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UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANIZATION

GUIDEBOOK ON THE USE OF SMALL SCALE COMPUTERS

FOR INDUSTRIAL MANAGERS IN DEVELOPING COUNTRIES[1]/

(With Sample Survey of Applications).

Prepared by

UNIDO Secretariat in co-operation with

EXEC AG, Basel, Switzerland

and the

International Institute for Applied Systems Analysis (IIASA)

Laxenburg, Austria

[1]/ This document has been reproduced without formal editing.

id.79-4577

P R E F A C E

This guidebook is designed for use by industrial managers and development officials in the industrializing countries. UNIDO neither advocates nor endorses indiscriminate application of computer systems. Indeed, in a given situation, attention to other aspects of management may deserve higher priority for technical or socio-economic reasons. But in cases where a decision has been made to go ahead, this publication is intended to help its users:

1) to apply small scale computers as a basic management tool;
2) to do so in an economically and technically sound manner; and
3) to secure more of the potentially available decision-making and operational benefits.

The material presented will not make a manager completely self-sufficient in decisions regarding computer systems. But it should, i.a., enable him to ask penetrating questions of prospective suppliers and give him a better basis for comparison of eventual offers.

This publication is a preliminary version. It is based on limited field inputs, which were obtained from selected sources between July 1977 and April 1979. If the idea is well received, it is hoped that more comprehensive versions can follow later. Comments or suggestions concerning the guidebook and UNIDO's programme of co-operation in this field may be addressed to:

> Factory Establishment and Management Section
> Industrial Operations Division
> U N I D O
> P. O. Box 707
> A-1011 Vienna, Austria

C O N T E N T S

ANNEXES

LIST OF EXHIBITS

1.   INTRODUCTION TO THE PRELIMINARY GUIDEBOOK

This guidebook on small scale computers is designed for industrial
executives and development officials concerned with the actual or potential
use of small computers as a basic management tool.

The objective of the guidebook is three-fold:

first - to offer brief technical and economic explanations
          about small computers and their use;

second - to provide a reference to application software
          used in, and available for, developing countries;

third - to provide information about UNIDO's co-operation
          programmes in this field.

As suggested above, the guidebook is directed to a range of users
in developing countries. It is primarily designed for use by top management
and functional management in industrial enterprises. At the same time,
officials of Government ministries may find it a source of information
useful in policy formulation and in development of national and inter-
country programmes.

Finally, officials of development institutions, investment banks,
national management centers, educational institutes, etc. may also find
this material valuable. It may help potential users to increase the inter-
change of talent among various segments of industry, to foster inter-
disciplinary approaches to problems or to pool resources to support new
projects.

The term "small scale computer" as used throughout this guidebook
denotes computers in the present "mini" and "micro" range. However, even
this terminology does not provide precise definitions because the capabilities
of "small" computers are constantly increasing while the prices are declining.
As this document goes to press the general range of computer power we wish
to cover is in the hardware price range of 15,000 to 150,000 US dollars
(European prices).

2. THE GROWING ROLE OF SMALL COMPUTERS IN INDUSTRIAL MANAGEMENT[1]

The increasing use of small scale computers is a result of (1) the sharp decrease in their cost and (2) the simultaneous improvement in the functional characteristics of their basic components. The experience of many industries currently using small computers suggests that the present remarkable expansion of computer capabilities at lower cost will stimulate a deepening and broadening of the areas of application in industrial management. This tendency will no doubt continue to alter managerial activities by aiding the decision process and improving operational efficiency.

In developing countries considerable resources are being expended to install, develop, operate and maintain computer-based systems. These systems are now used mostly for routine tasks, but there is a growing trend towards applications which aid managers in decision making. Some typical applications are indicated in the following table:

Exhibit 1: Typical Small Scale Computer Applications

Production planning	Management reporting
Inventory control	Personnel records
Financial budgeting and control	Maintenance systems
Cost control	Customer credit evaluation
Payroll	Mailing lists
Sales analysis	Word processing
Information banks	Distribution control
Long range planning	Analysis of investment projects
Energy conservation	

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[1] It may of course be noted that small scale computers are increasingly being used for the control of machine tools and industrial processes; UNIDO is also involved in this related field.

As one step in the preparation of this guidebook, the International Institute for Applied Systems Analysis (IIASA)[1] carried out a study for UNIDO on the minicomputer scene. According to the study[2]

In those developing countries seriously stimulating their industrial development, the concept already exists that improving industrial management is one of the most important factors determining present and future effectiveness in the face of rapidly growing national needs.

As has been demonstrated by many years of computer use (at various levels) in industrial management, their basic effect is revealed not in the reduction of personnel as such, but rather in the reduction of the general costs of production, elevation of the level of management (especially the degree to which it is planned and dynamic), and in a significant growth of the enterprise's economic stability and productive mobility under the necessity of varying goods produced and hence in the financial structure.

Minicomputers are therefore an indispensible tool for introducing the management of industry in developing countries to the possibilities of modern computational technology. In any case the alternatives usually turn out to be impossible under the conditions of the developing countries. Thus, supplying developing countries with medium-sized or large machines turns out to be difficult because of their enormous cost and complexity, the high cost of using them, and the need for a large number of highly qualified specialists. Applying them in a time sharing mode is practically impossible because developing countries at present lack adequate telephone systems to support computational networks in all their basic elements (central processors, communication networks, message switching centers, etc.).

When the above become accessible to the basic industrial centers in developing countries, the fact that the users already have and are exploiting minicomputers, will make it possible, if needed, to use them effectively as "buffer" computers (taking a corresponding share of the tasks) and as "intelligent" terminals. The most important thing is that we can expect (as a positive effect of the rapid exploitation of minicomputers by industrial management in developing countries) a real possibility for beginning to reduce the deficiency in the scientific and technological level of management relative to the developed countries, and the possibility of training and educating national teams of specialists in the use of computers in industry.

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[1] IIASA is located in Laxenburg, Austria
[2] A Systems Framework for the Preparation of a Mini-Computer Handbook for Industrial Managers In Developing Countries, IIASA, 1977.

As a leading example of a successful application of small scale computers in a developing country, we may cite the example of Cuba, as reported at a consultation panel held in Budapest during December 1978.[1] Approximately 140 sugar factories are linked in a network connected to 12 provincial centres, which are in turn connected to the central government ministry responsible for the industry. Production and operating efficiencies (yield, fuel consumption, transport delays) have shown continuous substantial improvements since the system's installation.

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[1] Report of The Consultation Panel on the Use of Minicomputers to Manage Industries, UNIDO Publication ID/WG.288/8

3. BASIC TECHNICAL AND ECONOMIC CONSIDERATIONS

3.1 Capabilities and Cost of Systems

The IIASA study summarizes the techno-economic trend as follows:

> The experience of all countries currently using mini-computers and product news from the world's largest firms that manufacture minicomputers, testify that a significant expansion of their functional capabilities along with a steady decrease in their cost will stimulate further interest in them by a broadening circle of users. This includes countries that have only in recent years begun /to move toward/ the mass application of mini-computers equipped with time-sharing operating systems, well developed "built-in" software, broad possibilities for effective man-machine dialogue, and the corresponding organizational management structures and maintenance services. These are /potentially/ rapidly assimilable, convenient, inexpensive to use, and a highly efficient technical means of data processing. Such features of minicomputers as universality, large computational capability, simplicity for training professional staff, and low price, has made them a powerful means of raising the effectiveness of industrial production in all countries - especially /potentially/ in the developing ones.

A computer system includes the following basic elements:

- A processing unit with certain memory capacity

- Data storage capacity

- Input and output devices, e. g. display terminals,

    printers and readers

- System software, language compilers

- Applications Software

Even in the relatively low-cost small scale computer line a great variety of devices and software packages are available. Some of the variations may be seen by referring to the Exhibits 2, 3, and 4 on the following pages.

1/ Please see note 2 on page 3. (The bracketed words have been added for clarification.)

Exhibit 2: Range of System Element Capabilities[1]

Central Processing Unit (CPU)

- Computation speeds range from 0.5 to 1 microsecond.

- Can be equipped for mono- or multi-programming, time sharing, telecommunications and other capabilities, depending on number and capacity of input/output ports.

Central memory (CPU) capacity

- For computers within the limit of consideration of this guidebook, CPU memory ranges from 16,000 to 256,000 bytes (16-256 Kb) (1 byte = 1 character)

- In larger machines CPU memory can be virtually unlimited.

Data Storage devices (on line)

- Data is most commonly stored on either magnetic tape or disk.
- See Exhibit 3 for more details.

- In recent years mini-disks (diskettes) and mini-tapes (cassettes) have been developed. The speeds and data density vary greatly from unit to unit which is also reflected in the price.

Input/Output devices

- Speeds for reading and printing data range from normal human typing speed to millions of characters per minute.

- Exhibit 3 gives a sample of the many devices which serve as Input/Output units.

System Software

- System software, usually provided by the equipment manufacturer, has optional features which depend on the capabilities (size and type) of hardware.

- The quality of the system software determines the degree of convenience the user has to develop and operate applications packages.

Computer language compilers

- While the basic computer languages follow a general standard, there are different versions of each language which offer the user differing degrees of sophistication and standardization. Most computer manufacturers offer at least two such compilers.

- The most common compilers are for the languages FORTRAN, BASIC, PL 1, COBOL. Some machines do not use the compiler logic but are interpretive.

Applications software

- This software usually comes as a "package" meaning a group of programs which function together to complete a desired task. For example, a stock control system may have 20, 40 or 60 programs, depending on the scope of the problem – is it simply a stock balance, or integrated with accounting, or optimization of inventory, etc.

- The skill and imagination of the user manager (and his system developer) is the key factor in building efficient user applications. These can cover the full range of industrial functions. (See examples in Section 2).

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[1] Technical specifications vary greatly from manufacturer to manufacturer and change frequently. UNIDO accepts no responsibility for accuracy of the information presented herein, which is only intended to show typical or average values as of spring, 1979.

Exhibit 3: Characteristics of Some Common Magnetic Storage Devices [1]

Type of device	Typical Capacity	Average access speed	Approx. price (US$)
Central computer memory	16 Kb to 256 Kb (limit of this paper)	0.5-1 microsecond	from 1,000 - 3,000 per 16Kb element of memory
Disk with controller	18.8 MB (1 spindle)	55 milliseconds	13,000
	37.6 MB (2 spindle)	35 milliseconds	21,000
Disk cartridge [2]	2.5 MB	30-145 milliseconds	10,000
	4.6 MB		12,500
	10 MB		15,000
Diskettes	1 MB (1 drive)	266 milliseconds	1,500
Floppy disk with controller	2.6 MB (2 drives)	150 milliseconds	5,000
Mini-floppy	180 Kb (2 drives)	533 milliseconds	2,000
Magnetic tape drive and controller		400 to 800,000 characters per second transfer rate	40,000 (first unit) 30,000 (add'l units)
Cassette drive	256 Kb		2,000 to 3,000

[1] Prices and technical specifications indicated here are highly variable from manufacturer to manufacturer and change frequently. UNIDO accepts no responsibility for their accuracy. These values are rough estimates intended to approximate normal average levels in Europe during spring, 1979.

[2] Half of the capacity is fixed, and half removable (2 drives).

Exhibit 4: Characteristics of Some Common Input/Output Devices [1]

Type of device [2]	Form of Input/Output	Rated speeds	Approx.price (US$)
Input			
Card reader [3]	cards	285 cards/min. (380 character/sec.)	2,000
Output Printers			
Impact	paper	30-45 characters/sec	5,500
Matrix	paper	90 characters/sec	2,600
Serial	paper	120 characters/sec	4,000
Matrix	paper	200 characters/sec	6,500
Line	paper	300 lines/min	6,000 to 12,000
Line	paper	400 lines/min	19,000 to 24,000
Input/Output			
CRT Terminal	keyboard and display screen	- Input at typing speed - Output nearly instantaneous	2,000 to 4,000 ing on features, relative "intel-ligonce", buffer etc.

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[1] Prices and technical specifications indicated here are highly variable from manufacturer to manufacturer and change frequently. UNIDO accepts no responsibility for their accuracy. These values are rough estimates intended to approximate normal average levels in Europe during spring, 1979.

[2] The magnetic storage devices shown in Exhibit 3 may also be considered technically as input/output devices.

[3] This device is being less frequently used in new systems.

Given the relative complexity of a computer system, the number of possible variations in configuration is infinite. In order to illustrate the range of possibilities in a simple fashion, we have defined four examples of small-scale computer systems. The four examples are briefly described below and approximate prices[1] for the system elements are indicated:

Example 1: A simple stand-alone unit which could be used for one or more special purpose applications such as stock control, purchasing, sales analysis, etc., within the range of its limited storage and output capacity. The same unit could be used to develop and operate decision making aids such as capital investment models for evaluation of feasibility studies, product design studies, etc.

Example 1: System Configuration and Approximate Cost Breakdown

	US$
Central processor)	
Central memory (16 KB))	
System Software)	
Screen display terminal)	10,000
Floppy disk storage unit (180KB) with 2 drives	
Matrix printer (120 char/sec)	4,000
Total	14,000

[1] The prices are intended to reflect rough approximations of spring 1979 European prices for units with the characteristics indicated. Prices vary considerably from manufacturer to manufacturer. The values given here include little or no "support" service from the manufacturers.

Example 2: A small computer with additional storage and input—output capability. This unit can easily support a number of simple applications for a small to medium size industry. Similarly, it could probably handle the basic work load of a moderate—sized industrial finance corporation, or the headquarters of a sectoral holding company.

Example 2: System Configuration and Approximate Cost Breakdown

	US$
Central Processing Unit)	
Central memory (32KB))	10,000
System Software)	
Floppy disk storage (2.6 MB)	5,000
Display console	2,000
Matrix printer (180 characters/sec)	3,000
Cabinets	2,000
Cassette drive	2,000
Total	24,000

Example 3: This unit represents a further increase in storage capacity and input-output capability, permitting it to handle larger volumes of work. This it can accommodate a greater number of applications within a small or medium enterprise or a limited number of applications with a larger enterprise. Capacity of this basic system can be still further expanded through additional units.

This system also has an additional capability: it is possible to communicate with the central processor from a remote point. The remote terminal could be used, for example, to operate an inventory control system. It could also be used for "on-line" work with investment planning models and other management decision-making tools. If several remote terminals are linked to the central processing unit (CPU) they can be operated simultaneously through a "time-sharing" system, which allows each user to experience nearly immediate response from the computer.

Example 3: System Configuration and Approximate Cost Breakdown

	US$
Central Processing Unit) Central Memory 64 KB)	12,000
Systems Software (Operating system)	4,000
Disk storage (10MB)	9,000
Screen display operating console	2,000
Screen display remote terminal with impact printer (45 characters per sec.)	4,000
Line printer (300 lines/minute)	8,000
Total	39,000

Example 4: This system provides a still greater throughput capability because it is capable of "multiprogramming"; i. e., several programmes can be operated concurrently. It also has greater storage and faster output capacity as well as a second remote terminal. Of course the configuration can be changed or increased to accommodate specific needs (with a corresponding adjustment in the cost).

Example 4: System Configuration and Approximate Cost Breakdown

	US$
Central Processing Unit)	55,000 (with 60 KB incl.)
Central Memory 128 Kb)	7,000 (for 64 KB extra)
Systems software)	
Data Communications hardware	2,000
Disk storage unit (18.8 MB fixed)	15,000
(9.2 MB removable)	8,000
Operating console with screen	3,000
2 Display terminals with controllers	8,000
Line printer(300 lines per minute)	6,000
Total	104,000

From the above brief discussion and the preceeding exhibits it may be seen that a computer system configuration can be custom designed to produce the capabilities required by the user. This inherent flexibility must be seriously taken into account at the system design stage since the cost of the system as well as its inherent operating effectiveness can be greatly influenced at this stage.

3.2 Necessary Support for Computer Operations

Of course, a number of specialized skills are needed to make effective use of the computer as a management tool. The following list indicates the range of such skills:

- Analysis of the industrial operations for which computer application is under consideration (technical, economic, socio-economic, and perhaps socio-psychological)
- Design, programming and documentation of applications software
- Design of related input and report forms
- Operation of the computer
- Maintenance of hardware and software
- Performance evaluation

In the simplest case, the users of the computer output employ ready-made software packages and operate the machine themselves. This may be the case for a very small installation (e.g. Example 1 in Section 3.1). Similarly, a relatively sophisticated group of users such as a corporate planning unit or a purchasing department may use a small installation for its own purposes and even do its own programme development.

In a more complex installation, such as Example 3, it is likely that a full time or part-time operator may need to be assigned. The work related to development and maintenance of software will also be much more extensive, requiring the services of at least one qualified programmer. In an even larger installation there will most likely be a need for a supervisor who should normally be qualified at least as a systems analyst, but preferably as systems analyst and programmer.

Some of the simplest routine maintenance would be carried out by the operator, and the rest through routine and special service calls arranged under contract with the supplier.

The need for performance evaluation is discussed below under Section 4.4.

Depending upon the location, it may be possible to contract for some or all of the desired support services with a software house or a systems house. Since the availability, cost and reliability of such services vary, careful attention should be given to this issue before purchase commitments are made (i.e. during the evaluation stage).

3.3   Future Impact of Small Scale Computers on Industrial Management

The effects of small scale computers on management techniques and on organizations themselves have only begun to emerge.   Since the pace of change (as exemplified by the practices of the most advanced users) is great, some of the information in this guidebook may be obsolete before it is printed.   Yet managers and organizations in general exhibit a healthy conservatism;   and the skills and conditions needed to make use of the "latest" technology do not develop everywhere simultaneously.

We have not sought in this publication to advocate wholesale adoption of a particular technology, but simply to inform about current "proven" techniques – although some of these are relatively new, especially in most of the developing countries.   (In fact it is stressed that both system configurations and applications packages as well as performance objectives need careful review and adaptation to the local situation.)   In addition, however, we should like to point the way towards possible future developments. We wish to call attention to some of the more advanced thinking as an implicit, though indirect, guideline for designing operational computer-based systems today.

Fortuitously, 11ASA, with which UN1DO has been collaborating in this field, has recently issued the proceedings[1] of an international workshop on small scale computers which was held at Laxenburg, Austria in Sept. 1978. Following are two excerpts from the proceedings, which are included here with permission.   The first excerpt[2]:

1/   "The Managerial and Organizational Consequences of Small Scale Computer Systems", G. Fick, Editor, January 1979

2/   From the introductory paper by Dr. Rolfe Tomlinson, Head of IIASA's Management and Technology Group.

Most managers never see $\lfloor$ the computers $\rfloor$. They are aware that
there may be advantages to the organization as a whole, but the
immediate effect on themselves is largely one of convenience. Their
working pattern is unaltered, and the organization in which
they work retains the same basic structure as before.

It is likely that this will change in the next decade. Mini- or
microcomputers have already had a major effect on process control,
on equipment design, on office routines and procedures. We are just
beginning to see the first glimmerings of what it will do to
managers' actual tasks, to the way they approach their problems,
to the way they are organized. It seems inevitable that the
changes will ultimately be very great. The low cost of
small scale computers, in particular the low cost of storage, will
mean that the main barrier to their widespread use will be the
conservatism of the people concerned and in restrictive administra-
tive practices. One of the most important new developments
will be the use of small scale computer systems as an "on-line"
aid to thinking and planning. An illustration of what may be in
store can be seen from a typical experience in introducing simple budget
models on to interactive terminals. In one such case these models
were introduced as a means of carrying out quick checks on the
historical-financial position. However, the managers concerned
quickly saw that if they turned the model around, using forecasts
rather than historical data, they had a planning tool which was
ideally suited to the exploration of the consequences of possible
alternative actions. In the past the time limitations imposed on
planners were such that they had little time for exploring alterna-
tives. They had had to guess a convenient plan, quickly undertake
the necessary financial calculations, and then check that it gave
satisfactory answers. If the plan had to be changed at short notice
there was no chance to explore alternatives. Suddenly, by the use of
terminals the whole pattern of planning altered almost overnight.
Planning became analytical rather than guess-work; last minute changes
to plans were handled with precision, rather than through the intro-
duction of ad hoc adjustments whose consequences could never properly
be evaluated. Just how far may we expect such changes to go in
the future?

The change on managers - in their thinking and in the way in which
they do their work - may be the most critical effect of the mini-
micro computer revolution, but the consequences will be much more
widespread than just on the individual. There are major potential
consequences on organization, on training, on employment itself.
These consequences will feed back to the technological problems,
for example, in connection with network design and on software.
In the long run the whole management information and control
structure will be transformed, possibly in a way that makes the
present body of knowledge irrelevant.

The second excerpt$^{1/}$ describes the interface between the manager and the particular kind of information technology which he or she employs in performing tasks. The interface is described through a series of characteristics, and the concerns implicit in the description reflect those expressed strongly by participants in the workshop:

The Manager / Information Technology (M/IT) Interface

Personalization. The first characteristic of the M/IT interface is the degree to which a manager can personalize or customize the technology to fit the managerial task. SSC$^{2/}$s having a major impact through increasing personalization. In fact, many refer to small-scale computing as "personal computing", thereby implying that microcomputers are being used primarily on a personal level.

Friendliness. Another characteristic of the interface is the degree to which the manager perceives that the technology is "friendly". This characteristic is an emotional perception by the manager that can have important side-effects on adoption patterns, etc.

Predictability. The degree to which a manager can predict the outcome of using a certain information technology is related to the extent to which that manager utilizes the technology. To state this assertion another way, the average length of time to obtain a useful response is not as important to a manager as the variance in that length. If a manager can predict with a high certainty when and how the technology will supply useful information, then the manager can plan to incorporate that information in a larger activity. Uncertainty prohibits the manager from planning.

Self-Control. The degree to which the technology is under the manager's direct control is positively related to the utilization of that technology. An analogy to the telephone may be useful. Sharing a telephone among managers will cause more inconvenience than purchasing telephones for each manager.

Confidentiality. It has been stated by many authors that information is power. Therefore, the degree to which a manager must share his/her information negatively affects the manager's power. The information technology should allow variable amounts of confidentiality for the data used by a manager.

1/ From the workshop group report on "Impacts of Small Scale Computer Technology on Managerial Tasks, by MAH Dempster, G. Fick, R.D. Hackathorn and N. Suzuki.

2/ Small scale computing.

Involvement. If a manager is directly involved with using the technology, the manager can more effectively use that technology. Since LSC[1] technology has often been centralized into a separate organizational unit, SSC technology has once again allowed the manager to be involved with the technology.

Adaptability. The technology needs to adapt to the changing environment faced by the manager. Since the manager is responsible for all phases of the information processing activity, changes to the information system require less co-ordination among individuals. Hence, the information requirements can be translated more easily into usable software programmes.

Two additional characteristics have subsequently been added to the above list. These are "understandability" of the technology to the manager and "mundaneness", or the degree to which the technology becomes familiar to the manager (as a pocket calculator has become familiar)[2]

1/ Large scale computing

2/ Working Paper 79-03-09
Department of Decision Sciences, The Wharton School,
University of Pennsylvania.

4. GUIDELINES FOR IMPLEMENTING AND OPERATING SMALL COMPUTER SYSTEMS

This section is presented as a brief introduction - almost a "checklist" - to the issues and activities which managers normally deal with during establishment of a computer-based system.

4.1 Roles of The Major Participants

The computer is generally applied as a basic management tool. Thus it operates at the center of the enterprise's business system; and its use can have widespread effects, for better or worse. This sensitive position justifies close attention to the respective contributions of the individuals and organizations involved in establishing and operating a system. The following paragraphs call attention to some key considerations.

4.1.1 Top Management Direction Is Essential

Because of its widespread influence on operations, a computer system is a far more important acquisition than the relatively modest cost of the hardware would indicate. There is much to be gained through active participation of top management at several stages of the development and use of the system. A top executive can exert extremely valuable influence by applying his experience, judgement and creativity to the following issues, i. a.:

- What quantitative and qualitative improvements in business results can be sought through use of the computer? (Increased production, reduced material waste, lower inventory cost, better product quality, shorter production cycles, etc.)

- How can the computer system be used to help make short-range and long-range top management decisions more effective?

- What are realistic targets for the initial phase of the system (applications, cost, schedule, results)?

- Who should make up (and lead) the team which designs and
implements the system?

- What resistance, conflicts or frictions may possibly arise
within the enterprise as a result of the computer activity?
How can these emotions be reduced, controlled or employed
to positive advantage?

Of course, in order to be effective in this role, the top executive must
have some understanding of the potential capabilities and limitations of
computer systems. If necessary, he should arrange to receive familiarization
training from one of the many institutes offering courses, or from a consultant.

A recent article in a prominent management journal[1] gives interesting
suggestions for executive involvement. The article comments unfavourably
on traditional approaches to supplying decision-making information to top
executives[2]. It describes a method for identifying those few factors which
an individual top executive considers vital to success or failure in meeting
the organization's goals. These items are designated "critical success
factors" (CSFs). They become focal points for creating a result-oriented
information system which complements the standard accounting-based system.
Some examples of CSFs might be: strengthen customer relations, develop new
products, control costs, improve morale.

Designing and implementing a CSF system presents a challenge because
the information needs thus determined are likely to: 1) vary considerably
over time, 2) require both quantitative ("hard") and qualitative ("soft")
information and 3) rely on inputs from a number of departments. Yet the
potential payoff is practical decision-making assistance to the top executive
without a flood of paper.

1/ Chief Executives Define Their Own Data Needs, John F. Rockard, Harvard
Business Review, March-April 1979.

2/ The existing approaches are identified as the by-product technique, the
null approach, the key indicator system and the total study process.

4.1.2 Success Requires Close Involvement of Line and Functional Managers

Computer-based systems are sometimes designed and implemented with little or nc involvement of the departments which supply information and use the output. Such an approach greatly increases the chances that the results of the system will fail to meet expectations. This is true both for technical and socio-psychological reasons.

As a basic principle it is good sense to ensure practical participation of line and functional managers at every stage: defining objectives, selecting equipment, designing applications, evaluating test runs, etc. Such participation will help ensure that:

- the various computer applications are suitably integrated, and not counterproductively isolated;

- the output information is designed for easy use by the departments concerned;

- the information produced contributes to control and analysis, decision-making and planning, as well as day-to-day transactions;

- adequate quality controls are applied to input, processing, and output.

4.1.3 The Computer Specialists' Role Is Vital, But Limited

The specialist may play an important role in perceiving the range of applications which may be "viable" for the enterprise and in establishing suitable links among individual applications to create an integrated system over a period of time. The specialist may also be able to help in educating top management and functional management about the potential benefits and about the need for their attention and co-operation during the development of the system. It is important, however, to recognize that the computer specialist is not a substitute for management's understanding and leadership, which alone can ensure that the computer-based system fulfills its potential within an industrial activity.

In addition to providing expertise needed to develop and operate
the system in the technical sense, he may exert a very useful influence
in such areas as the standards and methods to be applied in creating and
using new applications packages and in training personnel of the using
departments.

4.1.4 The Role of Manufacturers, Software and Systems Houses and Consultants

The installation of a computer-based system often requires the
creation of a specialized task force. The core of the task force may be
made up of line managers and functional specialists of the enterprise
itself. If the organization has a qualified computer specialist, he
may function as a technical team leader. It is often necessary to
add external skills to such a task force. This need normally arises
at the stages of defining detailed requirements, and of selecting
equipment and operating systems needed to satisfy them. It may also
arise at some point during development of application software systems.

The supplementary skills required may sometimes be supplied on a
contract basis by the manufacturer of the computer equipment or the software.
It is also possible to contract with a "systems house", which is an independent
organization specializing in feasibility studies and systems design as well as
installation and support activities. The systems house can assist the

enterprise to select equipment and software from a number of different sources which may be combined to provide the desired functions at a reasonable cost. The concept is that the most useful hardware and software elements from various sources may be combined to the user's advantage.

A consulting firm can provide similar services but with the advantage that it usually has a strong background in industrial operations problems - such as structure, communications flow, financial controls and leadership, as well as specialized technical capabilities. Thus well established consulting firms can contribute more in the sense of detailed knowledge of industrial functions, but probably less depth in terms of specialized data processing knowledge. Both systems houses and consultants claim to (and often do) offer a degree of objectivity and independent judgement regarding hardware, which a manufacturer cannot.

All three of the above organizations may help with the training of personnel; with certain kinds of problems encountered in developing and installing application software; and with the recruitment of specialized computer people. They may also provide computer appreciation courses for top managers.

It is useful to keep in mind that the computer field is rapidly changing, so that employees of a firm may need to have their knowledge supplemented and their skills updated from time to time. At the present intensity of development, an annual training cycle may be regarded as desirable.

4.2 Preparing for the Installation

4.2.1 Requirements Analysis

If a general survey of the possibilities of using a computer as a management tool gives a positive result, then the next steps to complete a definition of requirements would be the following:

(a) a detailed investigation of information flows in current operations in areas being considered for inclusion in the prospective system; e. g. personnel, purchasing, accounting, sales, etc.;

(b) preliminary designation of objectives and areas of application
for introducing computer operations based on an analysis
of potential benefits;

(c) preparation of a preliminary implementation plan which
clearly identifies phasing of the system development and
operational objectives associated with each phase;

(d) estimates of storage capacity, volume of inputs and outputs
and other operating parameters;

(e) preliminary estimate of configuration and equipment
capacities based on (c);

Ideally the individuals who conduct the requirements analysis
should have experience in organizational analysis as well as in the
basics of computer systems, otherwise there is a risk that the study will
have shortcomings from the outset.

Based on the results of the requirements study, a "system specification"
may be written to enable various manufacturers to submit their proposals.
This booklet of specifications explains the type of work envisaged, the
present manner of doing the work, the volume of data foreseen in each file, the
frequency of various transactions, the number of people involved, etc.
If a specific new work flow is known or assumed, this can also be added.
With this information prospective suppliers of hardware and software can
estimate the number and size of units required for input/output, and from
the type of application(s) the computing power can be determined. It is
advisable to obtain offers from several suppliers to permit realistic
comparison of strengths and weaknesses.

4.2.2 Requesting and Evaluating Proposals

At this stage, either a consultant or systems house may be involved
or the prospective user may directly contact vendors. Proposals may be
obtained in two stages beginning with informal contacts to determine technical
capabilities available and estimating prices. Some of the information to be
requested will be the following:

(a) detailed equipment specifications;

(b) available peripheral equipment options and support services;

(c) costs including equipment, installation, programming, training, maintenance, delivery costs;

(d) standard and special conditions of a proposed sales contract;

(e) delivery time for equipment and software;

(f) identification of companies which have installed similar systems;

(g) availability of repair and maintenance services including location of the agent and of spare parts depots;

(h) physical site preparation (electrical requirements, security, fire protection etc.)

(i) an implementation plan including a conversion plan, if necessary.

When literature and information has been accumulated, individual firms may be invited to submit formal proposals in accordance with the systems specification written by the firm. In evaluating alternative and competing proposals, the following criteria, inter alia, will be considered:

(a) economics, e.g. prices of equipment, software, training, service, options regarding lease or purchase, etc.;

(b) technical factors such as available application software and languages, ease of use of hardware and software, availability of backstopping services;

(c) expansion potential and compatibility for future system development;

(d) expected reliability as judged through experience of other users

(e) ease of availability of services and spare parts, etc.;

(f) the amount of installation support and extent of training offered.

4.2.3 Staff Preparation

Once a decision has been made to obtain a computer, it is of paramount importance to train the staff in the new skills which they will require. These skills will typically include the following:

- systems analysis,
- systems programming,
- applications programming and documentation,
- data capture,
- work preparation,
- computer operations,
- basic technical maintenance.

In many cases, the supplier of the computer hardware offers courses in all or most of these disciplines. However, in the case of smaller manufacturers and especially in developing countries, availability may be severely limited. In such cases personnel may have to travel abroad for weeks or months of training.

As an alternative or supplement to locally available courses, one can consider in-house training sessions in the computer centre of another enterprise which has a similar system. During the pre-installation phase, your staff may work at the location of the co-operating firm. Later, the co-operating firm can send its personnel to your site to observe how your operation has been organized. This kind of two-way exchange may lead to improved operations in both organizations.

4.3 Installation and Operation

4.3.1 Physical Installation

Suppliers of system hardware normally provide clear instructions and may make available experts to assit in preparing floor layouts, wiring specifications, security arrangements, etc. The installation should be a relatively simple activity. The ideal conditions for installation are:

- Site preparation completed on time,
- Computer staff fully trained,
- All reorganization of work flow carried out (new forms, handling instructions, job descriptions, etc.),
- All people in the organization who handle the input for the computer fully trained, properly supported and motivated,
- The first group of programmes tested and operative,
- Programmes and operating instructions properly documented,
- Close co-operation with staff representatives so that all the employees are fully aware of the changes being implemented.

4.3.2 Applications Programming

Many programme packages (known as application software), are available commercially in ready-to-use form, complete with full documentation. Such ready-made packages can be obtained to carry out such routine tasks as payroll, order entry, invoicing, accounting, purchasing, inventory control, etc. In such cases it is not necessary to programme all the logic from start to finish.

Such ready-made packages are offered by hardware manufacturers, software and systems houses. These programme packages must be closely examined to make sure that they will do the job you require and that they allow for future adaptation for changed needs. Usually some modifications will be necessary, but these can be done under contract with the firm supplying the software. A "turn-key" solution, although at first sight more expensive, is likely to be the best way to contract this work, for only in this manner do you have reasonable assurance that the system will function as planned and on time.

There is usually a lot of minor programming to be done, plus a great deal of testing (on other computers) prior to the delivery and installation of your computer. This activity may require frequent travel by your staff for as much as a year in order to prepare correctly for the introduction of computer operations in your enterprise. Too often this budget item is far underestimated. A reasonable amount of funds must be allocated for this training and preparatory phase, otherwise the quality of the entire operation may suffer for years thereafter. The effective cost may be many times that "saved" by skimping on the training programme.

4.3.3 Initial Operations

The computer is usually installed by the manufacturer or his appointed agent or dealer who will then conduct acceptance routines to prove that the installation is complete and that the equipment and the operating software are performing satisfactorily. It is very important that management be aware of what is involved in these acceptance routines so that tests specified in the contract are actually performed to the full satisfaction of the user. Contractually payment of some portion of the contract value should depend on proper completion of the acceptance routines. After this step is complete, actual data processing in your enterprise can begin.

4.3.4 System Development and Expansion

The effort of management to install a computer is a relatively small and easy task, compared with the proper supervision and other requirements that follow.

Firstly, training of all individuals must be a continuous activity. Not only do functional specialists and computer staff need advance training, but periodically all members of middle and top management should receive additional exposure. They may find it useful to visit other installations, take special courses at an institute or university, etc. Only if the capabilities of the computer system are fully understood and exploited by a creative management team can the maximum economic benefit be achieved.

Subsequently, after the initial applications packages are running and some experience has been gained, additional stages of system development may be undertaken to increase the benefits being realized.

4.4 Monitoring Results and Improving Performance

As suggested in Section 4.1.1, basic performance objectives for the computer system should be established by top management, preferably according to a phased timetable on a regular cycle. Progress measurement against this plan and evaluation of the results - in quantitative terms if possible - should be carried out.

As suggested in Section 3.2, an effective system design must at least implicitly take account of socio-economic and socio-psychological factors inherent in industrial operations. This is especially important in analysing the impact of changes which arise as a result of installing a computer system. Follow-up evaluation is recommended to determine where adjustments to the installed system can improve the "human factors" aspect.

5. UNIDO'S CO-OPERATION PROGRAMME

One of UNIDO's primary missions is to help developing countries make
the best use of the vast physical and human resources being committed to
industrialization. Small scale computer systems are being adopted more and
more as a basic tool in this effort; and UNIDO is increasingly being asked
to co-operate in ensuring that the systems are suitably designed and
effectively operated.

Accordingly, for a number of years, UNIDO has been analyzing the
requirements of different groups of current and prospective computer users
and formulating approaches to co-operation at various levels. Some of the
results are summarized herein for reference.

UNIDO co-operation usually involves exchange of information, provision
of consultancy services, and/or skill development.

5.1 Information Exchange

This guidebook is an example of the information exchange activities.
It is largely based upon the results of a series of international consultation
panels, meetings at which officials from developing countries shared their
experiences,and representatives of manufacturers and commercial service firms
presented their ideas on practical approaches to computer system development.

5.2 Consultancy Services

UNIDO is able - within the limits of available resources and administra-
tive procedures - to provide advisory services in a variety of areas such as:

- Preparation or evaluation of feasibility studies for the
  establishment of computer-based systems;
- Development of systems designs for local, national or regional
  systems and networks;

- Technical and economic evaluation studies regarding investments
  in computer-based systems;
- Operational evaluations of existing computer installations
  regarding effectiveness and security procedures;
- Evaluation of systems specification or proposals for hardware
  and software and support to improvements in decision making;
- Solution of infrastructure or organizational problems which may
  be a prerequisite to the installation of computer-based systems.

5.3 Skill Development

There is often a need for familiarizing top-level and functional
management with the possible benefits of a computer-based system or with
its basic technical and operational characteristics. This can be done at
the enterprise level as part of a co-operation scheme. It can also be done
within the context of a national or regional institution as is currently
being planned with India and Hungary, for example.

5.4 Case Studies of UNIDO Co-operation

The diagramme (Exhibit 5) gives an overall view of normal co-operation
projects. It indicates four specific examples of approaches (labelled
A through D) which might suggest themselves, depending on a user's previous
use of computers and the level at which action is desired. The following
case studies illustrate some of the situations UNIDO has encountered to date.

5.4.1 Case Study: A Public Industrial Corporation

(Approach Ⓐ - "Package" for a non-computer user)
Situation:

- A Government requested help in designing a small-scale system for
  production and cost control. It was desired to determine whether
  the concept was feasible and if so, with what effort and
  investment.

Action_and_Result:

- A short survey was proposed as the first step in a programme of co-operation. The survey was designed to:

  - review present (manual) production and costing systems;
  - analyze the factory's organizational structure and financial performance;
  - prepare an action programme and detailed work statement for completing a system design (if initial results are positive);
- Financing for the diagnostic study is now being negotiated.

Exhibit 5. Examples of Possible Co-operation Approaches[1]

Institutional level / Status of Computer Use	Factory or Enterprise level	National Institution level	Regional level
Non – Computer User	"Packaged" Support Plans ←————— Ⓐ —————— Ⓑ —————→		/////
Small Scale Computer User	↑ Survey or Diagnostic Review + Follow-up Ⓒ ↓		↑ Regional Co-operation Programme Ⓓ ↓
Larger Computer User			
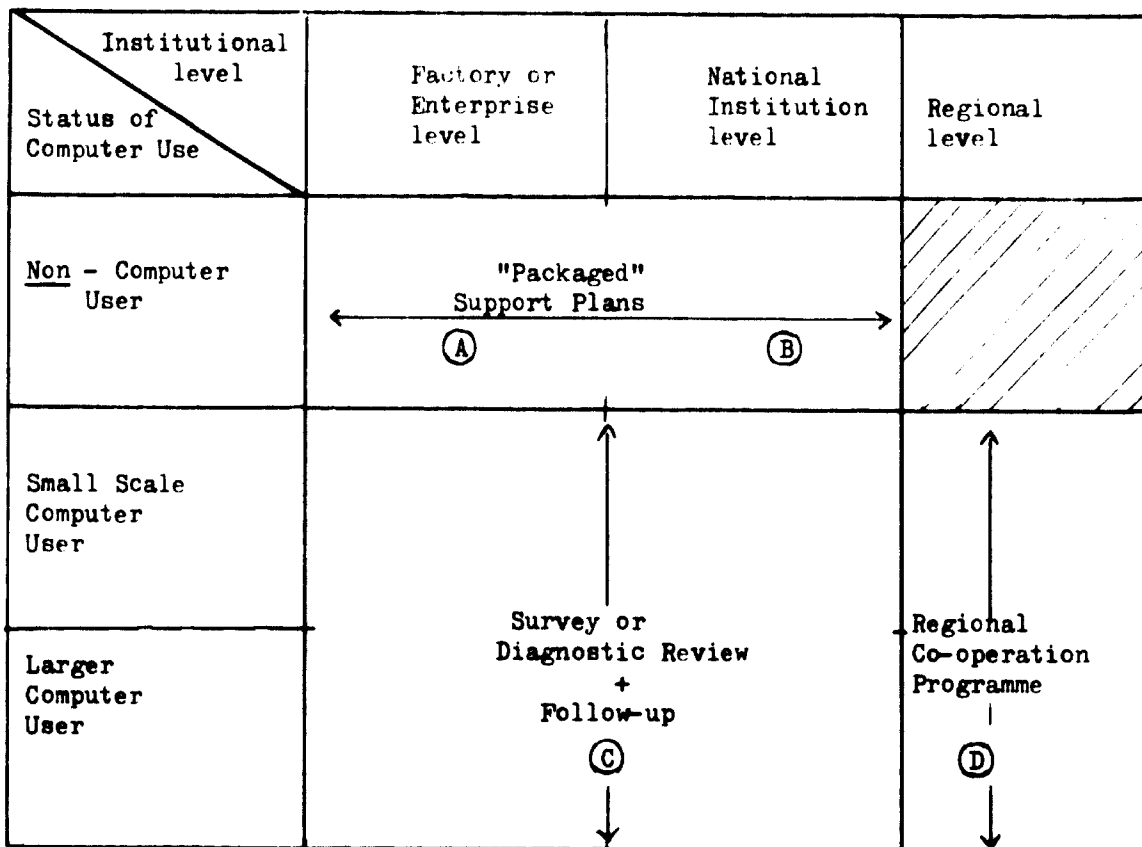
1/ Please refer to case studies in section 5.4 for discussion of approaches Ⓐ Ⓑ Ⓒ and Ⓓ.

5.4.2 Case Study: A National Consultancy and Training Institution

(Approach (B) - "Package" for a non-user)

Situation:

- UNIDO has been requested to prepare a project for an Asian
  country to be financed from the UNDP Country Programme. The
  project will strengthen a newly established institute by
  providing computer equipment and short-term advisory services
  as well as funds to recruit local consultants.

Action and Result:

- The project has been drafted to support research and development
  for suitable application software; consultancy assignments in
  individual industrial enterprises; and skill development
  for industrial executives and technicians. The request
  follows a national study on computer utilization; the
  scheduled project duration is three years.

- UNIDO and national personnel assigned will have to include
  specialists with industrial engineering background who are
  familiar with factory operations and management decision
  making.

5.4.3 Case Study: A Machinery Manufacturing Enterprise

(Approach (C) - Short-term review and follow-up/small computer user)

Situation:

- UNIDO was requested to help evaluate existing computer
  operations with the aim of improving the use of the existing
  facility for increased management effectiveness (reduced cost
  and order-cycle time, etc.).

Action and Result:

- Two consultants and a UNIDO staff member visited the factory
  for one week. They found that the existing installation was
  unsuitable for expansion. The machine requires a special
  computer language which makes standard programmes useless.
  Further, its capacity is too small to permit effective
  use.

The conclusion was that the previous expenditure had been largely wasted. A new system will have to be designed from the beginning.

5.4.4 Case Study: A Multi-plant State Chemical Corporation
(Approach (A/C) - "Package", large computer user)

Situation:
- The corporation has several plant locations and several isolated computer systems, serving only parts of the organization.

  The requirement was to create an integrated information system to:
  i)   reduce inventories
  ii) save foreign exchange
  iii) other benefits to be selected

Action and Result:
- A joint study was organized. Visits were made to several countries where relevant technology has been applied.

- The corporation is proceeding to analyze its overall information system and to organize a phased system improvement programme.

5.4.5 Case Study: A Regional Technical Institute
(Approach (D) - regional co-operation programme)

Situation:
- An institute with previous experience in international co-operation programmes recently upgraded its programme of computer-related consultancy and skill development. UNIDO was invited to jointly develop a programme which will assist other developing countries to increase their own self-reliance in this field.

Action and Result:

- Because of the logical desire to utilize expensive equipment to the maximum as well as to pool scarce manpower, the project has been specifically designed to combine the requirements of various users in planning the development of application software.

- This programme is oresently under negotiation regarding final technical details and finance.

5.4.6 Case Study: Evaluation and Updating of Feasibility Studies for Investment Projects

(Approach (D) _ Regional co-operation programme)

Situation:

- Through the good offices of a UNIDO field adviser, it was learned that the research and development centre of a diversified holding company had developed a computer-based system for evaluating industrial investment projects. This method permits easy determination of the financial effects of varying factor costs, selling prices, market shares, production methods, distribution schemes, etc.

Action and Result:

- By agreement, the system (developed in FORTRAN on a very small free-standing minicomputer) is being further refined to expand its range and increase its feasibility.
- UNIDO expects to publish the system for use in development banks, holding companies, government ministries, etc.

6. DIRECTORY OF APPLICATIONS SOFTWARE FOR DEVELOPING COUNTRIES

6.1 Background: The UNIDO Survey

Repeated requests to UNIDO to assist in field projects involving management use of computers prompted the Factory Establishment and Management Section to undertake a survey of software now being used in developing countries.

In mid 1977, UNIDO invited selected institutions to serve as national focal points for gathering and disseminating information on computer applications in the developing countries.$^{1/}$ The focal point institutions in turn contacted industrial enterprises in their respective countries requesting data on existing computer-based management applications. The returns were precessed by UNIDO with the help of EXEC AG, a specialized consulting firm. Subsequently, further details were requested and some additional entries were made. A computer master file was created which permitted rapid analysis of the information.

In addition to these co-operating "users", a number of commercial suppliers of equipment and software have been assisting UNIDO throughout the programme. These "suppliers" have kindly made available data on some of their ready-made application packages, which are considered likely to be of interest to industries in developing countries. Information from both sources is included in the following listings. It should be kept in mind that these listings represent only a sampling of existing software packages. Depending on demand, UNIDO expects to expand and update the listings in order to increase the possibility for developing countries to exchange software and know-how among themselves.

6.2 How to Use the Applications Listings

Altogether the present sample listings include 100 entries: 42 applications from 9 developing countries and 48 applications from 16 suppliers. For quick reference the applications are listed separately:

- According to type of application (see 6.3);
- By country, in the case of user applications (see 6.4); and
- By supplier, in the case of commercially available packages (see 6.5).

$^{1/}$ Please see Section 6.6 for a list of the national focal points.

Finally, more information on each application is given on a separate sheet in Annex I (user applications) and Annex II (supplier applications).

This arrangement allows an interested person to find readily[1] what is already in use in a given country or to find a representative listing of, say, inventory control applications. If he wishes, he can review the basic characteristics of selected applications from the annexes. He may also contact the user or supplier directly to discuss technical details or some form of co-operation in satisfying his own requirements.

UNIDO will be most interested to receive comments and suggestions from users of this preliminary publication on ways to make it more effective. In particular additional user inputs for the applications data base will be welcome. (Please use the questionnaire given in Annex III). Kindly address:

> Factory Establishment and Management Section
> Industrial Operations Division
> U N I D O
> P. O. Box 707
> A-1011 Vienna
> Austria

1/ Within the limits of the sample survey

6.3 INDEX OF APPLICATIONS BY TYPE [1]

Application Type	Country or Supplier	Registration Number
Decision Aid	India	U 02001
	IBM	S 01110, S 01111
	Mitsubishi Electric Corp.	S 01801
	Scientific Control Systems-SCS	S 01601, S 01602
	WANG	S 00901 ~ S 00903
Management Information	Thailand	U 01402
	Nippon Electric Co. Ltd.	S 01901
	Szamki Research Institute for Applied Computer Science	S 02301
	Videoton	S 00604
Production Control	Thailand	U 01407
	IBM	S 01101, S 01102, S 01105, S 01106, S 01114, S 01115
	ICL European Computers	S 00701, S 00702
Financial Control	Ecuador	U 02101
	Ethiopia	U 00205
	Guatemala	U 01901, U 01902
	Kuwait	U 01006, U 01008
	Thailand	U 01408

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[1] For details of a particular application consult the data sheets which are arranged by application number in Annexes I and II.

(cont...)

Application Type	Country or Supplier	Registration Number
Financial Control (cont.)	DATASAAB	S 00401
	DCM Data Product.	S 02901
	IBM	S 01108, S 01112
	OKI Electric Industry Co. Ltd.	S 02101
	Videoton	S 00602
Stock Control	Ivory Coast	U 00101
	Thailand	U 00101
	IBM	S 01103
	Videoton	S 00605
Inventory Control	Costa Rica	U 00301
	Fthiopia	U 00207
	Guatemala	U 01903
	Kuwait	U 01002
	IBM	S 01104
Distribution Control	Thailand	U 01403
Bookkeeping	Costa Rica	U 00303
	Cyprus	U 00802
	Ethiopia	U 00203, U 00204
	Kuwait	U 01001, U 01004 U 01005, U 01007
	Thailand	U 01401, U 01410, U 01411 U 01415, U 01416

(cont...)

Application Type	Country or Supplier	Registration Number
Payroll	Costa Rica	U 00302
	Cyprus	U 00801, U 00803
	Ethiopia	U 00201
	Kuwait	U 01003
	Thailand	U 01406, U 01414
Invoicing	Thailand	U 01412, U 01417
Communic. Services	Ethiopia	U 00202
Data Base	Hewlett Packard	S 00101
	SFMS	S 02701, S 02702
	Videoton	S 00603
Data Collection	Fujitsu Ltd.	S 01701
	Videoton	S 00601, S 00606
Report Generator	IBM	S 01107
Text Processing	IBM	S 01109
Personnel Administ.	IBM	S 01113

6.4 INDEX OF APPLICATIONS BY USER [1]

Country and User	Application Type	Registration Number
Costa Rica		
Cooperativa Agricola Industrial Victoria R.L.	Bookkeeping	U 00303
	Inventory Control	U 00301
	Payroll	U 00302
Cyprus		
Cybarco Ltd.	Bookkeeping	U 00802
	Payroll	U 00801
The Cyprus Cement Co. Ltd.	Payroll	U 00803
Ecuador		
Plastigama	Financial Control	U 02101
Ethiopia		
Commercial Bank of Ethiopia	Bookkeeping	U 00203
	Communic. Services	U 00202
	Payroll	U 00201
Maritime and Transit Services	Bookkeeping	U 00204
Rural Project Agency	Financial Control	U 00205
	Payroll	U 00206
	Inventory Control	U 00207
Guatemala		
Inversiones de Guatemala S.A.	Financial Control	U 01901
Super Repuestos Aquarony	Financial Control	U 01902
Administradora de Inversiones	Inventory Control	U 01903

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[1] For details of a particular application consult the data sheets which are arranged by application number in Annex I.

(cont...)

Country and User	Application Type	Registration Number
India		
Digitron Computers Pvt.Ltd.	Decision Aid	U 02001
Ivory Coast		
Prosuma	Stock Control	U 00101
Kuwait		
Kuwait Metal Pipe Industries	Bookkeeping	U 01001
Kuwait Transport Company	Bookkeeping	U 01004, U 01005 U 01007
	Financial Control	U 01006, U 01008 U 01002
	Payroll	U 01003
Thailand		
Bangkok Data Center Co.Ltd.	Bookkeeping	U 01401
	Distribution Control	U 01403
	Management Information	U 01402
	Payroll	U 01406
	Production Control	U 01407
Construction Accesories Co.Ltd.	Financial Control	U 01408
ICI Co. Ltd.	Bookkeeping	U 01415
	Payroll	U 01414
	Stock Control	U 01413
Loxley Co. Ltd.	Bookkeeping	U 01416
Provincial Electricity Authority	Invoicing	U 01412
Siam Commercial Bank Ltd.	Bookkeeping	U 01410
Thai Farmers Bank	Bookkeeping	U 01411
Richardson-Merrell Ltd.	Invoicing	U 01417

6.5 INDEX OF APPLICATIONS BY SUPPLIER [1]

Supplier Name	Application Type	Registration Number
DATASAAB	Financial Control	S 00401
	Order Processing	S 00402
DCM Data Product	Financial Control	S 02901
Fijitsu Ltd.	Data Collection	S 01701
Hewlett Packard	Data Base	S 00101
IBM	Decision Aid	S 01110, S 01111
	Financial Control	S 01108, S 01112
	Inventory Control	S 01104
	Personnel Administration	S 01113
	Production Control	S 01101, S 01102
		S 01105, S 01106
		S 01114, S 01115
	Report Generator	S 01107
	Stock Control	S 01103
	Text Processing	S 01109
ICL European Computers	Production Control	S 00701, S 00702
Mitsubishi Electric Corp.	Decision Aid	S 01801
Nippon Electric Co.Ltd.	Management Information	S 01901
Oki Electric Industry Co.Ltd.	Financial Control	S 02101
SEMS	Data Base	S 02701, S 02702

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[1] For details of particular applications, please see the data sheets which are arranged by registration number in Annex II.

(cont...)

Supplier Name	Application Type	Registration Number
SCS Scientific Control Systems	Decision Aid	S 01601, S 01602
SZAMKI	Management Information	S 02301
Videoton Corp.	Data Base	S 00603
	Data Collection	S 00601
	Financial Control	S 00602
	Management Information	S 00604
	Process Control	S 00606
	Stock Control	S 00605
WANG	Decision Aid	S 00901 ~ S 00903

6.6   Index of National Focal Point Organizations [1]

BANGLADESH

Bangladesh Management Development Centre
Mirpur Road
Lalmatia
Dacca-7

COSTA RICA

Instituto Nacional de Fomento Cooperative
  (INFOCOOP)
Apartado 4203
San José

CYPRUS

Cyprus Productivity Centre
Ministry of Labour and
  Social Insurance
7, Byron Avenue
Nicosia

ECUADOR

Centro de Desarrollo Industrial
  del Ecuador (CENDES)
Apartado 2321
Quito

ETHIOPIA

Centre for Entrepreneurship and
  Management (CEM)
Chamber of Commerce Building
Mexico Square
P. O. Box 3246
Addis Ababa

GUATEMALA

Centro Nacional de Desarrollo
Adiestramiento y Productividad
  (CENDAP)
5, Avenida 8 - 24
Guatemala

Instituto Tecnico de Capacitacion y
  Productividad (INTECAP)
12 Calle 4 - 17, zone 1
P. O. Box 1261
Guatemala

GUYANA

Ministry of Education
Training Division
21 Brickdam
Georgetown

HUNGARY

International Computer Education and
  Information Centre (SZAMOK)
H-1502 Budapest
P. O. Box 146

INDIA

Computer Centre
Motital Nehru Regional Engineering
  College
Allahabad 211004

National Institute for Training in
  Industrial Engineering (NITIE)
Vihar Lake
Bombay 400087

IVORY COAST

Centre Ivoirien de Gestion des
  Entreprises (CIGE)
B. P. 7322
Abidjan

Institut Africain pour le Developpement
  Economique et Social (INADES)
B. P. 8008
15 rue Jean Mermoz
Cocody-les-deux-Plateaux
Abidjan

KUWAIT

Arab Planning Institute
Department of Public Administration and
  Industrial Management
P. O. Box 24038
Kuwait

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[1] This is a list of those organizations which have contributed to the UNIDO survey
thus far. UNIDO will be pleased to receive expressions of interest from qualified
national institutions to serve as national focal points in countries not yet fully
covered by the above organizations.

NIGERIA

Centre for Management Development
Ikorodu Road
Ilupeju
P. O. Box 7648
Lagos

Federal Institute of Industrial Research
Oshodi, Private Mail Bag 1023
Ikeja Airport
Lagos State

Nigerian Association of Management
  Consultants
c/o Centre for Management Development
P. O. Box 7648
Ikorodu Road
Lagos

PAPUA NEW GUINEA

Department of Business Development
Small Industries Section
P. O. Box 3383
Port Moresby

Papua New Guinea Institute of
  Training and Development
P. O. Box 9080
Hohola

TANZANIA

National Institute for Productivity
P. O. Box 2021
Dar-es-Salaam

THAILAND

Ministry of Industry
Management Development and
  Productivity Centre
Rama VI Road
Bangkok

THAILAND

Thailand Management Association
Samaagi Insurance Building
308 Silem Road
Room 5, 3rd floor
Bangkok

UGANDA

Management Training and Advisory Centre
Jinja Road
Nawaka
P. O. Box 4655
Kampala

URUGUAY

Instituto de Capacitación en
  Dirección de Empresas
Juncal 1305
Of. 302, Rincón 467, 6 B
Montevideo

ZAMBIA

Office of the Prime Minister
Management Development and Advisory
  Service
Management Development Unit
Office location:
Corner Tukuluho Road and
Haile Selassie Avenue (opposite
  Barclays Bank)
Longacres
P. O. Box 2181
Lusaka

ANNEX I: Details of Application Software Employed by End-Users

REGISTRATION No. | U 001 01 |

ORGANIZATION
                Name: PROSUMA
             Address: P.O. Box 20837
                      Abidjan
                      Ivory Coast

INFORMATION CONTACT
            Official: P. Ogoussan
           Telephone:
               Telex:

APPLICATION PACKAGE
                Name: STOCK

                Type: Stock Control
           Programme: COBOL
       Documentation: French

SYSTEM REQUIREMENTS
     Computer system: HB 61/40
         Minimum CPU: 16KB
           Including   6KB   for operating system   HB GCOS
    Input device(s): Keyboard or Console

    Output device(s): Line Printer, Disk-device, Floppy disk

REGISTRATION No. | U 002 01 |

ORGANIZATION
                Name: Commercial Bank of Ethiopia
             Address: Addis Ababa
                      Ethiopia

INFORMATION CONTACT
            Official:
           Telephone:
               Telex:

APPLICATION PACKAGE
                Name: PAYROLL

                Type: Payroll
           Programme: NEAT
       Documentation: English

SYSTEM REQUIREMENTS
     Computer system: NCR 399
         Minimum CPU:
           Including   for operating system
    Input device(s):

    Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | U 002 02 |

ORGANIZATION
            Name: Commercial Bank of Ethiopia
         Address: Addis Ababa
                  Ethiopia

INFORMATION CONTACT
         Official:
        Telephone:
            Telex:

APPLICATION PACKAGE
            Name: Foreign Currency Posting

            Type: Communication Services
        Programme: NEAT
    Documentation: English

SYSTEM REQUIREMENTS
    Computer system: NCR 399
        Minimum CPU:
          Including   for operating system
     Input device(s):

     Output device(s):

REGISTRATION No. | U 002 03 |

ORGANIZATION
            Name: Commercial Bank of Ethiopia
         Address: Addis Ababa
                  Ethiopia

INFORMATION CONTACT
         Official:
        Telephone:
            Telex:

APPLICATION PACKAGE
            Name: Accounting

            Type: Bookkeeping
        Programme: NEAT
    Documentation: English

SYSTEM REQUIREMENTS
    Computer system: NCR 399
        Minimum CPU:
          Including   for operating system
     Input device(s):

     Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | U 002 04 |

ORGANIZATION
                Name: Maritime and Transit Services
             Address: Addis Ababa
                        Ethiopia

INFORMATION CONTACT
             Official: Edme Alem Ayalew
            Telephone:
                Telex:

APPLICATION PACKAGE
                Name: Accounting

                Type: Bookkeeping
           Programme: NEAT
        Documentation: English

SYSTEM REQUIREMENTS
     Computer system: NCR 399
         Minimum CPU:
           Including   for operating system   NCR - Operating System
     Input device(s):   Keyboard or Console, Nonstand.Cassette

    Output device(s):   Serial printer, Line printer, Matrix printer

---

REGISTRATION No. | U 002 05 |

ORGANIZATION
                Name: Rural Project Agency
             Address: Addis Ababa
                        Ethiopia

INFORMATION CONTACT
             Official:
            Telephone:
                Telex:

APPLICATION PACKAGE
                Name: Accounting

                Type: Financial Control
           Programme: NEAT
        Documentation: English

SYSTEM REQUIREMENTS
     Computer system: NCR 499
         Minimum CPU: 16KB
           Including   for operating system
     Input device(s):   Keyboard or Console

    Output device(s):   Matrix printer

APPLICATION DATA SHEET

REGISTRATION No. | U 002 06 |

ORGANIZATION
                 Name: Rural Project Agency
              Address: Addis Ababa
                        Ethiopia

INFORMATION CONTACT
             Official:
            Telephone:
                Telex:

APPLICATION PACKAGE
                 Name: PAYROLL

                 Type: Payroll
            Programme: NEAT
        Documentation: English

SYSTEM REQUIREMENTS
   Computer system: NCR 499
       Minimum CPU: 16KB
         Including   for operating system
   Input device(s): Keyboard or Console

   Output device(s): Matrix Printer

REGISTRATION No. | U 002 07 |

ORGANIZATION
                 Name: Rural Project Agency
              Address: Addis Ababa
                        Ethiopia

INFORMATION CONTACT
             Official:
            Telephone:
                Telex:

APPLICATION PACKAGE
                 Name: Stock Control

                 Type: Inventory Control
            Programme: NEAT
        Documentation: English

SYSTEM REQUIREMENTS
   Computer system: NCR 499
       Minimum CPU: 16KB
         Including   for operating system
   Input device(s): Keyboard or Console

   Output device(s): Matrix Printer

APPLICATION DATA SHEET

REGISTRATION No. U 003.01

ORGANIZATION
           Name: Cooperativa Agricola Industrial Victoria R.L.
        Address: Apartado CV
                 Grecia
                 Costa Rica
INFORMATION CONTACT
        Official: Luis A.Rodriguez R.
       Telephone: 445188
          Telex:

APPLICATION PACKAGE
           Name: Material Control

           Type: Inventory Control
      Programme: COBOL
  Documentation: Spanish

SYSTEM REQUIREMENTS
  Computer system: Burroughs L 8000
     Minimum CPU: 22KB
       Including   for operating system
  Input device(s): Nonstand.Cassette

  Output device(s): Nonstand.Cassette, Matrix Printer

REGISTRATION No. U 003 02

ORGANIZATION
           Name: Cooperativa Agricola Industrial Victoria R.L.
        Address: Apartado CV
                 Grecia
                 Costa Rica
INFORMATION CONTACT
        Official: Luis A.Rodriguez R.
       Telephone: 445188
          Telex:

APPLICATION PACKAGE
           Name: Payroll, Planillas Salarios

           Type: Payroll
      Programme: COBOL
  Documentation: Spanish

SYSTEM REQUIREMENTS
  Computer system: Burroughs L 8000
     Minimum CPU: 22KB
       Including   for operating system
  Input device(s): Nonstand.Cassette

  Output device(s): Nonstand.Casset, Matrix Printer

APPLICATION DATA SHEET

REGISTRATION No. | U 003 03 |

ORGANIZATION
        Name: Cooperativa Agricola Industrial Victoria R.L.
    Address: Apartado CV
             Grecia
             Costa Rica
INFORMATION CONTACT
     Official: Luis A. Rodriguez R.
   Telephone: 445188
       Telex:

APPLICATION PACKAGE
        Name: Accounting

        Type: Bookkeeping
   Programme: COBOL
 Documentation: Spanish

SYSTEM REQUIREMENTS
 Computer system: Burroughs L 8000
   Minimum CPU: 22KB
    Including   for operating system
 Input device(s):

 Output device(s):

REGISTRATION No. | U 008 01 |

ORGANIZATION
        Name: CYBARCO Ltd.
    Address: P.O. Box 1653
            Nicosia
            Cyprus
INFORMATION CONTACT
     Official: S. Christodoulou
   Telephone:
       Telex:

APPLICATION PACKAGE
        Name: PAYROLL

        Type: Payroll
   Programme: NEAT
 Documentation: English

SYSTEM REQUIREMENTS
 Computer system: NCR 399
   Minimum CPU: 8KB
    Including   for operating system
 Input device(s): Keyboard or Console

 Output device(s): Matrix Printer

APPLICATION DATA SHEET

REGISTRATION No. | U 008.02 |

ORGANIZATION
    Name: CYBARCO Ltd.
   Address: P.O. Box 1653
       Nicosia
       Cyprus

INFORMATION CONTACT
    Official: S. Christodoulou
   Telephone:
     Telex:

APPLICATION PACKAGE
    Name: Accounts Payable

    Type: Bookkeeping
  Programme: NEAT
 Documentation: English

SYSTEM REQUIREMENTS
 Computer system: NCR 399
  Minimum CPU: 8KB
   Including   for operating system
 Input device(s): Keyboard or Console

 Output device(s): Matrix Printer

REGISTRATION No. | U 008 03 |

ORGANIZATION
    Name: The Cyprus Cement Company Ltd.
   Address: Limassol
       Cyprus

INFORMATION CONTACT
    Official: A.C. Kakofeggitis
   Telephone:
     Telex:

APPLICATION PACKAGE
    Name: PAYROLL

    Type: Payroll
  Programme: NEAT
 Documentation: English

SYSTEM REQUIREMENTS
 Computer system: NCR 499
  Minimum CPU: 16KB
   Including 12KB for operating system NCR - Operating Syst.
 Input device(s): Keyboard or Console

 Output device(s): Matrix Printer

APPLICATION DATA SHEET

REGISTRATION No. | U 010 01 |

ORGANIZATION
           Name: Kuwait Metal Pipe Industries KSC
           Address: P.O. Box 3416
                     Safat
                     Kuwait

INFORMATION CONTACT
           Official: Yakoob M.Awaida
           Telephone:
           Telex:

APPLICATION PACKAGE
           Name: Accounting

           Type: Bookkeeping
           Programme: NEAT
           Documentation: English

SYSTEM REQUIREMENTS
   Computer system: NCR 399
   Minimum CPU: 8KB
        Including   4KB   for operating system   NCR - Operating Syst.
   Input device(s): Keyboard or Console

   Output device(s): Matrix Printer

REGISTRATION No. | U 010 02 |

ORGANIZATION
           Name: Kuwait Transport Company K.S.C.
           Address: P.O. Box 375
                     Safat
                     Kuwait

INFORMATION CONTACT
           Official: J. Khalaf
           Telephone:
           Telex:

APPLICATION PACKAGE
           Name: Inventory Control

           Type: Inventory Control
           Programme: FORTRAN
           Documentation: English

SYSTEM REQUIREMENTS
   Computer system: IBM /1130
   Minimum CPU: 16KB
        Including   2KB for operating system   IBM DOS
   Input device(s): Card reader, Disk-device, Keyboard or Console

   Output device(s): Card punch, Disk-device, Line printer, Teletype

APPLICATION DATA SHEET

REGISTRATION No. | U 010 03 |

ORGANIZATION
        Name: Kuwait Transport Company K.S.C.
     Address: P.O. Box 375
             Safat
             Kuwait

INFORMATION CONTACT
      Official: J. Khalaf
    Telephone:
        Telex:

APPLICATION PACKAGE
        Name: Payroll and Personnel Statistics

        Type: Payroll
   Programme: FORTRAN
 Documentation: English

SYSTEM REQUIREMENTS
 Computer system: IBM /1130
   Minimum CPU: 16KB
    Including   2KB for operating system IBM DOS
 Input device(s): Card reader, Disk-device, Keyboard or Console

 Output device(s): Card punch, Disk-device, Line printer, Teletype

---

REGISTRATION No. | U 010 04 |

ORGANIZATION
        Name: Kuwait Transport Company K.S.C.
     Address: P.O. Box 375
             Safat
             Kuwait

INFORMATION CONTACT
      Official: J. Khalaf
    Telephone:
        Telex:

APPLICATION PACKAGE
        Name: Bus Revenue Report

        Type: Bookkeeping
   Programme: FORTRAN
 Documentation: English

SYSTEM REQUIREMENTS
 Computer system: IBM /1130
   Minimum CPU: 16KB
    Including   2KB for operating system   IBM DOS
 Input device(s): Card reader, Disk-device, Keyboard or Console

 Output device(s): Card punch, Disk-device, Line printer, Teletype

APPLICATION DATA SHEET

REGISTRATION No. | U 010 05 |

ORGANIZATION
          Name: Kuwait Transport Company K.S.C.
        Address: P.O. Box 375
                 Safat
                 Kuwait

INFORMATION CONTACT
        Official: J. Khalaf
        Telephone:
           Telex:

APPLICATION PACKAGE
           Name: Holders Accounts

           Type: Bookkeeping
      Programme: FORTRAN
  Documentation: English

SYSTEM REQUIREMENTS
  Computer system: IBM /1130
    Minimum CPU: 16KB
       Including   2KB   for operating system   IBM DOS
  Input device(s): Card reader, Disk-device, Keyboard or Console

  Output device(s): Line printer, Teletype

REGISTRATION No. | U 010 06 |

ORGANIZATION
          Name: Kuwait Transport Company K.S.C.
        Address: P.O. Box 375
                 Safat
                 Kuwait

INFORMATION CONTACT
        Official: J. Khalaf
        Telephone:
           Telex:

APPLICATION PACKAGE
           Name: Material Costing

           Type: Financial Control
      Programme: FORTRAN
  Documentation: English

SYSTEM REQUIREMENTS
  Computer system: IBM /1130
    Minimum CPU: 16KB
       Including   2KB   for operating system   IBM DOS
  Input device(s): Card reader, Disk-device, Keyboard or Console

  Output device(s): Card punch, Disk-device, Line printer, Teletype

APPLICATION DATA SHEET

REGISTRATION No. | U 010 07 |

ORGANIZATION
          Name: Kuwait Transport Company K.S.C.
       Address: P.O. Box 375
                Safat
                Kuwait
INFORMATION CONTACT
      Official: J. Khalaf
     Telephone:
         Telex:

APPLICATION PACKAGE
          Name: Employees Accounts

          Type: Bookkeeping
     Programme: FORTRAN
 Documentation: English

SYSTEM REQUIREMENTS
 Computer system: IBM /1130
     Minimum CPU: 16KB
       Including   2KB for operating system   IBM DOS
 Input device(s): Keyboard or Console, Card reader, Disk-device

 Output device(s): Line Printer

REGISTRATION No. | U 010 08 |

ORGANIZATION
          Name: Kuwait Transport Company K.S.C.
       Address: P.O. Box 375
                Safat
                Kuwait
INFORMATION CONTACT
      Official: J. Khalaf
     Telephone:
         Telex:

APPLICATION PACKAGE
          Name: Labour Costing

          Type: Financial Control
     Programme: FORTRAN
 Documentation: English

SYSTEM REQUIREMENTS
 Computer system: IBM /1130
     Minimum CPU: 16KB
       Including   for operating system   IBM DOS
 Input device(s): Keyboard or Console, Card reader, Disk-device

 Output device(s): Card punch, Line printer, Disk-device, Teletype

APPLICATION DATA SHEET

REGISTRATION No. | U 014 01 |

ORGANIZATION
          .Name: Bangkok Data Center Co.Ltd.
        Address: 183 Pitsanuloke Road, Nangleung
                    Bangkok
                    Thailand

INFORMATION CONTACT
         Official:
        Telephone:
            Telex:

APPLICATION PACKAGE
            Name: System Ten for Banking

            Type: Bookkeeping
       Programme: Assembler
    Documentation: English

SYSTEM REQUIREMENTS
  Computer system: ICL 2903
     Minimum CPU: 30 KB
        Including   for operating system   ICL Operating System
   Input device(s): Screen terminal (I/O)

   Output device(s): Display screen, Line printer

REGISTRATION No. | U 014 02 |

ORGANIZATION
            Name: Bangkok Data Center Co.Ltd.
         Address: 182 Pitsanuloke Road, Nangleung
                     Bangkok
                     Thailand

INFORMATION CONTACT
         Official:
        Telephone:
            Telex:

APPLICATION PACKAGE
            Name: Hotel on-line with System Ten

            Type: Management Information
       Programme: Assembler
    Documentation: English

SYSTEM REQUIREMENTS
  Computer system: ICL 2903
     Minimum CPU: 30KB
        Including   for operating system ICL Operating System
   Input device(s): Screen terminal (I/O)

   Output device(s): Display screen, Line printer

APPLICATION DATA SHEET

REGISTRATION No. | U 014 03 |

ORGANIZATION
        Name: **Bangkok Data Center Co.Ltd.**
        Address: **183 Pitsanuloke Road, Nangleung**
        Bangkok
        Thailand

INFORMATION CONTACT
        Official:
        Telephone:
        Telex:

APPLICATION PACKAGE
        Name: **Daily Sales Activity**

        Type: **Distribution Control**
        Programme: **Assembler**
        Documentation: **English**

SYSTEM REQUIREMENTS
    Computer system: **ICL 2903**
        Minimum CPU: **40 KB**
        Including   **for operating system**
    Input device(s):

    Output device(s):

REGISTRATION No. | U 014 06 |

ORGANIZATION
        Name: **Bangkok Data Center Co. Ltd.**
        Address: **183 Pitsanuloke Road, Nangleung**
        Bangkok
        Thailand

INFORMATION CONTACT
        Official:
        Telephone:
        Telex:

APPLICATION PACKAGE
        Name: **Payroll**

        Type: **Payroll**
        Programme: **Assembler**
        Documentation: **English**

SYSTEM REQUIREMENTS
    Computer system: **ICL 2903**
        Minimum CPU: **40 KB**
        Including   **for operating system**
    Input device(s):

    Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | U 014 07 |

ORGANIZATION
        Name: Bangkok Data Center Co.Ltd
      Address: 183 Pitsanuloke Road, Nangleung
                     Bangkok
                     Thailand

INFORMATION CONTACT
      Official:
    Telephone:
        Telex:

APPLICATION PACKAGE
        Name: Production Control

        Type: Production Control
    Programme: Assembler
 Documentation: English

SYSTEM REQUIREMENTS
 Computer system: ICL 2903
   Minimum CPU: 40 KB
     Including   for operating system
 Input device(s):

 Output device(s):

REGISTRATION No. | U 014 08 |

ORGANIZATION
        Name: Construction Accesories Co.Ltd.
      Address: Bangkok
                     Thailand

INFORMATION CONTACT
      Official: Parl Na Pombejra
    Telephone:
        Telex:

APPLICATION PACKAGE
        Name: Accounting

        Type: Financial Control
    Programme: Assembler
 Documentation: English

SYSTEM REQUIREMENTS
 Computer system: Olivetti A-5
   Minimum CPU:
     Including   for operating system
 Input device(s):

 Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | U 014 09 |

ORGANIZATION
            Name: Thai Teak Wood Veneer Co.Ltd.
         Address: Bangkok
                   Thailand

INFORMATION CONTACT
        Official:
       Telephone:
           Telex:

APPLICATION PACKAGE
            Name: **Mathematical**

            Type:
       Programme: **Assembler**
   Documentation: **English**

SYSTEM REQUIREMENTS
 Computer system: Olivetti P603
    Minimum CPU:
       Including   for operating system
  Input device(s):

  Output device(s):

REGISTRATION No. | U 014 10 |

ORGANIZATION
            Name: **Siam Commercial Bank Ltd.**
         Address: **Bangkok**
                   Thailand

INFORMATION CONTACT
        Official:
       Telephone:
           Telex:

APPLICATION PACKAGE
            Name: **Accounting**

            Type: **Bookkeeping**
       Programme: **Assembler**
   Documentation: **English**

SYSTEM REQUIREMENTS
 Computer system: **ICL SYS 10**
     Minimum CPU:
       Including   for operating system **ICL – Operating System**
  Input device(s):

  Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | U 014 11 |

ORGANIZATION
            Name: Thai Farmers Bank
         Address: Bangkok
                  Thailand

INFORMATION CONTACT
         Official: Vira Hayodom
        Telephone:
            Telex:

APPLICATION PACKAGE
            Name: Accounting

            Type: Bookkeeping
       Programme: COBOL
   Documentation: Thai

SYSTEM REQUIREMENTS
   Computer system: Burroughs B3731
       Minimum CPU: 100KB
         Including   for operating system
   Input device(s): Card reader

   Output device(s): Matrix printer

REGISTRATION No. | U 014 12 |

ORGANIZATION
            Name: Provincial Electricity Authority
         Address: Bangkok
                  Thailand

INFORMATION CONTACT
         Official: Akison Sindkipana
        Telephone:
            Telex:

APPLICATION PACKAGE
            Name: Electricity Invoicing

            Type: Invoicing
       Programme: BASIC
   Documentation: English

SYSTEM REQUIREMENTS
   Computer system: WANG 2200B-1
       Minimum CPU: 4KB
         Including   for operating system
   Input device(s): Magnetic-tape-device, Keyboard or Console

   Output device(s): Display screen, Magnetic-tape-device, Serial (typing) prt.

APPLICATION DATA SHEET

REGISTRATION No. | U 014 13 |

ORGANIZATION
    Name: ICI Co.Ltd. (Thailand)
   Address: Bangkok
       Thailand

INFORMATION CONTACT
   Official:
   Telephone:
    Telex:

APPLICATION PACKAGE
    Name: Stock Control

    Type: Stock Control
  Programme: Mach.Code
 Documentation: Thai

SYSTEM REQUIREMENTS
 Computer system: Olivetti P603
  Minimum CPU:
   Including   for operating system
 Input device(s): Keyboard or Console

 Output device(s): Serial (typing) printer

REGISTRATION No. | U 014 14 |

ORGANIZATION
    Name: ICI Co.Ltd.(Thailand)
   Address: Bangkok
       Thailand

INFORMATION CONTACT
   Official:
   Telephone:
    Telex:

APPLICATION PACKAGE
    Name: Payroll

    Type: Payroll
  Programme: Mach.Code
 Documentation: Thai

SYSTEM REQUIREMENTS
 Computer system: Olivetti P603
  Minimum CPU:
   Including   for operating system
 Input device(s): Keyboard or Console

 Output device(s): Serial (typing) printer

APPLICATION DATA SHEET

REGISTRATION No. | U 014 15 |

ORGANIZATION
            Name: ICI Co.Ltd.
         Address: Bangkok
                    Thailand

INFORMATION CONTACT
         Official:
        Telephone:
            Telex:

APPLICATION PACKAGE
             Name: Ledger Application

             Type: Bookkeeping
        Programme: Mach.Code
    Documentation: Thai

SYSTEM REQUIREMENTS
  Computer system: Olivetti P603
      Minimum CPU:
        Including   for operating system
   Input device(s): Keyboard or Console

   Output device(s): Serial (typing) printer

REGISTRATION No. | U 014 16 |

ORGANIZATION
            Name: Loxley Co.Ltd.
         Address: 304 Suapah Rd.
                   Bangkok
                   Thailand
INFORMATION CONTACT
         Official:
        Telephone:
            Telex:

APPLICATION PACKAGE
             Name: Banking

             Type: Bookkeeping
        Programme: Assembler
    Documentation: English

SYSTEM REQUIREMENTS
  Computer system: Olivetti
      Minimum CPU: 22KB
        Including   18KB for operating system Olivetti - Op.Syst.
   Input device(s): Keyboard or Console, Floppy Disk, Compact Cassette

   Output device(s): Keyboard or Console

APPLICATION DATA SHEET

REGISTRATION No. ☐ U 014 17

ORGANIZATION
          Name: Richardson-Herrell Ltd.
       Address: 1-7 Convent Rd.
                Bangkok
                Thailand

INFORMATION CONTACT
      Official:
     Telephone:
         Telex:

APPLICATION PACKAGE
          Name: Invoice and Accounting

          Type: Invoicing
     Programme:
 Documentation: English

SYSTEM REQUIREMENTS
  Computer system: Olivetti A-6
     Minimum CPU: 22KB
       Including   for operating system
  Input device(s): Compact cassette, Floppy disk

  Output device(s): Line printer

REGISTRATION No. ☐ U 019 01

ORGANIZATION
          Name: Inversiones de Guatemala S.A.
       Address: Km.16 1/2 Carretera Roosevelt
                Mixco
                Guatemala

INFORMATION CONTACT
      Official: Jorge Chiu Oliva
     Telephone:
         Telex:

APPLICATION PACKAGE
          Name: Accounting, Sales Inventory

          Type: Financial Control
     Programme: FORTRAN VI
 Documentation: Spanish

SYSTEM REQUIREMENTS
  Computer system: HP 2000
     Minimum CPU: 96KB
       Including 32KB for operating system HP - RTE
  Input device(s): Keyboard or Console, Standard terminals

  Output device(s): Line Printer

APPLICATION DATA SHEET

REGISTRATION No. | U 019 02 |

ORGANIZATION
          Name: Super Repuestos Aquarony
       Address: 7 Av. 1-54, Zona 4
                Guatemala City
                Guatemala

INFORMATION CONTACT
      Official: Walter Aquarony
     Telephone: 67378
         Telex:

APPLICATION PACKAGE
          Name: Inventory, Accounting

          Type: Financial Control
     Programme: BASIC
 Documentation: Spanish

SYSTEM REQUIREMENTS
Computer system: WANG
   Minimum CPU:
     Including   for operating system
 Input device(s): Screen terminal (I/O), Keyboard or console, Disk-device

 Output device(s): Line printer

REGISTRATION No. | U 019 03 |

ORGANIZATION
          Name: Administradora de Inversiones S.A. (ADINSA)
       Address: Edificio Galerias España, Zona 9
                Guatemala City
                Guatemala

INFORMATION CONTACT
      Official: Salvador Sosa
     Telephone:
         Telex:

APPLICATION PACKAGE
          Name: Inventories, Real State

          Type: Inventory Control
     Programme: BASIC
 Documentation: English

SYSTEM REQUIREMENTS
Computer system: WANG
   Minimum CPU:
     Including   for operating system
 Input device(s): Screen terminal (I/O), Disk-device

 Output device(s): Line printer

APPLICATION DATA SHEET

REGISTRATION No. | U 020 01 |

ORGANIZATION
          Name: Digitron Computers Pvt.Ltd.
       Address: State Bank Bldg. Bank Street
                Bombay
                India

INFORMATION CONTACT
       Official:
      Telephone:
          Telex:

APPLICATION PACKAGE
          Name:

          Type:
      Programme: COBOL, RPG II, BASIC
  Documentation: English

SYSTEM REQUIREMENTS
  Computer system: WANG 2200VP
      Minimum CPU:
        Including   for operating system
   Input device(s): Keyboard or Console, Magnetic-tape-device, Disk-device

  Output device(s): Magnetic-tape-device, Disk-device, Printer/Plotter

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REGISTRATION No. | U 021 01 |

ORGANIZATION
          Name: Plastigama
       Address: Casilla Letra I
                Guayaquil
                Ecuador
INFORMATION CONTACT
       Official: A. Piedrahita
      Telephone:
          Telex:

APPLICATION PACKAGE
          Name: Sistema de Cuentas por Cobrar

          Type: Financial Control
      Programme: COBOL
  Documentation: English

SYSTEM REQUIREMENTS
  Computer system: IBM /370-125
      Minimum CPU:
        Including   for operating system
   Input device(s):

  Output device(s):

ANNEX II. Details of Application Software Offered by Equipment Suppliers

REGISTRATION No. | S 001 01 |

ORGANIZATION
             Name: Hewlett Packard (General Systems Division)
          Address: 5303 Stevens Creek Blvd.
                   95050 Santa Clara, California
                   U.S.A.
INFORMATION CONTACT
         Official: Rene Adler
        Telephone:
            Telex:

APPLICATION PACKAGE
             Name: Image, Query

             Type: Data Base
        Programme: SPL
    Documentation: English

SYSTEM REQUIREMENTS
  Computer system: HP 3000
      Minimum CPU:
        Including   for operating system
  Input device(s): Screen terminal (I/O), Magnetic Tape 9-Track,
                   Card Reader
 Output device(s): Line Printer, Screen Terminal (I/O), Magnetic Tape
                   9-Track, Card Punch

REGISTRATION No. | S 004 01 |

ORGANIZATION
             Name: Datasaab
          Address: Fack S-581 01
                   Linkoeping
                   Sweden
INFORMATION CONTACT
         Official: A. Linge
        Telephone: (4613) 117000
            Telex:

APPLICATION PACKAGE
             Name: D15 - Accounting System (Integrated accounting system for
                   small or medium firms)
             Type: Financial Accounting
        Programme:
    Documentation:

SYSTEM REQUIREMENTS
  Computer system: Datasaab D15 Series
      Minimum CPU:
        Including   for operating system
  Input device(s):

 Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | S 004 02 |

ORGANIZATION
              Name: Datasaab
           Address: Fack S-581 01
                    Linkoeping
                    Sweden

INFORMATION CONTACT
          Official: A. Linge
         Telephone: (4613) 117000
             Telex:

APPLICATION PACKAGE
              Name: D15 - Order, Invoicing and Inventory (Integrated order-
                    processing system for small or medium firms)
              Type: Order Processing
         Programme:
     Documentation:

SYSTEM REQUIREMENTS
   Computer system: Datasaab D15 Series
       Minimum CPU:
         Including   for operating system
   Input device(s):

   Output device(s):

REGISTRATION No. | S 006 01 |

ORGANIZATION
              Name: Videoton
           Address: P.O. Box 557
                    Budapest 62
                    Hungary
INFORMATION CONTACT
          Official:
         Telephone: 126620
             Telex:

APPLICATION PACKAGE
              Name: Data Collection (Data recording and collecting system)

              Type: Data Collection
         Programme: Cobol, Basic, Assembler
     Documentation: English, Russian, German, Hungarian

SYSTEM REQUIREMENTS
   Computer system: Videoton V1-1010
       Minimum CPU: 12KW
         Including   for operating system
   Input device(s): Screen Terminal (I/O), Magnetic Tape Device,
                    Disk Device.
   Output device(s): Screen Terminal (I/O), Magnetic Tape Device,
                    Disk Device.

APPLICATION DATA SHEET

REGISTRATION No. | S 006 02 |

ORGANIZATION
          Name: Videoton
       Address: P.O. Box 557
                Budapest 62
                Hungary
INFORMATION CONTACT
      Official:
     Telephone: 126620
         Telex:

APPLICATION PACKAGE
          Name: Financial Transactions (settling of financial operations,
                banking, insurance)
          Type: Financial Control
     Programme: Assembler, DIL 5
 Documentation: English, Russian, German, Hungarian

SYSTEM REQUIREMENTS
   Computer system: Videoton VT-70
       Minimum CPU: 2KW
         Including   for operating system
   Input device(s): Keyboard or Console

   Output device(s): Compact Cassette, Spec.Printer.

REGISTRATION No. | S 006 03 |

ORGANIZATION
          Name: Videoton
       Address: P.O. Box 557
                Budapest 62
                Hungary
INFORMATION CONTACT
      Official:
     Telephone: 126620
         Telex:

APPLICATION PACKAGE
          Name: Data Base Management Program ('Personal computing' / access
                to data at the point of work)
          Type: Data Base
     Programme: Assembler
 Documentation: English, French, Hungarian

SYSTEM REQUIREMENTS
   Computer system: Videoton VT-60
       Minimum CPU: 16KW
         Including   for operating system
   Input device(s): Card Reader

   Output device(s): Display Screen, Nonstand.Cassette, Magnetic-tape
                Device, Matrix Printer

APPLICATION DATA SHEET

ORGANIZATION
          Name: Videoton
       Address: P.O. Box 557
                Budapest 62
                Hungary
INFORMATION CONTACT
      Official:
     Telephone: 126620
         Telex:

APPLICATION PACKAGE
        . Name: Management Applications (Computerization of management
                procedures on office-computers)
          Type: Management Information
     Programme: RPG, Assembler
 Documentation: English, Russian, German, Hungarian

SYSTEM REQUIREMENTS
   Computer system: Videoton VT-50
       Minimum CPU: 2KW
         Including   for operating system
   Input device(s): Keyboard or Console

   Output device(s): Matrix Printer, Compact Cassette, Disk-Device

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REGISTRATION No. | S 006 05 |

ORGANIZATION
          Name: Videoton
       Address: P.O. Box 557
                Budapest 62
                Hungary
INFORMATION CONTACT
      Official:
     Telephone: 126620
         Telex:

APPLICATION PACKAGE
          Name: File Management System (Stock-in-hand-accounting)

          Type: Stock Control
     Programme: Assembler
 Documentation: German, Hungarian

SYSTEM REQUIREMENTS
   Computer system: Videoton VT-20
       Minimum CPU: 32KB
         Including   for operating system
   Input device(s): Screen Terminal (I/O)

   Output device(s): Disk Device, Matrix Printer

APPLICATION DATA SHEET

REGISTRATION No. | S 006. 06 |

ORGANIZATION
              Name: Videoton
           Address: P.O. Box 557
                    Budapest 62
                    Hungary
INFORMATION CONTACT
          Official:
         Telephone: 126620
             Telex:

APPLICATION PACKAGE
              Name: Data Logging (Industrial and laboratory process-control)

              Type: Data Collection
         Programme: Assembler
     Documentation: English, Russian, German

SYSTEM REQUIREMENTS
   Computer system: Videoton Rem.Proc.Term.
       Minimum CPU: 8KB
         Including   for operating system
   Input device(s):

   Output device(s):

REGISTRATION No. | S 007 01 |

ORGANIZATION
              Name: ICL European Computers
           Address: 52 Quai National
                    92806 Puteaux
                    France
INFORMATION CONTACT
          Official: A.F. Mudarres
         Telephone: 776 4314
             Telex: 620026

APPLICATION PACKAGE
              Name: OMAC (Bill of materials, stock requirements, planning,
                    forward loading, product costing, completion time estimation)
              Type: Production Control
         Programme: COBOL, RPG
     Documentation: English

SYSTEM REQUIREMENTS
   Computer system: ICL 2903
       Minimum CPU: 32KW
         Including   for operating system
   Input device(s):

   Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | S 007 02 |

ORGANIZATION
        Name: ICL European Computers
     Address: 52 Quai National
              92806 Puteaux
              France
INFORMATION CONTACT
     Official: A.F. Mudarres
    Telephone: 776 4314
        Telex: 620026

APPLICATION PACKAGE
        Name: SAFES (Bill of materials, requirements planning, shop
              floor loading, product costing, i.a.)
         Type: Production control
    Programme: Assembler
Documentation: English, German, Spanish, French, Italian, Dutch

SYSTEM REQUIREMENTS
Computer system: ICL SYS 10/220
   Minimum CPU: 40KB
     Including   for operating system
 Input device(s): Screen Terminal (I/O)

 Output device(s): Screen Terminal (I/O), Line printer

REGISTRATION No. | S 009 01 |

ORGANIZATION
        Name: WANG Laboratories Inc.
     Address: Wiedner Hauptstrasse 68
              A-1040 Vienna
              Austria
INFORMATION CONTACT
     Official: Heinrich F. Giefing
    Telephone: (0222) 579420
        Telex: 07/6424

APPLICATION PACKAGE
        Name: ANOVA (2200A)

         Type: Decision Aid
    Programme: BASIC
Documentation: English, French, Spanish

SYSTEM REQUIREMENTS
Computer system: WANG 2200T; 2000VP; PCS II
   Minimum CPU: 12KB
     Including   for operating system
 Input device(s): Diskette, Magnetic Tape unit

 Output device(s): Printer, Magnetic Tape unit

APPLICATION DATA SHEET

REGISTRATION No. | S 009 02 |

ORGANIZATION
            Name: WANG Laboratories Inc.
         Address: Wiedner Hauptstrasse 68
                  A-1040 Vienna
                  Austria

INFORMATION CONTACT
        Official: Heinrich F. Giefing
       Telephone: (0222) 579420
           Telex: 07/6424

APPLICATION PACKAGE
            Name: ANOVA (2200S)

            Type: Decision Aid
       Programme: BASIC
   Documentation: English, French, Spanish

SYSTEM REQUIREMENTS
 Computer system: WANG 2200T; 2200VP; PCS II
     Minimum CPU: 8KB
       Including   for operating system
 Input device(s): Diskette (2)

 Output device(s): Printer

REGISTRATION No. | S 009 03 |

ORGANIZATION
            Name: WANG Laboratories Inc.
         Address: Wiedner Hauptstrasse 68
                  A-1040 Vienna
                  Austria

INFORMATION CONTACT
        Official: Heinrich F. Giefing
       Telephone: (0222) 579420
           Telex: 07/6424

APPLICATION PACKAGE
            Name: ISS Utilities

            Type:
       Programme: BASIC
   Documentation: English, French, Spanish

SYSTEM REQUIREMENTS
 Computer system: WANG 2200T; 2200VP
     Minimum CPU: 8KB
       Including   for operating system
 Input device(s): Diskette (2)

 Output device(s): Printer

APPLICATION DATA SHEET

REGISTRATION No. | S 011 01 |

ORGANIZATION
        Name: IBM European Headq. Paris
       Address: 8-10 Cite du Retiro
               75008 Paris
               France

INFORMATION CONTACT
       Official: P.M. Foley
      Telephone: 266 33 11
         Telex:

APPLICATION PACKAGE
        Name: IPICS - Engineering/Production Control (Bills of material,
                 item-inform., manufacturing routing and workcenters)
        Type: Production Control
     Programme:
  Documentation:

SYSTEM REQUIREMENTS
  Computer system: IBM /3
    Minimum CPU: 24KB
      Including   for operating system
  Input device(s):

  Output device(s):

REGISTRATION No. | S 011 02 |

ORGANIZATION
        Name: IBM European Headq. Paris
       Address: 8-10 Cite du Retiro
               75008 Paris
               France

INFORMATION CONTACT
       Official: P.M. Foley
      Telephone: 266 33 11
         Telex:

APPLICATION PACKAGE
        Name: IPICS - Product Cost (Cost sheets, management costs
                 summaries, cost variance reports)
        Type: Production Costing
     Programme:
  Documentation:

SYSTEM REQUIREMENTS
  Computer system: IBM /3
    Minimum CPU: 24KB
      Including   for operating system
  Input device(s):

  Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | S 011 03 |

ORGANIZATION
          Name: IBM European Headq. Paris
      Address: 8-10 Cite du Retiro
                75008 Paris
                France

INFORMATION CONTACT
      Official: P.M. Foley
    Telephone: 266 33 11
        Telex:

APPLICATION PACKAGE
          Name: IPICS - Inventory Accounting (Processes transactions
                affecting stock-balances and inventory items)
          Type: Stock Control
    Programme:
  Documentation:

SYSTEM REQUIREMENTS
  Computer system: IBM /3
    Minimum CPU: 24KB
      Including   for operating system
  Input device(s):

  Output device(s):

REGISTRATION No. | S 011 04 |

ORGANIZATION
          Name: IBM European Headq. Paris
      Address: 8-10 Cite du Retiro
                75008 Paris
                France

INFORMATION CONTACT
      Official: P.M. Foley
    Telephone: 266 33 11
        Telex:

APPLICATION PACKAGE
          Name: IPICS - Material Requirements Planning (Determine require-
                ments of inventory items and generate order-action)
          Type: Inventory Control
    Programme:
  Documentation:

SYSTEM REQUIREMENTS
  Computer system: IBM /3
    Minimum CPU: 24KB
      Including   for operating system
  Input device(s):

  Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | S 011 05 |

ORGANIZATION
        Name: IBM European Headq. Paris
     Address: 8-10 Cite du Retiro
              75008 Paris
              France
INFORMATION CONTACT
     Official: P.M. Foley
    Telephone: 266 33 11
        Telex:

APPLICATION PACKAGE
        Name: IPICS - Capacity Planning (Infinite capacity planning
              for released orders)
         Type: Production Control
    Programme:
Documentation:

SYSTEM REQUIREMENTS
  Computer system: IBM /3
    Minimum CPU: 24KB
      Including   for operating system
  Input device(s):

  Output device(s):

REGISTRATION No. | S 011 06 |

ORGANIZATION
        Name: IBM European Headq. Paris
     Address: 8-10 Cite du Retiro
              75008 Paris
              France
INFORMATION CONTACT
     Official: P.M. Foley
    Telephone: 266 33 11
        Telex:

APPLICATION PACKAGE
        Name: IPICS - Production Control (Shop-order tracking, status
              reporting, job costing, dispatch-list preparation)
         Type: Production Control
    Programme:
Documentation:

SYSTEM REQUIREMENTS
  Computer system: IBM /3
    Minimum CPU: 24KB
      Including   for operating system
  Input device(s):

  Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | S 011 07 |

ORGANIZATION
           Name: IBM European Headq. Paris
        Address: 8-10 Cite du Retiro
                 75008 Paris
                 France
INFORMATION CONTACT
        Official: P.M. Foley
       Telephone: 266 33 11
           Telex:

APPLICATION PACKAGE
           Name: Query Facility (Selective retrieval of data from disk-files
                 and preparing reports or statistics)
           Type: Report Generator
      Programme:
  Documentation:

SYSTEM REQUIREMENTS
  Computer system: IBM /3
    Minimum CPU: 12 KB
      Including   for operating system
  Input device(s):

  Output device(s):

REGISTRATION No. | S 011 08 |

ORGANIZATION
           Name: IBM European Headq. Paris
        Address: 8-10 Cite du Retiro
                 75008 Paris
                 France
INFORMATION CONTACT
        Official: P.M. Foley
       Telephone: 266 33 11
           Telex:

APPLICATION PACKAGE
           Name: General Ledger Financial Accounting (Supplying information
                 for evaluating performance of the business)
           Type: Financial Accounting
      Programme:
  Documentation:

SYSTEM REQUIREMENTS
  Computer system: IBM /3
    Minimum CPU: 12KB
      Including   for operating system
  Input device(s):

  Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | S 011 09 |

ORGANIZATION
         Name: IBM European Headq. Paris
      Address: 8-10 Cite du Retiro
               75008 Paris
               France
INFORMATION CONTACT
     Official: P.M. Foley
    Telephone: 266 33 11
        Telex:

APPLICATION PACKAGE
         Name: ATMS DOS/VS (Input, editing, transmission, storage and
               output of textual material)
         Type: Text Processing
    Programme:
Documentation:

SYSTEM REQUIREMENTS
Computer system: IBM /370-115
   Minimum CPU: 192KB
     Including   for operating system IBM DOS/VS
Input device(s):

Output device(s):

REGISTRATION No. | S 011 10 |

ORGANIZATION
         Name: IBM European Headq. Paris
      Address: 8-10 Cite du Retiro
               75008 Paris
               France
INFORMATION CONTACT
     Official: P.M. Foley
    Telephone: 266 33 11
        Telex:

APPLICATION PACKAGE
         Name: PLACODE I DOS/VS (Planning and stimulation of the effect of
               alternatives and future events, monitoring and comparing
         Type: Decision Aid   results)
    Programme: PL/I
Documentation:

SYSTEM REQUIREMENTS
Computer system: IBM /370-115
   Minimum CPU: 256 KB
     Including   for operating system IBM DOS/VS
Input device(s):

Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | S 011 11 |

ORGANIZATION
            Name: IBM European Headq. Paris
         Address: 8-10 Cite du Retiro
                  75008 Paris
                  France
INFORMATION CONTACT
        Official: P.M. Foley
       Telephone: 266 33 11
           Telex:

APPLICATION PACKAGE
            Name: PROJACS DOS/VS (Control of projects by means of
                  time/resource/money)
            Type: Decision Aid
       Programme: PL/I
   Documentation:

SYSTEM REQUIREMENTS
  Computer system: IBM /370-115
    Minimum CPU: 192KB
       Including   for operating system   IBM DOS/VS
  Input device(s):

  Output device(s):

REGISTRATION No. | S 011 12 |

ORGANIZATION
            Name: IBM European Headq. Paris
         Address: 8-10 Cite du Retiro
                  75008 Paris
                  France
INFORMATION CONTACT
        Official: P.M. Foley
       Telephone: 266 33 11
           Telex:

APPLICATION PACKAGE
            Name: IFS DOS/VS (Interactive financial accounting)

            Type: Financial Accounting
       Programme: PL/I
   Documentation:

SYSTEM REQUIREMENTS
  Computer system: IBM /370-115
    Minimum CPU: 192KB
       Including   for operating system   IBM DOS/VS
  Input device(s):

  Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | S 011 13 |

ORGANIZATION
Name: IBM European Headq. Paris
Address: 8-10 Cite du Retiro
75008 Paris
France
INFORMATION CONTACT
Official: P.M. Foley
Telephone: 266 33 11
Telex:

APPLICATION PACKAGE
Name: INTERPERS (Personnel administration and management
activities)
Type: Personnel Administration
Programme: PL/I
Documentation:

SYSTEM REQUIREMENTS
Computer system: IBM /370-115
Minimum CPU: 256KB
Including   for operating system   IBM DOS/VS
Input device(s):

Output device(s):

REGISTRATION No. | S 011 14 |

ORGANIZATION
Name: IBM European Headq. Paris
Address: 8-10 Cite du Retiro
75008 Paris
France
INFORMATION CONTACT
Official: P.M. Foley
Telephone: 266 33 11
Telex:

APPLICATION PACKAGE
Name: CAPOSS/E (Capacity planning and production control -
manufacturing activities)
Type: Production Control
Programme:
Documentation:

SYSTEM REQUIREMENTS
Computer system: IBM /370-115
Minimum CPU: 256KB
Including   for operating system   IBM DOS/VS
Input device(s):

Output device(s):

APPLICATION DATA SHEET

REGISTRATION No. | S 011 15 |

ORGANIZATION
         Name: **IBM** European Headq. Paris
      Address: 8-10 Cite du Retiro
               75008 Paris
               France
INFORMATION CONTACT
      Official: P.M. Foley
     Telephone: 266 33 11
         Telex:

APPLICATION PACKAGE
         Name: ON-LINE ROUTING (Line-lead-time, product cost, payroll,
               capacity, materials on the base of routing documents functions)
         Type: Production Control
    Programme: PL/I
Documentation:

SYSTEM REQUIREMENTS
  Computer system: **IBM** /370-115
     Minimum CPU: **256KB**
       Including   for operating system   **IBM DOS/VS**
  Input device(s):

  Output device(s):

REGISTRATION No. | S 016 01 |

ORGANIZATION
         Name: SCS Scientific Control Systems **GMBH**
      Address: Oehleckerring 40
               2000 Hamburg 62
               W. Germany
INFORMATION CONTACT
      Official: Horst Schupferling
     Telephone: (040) 5314011
         Telex: 2174113

APPLICATION PACKAGE
         Name: **MINI LP**

         Type: Decision Aid
    Programme: **FORTRAN**
Documentation: **English, German**

SYSTEM REQUIREMENTS
  Computer system: **DEC** PDP 11
     Minimum CPU: **64KB**
       Including **16KB** for operating system   **DEC PDP11 RSX 11 M**
  Input device(s): **Card Reader, Screen Terminal (I/O)**

  Output device(s): **Line Printer**

APPLICATION DATA SHEET

REGISTRATION No. | S 016. 02 |

ORGANIZATION
            Name: SCS Scientific Control Systems GMBH
         Address: Oehleckerring 40
                  2000 Hamburg 62
                  W. Germany

INFORMATION CONTACT
        Official: Horst Schupferling
       Telephone: (040) 5314011
           Telex: 2174113

APPLICATION PACKAGE
            Name: KATER

            Type: Decision Aid
       Programme: FORTRAN
   Documentation: English,German

SYSTEM REQUIREMENTS
   Computer system: DIGITAL EQU.
      Minimum CPU: 32KW
        Including 16KW   for operating system   DEC - Operating Syst.
   Input device(s): Card Reader, Screen Terminal (I/O)

   Output device(s): Line Printer

REGISTRATION No. | S 017 01 |

ORGANIZATION
            Name: Fujitsu Ltd.
         Address: 6-1 Marunouchi 2-Chome, Chiyoda-Ku
                  Tokyo
                  Japan

INFORMATION CONTACT
        Official: S. Inoko
       Telephone: (03) 216-3211
           Telex: J22833

APPLICATION PACKAGE
            Name: Analogue Data Package

            Type: Data Collection
       Programme: FORTRAN
   Documentation: Japanese

SYSTEM REQUIREMENTS
   Computer system: Fujitsu PFU-100
      Minimum CPU: 32KB
        Including   for operating system UMOS/D
   Input device(s): Keyboard or Console, Papertape Punch

   Output device(s): Magnetic Tape Device, Disk Device

APPLICATION DATA SHEET

REGISTRATION No. | S 018 01 |

ORGANIZATION
              Name: Mitsubishi Electric Corporation
           Address: 2-3 Marunouchi 2-Chome, Chiyoda-Ku
                    Tokyo
                    Japan
INFORMATION CONTACT
          Official: K. Fukuda
         Telephone: (03) 218-2111
             Telex: J24532

APPLICATION PACKAGE
              Name: Sales Analysis

              Type: Decision Aid
         Programme: COBOL
     Documentation: English, Japanese

SYSTEM REQUIREMENTS
   Computer system: Mitsubishi Melcom-80/31
       Minimum CPU: 32 KB
         Including 11 KB for operating system AOS
   Input device(s): Magnetic character reader, Floppy Disk, Workbench terminal,
                    Compact Cassette, Magnetic-tape-device.
  Output device(s): Line Printer, Magnetic-tape-device.

REGISTRATION No. | 3 019 01 |

ORGANIZATION
              Name: Nippon Electric Co. Ltd.
           Address: 33-1 Shiba 5-Chome, Minato-Ku
                    Tokyo
                    Japan
INFORMATION CONTACT
          Official: K. Kagiyama
         Telephone: (03) 454-1111
             Telex: J22686

APPLICATION PACKAGE
              Name: APLIKA Sales Management System

              Type: Management Information
         Programme: COBOL
     Documentation: English

SYSTEM REQUIREMENTS
   Computer system: NEC - S/100
       Minimum CPU: 64KB
         Including 11KB for operating system OS-4
   Input device(s): Floppy disk, Card reader

  Output device(s): Papertape reader, Serial (typing), Line printer.

APPLICATION DATA SHEET

REGISTRATION No. | S 021 01 |

ORGANIZATION
            Name: OKI Electric Industry Co. Ltd.
         Address: 1-7-12, Toranomon, Minato-Ku
                  Tokyo
                  Japan
INFORMATION CONTACT
        Official: H. Yasuda
       Telephone: (03) 454-2111
           Telex: J22627

APPLICATION PACKAGE
            Name: OKI Business Management

            Type: Financial Control
       Programme: COBOL
   Documentation: English, Japanese

SYSTEM REQUIREMENTS
 Computer system: OKI OKITAC-9
     Minimum CPU: 64KB
       Including 32KB   for operating system   BOS/F
  Input device(s): Workbench terminal, Floppy disk, Disk-device

 Output device(s): Spec.printer, Line printer.

REGISTRATION No. | S 023 01 |

ORGANIZATION
            Name: SZAMKI Research Institute for Applied Computer Sciences
         Address: P.O. Box 227
                  1536 Budapest
                  Hungary
INFORMATION CONTACT
        Official: Istvan Siklaky
       Telephone: 882-130
           Telex: 22-5144

APPLICATION PACKAGE
            Name: Managers Modules System (MIS are built from a dozen common
                  modules such as up-date, sort merge, etc.)
            Type: Management Information
       Programme: APL
   Documentation: English, Hungarian, Russian

SYSTEM REQUIREMENTS
 Computer system: SZAMKI R-10/12
     Minimum CPU: 48KB
       Including 12KB for operating system MRSE
  Input device(s): Card reader, Magnetic-tape-device, Screen terminal (I/O)
                  Papertape reader
 Output device(s): Line printer, Magnetic-tape-device, Screen terminal (I/O)

APPLICATION DATA SHEET

REGISTRATION No. | S 027 01 |

ORGANIZATION
                Name: SEMS
             Address: 36-38 Rue de la Princesse
                      BP4-78430 Louveciennes
                      France
INFORMATION CONTACT
             Official: P. Talin
            Telephone: 958-39-50
                Telex: 695272

APPLICATION PACKAGE
                 Name: MUTEX (Real-time data management)

                 Type: Data Base
            Programme: PL/I, FORTRAN
        Documentation: French

SYSTEM REQUIREMENTS
     Computer system: SEMS SOLAR-16/40
         Minimum CPU: 96KB
           Including 40KB   for operating system SOLAR RTES/D
      Input device(s): Card reader, Screen terminal (I/O), Workbench terminal

     Output device(s): Line printer, Display screen, Magnetic-tape-device,
                       Disk-device

REGISTRATION No. | S 027 02 |

ORGANIZATION
                Name: SEMS
             Address: 36-38 Rue de la Princesse
                      BP4-78430 Louveciennes
                      France
INFORMATION CONTACT
             Official: P. Talin
            Telephone: 958-39-50
                Telex: 695-272

APPLICATION PACKAGE
                 Name: TRIBU (Real-time data management)

                 Type: Data Base
            Programme: COBOL, FORTRAN
        Documentation: French

SYSTEM REQUIREMENTS
     Computer system: SEMS MITRA-15
         Minimum CPU: 64KB
           Including 40KB   for operating system MITRA MULTITASKING
      Input device(s): Screen terminal (I/O), Card reader, Magnetic-tape-device

     Output device(s): Magnetic-tape-device, Disk-device, Line Printer

APPLICATION DATA SHEET

REGISTRATION No. S 029.01

ORGANIZATION
                    Name: DCM Data Product
                  Address: New Delhi
                            India

INFORMATION CONTACT
                 Official:
                Telephone:
                    Telex:

APPLICATION PACKAGE
                     Name: Financial Accounting

                     Type: Financial Control
                Programme: BASIC
            Documentation: English

SYSTEM REQUIREMENTS
         Computer system: SPECTRUM/7
            Minimum CPU: 36KB
              Including   20KB for operating system
         Input device(s):   Floppy disk, Keyboard or Console

        Output device(s):   Floppy disk, Display Screen

Data Sheet for Entering Additional User Applications

UNITED NATIONS � NATIONS UNIES

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

DATA PROCESSING

G U E S T I O N N A I R E

FOR USERS OF INDUSTRIAL SOFTWARE PACKAGES

ACQUIRING ORGANIZATION / USER

1

NAME					
STREET			ZIP	CITY	
FEDERAL STATE	COUNTRY		TEL. AREA	TELEPHONE	TELEX
DATE	NAME & SIGNATURE OF OFFICIAL				

GENERAL PACKAGE DESCRIPTION

2

NAME OF PACKAGE
PURPOSE
DESCRIPTION

LANGUAGE(S) OF DOCUMENT.	a		b	c	d	e	f	g	h
YEAR FIRST OPERAT.	YEAR(S) REVISED		b	c		d	e	LAST RELEASE / DESIGNATION	

INSTALLATIONS → (COUNTRY/N° USER)	COUNTRY	N°							

MANUFACTURER / OWNER

3

NAME					
STREET			ZIP	CITY	
FEDERAL STATE	COUNTRY		TEL. AREA	TELEPHONE	TELEX

PRICES

4

	PURCHASE		LEASE		CURRENCY
SOFTWARE LOCAL CURR. →	PURCHASE		LEASE		CURRENCY
HARDWARE LOCAL CURR. →	PURCHASE		LEASE		VAL. DATE
TOTAL LOCAL CURR. →	PURCHASE			LEASE	
US $ TOTAL	PURCHASE			LEASE	

GENERAL _____

PROGRAMMING LANGUAGES →	a	b	c	d	e	

5

RUN-MODE: BATCH ◯ REMOTE BATCH ◯ INTER-ACTIVE ◯ REAL TIME ◯

PACKAGE MUST COMMUNICATE → WITH OTHER P.	a	b

PACKAGE CAN COMMUNICATE → WITH OTHER P.	a	b	c

ACTUAL CONFIGURATION

6

COMPUTER	SERIES	MODEL	CPU-STORAGE IN KB ◯ KW ◯	OPERATING SYSTEM

SOFTWARE AID		STORAGE	HW ____	TOTAL STORAGE REQ.	

INPUT-DEVICES →	a	b	c	d	e

OUTPUT-DEVICES →	a	b	c	d	e

MAINTENANCE AND SUPPORT

7

MAINTENANCE OFFERED BY: NO ◯ YES ◯   MANUF. ◯   DISTRIB. /SUPPL. ◯   SERVICE-BUREAU ◯

CONDITIONS

TECHN. SUPPORT BY: NO ◯ YES ◯   MANUF. ◯   DISTRIB. /SUPPL. ◯   SERVICE-BUREAU ◯

CONDITIONS

USER-TRAINING BY: NO ◯ YES ◯   MANUF. ◯   DISTRIB. /SUPPL. ◯   SERVICE-BUREAU ◯

CONDITIONS

COMMENTS:

EXPLANATIONS TO THE QUESTIONNAIRE

0.   INTRODUCTION

Please read these explanations carefully before filling in the questionnaire!
Thank you!

-   Use one questionnaire for one package only.

-   Follow these explanations from top to bottom (top-down), please.

-   The questionnaire has been designed to be filled in by typewriter.
    Please make sure not to exceed the fields provided for your answers
    and do not fill in shaded fields.

-   The questionnaire is devided into numbered sections ('1', '2', ...)
    to build logical units which are discussed below.

1.   ANSWERING ORGANIZATION (END-USER)

Please enter name and address of your organization (firm) as indicated by
the field-headings; 'ZIP' means the ZIP-code (postal code) of the city of
your location and 'TEL. AREA' means the area-code of your telephone-number.

2.   GENERAL PACKAGE DESCRIPTION

Please enter the exact name of the software package you are using, the pur-
pose and a brief description of the package itself as indicated by the field-
headings.

Please enter also the language (or languages), in which the documentation of
your package is written, into field 'a' ('b', 'c', ...) at the right of the
heading: 'LANGUAGES OF DOCUMENT.'.

Enter the year of first installation of the package into field 'YEAR FIRST
OPERAT.' and the year(s) of installing new versions or major changes into
'YEAR(S) REVISED' and the fields 'b', 'c', ... following at the right.

Please write the name (number) of the last release or designation of the
package into the proper field at the right of 'YEAR(S) REVISED / e'.

3.   MANUFACTURER / OWNER

Please fill in name and address of manufacturer and/or owner of the package,
from whom you bought it, in the same way as you did with your own name and
address.

4.   PRICES

Filling in the 'PRICES'-section depends on if you bought or leased software
(package) and/or hardware.

Please enter the prices of purchase or lease of both software (package) and
hardware into the proper fields as indicated by the field-headings. Enter
also currency of the above prices and into field 'VAL. DATE' the date of
invoice, please.

5. GENERAL TECHNICAL INFORMATION

Please enter the programming language (programming languages) into field 'a'
('b', 'c', ...) at the right of the heading 'PROGRAMMING LANGUAGE(S)'.

Cross out the proper field under the heading 'RUN-MODE', please, indicating
if the package runs in BATCH-mode or INTERACTIVE-mode etc. or any combination.

If the package must communicate with other programs or packages (except
operating-systems) enter their names into fields 'a', 'b', 'c' at the right
of the heading 'PACKAGE MUST COMMUNICATE WITH OTHER P.'. Do the same next
line, if the package can, but does not necessarily, communicate with others.

6. SAMPLE / ACTUAL CONFIGURATION

Please enter your actual configuration as indicated by the field-headings.
Enter the amount of CPU-storage in KB or KW resp. and mark the proper
field to indicate k-bytes or k-words. Name the operating-system you use as
well as software-aid-system, if you use any, and place their storage-re-
quirement into the fields 'OP.SYST.STORAGE' and 'SOFTW.STORAGE' resp.

Enter the types of input-devices and output-devices into fields 'a', 'b', ...
at the right of the headings 'INPUT DEVICES' and 'OUTPUT DEVICES' resp.

7. MAINTENANCE AND SUPPORT

Please mark the proper fields for either

-       'MAINTENANCE OFFERED / NO - YES' or
-       'TECHNICAL SUPPORT / NO - YES' or
-       'USER-TRAINING / NO - YES'

and by whom, if offered, maintenance / technical support / user training
are given, where 'MANUF.' means: by the manufacturer himself, 'DISTRIB./
SUPPL.' means: by the sales agent, where you bought the package from and
which is not the manufacturer, 'SERVICE-BUREAU' means: any firm, which is
neither manufacturer nor the sales agent.

Please enter remarks also about the conditions, under which maintenance /
technical support / user-training is given.

Thank you very much for filling in the questionnaire!

ANNEX IV.   Sources of Additional Information

    This Annex presents a list of directories, books, technical reports
and periodicals to which different levels of readers can refer. Detailed
information on available software, hardware and peripherals are found in
the listed Directories. The selected books listed here are not for
advanced engineers and programmers, but for non-EDP officials and managers
who seek basic knowledge about computer systems, software engineering, etc.
Some leading technical periodicals are also listed, which enable more
advanced specialists to stay abreast of the development of computer
hardware and software. Lastly, selected technical reports and papers
from international conferences are presented.

1.   **DIRECTORIES**

    (a) DATAPRO Report on Minicomputers
        Vol. I, II (annual)
        McGraw Hill
        New York

Comprehensive minicomputer
guidebook which can be used
in the following ways:

1. As a selection tool to
   acquire products or services

2. As a current awareness vehicle
   to keep abreast of continuing
   developments

3. As a planning guide in
   designing future systems

4. As a means of checking and
   comparing hardware prices and
   specifications

    (b) On Line Terminal Guide and Directory
        1979-1980 (Second Edition)

        Jenny Chase Pemberton
        Shirley A. McAllister
        Online, Inc.
        II Tannery Lane,
        Weston, CT 06883 USA

Directory of computer terminal
sales and services offices on a
global scale, together with
comprehensive guide to choosing
a terminal for online interactive
use. Includes over 3000 listings
of terminal manufacturers' and third
party vendors' sales and service
locations

(c) The CUYB Directory   Gives a very good overview of
     of Software   many software product
                                 descriptions.

     (The Computer Users'
     Year Book)
     18 Queens Road
     Brighton
     Sussex BNI 3XA

(d) Small Scale Systems   Intended to acquaint readers
     Computer Source Book 1978   with the rapidly growing market
                                 place for available computer
     The Rococo Press Limited   products (no attempt has been
     97, Dumont Ave.   made to compile an all-embracing
     Point Clear St., Osyth, Essex   catalogue of small computer
     England   systems) and to give a selection
                                 of systems that are within the
                                 reach of small business users.

(e) Continuing Progress of   Introduction of available
     Computerization in Japan   Japanese software and hard-
     (annually published)   ware, together with description
                                 of the actual applications.
     Centre of the International
     Co-operative for Computerization
     Kikaishinko-Kaikan Rm 313
     5-8 Shibakoen 3-Chome
     Minato-ku
     Tokyo

2. BOOKS
    (a) Programme Flowcharting for Business   An introductory text for those
         Data Processing (1978)   wishing to enter the field of
                              .   programming and those taking
         Barry J. Passen   programming courses. (Appropriate
         John Wiley and Sons, Inc.   for non-EDP managers who wish
         Santa Barbara   to gain an overall picture of
         U S A   programming for business data
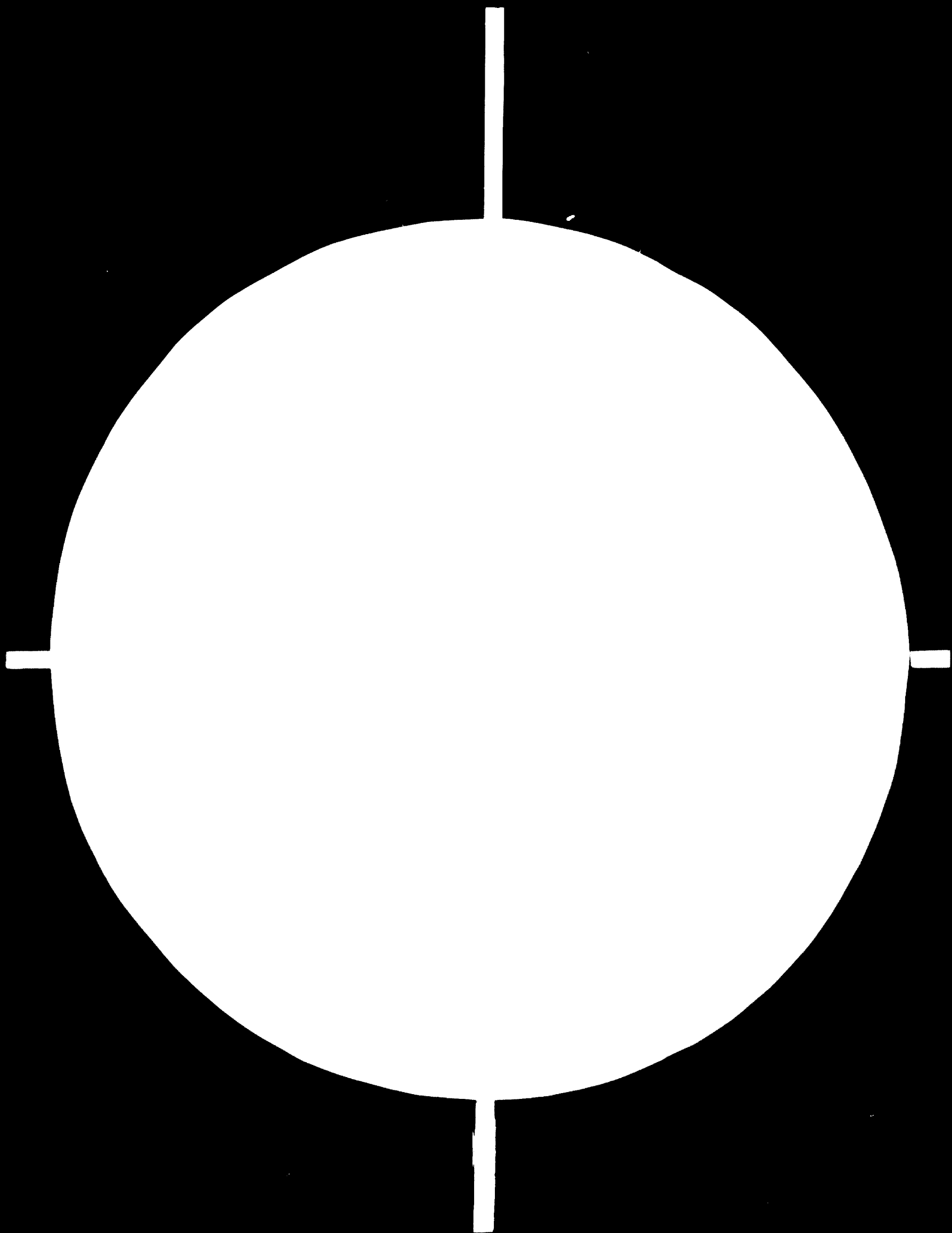   processing).

    (b) Data Processing with Applications   An introductory text which
         Robert J. Condon (1978)   covers (1) What the Computer
         Reston Publishing Company, Inc.   Does; (2) Processing Data;
         Reston, Virginia 22090   (3) Programming; (4) Computer
         U S A   Applications.

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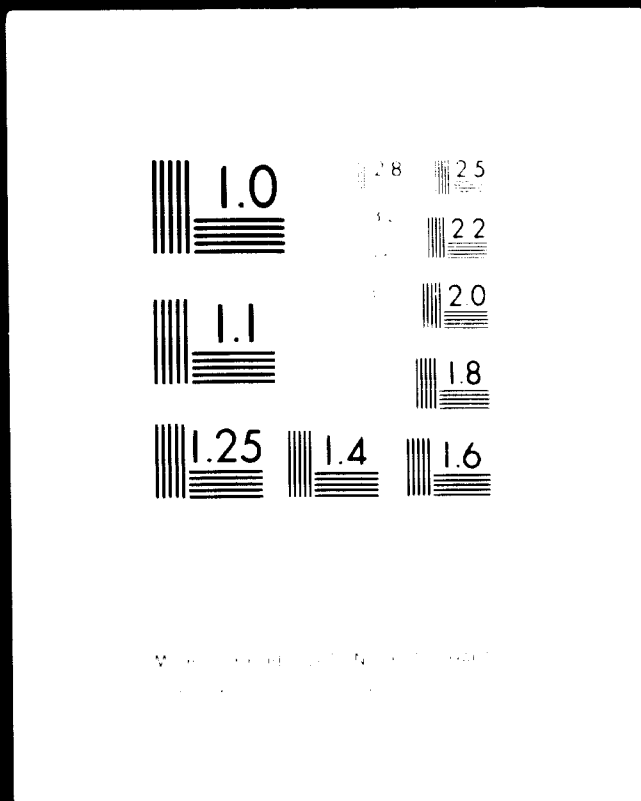1.25   1.4   1.6

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(c) The Architecture of Small Computer Systems
Arthur G. Lippiatt (1978)
Prentice Hall International Inc.
London
England

An introductory text for engineers who have nothing to do with computers excepting perhaps as a tool in the design process. In its appendix, the specific characteristics of small computers such as NOVA, PDP 11, M 6800 are described.

(d) Minicomputer Systems
Infotech International Ltd. (1977)
Nicholson House, Maidenhead
Berkshire
England

Consists of two volumes:
(1) Analysis and Bibliography
(2) Invited Papers. The first volume covers various issues such as (a) minicomputer concepts and characteristics, (b) evolving minicomputer architecture, (c) minicomputer software, (d) microprocesses and microcomputer systems, etc. The volume II presents papers written by outstanding professors covering the above fields.
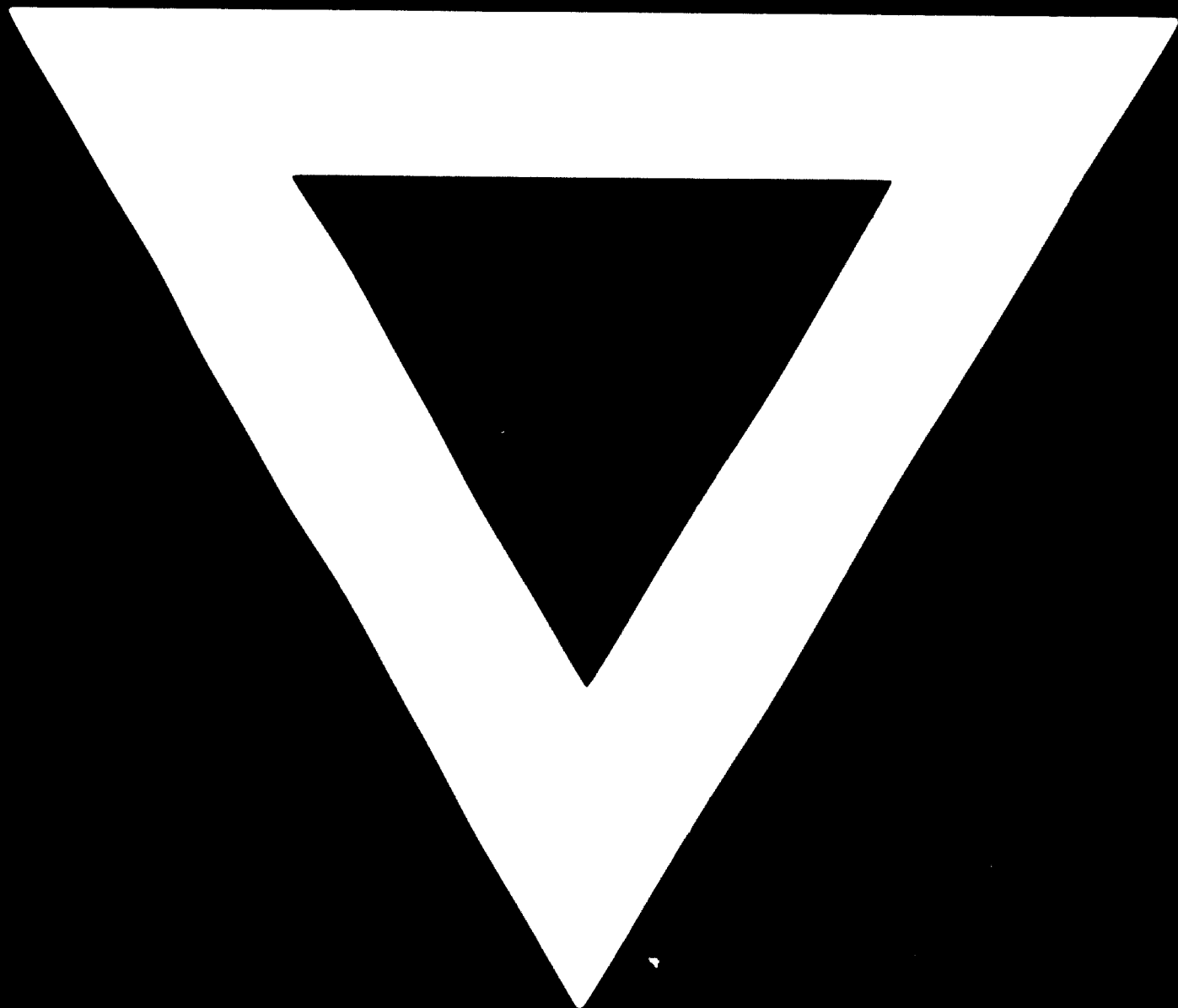
3. **PERIODICALS**

(a) Datamation
Technical Publishing Company
Illinois, U S A

Emphasis on Computer Software

(b) Electronics
McGraw Hill
1211 Ave of the Americas,
N. Y. City, 10020

Hardware technology oriented magazine

(c) Digital Design
Penwill Publishing Corp.
Brooklyn, Mass. 02146, U S A

(d) Computer Products
Computer Products International
P. O. Box 147
40 Bowling Green Lane, London
EC1B1QQ, England

Introduction of new products in the market of both software and hardware

4.   TECHNICAL REPORTS AND CONFERENCE PAPERS

(a)   Proceedings of the International
Conference on Computer Applications
in Developing Countries (1977)
Volume I, II
Asian Institute of Technology
Bangkok
Thailand

The compilation of technical
papers for the Conference
describes a wide range of
computer applications in
developing countries and pin-
points the opportunities and
problems in each application.
Overall problem areas such as
software engineering and non-EDP
manager training are also
presented; "Experiences in
Introducing EDP in a non-EDP
Environment": "Why software
Engineering is important to
Developing Countries".

(b)   Minicomputer Systems to Manage
Industries
UNIDO publication IOD.91, 1977

General introduction of mini-
computers, managerial appli-
cations in developing countries;
present trend of minis and
problems and opportunities of
its applications in industrial
management.

(c)   Application of Small Scale
Computers in Industrial Management
UNIDO publication ID/WG.288/2, 1978

The technical paper for the
Consultation Panel on the Use
of Minicomputers. Emphasis on
problem areas of managerial
application of small scale
computers and UNIDO's co-operation
programme.

(d)   Commercial and Business Applications
for the TPA Minicomputer Family
A. Szabo
KFKI
Budapest, Hungary

Presented to the consultation
panel (please see (f) below).

(e)   The Managerial and Organizational
Consequences of Small Scale
Computer Systems, G. Fick, Editor
IIASA
Laxenburg, Austria, 1979

Proceedings of an international
seminar held in September 1978.

(f)   Report of the Consultation Panel
on the Use of Minicomputers to
Manage Industries,
4 - 8 December 1978, Budapest,
Hungary

Summarizes experience of a
number of developing countries
as discussed at the meeting.

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