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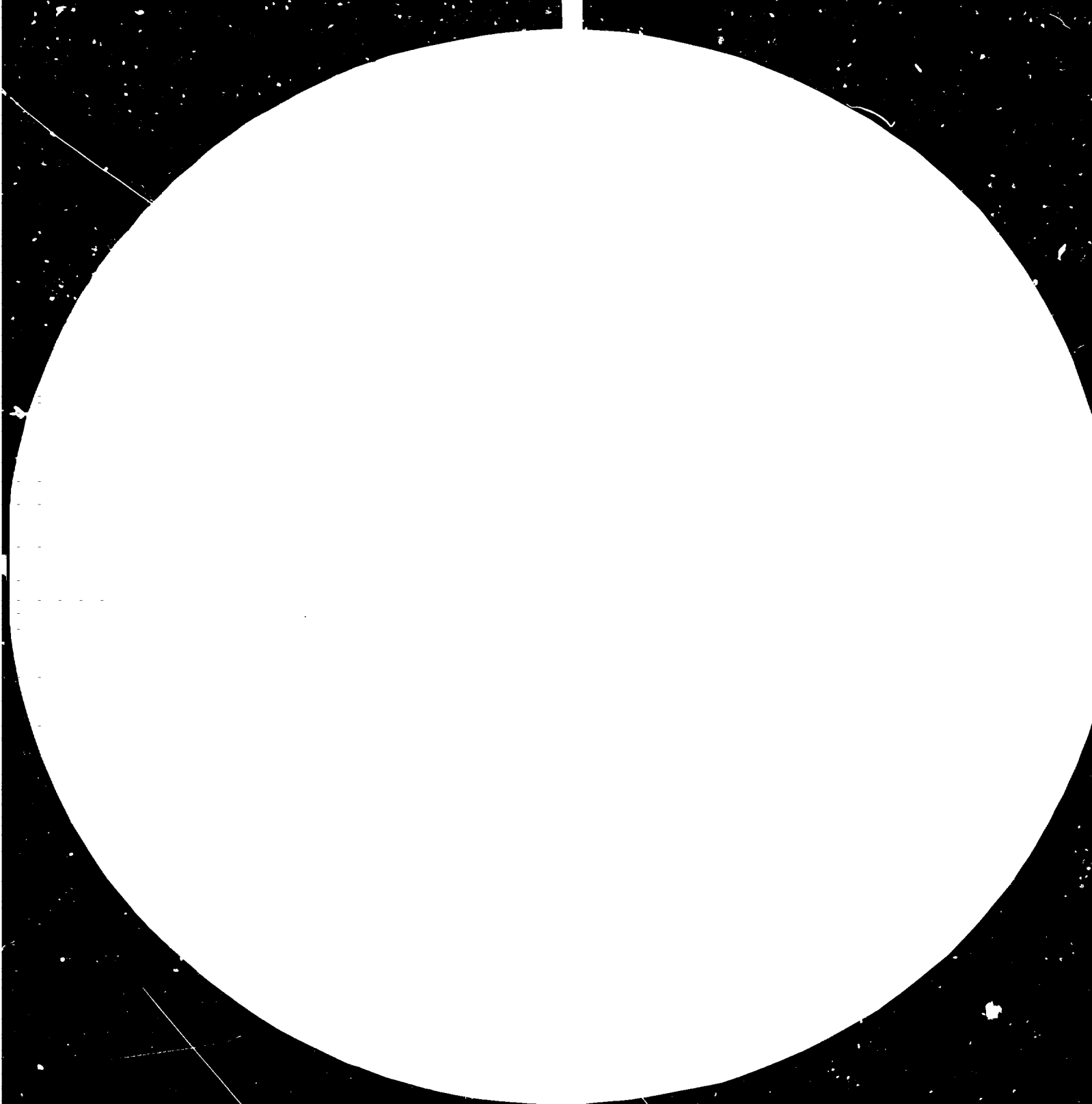

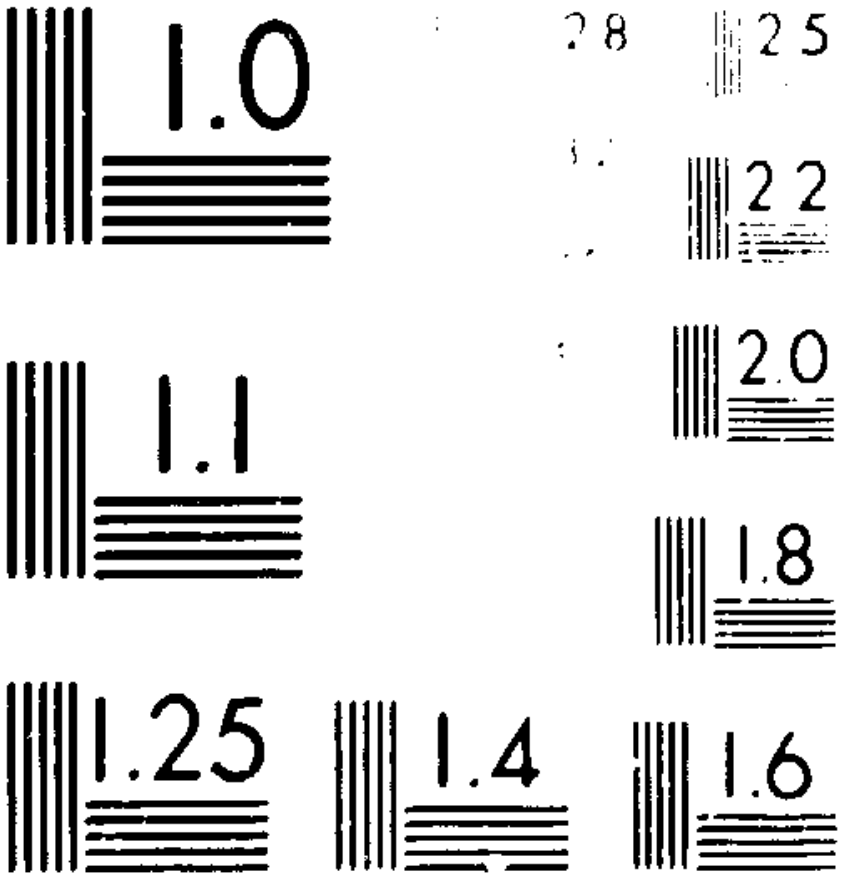
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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

MICROELECTRONICS MONITOR

12011

Issue Number 1 December 1981

Dear Reader,

This first issue of a new quarterly newsletter has been brought out by UNIDO in response to a recommendation of a group of experts who met in Vienna in June 1981 to review the implications of technological advances in microelectronics for developing countries. The experts requested UNIDO to monitor the technological advances, developments and applications in the field of microelectronics and disseminate the information for the benefit of the developing countries.

The concept of monitoring technological advances as such stems from the Vienna Conference on Science and Technology for Development in 1979 and has been further considered by the Third General Conference of UNIDO and the Industrial Development Board, the governing body of UNIDO. Consequently, UNIDO is engaged in implementing a programme of technological advances in which activities related to microelectronics form a significant part. The aim of this programme is to sensitise developing countries on the potentials and limitations of technological advances for developing countries and to help them to strengthen their technological capabilities, where appropriate.

At present, the Newsletter purports to be no more than a bulletin of current awareness aimed at a target audience of industry, government and the scientific and technological community in developing countries. As such, information of potential interest to developing countries is presented without evaluation or recommendation. The first attempt through this issue, I hope, will be of interest to developing countries. It is intended to keep the format and the type of contents under review. Suggestions in this regard are welcome.

An exercise of this kind will be most effective with reader participation. Readers are invited to provide us with information of potential interest, particularly from their respective countries.

I wish you and your family a successful New Year.

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G.S. Gouri
Director
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NEWS AND EVENTS

UNIDO reviews implications of microelectronics:

Some thirty electronics specialists, economists and development specialists met in Vienna on 10-12 June 1981 in a meeting organized by UNIDO to exchange views on the implications of technological advances in microelectronics for developing countries. The meeting discussed the question of strengthening the technological capabilities and infrastructure in developing countries with particular reference to microelectronics manufacturing; industrial applications; and special applications for developing countries. It recommended that developing countries should formulate and implement, at the national level, a microelectronics strategy. This strategy should take into account the specific conditions and requirements of each country and its level of development. The meeting also called upon UNIDO to assist the developing countries through a comprehensive programme of action encompassing technical assistance and advisory services; promotion of endogenous capacities; a programme of research and studies; information assessing and dissemination; and mobilization of international co-operation (see the report of the meeting, IS/242/Rev.2).

Asia reviews electronics:

The Asia Electronics Union (AEU) jointly with the Government and the Electronics Association of Thailand, organized a symposium on 2 and 3 December 1981 in Bangkok reviewing latest developments in microelectronics and telecommunications and the problems of international co-operation in education and training.

The AEU Secretary General, Mojiro Machida, attended the June meeting on microelectronics organized by UNIDO. The paper prepared by the UNIDO secretariat for the meeting (IS/246) has been summarized and published in the monthly journal of the AEU, published by Dempa Publications, Inc. Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo, Japan.

The AEU is collaborating in the organization of a group training course in advanced informatics to be held in Tokyo, from 21 January to 27 March 1982 under the Japanese Government's technical information programme administered by the Japan International Co-operation Agency (JICA). The purpose of the course is to introduce participants to advanced computer software and technologies in programming in order that they may become capable of designing basic systems to meet requirements of management. Ten trainees from Asian developing countries nominated by their governments are expected to participate.

Latin America to review microelectronics:

The UNIDO secretariat and the Economic Commission for Latin America (ECLA) are jointly organizing a meeting of experts to review the implications of microelectronics for the Latin American region, likely to be held in Mexico in April 1982. The meeting will pay particular attention to the socio-economic implications, national policies and regional co-operation. Representatives of some 15 developing countries from the Latin American region are expected to attend.

Informatics and industrial development:

An international conference on informatics and industrial development was held at Trinity College, Dublin, Ireland, on 9-13 March 1981. It was organized by the Irish National Board for Science and Technology and the Trinity College, Dublin, and co-sponsored by UNIDO. Informatics is the rational and systematic application of information technology to economic, social and political problems. The concept encompasses information processing and communication systems, their design, evaluation and complementation. Informatics was discussed at the conference both as a sector of industry and as a tool in other industrial sectors. The report of the conference as well as the papers presented to it have been compiled by the Trinity College and will be published shortly. Following the conference the UNIDO secretariat will also be bringing out a monograph on informatics and industrial development.

Informatics for the Third World:

The Intergovernmental Bureau for Informatics (IBI) organized a meeting in Mexico in June 1981, presided over by the President of Mexico to launch the preparations for a high level conference "SPIN 83" (Strategies and Policies for Information) to be held in June 1983 in Havana, Cuba. The Mexican meeting has adopted the "Declaration of Mexico on Informatics, Development and Peace". UNIDO's Executive Director, Dr. Abd-El Rahman Khane, participated in the meeting. The UNIDO secretariat will actively assist the conference in the area of informatics and industrial development.

Education in informatics:

"EDINFO 82", an international symposium on education in informatics, will be held on 20-22 January 1982 in Madras, India, organized by the Computer Society of India in collaboration with the International Federation for Information Processing - Technical Committee No. 3 (Education). An exhibition will also be organized reflecting the state-of-the-art in Computer Aided Learning (CAL).

SOME RECENT DEVELOPMENTS

The 64k market

Rams, the staple item of the semi-conductor industry, are bought and sold by the thousand by semi-conductor and computer companies. Although the latest generation of 64k Rams has only been available for about a year, the world-wide market is already valued at $100m (£51m). By 1985, the world market for 64k Rams will be worth nearly $2.4bn, according to Mactintosh Consultants, the U.S. market researchers. This will make it the largest market ever for a single type of chip.

According to Data Quest, Hitachi of Japan has the biggest shares of sales, with almost 40 per cent of the market. Fujitsu has just over 20 per cent, while Motorola is the top U.S. producer with just under 20 per cent of the market and Texas Instruments holds about 7 per cent. Next on the list is Nippon Electric with 6 per cent of the market (excerpted from Financial Times).

The 256k question

The race is on to produce the next generation of microchips, which will pack at least 256,000 electronic components on to a tiny piece of silicon - three to four times as many components as today. IBM announced that it had achieved pilot-scale production of the new chips. It is the first American company to make such a claim.

Japanese firms had already made similar announcements early last year. They are likely to be ahead in the next stage towards commercialisation, which is to send samples of the new chips to customers - to be evaluated and (it is hoped) incorporated in designs of products such as computers and word processors. Data Quest, the California-based consultancy on chips, predicts that the Japanese will send samples to customers next year, with the Americans following in 1983. It thinks proper commercial sales will begin in 1984 (excerpted from Economist, 3 October 1981).

Magnetic bubbles

Bubble memories were first developed by Bell Laboratories in the '60s. While in conventional magnetic storage devices such as disks and floppies the magnetic written information moves with the medium, the magnetic information in bubble memories is circulated by a rotating magnetic field on a fixed platen. Bubbles were meant to come in between silicon memory chips and conventional disk or floppy storage, offering more capacity than chips and a greater speed than disks and floppies.

Just one year ago, General Numeric Corp. became the first machine-tool controls manufacturer in the U.S. to use bubble memories. Since then, the Elk Grove Village (Ill.) company has equipped 1,400 controls with bubble memories supplied by Rockwell International. General Numeric's parents - Siemens of Germany and Fujitsu-Fanuc of Japan - have also been selling similarly equipped controls overseas, bringing total worldwide sales to 20,000.

Bubble memories are not just affecting new machine-tool controls. Bubbles are also being used to upgrade old control systems. Honeywell Inc.'s Information Systems Div. is so eager to gain the advantage of bubble memories on the machine tools turning out its printed circuit boards that it launched an in-house project to retrofit its 15-year-old from Intel. David W. Behner, project engineer at the Honeywell division in Phoenix, believes that productivity will improve about 20% (excerpted from Business Week, 1 December 1981).

European Economic Community

The European Economic Community's Council of Ministers, is studying a plan that is aimed at getting European nations to boost their share of world integrated circuit production from 6% to 12% by 1985. The plan calls for a four-year, $70 million subsidy to Europe and research and development.

Already European governments have committed upwards of $500 million to support semiconductor development. The U.K. for instance, spent $50 million to start INMOS - which built its first manufacturing facility in the U.S. in Colorado - and has approved another $50 million to start up production in Wales. France is using its program to revitalize its communications system to form a market for its semiconductor industry, but contractors include French affiliates of U.S.-based firms. Furthermore, most major European electronics manufacturers have bought into Silicon Valley companies rather than expand independently. (Pacific Research, 1st Quarter 1980.)

The Microcomputer Revolution - Estimates to 1990

The New Scientist (12 February 1981) compares the development of the computer sector to the machine revolution (1750-1860) and the scientific revolution (1880-1920). While mainframe and minicomputers are expected to grow from 500,000 in the late 70's to a number of 2 million in 1990, industrial microcomputers in the U.S. are expected to increase from 500,000 to 3 million. An estimate is also given for microcomputer-controlled robots. The number is expected to increase from 20,000 today (in the world) to 90,000 in 1990.

The number of robots in different countries (1980 estimates, various sources) are:

Japan	10,000
USA	3,500
FRG	1,200
Sweden	700
Italy	500
United Kingdom	400

APPLICATIONS

Microprocessors in medicine

A colloquium "Microprocessors in medicine" was held in June 1981 at the Royal Institution, London, organized by the IERE. The keynote address from Dr. Race of Brunel University suggested "... that the greatest impact micro-processors could have on health care would be in alleviating shortages in the routine but costly areas of ward management, heating control, resource scheduling etc. and ended with the hope that research would increase in these areas as well as in the more 'glamorous' ones."

Several microcomputer applications were reported: J.S.H. Curnow from Bristol General Hospital "... described a small, dedicated system for logging the arterial pressure waveform and from it calculating a measure of cardiac stroke volume."

Brydon from the Royal Infirmary, Edinburgh spoke about "... the 'Edinburgh Label Processor'. The trend in psychiatric medicine towards sending in-patients home at weekends with their supply of drugs had placed new pressures on hospital pharmacies. The system described sought to minimize the time involved in preparing labels for tablet bottles by using a combination of a special keyboard containing buttons for complete drug names and dosages with a high speed printer, the link being performed via a dedicated microprocessor system." This lecture was followed by C.J. Watkins of St. Bartholomew's Hospital who outlined the development and construction of an easily used portable heart rate meter. His system was based around a single chip microcomputer combined with analogue circuitry to detect the actual heart beat (excerpted from Nature, Vol.4, No.5, September 1980).

Computers take charge in analytical labs

When the microprocessor made its debut as an integral part of laboratory analytical instruments about six years ago, researchers hailed the push-button convenience. For the first time, technicians could save hours of drudgery by using instruments that automatically injected samples, changed their operating settings according to preprogrammed instructions, and recorded and stored data.

But now, the automatation is being carried farther. Computers are finding a new role in expanding the utility of analytical techniques that were once limited scope. Some companies are developing computers that serve as the centerpiece of totally automated

analytical labs. These units not only operate instruments; they also track such things as the flow of samples and the list of assignments to lab personnel. The trend toward totally automated analytical chemical laboratories may be inevitable because of the mounting workload.

But faster analyses and greater automation are only part of the current computerization drive in analytical instruments. The other is sensitivity - detecting concentrations of substances in the parts-per-billion range. During the past several years, computer-aided techniques have enabled nuclear magnetic resonance (NMR) and infrared (IR) analytical techniques to achieve greater sensitivity. But nowhere is the impact of computers on analytical technology so evident as in high-performance liquid chromatography (HPLC), which is, perhaps, the fastest growing analytical technique. In fact, HPLC technology is advancing so rapidly that it is challenging gas chromatography as the mainstay for routine analysis for dangerous organic contaminants of foods, drugs and cosmetics (excerpted from Chemical Week, 18 March 1981).

Computers to take control of biotechnology?

The basic parameters that have to be controlled during fermentation are essentially flowrates, temperature and, particularly in pharmaceutical applications, pH, foam levels and aeration rates. Control of these factors is obviously necessary to ensure the optimum growth of the organism but it is also important for the production of the organism in the right form - single cells or flocculants for example. Taken separately these parameters do not in themselves present any insurmountable obstacles to efficient control but it is only comparatively recently that coherent, integrated control strategies have evolved for these processes.

Once again, it is the ubiquitious 'mighty micro' that has brought fermentation up to the control standards more commonly associated with the huge, complex, single train continuous plants of the oil and petrochemical industries. Individual feedback control of, for example, temperature or pH has been a feature of most industrial fermentation processes for some time now but the advent of microprocessor-based systems has brought a degree of integration into the overall plant control.

The main problem with any fermentation - batch, semi-batch or continuous - is to control the whole fermentor to maintain the correct fermentation rate. Several techniques have been adopted for this, but the most common is probably control based on CO^2 levels or production rates. Other rather more complex techniques currently under development include measurement of microbial concentration in the fermenting broth, that is the actual concentration of the organism being grown. Instruments now being developed to do just this are based on an optical density form of measurement and are presumably specific to certain materials. Slightly more common methods of control are based on the measurement of vapour pressures in the gas outlet from the fermenter. This approach is particularly suited to alcohol fermentations although in such cases the vapour pressure will be specific to each system (excerpted from Chemical Engineering).

Computers and genetic engineering

Academic and corporate researchers alike have been quietly experimenting with a new computer language called LISP that enables a data processing system to function in a way that more closely resembles the human thought process than any other system. A growing number of large companies - including International Business Machines, Genentech, and Schlumberger - are now turning to LISP for help in solving such complex problems as integrated circuit design, genetic engineering, and geological analysis. In fact, LISP offers so much promise for such sophisticated processing that many computer experts predict that sales of this software and the specialized computers to run it will hit $2 billion by 1990, up from virtually nothing today.

Because LISP is so flexible in manipulating huge quantities of information, it is particularly suited for such complex scientific computing tasks as DNA modeling. At Stanford University, researchers have used LISP to catalog 500,000 genetic sequences in a genetic-engineering program called MOLGEN. With the LISP program, scientists can compare known sequences to chains of DNA not yet catalogued (excerpted from Business Week, 24 November 1980).

Productivity increase with CAD (Computer Aided Design)

With CAD, engineering productivity often triples and sometimes increases as much as 10-20X. But interactive computer graphics are expensive. Even the simplest of systems can cost $100,000+, but usually this initial investment is recovered in 2 years or less. However, the specific payback period varies from firm to firm and depends on the number and type of drawings processed by the system. Thus, managers deciding on purchasing a CAD system need to carefully consider whether or not productivity will increase sufficiently to justify the initial cost of the system. An article in Machine D, 08/20/81, pp.91-95, details how to compute the payback period for CAD.

Energy controls

The majority of small and medium sized companies do not have the necessary logical energy management and control programs to cope with escalating energy costs and reduced fuel supplies. A market potential exists for growth in instrumentation and controls but is practically ignored. The market falls into two types of systems building automation and power management. Three emerging areas for growth are: combustion control, process instrumentation to improve operational efficiency, and integrated microcomputer-based systems for monitoring and control of HVAC, fire, safety and security systems in buildings (Can. Contr. a. Instrum., 19 (1980) 5, p.32, 34-6).

More applications

Mechanical arms are putting chocolates in boxes in Cadbury's factory in Birmingham as part of a £30 million project to automate the 101-year-old plant. The 12 pairs of arms pick up chocolates with vacuum grippers, and place them in plastic trays that speed past on a conveyor belt. Each pair of arms is assigned to pick up just one kind of chocolate; a complete tray is filled by sending it past all 12 pairs in sequence (source unknown).

Knudson Tractor's new tractor is electronically controlled, with a microprocessor controlled transmission and axles. The tractor is aimed at the hillside farming market, basically concentrated in the pacific Northwest, Northern Idaho, Southeastern Idaho and parts of California. The application itself, with the possibility of working on grades up to 45%. required special design considerations throughout. The main feature is automatic leveling of the tractor, keeping the operator on an even keel on sideslopes up to 28%. This means more operator comfort, better weight distribution for increased traction, and increased time in the field, hence better overall productivity (Diesel Prog. 6/81 p.18-20).

Recent trends in numerical control (NC) of machine tools

The use of general purpose minicomputer as a part of a system and the use of software as applicable to the minicomputer is now being discontinued. Control systems built with microprocessors and with dedicated software constitute the architecture of computer numerical control (CNC) system.

Microprocessors are currently used in two configurations: in bit-slice architecture to construct a microcomputer which in all respects fulfils the function of a minicomputer and for microprogramming. The designer of a CNC system is thus offered the flexibility to formulate his own macro instruction sets. Hence it is now possible for many of the NC systems builders to change over from the minicomputer version to the microcomputer version without changing the system software. Westinghouse, Bendix, Standard and general automation, Fanucs, Siemens have changed over to microprocessor based systems keeping the same software that was developed for their minicomputer systems. This has proved very economical as no additional investment is required on software development.

The second configuration of microprocessor - based CNC system is to use three 16-bit microcompressors, and to assign certain tasks to each microprocessor viz, one for part calculation, one for axes drive and one for I/O interface. Similarly Allen Bradly 7100 CNC uses three 16-bit microprocessors, one each for axis drive, front panel interface and central processing unit (CPU). In this architecture, as the tasks are divided among the microprocessor, the CPU co-ordinates these tasks between the microprocessors. ("Technological perspectives in machine tool industry with special reference to microelectronics applications" by S.M. Patil, UNIDO/IS.230.)

SOFTWARE

Wall Street wed to software

Software companies are being courted like never before. As the fastest "...growing segment of the overall computer industry, software and services offered what seemed to be great investment potential and the chance for some real action...." This was influenced by "...the recent rash of public offerings, increasing emphasis on software by traditional hardware vendors, and the imminent explosion...of personal computing and on-line information services. Investment houses are not exactly rushing en masse to cash in on the software boom, but they are devoting more resources to finding out what makes this market segment tick."

"Several competing packaged software firms have gone public, several large services firms have merged, and the idea of software being a key component to success in the hardware arena has come to the forefront of the investor's mind.... Some of the strongest areas in venture capital activity are database management, CAD/CAM, and business graphics" (excerpted from Datamation).

Exporting software

India could earn substantial foreign exchange by way of software exports if the procedural delays involved in importing system hardware by software development organisations was cut down, according to Dr. O.P. Mehra, managing director of International Data Management Private Ltd (IDM).

He said the international software market was of the order of Rs 54,000m today and would go up to Rs 180,000m in another five years. Provided the Government procedures were made smoother and faster, India could get hold of at least one per cent of this vast market (excerpted from Electronics Weekly).

An acute shortage of programmers (in USA)

The acute shortage of people who write the instructions that tell the computer what to do is regarded by industry executives as perhaps the biggest single problem facing the data processing industry today. ...92% of all computer users say that they have trouble finding enough programmers for their inhouse staffs. The intense competition is causing a dramatic rise in job-hopping for higher salaries. Companies are trying nearly anything to pirate programmers. Software International offers its employees a $2,000 referral bonus if they bring in a programmer from a rival company. This turns out to be an effective way to build a programming staff. Campbell, of CTG, estimates that 50% of the programmers he will hire this year will come from referrals made by his own employees.

A big part of the problem, of course, is identifying the few good programmers. Many of the job applicants are simply not capable of writing sophisticated software. At Digital Equipment Corp., 20% of the programmers produce 80% of the minicomputer maker's software. And after interviewing 330 job candidates for 100 programming slots in June, CTG found only 22 of them met its requirements.

Programmer-short companies have also resorted to training their own people. Computer Task Group, for example, spends $1 million annually to train its programming staff. Liberal arts graduates, with no computer background, can be taught to do simple programming with six weeks of intensive training, say company executives (excerpted from Business Week, 1 September 1980).

BBC launching computer course on TV

BBC is launching a beginner's computer course on television in the New Year. The project has been designed "to introduce interested adults to the world of computers and computing" and is specifically aimed at the complete beginner. The course will consist of a ten-part weekly television series due to be screened on Sunday mornings on BBC-1 from 10 January with repeats later in the week.

Patents on computer programs

Two cases were decided by the U.S. Supreme Court: The first case involved a computerized process for heat-curing synthetic rubber inside a molding machine. The U.S. Patent Office refused to patent the process, arguing that would be granting monopoly rights over the laws of physics and mathematics, which exist in nature (rather than being invented by man) and which therefore should be freely shared. By a five-to-four vote, the Supreme Court overruled the Patent Office.

The second case involved a patent for a component of the new Honeywell Level 64 computer. The component is known in the computer trade as "firmware" - neither hardware nor software, but something in between. It is akin to a permanent program wired into the computer. The Patent Office said the firmware was nothing more than an unpatentable program; by a four-to-four vote...the Supreme Court affirmed a lower court ruling in favour of Honeywell (source unknown).

A consumers' guide to software shopping

Data base management system	Organizes data in line with the informational needs and organizational structure of a business. Makes it easier to access and update files	Computer vendors Systems software companies	Starts at $7,000 (for use with a minicomputer) and runs to more than $100,000 (for use with a mainframe computer or for custom programming)
Networking	Enables computers in one building or across the country to communicate	Primarily computer vendors	$5,000 to $15,000 per machine in a minicomputer network and $30,000 to $75,000 for each mainframe computer in a network
Transaction processing	Permits users to carry on a dialogue with the computer -typing information and getting an immediate response. For use with such commercial applications as check processing and order entry	Computer vendors Systems software companies	$15,000 and up
Programming tools	Helps programmers write applications programs by automatically testing software code and identifying errors. Also known as "debuggers"	Computer vendors Systems software companies	$1,000 to $5,000 (for a minicomputer) and $75,000 (for a large mainframe computer)
Queries and report generators	Aids the novice user in extracting information from a computer memory and formating it into a report	Computer vendors Systems software companies	$1,000 to $37,000 for standard software
Applications generators	Generates applications software programs without the need for an experienced programmer	Major computer vendors	$5,000 and up
General financial	Automates the accounting functions of a business, including billing, inventory control, accounts payable, accounts receivable, general ledger, and payroll	Computer vendors Applications software companies	Packages range from $1,000 to $20,000 (for minicomputer systems) and from $20,000 to $70,000 (for large mainframe computers)
Manufacturing resource planning	Helps the user gain better control over the entire manufacturing process from production planning and inventory control to materials monitoring	Large computer vendors Applications software companies	$50,000 and up for standard packages, $100,000 and up for custom software
Financial planning	Simulates profit-and-loss scenarios for a company based on revenues, sales force location, commissions, and other controllable variables	Primarily applications software companies	$5,000 to $45,000 for packages; custom work begins at $250,000

A consumers' guide to software shopping (continued)

Cash-flow management	Assists financial managers in getting the best use of funds within a business	Primarily applications software companies	$25,000 to $75,000 for packages; custom software begins at $150,000
Management support systems	Combines software packages such as color graphics and business modeling that aid the manager in making decisions	Primarily applications software companies	Depends on the packages selected

(Data: International Computer Programs Inc. BW)

The increasing costs of developing, operating and maintaining software

(1) In computer users' budgets, the proportion of expenditure for rented or purchased hardware has fallen rapidly with the introduction of microelectronics, while software costs are increasing.

(a) The findings of the Siemens study

	Average share of outlays for software in computer users' overall budget (%)
1955	5-10
1970	50
1985 (estimates)	90

(b) Trends in the U.S. Air Force computer budget

	Expenditure for software Overall computer budget (%)
1970	20
1980	80
1985 (estimates)	90

(2) Costs of producing software are rapidly outpacing costs of producing microelectronic hardware.

Example: The production of a program line costs on average about 10 dollars, which is considerably higher than the unit costs of state of the art microprocessors

(3) Outlays for software absorb an increasing part of the R+D expenditures of both computer and semiconductor firms.

Example: For major components manufacturers, software absorbed over 50% of r&d expenditure in 1980. In the mid-1980s, this figure is expected to rise as high as 80%

(4) Outlays for software maintenance account for a growing part of the user firms' maintenance budget.

Industry estimates: 50-80%
(Dieter Ernst, Project Technologie Transfer, University of Hamburg, Hamburg, FRG)

COUNTRY REPORTS

People's Republic of China

The People's Republic of China faces a significant challenge in computer technology and seems eager to make every effort to catch up, according to MH Li of Chemical Bank and New York U (both New York, NY). The PRC wants to develop closer relations with more technically advanced nations. The country has no data base systems and is eager to learn, especially regarding conversion of manual into computer systems. Current focus is on software, and co-operation in this area between the PRC and the US will give 'a new horizon of DP'. Chinese universities are not 'low level' but they are short of teachers (Computrwld. 11/17/80, p.17).

Hungary

The United Incandescent Company has designed a programmable robot for operating press equipment. So far three prototypes have been produced. One has been installed at the Csepel Steel Works and the other at the Engineering Institute (Electronics Weekly, 4 November 1981).

Hongkong

In 1977, American firms first introduced microprocessors into Hongkong. At that time, these industrialists working on the application of the chips were predominantly under an OEM subcontract basis with the U.S. firms. In this way, the microprocessor kits were assembled into the end-product in Hongkong. Gradually, however, more and more people were attracted to the lucrative business, culminating in the 1979 boom.

Today, though the hand-held game fad has somewhat subsided, local industrialists unanimously see immense potential in the chips. There are still many concerns working hand-in-hand with overseas OEMs but others have diversified to many other fields of applications, maturing from the climax of two years ago. (For more details please refer to an article on microprocessor applications in Hongkong, published in the July 1981 issue of the AEU Journal.)

Japanese Push Robotics

The Japanese Government is now doing with industrial robots what it did two decades ago with mainframes.

To assist domestic mainframe manufacturers, the government established Japan Electronic Computer Co., Ltd. in 1961. The sole purpose of JECC was to finance the leasing of systems, thus removing this financial burden from the hardware vendors. The success of this venture is shown by its performance in the fiscal year ended March 1980, the latest figures available. In that year, it rented 690 systems with an if-purchased value of more than $700 million, the highest annual value in the history of that organization. At the end of that period more than 2,000 systems had been installed.

Now the Japanese are trying a similar tack with industrial robots. Japan Robot Leasing Co., Ltd. was inaugurated in April 1980, and at the end of its first year the organization had installed robots at user sites with an if-purchased value of $5.5 million. That was 160% of the year's business goal, says JAROL's executive managing director, Kenichi Kido. The new target for the current fiscal year is $12.5 million, based on a conversion rate of 200 yen to the dollar.

There are said to be 14 000 "real" robots installed in Japan (simple manipulators, which require direct human operation, are not counted in).

The largest users, not surprisingly, are automakers, who account for almost 40% of installations, followed by the electrical machinery industry and makers of molded plastic products. Those three make up two-thirds of the total.

According to Kido, the average price of a pick-and-place robot is from $10,000 to $15,000, for a variable sequence control robot about $25,000, and for an intelligent robot about $65,000. He adds that the intelligent variety comprise some 20% of the nation's installed base, while pick-and-place robots account for an additional 15%. The remainder are of the variable sequence variety. Included in the latter category are welding robots, painting robots, and the like (abstracted from Datamation, July 1981).

Korea

The Korean Electronics Industry now seems to be entering a new era; beginning this September the Government established the Fifth Five-Year Economic Development Plan (1982-1986), which places emphasis on the development of the electronics industry, particularly semiconductor production.

With a total of 2,300 billion Won (or about $US3 billion) invested in the field of electronics, highly sophisticated and value-added electronic products such as video-tape recorders (VTRs), semiconductors, computers, and electronic switching systems (ESS) will be intensively developed as a core strategic industry in order to increase the export share of electronic products.

To attain such a target, the sophistication of industrial structures, the promotion of technology development reinforcing the local production and consumption, and the continuous promotion of export policies for electronics products will be pursued.

The demand in the government sector will be fully explored for semiconductors, computers, and other industrial-use electronic items to replace imports, and electronic parts will be actively developed in order to attain self-sufficiency. In the case of semiconductor elements, the government plans to raise the ratio of self-sufficiency from the current 15% to 85% by the end of 1986.

In the five year plan, high level technology is seen as the driving force of innovative industrial development and economic growth, and the semiconductor industry has been evaluated as the core strategic industry leading all the other ones.

Currently, there are 24 semiconductor companies in Korea. Twenty of them are foreign-invested companies assembling imported parts, and the others are domestic firms (AEV Journal, October 1981).

Mexico's move to micros:

The recent heated bidding battle for new computer equipment at the Technology Institute for Advanced Study in Monterrey, Mexico, had significance far beyond the monetary value of the contract. Some 150 Apple IIs have already been installed at the top technical school and another 150 are on the way.

In operation from 8 a.m. until 4 a.m. the next day, the processors are used for a variety of applications. On the practical problem-solving side, students use the systems to decipher differential equations and complicated economic modeling tasks. For amusement purposes, they also run chess games and computer dating programs.

The most important aspect of the Monterrey setup, however, is that it allows the entire student body to become "computer literate" virtually overnight. Personal computers have been primarily selling in the small business market. Most small system buyers are first-time computer users who are using the new gear to replace old electromechanical accounting devices.

Mexican users are also showing resourcefulness and ingenuity in the applications' realm. The country's oil exploration firms, for example, purchase personal computers by the dozens, installing them on drilling platforms in the Gulf of Mexico. When they burn out - rendered inoperable by the severe environment - they are simply tossed overboard and replaced with new inexpensive micros.

Microcomputers are also moving into the data communications field. Personal computers worth $5,000 are currently serving as sophisticated communications PBX systems. These inexpensive processors replaced $80,000 systems made by the Mexican telephone company (excerpted from Datamation 192-14).

United Kingdom

The Goverment of the United Kingdom has undertaken a micro-electronics drive, with £400 million in public funds, devoted to the microelectronics industry support programme (£70 million) to stimulate production; the software products scheme; the schools' awareness project; and the microprocessor applications project (£55 million), administered through the Department of Industry. In addition, a further £250 million are channelled through the National Enterprise Board. The Government of the United Kingdom has put into operation a four-point programme comprising:

(i) an awareness campaign with the aim of reaching 50,000 key decision-makers in three years;

(ii) a concentrated programme for education and training;

(iii) direct support to industry, including industrial awareness and training and feasibility studies and consultancy support for public procurement;

(iv) public procurement.

1982 has been declared Information Technology Year and funds are being made available for a wide range of promotional activities.

More detailed information on government initiatives and applications in the United Kingdom will be provided in subsequent issues.

UK Government standard micro range

The UK Government Central Computer and Telecommunications Agency (CCTA) has drawn up a standard range of nine microcomputers from which government agencies have to choose their hardware. It was considered that no organization could properly appraise and evaluate all the microcomputers (over 250 in the UK) that are available.

The CCTA range covers the whole cost spectrum for microcomputers: up to £2,500; £2,500-£6,000; and £6,000-£15,000, with three models in each range. There are several advantages to this sort of system. By using only nine companies, the agencies will get discount packages, quicker delivery, continued supplier support and maintenance back-up. Additionally, the combination of a standard range and a compatible software environment makes the use of transportable software possible and thus departments may exchange software.

Demonstrations and feasibility and sizing studies for the range will be possible at CCTA's headquarters in Riverwalk House, London, UK. The range is a follows:

- bottom range

Research Machines Ltd. - 380Z
Microsense Computers Ltd. - Apple II system
Commodore Business Machines (UK) Ltd. - Super PET

- middle range

Casu Electronics Ltd. - Super C
Modata Ltd. - DSC3
Thame Systems Ltd. - MCZ1/05

- top range

BMG Microsystems Ltd. - MS 5020
Equinox Computer Systems Ltd. - Series 200
Wilkes Computing Ltd. - General Robotics 11/23

("Microprocessors and microsystems", vol. 5, June 1981).

United States

The U.S. semi-conductor industry - fast growing, prosperous and free of government control - is appealing to Washington for help in competing with the Japanese and in investing in new equipment. It is mounting a campaign for freer trade and tax incentives (New York Times Service).

RECENT PUBLICATIONS AND ARTICLES

Microelectronics strategy for developing countries:

(Excerpt from UNIDO document IS/246/Rev.1, Report of the Exchange of Views with Excerpts on the Implications of Technological Advances in Microelectronics for Developing Countries, Vienna, 10 - 12 June 1981.)

In the light of the suggestions in the secretariat document and the discussions in the meeting, components of the strategy would be broadly the following, the sequencing depending on the situation of each country:

Monitoring and awareness

(a) Monitoring on a continuous basis, through a multi-disciplinary national team, the developments in microelectronics technology and its impact on priority areas in industry and other sectors, in particular in terms of skill and infrastructure requirements and comparative advantage in international trade;

(b) An awareness campaign directed to a target audience of decision-makers and end-users.

Endogenous capacities and applications

(c) Promotion and establishment of a microelectronics industry, ranging from assembly to design and manufacture of chips and instrumentation, the actual feasibility being dependent on local requirements and applications, comparative advantage, technological capabilities and other relevant factors;

(d) Promoting applications, based on identified national tasks, in priority areas in industry and other sectors, including the accessing, handling, processing and use of information;

(e) Short-term and long-term programs of education and training in hardware and software, to meet local requirements and, where possible, for export; existing programs and institutions should be kept under review and reoriented as appropriate;

(f) Setting up or encouraging applied research and development (R+D), particularly in the fields of special applications of importance, including the training and sensitization of R+D personnel in those fields;

(g) Setting up and/or linking national institutions to develop endogenous capactities and applications mentioned above;

(h) Reviewing or formulating appropriate policies for transfer of technology and investment and the encouragement of endogenous capacities and applications.

Review

(i) Keeping under review the implementation of the several elements of the strategy and ensuring coherence and consistency of the strategy with overall development aims and other sectoral strategies, in particular a telecommunications strategy.

In this context the meeting underlined the importance of the following issues:

(a) The monitoring of the effects on industry and other sectors is an important continuous task for the developing countries, which should be made on a clearly institutionalized, stable basis;

(b) The institutions should be established and should work as far as possible on a co-ordinated basis. UNIDO should start work on how this co-ordination can be made.

Singapore and software

(Excerpt from "The Computer Knowledge Industry - a Look at the Economic Rationale of a New Phenomenon from the East", paper prepared by Robert Iau for the International Conference on Informatics and Industrial Development, Dublin, March 1981.)

"To begin with, computer studies as an examination subject will be offered to all A-level students with effect from this year. Over 200 mini and microprocessors will be installed in all secondary and pre-university schools within the next 18 months. Teachers have been undergoing training since mid-80 to ensure proper staffing in the schools. The National University of Singapore has revamped its syllabus to include a large element of computing in its curriculum in addition to pure computer science. This will ensure that graduates would be suitably trained to be productive almost immediately. Teaching of computer usage is also included in other disciplines such as engineering, science, business administration, commerce, economics and so forth.

"A training institute known as 'The Japan Singapore Institute of Systems Technology' will be set up by the end of 1981. This institute, a joint venture between the Japanese and Singapore Governments, will train software personnel for both the large and the mini computer systems. It will also offer training courses for non-computer professionals such as engineers, managers and upgrading courses for existing computer personnel in the market. A second institute known as 'The Institute for Systems Studies' will also be set up. The initial objective of this institute is to concentrate its training to basic entry level software personnel but the institute will work closely in future with the National University of Singapore and computing professionals on software at the leading edge of the technology. Computing studies have recently been introduced into the two technical colleges in Singapore. Another two technical colleges are expected to be established by mid 80's and they will have computing included in their curriculum.

"On the business side of the coin, various incentives in financial support and tax-holidays will be introduced by the Singapore Government. Purchased computer equipment can be written off against corporate tax over three years. Organizations who send their EDP staff for upgrading courses either in Singapore or overseas could be subsidized by the Government up to a maximum of 70% of the total training cost. Guidelines are being prepared to allow income from software developed in Singapore and marketed overseas tax-holidays or lower rates of tax and Government will also liberalize the issue of professional and employment passes for computer experts who wish to set up offices or work in Singapore."

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