THE SECRETARY SPEAKS . . .

Dear Member,

It is time to renew your membership by paying the annual fee. The last Newsletter carried a special form as well as an envelope for the same. Did you make use of this? And have you written to Raizada for the "who is who" he is compiling for the computer people? Your name and photograph should appear in the computer "WHO IS WHO?"

The financial year of the Society has ended on the 30th June. This was the first full year since the new Constitution was introduced, and the effects are still not prominent enough to be seen. I think the changes are just only creeping in.

Your Executive Committee is taking over from 1st July 1975. As you will observe, there are lots of old faces with only two newcomers. This will help in keeping a continuity which is many times needed in the initial changeovers — even in those days of revolutions in all fields. Some of the Committees have definitely started working and I think that their efforts would be visible during the course of this year.

One thing that concerns me is the student membership. In fact, the lack of it. This grade of membership was introduced last year, but we have not so far been able to attract any appreciable number of students. Recently an advertisement campaign has been started and the response so far has been quite good. I seek your help in getting more and more students enrolled as members. The annual subscription is only Rs. 10/-.

Over 400 members amongst you are not getting benefits of the Regional, Divisional and Chapterwise activities of your choice. This is due to the absence of the application forms which you are expected to fill in last month. I had written to all individual members who have not sent their application forms. About 100 members responded by filling in their forms. If you have not yet sent to me your application form, please do so immediately. The Chapters are becoming more and more active and I do think that you should benefit from their activities.

Sarvottam S Thakur
General News

NEW COMPUTER AT PSG COLLEGE OF TECHNOLOGY, COIMBATORE

The Computer Centre at the PSG College of Technology & Polytechnic, Coimbatore was inaugurated and the First Phase of the Computer System was commissioned by Thiru. G. K. Devanarayanan, Chairman, Lakshmi Group of Industries, Coimbatore on 9th June 1975.

The digital computer system being installed is a modern third generation TDC-312 system supplied by Electronics Corporation of India Ltd. The system when completed will comprise:

- TDC-312 Central Processor Unit
- 16K Core Memory
- 4 Nos. Magnetic tape units
- Paper Tape Reader and Punch
- Card Reader and Line Printer

The First Phase of the System commissioned on 9-6-1975 is a paper tape system. The TDC-312 systems are capable of working in various capacities, enhancing the resources of a variety of users. A few typical application packages are:

- Management, Business and Industry
  - PERT/CPM
  - Time analysis for projects, activity schedules
  - Resources levelling, Linear Programming
  - Accounting packages
  - Sundry Creditors' and debtors' ledgers, purchase and sales day books and customers ledgers, General ledger and trial balance
  - Inventory Control Systems
  - Inventory control through indexing, purchasing, receiving, inspection and issuing of materials
  - Stores Accounting System
  - Bill of Materials Process
  - Forecasting Sales/Demand
  - Pay Roll System
  - Data Storage and Retrieval
  - Order entry
  - Data Acquisition and Control

Education

- Computer-aided Instruction
- Programming Courses
- Computer Science Courses
- Problem Solving
- Administrative Processing

SYMPOSIUM ON TRANSDUCER TECHNOLOGY, MAY 1975
Organized by
Naval Physical & Oceanographic Laboratory, Cochin

An all India Symposium on Transducer Technology was held in the Naval Physical and Oceanographic Laboratory, Naval Base, Cochin on the 16th and 17th May 1975.

Organised by the Naval Physical and Oceanographic Laboratory, the Symposium was co-sponsored by the Aeronautical Development Establishment, Bangalore and the Defence Research and Development Establishment, Hyderabad. It was held under the auspices of the Defence Research and Development Organisation.

The Symposium was inaugurated by Prof. M.G.K. Murty, F.R.S., Scientific Adviser to Raksha Mantri and Secretary, Department of Electronics, Prof. R.S. Krishnan, Vice Chancellor, Kerala University presided over the function.

The Technical sessions lasting two days included about 60 papers contributed by Scientists from leading organisations in the country.

An exhibition of Transducer materials and devices, developed and manufactured in the country was also held on this occasion.

Transducers which convert physical parameters into measurable electrical signals and vice versa, are fundamental tools in military and civilian applications. Considerable amount of work is being done in the country in the field of transducer measurement of parameters in Oceanography, Defence Establishment Electronics Engineering.

Over 120 organisations including Universities IITs, Institutions of the CSIR, the ISRO, the Atomic Energy Commission and Defence R&D Organisation participated in the Symposium.

ATTENTION COMPUTER USERS!

Electronics Trade and Technology Development Corporation Limited, a Government of India Undertaking under the Department of Electronics, will be importing shortly:

- DISC PACKS — 6" high (Compatible with IBM 2311)
- MAGNETIC TAPES — Length 2100' and 1200 and 800/1600 b. p. i.

No licence required. Payment in Rupees. Project your requirement to:

IMPORTS DIVISION
E. T. T. D. C. Ltd.
1548, Malcha Marg
New Delhi-110 021

Firm quotations by July.
COSTAR

The details of COSTAR described above in two separate dimensions (medical and administrative), although in reality, this separation is artificial since the two functions have considerable overlap.

Medical Systems

When a new member enters the HCHIP, a clerk enters the registration data from the application card into the computer, and establishes the identification number and the demographic portion of the patient file. At the time of a visit (encounter), the provider (physician or nurse) completes a standardized specialty-oriented Encounter Form which is the basic document for data capture. The Encounter Form provides for recording basic administrative data, a brief biographic sketch of the patient, and a self-encoding format for recording the patient’s problems (or diagnoses), medication and other therapies, and disposition. The provider may add as much or as little text to each of the patient’s problems or procedures; the free text is linked with the problem and will appear on all output records. Such comments are usually brief descriptions of pertinent history or physical findings or statements about the course of the disease or response to therapy. If the provider wishes to add more detailed information, he or she may do so. Information such as laboratory test results, X-ray reports and ECG results are recorded on separate self-encoding forms. Clerks enter all data into the system through terminals in the medical record room or in the laboratory area. This information is then transmitted to the provider’s name establish appropriate linkages to the patient record and a complete recording of the information associated encounter.

For scheduled visits, the computer prints output reports in advance of the visit so they are available in hard copy for the provider. The basic output document is a Status Report, and an updated summary of the following:

1) All the patient’s problems, classified as major, minor or presumptive
2) Laboratory test results with an indication of which test results have been compared and 3) current medications.

For Unscheduled visits, the computer generates specific output request based on any of the previous reports.

In addition to the Status Report and the Encounter Report, the computer generates specific output request for certain specialty areas. For example, in pediatrics, the system creates a continuing record of growth and development, ranked according to percentages. In addition, it supplies milestone charts and immunization records to facilitate effective delivery of health-care to this age group.

For non-scheduled visits or for telephone calls, the system makes the Status Report and Encounter Reports available for the provider. A provider can easily review a patient’s charts blood pressure readings, results of a specified laboratory test, or changes made in a given medication. Flow charts take a ingenious are under development. Thus when a patient has hypertension, for example, the provider will get a combined flow chart of blood pressure readings, urinalysis results, BUN, and medication history.

The computer-stored ambulatory medical record system offers the providers many advantages. They are no longer dependent upon the availability of unique physical documents; instead, they may obtain an instantaneous display of any patient’s data file from any number of one of a number of different locations.

Administrative System

In addition to medical information, the system contains administrative data which provides health center management with statistical and billing information vital to informed and successful management and planning. Enrollment forms in the Plan creates the demographic and registration portion of the patient file. This nucleus, combined with the information entered by each medical encounter, establishes the basis for the management information system.

A variety of administrative and management functions are necessary and available with the system. The computer generates mailing labels to send medical history questionnaires and health center information to customers. The system produces forms which are used for the generation of membership identification cards. The system supports the communication activities required for capitation billing as well as fee-for-service billing of non-members. The provider notes hospitalizations and outside referrals on the encounter form, and these are input to the computer and made available on inquiry to verify patient insurance claims. Utilization and membership reports are available and provide data organized by age, sex, geographic location, medical specialties involved or any combination thereof.

Administrators can develop long-range plans based on analyses of current data and various assumptions as to growth. Cost/Membership ratios allow management to accommodate records on specific criteria, permitting assessment of facilities utilization via patient encounter statistics. Management thus informed, can better plan for future requirements including "what-if" projections related potential number of future members.

In summary, the computer-stored ambulatory medical record system developed for the Harvard Community Health Plan provides the data necessary to keep valid, timely, and readily accessible records specific for day-to-day patient care in an ambulatory practice and it contains the data base necessary to manage, supervise, and plan the evolution of a health-care delivery system.

Source:

Computes in Patient Care and Medical Education, Status Report—1974, Laboratory of Computer Science, Massachusetts General Hospital, Harvard Medical School, pp. 4-4.

Additional information is available from Laboratory of Computer Science, Massachusetts General Hospital, Francis Street, Boston, Massachusetts U.S.A.

SURVEY ON TC4 ACTIVITIES:


These groups study special problems in the field of medical informatics. A publication summarizes the results of this work.

Working Group 4.1.

Information Sciences and Medical Education. Chairman: Mr. Gremy, France.

This working group will continue to monitor the development of the computer education of health personnel. In addition, it will elaborate recommendations for the education of non-physicians in medicine. Also, the influence of informatics on the medical practice and the education in medicine will be investigated.

Two international surveys and many discussions among specialists resulted in the publication of the first TC4 monograph. This report deals with many aspects of the computer education health care personnel and gives guidelines how it can be organized.

Working Group 4.2.

Requirements for Interface Input and Output Procedures in Medical Computer Applications. Chairman: W. Schneider, Germany.

This Working Group is focused on four main topics:
- tools needed in order to meet confidentiality and legal requirements
- tools needed for the presentation of computer-prepared information to doctors, nurses, hospital administrators and patients
- tools needed for the control of on-line data input from instruments
- tools needed for the interaction between different kinds of computer systems (medical computer network systems).

Working Group 4.3.


The aims of this Working Group can be summarized:
- definition of minimum requirements and standards for ECG data acquisition systems
DISCUSSION FORUM:

On Characteristics of Medical Informatics.

"As all medical sciences, medical informatics is concerned with the amelioration of the quality of patient and population care. The introduction of information processing methodology and the judicious utilization of the informatical tools should in fact increase the rate performance/cost in the field of health care.

Especially in the future, the influence of medical informatics will be more felt in medicine. This point was stressed during a meeting of working group 4.1. The attending members described medical informatics as being the application of formal methods to medicine, giving descriptions of models and their implementation with or without computer, always intending to be useful for medical behaviour in medical action".

J. Van Egmond

INDIA'S WHO'S WHO IN COMPUTER SCIENCE

This form is for submission for the compilation and publication of India's Who's Who in Computer Science 1975. Even non-members of CSI can fill it. Members' help is solicited in giving a wider publicity to this form. The completed form may be mailed to the Editor, CSI Newsletter, CSIINDOG, Hillside Road, New Delhi-110012 by 30th July 1975 — Editor

1. NAME Dr/Shri/SMT/KM
(Surname First)

2. DATE OF BIRTH

3. PLACE OF BIRTH

4. PRESENT POSITION and FUNCTIONAL DESIGNATION

5. CSI MEMBERSHIP YES/NO

If Yes Membership No.

6. MAILING ADDRESS

7. PRESENT EMPLOYER & ADDRESS

8. ACADEMIC QUALIFICATIONS (Start from Graduation)

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<th>Subject</th>
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9. FIELD OF SPECIALISATION IN COMPUTER SCIENCE
10. PROFESSIONAL QUALIFICATIONS

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11. BRIEF EMPLOYMENT HISTORY OF PAST FIVE YEARS

12. HOBBIES AND INTERESTS

13. MEMBERSHIP OF LEARNED BODIES & ADWAR

14. LIST MAXIMUM OF FIVE LATEST CONTRIBUTIONS

Please fix a passport size photograph aixed at its back.

Signatures

COMPUTER ROSTER INDIA 1975

This form is as per directives for the compilation and publication of Computer Roster India 1975. Even novembers of CSl can fill it. Members' help is solicited in giving wider publicity to this form. Kindly complete this form and mail to Editor, CSI Newsletter, C/o INSOC, Hillside Road, New Delhi-110012 by 31st July 1975 — Editor

1. NAME OF ORGANISATION

2. MAILING ADDRESS

3. NATURE OF ORGANISATION (Check appropriate square)
   - Educational
   - Government (State) Dept
   - Government (Centre) Dept
   - Research
   - Industry (Public)
   - Industry (Private)
   - Commercial/Business
   - Banking
   - Name any other

4. HOW WAS COMPUTER ACQUIRED

5. WHEN WAS COMPUTER INSTALLED

6. NAME AND DESIGNATION OF HEAD OF COMPUTER CENTRE

7. MAKE AND MODEL OF COMPUTER

8. MEMORY SIZE WORDS CHARACTER BYTES

9. LENGTH OF WORD BYTE AVAILABLE TO USER

10. SPECIAL FEATURES
   - Virtual Memory: Yes/No
   - Multiprogramming: Yes/No
   - Remote Terminals: Yes/No
   - Arithmetic: Fixed/Floating/Binary/Decimal
   - Paging: Yes/No
   - Real-time: Yes/No
   - Any other Special Features

11. PERIPHERALS (Please indicate Make, Type, Quantity, Capacity, Speed and Configuration)
   a) Card Reader
   b) Card Punch
   c) Paper Tape Reader
   d) Paper Tape Punch
   e) Magnetic Tape Drums
   f) Magnetic Disc Drives
   g) On-line Plotter
   h) Graphic Display Device
   i) Visual Display Device
   j) On-line Terminals
   k) On-line Printer
   l) Satellite Computer
   m) Magnetic Drums
   n) Data Cell
   o) Name any others

12. BRIEF DESCRIPTION OF SOFTWARE AVAILABLE
FROM THE CHAPTERS

AHMEDABAD CHAPTER
The Annual General Meeting of the Chapter was held on Thursday, the 1st May 1975. Dr. Mohan Kaul was in the Chair. Accounts of the 10th Annual Convention were presented subject to audit.

Elections were held and the following members were elected unanimously:

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<td>President</td>
<td>Mr. S. R. Thakore</td>
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<tr>
<td>Vice-President</td>
<td>Dr. Mohan Kaul</td>
</tr>
<tr>
<td>Hon. Secretary</td>
<td>Mr. Ashok C. Mehta</td>
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<tr>
<td>Treasurer</td>
<td>Mr. K. Rajagopalan</td>
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The new Managing Committee has decided to hold regular meetings for all the members on the last Friday of each month and a lecture will be arranged on that day.

On 25th April 1975 meeting was held and a presentation was made by Mr. N. N. Chatterjee, Sales Manager of ICL Ahmedabad Branch. The topic was "Computer as an aid to Management Function".

A film on "Dialogue for Three" was also screened by the Speaker.

POONIA CHAPTER
The Second Annual Convention — 1975 of the Poona Chapter was inaugurated by Mr. F. C. Kohli, President, Computer Society of India on 12th June 1975. Dr. J. G. Krishnaaya delivered the Key-Note address.

ROUKELA CHAPTER
The Chapter organized the following activities during May-June 1975.

Audio-Visual:
1. The following three films dealing with different aspects of computers and some of the mathematical theories underlying them were screened on May 19, 1975 at the Gopabandhu Auditorium of the Steel Plant with the courtesy of British High Commissioner’s information department.
   1. Binary information
   2. Logic
   3. Programming languages.

2. The following films were screened on June, 19th, 1975 at Bisra Club of Bisra Stone Lime Co. Ltd., Burdwan on the benefit of the members.
   1. An Eye for Business
   2. Frontier Microcomputerisation
   3. Computer Product drawing
   4. 8080-A hardware.
Elections:
According to the chapter by-laws of the new constitution approved by the Executive Committee on 19th April, 1975, the term of Office of the present office bearers of the Committee came to an end on 30th June, 1975. The Nominations Committee consisting of Shri K.L. Srivastava and Shri P.C. Tripathi, was appointed by the Executive Committee for the purpose of calling for nominations and conducting elections for election the office bearers of the Managing Committee for the year 1975-76.
A General Body meeting was held on 15th June, 1975 at Brahmapur Club, Panipat and the following business was transacted:

(A) The minutes of the previous Annual General Body meeting were confirmed and the Secretary's report for the year 1974-75 was read and adopted by the General Body.

(B) The Chapter by-laws effective from July 1, 1975 were discussed and adopted by the General Body.

(C) The following office bearers for the Managing Committee for the year 1975-76 were elected:

S/Shri H.S. Manjuthan Chairman
K.K. Senarma Vice-Chairman
J.S. Maken Secretary
V.P. Srivastava Treasurer
K.K. Sarkar Member
D.A. Kheria Member
Babu Abhaam
S.R. Sahi
Auditor
K.L. Srivastava

Nomination Committee:
P.D. Subudhi
A.K. Agarwal

Tutorials:
For the benefit of a few Graduates, mostly in Mathematics and Science who had just completed their degree course and who evinced keen interest in knowing the working details of the electronic computer for widening their knowledge, the Chapter organised a five week course on "COMPUTER CONCEPTS, SYSTEM AND PROGRAMMING TECHNIQUES". Ten students joined the course and faculty was drawn from among the members.

The course was inaugurated by Shri H.S. Manjuthan on May 26, 1975 at Deepika Bhawan on B. The students had their degree certificate of Bara Stone Lime Co. Ltd. at Birlaipur and they were awarded certificates on successful completion of the course.

Seminars:
To promote professional development of members a two day workshop on "Pay Roll and Employees Services" was organised by the Chapter in collaboration with the Rourkela Steel Plant on June 16-17, 1975 at the Technical Institute of the Steel Plant. Delegates from Birla Steel Plant, Rourkela Steel Plant, Salem Steel Plant, Bara Stone Lime Co. Ltd. and Omsas Industries Ltd. Birla participated in the workshop to share each other's experience and evolve a more scientific Pay Roll system on the computer.

The workshop was inaugurated by Dr. N.S. Datar, General Superintendent, Rourkela Steel Plant on 16th Morning following which papers were presented by Rourkela Steel Plant, Birla Steel Plant and Bara Stone Lime Co. Ltd. with Shri P.K. Ramacharitosh, Cost Controller on the Chair. The various pay roll systems in vogue and the management information developed on Computer evinced keen interest from among the participating delegates who had interesting and lively discussions on the subject. On June 17, 1975 there were syndicate discussions on the following topics:

A. Development of an overall plan for a MIS in personnel and pay roll areas.
B. Comparative analysis of Pay Roll systems and development of Package Programmes.

The Group leaders were Shri P.S. Prabhu of Birla Steel Plant and Shri K.L. Srivastava of Rourkela Steel Plant. Shri K.K. Senarma of Bara Stone Lime Co. Ltd., Birlaipur was on Chair and the Secretary was Elected to the syndicate report under the leadership of Shri D.A. Pereira, Secretary.

AN INDEPENDENT DIGITAL INCREMENTAL PLOTTING

J.T. George*, (mem) P. Wilson Jeayseinha* P.V. Varghese*, P.V. George*

ABSTRACT
Modern computer graphic techniques reduce the laborious process of manually plotting the results printed out by a computer. The utilization of digital incremental plotters along with computers can produce graphical outputs economically and rapidly.

Such a plotter has been developed with indigenous components. It can translate digital inputs into graphs and drawings. It accepts data directly from digital devices. The paper gives complete system description, salient features and performance of the plotter.

The low cost and ease of interfacing it to a digital computer may enable the computer users in India, to get graphical outputs by adding such plotters to their systems. Similar plotters are extensively used as attachments to electronic desk calculators.

INTRODUCTION
Comprehension through the human eye is the primary objective of man. Development towards computer graphics. About ten years ago, the conversion of virtually unlimited logical and scientific data into visual or graphic form, which could be of substantial aid in a wide variety of technical tasks, was a vision of the future. Inventions of plotters both analog and digital, CRT displays and above all big computers made the dream come true.

Nowadays, so far as the direct output from a digital computer is concerned, analog methods of plotting are not generally used because of the error introduced by the D/A converters whose cost increases exponentially with accuracy. This paper deals with the details of a digital incremental plotter which has been developed by 100% indigenous components. The plotter may be used online with a computer or an electronic desk calculator and off line with a tape reader, magnetic tape drive or even from a manual key board. The photograph of the plotter is shown in Fig. 1.

PRINCIPLE OF OPERATION
The plotter is carried out along the two axes by moving the pen carriage along the X axis and the paper mounted on a drum along the Y axis. The pen or the drum can be moved backward or forward in precise increments. These movements are achieved by using two stepper motors, one each for X and Y axes.

The motion along 45° to the principal axes can be accomplished by moving the pen and paper drum simultaneously in the required direction. The pen can be lifted up or made to fall on the paper.

Fig. 1

Five channel inputs control the plotting movements; one each for +X, -X, +Y, -Y and pen up/down. A pulse on one of the input lines +X or -X via the plotter logic causes the X axis step motor to rotate clockwise or anti-clockwise respectively by one step. Likewise a pulse on one of the input lines +Y or -Y causes the Y axis step motor to rotate. These movements are transferred to the pen carriage and paper drum by means of pulley-wire drive arrangement. A pulse in the pen up/down input line will cause the pen solenoid to energise or de-energise. When the solenoid is energised, the pen is caused to touch the paper and when deenergised it is caused to raise.

THE SYSTEM DESCRIPTION
I. Mechanical Hardware
It consists mainly of the following assemblies:

(a) Pen carriage assembly
The assembly which incorporates pen holder and slider mechanism houses a solenoid to move the pen up/down. The carriage slides on two rails which are electrically isolated to provide power to the solenoid. A number of ball bearings have been fitted on the carriage so that the carriage strictly follows the path on the rails when it is made to travel by the
step motor by means of steel wire guided through pulleys.

(b) Drum Assembly
A hollow drum which is made up of a light weight alloy, has been fitted on an axial rod. The paper positioning mechanism forms part of the drum. The paper is held tightly to the drum by a spring loaded bar. The whole assembly is rotated by the step motor with steel wire and guide pulleys.

(c) Lid Assembly
A transparent plastic lid covers the pen carriage and the drum assemblies. It is mechanically coupled to the pen carriage assembly in such a way that when it is opened, the pen assembly is also lifted which facilitates easy access for fixing the paper onto the drum.

II. Electronic Hardware

The electronic system comprises the following circuit modules; the block diagram of which is shown in fig.

(a) The input gating circuits gate the signals from either manual control or external units depending upon the auto/manual switch position and route them to the desired channels.

(b) Plotter interlock module checks for the off scale position of the pen and paper and sends the pulses or inhibits them from entering into the motor control circuits accordingly.

(c) The step motor control module consists of control circuits to carry out the necessary switching sequences that are required for the bidirectional rotations of the step motors.

(d) Step motor driver module incorporates four drivers to drive the four windings of the step motor used. There are two such modules for the two step motors.

(e) A bistable has been used to control the two states of the pen (up and down). A relay driver drives the pen solenoid.

(f) Two internal clocks 150Hz and 2Hz have been provided to control the rotation of the motors with coarse and fine speed in manual mode.

(g) Regulated power supplies have been built in to provide power to the motors and the logic circuits.

TECHNICAL SPECIFICATIONS

1. Plotting dimensions
   - Plotting length: X axis 275 mm
   - Y axis 70 mm
   - Paper size: 225 x 222 mm

2. Input data
   - The following 5 bit codes have been assigned to control the plotting:
     - Code: 00001
       - Action: -X (Right)
     - 00010
       - +Y (Up)
     - 00100
       - -X (Left)
     - 01000
       - -Y (Down)
     - 10000
       - Pen up/down

3. Speed and step size
   - Speed: 150 steps/sec
   - Step size: 0.2 mm

4. Input levels
   - TTL Compatible
   - Logic: Positive
   - Logic 0: 0.8 V Max
   - Logic 1: 2 V Min
   - Duration: 100 ns to 1 ms
   - Pulse rate: 150 Hz

5. External input connections: External signals can be given through an Amphenon 8 pin connector.

6. Pen nib size options: 0.2 mm to 0.8 mm in steps of 0.1 mm

7. Power: AC 220 ± 20 V, 150 W

8. Physical dimensions
   - Overall size: 450 x 360 x 210 mm
   - Weight: 25 Kilograms

SALENT FEATURES

The system has been designed completely with integrated circuits except the final motor drivers which are of discrete components. The speed of the plotter is limited only by the step motors. The step motors used in this plotter are having a maximum speed of 200 steps/sec on no load. As the load on the motors is applied, steadiness sets in. A maximum reliable speed of 150 steps/sec has been achieved by using specially designed driver circuits and light weight materials for the drum and pen carriage to reduce the torque. A power on/off switch, an auto/manual switch and a pen control switch have been provided in the plotter. The joystick facilitates the manual positioning of the pen anywhere on the paper; with options for coarse and fine positioning before a plot is carried out. Limit switches, provided for all the four directions, prevent damage to the pen or drum assembly and they can also serve as the reference points for remote plotting. Some plots carried out on this plotter by connecting it to a Minck-22 TDC 12-EC1 Computer are shown in fig. 3. The required software has also been developed. Requests for the transfer of know-how for commercialisation have also been received from various quarters.

CONCLUSION

Usefulness of this plotter in graphically interpreting digital data is unlimited. Applications include automatic drafting, computer aided design, numerical control tape checkout and many others. The plotter has been made with 100% indigenous components; its cost work is less than that of an imported one having the equivalent specifications. With virtually little interface it can be connected to any digital computer particularly to the one which has a teletype as an output device.

ACKNOWLEDGEMENTS

The authors are indebted to Dr. Brahman Prakash, Director, VSSC for permitting to work on this project and Shri R. Aravamudan for his guidance and many valuable suggestions. They wish to acknowledge the support rendered by the members of the Software Group of the Computer Division. TERLS for generating the necessary plotter software. Thanks are due to Shri Velappan Puli for his help in fabricating a few mechanical components of the recent model of the plotter.

REFERENCES

George (J. T.), George (P.V.), Narayanaswamy (K. M.), and Wilson Jayanthi (P.), A Digital Computer Plotter Interface. IIEETE, 25, 3 & 4, 1974: 133-135.

POSITION WANTED

A young (33) ambitious Systems Analyst working in multinational foreign company at Bombay is looking for a change in India or abroad. Education — M.Sc. in Statistics Experience — 12 years comprising of Systems Designing for Commercial Industrial & Scientific Applications; Programming — AUTO-CIDER & FORTRAN; Knowledge of COBOL & Q M; Statistical Analysis on computer for Research Projects. Survey; Supervision of DP section. Please contact Box EFJ, Co C21 Newsletter, NHDCO, Niladri Road, New Delhi-12.
Short Communication

DATA PATH TRACING IN A DIGITAL PROCESSOR

It is well known, with reference to conventional computer architecture that each machine code, during its fetch and execution, causes pulses to flow along pre-fixed paths involving a specific set of computer registers.

If you are faced with the problems of demonstrating these paths, small programs which contain a loop over the single instruction of interest will be of help. These programs are also useful for maintenance checking of the hardware logic and should be of the "stand-alone" type (they should be understandable in terms of the machine code manual alone).

A one card (40 column) program of this type has been designed by the authors for the IBM 1130 (see Multipunch program card). Its function is to make the display lamps of the accumulator extension alternately bright and dark for periods of 2 seconds. The card is readable in the program load mode (i.e., without software).

With suitably designed programs, this technique can be used to demonstrate quite a few points asserted by the manuals but not testable without sophisticated equipment (or time consuming single beat node of running).

Looping for such programs should be done necessarily through index registers (or repetitive interrupt generators such as the 1130 stop key), since use of accumulator for decrementing and testing of indices messes by the visual effect.

Maintenance checking too is simple. We write a set of such programs, record their display "signatures" and look for the latter when the programs are run during maintenance.

The vision persistence obtainable by looping should be particularly interesting on serial computers such as the IBM 1401.

MULTIPUNCH PROGRAM CARD

Col. No.
01 12 11 11 4 9
02 1 6

P.V. Ratan
P.S. Raj

GENERAL

RINGE R D: ABC of systems leasing. Infosystems 1974, 21(8), 30-145.

ARTIFICIAL INTELLIGENCE


HARDWARE


PROGRAMMING

INPUT/OUTPUT


Table of Key-to-disc systems. Data Processing 1974, 16(5), 292-3.

DATA TRANSMISSION


SPECIFIC DIGITAL COMPUTERS


EDUCATION & PERSONNEL


APPLICATIONS

Airlines


Arts

HERTELIN GC: Computer art for the artist—a syllabus for course instruction. Computers and Arts People 1974, 23(8), 32.


Business & Management


Law

JAMES RB: San Diego County Court system speeds justice. Computers and People 1974, 23(8), 39.

Medical Science

HEWLETT PACKARD: Canadian University using computer system to train medical students and analyze research data. Computers and People 1974, 23(8), 38-9.

KENNEDY KATHERINE: Computer patients die and medical students learn. Computers and People 1974, 23(8), 7, 33.

Music

MURRAY F: Computer plays jazz, rock and roll or classical music. Computers and People 1974, 23(8), 38.


Shipbuilding