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Electronic News

THE INDUSTRY'S WEEKLY NEWSPAPER • A FAIRCHILD PUB'

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NEW YORK 3, N. Y., MONDAY, FEBRUARY 24, 1958

Advance Year \$3

AUTOMATION—MIRACLE OR MIRAGE

Design Changes Mark Varied Computer Uses

By KEN STEIN
(Second in a Series)

Changes in computer design are increasingly reflecting the variety of uses that business is finding for electronic data processing systems, industry spokesmen say. Many see an increased emphasis on special purpose machines as the over-all trend in the so-called automation of paper work.

The present-day size and complexity of paper work has swelled the demand for digital computers to a market estimated at between \$300 million and \$400 million last year, and it would be difficult to find a business area that has not tried to apply electronic techniques to stem this rising tide, data processing specialists point out.

However, there is a strong feeling in some quarters that business is still a long way from achieving the cost savings and improved efficiency most often cited as the objective of an electronic installation.

Costs Underestimated.

Large cost savings have not materialized, in general, because programming and equipment costs were generally underestimated, while projected savings were overestimated, Dr. Dan Teichrow of the Graduate School of Business, Stanford University, told a recent symposium sponsored by the Electronic Industries Association.

Many computer programs have been done under pressure of time, he added, also leading to increased costs.

Management should not be content with the easy, straightforward approach such as use in payroll accounting, Dr. Teichrow said, but rather should study and research computer techniques in order to get the most effective and economical use from computers.

This point of view was underscored by John Diebold,
Continued on Page Four

IUE Opens Drive For Job Security

WASHINGTON, Feb. 23. — The International Union of Electrical, Radio and Machine Workers of America today formally opened its drive for a guaranteed annual wage, a shorter week and other phases of "employment security" in the radio-TV, appliance and electronic industries. The program, it was clear, is tailored to ending the "roller coaster" employment pattern in those industries.

An eight-point program will be handed to both Westinghouse Corp. and General Electric Co. in contract negotiations later this year. The IUE represents more than 50,000 workers at Westinghouse, and more than 100,000 at GE installations.

RCA Indicted On Anti-Trust Act Charges

Special to Electronic News
NEW YORK, Feb. 23. — Radio Corp. of America was indicted on Friday by a Federal Grand Jury on a charge of violating Sections I and II of the Sherman Anti-Trust Act.

The indictment charges that RCA conspired to restrain the manufacture, sale and distribution of radio purpose apparatus and the licensing of radio purpose patents. The alleged conspiracy involved an attempt to monopolize the licensing of radio purpose patents in the United States, it is charged.

Radio purpose patents are defined in the indictment to include

Shockley Predicts New Diode Trend

Rapid Advances Told at Conference

Inventor Cites Use in Computer

By STUART GELLMAN
Special to Electronic News

PHILADELPHIA, Feb. 23. — The electronics industry is "trying to do for transistors in a year or two what took more than a decade to accomplish for tubes," the 1958 Transistor and Solid-State Circuits Conference was told last week.

This appraisal was made by Dr. H. E. Tompkins, of the University of Pennsylvania's Moore School of Electrical Engineering, and program chairman for the new techniques session.

More than 1,200 attended the two-day conference sponsored jointly by the IRE Professional Group on circuit theory, the AIEE Committee on Solid State Devices, the Philadelphia Sections of IRE and AIEE, and the University of Pennsylvania.

Dr. Tompkins asserted that we are now going from the general idea, which he termed well in hand, to specific optimum design methods.

"We are past the day of the new concept," he declared, add-

Continued on Page Nineteen

Test Detector-Converter for

FOURTH ANNUAL WINNER
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Special to Electronic News
PHILADELPHIA, Feb. 23. — A new electronic revolution may be in the making with the conventional transistor replaced in digital computers by a new form called a transistor diode.

This was predicted last week by Dr. William Shockley, head of the Shockley Semiconductor Laboratory, a division of Beckman Instruments, Inc. Dr. Shockley addressed the 1958 Transistor and Solid-State Conference here.

Four-layer diodes have been used in new circuits to amplify digital signals in recent experi-

PHILADELPHIA, Feb. 23. — "The chances are excellent" transistors will directly replace nearly all vacuum tubes within 5-10 years, Dr. William Shockley said in an interview. Dr. Shockley said the average transistor probably will cost about 25 cents instead of \$2.40, in five years or so.

He added that there are many new materials destined for future transistor use, although pointing out that this is little more than a guessing game. However, he listed silicon carbide as a likely candidate, since it will operate at higher temperatures.

Another Term Near

Special to Electronic News

BOONTON, N. J., Feb. 23. — A group of stockholders of Aircraft Radio Corp. here opposing the firm's proposed merger with Litton Industries, Inc., Beverly Hills, Cal., claimed support totaling over 100,000 shares, or more than one-third of the outstanding ARC common stock at the weekend.

This would be more than sufficient to defeat the merger proposal which requires deposit of more than 80 per cent of ARC's approximately 304,000 shares of common stock, John E. Johanson told Electronic News. Mr. Johanson is one of the stockholders leading the opposition to the Litton merger.

A letter mailed at the weekend by Mr. Johanson of Johanson Manufacturing Co., here, and Gordon

BEVERLY HILLS, Cal., Feb. 23. —Litton Industries, Inc. has purchased Roger White Electron Devices, Inc., for an undisclosed sum, according to unconfirmed reports.

The Roger White firm manufactures backward wave oscillators, traveling wave tubes and gas discharge tubes for use in microwave applications. Approximately 50 are employed by the firm.

Continued on Page Eighteen

vital electronic devices as radar, sonar and various instruments used in guided missiles.

Named as co-conspirators, but not as defendants, are General Electric Co., Westinghouse Electric Corp., American Telephone & Telegraph Co., Inc., Western Electric Co., Inc., Hazeltine Corp., International Telephone & Telegraph Corp., North American Philips Co., Inc., N. V. Phillips' Gloeilampenfabriek of Holland.

Also named as co-conspirators, but not as defendants, are Electric & Musical Industries, Ltd., of Eng-

Continued on Page Two

WASHINGTON, Feb. 23. — The Naval Ordnance Laboratory here is testing a new electron tube detector-converter for the Defense Department which could obviously have wide application in industry, as well as for guided missiles, sea mines, and other military uses.

Known as the "Orbitron," it was invented by Jan Forman, Director of Special Projects for Adalia, Ltd., Montreal, Que., and developed in cooperation with Spartan Air Services, Ltd., of Ottawa, Que.

Various types of Orbitrons, it is Continued on Page Eighteen

phone Labs in New Jersey.

The transistor diodes are presently only in pilot production at the California laboratory, but Dr. Shockley feels that both superior performance and lower costs will result from mass production of the units.

Demand is already such that greatly increased production facilities are being established at the Shockley Laboratory and a reduction in the price of the units will soon take place, he indicated.

"Speed of operation of transistorized computers depends upon the thinness of layers in the semiconductor used," he said. "But it is difficult and costly to make contact to the middle layer of a conventional transistor. The difficulty increases as the layer becomes thinner and the speed of operation higher. The four-layer diode avoids this difficulty since it requires no connections to the middle two layers."

He noted that requirements are continually increasing for comput-

Continued on Page Nineteen

Auto Trade Fast Becoming One of Top Electronics Users

By PHILIP QUERIDO
Special to Electronic News

DETROIT, Feb. 23.—The automobile industry is well on its way to becoming one of the electronic industry's largest commercial customers.

That is the consensus of engineering officials here.

Though the industry here is only a relatively limited user of electronic equipment today, everything points to an immense increase in the use of such equipment in the next three to four years.

Already the Big Three (Ford, Chrysler and General Motors) have spent millions of dollars for electronic test equipment in their engineering centers. And 90 per cent of that equipment has been bought within the last four years.

Now the industry is getting ready to encourage dealers to purchase such newly-developed servicing aids as electronic wheel balancers and engine analyzers.

And, within another few years it is expected that the ignition system and many other parts of most cars will be transistorized and miniaturized.

Currently, electronic firm sales engineers are among the most welcome visitors to the auto plants here. The automobile makers are

very much aware of the role electronics will play in the production of future cars. And, electronic firms seeking to develop new commercial products for the auto industry are lent eager ears.

It is, of course, difficult to obtain specific examples of when a certain auto maker will begin to introduce new electronic devices. Information about upcoming mod-

Active Competition Seen for Engineers

The auto industry, currently laying off thousands of production workers, may be an active competitor for electronic engineering talents by spring.

In the race to stay ahead, auto firms expect to need electronic design, development and instrument engineers.

els is as closely guarded as top military secrets.

But engineers interviewed admit that they are busily studying the application of electronics in cars and expect several items to come out of their test laboratories soon.

3 Categories.

Electronics and its application to the automobile industry can be divided into three distinct categories:

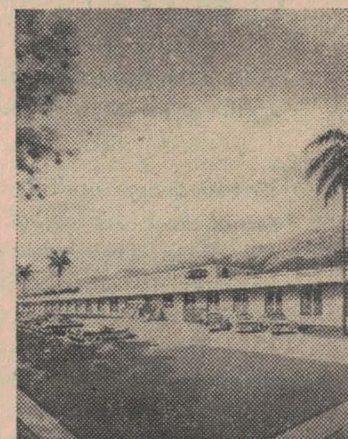
1. Its use by engineers in testing parts for new cars and in finding out more about present cars.
2. Its use on the dealer level to repair cars, and
3. As components in new cars.

Electronics' most impressive growth has been at the engineering level so far.

Chrysler, for instance, boasts of a \$500,000 "electronic highway." This is a newly inaugurated series of test chambers where actual highway conditions can be recreated without interference.

Besides, this firm has several labs where 15 technicians can be seen hovering over oscillographs, tape recorders, spectrum analyzers, a closed circuit television monitor,

Continued on Page Nineteen



DID YOU KNOW?

That Raytheon's new laboratory at Santa Barbara, California—devoted to advanced engineering in radar, countermeasures, communications and infrared—brings to 26 the number of Raytheon plants and laboratories.

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Letter from the Editor

..... By **ALFRED D. COOK**

DEAR READER:—

Electronic News will report on a day-by-day basis from March 24-27 what some 55,000 engineers and scientists plan to do to beat a recession.

The event will be the 1958 IRE National Convention at the Waldorf-Astoria and the New York Coliseum which is being held this year in the course of a business lull that has affected many parts of the industry. Electronic News plans to publish daily papers for the convention.

If advance indications are correct, the 850 exhibitors who make up this year's IRE show and even the 275 participants in the paper sessions should be seeking the answer to a single big question. That is: "How do we improve business?" * * *

If there are indeed answers to this at the mammoth show and meeting you can be pretty sure that Electronic News reporters will find them.

You see, Electronic News reporters and photographers will cover every foot of the huge auditorium and conference rooms in a search for news of the industry.

They will investigate every speech, study every booth for the latest news of the show and the people who participate in it. The resulting newspapers, if our first effort last year is any criterion, should carry a complete coverage of all of the major happenings at this biggest event of the electronics year. * * *

Just as satisfying as the show coverage, though, will be the out-of-show coverage. You see, these show issues will also report the world-wide events of this fast-moving, dynamic industry.

We expect to speed the news in here from Yokohama, London, Paris, Los Angeles and San Francisco. We'll probably have lesser known date lines on our stories, too, as the correspondents throughout the nation go to work for us on these dailies. Chances are there will be items from Laredo and Elmira.

Thus the news will be assembled on a spot basis, rushed upstairs to the composing room and set into type. Then as the city and the show-goers sleep, it will be printed and packed into trucks and trains. The next morning the correspondents will get their copies at the hotels and the Coli-

Radio, TV Output Off Slightly in Week

WASHINGTON, Feb. 23. — Radio and TV output during the week of Feb. 10 was off slightly, the Electronic Industries Association said at the weekend.

TV output totaled 98,841 sets, against 103,730 sets a week earlier. There were 211,545 radios made, compared to 224,149 in the week before.

Auto radio output dropped from 76,794 to 68,874 sets, EIA said.

New Circuit Board Plant Set by Corning

By **TONY GIUNTA**
Special to Electronic News

BRADFORD, Pa., Feb. 23. — Corning Glass Works will build a new plant for the manufacture of printed circuit boards made of Fotoceram, Corning's new high-strength, glass ceramic, William C. Decker, president, said last week.

The high temperature copper clad boards can withstand temperatures up to 300°C and are expected to be used extensively for missiles, hypersonic aircraft and computers.

These circuit boards will be made in the new plant where 450 people will be employed, all of whom will be transferred from facilities now leased here.

The plant will also make capacitors, resistors, delay lines, electrolytic level switches and a wide range of other glass components for use in military and industrial electronic equipment as well as television and radio receivers.

Fotoceram is said to have a flexural strength of 25,000 psi. The boards made of it are the first by Corning with through-hole plating.

The circuit boards are said to be capable of continuous operations at 250°C without fading or warping even in the most adverse environmental conditions.

Letters to the Editor

Dear Sirs:

Should a man who has been in the electronics industry his entire working career leave it because the industry spoon-fed in recent years by Government orders, is unable to adjust itself to changing economic conditions?

The last few months should suggest that now is the time for the industry to learn the fundamentals of economic life, to learn to sell its products.

My recent experience, however, indicates that too many firms are willing to sit back and be carried with the tide, when they should be pounding on doors, finding new markets and using the hard sell.

I have spent many dollars in trade publications, time and effort with manufacturing firms and employment agencies, offering my services as a components sales engineer with valuable contacts in

the New York area, without a sign of a tangible offer.

The reason given — "Things are tight and we're retrenching."

I submit that this is a short-sighted and ineffectual policy in an industry which has such enormous potential. I would appreciate hearing any comments, offers, or rebuttals you may have in mind.

STAN SHAPIRO
1410 Avenue S
Brooklyn, N. Y.

Dear Sirs:

Since starting our subscription to Electronic News, we find the paper an ideal supplement to all the other trade publications which are received here. Electronic News fills in for us the important technical material that does not appear in other trade journals.

WILLIAM M. BRADLEY,
Committee for Competitive TV,
Washington, D. C.

NEWS IN BRIEF

General News

Automobile industry fast becoming largest commercial electronic customer. [1]

Electronic industry trying to do for transistors in a year what took more than a decade to accomplish for tubes. [1]

Western Electric Co. had record sales year in 1957. [5]

Ampex president says sales up 50% this year. [18]

Business varies on eastern seaboard during blizzard. [18]

Financial

Defense order backlog rises rapidly at Sylvania Electric Co. [6]

Annual statements of El-Tronics, General Electric, Burroughs and other firms. [6]

Defense Electronics

Defense Department official says no new missile plants planned until

ature 100 KC cold cathode decade counter tube. [8]

Major West Coast precision potentiometer producers are going through a depressed market but see a chance for an upward turn. [8]

Materials

An electro-less process of plating copper on ceramic is being used by Radio Industries, Inc., Chicago. [10]

The ferrite industry is expected to have another steep climb this year. [10]

Previews of materials and processes to be shown at IRE. [10]

New metal mica attenuator elements developed by Filmohm Corp. [10]

Communications

Federal Communications Commission makes public its analy-

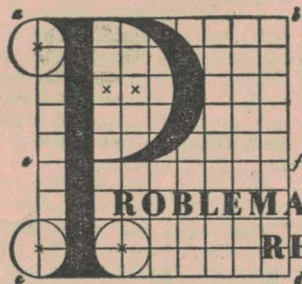
SRI Pact Volume Peaks

Special to Electronic News

MENLO PARK, Cal., Feb. 23.—Stanford Research Institute's 1957 volume of contracts was the highest in its history, and amounted to a 17 per cent increase over the previous year.

Research contracts amounted to \$14.8 million, and was about equally divided between Government and commercial. Government work, according to an SRI spokesman, was primarily in the field of defense, while its commercial contracts came from business and industrial organizations as well as individuals and foundations. At the year's end, the institute began work on its 2,400th project.

During the past year, SRI established an office in New York and another in Zurich, Switzerland, and at its headquarters office here it is building a \$2.5 million facility.



PROBLEMATICAL RECREATIONS - 57

What is the smallest square number which, when squared, results in the largest possible succession of equal digits?

—Ladies' Diary, 1810

We wish to apprise all Recreationers, especially all of you east of the Mississippi, of our operation in College Park, Md. There, Litton Industries Maryland Division, though humming with activity, is not too busy to answer your inquiries concerning their specialty—Systems. Communications, Data Processing, Fire Control, Missile Control, Navigation, and Radar are some in which they have considerable depth. And for related Systems or Equipments they have the immediate assistance of our other divisions and subsidiaries. Please write to Russell W. McFall, V.P. and General Manager, Litton Industries Maryland Division, College Park, Maryland.

ANSWER TO PROBLEM #56: An infinite series need not be the means of solution; a trivial means exists. 300 miles.

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lizing is... in one continuing operation without adhesives. This, the company said, gives surface runs and through-hole plating the same bond strength, which is a minimum of 12 pounds when a 1-inch strip is pulled perpendicular to the board.

The 1/8th-inch runs and through-hole plating of the board are said to show no indication of blisters, lifting or any metal failure after solder pot immersion of 5 minutes at 500°F.

Ground for the new plant will be broken immediately.

RCA Indicted On Anti-Trust Act Charges

Continued from Page One

land; English Electric Co., Ltd., of England; English Electric Valve Co., Ltd., of England; Marconi's Wireless Telegraph Co., Ltd., of England; Canadian Radio Patents, Ltd., of Toronto, Can.; RCA Victor Co., Ltd., Montreal, Can.; Telefunken G. m. v. H., of Germany; Siemens & Halske A. G., of Germany; Compagnie Generale de Telegraphie sans Fil, of France; Amalgamated Wireless (Australasia), Ltd., of Australia; Amalgamated Wireless Valve Co., Pty. Ltd., of Australia; Australian Radio Technical Service & Patents Co., Pty. Ltd., of Australia.

The indictment charges that RCA agreed with General Electric, Westinghouse and AT&T that those companies would not compete with RCA in the domestic licensing of radio purpose patents. RCA is also charged in the indictment with having entered into similar agreements with foreign electronics manufacturers. The agreements with the foreign manufacturers also provided that neither would export radio purpose apparatus into the others' home territory, it is charged.

Electronic News

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mends 300 VHF omni-directional radio range installations in European-Mediterranean region. [7]

Standard Pressed Steel Co. president sees promising future for firm in defense fields. [7]

Components

Huggins Laboratories has introduced four new models of traveling wave tubes. [9]

Sales of more than \$8 million for magnetic stereophonic tape are forecast for the tape industry in 1958. [9]

Sylvania has developed a mini-

General Transistor In Resistor Field

NEW YORK, Feb. 23.—General Transistor Corp. has entered the resistor field with a precision resistor for analog computers, Herman Fialkov, president, said last week.

The firm has developed samples which were submitted for evaluation to a few of its customers, he declared. GT has been making components for digital computers; the resistor will give it a wedge into the analog computer field.

The firm expects the resistor to be in production by the end of next month. It will be on display at GT's booth at the Institute of Radio Engineers exhibit, starting March 24.

Storer Broadcasting Co. permit to build an experimental television station. [11]

Pay-TV news roundup. [12]
W. L. Maxson Corp. announces a radar with faster scanning, pulse repetition rates. [12]

Instruments & Controls

Preview of new instruments to be seen at the Institute of Radio Engineers Show. [13]

New Instruments of the Year. [14]

Michigan Hospital Service announces its Datamatic 1000 computer operation. [14]

Hewlett-Packard Co. plans to produce 22 new instruments at the IRE show this year. [14]

Government Procurement Bids, invitations to bid awards. [15-17]

TRANSISTOR AMPLIFIER OF THE WEEK

Model 214G Germanium

Features:

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- Up to 120db closed loop gain
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Shockley

Continued from Page One

ers capable of processing enormous amounts of data, emphasizing that "we must learn how to make the thinnest possible layers in semiconductors, and at present, much more basic research is needed on this important problem."

Dr. Shockley predicted also that it is "highly probable that the four-layer diode will become the chief switching element in establishing connecting circuits between telephones," because of new and immediate applications in that field.

Turning to the future, he said the trend toward decreased dimensions and higher frequencies is "already occurring and will continue since the limits set by the atomic structure have not yet been closely approached."

Rapid Advances in Transistors Cited at Philadelphia Parley

Continued from Page One

ing that "we have gone from the inventor stage into a whole new phase of design."

Among the individual papers presented was one on a high speed analog multiplier, by R. J. Bibby and P. M. Thomsson, Defense Research Board, Ottawa.

They described the design and over-all operation of a four-quadrant multiplier, which makes use of transistor and semiconductor diode properties and which will handle inputs from DC to 10 KC.

The unit is insensitive to changes in components and has a linearity better than plus or minus 0.3 per cent from -50° C to 70° C, they reported.

They indicated that while the application of transistor circuits to computers has been primarily in

the digital field, they may also be applied to the simulation of analog functions.

The multiplier was appraised as an example of the use of semiconductor circuits in the simulation of accurate analog functions.

"It has been shown that the particular characteristics of semiconductor diodes and transistors offer several advantages over previous techniques in this field," they declared.

In other new techniques discussions, a low-level, high-speed voltage comparator was described by H. W. Douglass and J. W. Higginbotham, of the Martin Co., Baltimore.

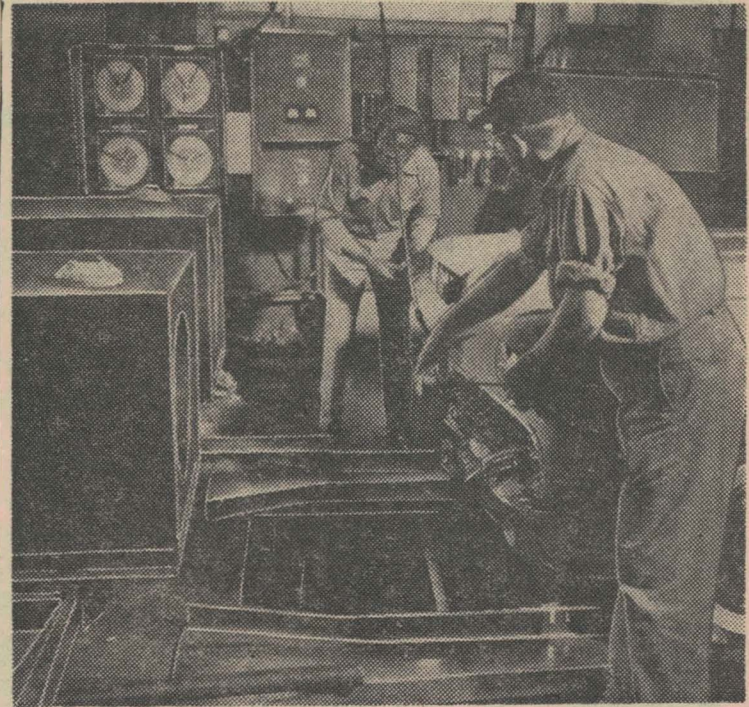
They declared the need for these comparators exists in applications such as missiles, automatic check-out equipment and analog computers, reporting that it is possible to increase the response speed and band-width of the comparator amplifier by using an internally generated carrier frequency.

Circuits using these principles have been tested from -55° C to 75° C, with a change of plus or minus 1 per cent in the error-switching point, they said, pointing out that errors as low as 200 microamperes can be made to switch 10 amperes in 200 microseconds.

Speaking at the computer circuits session, Robert E. McMahon, of the Massachusetts Institute of Technology's Lincoln Laboratories, compared linear selection memory techniques using transistors with coincident current techniques.

He held this to be of particular interest because of "the natural advantages" of linear selection, the memory having less transistors than the equivalent coincident current memory.

Also addressing the computer circuits group, two Philco Corp. scientists described high-speed computer circuits which utilize a base-gating technique with a new high-speed flip-flop to pro-



DETROIT.—Two technicians are using a new electronic adjuster to set the headlamps of a Cadillac coming off the assembly line here. The beams are fed into two large condensing lenses that pick up the light intensity. A series of photo-electric cells then test the lamps' candle power, which can be read on a large set of potentiometers.

Auto Trade Becoming Top Electronics User

Continued from Page One

and the like. And, the firm says, that's only a beginning.

Lists Gear.

L. X. Chapin, managing engineer of dynamic facilities of Chrysler's Engineering division, opened his desk to show a list of 44 pieces of new electronic gear he expects to buy soon, ranging from a multi-channel data type recording unit to new oscillographs and

that will permit constant speed idling, and also one that will not run down the battery even though a car is idling with accessory equipment turned on.

"Right now," this engineer added, "if you turn on a radio, the headlamps, and an air conditioner, and don't really clip along, your battery can not charge. We think electronic equipment will help us eliminate that problem."

Mostly Blue Sky"

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Help Wanted Men—Ag'cies

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Such equipment, for instance, in the testing of sound deadening qualities of different materials. To do this, pieces of felt, rubber or plastics are placed on top of a large metal jar. Inside the jar a controlled noise-making mechanism is placed. Atop the material rests a microphone, which picks up the fractions of decibels of noise and vibration that pass through the material being tested. This information is then recorded on a graph.

Many Test Rooms.

Chevrolet has 18 dynamometer rooms and various laboratories in its new engineering center, each filled with dozens of electronic test units of every type.

Yet, says M. M. Roensch, assistant chief engineer in charge of experimental testing, "four years ago we had only one oscilloscope and two voltmeters."

The same story can be repeated at each division of Ford, Chrysler and General Motors. Several key advancements have resulted from this equipment. Notable, for instance, is a major improvement in automatic transmission, since for the first time engineers are now able to accurately gauge and record pressures, speeds and torque fluctuations.

Dr. Killian, Scientists Visit Redstone Arsenal

HUNTSVILLE, Ala., Feb. 23.—Dr. James R. Killian, Jr., Special Assistant to the President for Science and Technology, and a party of scientists departed from here Friday evening after a tour and conferences with key personnel at the Army Ballistic Missile Agency at Redstone Arsenal.

During the two-day visit, Dr. Killian and the group conferred with Dr. Werhner Von Braun, director of the development operation of the agency; Brig. Gen. J. A. Barclay, deputy commander of ABMA; and with directors of the agency's nine laboratories.

The party was given tours of the static firing test area, guidance and control, computation and fabrication laboratories at the installation.

Accompanying Dr. Killian were Brig. Gen. Andrew J. Goodpaster, executive secretary to President Eisenhower; Dr. George B. Kistiakowsky, professor of chemistry at Harvard; Dr. Edwin Hand, National Academy of Sciences member and inventor of the Polaroid camera; Dr. Emmanuel R. Piore, member of the National Research Council; and S. M. Kenny and Robert O. Piland, staff assistants to Dr. Killian.

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For its part, Cadillac has just installed a new electronic means of setting the four headlamps on each new car. This is done by shining the beams into two large condensing lenses that pick up the light intensity. A series of photoelectric cells then test the lamps' candle power, which can be read on a large set of potentiometers.

In addition, some cars are spot checked once more by an installation featuring several photoelectric tubes. Only if the lamps have been adjusted properly do the tubes light up.

Told It's Long Way Off.

Officially the press is told that electronic components for use in cars is a long way off yet.

"That's strictly dream stuff," officials claim.

Yet the electronic engineers don't go along with this.

One engineer, who asked to remain anonymous, said many electronic advances will be creeping into the more expensive cars within another few years.

This particular engineer cited work on changing the entire electrical system.

What the industry is seeking — and hoping to achieve through transistorization techniques — is a battery-generator-ignition system

electronic guidance systems — are still mostly "blue sky" at this stage. This they say in spite of General Motors' announcement in Warren, Mich., last week that it is experimenting with an automatically guided car. (GM's progress in this field was described in last week's issue of Electronic News).

Work now is being stepped up in such areas as electronic fuel injection, electronic power steering, electronic shifting, and even electronic braking — besides electronic ignition systems.

"Should we want to, we could install a number of these items on our 1959 or 1960 models," the engineers say. Yet two major problems hold this up. They are:

1. Cost: "If only transistors would cost a few pennies instead of a few dollars," lamented one engineer, "why you'd be surprised how we could use them."

2. The lack of technical personnel at the dealer level. "We can't market a single car with parts that can't be repaired at any reasonably well-equipped garage," a Chevrolet official pointed out. "For years we have trained our dealer servicemen to care for cars as they exist today. You can't create electronic experts overnight."

Yet, officials here agree, the lack of technical personnel doesn't faze the auto industry.

"When we can get electronic equipment to be sufficiently economical and dependable, and when we can demonstrate that it will do the job better, we'll introduce it."

An example of a recent electronic advance is Chrysler's electronic fuel injection system in its limited 300D series.

Engineers here are divided on the merits of Chrysler's unit — the result of four years of research. But, they do point to it as a trend indicator.

The system provides electronic control over the quantity of fuel delivered into the engine. Fuel is supplied at constant pressure and is metered into the cylinder by electrically operated injector valves. The period that each valve remains open is controlled by an electrical pulse whose length is constantly controlled electronically to give optimum performance. Engines with this new system can deliver up to 390 horsepower at 5,200 rpm, and this performance is said to be possible without warmup.

Officially the 300D is a prestige car. To Chrysler engineers it is a dream car — a dream of how electronics may soon revolutionize the automobile industry.