

People and things

'Broken Symmetry' — the latest sculpture from Bob Wilson which stands over the Pine Street entrance of Fermilab. The Hi-rise building is visible in the background. The sculpture uses steel deck plate from the USS Princeton, stands 16 m high and weighs 21 tons.

(Photo Fermilab)



As a result of theoretical developments which have become known as the Weinberg-Salam model, the weak and electromagnetic interactions can now be understood by a single picture. In a way this parallels the developments in the last century when theoretical developments culminating in Maxwell's equations achieved a synthesis of electricity and magnetism, giving birth to the word electromagnetism.

No new word analogous to electromagnetism seems to be in common parlance among physicists to describe this newest unification. Many people still talk of the Weinberg-Salam or the 'standard' model. However Salam himself uses the term 'electro-weak' fairly freely.

Another possibility that has been suggested is pointed out by one of our readers in Edinburgh University, who regrets that physicists don't resort to Greek for new nomenclature in the way they used to. The background of classical education which produced such elegant words as hadron, meson, lepton or baryon has now given place to a new candour, with homespun names like parton, gluon, colour and flavour.

The suggestion is for the new electro-weak phenomena to be given the name 'asthenodynamics', or the 'asthenic force'. The Greek adjective 'asthenis' has the virtue of meaning 'not strong', rather than merely weak. In this way it can be used logically to describe all phenomena not associated with the strong force.

The root of the word 'sthen' means strong, and the α prefix denotes 'not', as in asymmetric. This gives us quantum asthenodynamics (QAD) as the field theory of the forces to be distinguished from those attributed to quantum chromodynamics (QCD) and strong interactions.

EPS and Trends in Physics

The 4th General Conference of the European Physical Society was held at York in the UK from 25-29 September. Organized in collaboration with the British Institute of Physics, it attracted 700 participants from Europe and overseas to the modern campus of York University.

Under the wide-ranging theme of 'Trends in Physics' the great diversity of present-day physics research was evident as a full programme of plenary sessions, specialized Seminars and posters attempted to cover the spectrum of modern optics, surface physics, phase transitions, nuclear astrophysics, hot plasma, heavy ions, synchrotron radiation and quarks.

In addition to the quark sessions, high energy physics came into prominence during the opening address of Professor A. Zichichi, Presi-

dent of the Society, at the General Assembly. He pointed out that in 1978 (the 10th anniversary year of the EPS), we can look back 100 years to the formulation of Maxwell's equations that unified electricity and magnetism and we can also see the new unification of electromagnetic and weak interactions as the model of Salam and Weinberg comes to fruition.

The laser and synchrotron radiation, two remarkable new tools now at the disposal of the experimental physicist, dominated the proceedings. Their almost ideal experimental characteristics have resulted in an increasing trend towards all forms of spectroscopy. A widening interdisciplinarity, with physics bridging the gap between such diverse disciplines as biology, ecology, medicine and telecommunications, was also noticeable.

Discussions on the role of education in popularizing science, on physics in the developing nations and on the

Top level meeting at the CERN-LAPP stand when the Annecy Fair was inaugurated on 29 September. In the foreground from left to right — Leon Van Hove (CERN Research Director-General), John Adams (CERN Executive Director-General), Raymond Barre (Prime Minister of France), Jean Teillac (President of CERN Council) and Marcel Vivargent (Director of LAPP, Annecy).

(Photo CERN 253.9.78)



physicist's attitude to the arms race drew animated audiences. Physics and science as a whole have a great role to play as a unifying force in human culture and the enthusiasm of the young physicists, so evident at York, augurs well for the Society which needs the support of a growing membership to fulfil its important task as a European forum of physicists.

CERN and LAPP at the Fair

From 29 September to 9 October, CERN and LAPP (Laboratoire d'Annecy de Physique des Particules) had a joint stand at the Annecy Fair — one of the biggest held in the region of Haute-Savoie in France. The stand presented high energy physics and the research facilities used by CERN and by LAPP to do this physics. The stand was a considerable success and attracted many thousands of people.

The Fair was inaugurated on 29 September by the Prime Minister of France, Monsieur Raymond Barre, who visited the stand and spoke very favourably of CERN in his opening address.

On 7 October the theme of the Fair was devoted to science. Films from CERN were projected throughout the day and talks on CERN and its work were given by Rafel Carreras and Robert Lévy-Mandel from CERN and by M. Pessard from LAPP.

A step to LEP

From 10-22 September, European high energy physicists and accelerator specialists gathered at Les Houches and CERN for a major review of the proposed large electron-positron storage ring, LEP, which is now unanimously acclaimed as the next desirable machine to extend particle physics research facilities for Europe in the future. This LEP Summer Study was under joint ECFA-CERN sponsorship with Marcel Vivargent and Sergio Fubini as Chairmen of the Organizing Committee.

The first eleven days drew some 80 people to Les Houches. Five working groups were set up — Electron-positron physics beyond PETRA energies (convener Ch. Llewellyn-Smith), Machine parameters and characteristic features (J. Le Duff), Design of interaction regions (P. Strolin), Experimentation at LEP (M. Davier) and New ideas about detectors (K. Winter). The last two in fact merged and resplit between physics topics.

On the machines itself, the focus of attention was a 'Design study of a 15 to 100 GeV e^+e^- colliding beam machine (LEP)', which was produced at CERN with the report number CERN / ISR-LEP / 78-17 and which is now commonly referred to as the 'blue book'. It emerged from the work, led jointly by E. Keil, W. Schnell and K.

Zilverschoon, which aims to have a design and report ready for the December CERN Council Session. We shall be returning to a description of the project and its physics aims in CERN COURIER about that time.

On 21-22 September summary talks from the work at Les Houches were given at CERN to packed audiences by the conveners, P. Darriulat considering polarization at LEP energies, J.B. Adams looking at the political scenario in which LEP takes its place and S.L. Glashow looking at the physics scenario(s).

Sheldon Glashow did not limit himself to things serious during the Summer Study and decorated a blackboard at Les Houches with the following:

'They all think we are building the bombs
As they scream and shout in alarm
But if they only knew it
They'd all say 'LEPS do it'
LEPS verify Weinberg-Salam'

ACCU at CERN

The CERN research facilities are now used by a very large number of physicists — the 'CERN Users'. The vast majority of them are from the scientific Institutes of the Member States and are financially supported by those Institutes. Their number, registered with CERN as 'Unpaid Associates', has risen from just under 900 in 1973 to over 1400 in 1978. The remaining CERN Users are research physicists financially supported by CERN, as established Research Staff Members, Fellows, and Scientific Associates paid fully or largely by CERN. Their number in early 1978 was about 320 (90 established staff members, 130 Fellows, 100 Scientific Associates paid fully or largely by CERN for a period of one year or more).

1. Edoardo Amaldi.
2. Abdus Salam.

It has been apparent for some time that it would be useful to have an organized channel of consultation between the CERN Direction and a representative group of CERN Users to review, at regular intervals, the practical measures and arrangements taken by CERN for the work of the Users at the Laboratory.

To that end, CERN has set up an Advisory Committee of CERN Users (ACCU). Its task is to advise the Directors-General on the practical measures taken by the CERN Management to smooth the use of the research facilities. This concerns in particular the working conditions and the arrangements for technical support.

The Chairman and members of ACCU are appointed by the Directors-General of CERN for a period of two years, with the possibility of extension but with a reasonable rate of rotation. It is intended that the members should be active users of CERN and that, for the users not paid by CERN, a balance should be established in ACCU between those mostly residing in the Institutes of their own countries and those present at CERN for longer periods of time.

The membership of ACCU has two Users, not paid by CERN, coming from each larger Member State (France, Italy, Germany, United Kingdom); one User, not paid by CERN, coming from each smaller Member State; two Users paid by CERN. Further members may be added if necessary and meetings are attended by members or representatives of the CERN Management and by a representative of the CERN Staff Association.

The Chairman of ACCU is E. Lillestøl (University of Bergen) and the Secretary is W. Blair (CERN). So far three meetings have been held and topics discussed have ranged from hostel accommodation at CERN and on-site restaurant and transport arrangements, to computing and electronics facilities for users.



1.

On people

From 7-9 September a symposium, 'Perspectives of Fundamental Physics', was held in Rome to mark the 70th birthday of Edoardo Amaldi. Organized by Carlo Schaerf and Giorgio Tecce of the Faculty of Science of Rome University, it brought together some 500 scientists from throughout the world to honour Amaldi, who has contributed so much to science and to Europe, being one of the major personalities in the history and development of CERN. The topics at the symposium reflected Amaldi's science interests and the areas of physics where his political influence has had great impact. It is a pleasure to add our greetings to a personality of such integrity, commitment and achievement.



2.

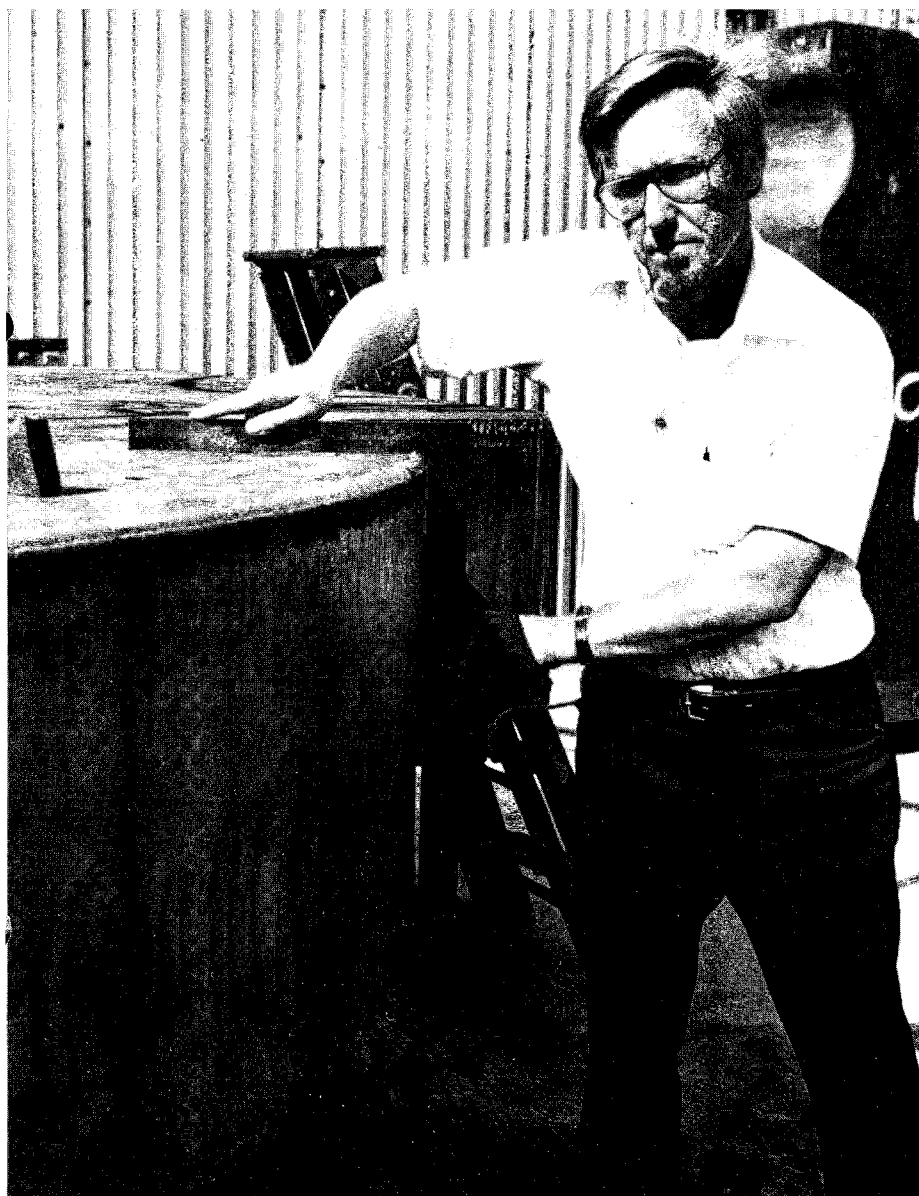
On 14-15 September a symposium devoted to the quark concept was held at Stockholm as part of the celebrations to mark the hundredth anniversary of the University of Stockholm. A very successful meeting opened by the Vice-Chancellor, Steffan Helmfrid, and Gösta Ekspong, heard talks by Don Cundy, Abdus Salam, Leon Lederman, Robert Jaffe, Gustaf Weber, Gerson Goldhaber, Harald Fritzsch, Erwin Gabathuler and Sheldon Glashow.

Abdus Salam has been awarded the American Institute of Physics 1978 John T. Tate International Medal for Distinguished Service to the Profession of Physics, for his successful efforts in bringing together physicists from different countries to collaborate on significant projects. The award no doubt recognizes in particular Professor Salam's role in creating the Trieste Centre for

The superconducting magnet of the Argonne 12 foot bubble chamber is being modified for use in the High Resolution Spectrometer (HRS) at the PEP electron-positron storage ring. Most of the 1600 tons of steel will be used intact but the end cap pieces are being extensively modified to allow access for the electronic detectors. This requires careful cutting through 60 cm thick steel pieces which, for reasons of economy, has to be done by cutting torches. Cuts of remarkable straightness were achieved

with a maximum 1.4 cm kerf, demonstrated by Klaus Jaeger who is in charge of the magnet modification. The next job will be to modify mechanically the superconducting coils to operate with their axis in the horizontal direction, rather than vertical as in the bubble chamber. Tests of the new configuration are expected in January and reassembly at PEP will take place by the fall of 1979.

(Photo Argonne)



Theoretical Physics. The award was presented by William Koch, the AIP Director, on 28 September.

Edouard Regenstreif, one of CERN's earliest staff members, died on 1 September. He had worked on the building of the PS and edited the three volume book which describes the machine in great detail. From 1963 he was Professor at the Université de Rennes.

On 26 September the first meeting of a new CERN Experiments Committee took place. It is known as the PSCC and is the result of merging the previous PS and SC Committees. The Chairman is Professor R. Klapisch from Orsay.

On 30 August Frank Sacherer from CERN and Joseph H. Weis, who was a visitor in the CERN Theory Division, died in a mountaineering accident in

the French Alps. Frank Sacherer had established himself as one of the world's leading accelerator theorists. He contributed greatly to the understanding of instabilities and, more recently, to the theory of stochastic cooling. Joe Weis was from the University of Washington in Seattle and an expert on multiparticle production. Some of his last findings were used extensively in the recent LEP Summer Study in Les Houches.

Edward Salant, for almost twenty years a member of the Brookhaven Physics Department prior to his retirement in 1966, died on 13 September. He was involved in many important emulsion experiments including the first observation of accelerator-generated kaons.

Meetings

The 1979 Particle Accelerator Conference on accelerator engineering and technology (the eighth in the USA series) will be held in San Francisco on 12-14 March. Further information may be obtained from Ruth Thor Nelson, SLAC, P.O. Box 4349 Bin No. 11, Stanford CA 94305, USA.

The International School of Nuclear Physics offers a course on 'Heavy Ion Interactions at High Energies' at Erice, Sicily from 26 March to 6 April 1979. Further information may be obtained from Sir Denys Wilkinson, University of Sussex, Falmer, Brighton BN1 9RH, UK.

The eighth International Conference of High Energy Physics and Nuclear Structure will be held at the University of British Columbia, Vancouver, Canada, on August 13-17, 1979. Enquiries should be sent to Dr. E. G. Auld at TRIUMF regarding registration and accommodation and to Dr. D.F. Measday regarding the programme and submission of papers.

The High Energy Physics Division at Argonne National Laboratory, a major R & D facility near Chicago, Illinois, is seeking well-qualified experimentalists at both the Assistant Physicist and Postdoctoral levels.

Current research programs include polarized proton beam experiments at the ZGS, the prototyping and construction of colliding beam detectors for both PEP and Fermilab, and the design of a high energy polarized proton beam for Fermilab. ZGS polarized beam experiments involve high statistics studies of exclusive channel reactions to investigate baryon spectroscopy and production mechanisms, and measurement of total and elastic cross sections in specific spin states using polarized targets.

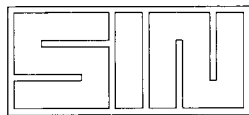
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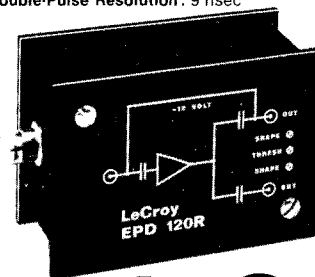
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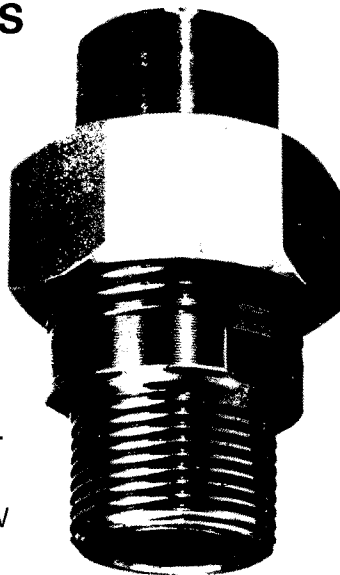
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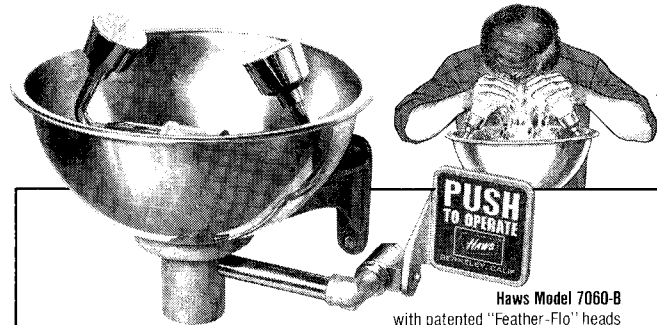
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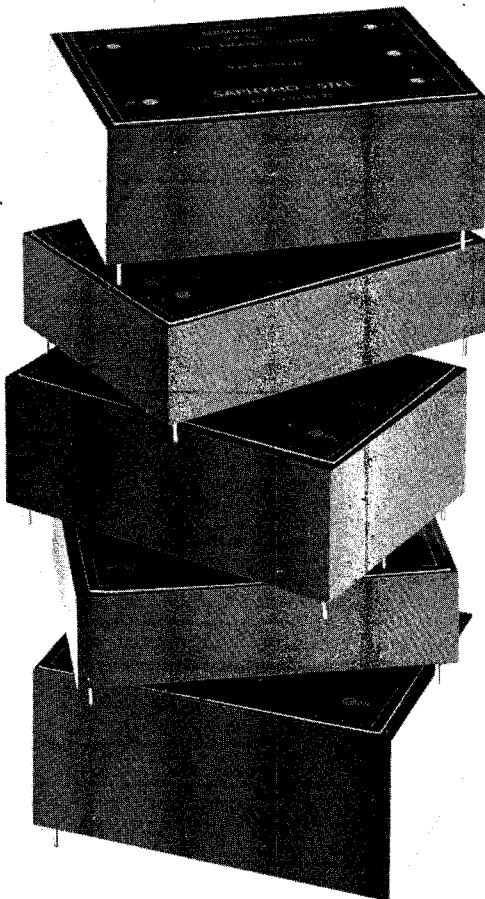
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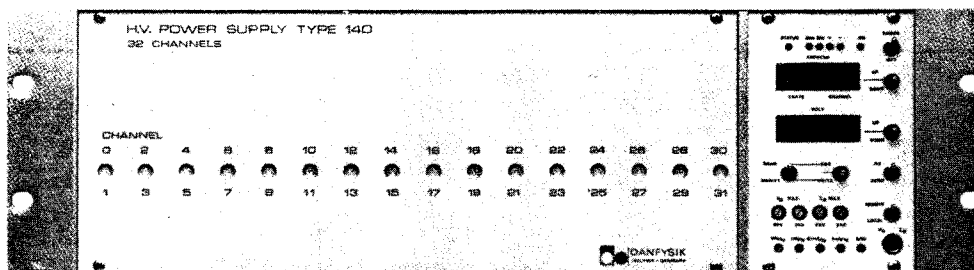
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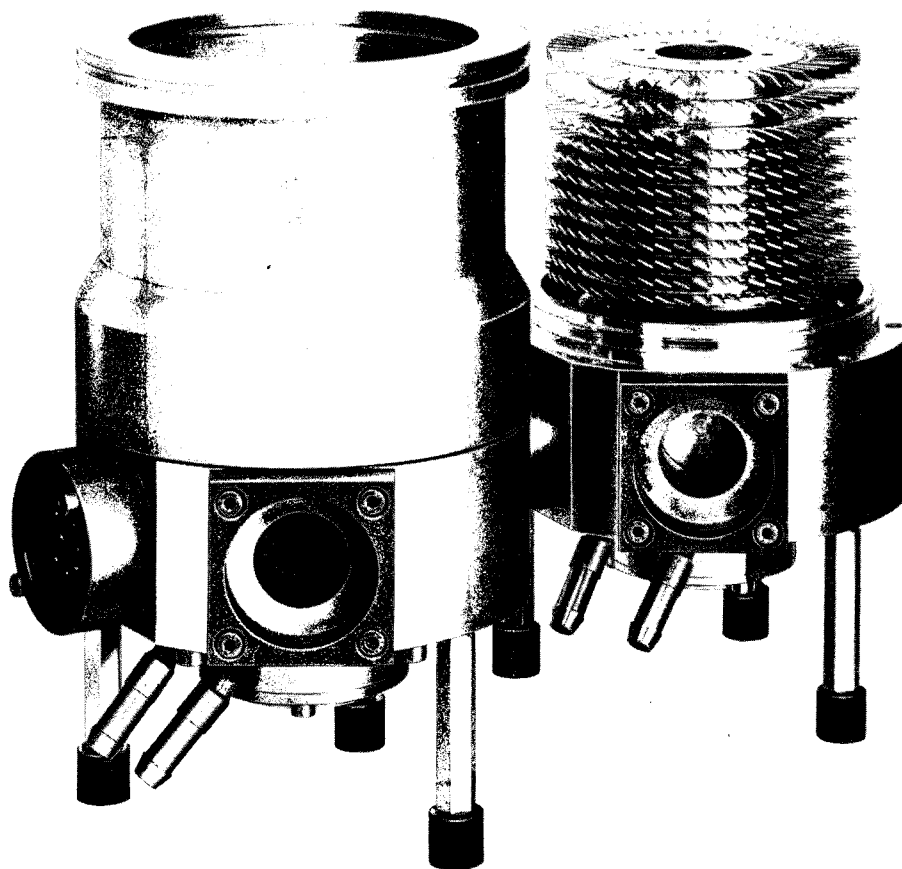
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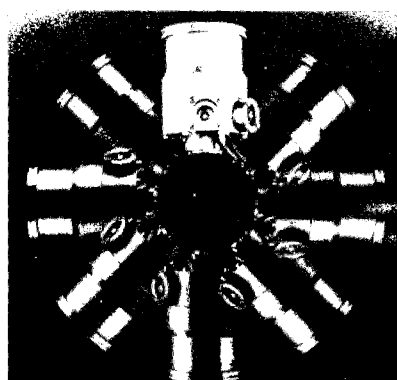
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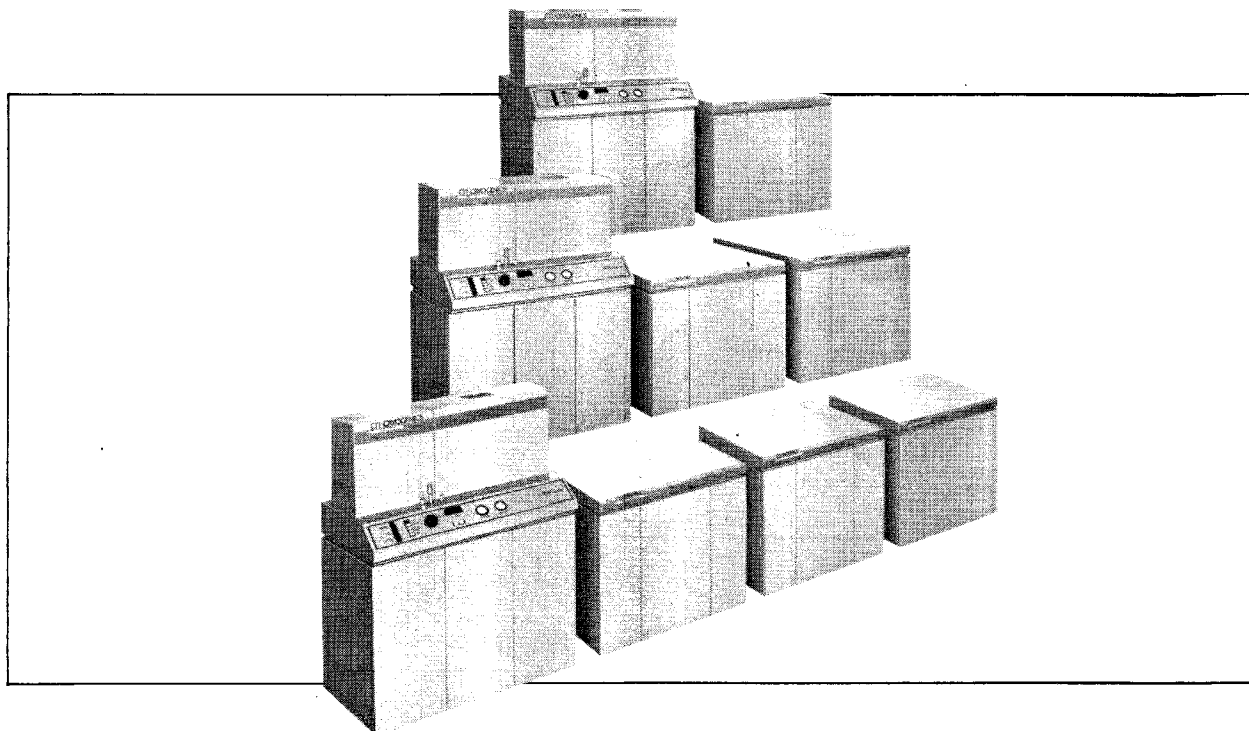
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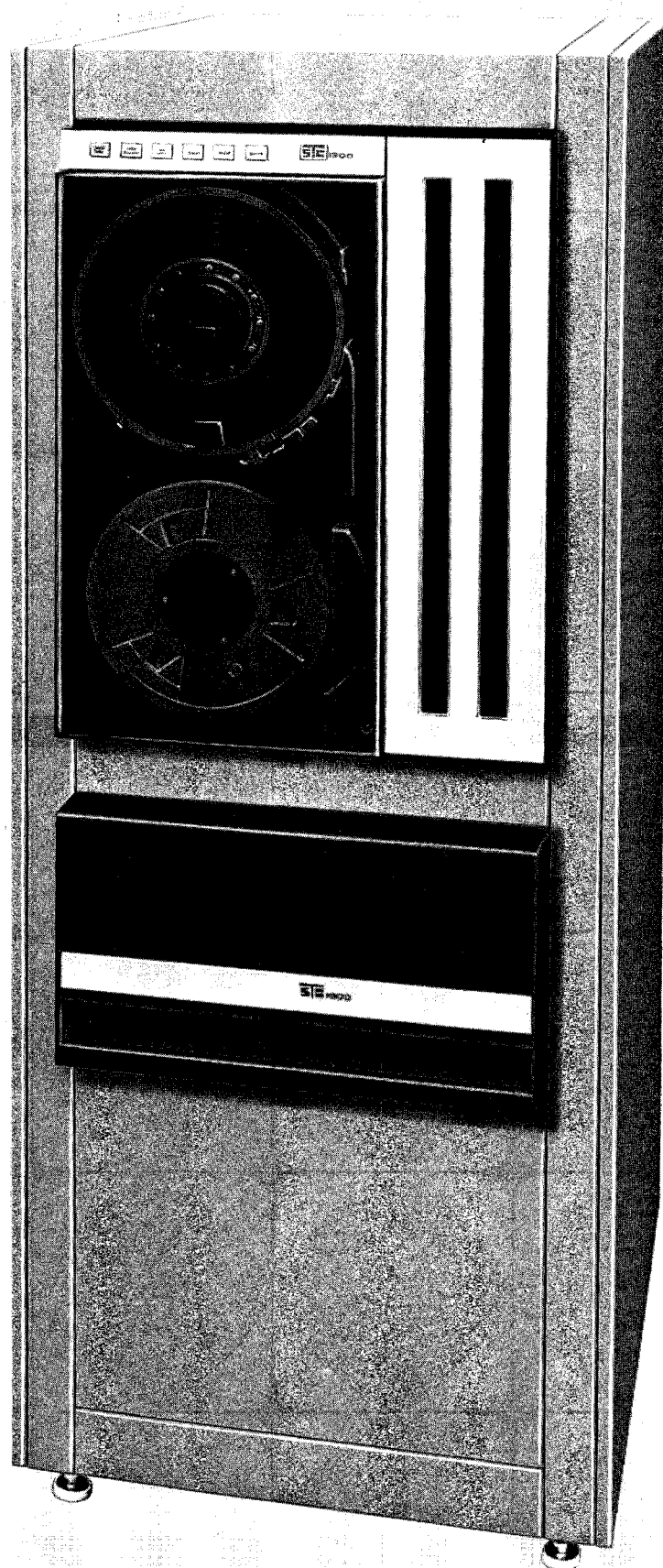
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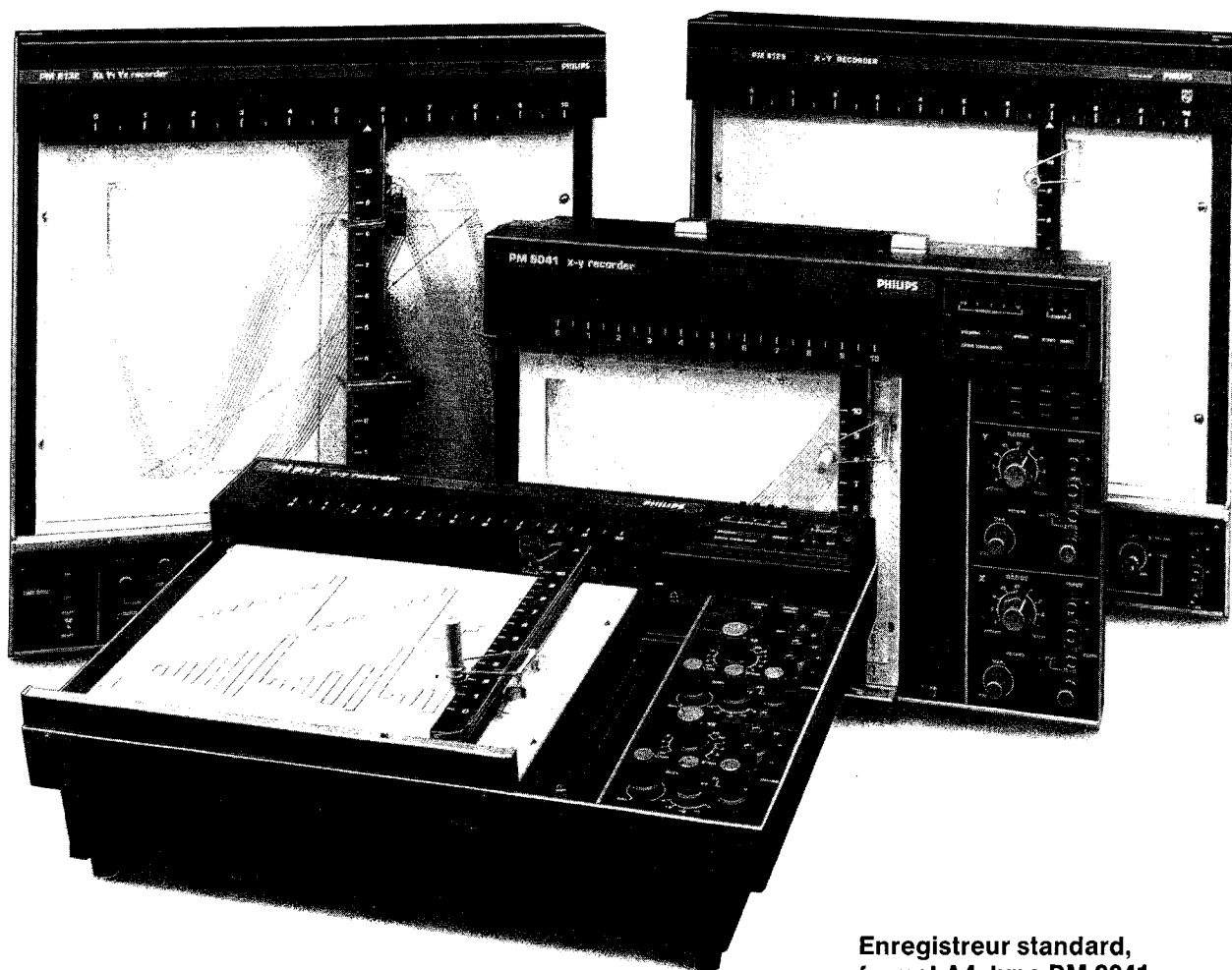
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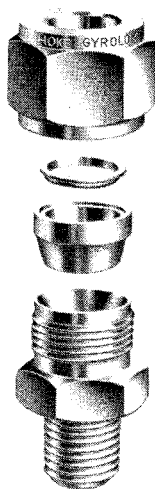
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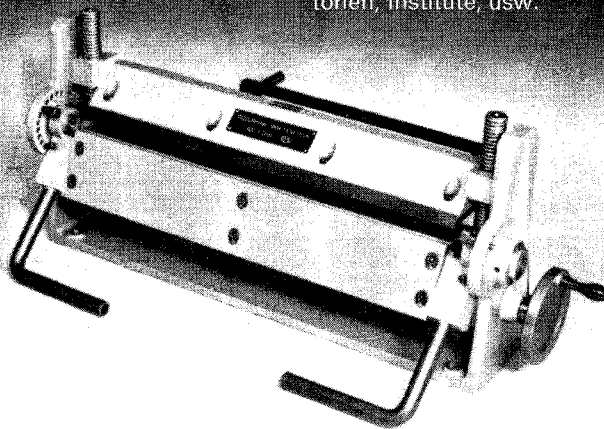
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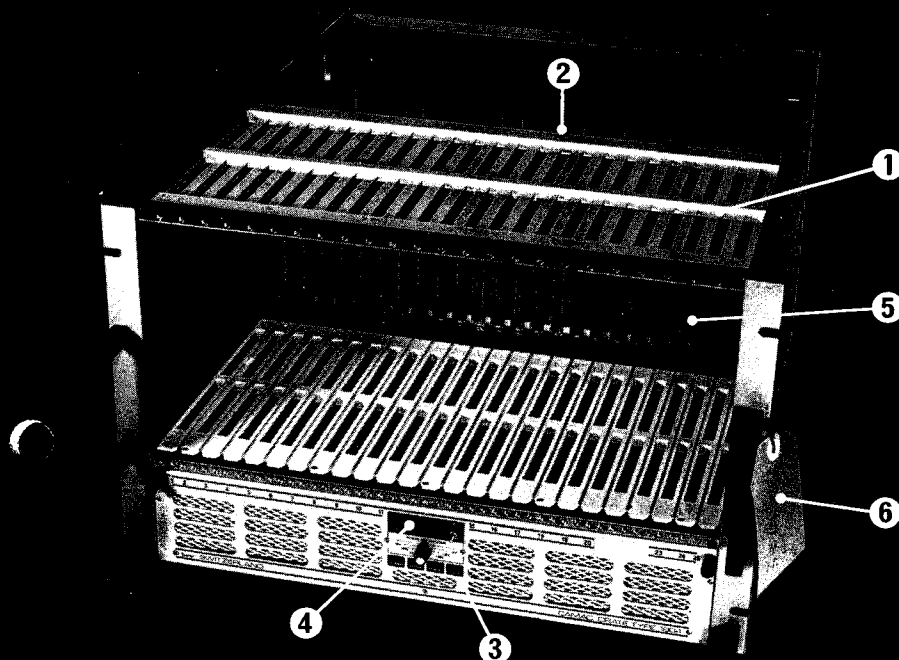
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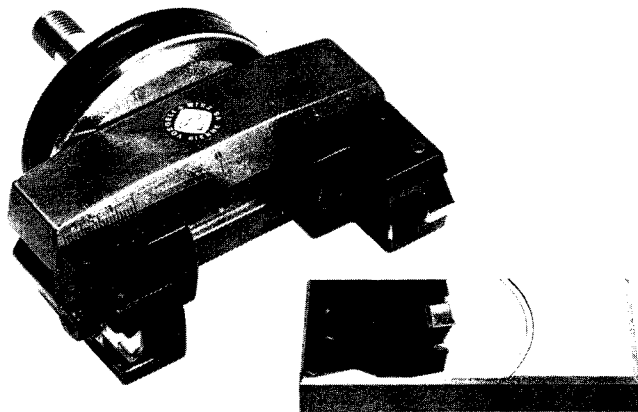


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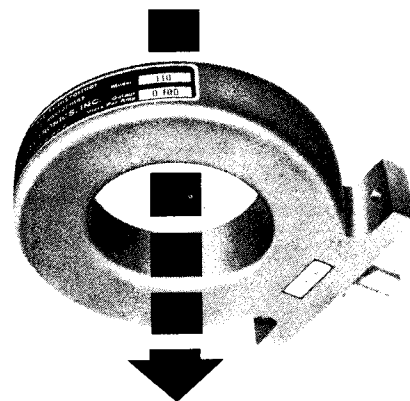
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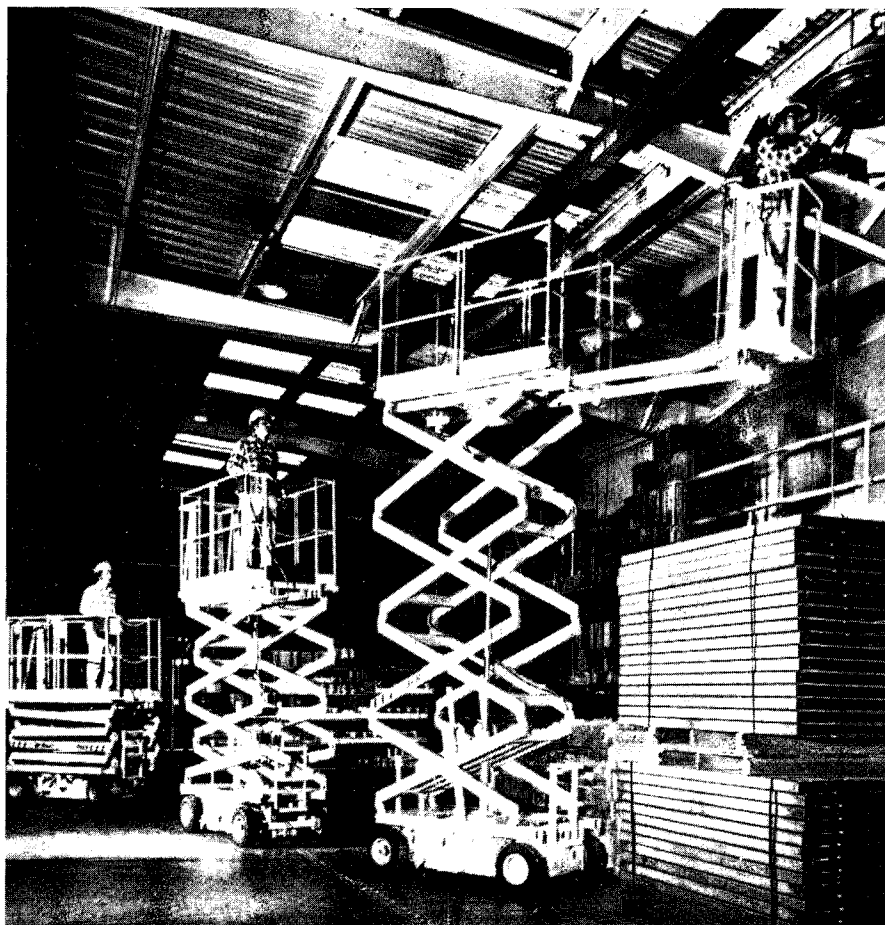
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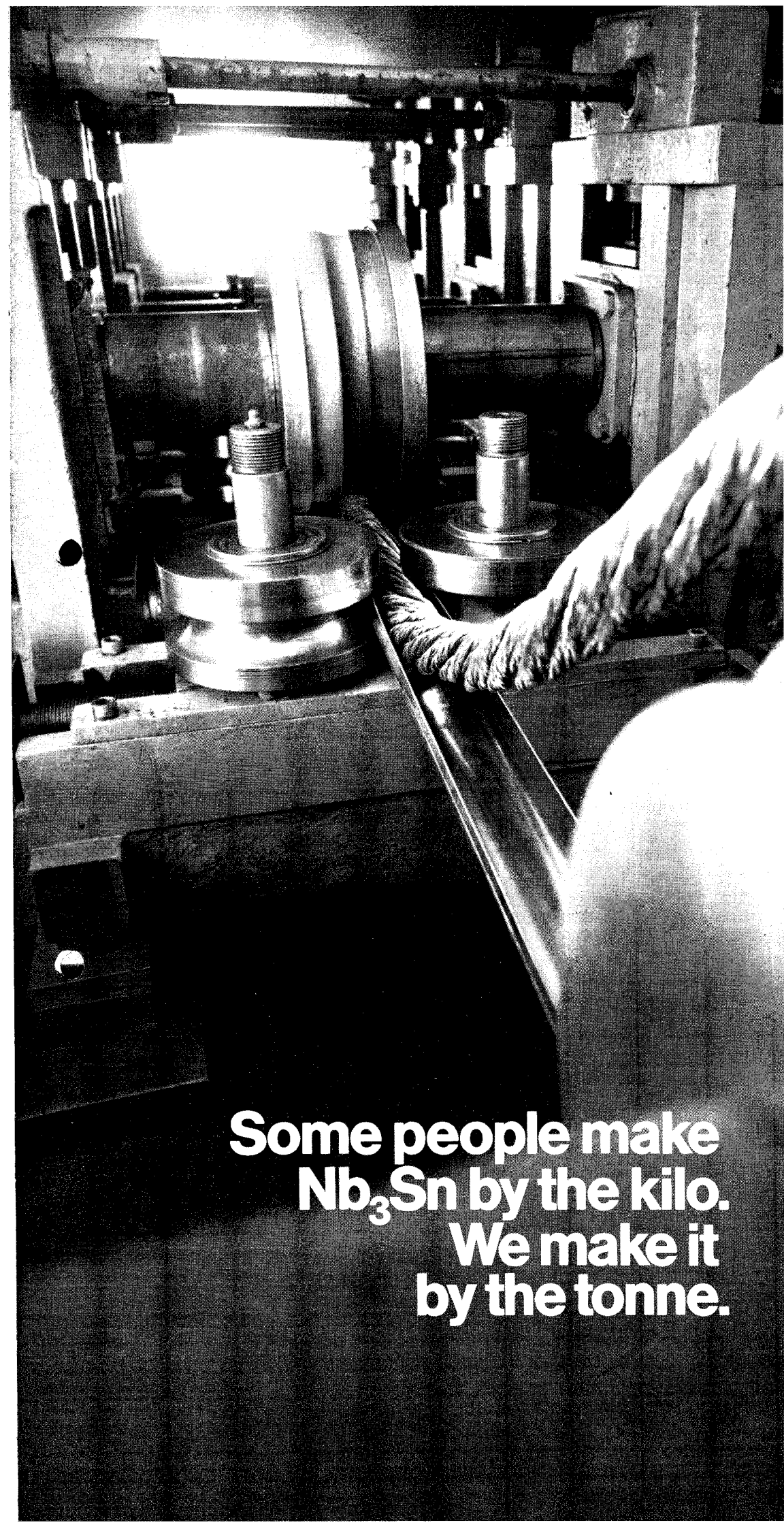
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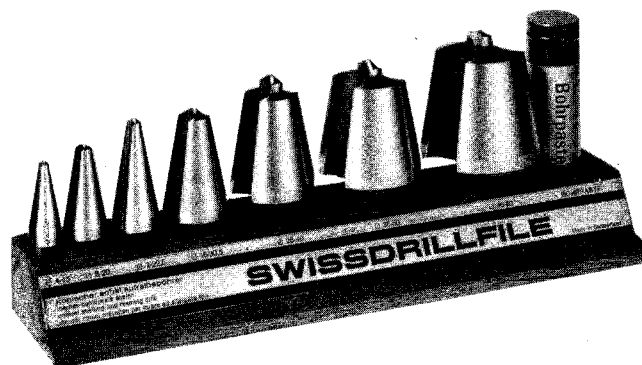
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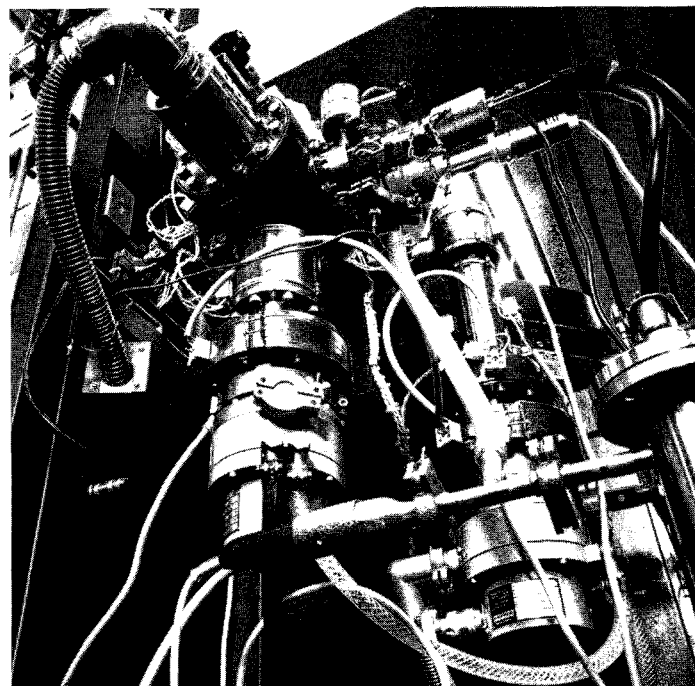
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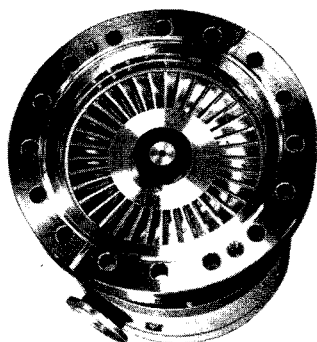
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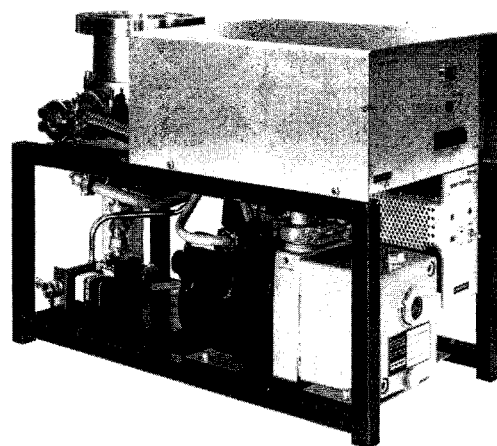
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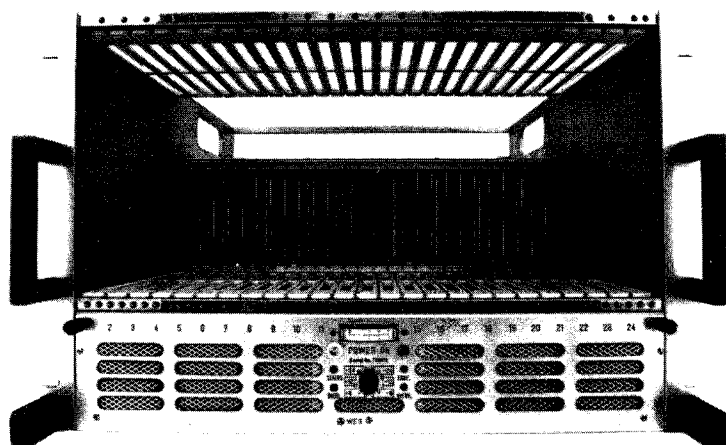


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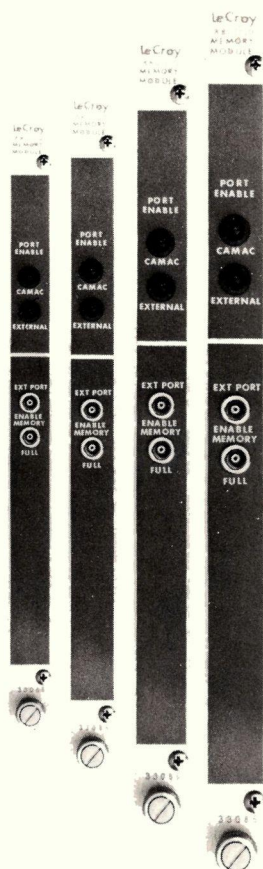
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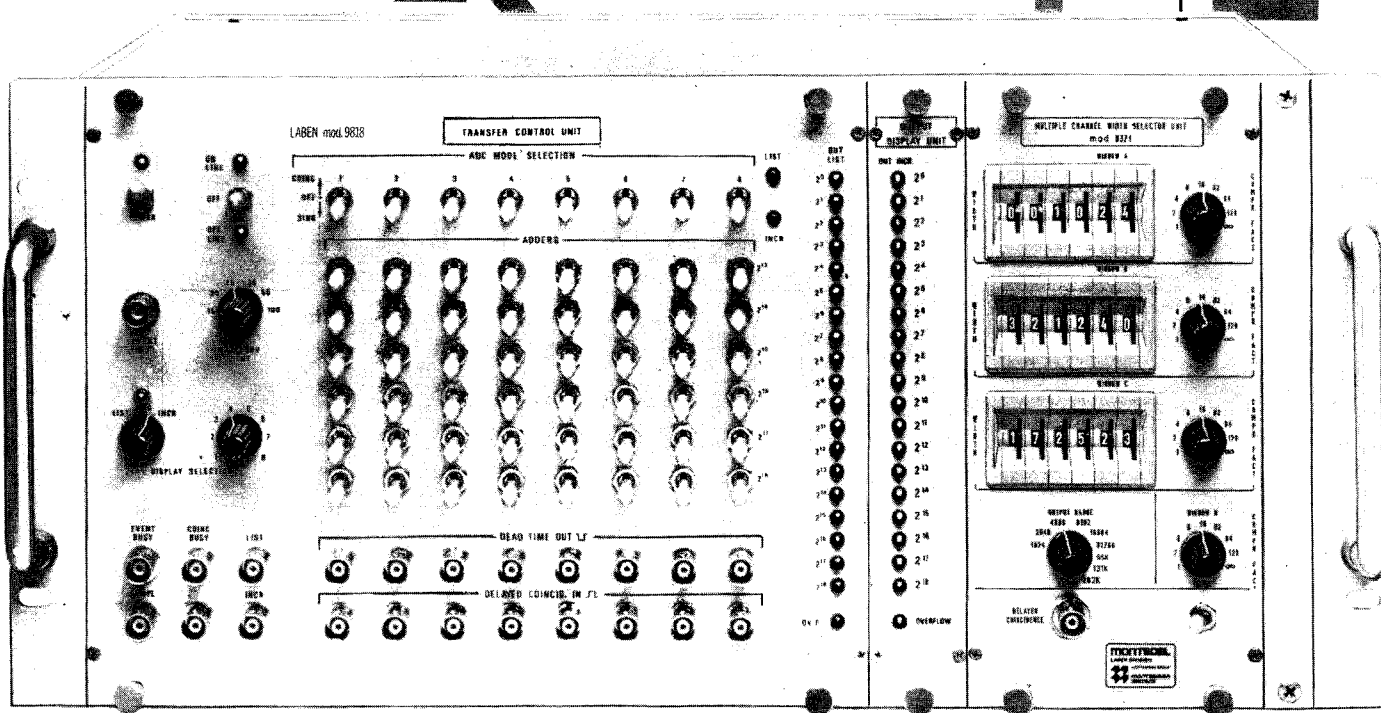
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CAMAC NEWS

New Mini Crate Enhances 8010 Microcomputer System

WITH THE ADVENT of Kinetic-Systems new mini crate, you can now realize all the advantages of the CAMAC computer interface standard within a small stand-alone microcomputer system.

This mini crate version of our 8010 Microcomputer System offers you both an economical way to automate your laboratory process and limitless capabilities for expansion. It is specifically designed for your small system requirements and for applications needing distributed processing.

Twelve stations within the crate provide for:

- crate controller
- microcomputer
- memory
- I/O modules

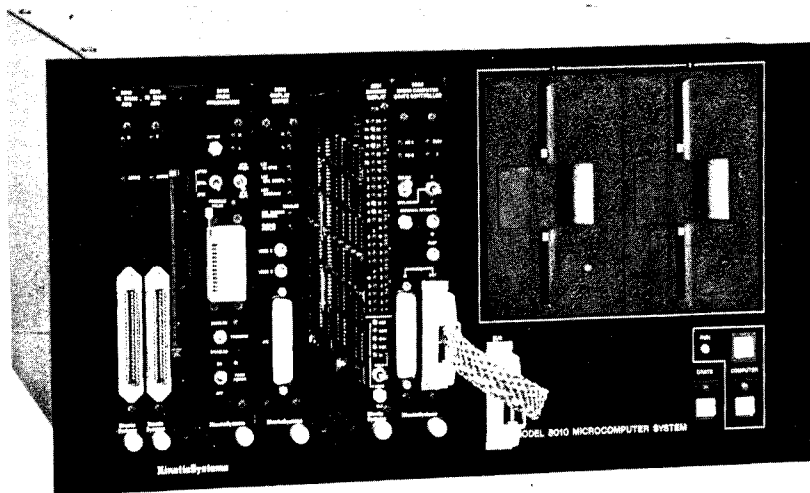
The right-hand enclosed portion of the crate contains two Minifloppy™ disk drives, a disk controller, and power supplies. An optional CRT terminal is also available.

As with our standard crate version of the 8010, the mini 8010 can:

- provide fast access of remote points
- be configured for distributed processing
- be programmed in either BASIC or 8080 assembly language

Since BASIC is quickly learned and easily used, you can begin almost immediately to program your system; and because BASIC is an interpretive language, you can implement changes to your program in seconds.

Due to the modularity of CAMAC, either 8010 System is inherently flexible and can be easily expanded into a number of different configurations.



- As many as six additional crates can be accommodated on the microcomputer's peripheral bus. Each crate uses a 3908 Microcomputer Crate Controller to communicate with the microcomputer.
- The 8010 System can drive a CAMAC serial or branch highway with up to seven remote crates on the branch highway and up to 62 remote crates on the serial highway.
- Remote intelligence is easily accomplished by placing an 8010 System on a CAMAC serial highway. In this configuration, the 3908 Crate Controller is replaced by a 3909 Auxiliary Crate Controller along with a 3952 type L-2 Serial Crate Controller. It is thus possible to have up to 62 crates, microcomputer-controlled, at any point along the highway with these remote systems being monitored by a main computer or another 8010 System.

™ Minifloppy is a registered trademark of Shugart Associates.

An 8010 System Includes:

- a 1500 standard CAMAC crate or a 1510 mini crate
- a 3880 microcomputer module
- a controller for the minifloppy disk drives
- a 3816 memory module with 16 kilobytes of RAM and 5 kilobytes of PROM (and expansion for 11 kilobytes more)
- a 3908 crate controller (or, optionally, a 3909 auxiliary crate controller and a 3952 type L-2 serial crate controller)
- two 5400 minifloppy disk drives
- an optional CRT terminal
- the following software on diskette or PROM (including one blank diskette): DOS, BASIC (with CAMAC extensions), 6001 monitor program and test CAMAC, 6009 CAMAC list program, 6013, editor, and 6010 macro assembler
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Please contact us for additional information

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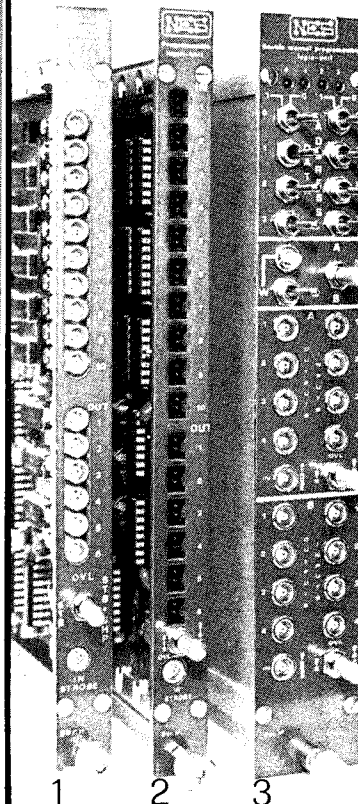
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ANY LOGICAL COMBINATION OF THE INPUTS IS ALLOWED EITHER BY MANUAL PROGRAMMING OR BY CAMAC CONTROL, DEPENDING ON THE MODULE.

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- 1**
 - NIM signal
 - 10 inputs
 - 6 outputs
 - CAMAC programming
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 - 10 inputs
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 - CAMAC programming
- 3**
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 - NIM signal
 - 4 inputs
 - 4 outputs
 - Manually programmable

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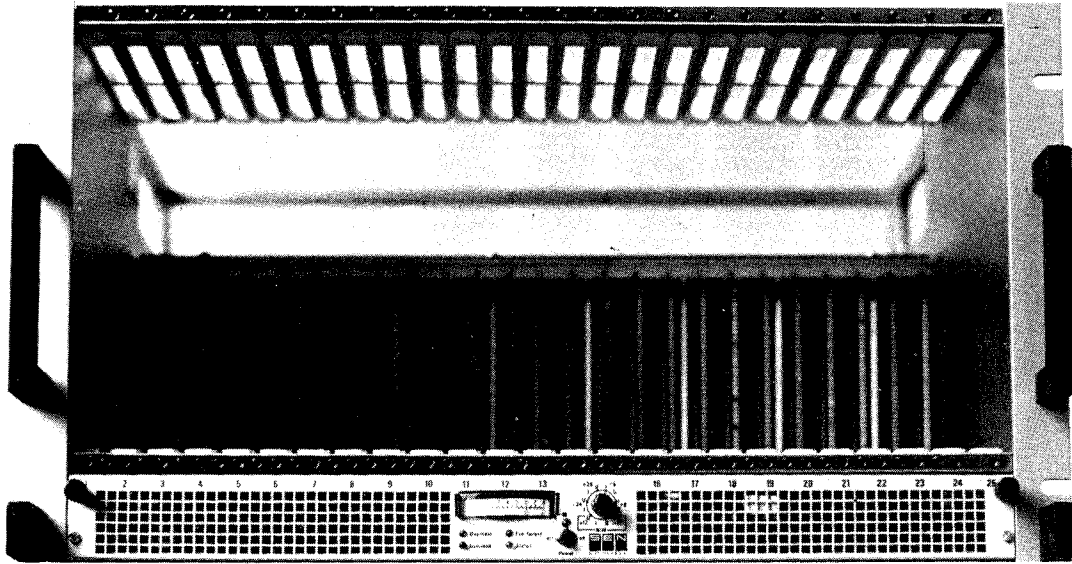
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WHAT'S NEW IN CAMAC 300 WATT POWERED CRATES?



THE NEW SEN 2093 AND 2094
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- * less power dissipation through mains pre-regulation
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- * output cards interchangeable with SEN CPC 2057.

The new crates are available in the following versions:

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SEN 2093: 300W, 4 voltages: $\pm 6V$, $\pm 24V$.

PLUS

- * SEN 470: 300W NIM crate, 6 voltages, especially designed for the new high-density ECL-based NIM electronics.

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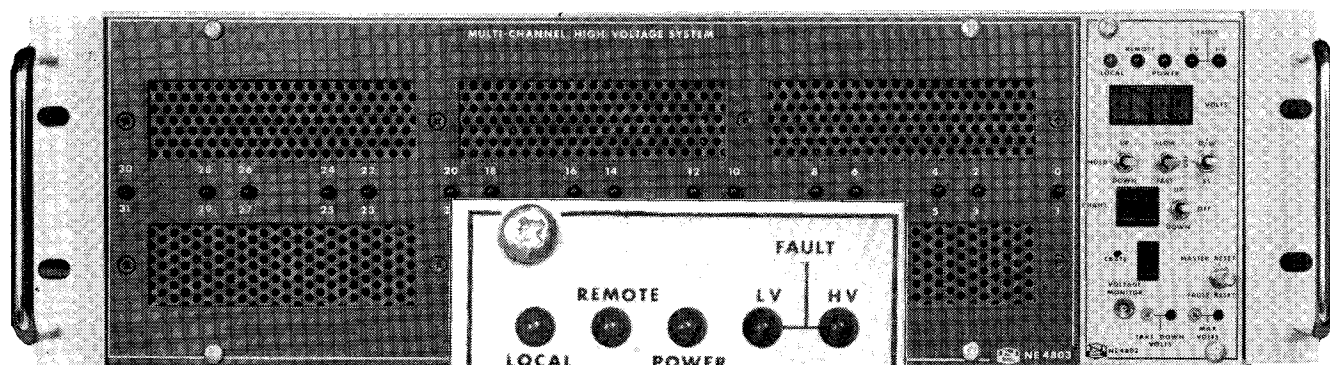
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Multichannel High Voltage System

NE 4800 SERIES

- * For use with large photo-multiplier detector arrays and wire chambers.
- * Economical
- * Easily serviced
- * Manual control of each channel or external control by Teletype or computer control via CAMAC

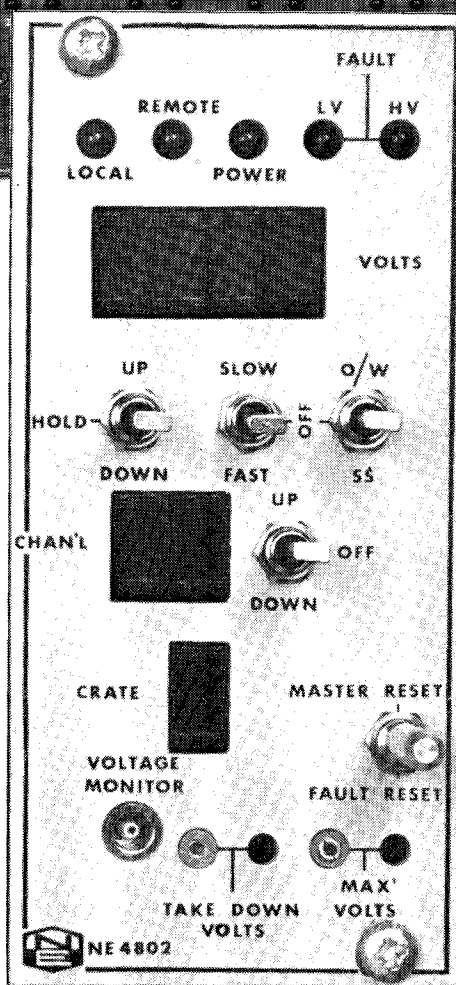


NE 4803 PHOTOMULTIPLIER HV

Outputs Up to 32 per crate
Voltage 300V to 3kV negative (positive optional)
Current 0 to 2mA average per channel, 3mA max
Stability 0.1% for line and temperature, range 0°C to +50°C
Ripple <0.5V peak to peak at 2mA
Protection Protected against short circuits on output
Overload Common overload line activated when any channel is overloaded
HV Monitoring From rear panel connector on common analogue line. Ratio 1V/1kV
Packaging 3' u' high rack containing 16 cards each with 2 individual outputs

NE 4802 HV CONTROL MODULE

Common to PM and wire chamber systems. Allows local control of any of the HV channels in the associated crate.
Control Range 0 to 6999V
Resolution ±0.5V
Up/Down 3 toggle controls provide voltage increment/decrement from single step to 200V/s.
Monitor 1V/kV trimmable to 0.05% at a specific voltage
Take Down Range 0 to 2500V set by front panel control (common to all channels)
Maximum Voltage Range 1kV to 7kV set by front panel control (common to all channels)
Data Bus Serial duplex, 20mA current loops. The control signals are based on the ASC11 code allowing remote control of any channel (256 per remote controller output) using either a remote Camac controller or a Teletypewriter (or similar) terminal.



NE 4804 WIRE CHAMBER HV

Outputs 16 per crate
Voltage 2.5kV to 7kV negative (positive optional)
Current 0 to 0.7mA
Stability 0.1% for line and temperature, range 0°C to +50°C
Ripple <1V peak to peak at 0.5mA
Overshoot <50V
Protection Protected against short circuit on output
Current limit Presettable for each channel 10μA to 700μA
Overload alarm Common overload line activated when any one channel goes into current limit
HV Current Monitoring From rear panel connector on common analogue line. Ratio 1V/1kV or 1V/100μA
Meter Indication Meter indicates voltage or current for each channel

Typical system: NE 4801 Crate and Low Voltage, NE 4802 Control, NE 4803 PM cards X16 = 32 channels, or NE 4804 wire chamber cards X16 = 16 channels

Request full details and new NIM Catalogue from:

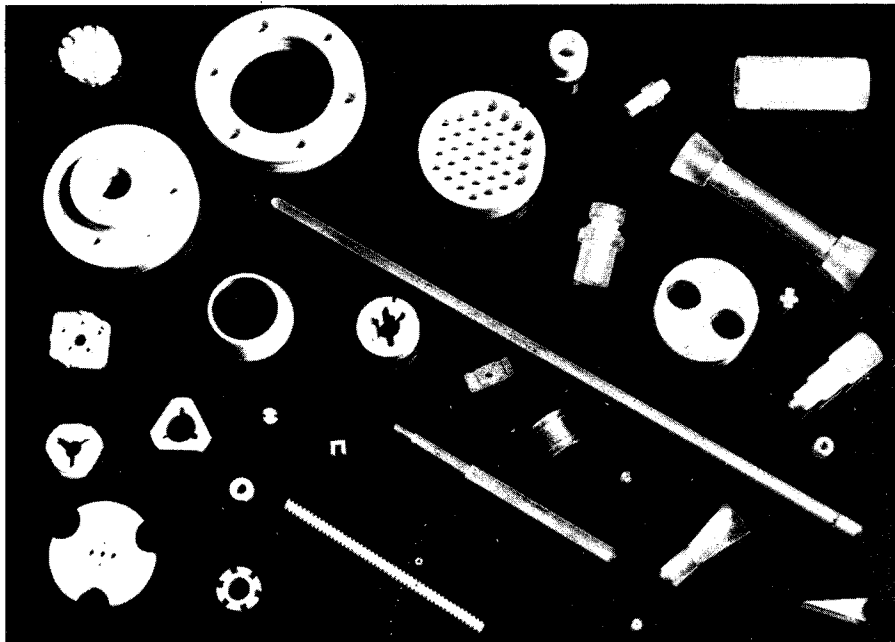
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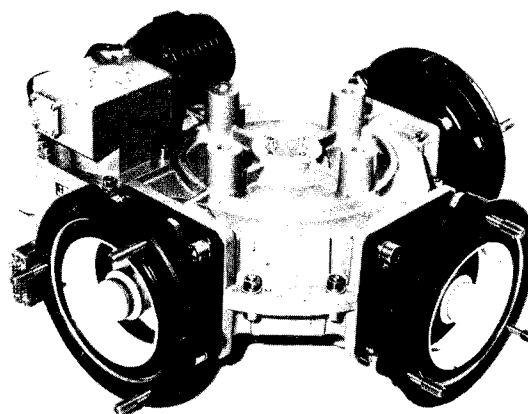
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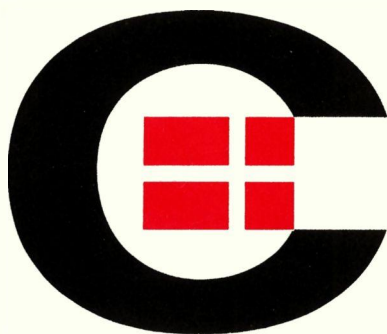
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