

# Shrewsbury Electronic Engineers Ltd

All the skills of the Electronic, Electrical and Electro-Mechanical Industry have long been established in our Shrewsbury factory.

**HARTLEY ELECTROMOTIVES LTD**, first established operations here in 1949 and became well known in the T.V. and centralised dictation system markets, and also introduced a number of products, which included oscilloscopes and domestic house electrical wiring systems. At the same time the Company received many M.O.D. contracts and in particular established a reputation for its work on the design and manufacture of Sonar equipment for the Royal Navy.

In 1972 Hartley Electromotives was taken over by **C & N ELECTRICAL INDUSTRIES**, which in turn became a major part of the **CRAY ELECTRONICS GROUP**.

With the support of the Group, facilities at Shrewsbury have been progressively developed and with effect from 1st May, 1979, the operations at Shrewsbury, whilst remaining within the Cray Electronics Group, were formed into an autonomous Company under the new name of **SHREWSBURY ELECTRONIC ENGINEERS LTD**.

The combination of comprehensive manufacturing facilities and experienced personnel enables the Company to offer a well established service of Design, Development, Manufacture and Repair of Equipment for the Electrical, Electronic and Light Mechanical Engineering industries for sub-contracts or major individual contracts in the United Kingdom and overseas.

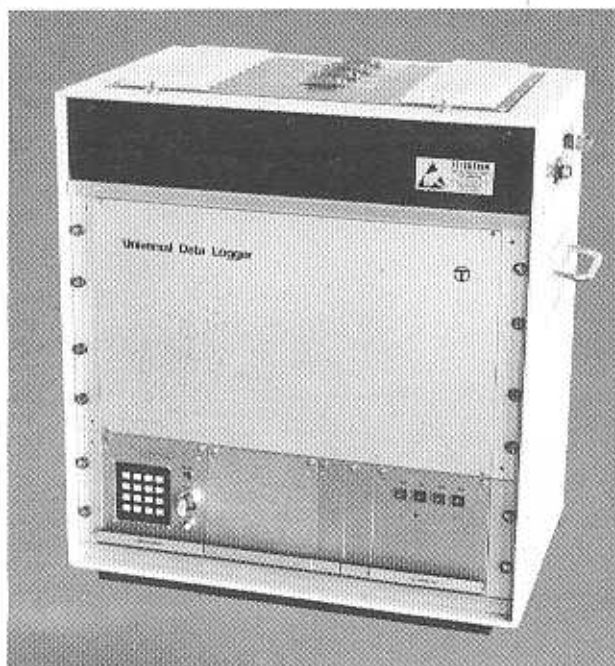
Any of these facilities are available separately or can be combined to produce complete pieces of equipment. Flexibility of manufacture enables the Company to produce single items, prototypes or production runs. Equipment can be designed and manufactured to customers individual requirements, or manufactured to customers' drawings.

Particular attention is paid to quality, which includes an on-site calibration laboratory. A proportion of production is for the Ministry of Defence, and the Company is approved to DEF-STAN. 05-21.

Although best known for the service to industry, the Company has also become the largest manufacturer in the United Kingdom of Microfiche Readers of all types, which are sold under the name **MICROSEE**.

For any additional information you require please contact our Sales Department on:—

Shrewsbury (0743) 56343



## Universal Data Logger

*A SOPHISTICATED MONITORING SYSTEM DEVELOPED AND PRODUCED BY SHREWSBURY ELECTRONIC ENGINEERS LIMITED FOR USE IN BRITISH TELECOM EXCHANGES. - AN EXAMPLE OF SOFTWARE AND HARDWARE FROM OUR DESIGN AND DEVELOPMENT DEPARTMENT.*

# Design and Development Department

The Company's Design and Development Department offers the capability of taking a requirement from the system definition stage through design and prototype development to pre-production models for both small and large production quantity requirements. This includes "one-off" systems and equipments.

Design capability covers linear, digital and microprocessor based products, and includes hardware design and software development.

The Company has particular expertise in the fields of digital communication, telemetry and data analysis systems, TV monitoring and control equipment, and special purpose test equipment design.

Microprocessor experience has included the Z80, 6502 and NSC800 microprocessors and associated software.

# Test Department

In our Test Department we have an extensive range of test equipment which is regularly calibrated to traceable standards, and enables testing to be carried out on a wide range of equipment employing technology ranging from thermionic right up to microprocessor based products.

Automatic test equipment facilities enable rapid functional checking of large quantity batches of PCB assemblies.

Our test capabilities also cover a wide range of wound components, whilst calibration procedures and our policy of keeping abreast of developments in test equipment technology ensures the continuance of reliability of our measurements.



*AUTOMATIC TEST EQUIPMENT IN OUR TEST DEPARTMENT.*

# The Cray Electronics Group

Shrewsbury Electronic Engineers is part of the Cray Electronics Group, which offers an engineering service in many fields, and gives this Company the advantage of considerable back-up from other parts of the Group, particularly for specific manufacture which may not be available in our Shrewsbury factory.

## Other Companies in the Cray Electronics Group

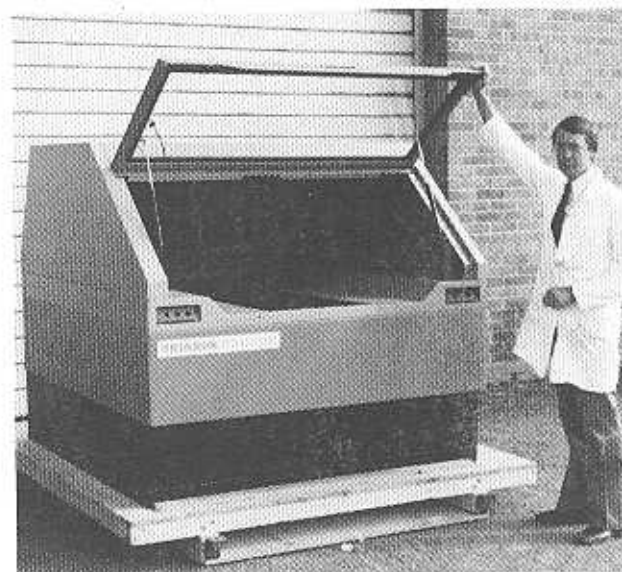
Cray Precision Engineers Ltd., Crayford, Dartford, Kent.	R.T. Laboratories Ltd., Wells, Somerset.
C & N Electrical Industries Ltd., Gosport, Hampshire.	Eurotel Ltd., Weybridge, Surrey.
Consep Ltd., Gosport, Hampshire.	J & S Marine Ltd., Barnstaple, Devon.
Cray Capacity Tools Ltd., Telford, Shropshire.	J & S Precision Ltd., Crawley, Sussex.
J O Grant & Taylor (London) Ltd., Potters Bar, Herts.	Stead Publications Ltd., Fareham, Hampshire.

including:

Vohurst Security Systems Ltd.,

Associated Company:— Triaxon Ltd.,

Barnstaple, Devon.

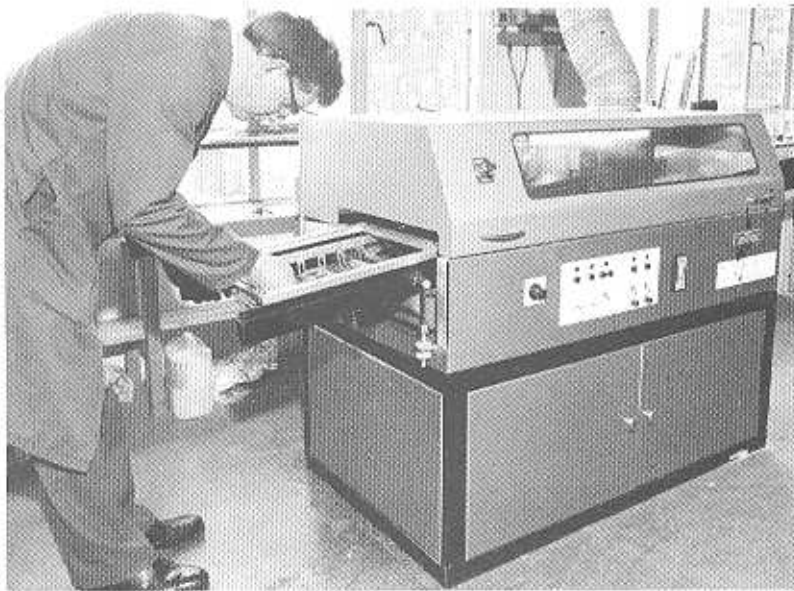


*A PAINTED SHEET STEEL ENCLOSURE FOR A TRIAXON PRINTED CIRCUIT BOARD DRILLING MACHINE READY FOR DESPATCH FROM SHREWSBURY ELECTRONIC ENGINEERS LTD.*

# Assembled Printed Circuit Boards



*MANUAL ASSEMBLY  
SEMI-AUTOMATIC ASSEMBLY USING MICROPROCESSOR  
CONTROLLED OVERHEAD PROJECTORS  
HAND SOLDERING  
FLOW SOLDERING  
(up to 10" WIDE x 14" LONG)  
ULTRASONIC CLEANING  
ENCAPSULATION  
FULL TEST FACILITIES  
INCLUDING MEMBRAN SYSTEM 730  
AND BEAVER MAJOR A.T.E.*



## Coil Winding

*TRANSFORMERS, CHOKES,  
FILTERS, SOLENOIDS ETC.*

*48 TO 12 s.w.g.*

*UP TO APPROX. 6" DIA. x 10" LENGTH*

*WAVE WINDING*

*MINIATURE FERRITE POT CORES*

*LARGE FORMERS AND BOBBINS AIR CORED,  
FERRITE, LAMINATED AND "C" CORED*

*OPEN OR SEALED*

*DRIP VARNISHED*

*VACUUM VARNISH IMPREGNATION*

*WAX OR OIL IMPREGNATION*

*ENCAPSULATION AND POTTING*

*PLASTIC INJECTION MouldING*

*LOW AND HIGH VOLTAGE*

# Metalwork

COMPREHENSIVE SHEET  
METAL WORKING,  
FINISHING AND  
MACHINING FACILITIES  
INCLUDING:-

GUILLOTINES (UP TO 8FT)

PRESS BRAKE (8FT)

FOLDERS

ROLLS

PRESSES (UP TO 200TONS)

TURRET PRESSES  
(STRIPPIT AND AMADA)

WELDING

TURNING (INCLUDING  
EMI-MEC AUTO SPRINT S,  
2" CAPACITY THROUGH  
SPINDLE)

MILLING

GRINDING

DRILLING

PLATING (ZINC AND  
CADMIUM AND  
PASSIVATING

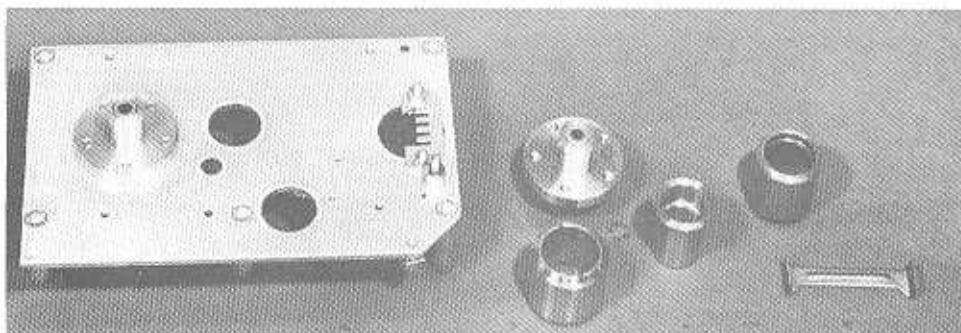
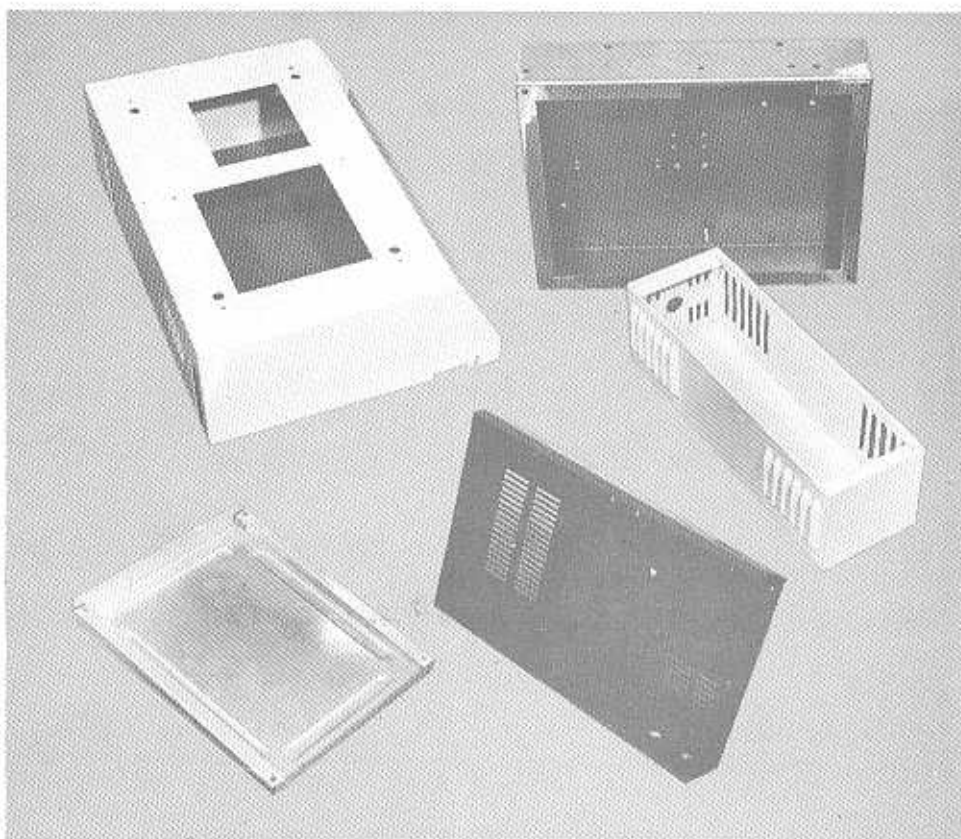
PAINTING

STOVING

ENGRAVING

SILK SCREEN PRINTING

TOOL ROOM (PARKER  
TEMPLET TOOLING  
DIVISION)



# Wiring and Assembly

CABLES

CABLEFORMS

HARNESSES

WIRING

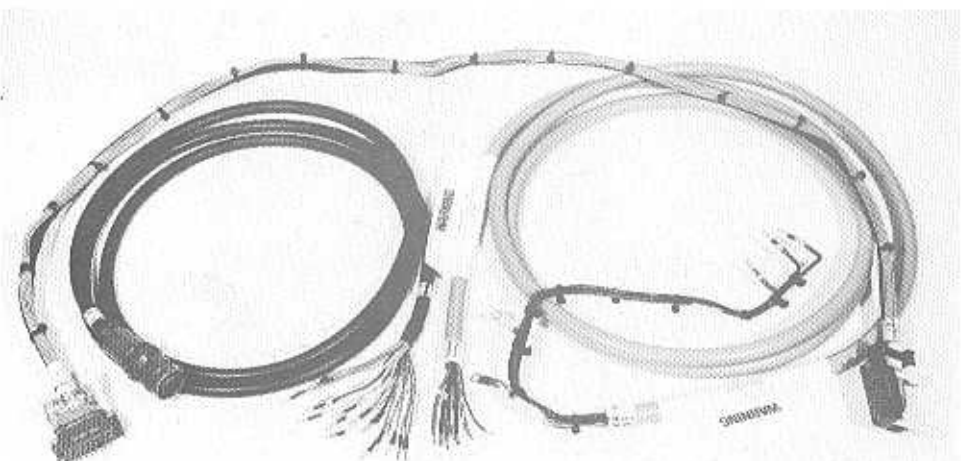
SOLDERED CONNECTIONS

CRIMPING

WIRE WRAPPING

MECHANICAL ASSEMBLY

CLEAN AIR ROOM



# Ministry of Defence — Post Design Services

(05-21 APPROVED)

Our Company offers an established Post Design Service to Ministry of Defence Establishments. Present staff complement is eight, including five engineers, and this number is expected to increase by one or two during 1983. New opportunities are sought to enable the Company to expand this section further.

Post Design work has been carried out by the Company and its predecessors for over fourteen years. All current Post Design work is administered by DUWP from AUWE, Portland, and this has been the case for several years. Currently the Company is Post Design Contractor for the sonars 2007, 193, 189, 182, 170 and 170M. Facilities include a well fitted-out laboratory which houses reference sets on loan from the Ministry of Defence, and includes power conversion equipment for providing "ship" supplies to energise the reference equipment.

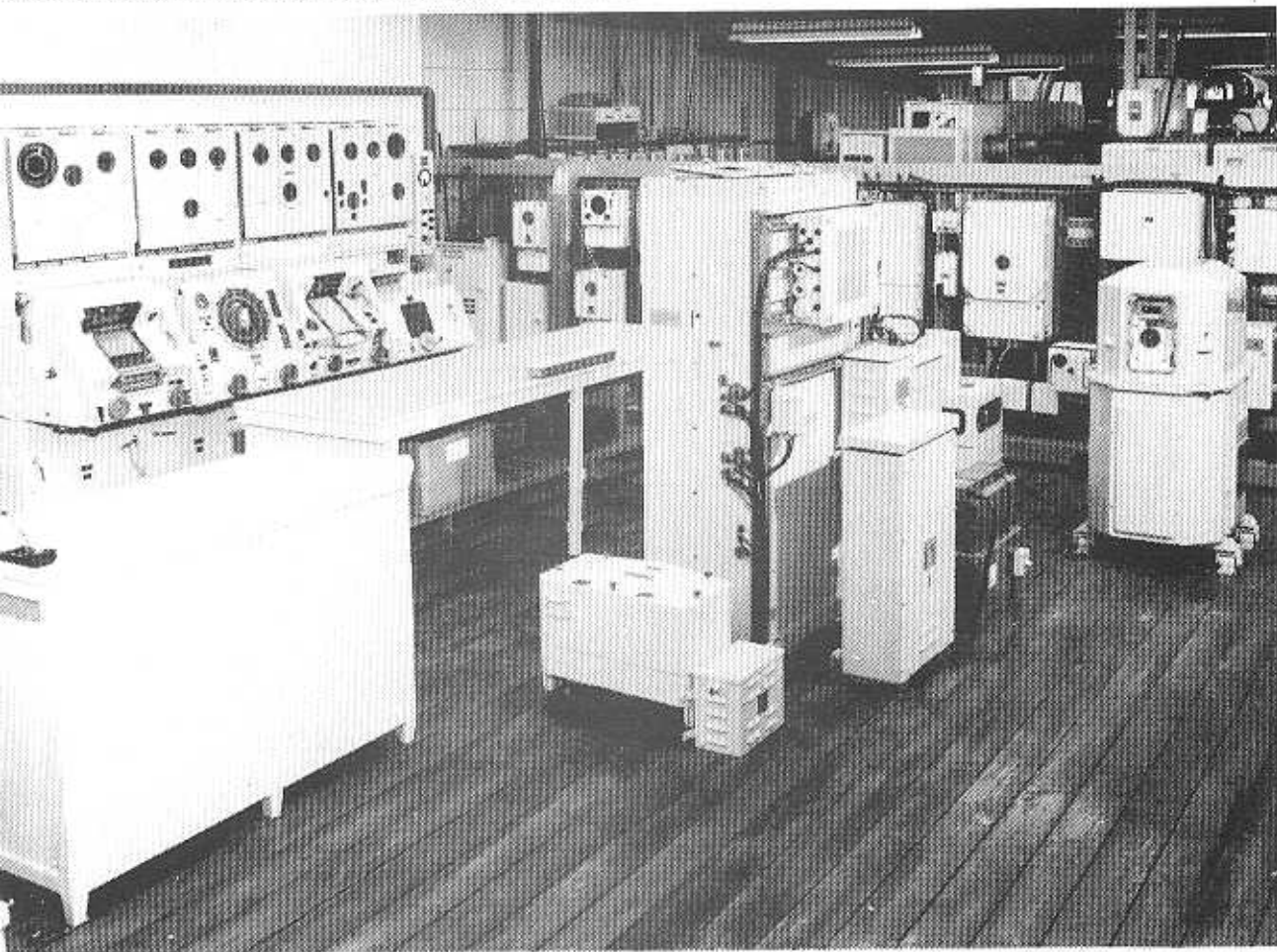
Significant projects have included:

- a) The design of a Head Amplifier Unit for Sonar 193, to increase signal to noise ratio and improve sensitivity. The units are now in production.
- b) Design and produce prototype modification kit for Sonar 170M, to decrease dead range and make the Sonar more versatile.
- c) Design balanced input for Sonar 185 to reduce noise. This modification is now in production.
- d) Engineer interface to operate Speedscan from a standard Sonar 193.
- e) Engineer shipborne interface to enable Trainer A/S 1090 to operate from a standard Sonar 193.

In addition to AUWE, work has also been carried out for ASWE, Portsmouth. Work is currently in hand for ACO, Plymouth, involving "soak" tests on a Type 5 Gyro-Stabiliser.

Most of the work involves the electronics discipline, but our Company also has capabilities in the electrical and mechanical engineering areas, and can obtain specialist advice when required.

The Post Design Section is supported by the Company's comprehensive production facilities, including repair of equipment, and the manufacture and supply of spare parts.

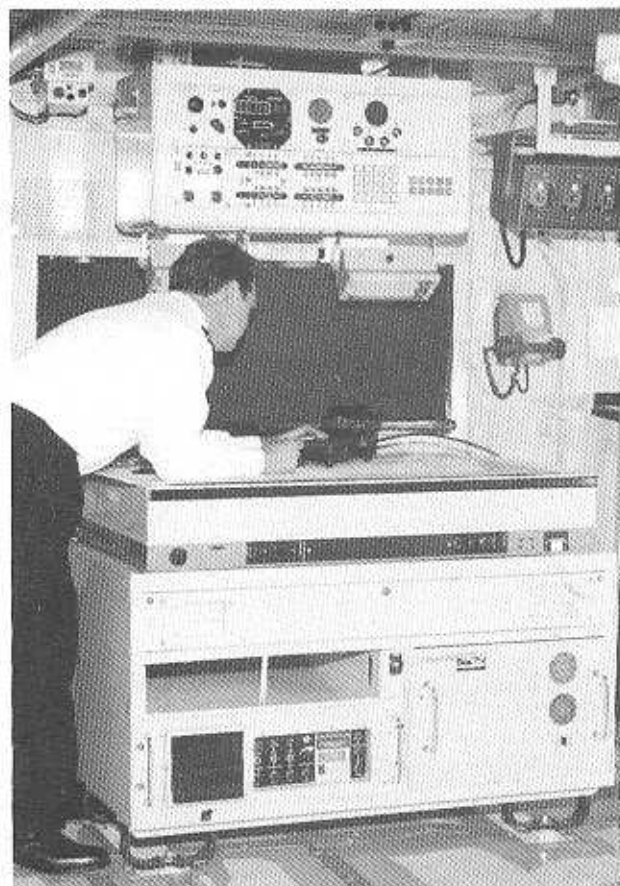


SONAR REFERENCE SETS IN OUR SHREWSBURY FACTORY

# Defence Equipment

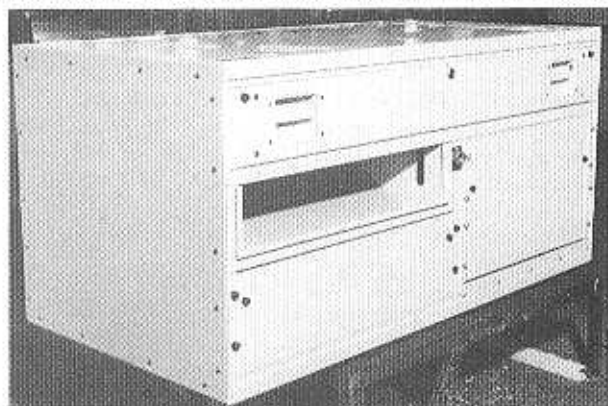
(05-21 APPROVED)

OUR COMPANY IS PLEASED TO UNDERTAKE A VARIETY OF DESIGN, DEVELOPMENT, MANUFACTURING AND REPAIR WORK FOR MINISTRY OF DEFENCE ESTABLISHMENTS.

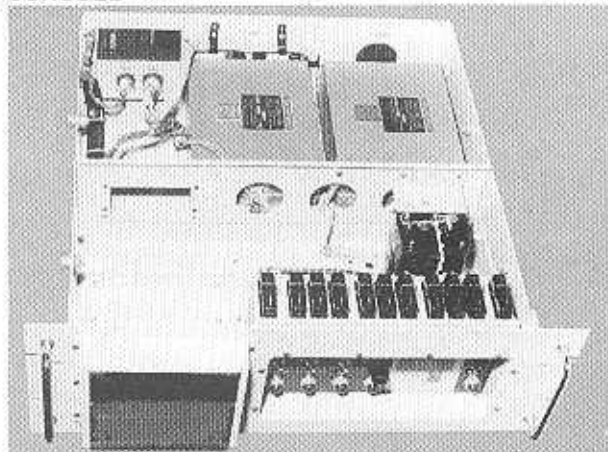


(PHOTO COURTESY OF SMITHS INDUSTRIES)

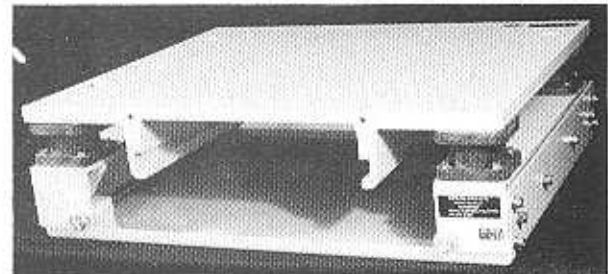
THE SHIP'S NAVIGATION AND PROCESSING SYSTEM (SNAPS) IS AN INTEGRATED POSITIONING SYSTEM WHICH ASSISTS IN THE ACCURATE AND SAFE NAVIGATION OF SURFACE SHIPS AND SUBMARINES. THE COMPUTER AND PLOTTING TABLE ARE MADE BY SMITHS INDUSTRIES. THE READY WIRED CONSOLE AND EQUIPMENT DRAWER ARE MADE AND SUPPLIED TO THE NAVY BY SHREWSBURY ELECTRONIC ENGINEERS LTD.



CONSOLE



EQUIPMENT DRAWER



MOUNTING FOR TELEPRINTER



R F MOBILE SCREENED CAGE

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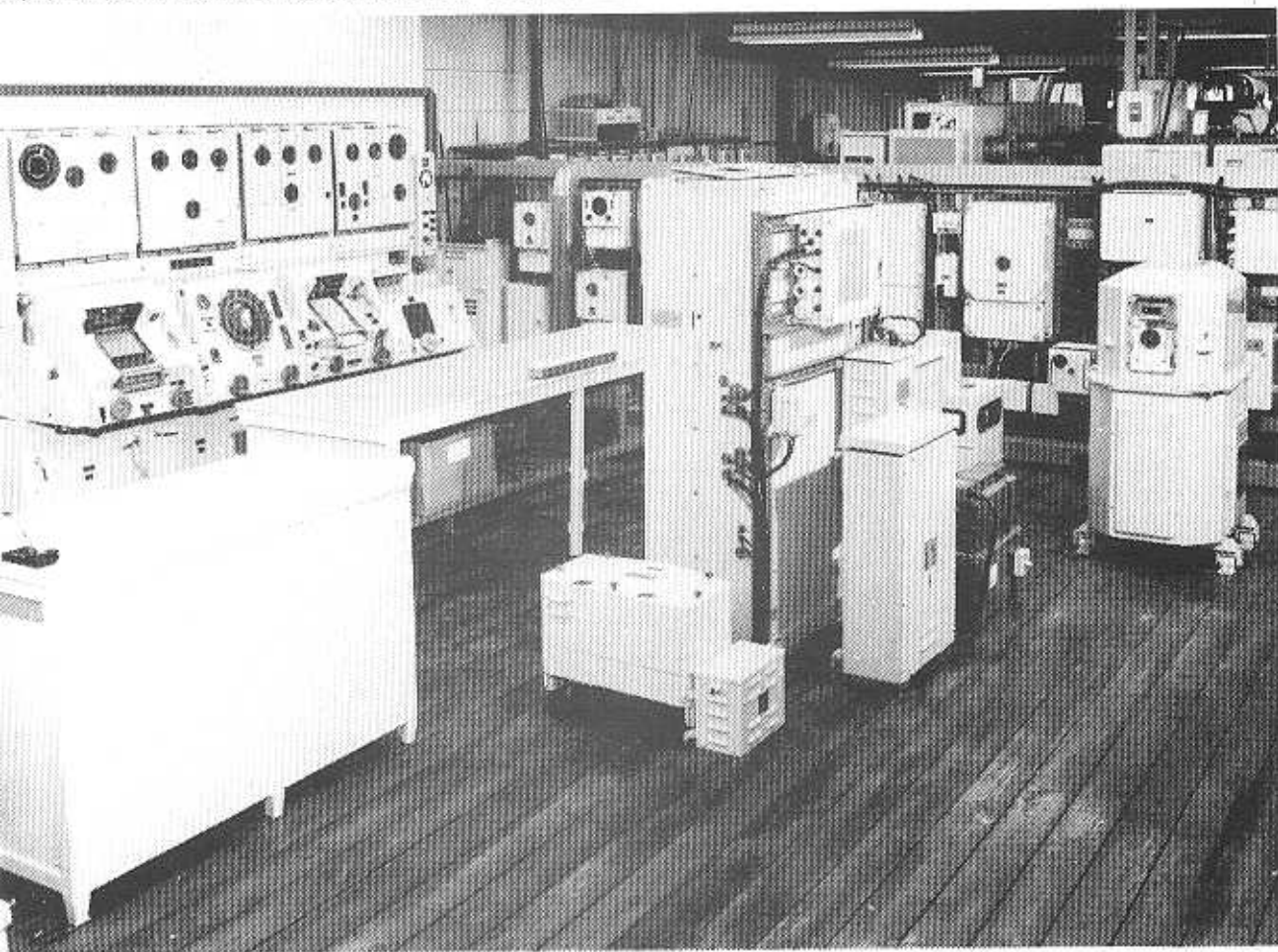
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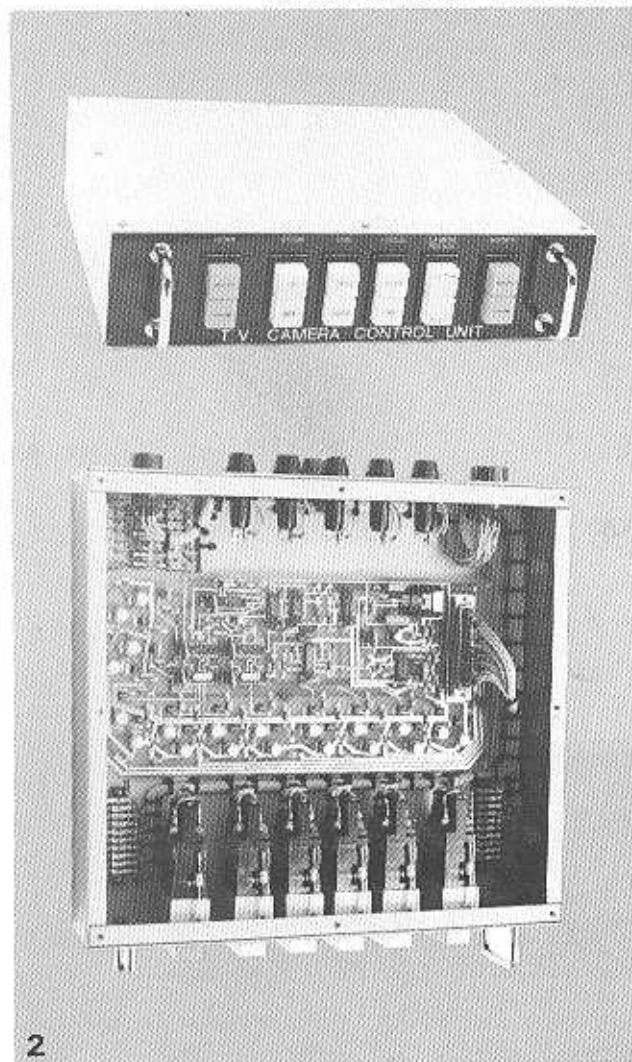
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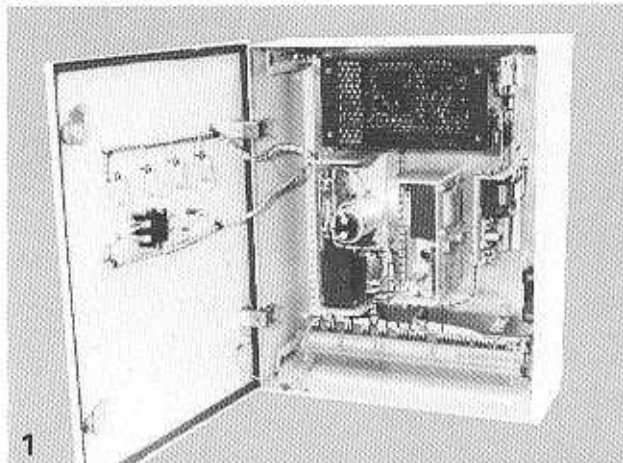
SONAR REFERENCE SETS IN OUR SHREWSBURY FACTORY

# Equipment for Nuclear Industry

APPROVED BY BRITISH NUCLEAR FUELS LIMITED



2

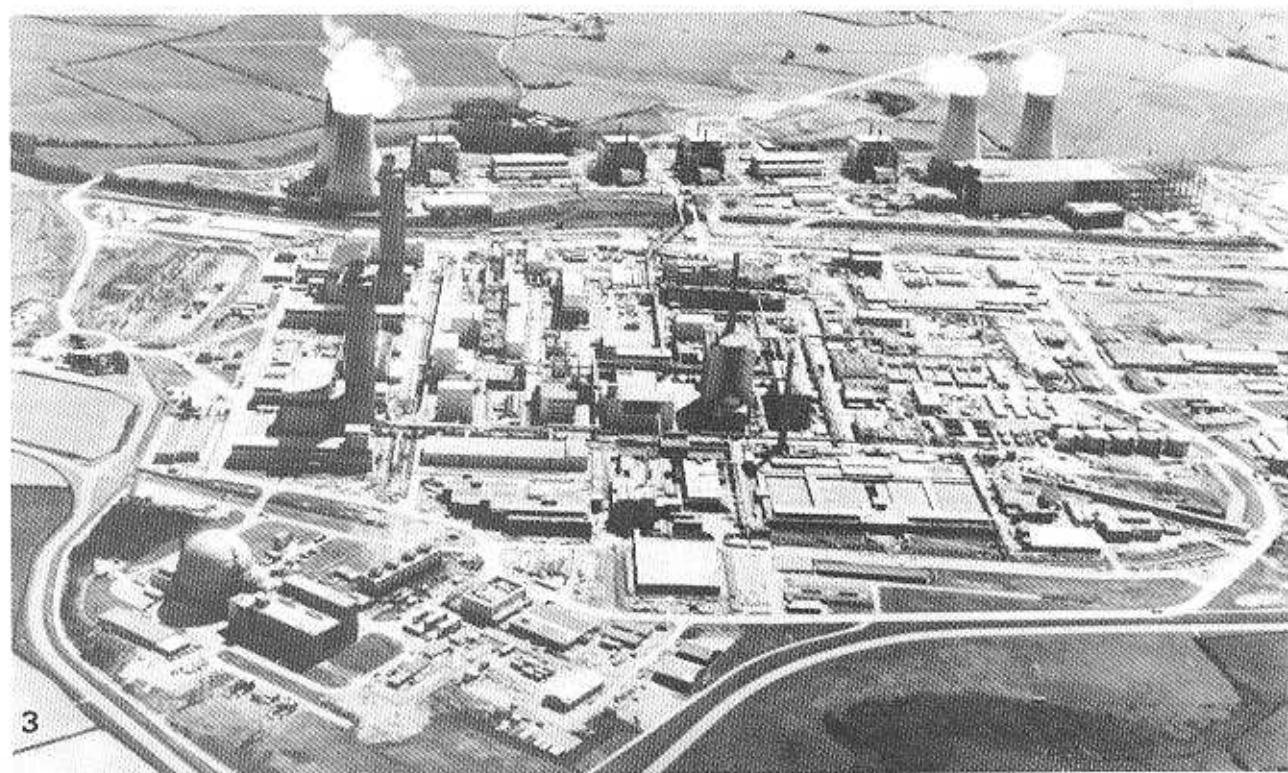


1

1 **POWER SUPPLY** for TV Camera Control System as manufactured for BNFL including metalwork, plating engraving, painting, wiring and testing.

2 **TV CAMERA CONTROL UNIT** for Remote Control Surveillance in radiation areas, as manufactured for British Nuclear Fuels Limited (BNFL) including printed circuit board layout and assembly, metalwork, engraving, painting, wiring and testing.

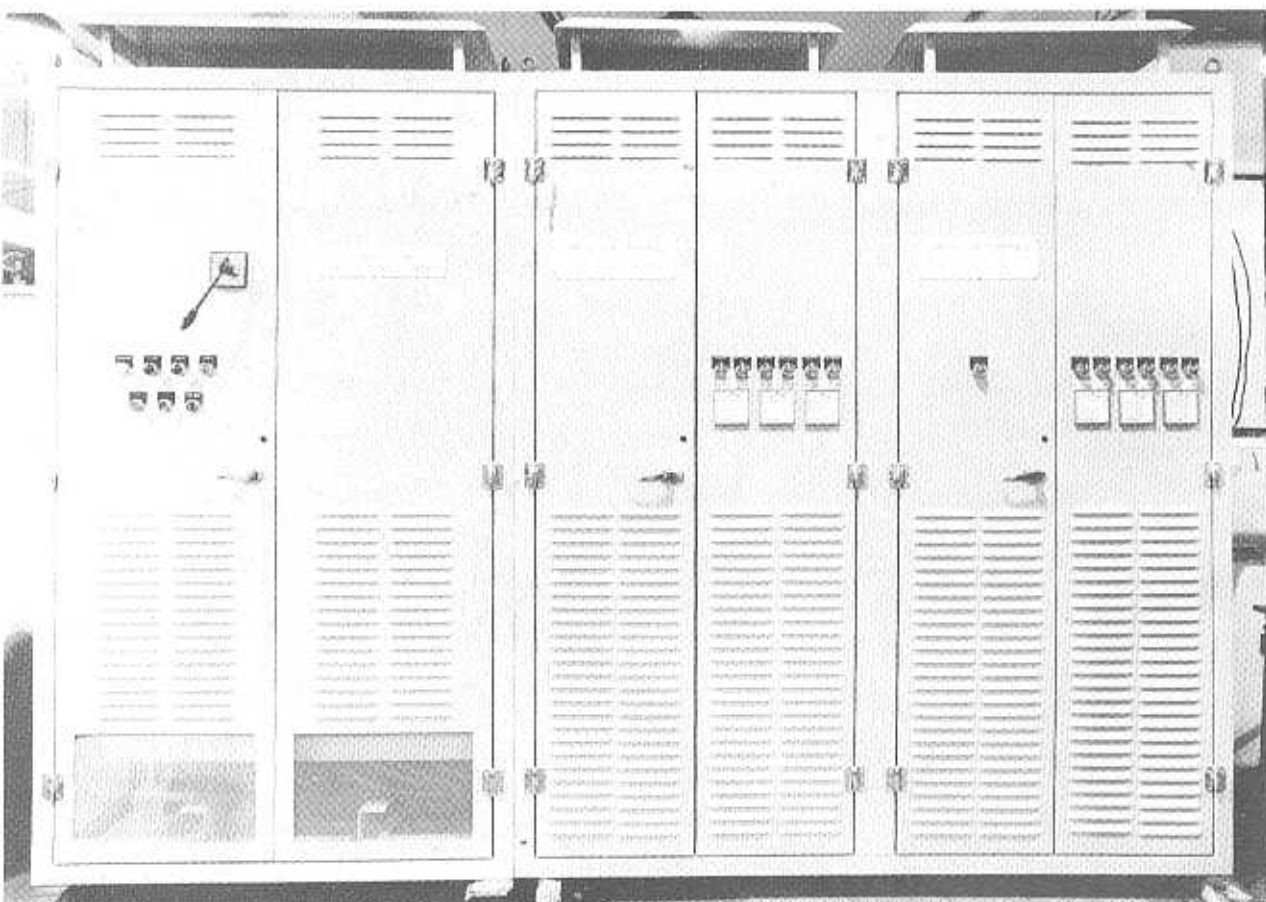
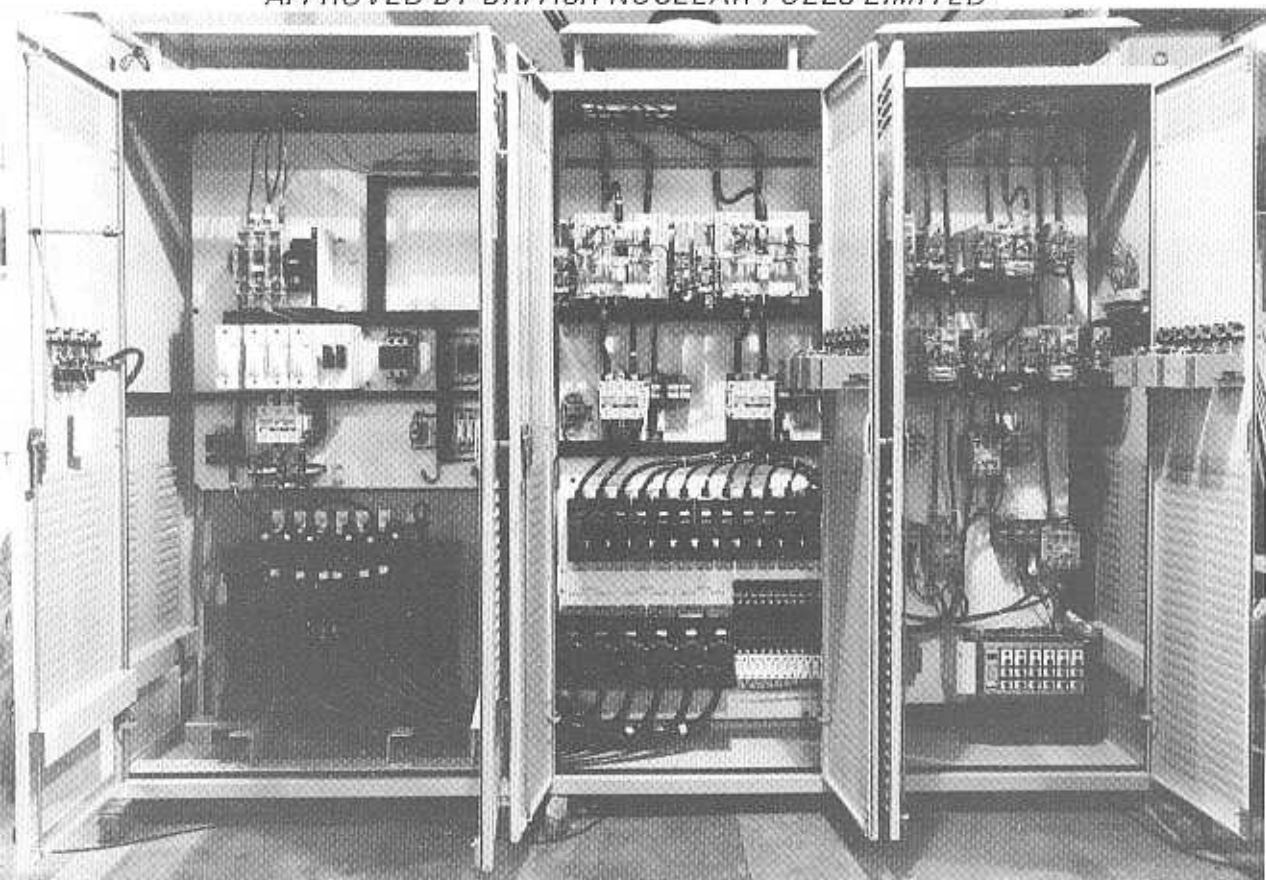
3 **An aerial view of the Sellafield works in Cumbria of British Nuclear Fuels Limited, where the TV Camera Control Systems are being installed.**



3

# Equipment for Nuclear Industry

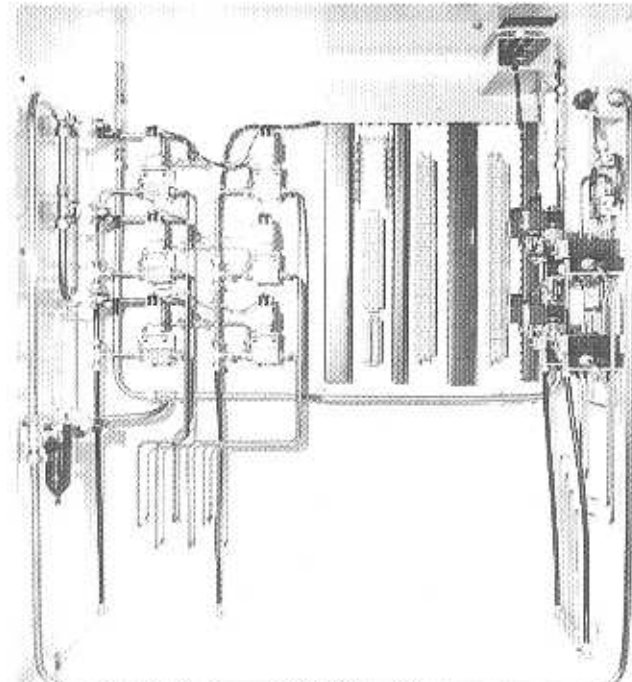
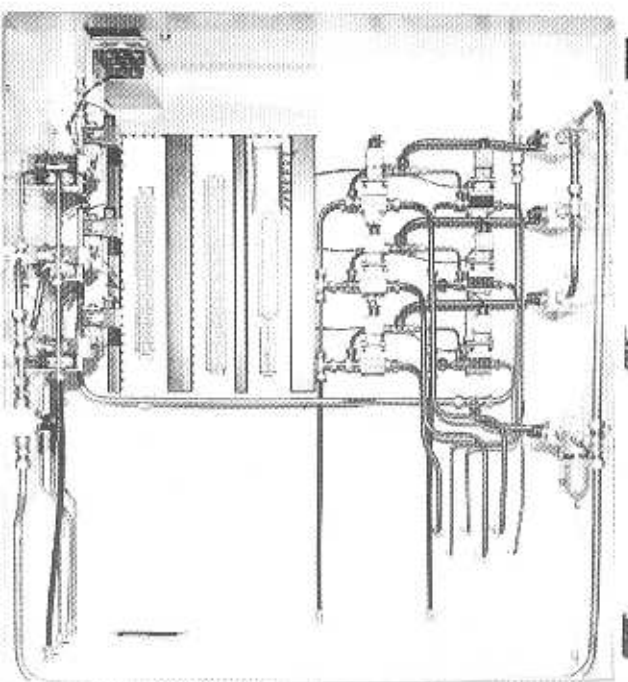
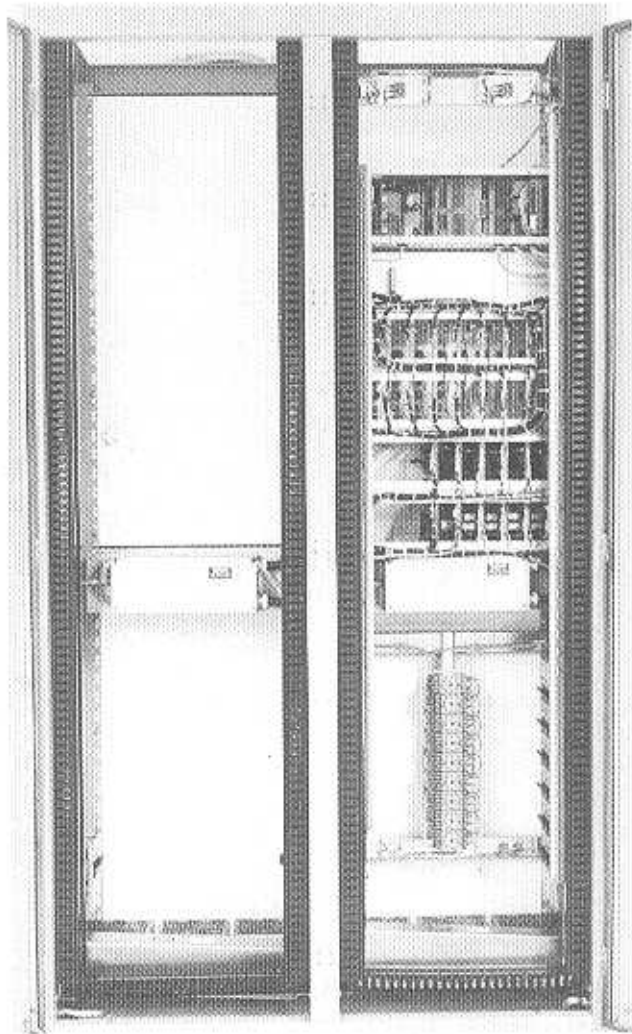
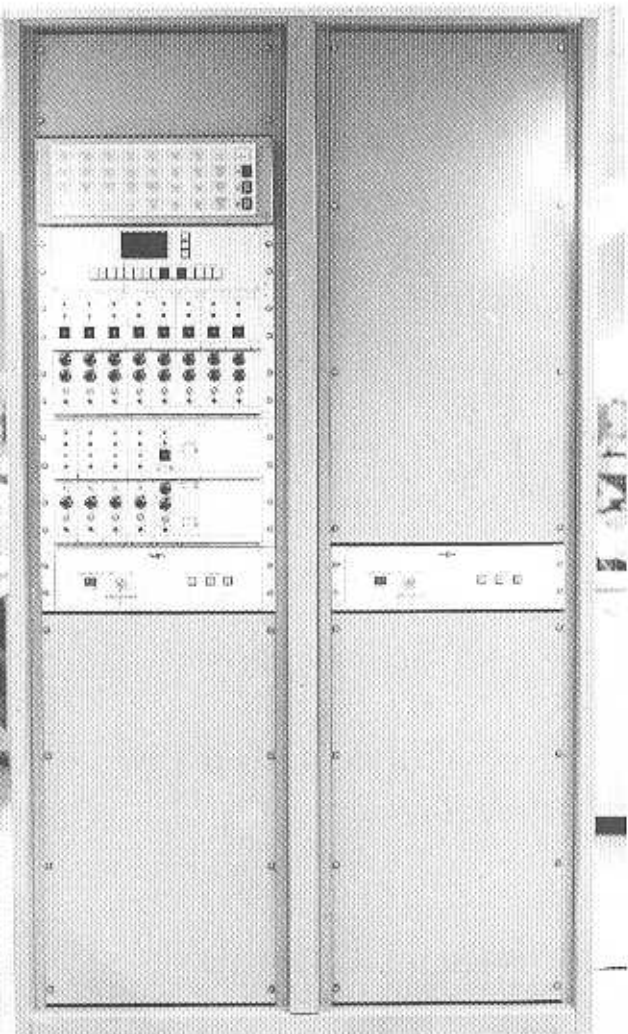
APPROVED BY BRITISH NUCLEAR FUELS LIMITED



*FURNACE CONTROL CUBICLES as manufactured for Eurotherm Limited, for installation at British Nuclear Fuels plant. Including metalwork, assembly, wiring, engraving, painting and testing.*

# Nuclear Equipment

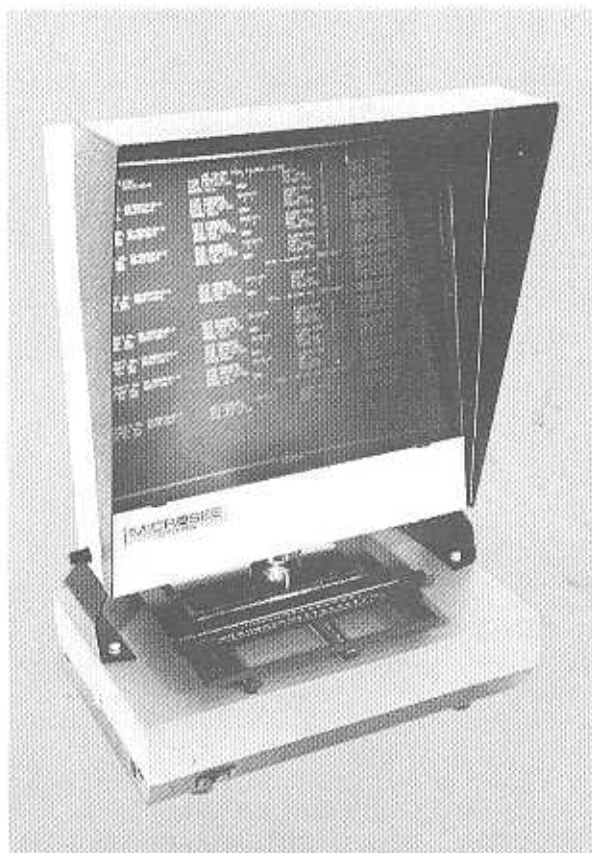
APPROVED BY BRITISH NUCLEAR FUELS LIMITED



# MICROSEE

## Microfiche Readers

OVER THE PAST 5 YEARS OUR COMPANY HAS BECOME THE LARGEST MANUFACTURER OF MICROFICHE READERS IN THE UNITED KINGDOM. OUR READERS ARE SOLD UNDER OUR TRADE NAME **MICROSEE**.



ORIGINALLY DESIGNED FOR BARCLAYS BANK, MORE THAN TWELVE THOUSAND OF OUR RANGE OF COM READERS HAVE BEEN SUPPLIED TO CUSTOMERS THROUGHOUT THE BRITISH ISLES, AND ARE IN DAILY USE IN MOST MAJOR CITIES AND TOWNS FROM THE SHETLANDS IN THE NORTH TO THE CHANNEL ISLES IN THE SOUTH. THE RANGE COMPRISES THREE MODELS, ALL DESIGNED FOR STANDARD COM FICHE, SIZE 105 x 148 mm, REQUIRING x 48 MAGNIFICATION:—

### **MICROSEE 270-100**

*Projects each frame at 100%  
i.e. x 48 magnification.*

### **MICROSEE 270-85**

*Shown on left — a very popular Compact Reader showing each frame at 85% of above*

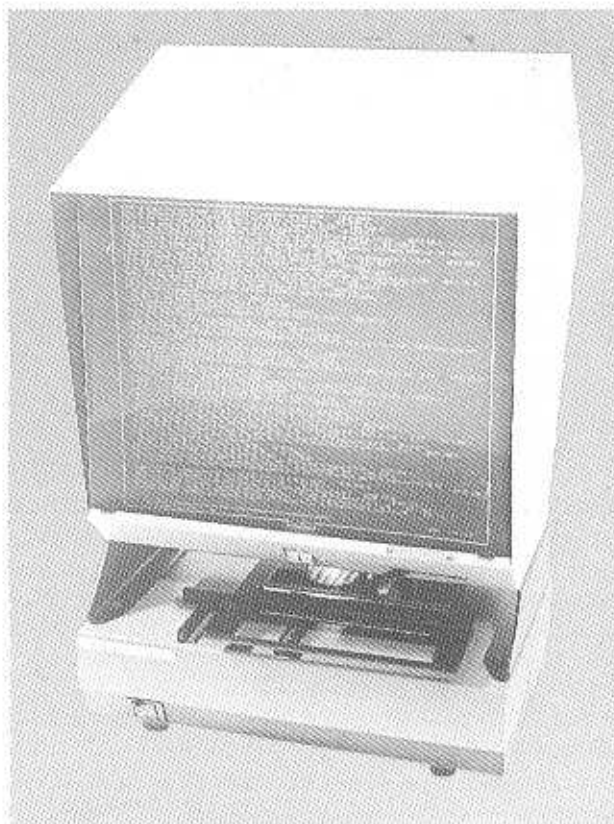
### **MICROSEE 270-EXC**

*Also at 85% but shows only about one third of frame, but some users prefer its reduced height.*

### **MICROSEE 270-98/85**

*Shown on right — a Dual Lens Reader with lens changeover by a lever mechanism. First lens to suit standard COM fiche requiring x 48 magnification, second lens to suit photographic fiche requiring x 24 magnification. Images are projected at 85% and 80% of full size respectively.*

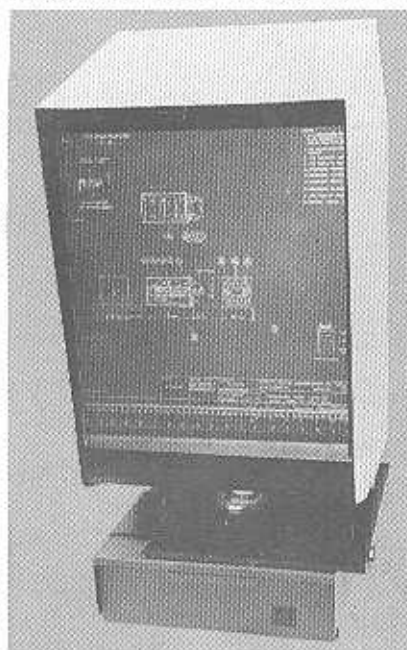
ALL READERS ARE OF STRONG STEEL CONSTRUCTION, FITTED WITH "ACCURIDE" BALL SLIDES AND "MULTIFLECTOR" TUNGSTEN HALOGEN LAMPS. THE FLOATING LENS ASSEMBLY IS CONTROLLED BY AN ARTICULATED SHAFT AND ENSURES THAT THE IMAGE REMAINS IN FOCUS AS THE FICHE CARRIER IS MOVED FROM FRAME TO FRAME.



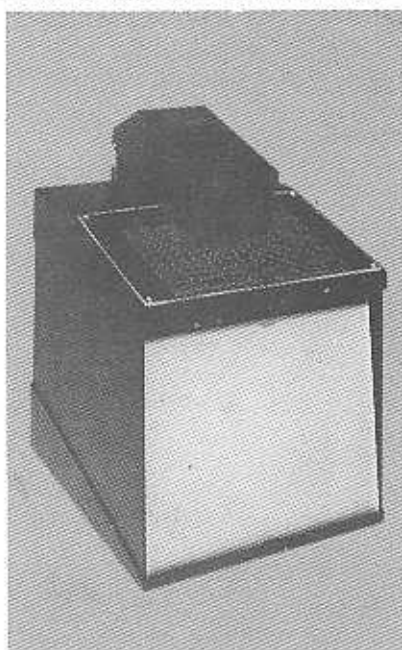
OUR COMPANY IS ABLE TO OFFER TO DESIGN AND MANUFACTURE MICROFICHE READERS FOR SPECIALIST APPLICATIONS, OF WHICH THE FOLLOWING ARE EXAMPLES:-

**MICROSEE X-RAY**

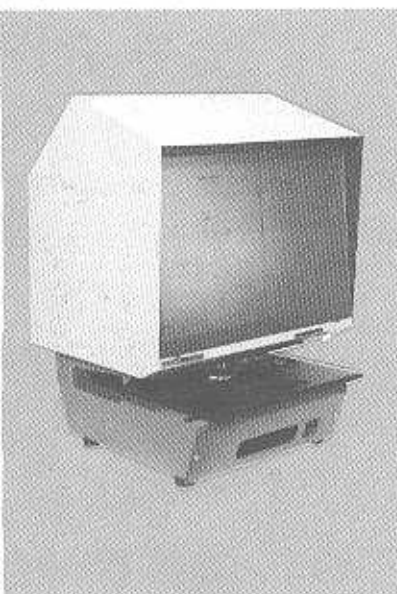
*This Reader has been specially designed to meet the requirements of Hospitals to view 35 mm X-Ray Microfilm that has been jacketted into 105 x 148 mm fiche.*

**MICROSEE UNIVERSAL**

*With optional extras this Reader gives the choice of viewing all types of fiche including standard (105 x 148 mm) Jumbo (105 x 190 mm), Super Jumbo (180 x 237 mm) and Aperture Cards.*

**MICROSEE PORTABLE**

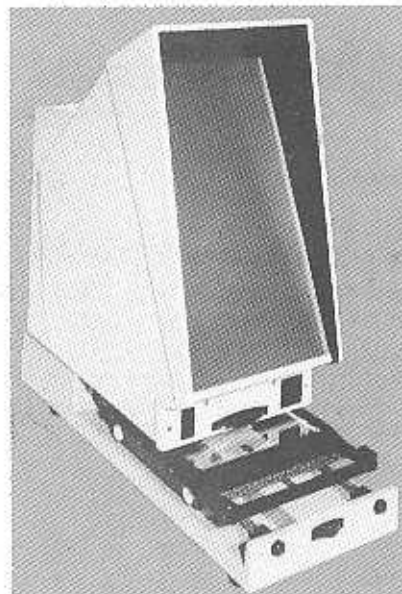
*Versions are available to read fiche requiring x 48 or x 24 magnification and for use on mains, or 12 volt supply or for both mains and 12 volt. Carrying case also available.*

**MICROSEE A3**

*A Dual Lens Reader. One lens to project full size A3 images from fiche at x 24 magnification. Second lens to suit standard COM fiche requiring x 48 magnification. Lens changeover by lever mechanism.*

**MICROSEE MET 60**

*A front projection Reader for x 24 magnification in either portrait or landscape formats. Fitted with an additional prism to give the facility of image rotation. Supplied to a number of Police Forces.*

**DG No1A**

*A quantity of 7500 Readers of this type has been manufactured by our Company to totally equip the Directory Enquiry Service (Dial 192) of the British Telecom telephone system.*

*If you have a requirement for Readers to view microfiche or aperture cards, please send the details and ask for our Quotation:-*

**Shrewsbury Electronic Engineers Ltd.,**

Hartley Works, Monkmoor Road, Shrewsbury, Shropshire, SY2 5SU Tel: (0743) 56343, Telex 35279

# Mining Equipment

*B.T.H.I. TEMPERATURE MONITOR DESIGNED AND MANUFACTURED BY SHREWSBURY ELECTRONIC ENGINEERS FOR THE NATIONAL COAL BOARD.*

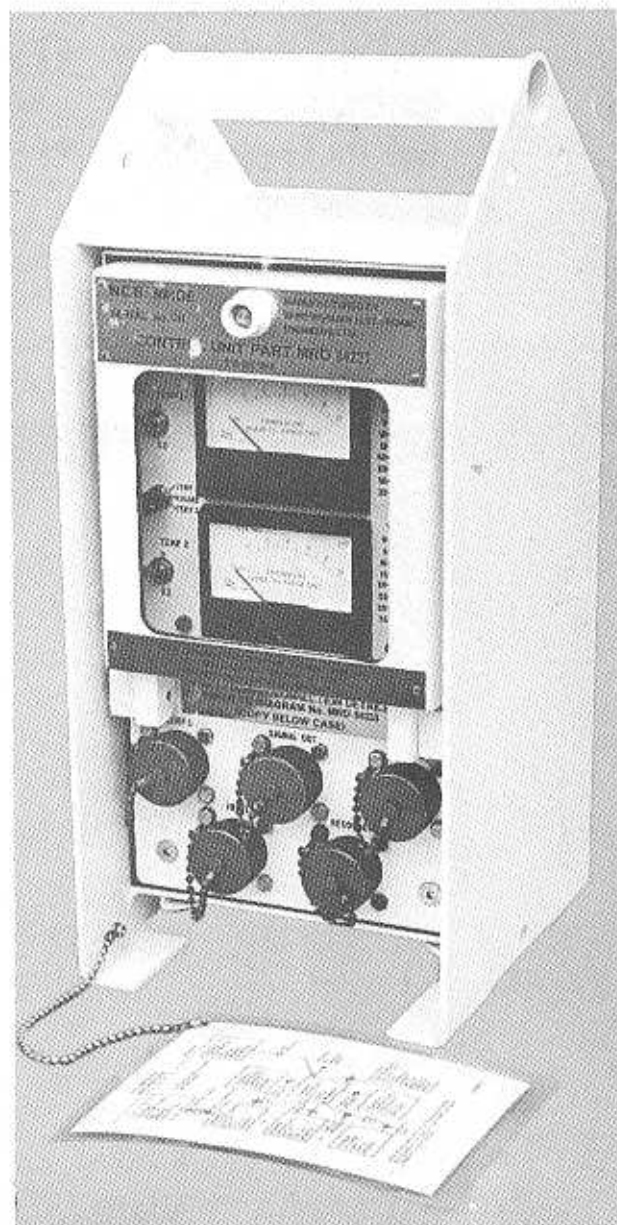
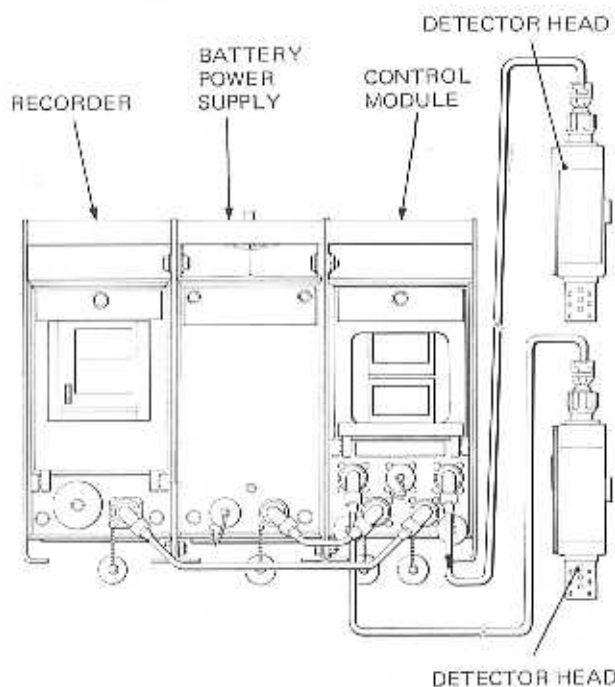
*The B.T.H.I. Temperature Monitor is an Intrinsically Safe apparatus to measure and record the temperature of air, underground or on the surface, of a coal mine.*

*The system is certified intrinsically safe throughout and comprises a Control Module, a Power Supply and/or a Re-chargeable Battery Pack, a Chart Recorder and two Detector Heads, together with a range of interconnecting cables. It may be used on battery or on mains power supply and contains its own self checking facility to indicate the charge state of the battery.*

*The Control Module, Chart Recorder, Power Supply and Battery Pack are housed in modular metal enclosures, which can be bolted together to form an integral monitoring system. The system is designed to be suitable for a number of different applications, enabling the most suitable arrangement to be applied to a given situation.*

*Where a mains supply is available, the simplest configuration consists of the two Detector Heads, a Control Module and a DC2 Power Supply. This provides direct indication of temperature on the Control Module Meters. The addition of the Chart Recorder gives the added facility of a permanent record of temperature activity over a period of approximately two months.*

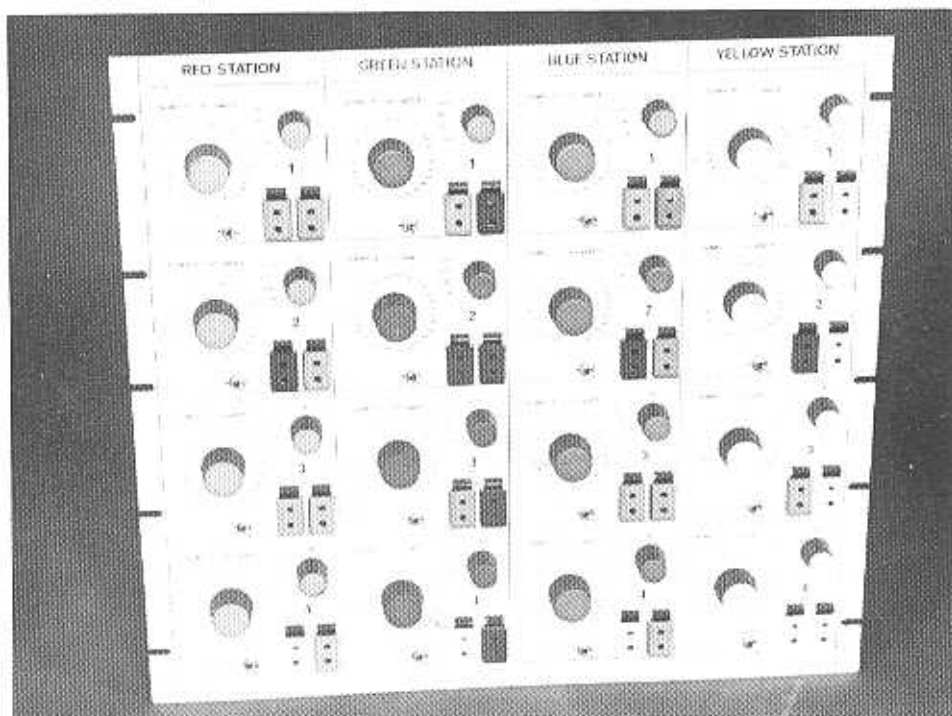
*A more comprehensive system consists of the two Detector Heads, a Control Module, a DC3 Power Supply used as a float charger for a BATTI re-chargeable battery and a Chart Recorder. This arrangement is used when the B.T.H.I. system is required to be portable on occasions and static on others, continuous operation being assured by the battery for short periods of power failure.*



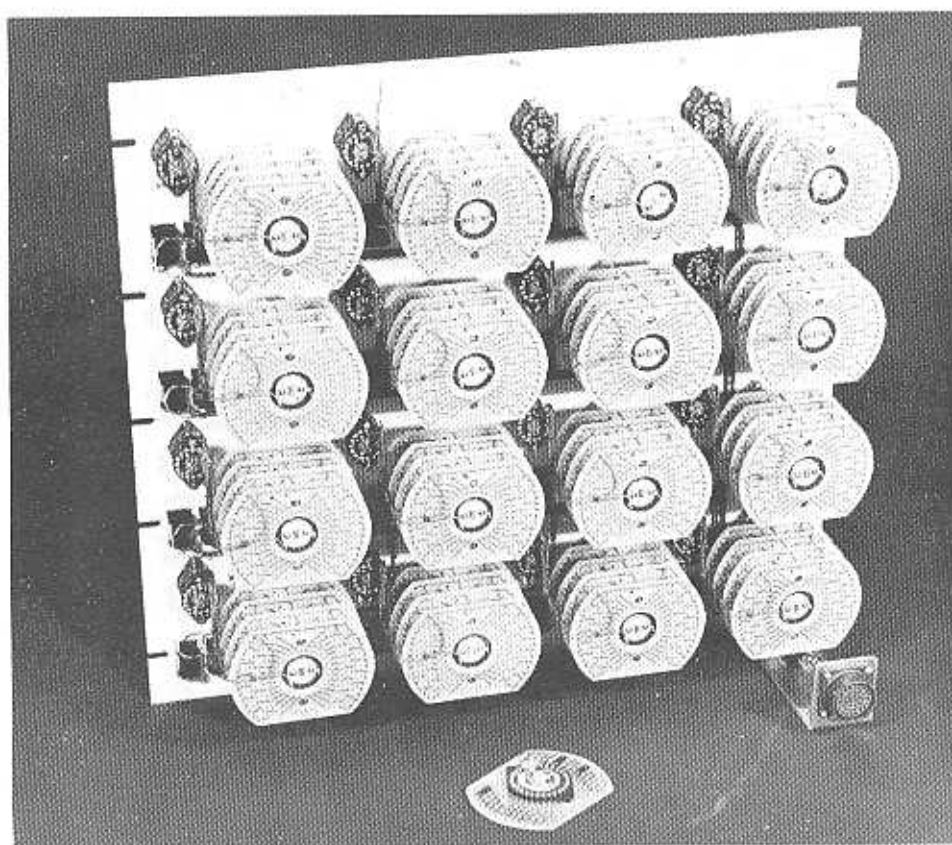
*The DC2 & DC3 Power Supplies and the Battery Modules are not manufactured by our Company, but available from us as part of a complete system.*

**CONTROL MODULE**

# Test Equipment



*TEST EQUIPMENT FOR AV8B AIRCRAFT PRODUCTION  
Including Metalworking, Painting, Screenprinting, Assembled Printed Boards,  
Wiring and Assembly.*



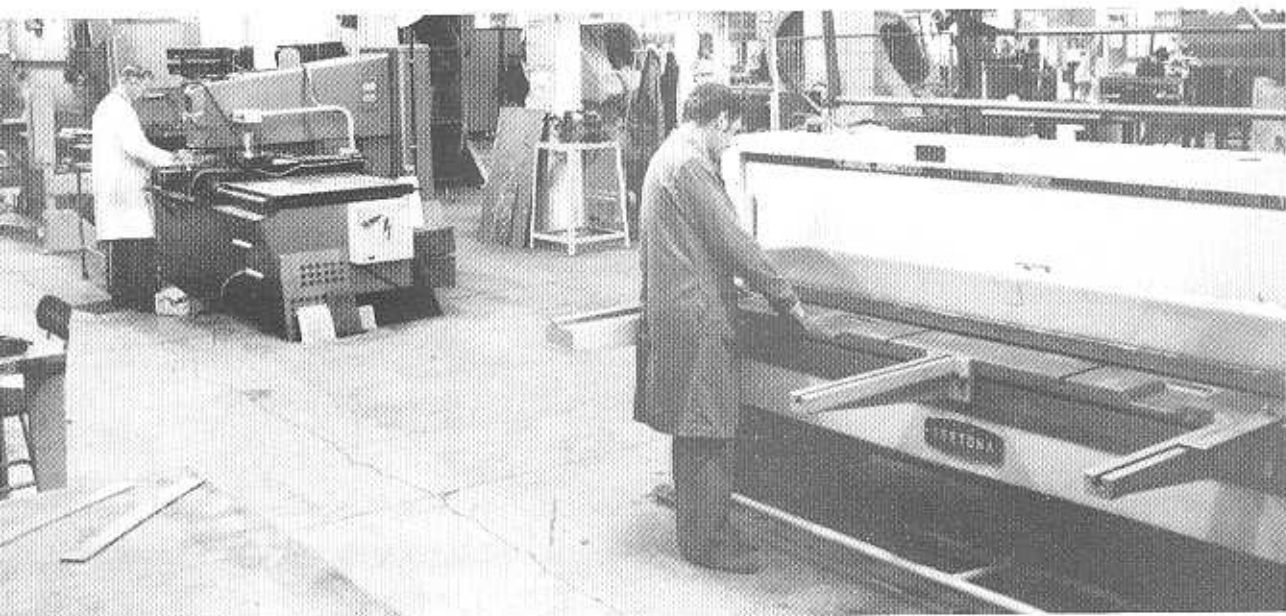
*WORK IN PROGRESS AT OUR SHREWSBURY FACTORY*



*ASSEMBLY*



*COIL WINDING*



*SHEET METAL WORKING*



*MACHINE SHOP*