

## Welcome Monsieur le Ministre



*The Minister, the Ambassador, J. Foyer, F. Leroux, J. Le Roy, the Minister's secretary.*

Dr KIM SUNG JIN, Korean Science & Technology Minister, invited by his french homologue Mr Hubert CURIEN, has wished to visit a high technology middle size company.

**ADRET Electronique** was chosen for its important efforts paid to the Research & Development (23% of the Turnover and 30% of its manpower).

The Minister accompanied by his secretary, Mr. CHA JOO-HO, and the Korean Ambassador in Paris, told us how impressed he was by the resources and technologies used in our R & D Department as well as by the equipment and organization standard in the Production Department.

The Minister invited us to pay him a visit in the event of a trip to the Far East and has strongly incited us to develop our economic relations with his country. Besides, we have received an order for two 7100 D generators from the Korean PTT and we have a technical cooperation project with a firm in this country.

J. ROYER  
Chairman & Managing Director.

## Brief news

### 730 A features :

- 20 Hz to 180 MHz
- 1 Hz resolution
- +22,9 dBm to -129 dBm (50  $\Omega$ )
- AM-FM (stereo) PM DC-AC
- Noise at 20 kHz offset : 120 dB/Hz
- 140 dB/Hz noise floor

- The 730 A passed all evaluation tests at the CELAR (Army Test Center). It is classified in the GAM T 4, level 4 (operational laboratory equipments) used on board of ships, airplanes, vehicles and during military operations.

In the course of this evaluation, the FRENCH NAVY ordered 50 and the NAVAL AIR SERVICE 10 of them.

- The AMERICAN NAVY just ordered 6  $\times$  7200 A.

- The American firm TRW chose the 740 A to equip programmable test benches after a very thorough evaluation of the competition. Twenty one generators have already been ordered.

- TELSPACE ordered 15  $\times$  5104 synthesizers to drive transmitters and receivers for satellite communications ground stations. These instruments are to be exported.

## A new signal generator : the 742 A

### 742 A features :

- 0.1 to 2400 MHz
- 10/20 Hz resolution
- +13 to -129.9 dBm /50  $\Omega$
- AM-FM-Phase-Pulse (optional) DC-AC (with ALC)
- AF generator : 30 Hz to 12.8 kHz
- 0.5  $\mu$  V leakage
- IEEE 488. Talker and Listener

**ADRET Electronique** is pleased to announce the launching of a new signal generator : the 742 A. It will be presented at the WESCON Show in San Francisco and at ITAME in England at the end of November, then at MESUCORA in France at the beginning of December.

The first units will be available as from March 86.

The 742 A has been developed to satisfy new requirements in Radio-communications over 1 Ghz. Derived from the 740 A, of which it has all the qualities, it offers furthermore :

- FM deviation from 200 kHz to 1.600 kHz according to the frequency carrier.

- DC coupled modulation input and ALC with AC coupled input.
- Internal programmable AF generator.
- RF leakage inferior to 0.5  $\mu$  V.
- Bus IEEE 488 - Listener and Talker.

Thanks to its spectral purity close to the carrier, its low AM et FM distortion, its very low residual FM in CW and FM, as well as its performances in Pulse modulation, the 742 A is the ideal general purpose signal generator for Research, Production and Maintenance applications.

J. LE ROY  
Marketing & Sales Director



# Research & development management

*The evolution of techniques and technologies and the very high increase of resources and manpower have led ADRET to reconsider its R & D activity organization. The new set-up allows a better use of skills and means, provides a wider efficiency and should lead to an even better product quality both on the research and creation levels.*

The fast evolution of techniques implying specialization, the increasing complexity of equipments demanding more and more on several specialities, the need to widen the performances of the R & D activity, have led us to install a system of Ranges of Products, Projects and Technological branches, all having at their disposal an Industrial department, Functional Services and important modern resources.

## RANGES OF PRODUCTS

The function of a Products Range responsible is to maintain the technical consistency of all the products in this range, as well as to ensure the prompting of project responsables and the technical/marketing/customers interface so to center the products on the actual and future needs of potential users.

For this reason, he has to do the synthesis between the possible and the desirable and to draw up the first specifications of the instruments to be elaborated.

## PROJECTS

To carry out a project implies many people with diversified specialities and belonging to different departments.

To coordinate their action and to have them intervened when necessary so to reduce time loss, delays and costs, a structure per project has been installed with a responsible, a planning and its follow-up, a budget and its follow-up. The engineers and technicians working on the projects realization come from different technological branches for the duration of the imparted tasks.

## THE TECHNOLOGICAL CHANNELS

The constant search for superior performances, cost reduction and improved production and reliability, implies that each engineer or technician works to the best of his abilities and that a type of sub-assemblies standardization is sought.

Therefore, we have defined eight technological branches :

- LF/HF synthesis,
- VHF/SHF synthesis,
- Analysis (IF processing, filtering, log amplifier, demodulation),
- Microwave technologies (SMD, thick film hybrid circuits),
- Signal processing (digital filtering),
- Software (instrument control, computation),
- Monitoring.

The engineers and technicians are assigned to the channels according to their abilities and tastes so to constitute specialized teams in each technology.

Each responsible establishes every year a development plan of his own branch, with an investment and operation budget.

## PRODUCTION ENGINEERING & FUNCTIONAL DEPARTMENTS

The extent of the different projects we wish to rapidly carry out, made us create an Industrial department recovering and reinforcing the products development and industrialization.

Its main tasks are : the mechanical design of the instruments, the circuits CAD (computer aided design), the design and production of calibration and test benches which are elaborated at the same time as the projects, the wiring of mock-ups, prototypes and « short-circuits », the supply and management of the Research department store, the technical files, and the maintenance and operating manuals for the instruments as well as their test specifications.

The production engineering has a vital role as far as the value analysis of production and maintenance is concerned.

There are three functional services : the technical secretaryship, the technical documentation which soon will be processed by a computer, and the projects management (follow-up, and test).

## THE MEANS

This new organization has been made necessary and possible because of the very important increase of the R & D activity which grew in a year from 26 to 66 people (30% of the manpower) with a budget representing 23% of the turnover.

The installed resources are also important and are of the highest technical level :

- computerized circuit simulation.
- CAD for the printed circuit realization and all the technical documents, The CAD software used is one from the french firm SECMAI.
- Several very performing measuring equipments.
- One computer, 15 personal computers and 5 software development networks with an execution speed of 6.5 Mips and a user memory of 7.8 Megaoctets.

## CONCLUSION

A firm making progress is a firm which adapts itself to the technical evolution as well as to its manpower and resources to circumstances.

Since ADRET was chosen by involved ministries to study, manufacture and sell RF and SHF spectrum analyzers which should be at the best international level, we had to implement all the necessary means for the realization of this important project (and few others). In 1987, these projects will be achieved and the merits of the organization set-up as well as its means will be appreciated.



J. REMY  
R & D Manager



# Production & quality management

*ADRET has installed an exemplary organization of production and quality management, allowing very significant productivity and reliability savings. Thus, the warranty year cost has dropped down to 0.5% of the turnover and ADRET has received the RAQ 2 agreement from the SIAR (Service Industriel de l'Armement) equivalent to the NATO AQAP 4. (SIAR is the Department of Industrial Supervision of the Defence).*



J.C. Lévêque

The organization and resources are particularly orientated towards :

- Production Management automation,
- Quality improvement,
- Manufacturing and control means automation,

## PRODUCTION MANAGEMENT AUTOMATION

The equipments used are : an IBM 34, GIP and MAPICS softwares, specific softwares, terminals in each department and Minitel terminals connected to the IBM to control the rotary stores.

The production planning for the 24 referenced instruments is organized on a commercial scheme over an 18 month period which includes sales forecasts/aims as well as order booked at the beginning and at the end of this period. This commercial scheme is simulated on the IBM 34. It leads to the drawing up of a leading plan reviewed every three months, according to forecasts/results/new forecasts adjustments.

This leading plan allows to manage the middle term costs and evaluate the next needs from which the supply and manufacturing programs are deducted, as well as short term costs and forecasts of the weekly production.

The computer automatically calculates the quantities to be supplied, taken out from stock and manufactured, on the basis of a 4 to 5 month production cycle depending on the products. The stock management is ensured either by a MRP American system or by a KANBAN Japanese one, and by a « just in time » system depending on the articles.

The computer establishes the order forms, manufacture notes and the lists of warehouse preparations. These latter are sent to the Minitels connected to the IBM 34, and which manage three ELECTROCLASS stocking machines. The machines contain approximatively 2 400 references from the 4 000 active ones and the 8 000 referenced ones. The operator only has to take them from the racks presented to him by the system.

The automation of this equipment has been realized by ADRET and ELECTROCLASS. The next and final automation step will be the use of striped coded labels and optical pens for the stores restocking to reduce risks even more.

## QUALITY IMPROVEMENT

The different means used are :

- A standardized quality process manual, following the products all along their life cycle.
- Recording and analysis of the failures on an IBM PC, from the suppliers, manufacture work-shops and returns from customer.
- visual controls during manufacturing.
- Suppliers audit.
- Burn-in by successive thermal shocks and ageing : the boards are at  $-20^{\circ}\text{C}$  during 3 days, then at  $+60^{\circ}\text{C}$  for at least 3 more. Furthermore, they stay for 200 hours at  $50^{\circ}\text{C}$  with ON/OFF cycles. Finally, the instruments are aged for at least 100 hours at  $+50^{\circ}\text{C}$  with a recording of possible intermittent failures. These failures being the most difficult ones to detect and the most penalizing for the end users.
- Quality circles.
- successive checks of completed instruments by :

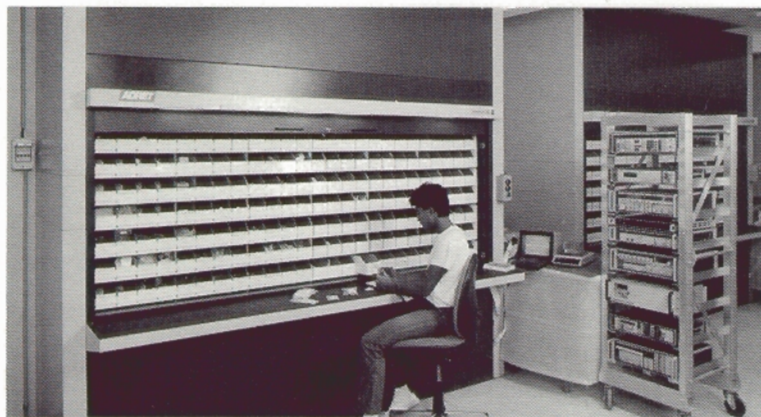
- The technician in charge of the final adjustment.
- The final test which checks all the functions of the instrument.
- The test and calibration automatic benches (for signal generators only) on which the instruments undergo 4 hours of measurements (driven by calculator) of all parameters and configurations (1 400 measurements are carried out).

If only one characteristic is out of the limits, the instrument will go back to the production and undergoes the three previous tests once more.

This entire process improves the quality and results in the lowering of the warranty returns (warranty cost being lower than 0.5% of the turnover) and in the SIAR's trust : ADRET received the RAQ2 agreement.

(Cont. p. 4)

Rotary stocking system driven by IBM 34. ▼



Calibration bench for generators. ▶





## Production & quality management (cont.)



Michel Gérard

### MANUFACTURE AND TEST MEANS AUTOMATION

At all times, ADRET has been equipped with performing measuring-test-calibration systems to achieve the specifications adjustments of its instruments. They are often specific means.

For instance, beyond the components storage system and the previously mentioned automatic calibration bench for generators, we will mention :

- A close to the carrier noise bench,
- An intermittent failures detection system during the ageing period,
- Automatic machinery for mechanical parts,

- Insertion aided machinery (automatic insertion is not suitable considering reduced series, 10 to 500 units per year),
- Adjustment and test benches controlled by computer.

### CONCLUSION

Our aim is to reach the best international level, for instrument performances as well as for their reliability and service quality. It is up to our customers to evaluate the remaining distance to cover and the progress already achieved.

J. C LEVEQUE  
Production manager

M. GERARD  
Quality manager

## Right up to the minute

After a long and a strong competition with the british firm Plessey the US Army has selected the french equipment called «RITA» (Réseau Intégré Télécom Automatique, or Integrated Automatic Telecommunications Network) manufactured by Thomson CSF. This choice is a brilliant recognition of the french technical and technological level.

The transceiver which is the heart of this system has been studied and developed with our 7100D and 7200A.

The automatic test benches used in production are equipped with our 7100D.

This is a magnificent reference.

## Bob Blindbury top U.S. Sales Rep.

Bob BLINDBURY of BLAIR ASSOCIATES, the Southern California representative of COMSTRON/ADRET, has won a trip to France for being the top ADRET salesman. Bob was able to convince TRW to stop buying HP 8656 B's and buy ADRET 740 A's. To date Bob has got ten orders for over 20 x 740 A's from TRW alone.

Bob has also been successful at HUGHES AIRCRAFT in substituting ADRET signal generators for HP signal generators. Bob has been successful selling test equipment in California for over 15 years.

Congratulations Bob, enjoy your trip !



Leonard J. BOROW  
President of COMSTRON CORPORATION

## For ones who visit and phone Adret



For a year now, Adret's reception has a new voice and look. For those who never had the opportunity - or chance - to visit us, we are pleased to match a face to this voice, especially since it suits perfectly well the image we want to offer.

Here is Mrs Colette ROLLAND, 21 years old and just married.

Our new telephone number is

- (33) 1 30.51.29.72 from Abroad.
- (33) 1 30.51.00.74 for our telefax.
- Telex : ADREL 697 821 F

*For any further information, subscription..., please contact your usual correspondent at our Marketing Department, or send us back the enclosed reply-card.*



ADRET ELECTRONIQUE - BP 33 - 12, avenue Vladimir Komarov - 78192 TRAPPES CEDEX - FRANCE  
Tel. : (33) 1 30.51.29.72 - Telex : 697821 F ADREL - Telefax : (33) 1 30.51.00.74

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