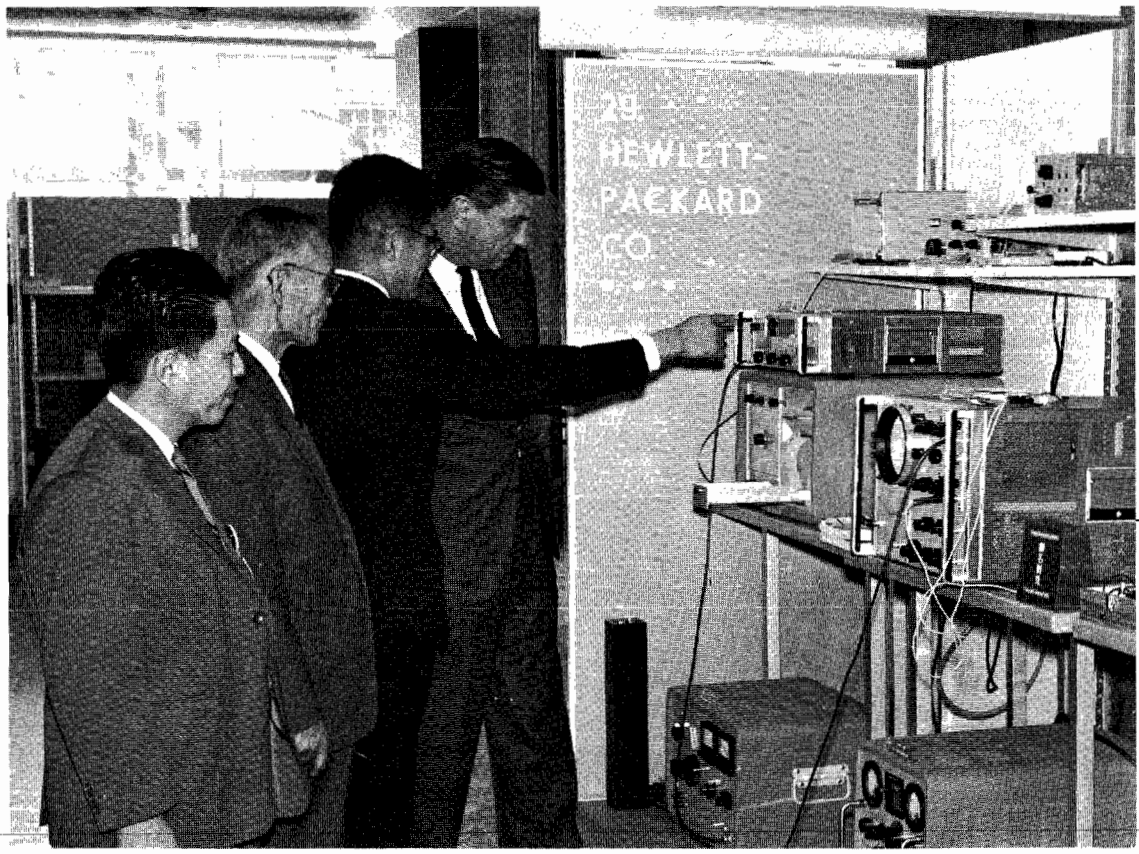
A large tract of undeveloped land in one of the most scenic regions of the United States has been acquired by Hewlett-Packard for use by employees as a year-round camping, picnicking, and hiking area. The 240-acre tract, located 21 miles west of Loveland, Colorado, on U.S. 34, is adjacent to the 2-million-acre Roosevelt National Forest near the outskirts of famous Estes Park. Construction of barbecue pits, picnic tables, and comfort stations has begun and plans are being drawn for a large shelter house. Electric lights will be installed at various spots, and the area will be maintained by a full-time caretaker and his wife. Although Loveland division personnel and their families will have the advantage of proximity, all employees of HP and affiliates are most welcome to use the facilities should they be in the area during vacations, weekends, or holidays.



Map at left points up relative location of new Loveland Recreation Area for HP employees, situated near the heart of Colorado's fabulous Rockies.

New United States-Tokyo Trade Center

The new U.S. Trade Center in Tokyo opened officially April 3, with Undersecretary of Commerce Franklin D. Roosevelt, Jr., presiding at the dedication. Here Mr. Roosevelt (right) is seen examining the Hewlett-Packard display of instruments. More than 900 leading Japanese government officials and representatives of business and international trade attended the reception following ceremonies. The exhibition opened the following day to some 25,000 invitees representing users of industrial instruments and laboratory apparatus. The Tokyo Trade Center is a permanent showcase for U.S. products. Other Centers are operating in London, Frankfurt, and Bangkok.



DATA ACQUISITION WITH DYMEC SYSTEMS

CHOOSE THE INPUT SCANNER YOU NEED FOR AUTOMATED MEASUREMENT

Standard Dymec Data Acquisition Systems offer a wide choice of input capabilities, all derived from multichannel scanners. One scanner, the flexible DY-2901 Input Scanner/Programmer features a system programmer for on-demand measurement of mixed types and levels of inputs. The system can be commanded manually or remotely to measure one cycle, then stop; scan continuously; operate single-step; and repeat monitoring of a single channel.

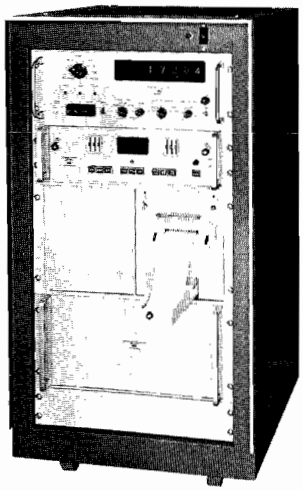
The higher capacity (600 point) DY-2911 Guarded Crossbar Scanner offers single-scan measurement; continuous recording, single-step monitoring, and single-channel monitoring. Front-panel controls provide random access to any channel or group of channels for measurement. Guarding of the entire crossbar switch assembly complements the high common mode rejection of the associated DY-2401A Integrating Digital Voltmeter.

The DY-2010C Data Acquisition System, pictured here, records data on printed tape and incorporates the DY-2911 Guarded Crossbar Scanner. The system is equally suitable for measuring millivolt-level signals from thermocouple and strain gage bridge transducers, potentials of hundreds of volts and frequencies to 300 kc.

Advantages common to all systems of the DY-2010 Series are modest cost, fast delivery, high reliability derived from standard design and construction, and proved performance. You get a pre-designed, tested system. You don't have to wait—or pay—for "custom" engineering, fabrication or testing time.

Major characteristics of the 2010 Series standard systems are listed in the chart below. Other systems are available to fit many additional requirements.

Check for the system that meets your needs, then call your Hewlett-Packard/Dymec representative for complete information.



DY-2010C

	DY-2010A	DY-2010B	DY-2010E	DY-2010C	DY-2010D	DY-2010F
Scanner Input	Up to 25 3-wire signal sources; to 100 channels with slave scanners; programming capability permits measurement of mixed types and levels of signals			Up to 200 guarded 3-wire inputs; 300 2-wire; to 600 non-guarded 1-wire inputs		
Voltage Ranges	100 mv to 1000 v full scale; overranging to ±300% of full scale on four most sensitive ranges; 0.01% stability on four highest ranges					
Frequency Ranges	10 cps to 300 kc; sample period 0.01, 0.1 or 1 sec ; accuracy ± 1 digit ± time base accuracy					
Display	5 digits of data, range, function (polarity), channel number, all included in front-panel readout, logged on output recording device					
Measurement Speed	5 channels/sec	10 channels/sec	1 channel/sec	5 channels/sec	10 channels/sec	1 channel/sec
Effective Common Mode Rejection	105 db	105 db	105 db	130 db	130 db	130 db
Output	Printed paper tape	Perforated tape	Punched card (on IBM 526)	Printed paper tape	Perforated tape	Punched card (on IBM 526)
Price	$8675	$10,800	$9885	$10,965	$12,850	$12,175
Options	Time of day information, ac voltage and resistance measurements, 10 mv full-scale sensitivity, cabinet					

Data subject to change without notice. Prices f.o.b. factory.

DYMEC

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Ad prepared by L. C. Cole Company, Inc., with appearance in "Electronics," "Electronic Design," and "Instruments and Control Systems."