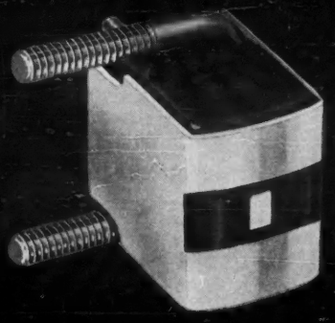
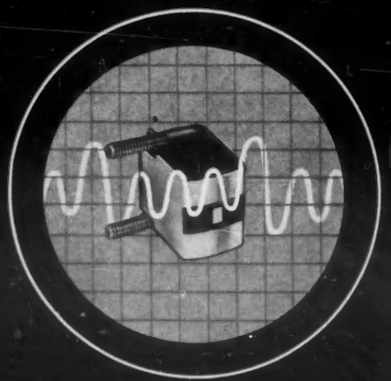
MINIATURIZATION



with fullest reliability



This is the 7H17 Half Track Monaural Head . . . the last word in miniaturization . . . actually only this big→ And what was sacrificed to achieve this smaller size? Absolutely nothing! In fact, the 7H17 actually offers better performance than any comparable head. It is a modification of the performance-proven design of today's most popular monaural half track head . . . but because of 100% functional flush-face shielding it actually achieves greater fidelity and reliability, and permits easier tape starting. And it's small enough to have application in industrial as well as home entertainment equipment. Finally, Michigan Magnetics' unexcelled production and quality control system assures that every 7H17 delivered will have the same full reliability that has made ▬ heads the most popular among leading original equipment manufacturers. Write today for complete specifications on the new 7H17 head!

THIS GUARANTEE TAG IS YOUR CUSTOMER'S ASSURANCE OF FIDELITY AND RELIABILITY

MICHIGAN MAGNETICS, INC.
VERMONTVILLE, MICHIGAN

1-2

CIRCLE 141 ON READER-SERVICE CARD

Index of Articles

July 5 through December 20

All articles are indexed under one of the basic categories listed below:

The kind of article is identified by the following reference keys:

ART	Article (bylined by an authority)
DD	Design Decision
DIG	Digest
DYF	Designing Your Future
ED	Engineering Data
EDN	ELECTRONIC DESIGN News
GA	German Abstract
IFD	Idea for Design
PF	Product Feature
RT	Russian Translation
SR	Staff Report

COMMUNICATIONS, METHODS AND EQUIPMENT

COMPONENTS
(except microwave components, tubes and semiconductors)

Stepping Motors...

√ BI-DIRECTIONAL
√ HIGH RELIABILITY
√ POSITIVE LOCK

Compact and lightweight Curtiss-Wright bi-directional digital motors index precisely and lock positively between each angular rotation when converting electrical pulses to mechanical motion in missile, aircraft, automation and actuation applications. Ruggedly constructed and dynamically balanced for long life and reliable service under severe environmental conditions, shock and vibration. Low power required for high speed operation.

Temperature: —65°F to +165°F
Vibration: 20 G's to 500 CPS
Shock: 30 G's for 11 milliseconds along each axis

Write for latest complete components catalog #501

TIME DELAY RELAYS • DELAY LINES • ROTARY SOLENOIDS • SOLID STATE COMPONENTS • DUAL RELAYS • DIGITAL MOTORS • TIMING DEVICES

Electronics Division
CURTISS-WRIGHT CORPORATION
East Paterson, New Jersey

AD NO. 4501

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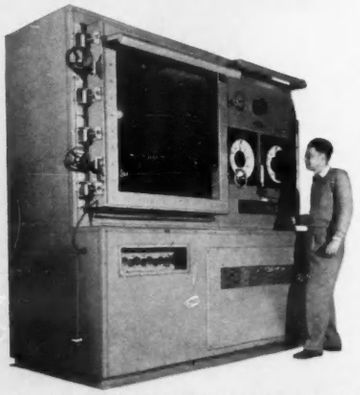
Eicor is now an operating division of the
INDIANA GENERAL CORPORATION

AERO-SPACE QUALITY... ANY PLACE RELIABILITY

Precision motors —.001 to 7.5 hp

Designed for a wide range of military and non-military uses, Eicor precision quality motors are built to meet and exceed rigid aerospace requirements. This means building and testing prototypes for performance and reliability under adverse conditions. Eicor's facilities include a well-tooled model shop and several test laboratories. Lab equipment includes an altitude chamber, radio noise room (screen room), vibration table, Brush surface analyzer, comparator, electro-limit gauge and many other testing devices.

Our engineers work closely with you to develop a motor for your exact needs. Fast delivery on both special and production motors. Phone or write Eicor, Oglesby, Illinois. Dept. M-12



This altitude chamber is used for environmental testing of airborne equipment. It simulates altitudes up to 80,000 ft with temperature control to —67° F.

INDIANA GENERAL CORPORATION
EICOR DIVISION / Oglesby, Illinois

HIGH-RELIABILITY ROTATING EQUIPMENT

CIRCLE 151 ON READER-SERVICE CARD

INDEX OF ARTICLES

New! MINIATURE
AXIAL FANS
with
up to 4 times greater cooling efficiency!

Characteristic	PAMOTOR Model 1000	Conventional Fan
Type of Motor	induction (capacitor-type squirrel cage)	shaded-pole
Housing	die cast warp-free Zymec	plastic
Output @ 60 cps (0 back pressure) (.25" back pressure) (.3" back pressure)	125 cfm 75 cfm 50 cfm	100 cfm 20 cfm 0
Output @ 50 cps (0 back pressure) (.25" back pressure)	100 cfm 62.5 cfm	75 cfm 5 cfm
Operating Temp. Range	—55°C to +85°C	—18°C to +44°C

The PAMOTOR Model 1000 Miniature Fan is completely interchangeable with conventional units now in use (4½" center-to-center mounting holes). But the similarity ends there.

check this comparison chart!

The Model 1000 Fan meets MIL-T-5422E, Class 2 Environmental specifications. Inside-outside rotating motor design gives flywheel effect, resulting in constant, quiet fan speed. Large surface sleeve bearings mean minimum maintenance, maximum reliability.

For complete specifications and name of nearest stocking distributor, write to:

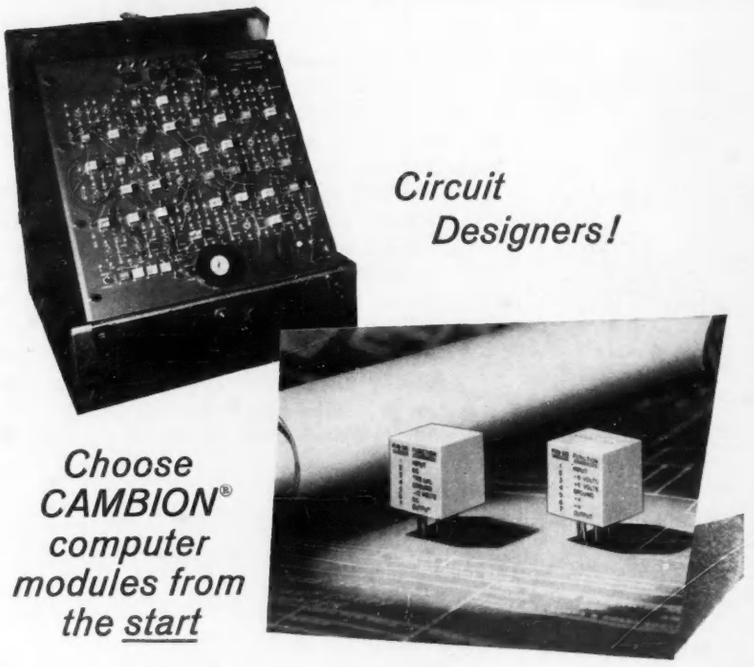
PAMOTOR, Inc.
312 Seventh Street • San Francisco 3, Calif.

CIRCLE 152 ON READER-SERVICE CARD

Even under the most severe operating conditions, Varfil Sleeving and Tubing retains its average dielectric strength. Twist it, tie it, bend it, wrap it, knot it. Remains just as pliable as when you started. Won't crack, peel or suffer dielectric loss. Heat Varfil 2000 hours at 110° C.—1,000 hours at 125° C.—and even for extensive periods at 150° C. It won't break down. Can be after-treated in baking and varnishing operations. Reacts better than other oleoresinous materials and synthetic coated tubings. Available in handy coils so you can cut the exact lengths you need . . . no waste. Standard colors. Wide range of sizes. Exceeds or meets all A.S.T.M. specifications.

VARFLEX Corporation, 508 W. Court St., Rome, N.Y.

CIRCLE 153 ON READER-SERVICE CARD



...FOR EASIEST PROTOTYPE DESIGN

CAMBION modules are built to make a designer's life easier by eliminating guess work. That's why they all have these physical characteristics that save you time and money in early design and prototype work — and in production!

- **Standard 7-pin miniature bases**—use them for plug-in or printed circuits.
- **Distinctive color-coding** — you can tell each module's function at a glance.
- **Compactness** — all modules require only 0.35 cu. in.
- **Uniform size** — easier arrangement in circuits without juggling.
- **Full range of types** — Flip-flops, And Gates, Or Gates, Inverters, Buffer Amplifiers, Level Triggers.
- **New Circuit Trial Case** specifically for CAMBION modules, lets you set up and check out any circuit ideas — change loads and connections with ease.

...AND BEST PERFORMANCE

CAMBION modules have a unique combination of dynamic characteristics, too. All units are compatible, and operate at up to 10 MC. They are built with MIL approved components, and surpass MIL environmental standards. Every CAMBION module is tested and monitored for 500 hours under dynamic conditions. That's your assurance of reliable performance — in any circuit! Contact CAMBION for full details or for application assistance. Write Cambridge Thermionic Corporation, 457 Concord Avenue, Cambridge 38, Mass.

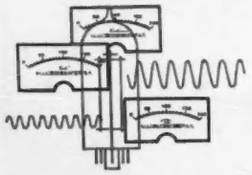
CAMBRIDGE THERMIONIC CORPORATION
CAMBION®
The guaranteed electronic components

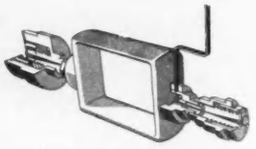
CIRCLE 154 ON READER-SERVICE CARD

FULL-SCALE RANGES AS LOW AS 2μA OR MV; SPECIFIED LINEARITY OF ±0.5% OR BETTER

The new Series II Stylist panel meter is probably the most precisely linear production-model microammeter or millivolt-meter you can get. It can divide 2μa or mv into as many as 100 clearly legible slices with virtually no tracking error at all. With proper adjustment of full-scale current, it can give you infinitely accurate indication.

Its ultra-linearity is the result of individual scale calibration, made economically feasible by a newly-developed electronic calibrator. This calibrator, operating through a system of servo controls, automatically prints individually adjusted scales according to the actual measured tracking characteristics of each meter movement. Theoretically, each meter's full-scale linearity is infinite, with no tracking error at any point. (We do, however, retain a maximum ±0.5% manufacturing tolerance).





Added to this, you get a taut-band suspension, which accounts for the meter's 2μa or mv full-scale sensitivity and its near-perfect (±0.2% f.s.) repeatability. No friction. No hysteresis. High resistance to shock and vibration in any plane. Nearly impossible to wear out.

For full details on the API Series II Stylist, including ranges and prices, write for Bulletin 28.

api ASSEMBLY PRODUCTS INC. • CHESTERLAND 17, OHIO

NEW!

THE SERIES II STYLIST TAUT-BAND PANEL METER

CIRCLE 143 ON READER-SERVICE CARD

INDEX OF ARTICLES

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DIRECT FACTORY TO OWNER **SAVES 50%**

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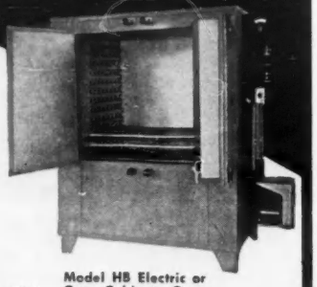
CIRCLE 144 ON READER-SERVICE CARD

Precise engineering and construction result in

UNIFORM HEAT

throughout the work space



- High velocity recirculating blowers
- Greater heat input
- Adjustable louvres for balanced airflow
- Superior heat seals

All combine to provide *excellent temperature uniformity* in these rugged cabinet ovens.

30 Standard Models

- Work space from 4.6 to 72.3 cubic feet
- Temperature ranges from 100 to 1250° F.
- Electronic combustion devices insure safety for gas fired models
- Indicating control instrument
- Factory tested

Model HB Electric or Gas Cabinet Oven

Other ovens from $121.50 up, including a complete line of laboratory, bench, cabinet, walk-in, and custom-built units.

Write for literature to help you select the right oven for your application

Specialists in Heat Process Equipment

GRIEVE-HENDRY CO.

1331 N. Elston Avenue, Chicago 22, Illinois

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DRAFTING TRENDS

New, improved Rotolite Expeediter conveniently makes sepia reproducibles and diazo films in addition to low cost whiteprints.

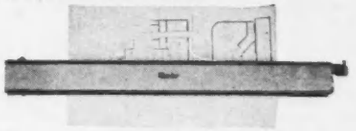
Make whiteprints in minutes

Here's a new, fast, economy whiteprinter that fills a real need in small drafting rooms or large engineering departments.

Workprints for architects, consulting engineers, surveyors, contractors. The Rotolite Expeediter can handle *all* copying needs for the two- or three-man drafting operation, is always ready to cope with rush jobs, even after hours. With POST Super Vapo Papers, print production can be doubled.

Quick checkprints for larger manufacturers. Even huge engineering divisions with their own reproduction departments praise Expeediter's practical, on-the-spot convenience for quick copies of preliminary sketches, checkprints, conference data, visual presentations. Hundreds of companies have placed Rotolites in their engineering and drafting rooms for "self-service" whiteprints in a hurry.

No preheating or other delays—Rotolite makes prints immediately. There's a choice of three models to take 18", 27" or 42" wide tracings of any length. Rotolite is easily hung on wall or placed flat on a table top, plugs into any standard convenience outlet. With new dial speed control, you can make cloth and film reproductions immediately, as well as paper prints. For fast developing, choose either economical ammonia tube or new, sealed Thermomatic unit, illustrated below.

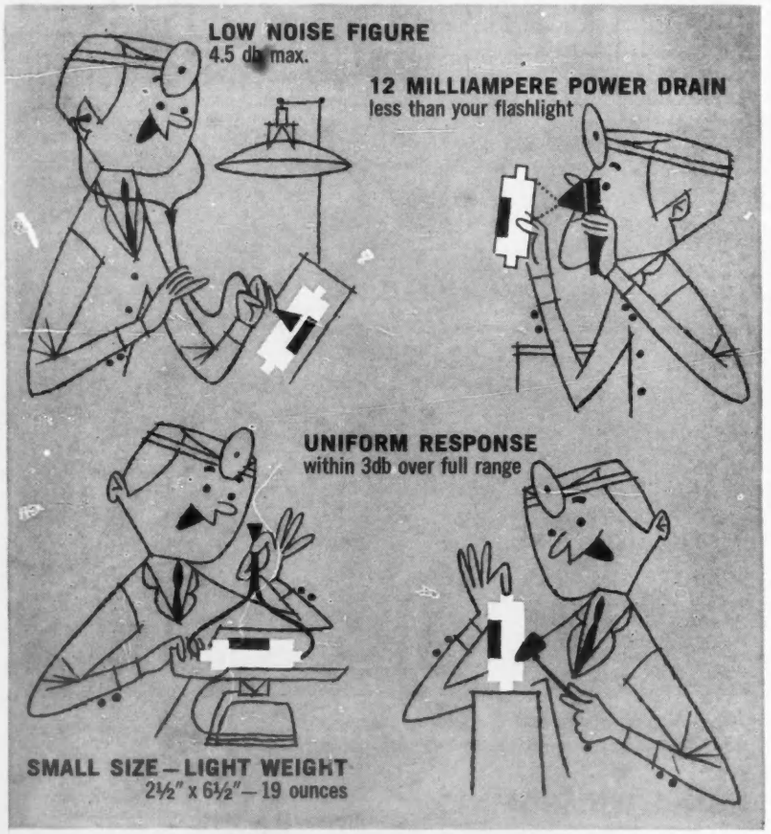


Recommended print materials. Use POST diazotype sensitized products—Vapo paper, sepia vellum, cloth or film—for best results. Get full information on Expeediter and standard Rotolite whiteprinters from your POST dealer or write Frederick Post Co., 3644 N. Avondale Ave., Chicago 18, Ill.

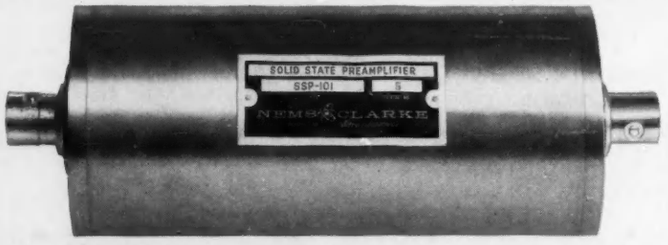
SENSITIZED PAPERS & CLOTHS • TRACING & DRAWING MEDIUMS • DRAWING INSTRUMENTS & SLIDE RULES
ENGINEERING EQUIPMENT & DRAFTING SUPPLIES • FIELD EQUIPMENT & DRAFTING FURNITURE

CIRCLE 146 ON READER-SERVICE CARD

JUST WHAT THE DOCTOR ORDERED



THE NEMS-CLARKE SOLID STATE TELEMETRY PREAMPLIFIER



Here's your baby for outstanding performance and economy in the 225-260 megacycle telemetry range—the Nems Clarke SSP-101 completely solid state preamplifier. Featuring extremely low noise, flat response, and a hefty 25db minimum gain, it's at home in any environment . . . installed either in the antenna mount or the coax cable. Its own external 12 volt power supply is available for rack mounting. Baby sitting? Forget it! The SSP-101 operates for thousands of trouble free hours at unattended locations.

Write for Data Sheet 999

Vitro ELECTRONICS A DIVISION OF VITRO CORPORATION OF AMERICA
PRODUCERS OF NEMS-CLARKE EQUIPMENT
919 JESUP-BLAIR DRIVE, SILVER SPRING, MARYLAND / 2301 PONTIUS AVENUE, LOS ANGELES 64, CALIFORNIA
CIRCLE 147 ON READER-SERVICE CARD

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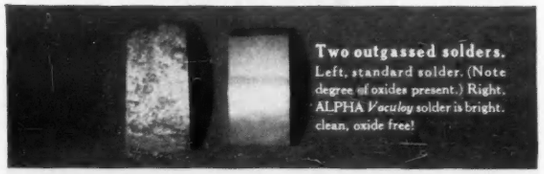
NEW solder discovery!



ALPHA *Vaculoy*® bar solder cuts printed circuit joint rejects from 1-in-50 to 1-in-5,000. No other solder does this because no other is *made* this way!

Above is an unretouched photograph of two solder specimens—both outgassed. Left, is a *standard* printed circuit solder. Note presence of impurities on surface—a sure sign of undesirable oxides. Right, is ALPHA *Vaculoy*.* Its bright, clear surface indicates freedom from oxide-forming elements. Result? ALPHA *Vaculoy* bar solder cuts dross, improves wetting, produces brighter connections, increases bath life, reduces inherent inclusions and insures reliable electrical connections. Meets Fed. Specs. QQS-571C. Get all the facts. *Write for data today!*

*Formerly called "ALPHA AAA"

When dependability counts!

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58A Water St., Jersey City 4, N. J.
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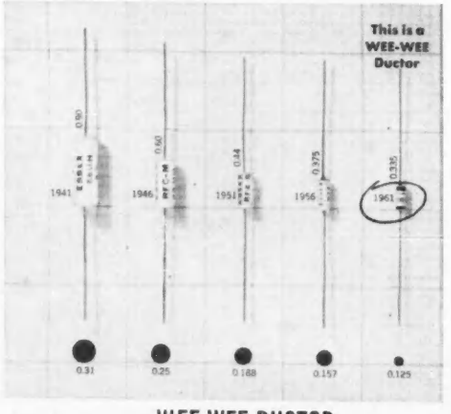
SPACE ELECTRONICS

TUBES, ELECTRON

MINIATURE INDUCTORS STILL TOO BIG?



try the new **WEE-WEE DUCTOR** for size

— the smallest inductor immediately available to the engineer with a complete set of values from 0.10 μh to 1000 μh. Meets Mil Spec. MIL-C-15305 B.

For complete engineering data, write to Dept. WW-A, or phone 464-9300.

NYTRONICS, INC.

550 SPRINGFIELD AVENUE, BERKELEY HEIGHTS, N. J.

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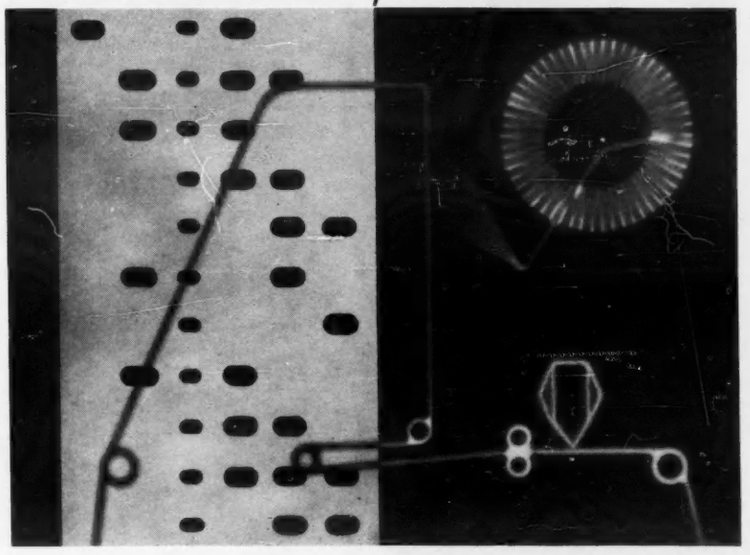
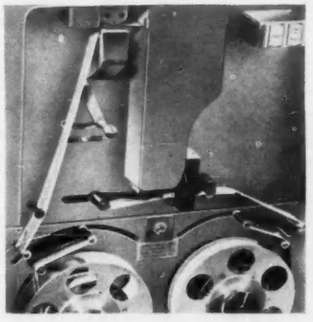
omni-data / ...a new generation in paper-tape equipment



- **High-speed electrostatic paper-tape recorder replaces mechanical punches**
- **Reflected-light reader accommodates all tapes—punched or recorded, opaque or transparent**

OMNI-DATA, a new line of equipment based on non-mechanical, non-impact reading and recording techniques. brings a new order of reliability, speed, and operating life to the application of coded paper tape.

OMNI-DATA combines two exclusive Omnitronics advances: Visible recorded code presentation, rather than punched holes in the tape, and chopped-reflected-light reading, both resulting in new levels of performance and the elimination of the bothersome chads of punched tape.



↑ Visible recorded data issues from OMNI-DATA recorder at speeds up to 600 characters a second at 10 characters to the inch. Even higher recording and reading speeds, as well as greater packing density, are possible.

↑ Omnitronics Photoelectric Tape Reader, a part of the OMNI-DATA system, reads any kind of tape (OMNI-DATA or punched, opaque or transparent) interchangeably without adjustment.

Learn the exciting details about OMNI-DATA recorders, readers, and reelers. Write for full information and the name of your nearest Omnitronics representative.

OMNITRONICS, INC.

Subsidiary of Borg-Warner Corporation

Dept. ED-12, 511 N. Broad St., Philadelphia 23, Pa.

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