IBM SERIES 1 IN EUROPE

INPUT

ABOUT INPUT

INPUT provides planning information, analysis and recommendations to companies in the information processing industries. Through market research, technology forecasting and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications and office products and services

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff analyse and interpret the research data, then develop recommendations and innovate ideas to meet clients'needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Professional staff have, on average, nearly 20 years experience in the information processing industry. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international consulting firm. Clients include over 100 of the world's largest and most technically advanced companies.

OFFICES

EUROPE

XE78
SER

Multiclient

AUTHOR
IBM Series 1 in Europe
TITLE

EMPIRE HOI   Road
414, CHISI   94025
LONDON W4
TEL : (01   -34-22
TLX : 896

PGP Siste   est-1
36 Via So   J 07662
20127 Mil   -94-71
(Italy)
Tel : (02

CPMI S.A.   ervice Company Ltd
75, rue d   ing, No 12-7
1420 Brai   Kita-Aoyama
(Belgium)   -Ku
Tel · (02

     70-90

     a

     et PO Box 110
     72
Tel : (02) 498-81-99

E R R A T A

The graphs on pages 18,108,117 and 121 should read:

```
       LEGEND:

       - - - -        ORDERS

       -·-·-·-        INSTALLED

       .......        SHIPMENTS
```

IBM SERIES/1
IN WESTERN EUROPE

USER ATTITUDES, PERIPHERAL/SOFTWARE
OPPORTUNITIES, PRODUCT PLAN
AND COMPETITIVE IMPACT

NOVEMBER 1978

THE IBM SERIES/1 IN WESTERN EUROPE

USER ATTITUDES, PLUG-COMPATIBLE OPPORTUNITIES
PRODUCT DEVELOPMENT & COMPETITIVE IMPACT

TABLE OF CONTENTS

INPUT

INPUT

INPUT

INPUT

I. INTRODUCTION

I. INTRODUCTION

- In July and August 1977, INPUT (US) conducted 56 on-site and telephone interviews with IBM Series/1 users, systems houses, hardware integrators, plug-compatible peripherals and add-on memory suppliers, minicomputer manufacturers and IBM marketing/ sales personnel.

- At that time IBM Series/1 installations were just getting under-way, the installed base was small (200 externally installed systems) and little was known by the EDP vendor community as to the degree of success of the Series/1, how it was being installed, by whom, in competition with which systems, which market targets were being focussed on, which targets were being hit etc etc.

- Despite wide-spread lack of concern by the major minicomputer competitors, the report clearly indentified the degree to which they were being impacted and the steps to be taken in avoiding the loss of growth potential.

- The degree to which IBM was relying on OEM sales support was also evidenced : 80% of the IBM Series/1 backlog of 5,000 systems came, at the time, from OEMs. This was in direct contrast to general expectation and to IBM's own market plan.

- 1 -

A. STUDY SCOPE AND METHODOLOGY

- In July 1978, with shipments underway since February in Western Europe, INPUT EUROPE initiated the present study of the Series/1 in the UK, West-Germany, France and Italy. The interview schedule is shown in Exhibit I-1. With respect to the targeted interviews, there was an abundance of · talkative users, systems houses, plug-compatible peripheral suppliers and competitors in most countries, France being the exception.

- This study does not attempt to exhaustively examine competitive comparisons since these are (i) freely available elsewhere (ii) best appreciated by internal analysis done by each vendor in his own market environment. Instead, the report concentrates on understanding the market role of the Series/1, the reasons underlying its success, the problems met by IBM in bringing it to market, the users' reactions and the likely profile of the Series/1's penetration and impact on the mini-computer and small business markets.

- With cross references from user sites of the outside software houses used and from these software houses of the users they serve, a list of the IBM Series/1 commercial activity in each country was quickly built up. These were then interviewed by telephone, based on the questionnaire in Appendix 2. The hardware competitors and software/systems houses were inter-viewed by on-site visits and telephone, using the combined questionnaire in Appendix 3.

- A sample list of the companies interviewed is given in Appendix 4. The price lists are given in Appendices 5-8. The exchange rates used in the report are shown in Appendix 1.

- 2 -

INPUT

INTERVIEW SAMPLE BY TYPE OF INTERVIEWEE

TYPE	DESCRIPTION	UK	F	WG	IT	TOTAL
USER A	Purchased Series/1 from IBM for in-house use	10	9	14	14	
USER B	Purchased Series/1 from IBM for service to others	5	1	3	4	60
System House	Provides Series/1 software or turnkey systems to users	10	1	2	3	16
IBM	Marketing or Sales Representatives specialized in Series/1 sales	2	2	2	2	8
Competitor	Minicomputer manufacturers or small business/office computer suppliers who compete with the Series/1	3	2	3	4	12
Peripheral Manufacturer	Potential supplier of peripheral equipment and add-on memory to the Series/1	4	2	2	2	10
TOTAL INTERVIEW PROGRAM		34	17	26	29	106

EXHIBIT I-1

- 3 -

INPUT

- Most of this report is based on a straightforward analysis of
  the questionnaire returns, or of the more extensive interviews
  carried out with competitors and IBM. There are two areas that
  differ from this ; one concerns INPUT's evaluation of elements
  such as IBM's Business Strategy (which is not known to INPUT
  directly, but which has been pieced together from IBM salesmen
  comments, the product's packaging and trends in new announce-
  ments, and examination of how the product is being marketed);
  the other concerns forecasted activity in the Series/1 sales/
  shipments to 1983, where the methodology employed and
  assumptions made are clearly spelled out.

B. USER RESPONSES AND ATTITUDES

- On the whole users were quite responsive in providing details
  on their reasons for choosing IBM, their relative satisfaction
  with the product, the amounts spent on developing software etc.
  In Germany, however, there were some users who were concerned
  that IBM would learn of their comments(!). In France, there
  was some difficulty on obtaining lists of clients due to
  (a) the small volume installed at the time of interviewing and
  (b) the reluctance of systems houses to talk about their lack
  of business with the Series/1.

- 4 -

INPUT

C. DEVELOPMENT STATUS OF IBM's MARKETING EFFORT

- When reading this report, it must be born in mind that IBM's marketing/sales efforts have not had time to be fully organised and developed. Thus, while the present penetration of Series/1 can be analysed and conclusions drawn as to the degree of impact the product will have on competitors, and the industry sectors where the product will find targets, it must be remembered that a policy change by IBM could rapidly modify the profile of the end-user base.

- To date, IBM has organised, in each country, a central Series/1 marketing group which has pre-sale support responsability. The group consists of a product manager and 5-10 sales support personnel whose current role is a combination of direct sales and product sales support. The direct sales function will be progressively transferred to the country branches, with a corresponding increase in effective Series/1 sales pressure on the market.

INPUT

II. EXECUTIVE SUMMARY

INPUT

II.   EXECUTIVE SUMMARY

- The announcement of the IBM Series/1 in November 1976 was
  greeted in Europe with more emotional reaction than clear
  analysis. Here was IBM finally entering the lucrative
  minicomputer market to challenge the established positions
  of the market leaders.

- If such was the intention of IBM, the industry giant certainly
  went about it in a strange way : little systems or application
  software was provided, disk storage was inadequate for many
  basic requirements, but most important of all, the cardinal
  market rule of the minicomputer industry, quantity discounts,
  were not followed.

- In Europe, a further item completes this strange un-IBM
  approach to the undeniably attractive minicomputer market :
  the marketing and sales support of the Series/1 is very
  limited.

- When seen in the light of IBM's Business Strategy (see II-A),
  however, these characteristics of the product and its support
  all fall into a logical pattern.

INPUT

A. IBM's SERIES/1 BUSINESS STRATEGY

- The basic objective of the IBM's Series/1 has, as yet, little
  to do with the minicomputer market itself. The Series/1 of
  1978 is not aimed at challenging the minicomputer vendors,
  nor at penetrating new markets for IBM and is not designed
  as a means of taking IBM into the expanding minicomputer market.

- The Series/1 is, in Europe, a defensive move to protect IBM's
  traditional mainframe market (particularly the medium and
  large scale 370s) from infiltration by the competition through
  the small business system and minicomputer-based communications
  systems. There is evidence to support a growing need, at these
  sites, for distributed processing, and the IBM Series/1 is a
  good answer to this.

- In doing so, IBM has had to ensure that self-impact from
  Series/1 is minimized ; there are many product areas which
  would be in danger of losing business to the Series/1 if an
  "open market" strategy were adopted e.g. :

  - The Series/1 could easily act as a data capture
    system controller, in conflict with the 3790.

  - Given an RPG compiler, the System/3 amd system/32 and
    34 prospects would become Series/1 targets.

- The System/7 is the only IBM product so far obsoleted by the
  Series/1, <u>because IBM has so chosen</u>.

- The inescapable conclusion of this is that the commercial
  success of the IBM Series/1 is a matter of secondary importance
  to IBM. It may, through the growing number of systems houses
  and software houses supporting it (and the slow addition, by
  IBM, of additional software tools like COBOL), develop a

- 7 -

INPUT

strong market of its own ; this will be all well and good
<u>provided it meets its primary goal of defense of the IBM</u>
<u>medium and large sites</u>.

- In the light of this, it is no surprise that IBM has :

    - not yet developed the full commercial potential of
      the Series/1, through starving it of software, (both
      systems and applications)

    - not given it full-blown IBM sales support (the Series/1
      "marketing" centres in Europe have wholesaler rather
      than retailer attitudes)

    - deliberately presented a "do-it-yourself kit" image
      in the Series/1 advertising and commercial documentation

    - targeted the large 370 users with the limited Sales
      support that has been made available.

  INPUT still maintains that the role of the Series/1 is in
  commercial applications, not process control or scientific
  analysis (although these capabilities are well catered for
  in the product design and current options available).

- The high volume O.E.M. market should in theory be non-existent
  at present, because of the no-discount policy adopted by IBM.
  In practice the IBM name is adequate attraction, and single
  sales of up to 150 units have been notched up.

- Therefore, while the Series/1 will (a) filter into the market
  of the small business computer, through the activity of the
  systems/software houses, (b) be installed in typical mini-
  computer applications (process control, scientific analysis,
  network control, data entry control) (c) appear, outwardly,
  in minicomputer form (architecture, hardware options, packaging,
  lack of application software) - the essential role of the
  IBM Series/1 does not yet lie with the minicomputer market.

- 8 -

INPUT

- That the Series/1 will be having a growing impact on the
  minicomputer market is undeniable ; but if IBM so wished,
  the impact could be far greater. For this reason an evaluation
  of the likely success of the Series/1 must be based on the
  current product plus the expected strategic intentions of IBM,
  rather than a logical process of assessing the market needs
  and the competition's challenge.

- One vital issue that surfaced strongly during the survey was
  the enormous influence that IBM can wield with the managers
  of those who are making the "buy" decision. A number of
  accounts stated point blank that the reason IBM had been
  chosen was mainly political. "It saved me the trouble of
  convincing my management of the need, for a start, and also
  saved me from being put through the wringer by IBM afterwards,"
  was the comment of one user.

- This reluctance to go against the tide is having a significant
  influence in the IBM shops, and the large visible users that
  IBM has so far targeted with the Series/1. These are accounts
  where IBM is prepared to spend considerable effort in the
  hope of (a) achieving large volume sales of Series/1 (b)
  defending the installed 370s.

- As IBM moves out of these market areas into the minicomputer
  market of small businesses, these advantages will fade and
  the real minicomputer fight will be on.

- The immediate target of the IBM Series/1 in Europe, (the large
  370 mainframe installations) do not need individualized
  support. The existing client and/or IBM staff can handle the
  programming, installation and integration of the Series/1.
  In some cases, this is supplemented by systems/software houses.

- 9 -

INPUT

- The small quantity orders that are being generated from these
  sites validates another tactic adopted by IBM in the pricing
  of the Series/1 : in low quantities the product is price
  competitive ; for the larger quantity orders the IBM name
  has adequate drawing power to overcome the price difference
  with volume-discounted competitors.

- This is, however, just the beginning of the IBM Series/1's
  commercial life. While IBM has adopted a policy of caution
  and limited scope for the product in its early life, (with
  self-impact looming large in the list of preoccupations).
  the product (like all IBM products) has already begun to
  evolve along its development path with the addition of IBM
  enhancements in hardware and software. Plug-compatible
  products offered by third parties and a ballooning variety
  of system and application software aids enhance the attraction
  of the Series/1 for a growing spectrum of users.

- Meanwhile, the system houses are gradually organising and
  developing the Series/1 turnkey business, mainly in volumes
  of one to five systems, using to full advantage the attraction
  to users of IBM's name, reliability and customer engineer
  support coverage that it is equal to none.

B.   ASSESSMENT OF THE SERIES/1 IMPACT ON THE EUROPEAN
     MINICOMPUTER MARKET

- There are two distinct areas where the Series/1 is impacting
  the minicomputer business in Europe :

    - the growth of the total minicomputer market, adding
      to the impetus provided by the large community of
      existing suppliers ; this has had a limited, negative

- 10 -

INPUT

impact on the competition.

- The main minicomputer competitors to the Series/1 are unanimous in experiencing an almost total absence of competitive contact with the Series/1, uptil now. "Not a single competitive loss has been registered so far", is a frequent comment. In reality, potential sales have been lost, (see VI-B).

- The total number of installed Series/1 minicomputers at 31/8/78 was 265 (See Exhibit II-1), and estimated by INPUT to be 940 systems by year end, given the average monthly shipment rate in each country. The ship rate was derived from interviews with systems houses ;- the orders and installations are the grossed-up sum of customer and system house orders found in country interviews.

- The mix of IBM Series/1 installations is broad and differs from country to country ; Section VII discusses the main categories by country, section IV-B analyses the installations interviewed during the study.

- By the end of 1978, a variety of key aspects on the Series/1 in Europe will have been modified, not the least of which will be availability of the first third-party COBOL compilers from the US and Europe. Distribution in Europe of the S/32 source-compatible RPG-II compiler from Series One Inc., a US software house, has not yet been established, but wide availability of this could have equal impact to that of COBOL.

- By mid-1979 IBM's own COBOL compiler and Resident Library plus the Transient Library will be distributed along with other IBM hardware/software support items :

  - Programmable Communications subsystem Extended Executive Support (for Series/1 to Series/1 connection and the

- 11 -

© 1979 by INPUT EUROPE B.V., Empire House, 414 Chiswick High Rd, London W4 5TF Reproduction Prohibited

INPUT

support of IBM 2740/1, 3271/5 and teletype terminals)

- an eight disk/diskette sort/merge utility

- an IBM 370 and Series 30 channel attachment feature
  allowing the Series/1 to feed those central processors
  with data from its own storage units, or for the
  Series/1 to act as a front-end processor

- a two channel switch for I/O units shared by dual
  Series/1

- expanded diskette magazines (up to 27MB)

- new disk subsystem (58/258 MB on 1-4 drives)

- enhanced Real-Time Programming System (versions 3 & 4)

- a Structured Programme Facility (SPF) for programme
  development/modification and development aids.

- In addition, by early 1979 deliveries, in Europe, of the first
  plug-compatible peripherals from CDC, to be announced in the
  fourth quarter of 1978, will be underway.

- Therefore, while 1978 has been a quiet year for the Series/1,
  the second half of 1979 will see a swift improvement in orders,
  just as IBM's teething troubles in manufacturing and delivery
  will have been eased.

C.   USER REACTIONS IN THE MAIN MARKETS

- When viewed through the user's eyes the Series/1 takes on an
  interesting profile and one that is a complete departure from

- 12 -

IBM 's habitual product policy. The following analysis, provided by a user, is particularly relevant in this regard :

" IBM's Series/1 is public property - a collection of building blocks that allow the user to assemble the system of his choice, a processor with a flexible interface that allows all manner of non-IBM devices to be connected to it, and a hardware tool that will shortly be supporting a wide variety of user-developed, systems house-developed, IBM-developed systems and application software".

Seen this way, the Series/1 can provide a modular processing unit for the construction of a wide range of applicational needs.

- Seen from IBM's viewpoint, it can transfer the point of connection of "foreign" (i.e. non-IBM devices, particularly terminals) from the 370 mainframe to the channel of the Series/1 - a level removed from the central system.

- Across the board, the user reaction to the Series/1 was one of surprise at the lack of preparation shown by IBM before presenting the product. Comments on IBM's support ranged from "its all right, but it could be a lot better" to "I think IBM panicked in bringing this product out before it was ready, to combat the other minis".

- Most felt the price was right, and cited it often as one of the main deciding factors in the "buy" decision. All were concerned at the lack of good software and the speed with which the software that is available uses up memory. A large number of users are developing their own software and some have resorted to selling it.

- All of the users interviewed during the survey bought their Series/1 from IBM and the majority (54%) either had already developed or were in the process of developing their own systems/software in-house. Of the remainder only one half had their programming done by a Software House, and the others either received IBM assistance in developing their own systems or had them developed by IBM directly. Where this latter solution was found, IBM frequently retained the license/rights to the resultant product. The majority expect to do all future programming in-house.

- The one major concern about the system was its memory size limitation, insofar as (a) some applications, both commercial and scientific, are more easily resolved with more memory space (b) since the announcement of COBOL, users are convinced that the larger memories are a must, (c) memory occupancy by RPS is considered to be too high.

- Users satisfaction with the quality of the IBM support was low. In a rating range (of 1 = poor, 5 = outstanding) IBM scored 3.2. The actual range was wide with a small number evaluating IBM's support as poor, while an equally small number found it outstanding.

- None of the users interviewed were concerned at the lack of instruction set compatibility between the Series/1 and IBM's other products and all considered IBM to be committed to the minicomputers business.

- The degree of satisfaction with the installed systems was generally low, and often the product's evaluation was being treated with a great deal of caution. The Series/1 has not yet convinced early users.

INPUT

OUTSIDE PROGRAMMING
EXPENDITURES, BY COUNTRY, (1978)

ONE TIME
COST, SK
PER SITE

LEGEND

• AVERAGE PER SITE

•* (AVERAGE PER SYSTEM)

W. GERMANY: 54, 38.4, 16.3, *(3.7)

FRANCE: 34, 22.0, 11, *(5.0)

U.K.: 27, 15.0, *(6)

ITALY: 30, 17.5, *(5.7), 5
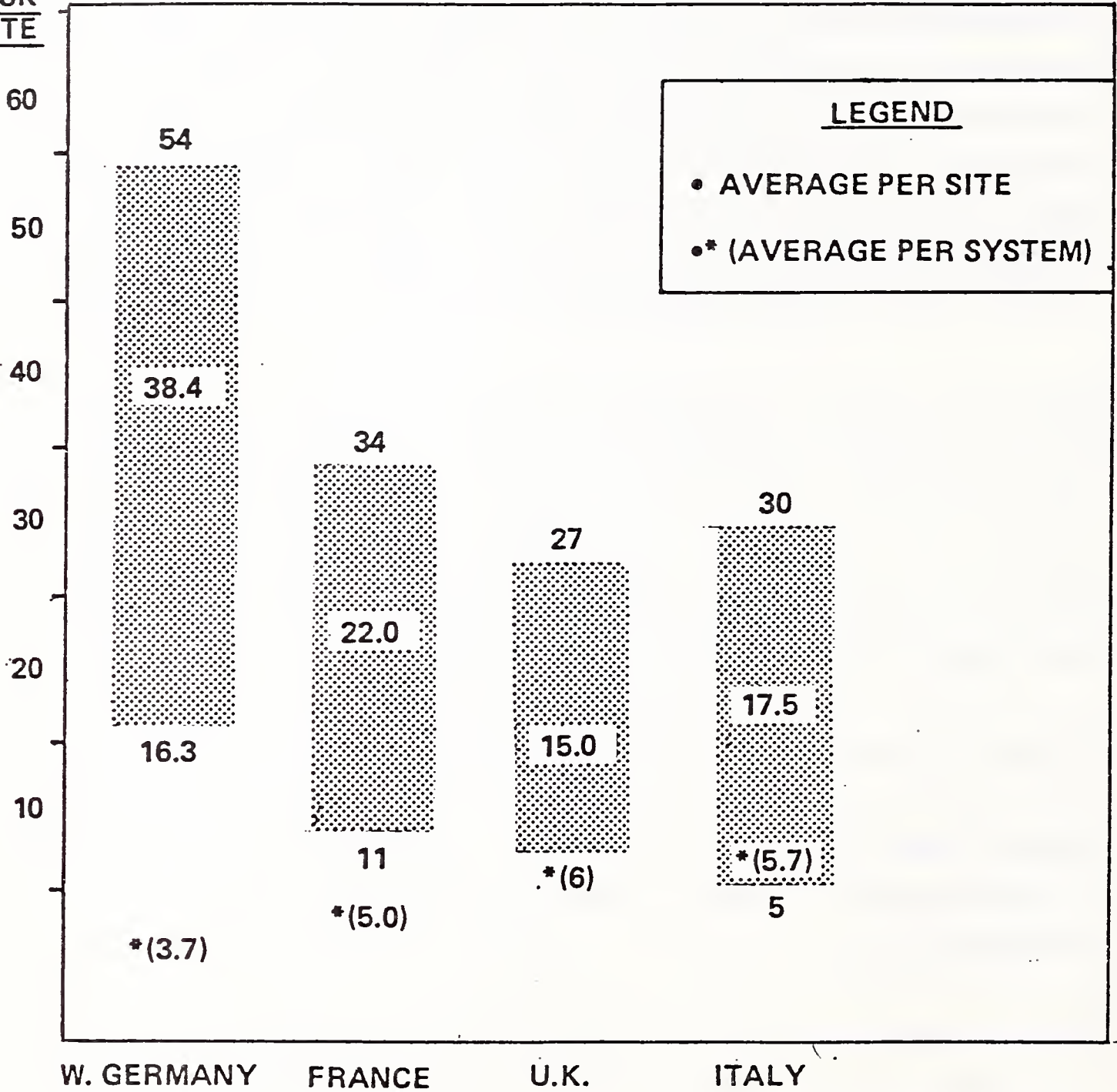
EXHIBIT II-I

INPUT

- Those users that are open to using PCM peripherals and memory intend to drive a hard bargain : the lowest price reduction targeted is 20-30% and 40-50% was often cited.

- The users are apparently looking to make up the lack of IBM quantity discount on the PCM suppliers, most of whom are eager to obtain market entry to the Series/1 and are therefore very flexible on price.

- Most users interviewed said they did not like the idea of plug-compatible memory add-ons, feeling it was "too close" to the CPU for IBM's liking.

- The maintenance of mixed-supplier configurations was considered as either :

    - the responsibility of the PCM vendor or the systems house who should support the full system

    - the responsability of the user, providing enough devices were being bought.

  Some very large users were looking at their ability to justify hiring their own maintenance staff. None thought that third party maintenance was a viable solution.

- The typical one-time programming costs spent on installations are shown in Exhibit II-1. The range of "per site" programming cost carried out by external software/system houses is largest in West Germany because of the larger installations found. Correspondingly, the per-system cost was the lowest. The United Kingdom is the lowest spender for software development, but several companies (e.g. Associated Portland Cement, Thomas Cook) have taken to not only writing their own system software, but aggressively marketing it to other sites also.

INPUT

D.   COMPETITOR ATTITUDES AND RESPONSES

- In general competitors were surprised (and relieved) to discover that the Series/1 has not proved a strong minicomputer competitor so far. This is mainly due to its limited marketing support and inadequate software. Comments found in the survey are shown in Exhibit VI-1.

- As a result of this lack of impact, there has been no attempt by competition to modify the sales approaches used hitherto. In fact most competitors have found that the advent of the Series/1 has opened up the market.

- All competitors reported bumper years in sales and were confident of exceeding next year's sales targets.

- IBM's main strengths are perceived as (i) the IBM label and (ii) the ease of installations of the Series/1 ("we bought one to look at it and we were surprised how easily it went in").

- Unanimously the lack of adequate software was found to be the main product weakness in the eyes of the competition. Most minicomputer vendors have trodden that route themselves before and can remember the installation/implementation problems caused by the lack of software.

- DEC had a particularly strong reaction to the question "what product announcements have been made in response to the Series/1 ?" :

    - "DEC's philosophy is to produce the best price/performance product in each market area ; we will not let IBM dictate changes in that policy. As and when the need is felt, we will change our products, not before".

- 17 -

ORDERS, SHIPMENTS & INSTALLED BASE FORECASTS FOR WESTERN EUROPE (1978-1983)
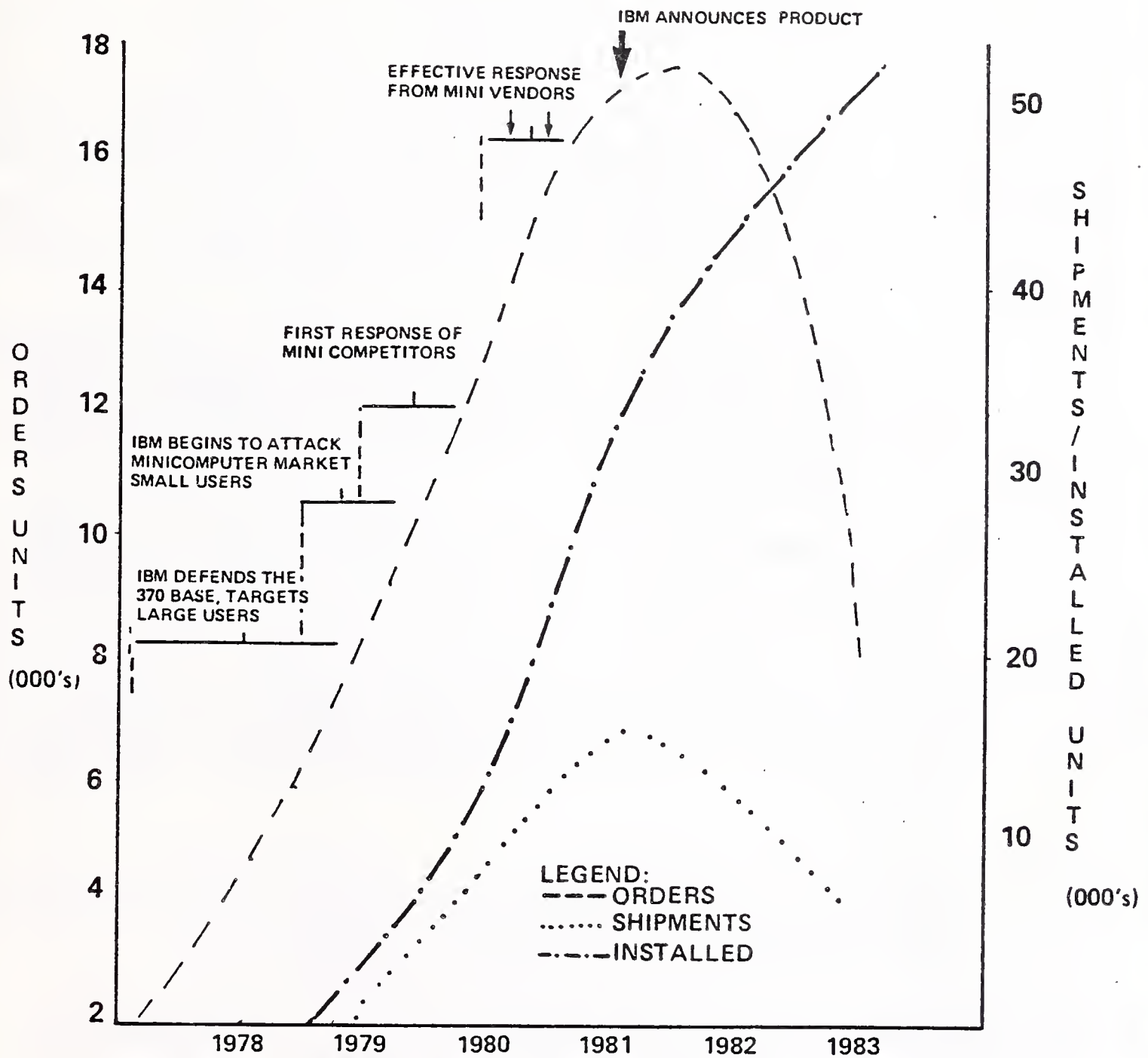
YEAR END:	1978	1979	1980	1981	1982	1983
UNITS						
INSTALLED:	940	540	16,800	36,000	49,000*	56,000*
ORDERS:	3300	7700	14000	17100	13,400	7,500
SHIPMENTS:	940	4460	11,400	19200	13,500	7,600
%						
OEM:	9	13	14	13	11	9
IBM:	91	87		87	89	91

* NET OF RETURNS

INPUT

- In assessing the potential offered by the IBM Series/1 and forecasting orders, shipments and the installed base through 1983, in each major country and in Western Europe as a whole, it was felt that this was most conveniently done on a unit system basis rather than value basis, because it is :

    - the most important unknown in establishing market potential for add-on memory/peripherals, software and systems support

    - independent of small price changes over the years (increase or decrease), whereas a dollar volume forecast is highly sensitive to these same changes

    - more easily related to establishment populations for calculations of relative penetration of each country market

    - easy to use for developing dollar volume scenarios for all aspects of the Series/1 market.

- The projections contained in Exhibit II-2 are grossed up summaries of the individual country markets examined in section VII (C,D, E and F). The methodology and assumptions used are detailed in that section.

- From shipments worth $46.3M in 1978, the Series/1 will grow to a $1,04B market by 1981, declining to a $412M market by 1983. The basic assumptions made for this forecast are that :

    - IBM will not begin to seriously impact the minicomputer market until late 1979/early 1980 (concentrating on the "370 defense" strategy until then)

- 19 -

INPUT

- initial response to this attack will be forthcoming
  from the other minicomputer vendors in mid 1980, but
  effective measures capable of overcoming the IBM name
  advantage (as opposed to the Series/1 product price/
  performance) will not be fully available before 1981

- IBM will continue to enhance the Series/1 through 1982,
  when a replacement will be available, at which time
  sales will decline rapidly (self-impact).

● Cumulative gross shipments are over 56,000 units on the six
years period, almost 88% of which are from sales by IBM. By
1981, cumulative shipments will total 36,000 (40% of shipments
in the US). This is due to (i) a year's delay in launching
the Series/1 in Europe (ii) the lack of adequate marketing
support.

● Of these shipments, the following requirements will be satisfied
by plug-compatible products in competition with IBM on shipments
from 1978 through 1981 :

- Main Memory	:	5% of requirements or $11.8M
- Disk Drives	:	15% of requirements or $75.0M
- Tape Drives	:	10% of requirements or $ 9.7M
- Line Printers	:	10% of requirements or $18.3M
- VDUs	:	20% of requirements or $50.6M

A description of the full requirements is given in Exhibit II-3.

● Plug-compatible memory is not a good market, and there is
strong reluctance by users to allow third party vendors to
provide add-in memory. The question of how this can be
maintained, therefore, didn't arise in the minds of the users
interviewed. However, when pressed on the subject most felt
this could be best handled either by the add-on memory supplier
assuming total processor support, or by the users themselves
having replacement cards available for exchange if faults occur.

- 20 -

SHIPMENTS, ALL SOURCES, UNITS AND VALUE

PERIPHERAL	1978		1981		TOTAL 1978-1981	
	UNITS	$M	UNITS	$M	UNITS	$M
MAIN MEMORY	60M Bytes	6.9	1,800M Bytes	111	2,880	236
DISK DRIVES	940	11.1	23K	320	40K	500
DISKETTE DRIVES	940	0.3	48K	156	63K	164
TAPE DRIVES	90	0.4	19K	91	20K	97
PRINTERS, CHARACTER	940	3.7	19.2K	85	36K	150
PRINTERS, LINE	90	1.6	9.9K	172	11K	183
VDUs	1390	3.3	86K	202	107K	253
SENSORS (all)	500	1.0	11.5K	32	20K	55

Note : The prices used in this chart are the US dollar prices augmented by the European averages found in Exhibit III-1 of section III.

EXHIBIT II-3

- 21 -

INPUT

- With the exception of the VDU market, the highest percentage
  of PCM Series/1 cumulative requirements over the 1978-1981
  period will be in disk drives. CDC, Datum, Shugart, Calcomp
  and Ampex are all likely suppliers of this market in Europe.
  The largest demand is for high capacity fixed disks in the
  60MB and above range. In terms of maintenance of these
  devices, where the contract is for large numbers of units
  (20+) per site, on-site maintenance is required ; for less,
  module replacement is preferred.

- The PCM tape drive market is not a large opportunity, although
  Ampex tapes (with a Datum Inc controller) are already being
  offered, and CDC is looking to announce IBM equivalents for
  a 15-20% price discount towards December 1978. No clear
  pattern for maintenance was found.

- The PCM Line printer market is the third largest of the Series/1
  opportunities. CDC will be offering a faster line printer
  (720 lpm) than IBM, with the intention of swapping it out when
  serious maintenance problems occur.

- The same maintenance approach (swap) is preferred with the
  PCM VDU market, numerically the best unit market opportunity
  on the Series/1. Successes have already been achieved in
  Europe by Hazeltine and Tally.

- 22 -

III.   S E R I E S / 1   B A C K G R O U N D

A N D   D E V E L O P M E N T S

INPUT

III. SERIES/1 BACKGROUND AND DEVELOPMENTS

A. CURRENT IBM SERIES/1 HARDWARE AND SOFTWARE

- When INPUT published the IBM Series/1 multiclient study in September 1977, the current Series/1 continuing hardware and software enhancements were projected. A list of IBM current hardware and software products including the announced enhancements through June 1978 is contained in Exhibit III-1.

- The INPUT forecasts for increased main memory, increased disk storage capacity and an enhanced communications module contained in the earlier study have all occured. The communications subsystem, however, was not forecast for announcement until mid-1979.

- Hardware enhancements forecast which have not occurred are a non-impact printer, low cost tape drive, and smaller and/or larger members of the Series/1 family.

- IBM software enhancements have been impressive. From a "naked" minicomputer, the Series/1 currently has enough software available to dispel any thought that software support would be left entirely to the system houses.

- However, Series/1 has attracted many hardware and software vendors anxious to fill any gaps (temporary or otherwise) in the IBM product plan and to compete against IBM on a price/ performance basis.

- 23 -

- When surveyed a year ago, Series/1 users cited the following weaknesses of the system :

    - Lack of software.

    - Lack of peripheral devices such as magnetic tape (for backup) or a removable disk.

    - Need for disk capacity in excess of 100M bytes

All of these weaknesses have been addressed by IBM and/or competitive vendors in the last year.

- As it becomes increasingly obvious that peripherals, software, and services will account for a very high percentage of Series/1 revenues, users can be assured of a continuing stream of hardware and software enhancements.

B. ANALYSIS OF IBM's SERIES/1 STRATEGY

- Minicomputer technology (and price/performance) presents enormous potential for extending computer power to very small business enterprises and establishments. However, the distribution of data processing also has the potential for impacting IBM's entire product line from 3033s down through System/3s and the 30 series to keypunches, word processing equipment, and typewriters. The IBM management challenge is to exploit new markets with Series/1 while controlling this impact. The carefully timed announcements of Series/1 enhancements reveal IBM's strategy in this regard.

- 24 -

INPUT

- The announcement of Series/1 as a relatively "unsupported" minicomputer had numerous advantages for IBM :

  - It emphasized IBM could be price/performance competitive against minicomputer vendors.

  - It focused attention on relatively cheap IBM configurations because software and peripherals were not available (tending to obscure the real growth areas).

  - It automatically restricted the market opportunities for the IBM sales force. (This was a dual benefit - restricting self-impact and concentrating the sales effort while the marketing organisation was being developed).

  - It created a major market for system houses (which in turn solved some of IBM's initial marketing problems by assuming responsibility for selling to the small end users). In addition, this external programming resource was not available to support competitive systems. More systems programming effort (both IBM and software houses) is being applied to Series/1 than any other minicomputer in existence - this will produce both short-and long-term benefits.

- Applications emphasis on Series/1 has been directed towards market segments in which IBM has been weak.

  - The energy conservation and process control applications are ones where substantial investment had already been made (System/7 and supporting software) without the type or return IBM prefers to see. There is no question that Series/1 was prompted by lack of success with sensor based systems.

- 25 -

- The multifunction work station application is directed
  to the market created by competitive intelligent data
  entry (and RJE) systems which promise significant off-
  loading of System 370 hosts. (The General Business Group
  of IBM can develop more enthusiasm for this approach
  than the Data Processing Group).

- The intelligent terminal subsystem offers an attractive
  alternative to the IBM 3277 Display Station and its
  numerous competitors.

- The Series/1 as a communications concentrator attempts
  to strengthen IBM in an area of traditional technical
  weakness without impacting profitable portions of DPD's
  System Network Architecture. However, from an IBM
  corporate viewpoint a little in-house competition for
  SNA can only be healthy.

- Stand-alone business applications are not being
  emphasized by IBM and are still being left to system
  houses to support. (GBG would rather compete with DPG
  than impact its own product lines). This has been a
  rather successful tactic. Some reports on small business
  systems ignore Series/1 completely. Perhaps the recent
  addition of COBOL to IBM's support may change this, but
  it is obvious IBM is moving slowly on support for a
  stand-alone business environment. The reasons are obvious

- Series/1 is viewed as a distributed processing alternative to
  SNA. This alternative is being made available to smaller
  enterprises and establishments which either cannot afford SNA
  or prefer to avoid the burden of large host processing. However,
  IBM (DPG) will not abandon SNA and the internal competition
  (which IBM corporate management is encouraging) will continue
  over the next few years.

INPUT

- Actually the competition is only temporary. Series/1 is designed as the first step towards the integration of business communications, data processing, and word processing. Cheap engines are required to sell terminals, storage and problem solutions (software). The ultimate objective is office and factory automation which does not necessarily conflict with IBM's concept of large, centralised host systems.

- In fact, there is only one missing ingredient, and IBM will be able to provide a totally integrated information system. That missing ingredient is communications services which will become available through Satellite Business Systems in the early 1980s.

C.   SERIES/1 PRICING ANALYSIS BY COUNTRY

- It is not possible to determine the transfer price of the IBM Series/1 produced in Vimercate, Italy and sold to the Western European countries. However, it is possible to obtain some measure of the mark up on prices practised by IBM on the Series/1 in Europe, with respect to the United States. Assuming the transfer price to be constant, this approach also indicates the level of profitability of the product in each country.

- The method used was to relate the U.S. price for each module or product line item to the price of the same module/item in each country market examined, and to divide that monetary equivalent by the current exchange rates. (see Appendix I). This then shows not only how the mark-up varies with each aspect of the product, but also how it varies from country to country, above and beyond the profit margin already contained in the U.S. prices. (Note : This does not allow for any difference in the manufacturing cost at Vimercate as opposed

- 27 -

to the U.S.).

- The four major categories of items analysed were (i) Processor and Main Memory, (ii) Features and Peripherals (iii) Programme Products and (iv) Maintenance Charges. (See Exhibit III-1). Actual values appearing in the chart should not be accepted at face value but used as relative indicators, since the fluctuation in Europe currencies will cause some distortion.

- Analysis shows that the mark-up is highest in software, peripherals and add-on features - a clear indication of IBM's product strategy. This clearly means that while the basic configurations (small number of peripherals, no software) must be competitive, once the client is installed, the programme products and add-on peripherals and features will maximize IBM's revenue. Maintenance charges, for a sales-only product are a visible item and must be competitive with the market rate.

- On a country basis, the market price for competitive price/ performance products allows the Series/1 to be sold at different mark-up levels. Taking the average of the four countries as the norm, it is clear that the U.K. market is by far the least profitable, but undoubtedly the most competitive. West Germany on the other hand must obtain substantial profits from the Series/1, compared to the other main European markets. Coincidentally, it is also the most expensive market from the standpoint of manpower costs (sales, systems/analysts, customer engineers etc).

INPUT

PRICE VARIANCE OF THE SERIES/1
CONFIGURATIONS IN WESTERN EUROPE,
BY COUNTRY, COMPARED TO U.S.

COUNTRY	% INCREASE OVER U.S. PRICES				COUNTRY VARIANCE FROM AVERAGE
	PROCESSOR AND MEMORY	FEATURES & PERIPHERALS	PROGRAMME PRODUCTS	MMMC*	
WEST GERMANY	40%	40-58%	41-44%	30-42%	+ 19%
FRANCE	23-35%	34-43%	33-34%	30-32%	− 3%
ITALY	24%	38-39%	33-63%	20-42%	+ 1%
UNITED KINGDOM	30%	30%	30-34%	30%	− 13%
AVERAGE	30.75	39	39	32	

* MMMC = MINIMUM MONTHLY MAINTENANCE CHARGE

INPUT

EXHIBIT III-1
- 29 -

D. SERIES/1 REVENUE ANALYSIS OF TYPICAL CONFIGURATIONS

- At a country or major charge category level, certain features
  of the IBM pricing strategy are clear. For a more detailed
  analysis of the _revenue_ produced by the Series/1, it is
  necessary to examine the product from the users viewpoint.
  A good basis for this is through the series of IBM "typical"
  configurations, comparing the revenue produced by each major
  charge category over a five year period (this eliminates the
  distortion introduced by one-time charges etc).

- There is clearly no doubt about the application, by IBM to
  the Series/1, of a strategy of low cost, basic configuration
  sales, followed by a strong push for feature/peripheral sales.
  Once the account is captured, there is a low risk of his
  changing suppliers, and a high possibility of application-led
  growth of each configuration. Hence the emphasis is put on
  revenue growth from peripherals.

- In Exhibit III-2, although systems and applications costs are
  a low percentage of the revenue, it must be remembered that
  single application charges only have been included. It is not
  possible to cater for the wide variety of application mixes
  that can be found on each configuration at actual user sites.
  It is highly probable that the share of revenue produced by
  systems/applications software will be double the 9% indicated.
  This is particularly true since the application and system
  software is sold on a "single license" basis.

- IBM "typical" configurations for applications are normally at
  the extreme low end of practicality - growth is expected.

- 30 -

EXHIBIT III-2

REVENUE BREAKDOWN OF "TYPICAL" SERIES/1 CONFIGURATIONS

Application	Percent of Revenue (5 years)			
	Processor and Main Memory	Features and Peripherals*	System/Applications Programming	MMMC
Small Energy Conservation	16%	24%	29%	31%
Standalone Business (Small)	12%	43%	13%	32%
Multifunction Work Station	16%	40%	8%	36%
Intelligent Terminal	20%	38%	3%	39%
Communications Concentrator	20%	39%	-	41%
Process Control**	19%	42%	3%	36%
Average	17%	38%	9%	36%

* Including Terminals
** Excluding RPQ's

INPUT

- Processors and main memory (traditional high revenue sources for IBM) will make substantially less contribution to revenue on Series/1 than IBM has expected in the past, IBM is very aware of this.

- Maintenance (an IBM strength with end users) is exposed as a primary revenue source. In addition, the percentages are calculated based on the minimum monthly maintenance charges. Maintenance has always been a high profit service for IBM and technology will make it even more so.

- Features and peripherals were restricted in terms of both availability and capacity at the time these configurations were developed but are obviously the primary Series/1 revenue source.

- Software showed definite revenue weakness in IBM's "typical" configurations, primarily because it was not available. For example, no software was proposed for the communication concentrator, and only the Base Program Preparation Facilities were included in the stand-alone business configurations.

- Compilers were not deemed to be necessary in any of the six environments and are not included in the costs (an indication of the "minimum" configuration approach).

- Where software was available (Facility Control/Power Management) the programming contribution to revenue jumped to 20%.

- It is understood that IBM's objective is to grow the "typical" configuration in terms of revenue. Announced enhancements give some indication of how these configurations are expected to expand. For purposes of analysis the enhancements will be categorized as follows : processors and main memory, major features and subsystems, input/output, and programming.

- 32 -

- The only new Series/1 processor announced has been the 4955E which permits maximum main memory to be doubled to 256KB.

  - This means the largest Series/1 processor (including 256KB main memory) will now cost $22,400 which is an increase of 36% over the 4955D (128KB) which was previously priced at $16,465.

  - When the 4955D was announced, prices on all other processor models were lowered by approximately 8.5%. (Not applied in Exhibit III-3)

  - The Multifunction Work Station configuration in Exhibit III-2 included the 4955D processor with 128KB. If that configuration were upgraded to the 4955E with 256K, it would only result in a 5.6% increase in total revenue over the 5 year assumed life of the system, and processors would still represent only 20% of total revenue.

  - None of the other configurations had more than 64KB of main memory and the effect of IBM's announcement would be to reduce processor revenue on small configuration by 8.5%.

  - It is obvious that Series/1 growth strategy is not based on processor type/model upgrades - quite the contrary.

- One year ago, the only major features (more than $1,000) were the I/O Expansion Unit, various line controllers and adapters, and battery backup. Since then major features and subsystems have been announced.

  - The Programmable Communications Subsystem (PCS) is probably the most impressive. The total price with required and selectable features (1300-controller, 3600 expansion scanner) and console (4990) comes to $9,325.

  - A highly desirable (and significant) feature is channel to channel communications between Series/1 and System 370. The Series/1 - 370

- 33 -

© 1978 by INPUT, Menlo Park, CA 94025. Reproduction Prohibited.

Channel Attachment (1200) plus the required System 370 termination enclosure (4993) is priced at $4,800.

- The Series/1 two-channel switch (4959) connects the I/O Expansion Unit to the I/O channels of two Series/1 processors for purposes of backup. The switch costs $2,550 (the I/O Expansion Unit was most expensive feature previously available - it cost $2,515).

- These major features obviously have greater potential than processors and main memory for increasing configuration revenue, and it should be noted they are all communications oriented tying together processors with terminals and/or other processors. This is important in understanding IBM's overall strategy and will be discussed later.

- IBM major enhancements in the I/O area have been as follows:

- The IBM Series/1 4963 Disk Subsystem which can be configured to cost as much as $40,580 (nearly twice as much as the largest processor). In addition, multiple 4963 subsystems can be attached to a single processor.

- Also announced was the 4966 Diskette Magazine Unit priced at $4,705 (which is more expensive than a Model A processor with 16K bytes of storage).

- All of the typical configurations contained in the Series/1 Digest proposed minimum (perhaps inadequate) on-line disk/diskette storage and made no provision for effective backup.

- IBM has addresed the software weaknesses of Series/1 by the impressive list of programming announcements contained in Exhibit III-4.

- The Program Preparation Subsystem has had two new versions released and the price has gone from $1,104 to $1,320 in one year (20% growth).

- 34 -

- RTPS has had three new versions released and the price has gone from $1,200 to $2,250 (88% growth).

- Facilities Control/Power Management (FC/PM) was announced (and enhanced). FC/PM 1 (included in the "typical" congifiguration) is priced at $6,240. By upgrading to FC/PM 2 and adding FC/PM 2 (a feature), the price reaches $11,520 (85% growth).

- An IBM COBOL compiler was made available for $4,000 (including transient library). This compiler is more expensive than either the PL/1 or FORTRAN IV compiler (and library) which were previously available ($3,072 and $1,152 respectively). The effect of this announcement will be to enhance the market for commercial systems sales in addition to providing increased software sales.

- The Series/1 Structural Programming Facility (SPF) is priced at $5,040. This could increase the software associated with the multifunction work station application by 58%.

- In addition, numerous less costly products (e.g., Sort/Merge for $400) and enhancements (FORTRAN IV Realtime Subroutine Library Version 2 for an additional $48) were made available.

- A separate category of programming revenue is associated with hardware enhancements.

  - The Programmable Communications Subsystem has the: Preparation Facility ($500), Execution Support ($336) and the more recent Extended Execution Support ($1,150) associated with it.

  - The Series/1 System 370 channel to channel requires the Channel Attach Program which costs $1,250. This represents 26% of the hardware cost.

INPUT

- Various RPQs are available at prices ranging for $24 to $1,842. Field-developed and installed user programs are priced from $150 to $6,240. Programming has truly been unbundled, and it all adds up to additional revenue.

- As usual, programming products also require additional hardware (larger processors and more on-line storage) and advanced versions of operating systems. Thus, enhancements of both hardware and software are synergistic in prompting growth.

- There is no question that the average configuration (both installed and shipped) will grow substantially from those proposed as "typical" in the Series/1 Digest.

  - The most dramatic growth will be in programming (primarily because it was so limited previously).

  - Direct access storage will increase in both size and as a percentage of revenue.

  - Communicating features (and subsystems) will be a fast growing revenue source (as will terminals).

  - Processors and main memory will become of decreasing importance in the total revenue picture.

  - Since maintenance is indexed to hardware it will continue to represent a substantial portion of revenue over the life of the hardware (becoming equal to hardware revenue in approximately 7 years at current rates).

INPUT

EXHIBIT III-3

IBM SERIES/1 HARDWARE CATALOGUE AND

MAJOR ENHANCEMENTS (4/77 - 6/78)

Machine Type	Model Number	Description	Purchase Price	MMMC
1060		Analog Input Control	$ 800.00	$ 4.50
1065		Analog Output	525.00	5.00
1070		Amplifier-Multirange	915.00	5.00
*1200		System 370 Channel Attachment	2,175	---
*1300		Programmable Communications Subsystem Controller for Machine Types 4953, 4955, and 4959	2,835.00	27.00
1560		Integrated Digital Input/ Output Nonisolated	825.00	14.00
1565		Channel Repower	520.00	2.00
1590		Customer Access Panel	180.00	1.00
1593		Customer Access Panel-Integrated Digital Input/ Digital Output Cable	385.00	.50
1594		Customer Access Panel-Customer Direct Program Control Adapter Cable	270.00	.50

- 37 -

*Enhancements since April 1977

INPUT

1595	Channel Socket Adapter	73.00	.50
1610	Asynchronous Communications Single-Line Control	1,090.00	17.00
2000	Communications Indicator Panel	250.00	3.00
2010	Communicaitons Power	120.00	3.00
2055	Teletypewriter Cable	52.00	.50
2056	Asynchronous Local Attachment Communications Cable	47.00	.50
2057	EIA Dataset Cable	70.00	.50
2058	BSC/High Speed Cable	125.00	.50
2059	Teletypewriter Customer Access Panel Cable	40.00	.50
2060	BSC V.35/High Speed DDN Cable	122.00	.50
* 2064/65	TTY-EIA connector		
2074	BSC Single-Line Control	1,190.00	19.00
2075	BSC Single-Line Control/ High Speed	1,380.00	21.00
2090	SDLC Single-Line Control	1,420.00	19.00
2091	Asynchronous Communications 8-Line Control	975.00	13.00
2092	Asynchronous Communications 4-Line Adapter	1,005.00	30.00
2093	BSC 8-Line Control	1,215.00	13.00
2094	BSC 4-Line Adapter	1,245.00	35.00
2100	Extension Cable	135.00	.50
3525	Digital Input/Process Interrupt Nonisolated	410.00	4.00
3530	Digital Input/Process Interrupt Isolated	695.00	46.00

- 38 -

INPUT

3535	Digital Output Nonisolated	355.00	4.00
3580	4962 Disk Storage Unit Attachment	815.00	8.00
3581	4964 Diskette Unit Attachment	730.00	8.00
3585	4979 Display Station Attachment	955.00	10.00
*3600	Programmable Communications Subsystem Expansion Scanner	1,765.00	15.00
3920	Floating Point	1,190.00	11.00
4450	Forms Stand	54.00	N/A
4540	Rack Mounting Fixture	55.00	N/C
*4700	Half Duplex DCE Attachment	500.00	3.50
*4701	Full Duplex DCE Attachment	415.00	3.00
*4704	TTY Current Attachment	640.00	5.00
*4706	Data-Phone Digital Service Adapter	960.00	5.00
*4709	Asynchronous Local Attachment	525.00	2.50
*4710	Synchronous Local Attachment	545.00	3.00
*4713	Autocall Attachment	505.00	3.50
*4716	1200 bps Asynchronous Modem Switched Network	1,010.00	8.00
*4717	1200 bps Asynchronous Modem Leased Line SNBU	1,160.00	9.00
*4718	1200 bps Asynchronous Modem Leased Line	1,010.00	8.00

INPUT

*4721		1200 bps Synchronous Modem w/Clock Switched Network	1,040.00	8.00
*4722		1200 bps Synchronous Modem w/Clock Leased Line SNBU	1,190.00	9.00
*4723		1200 bps Synchronous Modem w/Clock Leased Line	1,040.00	8.00
4940		Multiplexer-Reed Relay	650.00	16.00
4950		Multiplexer-Solid State	715.00	8.50
4953	A	Processor	4,360.00	80.00
	B		5,190.00	78.00
	C		5,870.00	88.00
	D		6,700.00	88.00
4955	A	Processor	6,165.00	77.00
	B		6,165.00	77.00
	C		7,915.00	87.00
	D		7,915.00	87.00
	E	Processor, 64KB (Maximum 256KB)	11,000.00	
		64KB Storage Addition	3,800.00	
4959	A	Input/Output Expansion Unit	2,515.00	37,00
		Series/1 Two Channel Switch (including console)	2,500	
4962	1	Disk Storage Unit	6,895.00	44.00
	1F		7,760.00	60.00
	2		8,575.00	60.00
	2F		9,440.00	76.00
	3	13.96MB Disk	8,595.00	69.00
	4	13.96MB Disk Plus Diskette Unit	10,275.00	89.00
*4963	58A	Primary Disk, 58MB With 131K Fixed Head	11,420.00	
	58B	Expansion Disk, 58MB With 131K Fixed Head	9,720.00	

INPU

	64A	Primary Disk Unit, 64MB	10,700	
	64B	Expansion Disk Unit, 64MB	9,000	
4964	1	Diskette Unit	2,410.00	17.00
*4966		Diskette Magazine Unit	4,705.00	
4973	1	Line Printer	8,625.00	85.00
	2		12,425.00	158.00
4974		Printer	2,790.00	34.00
*4978		Display Station (The 4978 is an RPQ item and prices can be quoted by your IBM representative)		
4979		Display Station	1,735.00	25.00
4982		Sensor Input/Output Unit	1,655.00	11.00
*4987		Programmable Communications Sybsystem Model 1	3,975.00	41.00
*4990	1	Communications Console	745.00	2.00
*4993	1	Series/1-System 370 Termination Enclosure	2,625.00	
4997	1A	Rack Enclosure	870.00	2.00
	2A		1,160.00	5.00
	1B		1,025.00	2.00
	2B		1,315.00	5.00
4999	1	Battery Backup Unit	1,895.00	18.00
	2		1,875.00	18.00
5430		Customer Direct Program Control Adapter	660.00	11.00
5620		4974 Printer Attachment	930.00	3.50
5630		4973 Line Printer Attachment	940.00	5.00
5650		Programmer Console	460.00	6.00

5700	4973 Printer Attachment Cable Increment	13.00	N/A
5701	4973 Printer Replacement Attachment Cable Basic	82.00	N/A
5720	4974 Printer Replacement Attachment Cable Increment	13.00	N/A
5721	4974 Printer Replacement Attachment Cable Basic	82.00	N/A
5740	4979 Replacement Attachment Cable Increment	13.00	N/A
5741	4979 Replacement Attachment Cable Basic	82.00	N/A
5821	Additional Print Belt for 4973 Model 1 or 2, 48-Character EBCDIC	170.00	N/A
5822	Additional Print Belt for 4973 Model 1 or 2, 64-Character EBCDIC	170.00	N/A
5823	Additional Print Belt for 4973 Model 1 or 2, 96-Character EBCDIC	170.00	N/A
6305	4982 Sensor Input/Output Unit Attachment	650.00	11.00
6315	Storage Addition (16,384 bytes-4953 Processor)	1,510.00	10.00
6316	Storage Addition (32,768 bytes-4953 Models C and D only)	2,425.00	22.00
6325	Storage Addition (16,384 bytes-4955 Processor)	1,750.00	8.00
6326	Storage Addition (32,768 bytes-4955 Models C and D only)	2,850.00	14.00
6335	Storage Address Relocation Translator	805.00	9.00
7840	Timers	570.00	4.00
7850	Teletypewriter Adapter	560.00	11.00
*7900	Two Channel Switch		

EXHIBIT III-4

SERIES/1 SOFTWARE CATALOGUE AND

MAJOR ENHANCEMENTS (4/77 - 6/78)

Program Type	Licensed Programs	Monthly Payment	One-Time Charge
5719-PC1	Realtime Programming System Version 1	$20.00	$1,200.00
*5719-PC2	Realtime Programming System Version 2	25.00	1,500.00
*5719-PC3	Realtime Programming System Version 3	32.00	1,900.00
*5719-PC4	Realtime Programming System Version 4	38.00	2,250.00
5719-AS1	Program Preparation Subsystem Version 1	18.00	1,104.00
*5719-AS2	Program Preparation Subsystem Version 2	20.00	1,208.00
*5719-AS3	Program Preparation Subsystem Version 3	22.00	1,320.00
5719-PL1	PL/1 Compiler and Resident Library	46.00	2,784.00
5719-PL3	PL/1 Transient Library	5.00	288.00
*5719-ED1	Series/1 Structured Programming Facility (SPF)	210.00	
*5719-CR1	" " " " (370MVS/VTAM)		
*5719-CR2	" " " " (370MVS/TCAM)		
5719-FO1	FORTRAN IV Compiler and Object Support Library	14.00	864.00
*5719-FO3	FORTRAN IV Realtime Subroutine Library	5.00	288.00
*5719-FO4	FORTRAN IV Realtime Subroutine Library Version 2	6.00	336.00
5719-LM1	Mathematical and Functional Subroutine Library Version 1	7.00	408.00
*5719-LM2	Mathematical and Functional Subroutine Library Version 2	8.00	480.00

INPUT

*5719-CA1	Series/1-System 370 Channel Attach Program	21.00	1,250.00
*5719-CB1	Series/1 COBOL Compiler and Resident Library	62.00	3,700.00
*5719-CB2	Series/1 COBOL Transient Library	5.00	300.00
*5719-CS0	Programmable communications Subsystem Preparation Facility	8.00	500.00
*5719-CS1	Programmable Communications Subsystem Execution Support	6.00	336.00
*5719-CS2	Programmable Communications Subsystem Extended Execution Support	20.00	1,150.00
*5719-SM1	Series/1 SORT/MERGE	7.00	400.00
5719-PA1	Base Program Preparation Facilities	90.00	2,160.00
*5718-U11	Facility Control/Power Management 1	130.00	6,240.00
*5719-U12	Facility Control/power Management 2	188.00	9,024.00
*5719-U12	Facility Control/Power Management 3	52.00	2,496.00

Program Number	Programming RPQs	Monthly Charge	Paid-Up Cost
*5799-TAA	Control Program Support	$15.50	$372.00
5799-TAL	Control Program Support Extensions I	1.50	36.00
5799-TAQ	Control Program Support Extensions II	1.50	36.00
*5799-TBQ	Control Program Support Extended Function	3.00	72.00
5799-TAH	Indexed Access Method Control Program Support	5.00	120.00
*5799-TBD	Control Program Support Commercial Arithmetic	2.00	48.00

		Monthly Charge	Paid-Up Cost
5799-TAF	Binary Synchronous Communication Control Program Support	3.50	84.00
5799-TAE	4979 Display Station Control Program Support	1.50	36.00
5799-TAK	4978 Display Station Control Program Support	6.00	144.00
*5799-TAW	Control Program Support Disk Table of Contents	1.00	24.00
*5799-TAT	Control Program Support Sort/Merge	5.00	120.00
*5799-TAY	Control Program Support Disk Spooling	3.00	72.00
*5799-TBA	Control Program Support Format/Print	3.00	72.00
*5799-TBC	Control Program Support Auto-Call Support	5.00	120.00
*5799-TBB	Control Program Support Operator Station/Debug Package	8.00	192.00
*5799-TBE	Control Program Support 4978/4979 Display Map	4.00	96.00

Program Number	Realtime Programming System PRPQs	Monthly Charge	Paid-Up Cost
*5799-TBN	Series/1 Indexed Access Method	$ 6.00	$ 360.00
*5799-TBP	Series/1 Basic Sort	2.00	120.00
*5799-TBM	Series/1 IBM 4978 Display Support	3.00	174.00
*5799-TBL	Series/1 Disk Spooling	3.00	150.00
*5799-TBK	Series/1 Remote Job Entry	31.00	1,842.00

Program Number	Field-Developed Programs	Monthly Charge	Paid-Up Cost
*5798-NLG	Series/1 Intelligent Terminal Subsystem	$110.00	$1,320.00
*5798-NND	Series/1 Event Driven Executive Basic Supervisor and Emulator	11.00	650.00

- 45 -

INPUT

*5798-NNC	Series/1 Event Driven Executive Utilities	8.50	500.00
*5798-NNB	Series/1 Event Driven Executive Macro Library	24.00	1,425.00
*5798-NNQ	System/370 Program Preparation Facilities for Series/1	520.00	6,240.00
*5798-NNR	Series/1 Native Application Load Facility	60.00	720.00
*5798-NPY	Series/1 Intelligent Data Entry System	55.00	660.00
*5798-NPZ	Series/1 Remote Job Entry for Control Program support	25.00	330.00
*5798-NRP	EDX Program Preparation Facility		
*5798-NPR	EDX Basic supervisor and emulator V.2		
*5798-NRQ	EDX Utilities V.2.		
*5798-NRX	EDX Macrolibrary Host		

INPU

E.   IBM's UNSTABLE BACKLOG

- At this early stage in the Series/1's commercial life in Western Europe, the teething troubles of its implementation are causing concern with some of the companies who have ordered the system, to the point of cancelling their order.

- While it is not uncommon for this to occur in the introduction of products in a new market area, it is obviously not acceptable in the long run and efforts to redress the shortcomings must be made.

- During the user interviews phase several "users" were contacted who had earlier attempted to use initial deliveries of the Series/1 and who had subsequently discarded the idea. In the same vein some systems houses spoke of initially committing themselves to (for them) large orders and then rescinding, usually as a result of the lack of IBM marketing support.

- Whereas IBM may have excellent reasons for adopting the limited marketing and support approach they have so far provided, the consequences may go further than IBM anticipated. In particular, the Series/1 operation has the IBM name on it, and any lack of success of the product can have wider implications.

- There is every reason to believe, however, that IBM's programme of new hardware and software announcements for the product, already well underway, will correct many of the criticisms of the product, particularly in the areas of larger memories, larger disks and high level languages (COBOL).

- 47 -

INPUT

- Criticisms of the implementation support will also surely diminish with the growing experience of the IBM personnel on what is, after all, new ground for them. The improvement in marketing support, so crucial to the systems houses, is unlikely to change in the near future.

F. THE SERIES/1 AS AN EDUCATION TOOL

- Given that IBM is breaking new ground with the Series/1 in :

    - entering, albeit not in force, the minicomputer market,

    - offering a bare bones, do it-yourself kit product, contrary to normal policy,

    - providing next to no commercial guidelines to its sales force on where and how to sell it,

  there is speculation that IBM is using the Series/1 as a "toe in the water" - a training tool for its workforce, and a test product for a market where its know-how is not yet fully developed.

- If this is true we can expect to see rapid changes in the Series/1's strategy, in similar fashion to the rapid rate of introduction of new hardware and software already appearing. The Series/1 will then appear in hindsight as a strategic tool for educating IBM and its workforce in the user needs and competitive environment of this crucial minicomputer market.

INPUT

IV. ANALYSIS OF TODAY'S

USER POPULATION

.

INPUT

IV. ANALYSIS OF TODAY'S USER POPULATION

- The following section is primarily based on an analysis of 60 user installations in the U.K., France, West Germany and Italy, supplemented by discussions with the main competitors in each country market.

A. DISTRIBUTION OF ORDERS, SHIPMENTS IN WESTERN EUROPE IN 1978

- With shipments getting underway, (since February 1978) the ship rate of Series/1 to Western European markets is climbing rapidly. In West Germany, the strongest market to-date, INPUT estimates that the rate had reached thirty five systems by the end of August, climbing to fifty systems per month by year-end. In all, 140 systems per month were estimated to be entering Western European markets in August ; this is expected to reach 185 a month by year end, (see Exhibit IV-1).

- Despite this rapid build-up, comments from systems houses indicate that this rate is below IBM's market plan. In particular the 265 systems installed across Europe at end of August was much lower than expected. By year-end INPUT estimates that there will be slightly less than 1000 systems installed in Western Europe. (Note : In extrapolating the orders and shipments totals for West Germany, France, the U.K. and Italy to a Western Europe total, it has been assumed that the "big four" account for 80% of the total).

- 49 -

INPUT

EXHIBIT IV-I

IBM SERIES/1 1978 ORDERS, INSTALLATIONS AND SHIP RATE

WESTERN EUROPE

COUNTRY	ORDERS		INSTALLED		ESTIMATED MONTHLY SHIP RATE	
	31/8/78	Y/E	31/8/78	Y/E	31/8/78	Y/E
WEST GERMANY	650	900	60	230	35	50
FRANCE	500	700	50	190	30	40
U.K.	380	550	40	150	25	30
ITALY	300	450	50	140	20	25
ALL OTHER	420	700	65	230	30	40
TOTAL	2250	3300	265	940	140	185

INPUT

MEMORY SIZE OF SYSTEMS INSTALLED & ON ORDER

A.

INSTALLED	% BY COUNTRY				% TOTAL
	UK	W.GERMANY	FRANCE	ITALY	
32K	–	–	–	33	11
64K	82	100	66	59	74
96K	18	–	34	–	11
128K	–	–	–	8	4

B.

ON ORDER	% BY COUNTRY				% TOTAL
	UK	W.GERMANY	FRANCE	ITALY	
64K	–	100	37	86	35
96K	69	–	52	14	42
128K	31	–	11	–	23

EXHIBIT IV-2

INPUT

- The order situation is much harder to calculate since the crucial factor of backlog at year-end 1977 was not available, but is estimated to have been 2250 at the end of August, with expectations of a year end total of 3300 systems.

B.   CONFIGURATION ANALYSIS OF INSTALLED SYSTEMS

- Out of the total sample of users interviewed, 44 (or 74%) have 64K of memory on their installed Series/1s. In West Germany, all of those interviewed had this memory size. In Italy, where process control applications were found (contrary to all other countries), one third of the installed sample had 32K - the only country where these small models were found.

- The comparison (Exhibit IV-2) of the configurations on order with those installed points to a resounding success of the IBM strategy of offering "bare bones" configurations : a majority of them are in the 96K memory range, and a high 23% have 128K.

C.   ATTITUDES OF USERS TOWARDS PCM MEMORY AND PERIPHERALS

- While the majority of users interviewed do not intend to buy PCM add-in memory, the requirements in PCM peripherals is substantial. It should be noted, with respect to the memory requirements, that many of the Series/1s interviewed have only just been installed, and to review their needs at this stage may have been premature. Nevertheless, there was a high proportion of categorial "nos". The main reason for this is that users consider that (i) memory is integral with the IBM processor, not to be tampered with (ii) IBM's memory is very cheap and not worth the trouble displacing (iii) the main needs are in peripherals, particularly disks and VDUs.

- 52 -

PCM MEMORY REQUIREMENTS

REQUIREMENT		UK	W. GERMANY	FRANCE	ITALY	ALL
NO REQUIREMENT		30	67	77	78	71
MEMORY	Static RAM	—	—	—	—	—
TYPE	Dynamic RAM	5	—	15	—	8
PREFERENCE	either	15	33	8	22	21

WOULD	NO	30	17	77	78	63
PAY PREMIUM	YES Single bit	15	17	—	—	11
FOR	YES Double bit	5	66	15	—	18
ECC	YES Either	—	—	8	22	8

(Note: PERCENTAGES ARE WEIGHTED BY THE NUMBER OF SYSTEMS INSTALLED).

PCM PERIPHERALS REQUIREMENTS

REQUIREMENT (%)	UK	W. GERMANY	FRANCE	ITALY	ALL
NO REQUIREMENT	41	25	40	43	42
LINE PRINTER	24	75	29	29	38
DISK DRIVES	43	75	57	29	50
VDU	52	25	29	29	38
* OTHER	24	25	14	14	21

* (1) — MATRIX PRINTER

(2) — SUPPLIERS (i.e. BASF DISKPACS AND TAPE REELS)

EXHIBIT IV-3

INPUT

- With many users more concerned with making the configurations they have installed work, the emphasis is on developing/finding/buying applications and system software rather than expanding the hardware. However, there are more users open to PCM peripherals than there are who look to IBM for their entire compliment of peripherals.

- The requirements by type of PCM peripherals varies from country to country. In the U.K., the highest demand is for screen terminals followed by disk drives, which is the most popular PCM peripheral in France also. In West Germany, line printers are of equal importance to disks. The demand for PCM peripherals in Italy is not clearly established at this stage.

D.   FUTURE PRODUCT REQUIREMENTS

- The repeat purchase factor of current Series/1 users is enormous, with a typical user having two to four systems installed and intentions or firm orders for a further 20-30. These orders are, almost without exception, for commercial applications.

- All known orders of this type are going or have already gone to IBM, not to systems houses/O.E.Ms. The latter must therefore create their own Series/1 business ; it will not fall out from IBM's sales/marketing activities.

- 54 -

INPUT

E.   VARIABLE DELIVERY CYCLE IN WESTERN EUROPE

- Delivery delays of the Series/1 have been extremely variable within Western Europe, as would be expected of a product that is in its initial shipment year. From country to country, the variance is of a factor 2-3, and within a country of a factor 4. One thing is clear, however : IBM can and will pull out all the stops to match a delivery requirement when necessary.

- In Italy, the average delivery cycle is 5.4 months so far, but varies from 3 months to 7 months. Most installations occured six months after order.

- In West Germany, delivery has ranged from 6 months to 12 months, but in the latter cases the machine was not needed earlier. In France the same applies, but six months has been the norm. In both countries the delivery cycle is becoming shorter rapidly.

- In the United Kingdom some very short deliveries have been found (six weeks). Some of the peripherals seem in short supply e.g. line printer and often the size of the configuration influences the availability of the system (starter kit : 3 months, 96K configuration : 8-9 months). Over the sample of users examined, average delivery was 3.7 months.

F.   APPLICATIONS FOR CURRENT AND FUTURE SYSTEMS

- The range of applications for the Series/1 is very broad and is in addition to the often considerable effort being made by users in the systems software area. Users have developed PCM peripheral emulators, teleprocessing monitors and a host of specialised I/O routines.

- 55 -

INPUT

SUMMARY OF APPLICATIONS
BEING DEVELOPED BY
END USER RESPONDENTS

APPLICATION DESCRIPTION	DP*	** PC	*** NEW	**** OFF LOAD	NUMBER OF USERS
INTEGRATED ORDER PROCESSING/ PRODUCTION CONTROL/STOCK CONTROL/INVOICING/AP/AR	X	X	X		1
INSURANCE BROKING/CLIENT FILE MANAGEMENT	X			X	1
DISTRIBUTED DATA PROCESSING /DB SYSTEM	X		X		1
TEXT PROCESSING	X		X		1
WAREHOUSE (DISTRIBUTION & CONTROL)	X			X	2
INVOICING	X			X	2
INVENTORY CONTROL	X		X	X	4
ORDER ENTRY/DATA COLLECTION	X			X	2
PERSONNEL MANAGEMENT	X				1
AUTOMATED CHEMICAL PRODUCTION		X	X	X	2

 *DP = DATA PROCESSING
 **PC = PROCESS CONTROL
***NEW = APPLICATIONS
***OFF LOAD = FROM OTHER SYSTEMS

EXHIBIT IV—4

INPUT

- Only 27% of the applications found were in the process control area and a further 6% were for network/concentrator functions. Thus two thirds of the Series/1s currently installed are for purely commercial/business applications.

- Nor are the majority of applications new : 52% of them are for off-loading existing equipment. The appeal of the Series/1 is broad, and its is impacting installed systems as well as displacing potential sales for a wide variety of equipment.

- The facility control/power management configuration proposed by IBM was found only in an IBM building - the users have not found this attractive so far.

- The most popular applications are classic business applications :

    - Inventory control
    - Sales Ledger and/or Analysis
    - Warehouse (distribution and control)
    - Invoicing (either as the principal application or as an add-on)

- Process control applications have been most prevalent in sector-specific areas such as Textiles (particularly in Italy) and Chemical production. Others include real time surveillance of production equipment for failure prediction, hydrocarbon refining and meat processing. The latter is an interesting integration of process control and standard commercial applications which follows the product from the slaughterhouse to the retail outlet, establishing inventory controls, processing orders, providing weekly production analysis and invoicing/accounts receivable/accounts payable.

- 57 -

INPUT

SUMMARY OF APPLICATIONS BEING DEVELOPED BY END USER RESPONDENTS

APPLICATION DESCRIPTION	DP*	** PC	*** NEW	**** OFF LOAD	NUMBER OF USERS
SALES LEDGER/ANALYSIS	X		X	X	4
TRAVEL TICKET PRINTING/ SEAT RESERVATION	X			X	1
TEXTILE PRODUCTION		X	X	X	2
GENERAL LEDGER/AP/AR	X		X		1
HOSPITAL PATIENT/BED INVENTORY	X			X	1
PAYROLL	X			X	1
NETWORK NODE/CONCENTRATOR	X		X		2
PETROLEUM/HYDROCARBON REFINERY		X	X		1
PREVENTIVE MAINTENANCE (OF PRODUCTION EQUIPMENT)		X	X		1
REAL TIME PRODUCTION CONTROL		X	X		2

*DP = DATA PROCESSING
**PC = PROCESS CONTROL
***NEW = APPLICATIONS
****OFF LOAD = FROM OTHER SYSTEMS

EXHIBIT IV-4 (Cntd)

INPUT

- The inhibiting factor in application development has been the low quality of the Operating system (RPS) and PL/1 (a very popular language with the current user base). In each case shortcomings have created delays in implementation ; RPS is also bulky and several installations have found that the intended application(s) just would not fit on the memory size they were sold. One distraught user commented : "I bought a 64K machine, was later told I needed 128K, but then learned that the version of RPS handling 128K wasn't available yet."

G.   PROGRAMMING SUPPORT

- Exhibit IV-5 details the support mix for the current base of IBM Series/1. The emphasis on "do-it-yourself" and the market reluctance of IBM to become involved at the system implementation phase are apparent.

- Three points must be borne in mind, however :

    (i)   IBM's pre-sale support (resolving specialist requirements and arranging for third party hardware/ software suppliers to get together with the user for the resolution of this particular needs, based on IBM's Series/1 building block) is quite effective ; thus although post-sale effort is low, IBM does offer a measure of support.

    (ii)   IBM's "assist" level is already at 21% of requirements.

    (iii)   Exhibit IV-5 relates to the early phases of the product's commercial life = system/software houses will be increasingly available for implementation support.

INPUT

PROGRAMMING SUPPORT FOR CURRENT INSTALLED SERIES/1

TYPE OF SUPPORT	W. GERMANY	FRANCE	UNITED KINGDOM	ITALY	All (weighted by installed systems)
USER ONLY	40	60	48	43	48
IBM ASSIST	14	20	18	36	21
IBM ONLY	–	–	–	7	1
SYSTEMS/ SOFTWARE HOUSE ONLY	24	5	4	7	11
SYSTEMS/ SOFTWARE HOUSE ASSIST	22	15	30	7	19

EXHIBIT IV–5

INPUT

- The marked, rapid development of software house and system house support in West Germany is slightly overstated in Exhibit IV-5, due to some particularly large orders. Nevertheless, the West German system/software houses have accepted the Series/1 opportunity far more quickly than all other Western European countries : they are present at 46% of the sites.

- It is likely that this overall picture will change very quickly. Many of those users who today are using IBM and third party support indicate that they ultimately expect to be autonomous for future programming. More importantly, the IBM Series/1 sale of tomorrow will be to the small unsophisticated user, rather than today's large, self-sufficient 370 user.

H.   REASONS FOR BUYING AND COMPETITION CONSIDERED

- The main reasons for choosing IBM relate to IBM's size and reputation, on the one hand, but also to the Series/1 price and modularity. Users like the hardware packaging IBM has adopted. However, where the product, its software or IBM's support are not adequate, users are quick to point out that they are confident that IBM will correct the deficiencies. This confidence element is far more important than actual product performance.

- Company policy and IBM's market coverage also generate a number of sizeable sales ; the former because the IBM policy is usually found in big companies, the latter because only very large companies are present on an international scale and frequently require 20-30 systems at a go.

- 61 -

INPUT

EXHIBIT IV-6

SAMPLE OF COMPETITORS PROSPECTIVE SALES LOSSES DUE TO INSTALLED
SERIES/1

MANUFACTURER	NUMBER OF SYSTEMS	% OF TOTAL LOSSES (ROUNDED
1= NIXDORF	30	13
1= SPERRY UNIVAC	30	13
3 DEC	26	11
4 HEWLETT PACKARD	25	11
5 MAI	23	10
6 NCR	22	10
7 VENTEK	19	8
8 SIEMENS	12	5
9 HONEYWELL	10	4
10 OLIVETTI	9	4
11= DATAPOINT	8	3
11= MDS	8	3
OTHERS (LOGABAX, GEA, T.I., TELEX)	8	3
TOTAL	230	

INPUT

- Users declared reasons for buying include :

  - "The IBM name"

  - "Good price/performance"

  - "The Series/1s ideal for a mix of process control and general business"

  - "We've got a large IBM installation, and the more you spend with IBM, the better the service gets"

  - "It is company policy to choose IBM"

  - "We're present over a wide area in this country, and in many foreign countries as well ; so's IBM"

  - "The Series/1's modularity".

- IBM's impact on other manufactures with the Series/1 has been widespread but not severe. This is largely due to the product's main market target (IBM 370 installations) so far. Over a sample of some 230 systems installed, the loss of prospective sales are examined in Exhibit IV-6. The percentages are small and widespread, which explains why so few of the competitors have perceived the Series/1 as a threat yet.

- The significance of being near the top of the table in Exhibit IV-6 is twofold :

  - it signifies a large number of systems lost (percentage lost multiplied by 230)

  - it means that the vendor came close in contention with the Series/1.

Thus, while it may be disappointing to lose many sales, those at the bottom of the Exhibit should not be satisfied with the fact that they were not often in contention.

I.   LEVEL OF SATISFACTION WITH SERIES/1 AND IBM SUPPORT

- The reasons for and against the IBM Series/1, in the users
  eyes are very varied and in some cases contradictory, but
  they can be summarised as follows :

    - FOR   : the IBM name and the modular architecture
    - AGAINST : bulky/poor quality (or non-existent) software
                and below par support.

- A selection of users' comments concerning these aspects is
  given in Exhibit IV-7. One particular aspect that has worried
  a lot of users is the fact that U.S.-developed software,
  supposedly already debugged through its use on the US market,
  is not performing to specification (particularly RPS and PL/1).
  Problems with PL/1 could cause serious problems in the UK market
  where a very high 83% of the users interviewed are already
  using it or intend to use it, (see Exhibit IV-8).

J.   LANGUAGE AND OPERATING SYSTEMS USED

- The mainstay of current Series/1 programming support is the
  Assembler language, particularly where special configurations
  are needed or process control applications are found. This
  has been universally the case throughout the four countries
  analysed. In many cases, however, it is due to the absence
  of the other main favourite : COBOL. In addition, even when
  the scheduled delivery of COBOL falls before the delivery of
  Series/1s on order, there are doubts over the ability of users
  to run it under all the OS support available (RPS, EDX, CPS).

- 64 -

WHAT DO YOU LIKE ABOUT YOUR SERIES/1 ?

BEST

- "Flexibility of the hardware : it will match our needs for the next five years".

- "Price, fast processing".

- "The hardware ; its public property. Anyone who wants to hook up their equipment can".

- "Modular architecture ; il allows us to control what our subsidiaries can do, according to their particular configurations

- "The IBM name : it saves me having to convince my management of the need to choose this product".

LEAST

- "New product, not yet established".

- "Lack of back-up capacity".

- "Poor support from IBM".

- "Quality of US software is not that hot ; most is on test before delivery".

- "Maintenance and support are below par with respect to IBM 370".

- "Promised software not available or incomplete".

- "I can't really use the 64K I was sold and I can't get the operating system to handle a larger memory yet".

EXHIBIT IV-7

- 65 -

INPUT

- FORTRAN, given its present availability, is quite popular, particularly in West Germany. COBOL will be at least as popular, however, when it becomes available. Other languages expected from systems houses, both European and US, include RTL/2 (from SPL Ltd in the UK), a Series/370 cross compiler (from Royal International Systems, U.S.), a BASIC interpreter (from DSI Inc, U.S.), a PASCAL compiler (from Conversational Systems Corp. U.S.) and an RPG-II compiler (from Series One Inc. U.S.). None of these were alluded to by European users, who obviously are unaware, at this stage, of their existence.

- Running COBOL on the Series/1 may require more than just software : the Series/1 does not offer string handling operations. To avoid slow execution of compiled code, Advanced Software Products in the U.S. is offering a microprogrammed attachment card (COBOL accelerator board).

- The following alternative operating systems are also available from U.S. systems houses :

PRODUCT	GOAL	VENDOR	PRICE
- COS/1	for COBOL business applications	COMPUDATA SYSTEMS	$ 11,500
- SPUTNIC	teleprocessing CICS equivalent	Series/1 Small Business & Communications Systems Corp.	$ 3,500
- MIIS	on-line DBMS for medical applications MUMPS equivalent	Medical Information Technology Inc.	$ 4,000 approx.
- OS/1	clustered terminal/ 3270 emulation support	DDP Products Inc.	$ 5,000

As already mentioned, users are also doing their own thing, particularly in the telecommunications area, rather than wait for systems house or IBM support.

INPUT

K.   ATTITUDES TOWARDS U.S., JAPANESE AND NON-DOMESTIC EUROPEAN
     VENDORS

● Overall there is broad agreement in Western European countries
  that the source of the product under review is a minor
  consideration. Uppermost in most users minds is the service
  that can be obtained.

● Thus while a product price/performance advantage is important
  for being considered as a candidate, support and maintenance
  are increasingly developing as the crucial "buy decision"
  factor. This applies across the board, from the large multi-
  national to the remotely situated small enterprise. The
  inherent advantage this provides to IBM, due to the latters
  coverage, cannot be over-emphasized.

● There are other significant IBM advantages :

        - in-house policy to choose IBM, where possible

        - security of the IBM name (if an IBM product is
          chosen and it fails, the DP manager cannot be faulted ;
          if he chooses a foreign product and it fails he can
          lose his job or at least his reputation)

        - the fly wheel support of third party vendors of
          hardware and software who wish to share the market
          revenue generated by the IBM product.

● West Germany is the least biased in this regard and users are
  willing to at least consider them for qualification. The
  sequence of selection is logical : qualification, service
  quality, domestic support if possible.

INPUT

LANGUAGE/OS SUPPORT USED
BY USERS, 1978/79
(SYSTEMS INSTALLED/ON ORDER)
% BY SITE

COUNTRY	LANGUAGES				OS	
	ASSEMBLER	PL/1	FORTRAN	COBOL *	EDX	RPS
UK	67	83	17	17	14	86
WEST GERMANY	78	—	35	24	60	40
FRANCE	85	—	15	20	45	55
ITALY	86	14	29	14	14	86
ALL	74	26	26	22	28	72

* – WHEN AVAILABLE

EXHIBIT IV-8

INPUT

- The French and the Italians are, to a lesser extent also prepared to adopt a "value for money" approach to using non-domestic vendors. One surprising aspect is that the Italians do not feel it necessary to qualify the vendor first.

- The UK market is the most reserved in this regard with a high percentage (25%), not willing to even consider non-domestic suppliers, although a local operation is a strong card, stronger in fact, than the service aspect (although this is likely to emerge at later stages of negociation).

L. SAMPLE OF USER INTERVIEWS

- A german Tobacco Distributor that has four Series/1 installed and a further 22 on order. All are for processing old applications (Invoicing and Inventory control). Programming will be done in-house both now and in the future at a cost of approximately DM 30,000 ($16,000). The decision to buy IBM was made by the Corporate EDP department "on the basis of price/performance". Only two other products were considered: an IBM 32 and an IBM 34, despite offers from Nixdorf, MAI, NCR, Sperry Univac and Hewlett-Packard.

  Non-IBM peripherals would be considered for purchase but not memory add-ons, although memory extensions will be needed. Dynamic RAM boards would be preferred. A double bit detection Error Correction Code would command a premium.

- An Italian Cement works with 2 Series/1 installed and two more on order. All are for new applications (sales analysis, inventory control, and process control shortly). The programming was done in-house at a relatively cheap cost ($5,000), using Assembler and RPS. IBM was chosen over Honeywell (level 6) and

- 69 -

- "My biggest problem is in educating my management as to who the company is we'd be dealing with, reliability etc".

- "They must have service coverage ; we're an International company and they must be international also".

- "How do I overcome in-house politics ?"

- "As long as IBM produces the product needed, we'll choose IBM".

- "Provided they offer adequate maintenance, why not ?"

- "We already deal with a broad spectrum of non-domestic vendors."

	Would not consider	Would consider with a domestic operation	Yes Providing service is good	Would need to qualify them
FRANCE	10	13	32	45
WEST GERMANY	5	21	30	44
U.K.	25	50	13	12
ITALY	14	29	43	14
ALL	17	29	29	25

EXHIBIT IV-9

INPUT

Olivetti. Non-IBM memory and peripherals would not be considered except TALLY terminals, despite the fact that 50% additional memory is required already.

- A UK travel agent with 2 Series/1 installed, both of 64K. They intend adding 32K more memory to each system. The attraction of the Series/1 was that of a stand-alone mini with a large number of screens for retail shop functions (printing tickets, invoices, sales ledger etc). The two systems will also be tied into the companies network of travel agents. Programming was done in-house with assistance from an outside software house. IBM was chosen to avoid having to convince management and "to avoid the hassel IBM would create if we had chosen anybody else". They would nevertheless consider PCM peripherals (but not add-in memory - "interface problems not attractive"). For PCM VDUs they are looking for 40-50% reduction in price, for printers and disks 20-30% reduction.

- An Italian Textile manufacturer with one Series/1 installed and two more on order, all three with 64K, used for process control. The applications were developed by in-house staff with IBM assistance for a $10,000 fee. IBM was chosen over DEC and H-P. The result has been less than satisfactory due to poor IBM support. Having had enough problems with IBM, they do not wish to complicate matters by allowing PCM peripherals onto the system. They have two Interdata minis installed.

- A UK Insurance Broker that is a group of small operating entities, all with their own particular requirements. A central database is currently used for a batch of 26 DATAPLEX unities in a truly distributed data processing organisation. They have now begun to adopt the Series/1 as a replacement for each unit, with the idea of using the Series/1 modularity to control (physically) the processing ability of the subsidiary operations by limiting the configurations they have. The applications

- 71 -

INPUT

will be insurance broking, distributed database processing
and text processing, and will be developed in-house using
RPS and PL/1. IBM was chosen over MAI, Data General and
Jacquard. The reasons were (i) "with everybody jumping on
the Series/1 bandwagon if IBM doesn't give us what we want,
someone else will, whether its applications, system software
databases, peripherals or memory" (ii) "we're spread all over
the country and in many foreign countries ; IBM is present
everywhere". PCM memory peripherals and software are all of
interest, providing there is a 20-30% price advantage for
an IBM equipment product.

- A French meat producer/distributer with 2 IBM Series/1 on
  order, both with 128K and used for an integrated combination
  of process control and business applications. Specialist
  terminals are provided by SECAPA for this specialist applica-
  tion. The applications are being written in Assembler under
  EDX. COBOL would have been preferred, but this is not yet
  available under EDX (RPS only). IBM was chosen over Honeywell
  Level 6, based on price and the pre-sale support from IBM.
  The user would consider PCM peripherals providing the system
  analysis and pre-sales support is available from the vendor ;
  "we have no time for such evaluations ourselves".

- A German motor cycle and bicycle manufacturer that has
  installed one Series/1 and has eight more on order for
  delivery to his distributors in November 1978. This user
  didn't want to be interviewed, initially, because he didn't
  want his comments to get back to IBM (!). The application
  software (order-entry, Inventory control) for the systems
  is developed by an outside software house and paid for by
  corporate headquarters. Each distributor then pays for the
  hardware it uses. Future programming will be done partially
  in-house and partially by the software house. IBM Series/1
  was chosen over Datapoint, Nixdorf, Mohank Data, Sperry
  Univac and Siemens. The user would consider plug-compatible

- 72 -

peripherals, and memory providing integral maintenance was supplied. The price reduction would have to be 30-40%, however. The decision to go IBM was taken by the corporate management, "on the basis of price".

- An Italian Chemical Manufacturer with four Series/1, of which one 128K model with 10 displays and five printers, and two other 32K Series/1s connected to it. IBM assisted in-house staff to program the commercial applications (Inventory control and Personnel management) but an outside software-house did the process control applications. Future programming will be done by the outside software house. FORTRAN, Assembler and PL/1 were used. IBM was chosen over Honeywell, Telex (System III), MSE (J100) and Olivetti. Others that "applied" but were not looked at include ICL, Data General, Datapoint and General Automation. This user would consider using plug-compatible peripherals but not plug-compatible memory ; the discount required would be in the 20-30% range.

- A UK Cement manufacturer with 3 IBM Series/1 installed, 10 on order and an option for a further6. All are 64K but all will be upgraded to 128K as soon as IBM can deliver the operating system to cover it. For their particular needs they have developed a teleprocessing monitor which they are aggressively selling to other Series/1 users at a price of $4,000. In addition, a Hazeltine terminal emulator has also been developed, despite time clock difficulties. Despite using a software house for this, they intend to use their own staff for future programming. IBM was chosen over Ventek for political reasons : they have IBM mainframes and consider that the more they spend with IBM, the better service they can command. As a result, plug-compatible products will not be considered.

- 73 -

- A UK brewery, with seven IBM Series/1 installed and 74 on order, all with 64K, 2VDUs, matrix printer and 9.3MB of disk plus communications. The main applications, both new, will be nominal ledger and purchase ledger ; later order entry will be off-loaded from the 100 Olivetti 521/523s installed (early 1980) and stock recording added. All applications are and will be written by in-house staff with no external help. PL/1 is preferred due to the mainframe policy already adopted. However, COBOL would have been a strong contender. The reason for choosing the Series/1 was that it was "the only IBM machine available". Now that the 8100 and the 38 have been announced, there is some concern that the right decision has been made. The user would consider PCM memory and peripherals, providing the price and performance are right, and the quality of maintenance/service is equivalent to IBM's. Price reductions are "not necessarily relevant".

- A West German machine tool and metalworking manufacturer, with one Series/1 installed and another on order of 128K, for "technical applications" (shop-floor control). All programming will be done in-house with no outside assistance, using Assembler and FORTRAN under RPS. PL/1 will not be used due to concern over the memory size available. The user has developed his own dialogue-monitor and is looking at PCM peripherals from CDC (no memory add-ins), for discounts in the area of 20-30%. Price was the deciding factor given, (although the user was already an IBM user-system/7, and no other vendors are present). The most attractive feature from the Series/1 was the concept of the hardware : modularity and flexibility.

INPU

V. SYSTEMS/SOFTWARE HOUSES

INPUT

V.   SYSTEMS/SOFTWARE HOUSES

- The reaction of the European systems/software house community to the Series/1 has been a mixture of enthusiasm and caution, of limited investment and full-blooded committment. The S/SHs interviewed ranged from the single one-off turnkey system house to the very large 150-system contract dealers.

- There was no difficulty for INPUT in identifying those active with the Series/1 in each country : they all freely advertise their intentions in the specialised press, some with considerable fanfare. Having done so, however, many are at a loss as to what step comes next, and are having considerable difficulty in finding prospects. Others, more fortunate, have become rapidly involved in significant contracts and can look forward to business snowballing.

A.   SELECTED INTERVIEW SUMMARIES

- ORGAMEDA, in West Germany, claims to have sold more than 150 turnkey Series/1s, primarily through its warehouse automation software ; they also claim to have sold the software product itself in other similar installations. ORGAMEDA is also developing standard accounting packages. The impact of the Series/1 on business is expected to be +60% in 1978, mainly due to the fact that "the end user has no alternative than to go to the software house in many instances".

- 75 -

- SOPRA, in France, has its own Series/1 and supplies turnkey systems and some PCM peripherals (Datum Inc. tapes mainly). They intend to be "the largest Series/1 turnkey supplier in France", and are the exclusive vendor in France for the COS/1 COBOL compiler from Compudata, DDP/1 (Distributed Data Processing package from Systems Design and Development) and ISAM sort from Applied Realtime Systems. All three products are from U.S. software houses. SOPRA is developing their own PACHA (payroll) system and SYSCOS (Accounting) system ; in addition, they see potential in the hotel management business.

- CYPHER COMPUTERS LTD, in the U.K., are an $8M+ company using Burroughs, ICL and NCR equipment. They initially ordered 10 Series/1 but backed away from it because of the lack of IBM marketing/sales support. They nevertheless have developed an Hotel Accounting system for 200-300 beds, have done several custom packages and are looking at the brokerage market. Cypher Computers expect the Series/1 to have a significant impact on their 1978 business because "the Series/1 is a first class product, it's easy to add peripherals and there's COBOL now". However, they find IBM's approach "not good enough - there's not enough direct sales effort".

- DATAMONT, in Italy, did a thorough check on the competition before deciding to go with the IBM Series/1. In particular they examined DEC, HP, CII-HB, Siemens, Data General, and General Automation. They are in the process of developing applications for (i) data entry of accounting informations, (ii) automatic weighing (iii) personnel log-in/log-out (iv) a variety of process control applications. Datamont is the computer services subsidiary of MONTEDISON and is thus primarily interested in manufacturing applications.

INPUT

- MBP, in West Germany, is developing Payroll, Receivables, Payables, Materials Management, Shop Floor control and Project control software. They have noted IBM' success in th e manufacturing and Wholesale sectors in West Germany and are targeting those users as a result. The value-added for MBP is the application software, and they are critical of the absence from IBM of two items they feel would assist application development - a good operating system and a data base management system.

- HADRIAN COMPUTER SERVICES LTD, in the U.K., offers turnkey and contract programming for commercial applications on the Series/1, plus their "own" peripherals (Hazeltine terminals, Lear Siegler terminals, Centronics printers). HCS is going after the small business market, but finds the Series/1 Assembler too slow. The application market is their target for value-added.

- SIO-TS, in Italy, is a systems house who offers turnkey and professional services for process control and commercial business applications on the IBM Series/1. They are not inclined to consider third party memory and/or peripherals since they are convinced that the maintenance/service support in Italy would not be adequate. Their main target is the Manufacturing sector where they have a lot of experience and a good client base to which they feel the Series/1 can be attractive, particularly for process control applications.

- SYSTEMS PROGRAMMING LTD, in the U.K., is primarily a systems/ software house aiming to offer their RTL/2 high level language on the Series/1 for real-time applications, communications and on-line data collection. As a language RTL/2 has been adopted by a number of very large companies (e.g. Fiat, Plessey, GEC, Philips) and some European Goverment (Dutch, British) and thus the product's attraction on the Series/1 is almost "repeat" business.

- 77 -

INPUT

SPL's business is therefore not hardware dependent, to a large degree.

- COGRAM, in Italy, has already installed 3 Series/1 and has a group of programmers working with IBM and users to develop (i) for the private sector a suite of standard packages on payroll/general ledger/order processing/production control/ inventory control and (ii) for the public sector a suite of financial analysis/revenue collection packages. The private sector applications are being developed in COBOL and the public sector reports are being developed in PL/1.

- G.B. HIGGINS DATA SERVICES, in the U.K., has formed a dedicated services division for turnkey Series/1 installations in South Wales, Gloucester, Cheltenham and Bristol. Their main target is the commercial business applications market using accounting packages, but they also offer to customize IBM's own applications. GBH is concentrating on the Food/ Drink, Printing and Manufacturing sectors where IBM is having the greatest success with the Series/1.

B. IMPACT OF SERIES/1 ON BUSINESS

- The system and software houses have become involved with the Series/1 to a degree which varies widely, ranging from "arm's length" to whole-hearted committment. The expected impact the Series/1 will have on their business as a whole is therefore just as varied, as shown in Exhibit V-2.

- In 1977, the Series/1 shipments had not begun, so that the 14% indicated only applies to a small number of companies.

- 78 -

EXHIBIT V-1

O.E.M. SUPPLIERS

WHAT, IN USER'S EYES ARE MAJOR REASONS FOR
YOUR WINNING CONTRACTS ?

- " Our independence, faster service and our consulting support".

- "We offer a total solution, not a piece of hardware or software. We're also going to have our own maintenance people".

- "Our Series/1 know-how and our references with the users already installed by us".

- "Our own customers upgrading ; they know us, trust us".

- "Users are keen to deal with the cheapest ; we offer PCM peripherals that make the total system price attractive".

- *"Our language (RTL/2) has been chosen as a standard by Dutch Government and large companies like FIAT, Plessey, Philips, Westinghouse, GEC, British Leyland etc".

LOSING CONTRACTS ?

- "Lack of disk capacity, high hardware price"

- "Unavailability of the right project leader, insufficient trained staff in general"

- "Price".

- "Delivery ; six months is too long".

* No known contracts as yet.

INPUT

- In 1978, the impact was not only bigger, it was more wide-
  spread, not only from one country to another, but also
  within each country market. The total turnover of the
  systems and software houses responding was $22M ; thus
  the accrued business from Series/1 was expected to be a little
  over $5M in 1978, or $5300 per shipped system, on average.

- In the years 1979 through 1981, allowing for (i) the growth
  of their business and (ii) the growth of the Series/1's
  contribution to that business, the systems/software houses
  will be generating $15M in 1981 from the Series/1, or an
  average of $780 per system that IBM ships that year.

- The actual revenue secured by systems and software houses
  from each system is much higher, of course, (since only
  13% of the systems shipped in 1981 are for O.E.M.s). The
  range of revenue per system per country is given in
  Exhibit II-1 for 1978.

- This revenue estimation excludes the cost of the OEM hardware
  itself, which in 1981 is expected to be $135M. Thus the
  value-added revenue from third parties will be equivalent
  to just over 11% of the total revenue generated by the
  Series/1 in 1981, compared with 10% in 1978.

C.   IBM SERIES/1 OPPORTUNITIES FOR SYSTEM AND SOFTWARE HOUSES

- As a "bare-bones" system, the Series/1 initially appeared as
  the ideal vehicle for system and software house added value,
  in the form of customized implementation support, standard
  applications, system software of all kinds and full turnkey
  solutions - none, or very little, of which was initially
  available from IBM.

- 80 -

INPUT

YEAR	%		
	RANGE		AVERAGE
	FROM	TO	
● 1977	small	+ 60	+ 14
● 1978	3	+ 70	+ 23
● 1979-1981	5	+ 100	+ 33

Notes :

● Values given for 1977 and 1978 are the range and average registered by the systems/software houses interviewed.

● Values for 1979-1981 are the estimates provided by the same companies.

EXHIBIT V-2

- 81 -

INPUT

- Very rapidly, however, this picture has changed, with a vast array of software coming from the U.S. systems and software houses and from IBM itself. As a result, there are many third party vendors in Europe who are delaying decisions for implementing software development plans and involvement in the Series/1 to any large degree, until the product's profile has become clear.

- Their most disquieting concern is "where will IBM produce application software ?". If this question could be clearly answered by a policy statement, development plans that have been moth-balled so far could be implemented. As it is, there is a fear that once a clear market target has been established, IBM could enter with its unparalleled ressources and absorb the larger part of the market.

- In the US, there are a number of standard application packages that are already available, (see Exhibit V-3). In addition various applications development tools are available, both from IBM (Structured Programming Support, Program Preparation Subsystem, Host Preparation Facilities, etc) and from third parties (ISAM access method, sort/merge from ORGAMEDA in West Germany ; System 32 OCL support, screen formatting facility, multiple worksation support from Series One, Inc. in the U.S. etc).

D.   THE CRUCIAL PROBLEM OF MAINTENANCE

- With the exception of plug-compatible memory, (where a combination of:(i) IBM's low pricing and (ii) the user's fear of a back lash from IBM, if provoked, has made the market less attractive than that of PCM peripherals), there is a strong demand from users and systems houses alike for the connection of non-IBM devices.

- 82 -

INPUT

SAMPLE OF STANDARD APPLICATIONS
AVAILABLE FROM SYSTEMS/SOFTWARE HOUSES

PRODUCT	FUNCTION	APPROXIMATE PRICE	VENDOR
DDP/1	Offers CRT screen formatting and data capture/storage/management in a network environment	(a) one-time charge : $ 20K (b) rental is $350/month	SYSTEMS DESIGN & DEVELOPMENT CORP.
DBMS	Data base management system	$ 15K	DATA TECHNOLOGY INDUSTRIES INC.
JDOL	Data base management system		APPLIED COMPUTER DESIGNS INC
CLASS	Computerized limited access Security System, using IBM magstripe card reader	$ 2.56K	APPLIED REALTIME SYSTEMS INC.
*	Suite of on-line business systems handling order entry, invoicing, A/R and general ledger	$ 4K	APPLIED COMPUTER SERVICES INC.
*	suite of business systems covering order entry, invoicing, A/R, A/P, general each module ledger	$ 0.6K	SPAN MANAGEMENT SYSTEMS

EXHIBIT V-3

INPUT

- This potential market, (discussed in section II and evaluated in Exhibit II-3) is large, but access to it is conditionned by the availability of adequate service/maintenance support which is the equivalent to that of IBM's. Excluding the exceptional (and rare) cases where responsive time is not critical, this means matching IBM's current offer of 3-hour response. (<u>Note</u> : MTBF and MTTR values are not yet available).

- This may seem like an impossible goal for many suppliers, particularly since the users interviewed were <u>formally opposed to the use of third party maintenance suppliers</u>. However, depending on the peripheral type there is an alternative which must be considered.

- For peripherals where, either :

  - the sales value is relatively low (e.g. VDU, matrix printer) or

  - the vendor confidence is high in the reliability of the device proposed (for higher cost peripherals) and/or

  - the site is sufficiently important in terms of potential sales to merit consideration,

  the offer of <u>on-site redundant</u> units can satisfy nearly all of the fears/requirements of the potential user. There are cases (e.g. disk drives, line printers, for single system installations) where this cannot be justified. However, in today's Series/1 market of high quantity installations/large company sites, this approach can prove economically viable.

INPUT

E.   DESIRABILITY OF CURRENT AND PROSPECTIVE SOFTWARE FEATURES

- Quite apart from the IBM hardware announcement anticipated and the PCM peripheral/memory that is/will be available, the software and system houses have a clear interest in expanding the software features available on the Series/1.

- Their views on the need for the various languages available either from IBM or elsewhere, the requirement for interactive facilities and the necessity of having a database management tool for the Series/1 are examined in Exhibit V-4.

- The biggest surprise is the lack of interest in RPG. Nearly half of those interviewed thought it wasn't necessary, despite the price/performance competition a Series/1 plus RPG system would offer to the System/32 and System/34.

- COBOL is preferred, almost unanimously, and received very strong backing. It is INPUT's view, however, that the responses in Exhibit V-4 relate to today's market for the Series/1 (the large IBM 370 user) not that of tomorrow (the small company/first time user). In the latter, an RPG would have a strong attraction.

- Supporters of BASIC were off-set by an equal number of vendors who thought it is not required. FORTRAN and APL were also thought to be largely unnecessary.

- PL/1 was clearly identified as being necessary to IBM, (who has a number of 370 users "blocked off" in this language) rather than as a universally attractive language for this level of system.

- In the market for interactive systems the Series/1 offers

- 85 -

INPUT

DESIRABILITY OF CURRENT AND PROSPECTIVE SOFWARE FEATURES

	NOT REQUIRED	SLIGHTLY DESIRABLE	MODERATELY DESIRABLE	VERY DESIRABLE
● A. LANGUAGES				
• RPG	46	8	23	15
• COBOL	–	15	23	62
• BASIC	38	15	15	23
• FORTRAN	31	31	15	15
• PL/1	15	31	31	15
• APL	23	23	38	8
● B. INTERACTIVE FACILITIES				
• Transaction oriented work-station system	–	–	31	69
• T/S	31	15	23	15
● C. DATABASE SOFTWARE				
• DDP-DBMS	8	8	15	54
• Standard CODASYL-DBMS	31	31	8	8

EXHIBIT V-4

- 86 -

INPUT

certain attractions, particularly for transaction-oriented workstations. This is where a high level language such as RTL/2 can score heavily, particularly for the larger (96K+) memory configurations with high disk file contention rates. Timesharing systems were not thought to be attractive, however.

- There is also a strong demand for a distributed data processing environment database.

- Overall, the software and systems houses have clearly identified the Series/1 in the market role targeted by IBM : - a large user, distributed processing system for commercial/process control applications, avoiding self impact on the 30 series.

INPUT

VI. SERIES/1 COMPETITION

VI.   SERIES/1 COMPETITION

- The announcement of Series/1 as a relatively "unsupported"
  minicomputer had numerous advantages for IBM :

  - It emphasized IBM could be price/performance compe-
    titive against minicomputer vendors.

  - It focused attention on relatively cheap IBM confi-
    gurations because software and peripherals were not
    available (tending to obscure the real growth areas).

  - It automatically restricted the market opportunities
    for the IBM sales force. (This was a dual benefit -
    restricting self-impact and concentrating the sales
    effort while the marketing organisation was being
    developed).

  - It created some questions (and confusion) as to IBM's
    intentions and what enhancements would be forthcoming.
    (Any delay in equipment selection or replacement works
    to IBM's benefit)

  - It created a major market for system houses (which in
    turn solved some of IBM's initial marketing problems
    by assuming responsibility for selling to the small
    end users). In addition, this external programming
    resource was not available to support competitive
    systems. More systems programming effort (both IBM
    and software houes) is being applied to Series/1 than
    any other minicomputer in existence - this will
    produce both short-and long term benefits.

- 88 -

INPUT

- The object of this section is to explore the reaction of the main competitors to the Series/1, based on the interviews that were carried out, rather than to exhaustively compare the various products on the marketplace in relation to the Series/1s hardware and software.

- Potentially, the Series/1 is powerful enough to compare with the smaller models of the IBM 370 series, well beyond the System/32, 34 and system/3. The important point to retain is <u>not related to the product's hardware and software</u>, (which are, competitively speaking, average and poor respectively) but to the user's perception of the system as a processing tool for identifiable needs.

- It is in this manner that the Series/1 can challenge an IBM 370/125 or a system/32, rather than in the light of the usual hardware comparisons with a DEC PDP 11/34, a Data General S3100 Eclipse, a Hewlett-Packard 21 MX-E etc etc.

- The Series/1 competition is not all external. IBM's new 8100 now has its sights set upon the high end of the Series/1's market. The growing competition between GBG and DP division cannot be neglected, nor can the possibility of GBG becoming a supplier to DP Division at some future stage.

- The planning and implementation of an integrated information system for a major corporation requires careful coordination and control. This is an aspect that IBM has emphasized when selling SNA, now established as not only the company's network architecture, but gradually becoming the standard interface for IBM's widespread product lines.

- In the future it is likely that DPD will be offering components of DPD and GSD lines incorporated into an overall systems design. In effect DPD will become the hardware and software

- 89 -

INPU

" <u>IN WHAT MARKETS DO YOU COMPETE WITH THE SERIES/1, AND HAVE YOU WON OR LOST</u> ?"

- "Series/1 is sold as a limited basis, where we do not target our own products. No impact."

- "We've met it in network applications where we are strong ; our software and better systems knowledge has so far meant that we've won".

- "Have seen it only in the systems house turnkey market in half a dozen situations."

- "Have not yet met it".

- "We've met them and in all situations neither of us has gotten the contract. Sale went to lowest bidder which was neither us nor IBM."

- "We've met them and won by discounting".

- "They're strongest in the "IBM shop" where some business went to us before the Series/1 announcement. Now IBM gets most of that business."

EXHIBIT VI-I

INPUT

integrator for the large IBM users. The significance of this is that lease/rental contracts could be available for the minicomputer component, a move that would have a devastating effect on the majority of the minicomputer vendors.

A.   COMPETITORS EVALUATION OF SERIES/1

- Unanimously, the main companies impacted by IBM's Series/1 are so far not concerned by potential loss of business. The general feeling is that the Series/1 has stimulated the minicomputer sales in all four of the countries examined. "IBM has legitimized the mini business", was one comment.

- None of the hardware competitors interviewed felt that it was necessary to react to the Series/1, though some admitted they had lost sales. However, the inroads made by their non-IBM colleagues was of more immediate interest. Data General in particular, has become a source of worry due to its aggressive discounting.

- Nixdorf was keenly aware of the loss to Series/1 of some large users who often need a distributed processing network of small, local satellite systems. Nixdorf has been successful with the first time users and small companies, however, against the Series/1.

- None of the competitors foresee any immediate need to modify their prices, announce hardware or software changes or modify their current approach in any fashion. IBM is thus left to develop its market penetration unopposed, while increasing its minicomputer market experience. There is therefore every reason to expect that the strategy of "securing" the large 370 sites will be a success - one that the competition would have great difficulty in opposing anayway.

- 91 -

INPUT

FORECASTED NUMBER OF MINICOMPUTERS
SHIPPED (1978-1981) IN WESTERN EUROPE

EXHIBIT VI - 2

INPUT
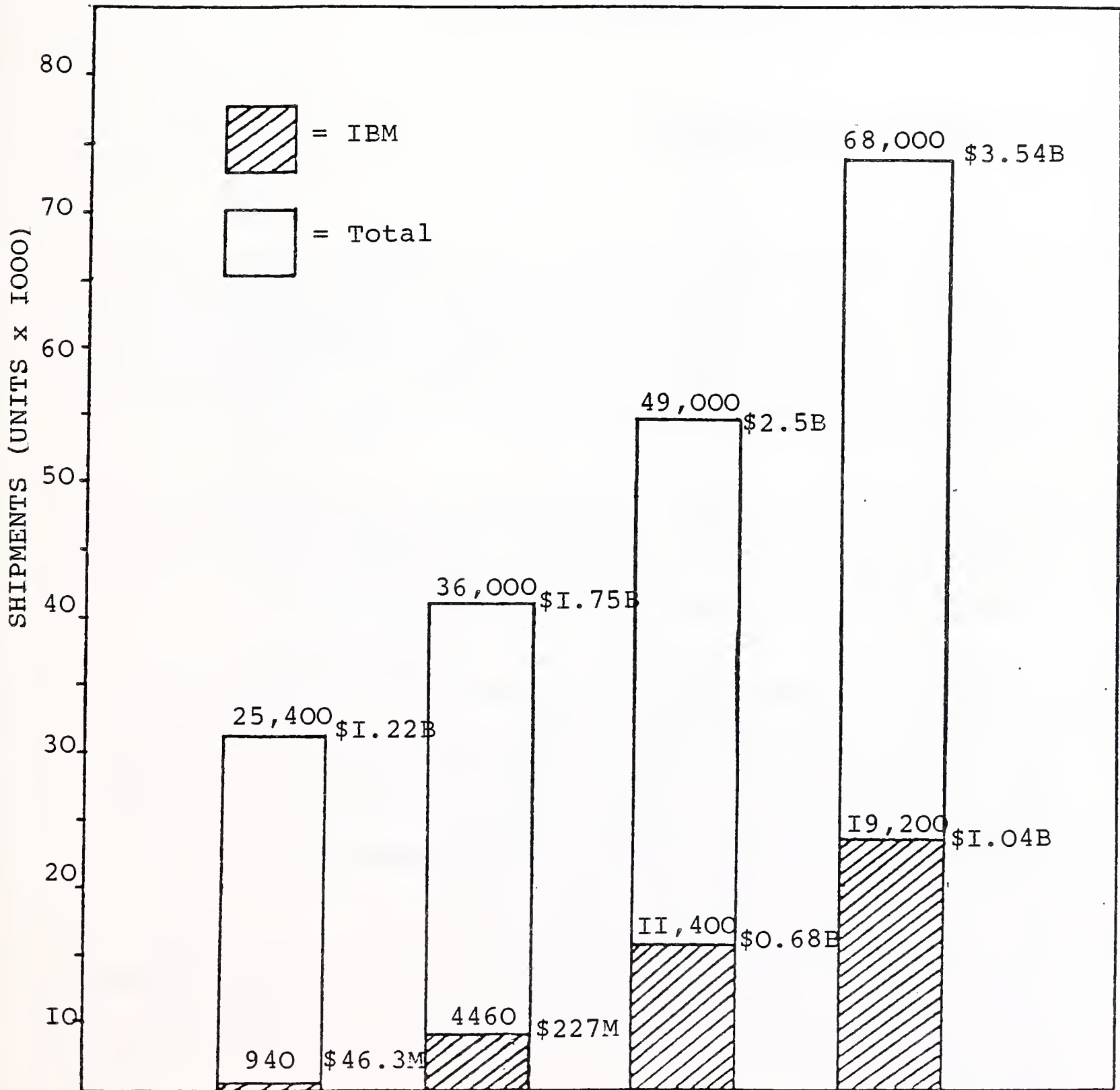
- From IBM's viewpoint the Series/1 is serious competition to its own system/32 and the 3790 (numerous references to systems being installed as replacements). There were no instances of installed system/7s being replaced, however, though it is unlikely that any further system/7 sales will occur. One system house said he thought that the system/34 was strong competition for the Series/1 because "IBM makes more money on the system/34".

B.   IBM's MARKET SHARE

- The estimates of IBM's immediate and future market share expectations were remarkably consistent from one country to the next. In general IBM is expected to capture less than 5% of the 1978 total shipments per country and to increase this rapidly to 15% by 1981.

- Yet having stated this, (which implies that IBM will become a major force in the minicomputer market by 1981) none had plans to counteract IBM's market entry.

- In terms of shipped units and value, IBM's share of the market will therefore grow very rapidly, attaining well over 10% by year end 1979 and doubling in 1980. The peak shipment year for the Series/1 will be 1981 when it will capture just over 28% of that years shipments.

- The value of these IBM shipments will grow from $46.3M to a 1981 peak of $1.04B. In Western Europe, the total market will grow in the same period from $1.22B to $3.54B (see Exhibit VI-2).

INPUT

EXHIBIT VI-3

ANNUAL GROWTH RATES

	1975-76	1976-77
DEC	43%	44%
Hewlett-Packard	13%	22%
Data General	49%	42%
Wang	28%	38%
Data Products	-1%	35%
Datapoint	53%	43%
Pertec Computer	2%	93%
Four-Phase Systems	26%	41%
General Automation	27%	18%
Sycor	22%	15%
Average Growth Rate	26.2%	39.1%

INPUT

C.   IMPACT OF THE SERIES/1 ON THE COMPETITION

- The announcement of the IBM Series/1 has acted as a stimulus to the entire market, as evidenced by the growth rates of all of the major vendors (see Exhibit VI-3).

- The average annual growth rate of the ten minicomputer and intelligent terminal manufacturers shown was 26.2% between 1975 and 1976 with healthy growth rates for some (DEC, DG, Wang, Datapoint etc) and far less healthy rates for others (Data Products, Pertec).

- Following the release of the Series/1, the growth rates increased to an average of 39.1% over the 1976-77 period, with DEC and Data General maintaining strong growth, while Pertec, Four-Phase and Data Products jumped dramatically.

- This short term, positive impact is likely to turn into a long term negative one, however, once IBM's market target turns from the large, captive 370 to the smaller enterprise/ non-users etc where the bulk of the competitors do their business.

- The Series/1 has attracted a lot of attention from the PCM peripheral and system/software house communities. This is highly beneficial to IBM, and detrimental in the near term to the competition, who will see this crucial source of installations/support manpower dwindling as the Series/1 shipments get underway. Systems Analysts and programmers are scarce enough without IBM placing an additional workload on the market.

- 95 -

INPUT

- Applications emphasis on Series/1 has been directed towards market segments in which IBM has been weak.

  - The energy conservation and process control applications are ones where substantial investment had already been made (System/7 and supporting software) without the type of return IBM prefers to see. There is no question that Series/1 was prompted by lack of success with sensor based systems.

  - The multifunction work station application is directed to the market created by competitive intelligent data entry (and RJE) systems which promise significant off-loading of System 370 hosts. (The General Business Group of IBM can develop more enthusiasm for this approach than the Data Processing Group.)

  - The intelligent terminal subsystem offers an attractive alternative to the IBM 3277 Display Station and its numerous competitors.

  - The Series/1 as a communications concentrator attempts to strengthen IBM in an area of traditional technical weakness without impacting profitable portions of DPD's System Network Architecture. However, from an IBM corporate viewpoint a little in-house competition for SNA can only be healthy.

  - Standalone business applications are not being emphasized by IBM and are still being left to system houses to support. (GBG would rather compete with DPG than impact its own product lines.) This has been a rather successful tactic. Some reports on small business systems ignore Series/1 completely. Perhaps the recent addition of COBOL to IBM's support may change this, but it is obvious IBM is moving slowly on support for a standalone business enviornment. The reasons are obvious.

- 96 -

INPUT

D.   PERCEIVED STRENGTHS AND WEAKNESSES

- The strengths and weaknesses of the Series/1 as perceived
  by the interviewed competitors are shown in Exhibit VI-4.
  Apart from the (small) price advantage the product has,
  and the fact that it is sold under the IBM label, the
  Series/1's strengths are considered to be :

    (i)   its growth potential, through the (already initiated)
           announcements that IBM introduces on all of its
           products, plus the flexible interfacing of PCM
           peripherals

    (ii)   its communications capability, which, although
           restricted, is compatible across the board via
           standard protocols (BSC, SDLC) with the other IBM
           product lines

    (iii) its speed and ease of installation (a few hours),
           compared with a full day or more for its competitors.

- The weaknesses, perceived by the competition, are far more
  diverse, and not always well thought out. For example,
  "expensive upgrades" can hardly be considered anything less
  than sound business sense, or at the very least good product
  strategy by IBM, given the market.

- Similarly, "lack of volume discount" merely reflects the
  astonishment of the minicomputer fraternity at IBM breaking
  the golden rule by which many of them live. The truth is
  that IBM is unlike any other vendor, and it can be seen that
  there is no visible sales impact on the Series/1 of the lack
  of discounts.

- 97 -

INPUT

SERIES/1 STRENGTHS AND WEAKNESSES

AS SEEN BY COMPETITORS INTERVIEWED

STRENGTHS

- "IBM label and committment to minicomputers".

- Product's growth potential".

- "Communications capability, compatible with other IBM products".

- "Ease of installations".

- "Price is moderate".

- "PCM peripheral connections are easy".

WEAKNESSES

- "Lack of understanding by IBM personnel of the minicomputer business and the product they are selling".

- "Volume discount missing".

- "Peripherals are limited".

- "System expansion is very expensive".

- "Lack of applications software".

- "No database software available".

EXHIBIT VI-4

- 98 -

INPUT

- It is true, however, that IBM is in the learning stage with respect to the minicomputer market and, more seriously, with respect to the Series/1, as yet. This, as has been outlined in section IV, has been clearly identified by the user population.

E.   ANTICIPATED SERIES/1 PRODUCT ANNOUNCEMENTS

- Compatible with the lack of conviction that the Series/1 would impact them, the minicomputer vendors interviewed were distinctly non-specific in their identification of expected Series/1 announcements from IBM.

- However, the following product announcements are expected :

        - new processor models with increased power
        - a 75 ips 800/1600 bpi tape unit and controller
        - a faster line printer (600 lpm)
        - more memory (512K forecast for January 1979)
        - bigger fixed disks with fixed head access
        - a CORAL compiler for Government applications
        - a database management system for the DDP environment
        - a telecommunications monitor.

- The Series/1 is therefore expected to expand by adding several faster processor types and larger memory sizes, rather than a line of models. In the software area the need for a database is consistent with the analysis of the systems/software houses (section V).

- 99 -

INPUT

F. SERIES/1 COMPATIBLE HARDWARE PRODUCTS

- Despite the fact that Series/1 shipments in Europe have only just got underway, and will not go above 1000 systems before 1979, the number and variety of the PCM peripherals products already available is quite high. Certainly, it would delight any other manufacturer, at this stage of the product's commercial life.

- In the disk drive area, activity is only just beginning. As shown in Exhibit II-3, the total requirements are expected to be $500M over the 1978-1981 period, 15% of which (i.e. $75M) is open to the PCM suppliers. CDC, already active in the US, intends to announce their Certainty series of miniperipherals on December 1, 1978 in Europe. Calcomp, meanwhile, are already marketing their products. Ampex will also enter the market in the first quarter of 1979.

- The tape drive market is almost bereft of PCM products. This is a marginal market, but one that INPUT estimates will be worth $9.7M in the 1978-1981 period. So far Datum Inc. (through system houses like SOPRA) and Ampex (1 Q'79) are the only suppliers involved.

- The serial printer market is a minor opportunity for the PCM vendor. CDC, in keeping with its intention to provide a full complement of IBM-equivalent/better performance devices, intends to supply a 180 cps alternative to IBM's 4974 120cps device.

- Line printers are a different story. They represent a relatively high price item (3 - 4.5 times as much as the character printer) and an estimated $18.3M market through 1981. Digital Associates, Datum, Data 100 and CDC will all

- 100 -

PCM PERIPHERALS IN EUROPE

PRODUCT	PERFORMANCE RANGE				
● DISK DRIVES					
(● IBM	9.3MB	58/64MB)			
● CDC (Dec '78)	9.3MB	19.7M	63MB	126MB	240MB
● CALCOMP		25MB	50MB	80MB	200MB
● AMPEX (1 Q'79)		40MB		80MB	
● TAPE DRIVES					
● AMPEX (1 Q'79)		45ips	800/1600		
● DATUM	12.5—125ips	200—1600bpi			
● SERIAL PRINTERS					
(● IBM	120 cps)				
● CDC (Dec '78)		180cps			
● LINE PRINTERS					
(● IBM	1201pm		3001pm)		
● CDC (Dec '78)			3001pm	6001pm	
● DATA 100	62.51pm	1251pm	2501pm	3001pm	
● DATUM	3001pm	6001pm	9001pm	15001pm	
● DIGITAL ASSOCIATES	3001pm	6001pm	10001pm		

● OTHER

● TERMINALS FROM TALLY, HAZELTINE AND LEAR SIEGLER.

● VOICE RESPONSE SYSTEM FROM INTERFACE TECHNOLOGY

● 3705/3272 CONTROLLER EMULATION FROM ASSOCIATED
  COMPUTER CONSULTANTS

● WIRE WRAP BOARDS FROM MDB SYSTEMS

EXHIBIT VI-5

INPUT

be providing price/performance competitors to IBM in this market.

- In the "other" category there is an assortment of interesting products, most prominent of which are the terminals available from Hazeltine, Tally and Lear Siegler. All three have been found in system houses and/or end-user sites, even at this early stage. The other items (voice response, magnetic stripe card reader, wire-wrap boards etc) were not in demand from the end-users sampled.

INPUT

VII. C O U N T R Y   M A R K E T   F O R E C A S T S

INPUT

VII.   COUNTRY MARKET FORECASTS

- In preparing the country level forecasts, in addition to
  the assumptions made in section II-E., the following were
  added concerning the orders, shipments and installed base :

  - current early orders are indicative of the level
    of acceptance by users of the product and determine
    the shipment profile of 1979.

  - IBM will continue to expand the Series/1 in hardware
    and systems software, (see section VIII).

  - In each country IBM, the users and the systems/software
    houses will produce applications software in quantity
    and variety to surpass the software available from any
    single minicomputer model from any other vendor.

  - The development of the Series/1 initial market impetus
    will continue without any significant competitive
    reaction to 1980, due to the lack of conviction by
    the minicomputer community that the Series/1 will
    impact them ; by the time the significance of the
    product is realised the Series/1 will (a) be an
    established product and (b) have a vastly expanded
    profile to that of today.

  - All systems in the backlog at year-end are shipped
    in the next year, and the backlog is cleared in (i)
    5 months in 1979 (ii) 6 months in 1980 (iii) 7 months
    in 1981, (the peak shipment year). Thus the level of

INPUT

the backlog determines shipments to a large extent.

- The volume of unit shipments indicated includes all applications of the Series/1, i.e. :

    - commercial applications
    - process control and scientific applications
    - controller functions (particularly data entry/collection)
    - network node and front end
    - remote batch terminal/satellite processor.

A.   GROWTH OF SERIES/1 SHIPMENTS AND INSTALLED BASE

- Today's Series/1 has a number of considerable problems in reaching the marketplace :

    - support staff is rare and inexperienced
    - some basic software is inadequate or not yet available (i.e. the 128K O/S)

    - the software that is available is sometimes of doubtful quality (e.g. PL/1)

    - availability of some of the hardware elements is sporadic (e.g. 5 months for the line printer as against as little as 3 weeks for the starter kit).

- But the overriding consideration for the Series/1 is that the users are excited about its possibilities and are convinced that "it will all come right in the end". This is a leeway not often accorded to other vendors, the value of which, in market development terms, is inestimable.

INPUT

- Forecasting the penetration in each country market, therefore, is an unusual task,in that normal product acceptancy limitations and market resistance do not apply. That the product has problems is not disputed by users ; they are very critical but these same problems are not in anyway a deterrent to the product's success.

- The country forecasts that follow are therefore subjective and based largely on INPUT's "feel" for the product's potential, developed in talking to the early users of the product, and enhanced by the basic assumptions made above and in section II-E (replacement product, competitive response). The orders, shipments and installed base forecasts have been related, in each country, to the installation support mix currently found. The projections are by users (to 1980) and INPUT (to 1983).

- No limitation has been placed on the sectorial penetration of the Series/1 : current shipments have shown that the scope of the product is unlimited in applicational terms, and what it lacks today will be available tomorrow.

B.   MARKET IN WEST GERMANY 1978-1983

- The Series/1 has spread rapidly into many applications in West Germany. Foremost among these are :

    - Wholesale distribution (Photo wholesalers, Chemicals, Pharmaceutical, Tobacco, Food)

    - Local Government

    - Manufacturing (particularly warehouse control)

- 105 -

INPUT

FORECASTED INSTALLATION SUPPORT MIX WEST GERMANY, (1978-1983), % of systems installed.
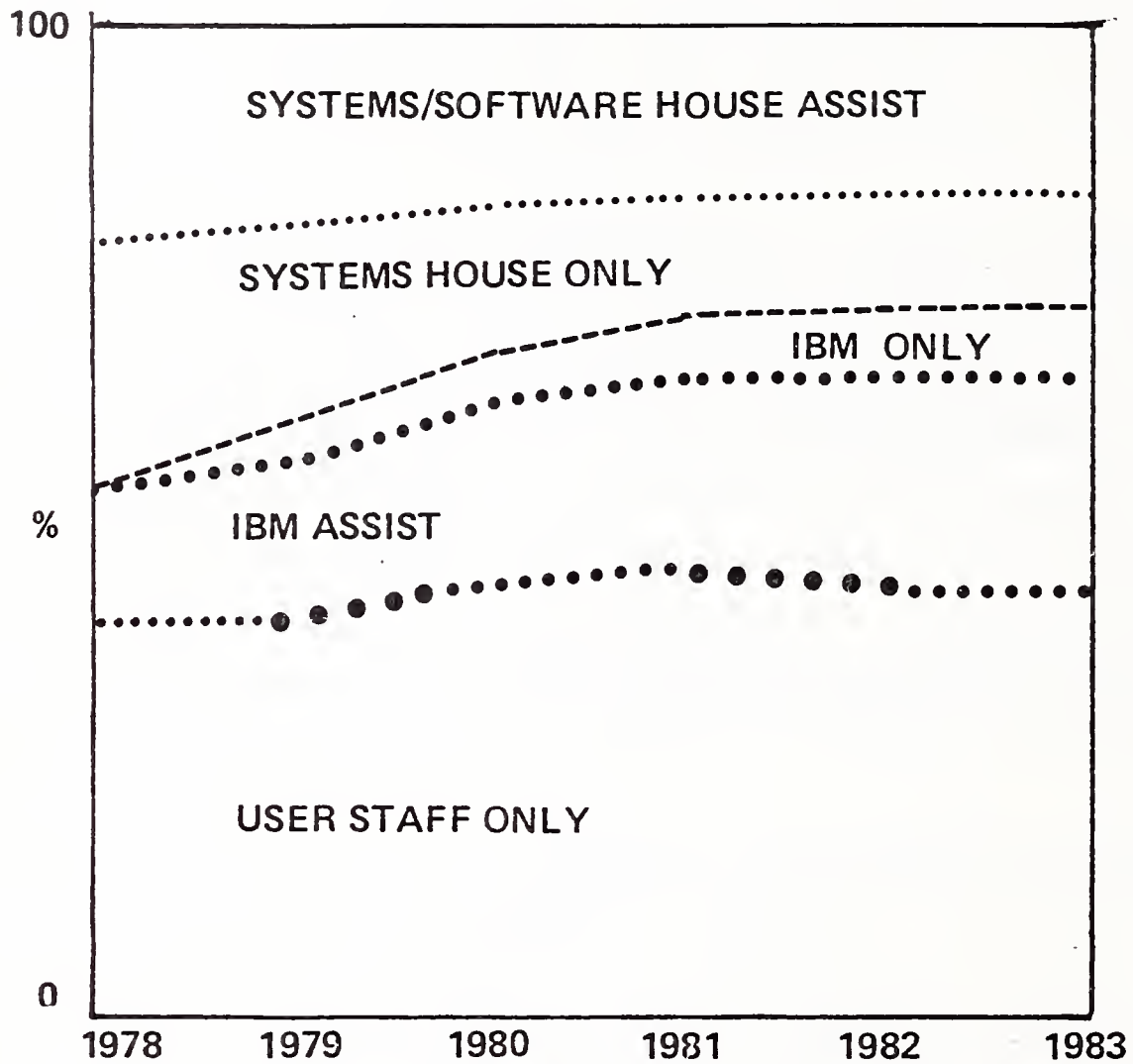
	1978	1979	1980	1981	1982	1983
S/S/H:	22	20	28	27	27	27
SYS:	24	20	15	12	12	10
IBM-O:	—	4	5	6	7	7
IBM-A:	14	16	18	20	21	23
USER:	40	40	44	45	43	43

- In most cases the basic requirements is that of distributed processing. The applications running on current installed Series/1s are straightforward : order processing, invoicing and inventory control. In the case of the main local government contract, in addition to the local processing for the township,there will be a tie-in to the central host computer at the state (Land) level.

- The significant feature of the West German market, compared with the other markets analysed, is the independence and maturity of the users : they intend to decrease their reliance on outside services as soon as possible. There are instances of some very large turnkey installations,but here again the users plan to develop their own in-house expertise.

- The support required from IBM is therefore forecast to be far lower than in other countries, either as the sole source of programming support or as an assist to in-house staff.

- On the systems house turnkey front, INPUT expects the volume of business to grow substantially. However, given the limit of available manpower, in percentage of installed systems this will mean a decline from 1978's high level. In number of systems, the volume will grow from 55 in 1978 to 660 by 1981.

- As to the assistance expected from systems/software houses in complementing the user staff's own programming, this also will grow in terms of first-time applications. Once the users are off the ground, however, the demand for repeat assistance will drop off rapidly.

INPUT

ORDERS, SHIPMENTS & INSTALLED BASE FORECASTS FOR WEST GERMANY (1978-1983)

LEGEND:
- — — ORDERS
- —··— SHIPMENTS
- ·········· INSTALLED
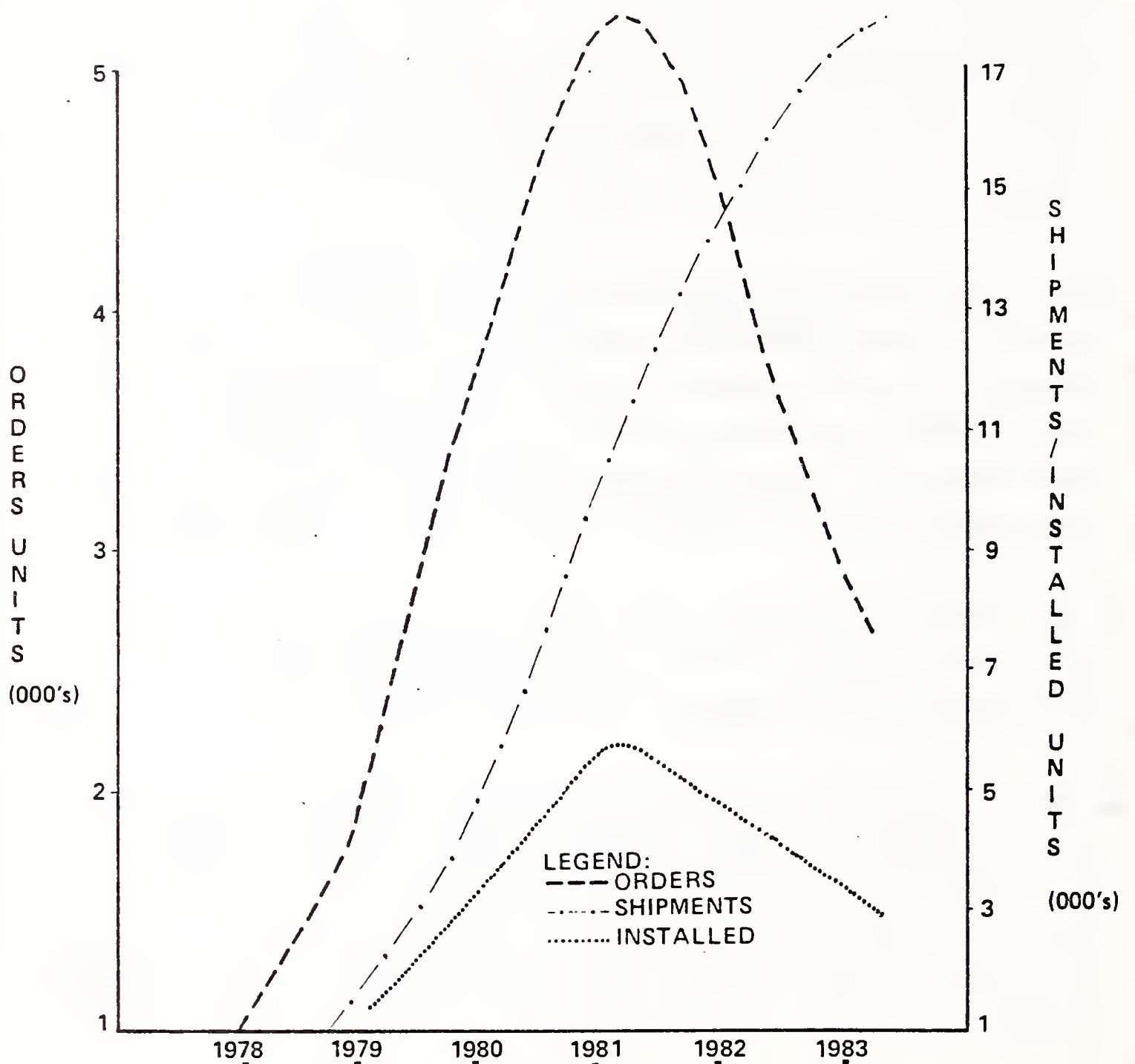
YEAR END:		1978	1979	1980	1981	1982	1983	
UNITS	INSTALLED:	230	1450	4650	10100*	14,200*	16,800*	
	ORDERS:	900	2000	3800	5000	3900	2600	
	SHIPMENTS:	230	1220	3200	5500	4200	2800	
%	OEM:	17	15	16	13	11	10	* NET OF
	IBM:	83	85	84	87	89	90	RETURNS

INPUT

ORDERS, SHIPMENTS AND INSTALLED BASE FORECASTS

- West Germany is the Series/1 market with the most potential, mainly due to the maturity of the German user, in terms of his self-sufficiency in software/programming developments. In addition, the West German market is a disciplined one, which has a tendency towards tight standardisation. In this manner, an application, once developped, can be broadly applied with limited modification.

- Orders are expected to reach 900 by year-end 1978, growing to a peak of 5000 in 1981. These will contain a high percentage of repeat purchases, from existing Series/1 users, particularly those implementing distributed data processing.

- Shipments, expected to reach 230 by year-end 1978, will increase rapidly in 1979 and more than double again in 1980. The peak shipment year is expected to be 1981 with 5500 systems.

- While Exhibit VII-2 shows O.E.M. shipments decreasing in percentage terms, the actual volume will, of course, increase sharply to a peak of 715 systems in 1981. Thereafter the systems house's attention will begin to center on the new announcements, leaving the Series/1 business to gradually decline.

- The German market is arguably the best prepared for implementing distributed data processing concepts, while maintaining a high degree of site independence. The Series/1 is highly suited to the EDP needs of the single establishment, with its combined business/process control processing abilities and simple standard communications facilities for their interconnection when needed.

INPUT

C.   THE FRENCH MARKET (1978-1983)

- The French market is difficult to characterize, since user opinion is so much more difficult to come by than it is in all of the other countries (reluctance to respond to questionnaires in general) and even when opinions are given, they usually represent a policy pronouncement to the outside world, rather than a frank, reasoned indication of satisfaction, dissatisfaction, intentions etc. Very few users agreed to their names being used.

- It is necessary to caution the reader, therefore, that what follows is the picture that emerges from the interviews, which may be slightly distorted by "policy" statements.

- At the end of August 1978, 60% of the systems installed were being implemented by the end-users themselves, and a further 20% with the assistance of IBM. None were found that were being entirely programmed by IBM. (see Exhibit VII-5).

- Systems and software houses assistance accounted for a further 15%, but very few were being implemented on a turnkey basis ; the contracts concern specific, single applications, often of a specialised nature.

- This situation is not expected to vary considerably, with the exception of the end-user autonomy. The proportion of systems programmed solely by the end-user is expected to drop from 60% in 1978 to 35% by 1983, due largely to a 40% increase in the assistance provided by IBM and an increase in the number of systems requiring hand-holding by IBM.

INPUT

FORECASTED INSTALLATION SUPPORT MIX FRANCE, (1978-1983), % of systems installed
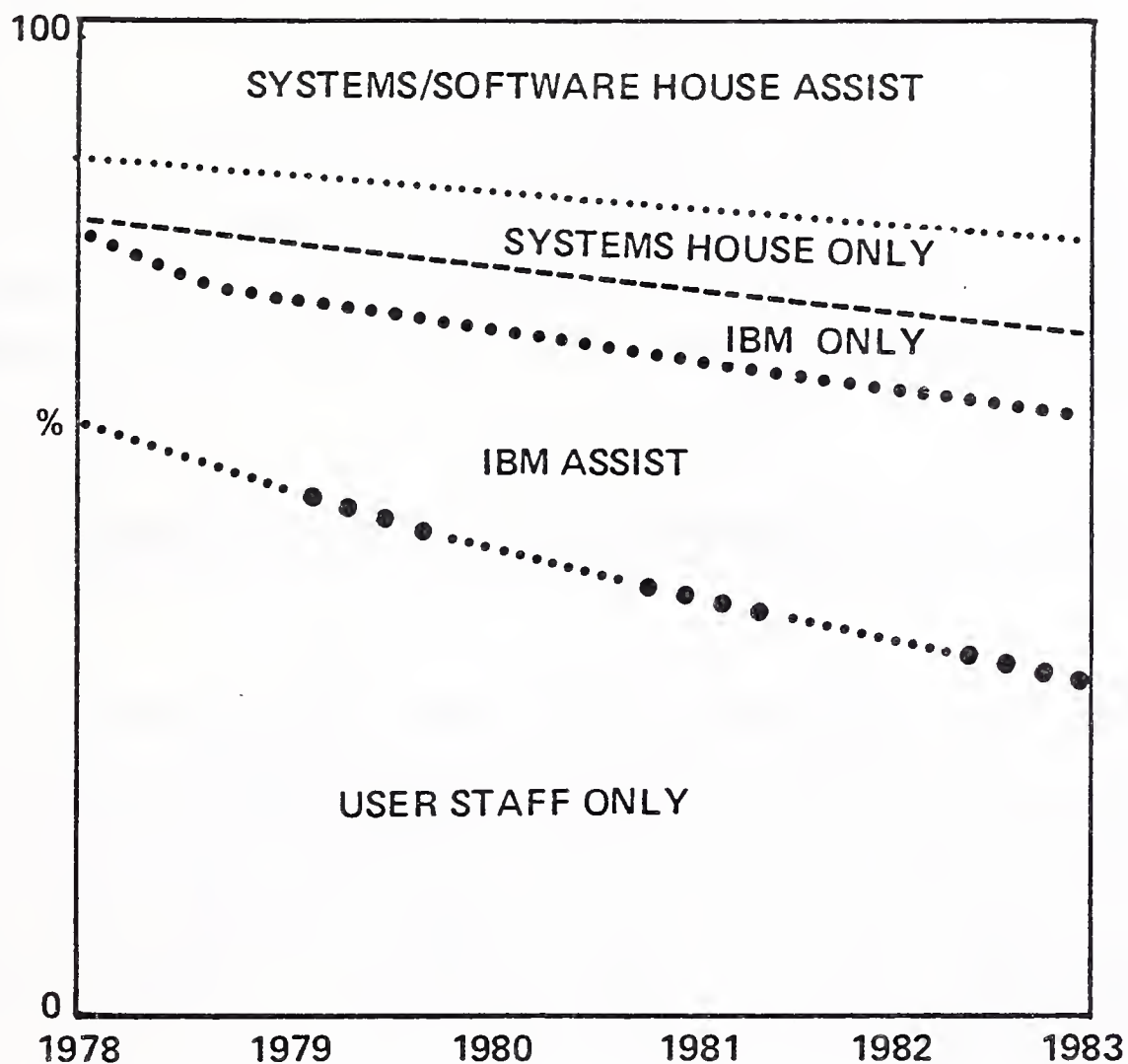
	1978	1979	1980	1981	1982	1983
S/S/H:	15	16	17	18	19	20
SYS:	5	6	7	8	9	10
IBM-O:	—	5	6	7	7	7
IBM-A:	20	23	25	27	27	28
USER:	60	50	45	40	38	35

- Turnkey systems are not expected to cover more than 10% of the installations, in any one year, for a cumulative total of a little over 1400 system shipments (8%) over the six year shipment period.

- System and software houses will be providing assistance to between 15 and 20% of shipments per year, or for a cumulative total of more than 3200 systems. IBM and the user will be installing between 80% (1978) and 70% (1983) together.

ORDERS, SHIPMENTS AND INSTALLED BASE FORECASTS

- France is a prime European market for any IBM product, second only to West Germany, and the IBM Series/1 is not expected to be any different. Indeed, the modular architecture of the Series/1 and the wide-ranging requirements of the French market go well together and should prove a profitable combination for IBM.

- Orders at the end of August 1978 stood at 500 and are expected to compare to 700 by year-end. By 1981 orders will have grown to 3600, declining thereafter to 1500 by 1983.

- Shipments follow suit, with the 1978 total of 190 systems improving rapidly to 960 in 1979 and expanding to 4340 by 1981. Installed systems will peak at 12,000 by year-end 1983.

- By 1980, the majority of systems will be going into less autonomous end-users, who will need a measure of assistance for programming their applications. By then, however, the range and variety of application software available from IBM, the software houses and other users will have grown to

- 112 -

INPUT

ORDERS, SHIPMENTS & INSTALLED BASE FORECASTS FOR FRANCE (1978-1983)
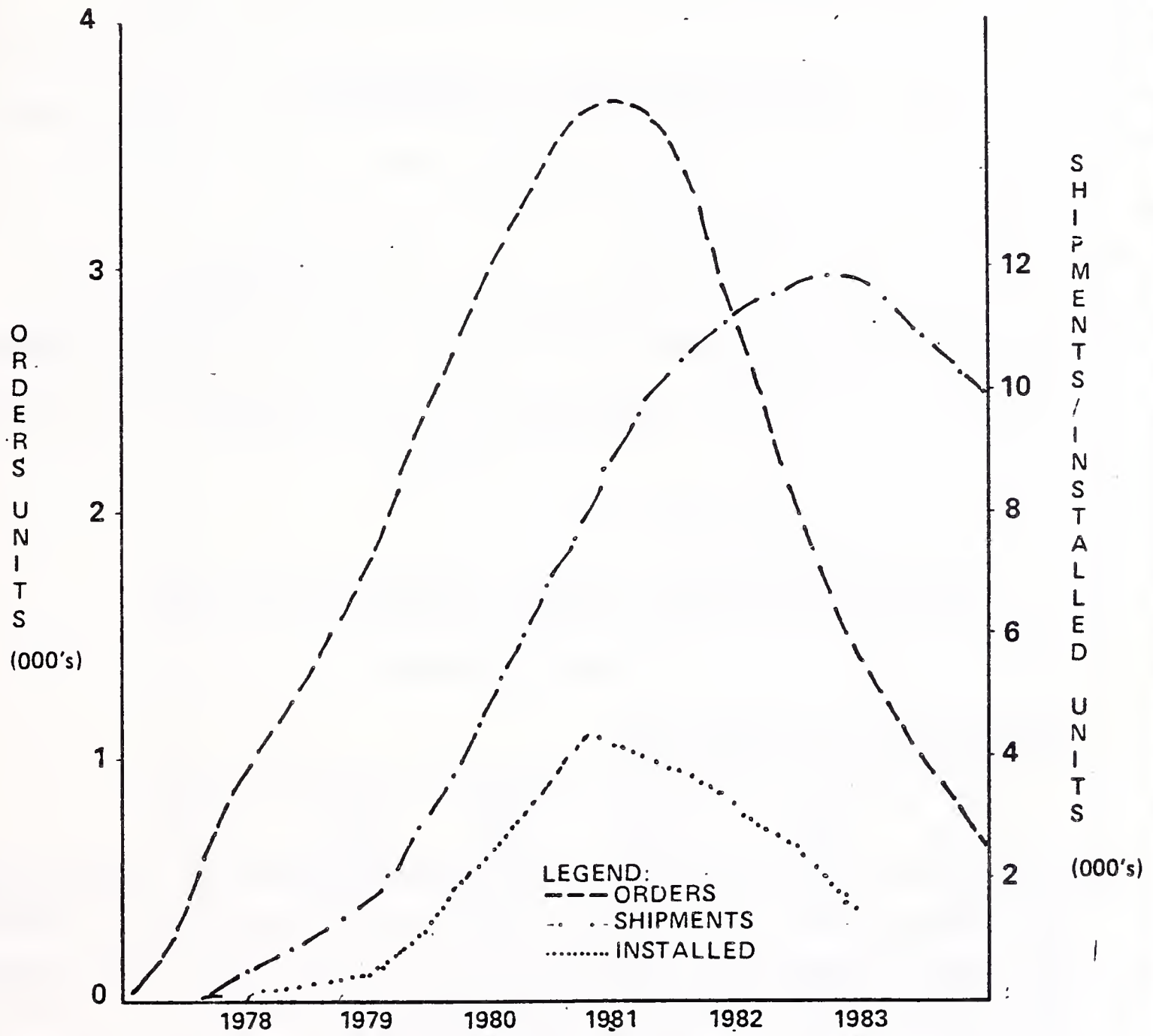
YEAR END:		1978	1979	1980	1981	1982	1983
UNITS	INSTALLED:	190	1150	3660	8000	10,900*	12,000*
	ORDERS	700	1600	3000	3600	2900	1500
	SHIPMENTS:	190	960	2510	4340	3,000	1250
%	OEM:	15	18	17	16	12	10
	IBM:	85	82	83	84	88	90

LEGEND:
- — — ORDERS
- — · — SHIPMENTS
- .... INSTALLED

* NET OF RETURNS

INPUT

significant proportions (over 3600 systems installed) and much of the basic software requirements needed for the expansion of 1980-1983 will be on the market.

- Thus while IBM's committment to assisting end-users will inevitably grow, it will not be needed to the extent that other vendors would have to face, due to this flywheel effect.

- In this way, IBM's goal of reduced involvement with the implementation side of the Series/1, begun with the product's launch, will be able to be continued throughout the product's commercial life.

D.   THE MARKET IN THE UNITED KINGDOM (1978-1983)

INSTALLATION SUPPORT MIX

- The survey of UK Series/1 users showed that two thirds of the software for the initial systems was developed by the end-users themselves, either alone or with IBM's assistance. IBM has not yet offered to implement the Series/1 for the user, but this will undoubtedly occur over the next few years for selected important accounts.

- Exhibit VII-5 shows the developments that are expected in each support category over the next five years. User implementation with or without IBM assistance is expected to take care of half or more of the installations, decreasing from 1978's 66%.

INPUT

FORECASTED INSTALLATIONS SUPPORT MIX UNITED KINGDOM, (1978-1983) % of systems installed
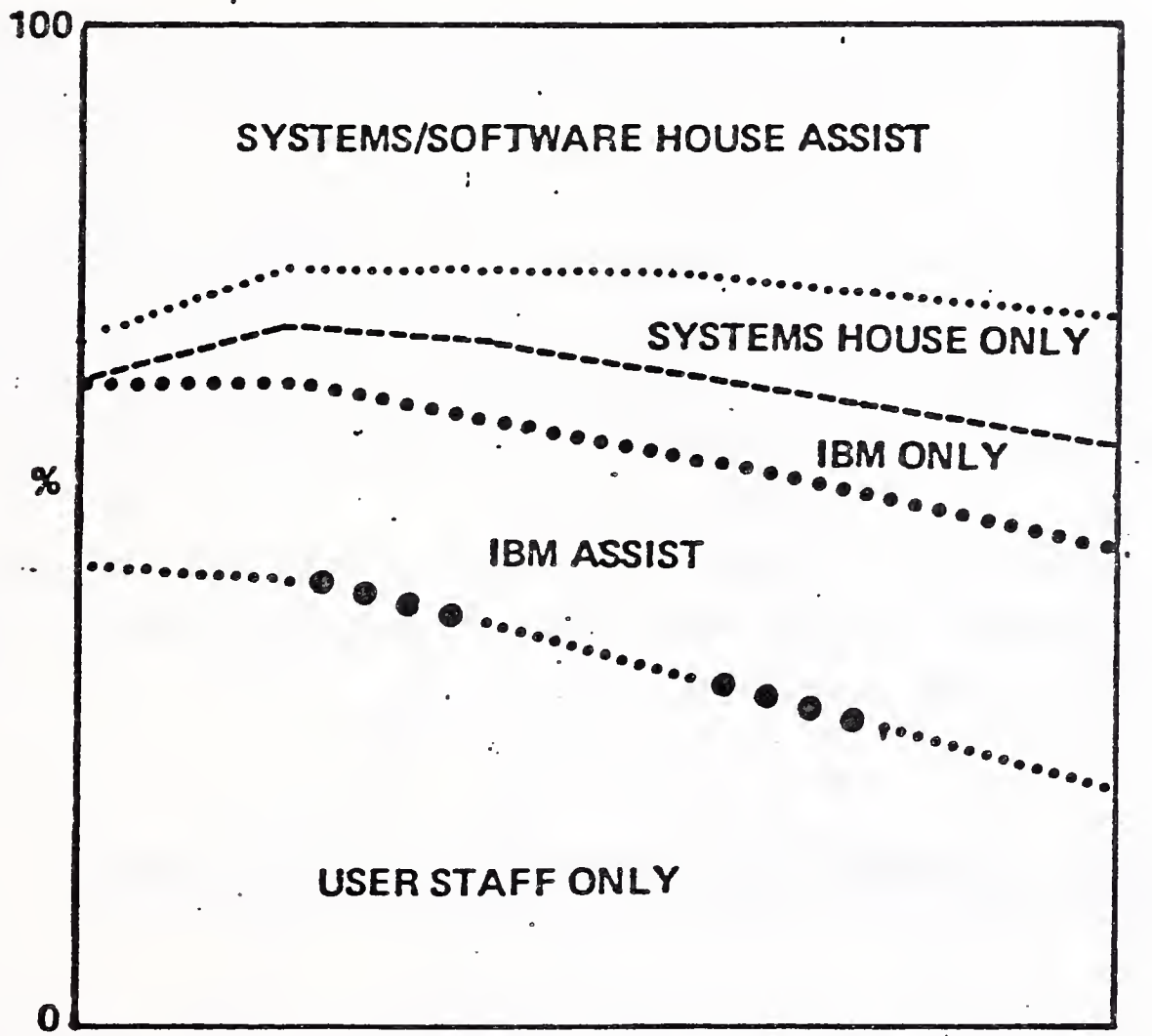
	1978	1979	1980	1981	1982	1983
S/S/H:	30	24	24	25	27	29
SYS:	4	6	8	10	11	12
IBM-O:	—	5	7	8	9	10
IBM-A:	18	20	21	22	23	24
USER:	48	45	40	35	30	25

- II5 -

- IBM software developments for key accounts are expected to grow from 5% to 10% of shipments, or a little under 700 systems over the five year period.

- The role of the systems houses will gradually increase, either as a source of sole support or of assistance to end-user staff, from 34% in 1978 to 41% in 1983. IBM has already sold a number of small single systems ("starter kits") which are providing the system houses with demand for general business applications. Very few scientific applications or process control work were found in the U.K.

- Throughout the forecast period the systems houses will not be involved in more than 40% of the installations and as little as 30% (in 1979).

ORDERS, SHIPMENTS AND INSTALLED BASE FORECASTS

- At the time of writing, it looked as though IBM would have difficulty installing 150 Series/1 in the U.K. by the end of 1978. INPUT believes this is below IBM's sales target. The key to the lackluster performance is the lack of qualified, experienced support people ; this has been noticed by the end-users. One manager's comment was : "they try hard with inadequate staff".

- This is expected to be a temporary problem, and the assumption has been made in the forecasts in Exhibit VII-6 that this limitation will not continue.

- O.E.M. shipments are so far non-existent but are expected to pick up in 1979 when the systems houses have managed to organise themselves. Nevertheless, shipments from this source are not expected to exceed 270 systems a year (in 1981) and

- 116 -

INPUT

ORDERS, SHIPMENTS & INSTALLED BASE FORECASTS FOR THE U.K. (1978-1983)
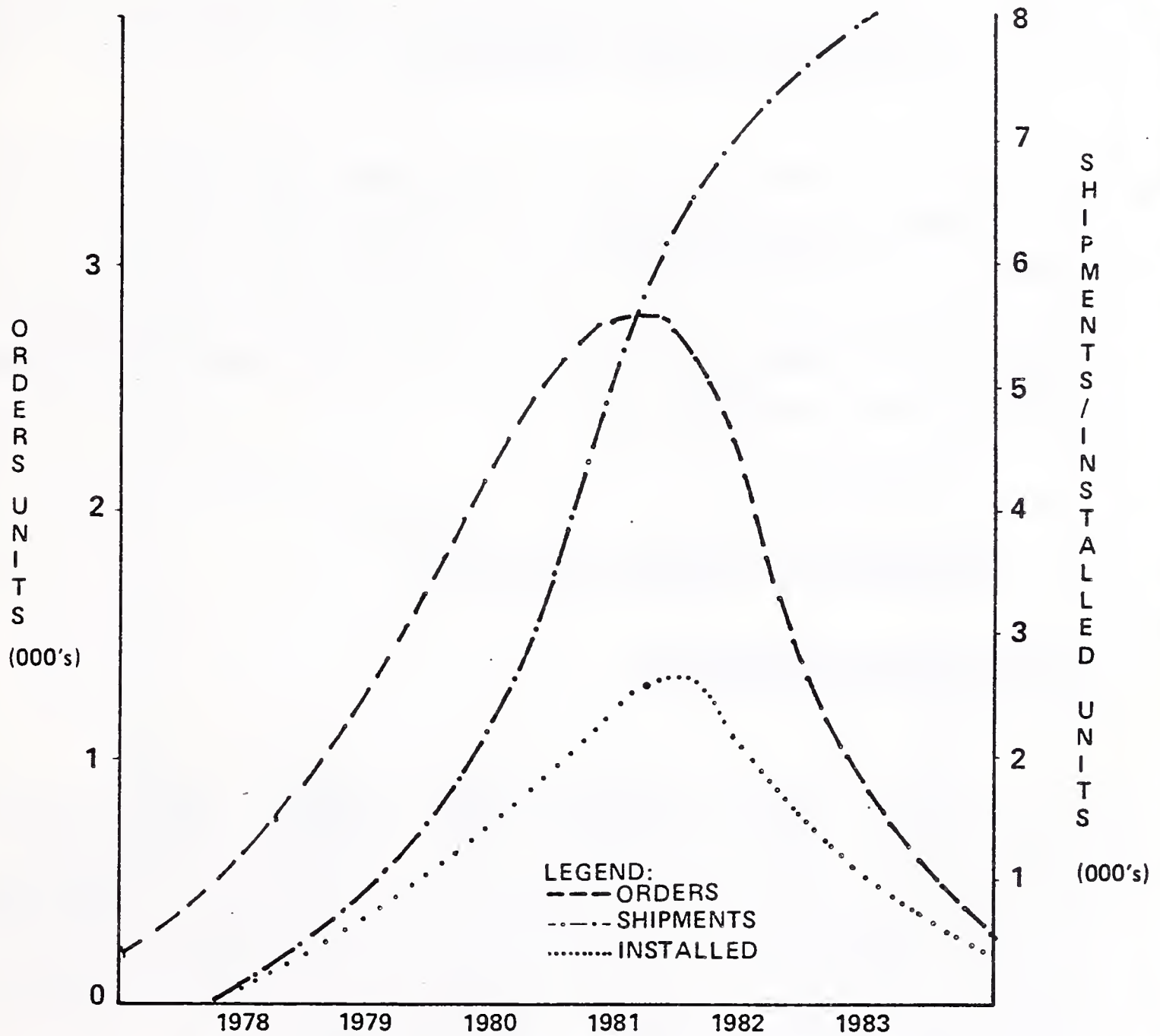
YEAR END:		1978	1979	1980	1981	1982	1983	
UNITS	INSTALLED:	150	850	2600	5600	7700*	8650*	
	ORDERS:	550	1250	2300	2800	2200	1100	
	SHIPMENTS:	150	700	1750	3000	2200	1000	
%	OEM:	—	7	8	9	8	7	* NET OF
	IBM:	100	93	92	91	92	93	RETURNS

INPUT

on average, will be slightly more than 140 systems a year.

- Orders at the end of August 1978 were 380 systems, and expected to reach 550 by year-end. In 1981 orders are expected to grow to a peak of 2800, five times the 1978 level.

- The installed base is projected to grow significantly from 150 systems in 1978 to 8650 by year-end 1983. It must be emphasized, however, that this is highly contingent on a market improvement on (i) IBM's sales effort, (ii) IBM's support staff, both in number and quality. INPUT's forecast includes these assumptions.

E.   THE MARKET IN ITALY (1978-1983)

INSTALLATION SUPPORT MIX

- In Italy, the majority of the first Series/1 installations software have been developed by the end-users themselves, with IBM or systems/house assistance. Where this assistance has been substantial, IBM has retained ownership of the software produced. Isolated systems have also been installed solely by systems houses or solely by IBM.

- By taking users intentions for future software development as meaning 1979/1980, an indication of the trend in support of the Series/1 in Italy has been established and is shown in Exhibit VII-7. According to the survey's respondents, the role of the systems and software houses will gradually increase, but only as a source of supplementary assistance rather than in a turnkey role.

- 118 -

FORECASTED INSTALLATION SUPPORT MIX
ITALY, (1978-1983), % of systems installed
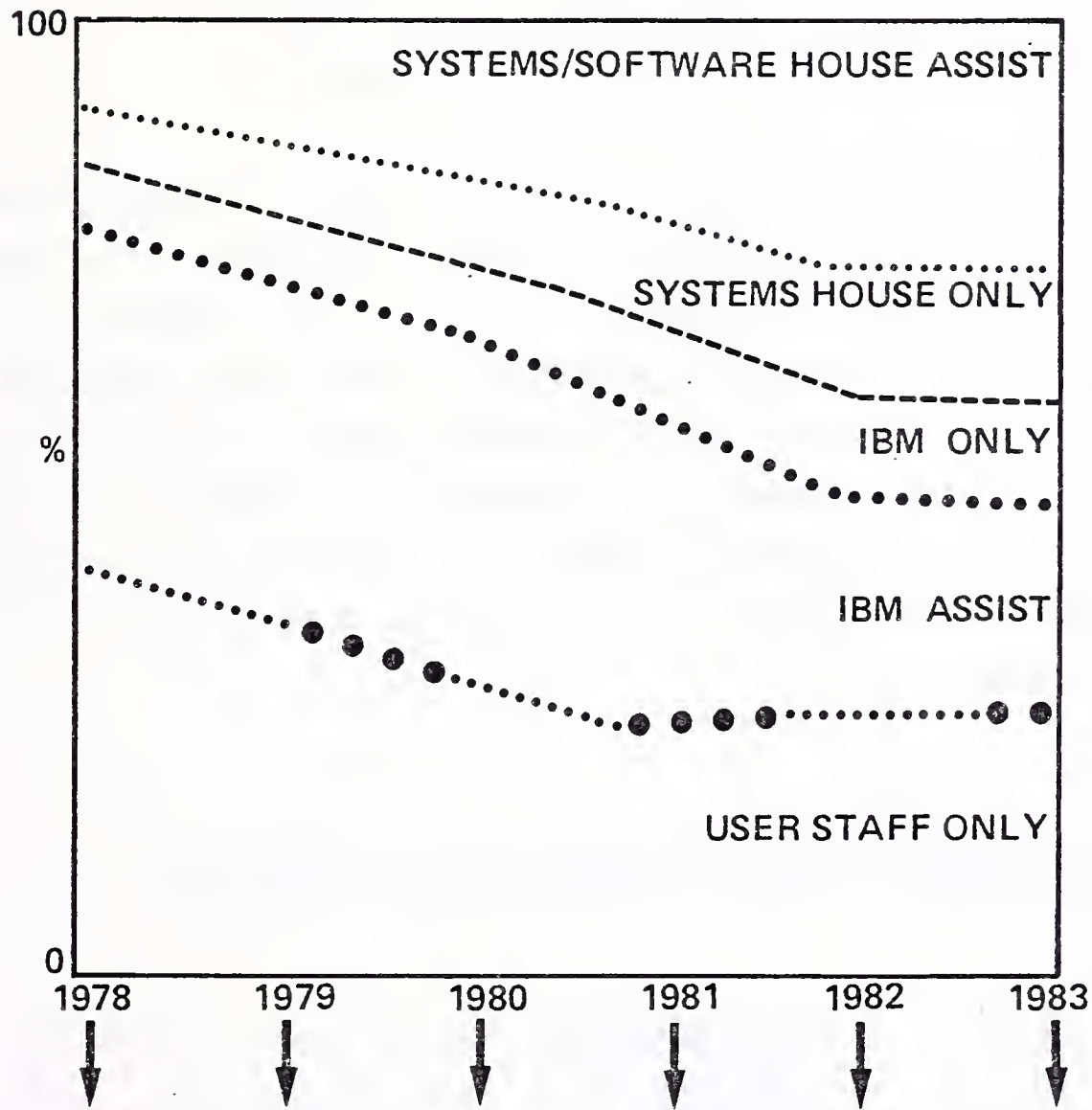
	1978	1979	1980	1981	1982	1983
S/S/H:	7	14	21	25	25	25
SYS:	7	10	12	13	14	15
IBM-O:	7	8	9	10	10	10
IBM-A:	36	31	26	24	23	23
USER:	43	37	32	28	28	27

INPUT

- In the same way, while it is expected that IBM will limit the number of installations where they supply the majority of the software development effort to large/very large and prestige accounts, users anticipate relying on them for hand-holding for the foreseeable future.

- Over the five year forecast period, the number of systems that will be installed by end-users via their own in-house staff is expected to drop sharply, as the Series/1 begins to penetrate the smaller companeis who need implementation/installation support. By 1983 the proportion of autonomous end-user installations will nevertheless be still quite high : 27%. The peak year for shipments of this type will be 1981, when over 700 systems are forecasted for installation by the end-user.

ORDERS, SHIPMENTS AND INSTALLED BASE FORECASTS

- At the current rate of installation, IBM will have 140 Series/1 installed by year-end 1978, more than double the amount found at the end of September this year. Of these systems none are expected to be sold through systems houses or other third party distributors.

- Orders at the end of August 1978 were 300 systems and are expected to rise to 450 by year-end. The main emphasis, in selling the Series/1 in Italy, has been on general business systems in network-connected mode, but a large proportion of process control applications have been installed, larger than anywhere else in Europe.

- Through 1981, the growth in orders, shipments and installed systems is as expected to be fairly rapid, as shown in Exhibit VII-8. Thereafter, while the installed base will

INPUT

ORDERS, SHIPMENTS & INSTALLED BASE FORECASTS FOR ITALY (1978-1983)
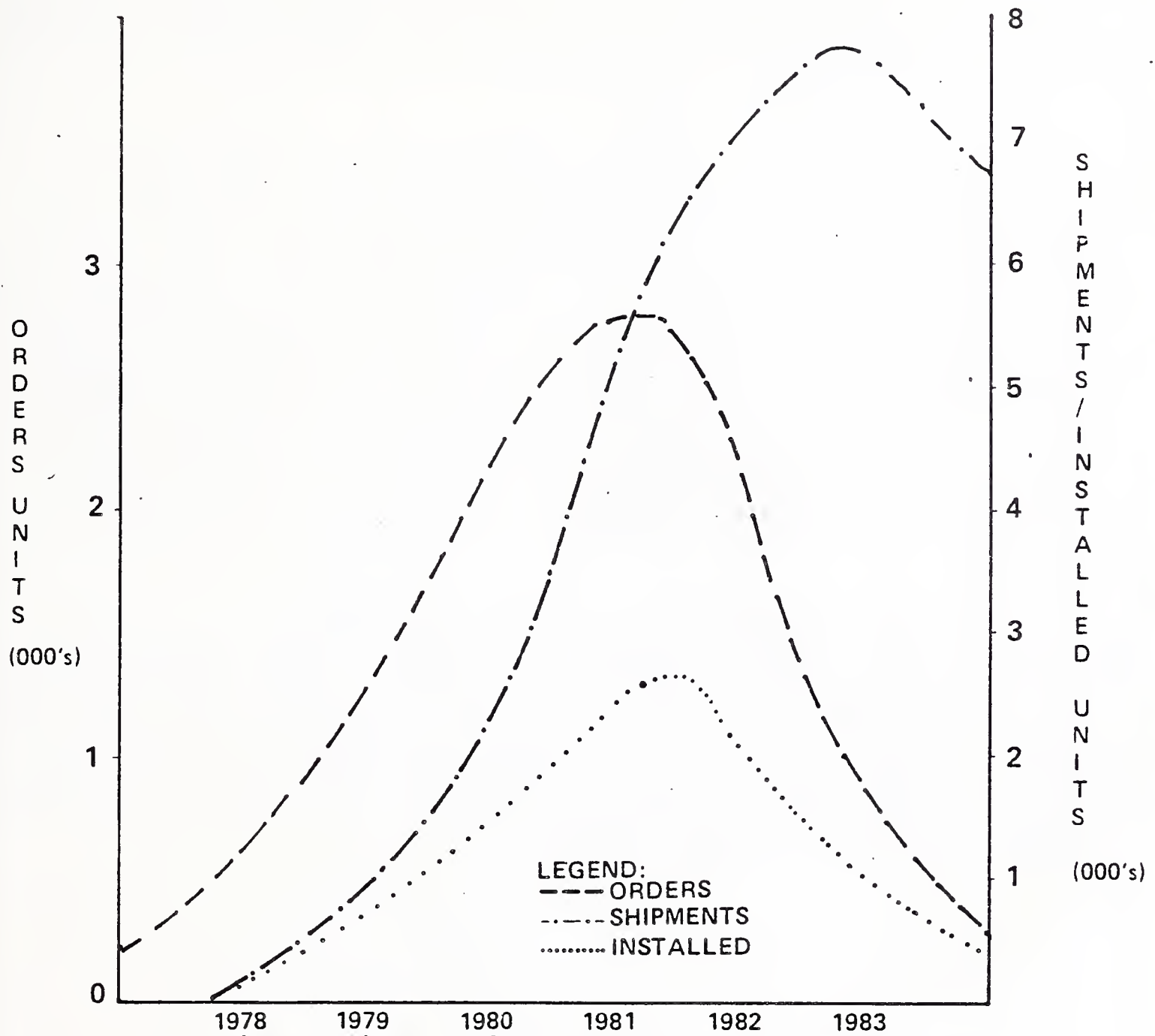
YEAR END:	1978	1979	1980	1981	1982	1983
UNITS INSTALLED:	140	700	2200	4800	6500*	7200*
ORDERS:	450	1100	1760	2100	1700	800
SHIPMENTS:	140	560	1500	2600	1800	800
% OEM:	0	10	11	12	10	8
IBM:	100	90	89	88	90	92

* NET OF RETURNS

INPUT

continue to grow to a peak of 7200 systems, orders are
expected to decline, in favour of the replacement, upgrade
product discussed in section II.

- Over the forecast period the OEM share of shipments is
expected to begin with a modest 56 systems in 1979, and
rise to a peak of nearly 300 systems in 1981. The attraction
of competitive products (both from IBM's replacement/upgrade
product and from IBM's competitors) is expected to begin
having its impact in 1982, when shipments through OEM's will
drop to 180. The systems houses will continue to assist in
installation support, however, throughout the forecast
period.

- Cumulatively, gross shipments by OEMs to the Italian market
are projected to be just over 750, while IBM will ship over
6600 systems. In 1982 losses due to returns are expected to
become significant, causing a loss of 1.5% of the installed
base, continued through 1983.

INPUT

VIII. THE DEVELOPMENTS TO 1983

INPUT

VIII.   THE DEVELOPMENT TO 1983

- The current product profile of the IBM Series/1 in Western
  Europe, (and, as a result, the perception that the competition
  has of it) is a misleading one. Given the short time frame
  within which the product has been delivered and installed,
  this is not surprising. However, it is important that long
  term decisions on the Series/1 should not be taken based on
  the narrow view of the product's potential which is currently
  visible.

- This section attempts to broaden the visibility of the product
  (VIII-A), the market in which it is being sold (VIII-B), the
  strategic environment which affects that market (VIII-C) and
  discusses the main areas affecting data processing development
  (network demand).

A.   THE IBM SERIES/1 1978-1983

- In addition to the considerable attention being paid to the
  IBM Series/1 by the software and sytems houses, and the PCM
  vendors, IBM's own research and development efforts will be
  producing a rapidly evolving suite of enhancements to the
  Series/1.

- It is hazardous to list IBM's intentions in this area since
  such intentions are always subject to wide-ranging strategic
  decisions which INPUT has no knowledge of, and/or tactical

- 123 -

INPUT

responses to competitor's moves, the schedule of which is always changing.

- However, using the basic requirements of today's Series/1 as a guideline a list of potential enhancements can be drawn up. (See Exhibit VIII-1). The most logical time frame of these announcements has been appended.

- On the mainframe (processor and memory) side, there is an urgent need of an increase in the size of the memory for (i) the wide range of applications the Series/1 is being applied to (ii) to satisfy the requirements of IBM's own software (e.g. existing RPS and new versions, impending COBOL compilers) and (iii) to allow the unhindered development of integrated process control/commercial application system sales.

- New, faster processor models are likely to be announced simultaneously (as the base for the larger memories), with the addition of special function instruction set boards. As these new processors are announced, it is probable that IBM will reduce the price of the existing processors.

- In the peripherals area, faster printers, a larger disk, enhanced communications and a file back-up tape transport are expected. In addition improved display units are likely, given the virulent criticism by users of the existing 4978/9 devices.

- The software enhancements necessary are very broad. Exhibit VIII-1 excludes, in this regard, the enhancement versions of existing operating systems and compilers that will be necessary to cope with the expanding memory size and variety of peripherals. A telecommunications monitor is a necessity, as several

- 124 -

INPUT

users have already identified. It is highly likely that the Series/1 will enter the network communications market as a network module, probably as a front-end device and/or as a network node.

● The distributed data processing environment is a fundamental market for the Series/1, as such, and will necessitate the development of adequate software support in the key area of database management.

● In addition, IBM will be providing the Series/1 with applications for narrow vertical markets (where country/industry branch needs present adequate sales potential) across a broad spectrum of requirements. The launch of these products can be initiated by system houses who develop packages finding broad appeal.

B.   MINICOMPUTER-BASED SMALL BUSINESS SYSTEMS

● With the growing volume of office computers (OCs) and small business computers (SBCs) that use a standard or customized minicomputer as the building block for the system, there is no justification for distinguishing the latter from minicomputers that are used for commercial applications. The Series/1 has already largely entered this business market, in addition to offering process control/real time processing abilities which the OCs and SBCs cannot match.

● The same can be said of products from other traditional minicomputer vendors (DEC, MAI, DG) who have now been joined by the business computer vendors (IBM, Honeywell). However, the Office computer vendors often have neither the product nor the marketing support needed for process control/real time applications which can exclude their products from contention when these needs are either paramount or ancillary,

- 125 -

ENHANCEMENT	1979	1980	1981
A. MAINFRAME			
• New processor models (increased power)	X	X	
• 512 K bytes Memory	X		
• 1024K bytes Memory		X	
• Special function instruction set			X
• Price reductions	X	X	X
B. PERIPHERALS			
• 3330-type 100MB disk drive		X	
• 75ips 800/1600 bpi tape unit and con- troller	X		
• 600 lpm printer	X		
• 1200 lpm printer		X	
• Solid state fast access memory			X
• Improved display units		X	
• Enhanced communications	X		
C. SOFTWARE			
• Telecommunications monitor	X		
• S/1 front-end support		X	
• Specialist compilers support			
- CORAL '66	X		
- PASCAL	X		
• Database management for DDP environment	X		
• Focussed, vertical market applications	X	X	X

EXHIBIT VIII-1

INPUT

(e.g. in integral business/process control applications).

- This leaves the traditional minicomputer manufacturers with a decided advantage in attacking the market for integrating the shop floor with the EDP centre, whereas the Office computer vendor will have the edge for integrating the EDP centre with the Office.

C.   DISTRIBUTED DATA PROCESSING IN EUROPE

- In a recent (September 1978) study of "DDP" users installations and "DDP" product vendors, INPUT was unable to find a clear consensus of users and vendors on the definition of Distributed Data Processing. It would appear that each vendor has adapted the DDP concept to his own product availability, using it as a marketing tool rather than as a strategy.

- From INPUT's work with vendors and users in the DDP environment, the following definition emerges :

    "Distributed Data Processing is the deployment of programmable intelligence, in order to perform data processing functions where they can be accomplished most effectively, through the interconnection of processor and terminal devices via a telecommunications network".

- DDP, as a blurred concept, is gaining acceptance with users and vendors alike and must therefore be factored into medium and long term planning strategies. The main consideration is that each unit of intelligence-based equipment must now be viewed as a potential node of future network. Hence a standard mode of intercommunication, (or network architecture) makes eminent sense. In this regard IBM's SNA is providing

- 127 -

a standard interface for the whole range of IBM current
product lines.

- The historical user propensity for centralized control is
  a cornerstone in the DDP product strategy, and is precisely
  targeted by IBM's growing separation of DP division from
  GBG :

  - DP division will receive responsibility for the
    central/controlling corporate user and the multiple
    user establishments

  - GPG will receive responsibility for the peripheral
    company locations and the single user establishments.

- The key driving forces for implementing DDP include (i) the
  dissatisfaction of remote users with the timeliness and
  accuracy of centralized data processor support ; (ii) the
  sheer volume and logistic difficulties of managing data
  from a multiplicity of different sources, each of which has
  its own specialized requirements (iii) redundancy and fail-
  safe advantages offered by a decentralized network of small
  systems.

- There is also an underlying social demand for more delegation
  of authority, coupled with the responsibilities that are
  already established. This is increasingly possible, due to
  the dramatic decreases in price/performance ratios of small/
  mini-computers and the growing integration of intelligence
  with peripheral products and terminals.

- However, although DDP may suggest (and provide) greater local
  independence, it is not synonymous with total local
  autonomy, but rather of increased responsibility in the
  control, capture, pre-processing and transmission of locally

INPUT

sourced data. The actual degree of site autonomy is directly proportional to the corporate management's willingness to decentralize control (as opposed to processing).

D.   NETWORK DEVELOPMENT DEMAND FOR MINICOMPUTERS

- The role of networks in providing processing power and storage to remote sites as well as linking vendors with users, companies (amongst each other and within themselves) has now been fully perceived by users and vendors alike. The enormous potential of this concept has yet begun to be realized in Western Europe due to the stumbling block provided by the PTTs. The latter have successfully muzzled a large portion of vendor initiative.

- Suppliers of network products, architectures, software and services all must work through the PTTs, coordinating their rate of development with that of the PTT in terms of line performance, realiability, availability and the huge body of regulations imposed by these monopolies.

- To date there is a wide variety of network characteristics, network product characteristics, line protocols etc, etc, which need to be adapted to one another in order to build a reasonably sized network. This calls for a cheap programmable node/interface.

- This is an ideal role (and market) for the minicomputer, which can tie workstations together, to the network, provide line multiplexing/concentrator functions, message storage/ forwarding and serve as a front-end to mainframes. They can also double as the local satellite processor, be it in a

- 129 -

INPUT

shop floor, scientific or business application environment.

E.   SERIES/1 INTERACTION WITH THE IBM 8100

- The newly announced IBM 8100 has a number of significant
  differences with the Series/1 :

    - its role is offensive ; (Series/1 is defensive)
    - it is fully supported ; (Series/1 is a do-it
      yourself kit)

    - it is principally destined to act as a tightly
      connected, dependent processing satellite of the
      central IBM 370, being capable of down-loading by
      the 370 with applications and data, and treated
      as a peripheral of the central computer ; (the
      Series/1 is a loosely connected independent proces-
      sing unit, optionally connected to a network and/or
      an IBM 370 or 303X)

    - it has clear targets (DDP market, 3790 replacement)
      and can be viewed as a transparent, arm's length
      extension of the central 370 or 303X ; (the Series/1
      is not aimed at anything, as yet, and is an indepen-
      dent device, even when connected to a 370 or 303X).

- There is no doubt, that the 8100 impacts the Series/1.
  Several of the large users of Series/1 interviewed by INPUT
  spontaneously mentionned the fact that, had they known of
  the existence of the 8100, they would have considered it in
  place of the Series/1.

- It is highly probable (as already mentioned in section II-E)
  that the 8100 will accelerate switch, by the IBM Series/1,
  from the defense of the large 370 and 303X installations to
  the small users and minicomputer market. This will be visible
  as shipments get underway in 1979.

- 130 -

INPUT

A P P E N D I C E S

1. Exchange Rates Used in the Report

2. User Questionnaire

3. Competitor/PCM/Systems House Questionnaire

4. Sample List of Series/1 Users Interviewed

5. Price List United Kingdom

6. Price Elements Germany

7. Price Elements Italy

INPUT

1. Exchange Rates Used in the Report

INPUT

APPENDIX I

- 131 -

EXCHANGES RATES USED IN THIS REPORT

ONE DOLLAR EQUALS :

WEST GERMANY	1.84	DEUTSCHMARKS
FRANCE	4.23	FRANCS
UNITED KINGDOM	0.50	POUNDS STERLING
ITALY	815.00	LIRE

INPUT

2. User Questionnaire

INPUT

USER QUESTIONNAIRE
EUR-S1-1978_____

Country _____

IBM SERIES/1 SURVEY
Int No _____

1.   Did you buy Series/1 Systems from:

IBM _____

A systems or integration house (name):_____

Other (name) _____ _____

2.   As of 8-1-78, how many Series/1s do you have:

a)   installed: _____

b)   on order: _____

3.   What is the installation schedule of those on order?

Models	Quantity	Scheduled Date	Location
a)			
b)			
c)			
d)			

4.   What Series/1 configuration(s) have you ordered?
     (Indicate if any are non-IBM or non-plug compatible peripherals.)

Quantity	Main Memory (Bytes)	Disk or Diskette (Bytes)	Printer (120 cps)	CRT Display	Communi- cations (Describe)	Other	Total Unit Cost

5. What are your estimated Series/1 requirements over and above those on order (as far as you are able)?

       1978: _____ units

       1979: _____ units

       1980: _____ units

       1981: _____ units

6. What delivery time are you being quoted on the Series/1? (months):

7. What applications are being performed? (Please name and indicate "new" (N) or "old" (O).)

a)

b)

c)

d)

e)

8. In order of priority, what will be the new applications you will develop or require? (Indicate "new" (N) or "old" (O).)

Priority	Date Required	Application	N/O
a)			
b)			
c)			
d)			

9. Is your Series/1 programming done:

       in-house

       by IBM

       outside software house

       other (please describe) _____

10. Who will do future programming?

        in-house

        by IBM

        outside software house

        other (please describe) _____

11. If programming is being/was done by an outside software house, please indicate:

a) Name:

b) Location:

c) Who recommended:

d) Degree of satisfaction: 1   2   3   4   5
   (1 = poor, 5 = outstanding)

12. What is/was the programming cost? $ _____

13. If programming is/was done in-house:

a) What software is/was used? (assembler, operating system, languages processor, distributed processing, etc)? _____
_____

b) Would you have preferred using another type of software that was not available? _____

c) Are you concerned about the system's limit on memory size? _____
_____

d) Are you concerned about the lack of instruction set compatibility between the Series/1 and other IBM equipment? _____
_____

14. If future programming will be done in-house, do you plan to use IBM's recently announced <u>PL 1</u>?

        Yes

        No

a) Why?

b) What features do you like?

c) What features do you dislike?

15. a) Who made the final decision on buying the Series/1? (Title) _____

b) Are you an "IBM shop"?   Yes   No

c) Do you think IBM is committed to the minicomputer business?

_____

_____

16. a) Why was the Series/1 selected? _____

_____

b) Were any buyer incentives offered (eg engineering assistance, software development, royalties on software you developed, publicity, discounts or other financial incentives, machine loan, other)? _____

_____

_____

17. What other products did you consider or evaluate and how did you rank them?

Rank	Manufacturer	Product
a) _____	IBM	SERIES/1
b) _____	_____	_____
c) _____	_____	_____
d) _____	_____	_____

18. Were you contacted by a US, European or Japanese competitor of the Series/1?

a)   Yes

b)   No

c) If yes, which companies?: _____

_____

19. What is your attitude toward buying from a foreign manufacturer?
    (ie Japanese, US or non-domestic European).

    Would not consider them as a vendor..

    Would consider and evaluate them as if they had a
    domestic operation.

    Comments _____

    _____

    _____

20. a) What other Series/1 users/references did you talk to?

Individual	Company	City
_____	_____	_____
_____	_____	_____
_____	_____	_____

   b) What other users do you know of in addition to the above?

    _____

    _____

    _____

21. Are you happy that you selected the Series/1?

    Yes

    No

    Too early to tell

22. Evaluate IBM's local support capability: 1   2   3   4   5
    (1 = poor, 5 = outstanding)

23. What do you like best? (strengths) _____

    _____

24. What do you like least? (weaknesses) _____

    _____

25. Since your selection of the Series/1, have any other minicomputer vendor announcements (product or price) had any effect on your decision?

     Yes

     No

If "yes", describe: _____

_____

_____

26. a) Would you consider purchasing non-IBM peripherals and memory for your Series/1 system:

        <u>Yes</u> <u>No</u>   <u>Comment</u>

 Mainframe memory   _____

 Line printers   _____

 Disk drives   _____

 Other (describe)   _____

b) What service and maintenance requirements would you have for these non-IBM add-ons: _____

_____

27. Will you require additional mainframe memory capacity on presently installed system(s)?

     Yes

     No

28. If "yes",

a) quantity of units involved: _____

b) size of additional memory: _____

c) do you have a preference for: static RAM boards

              dynamic RAM boards

              no preference

29. What percentage price reduction do you require for buying non-IBM mainframe memory or peripherals? (circle)

a)   10%   c) 20-30%   e) 40-50%

b) 10-20%   d) 30-40%   f)   50%

30. IBM does not supply memory with Error Correction Code (ECC). Would you be willing to pay a premium for ECC?

Yes, if single bit correction

Yes, if double bit detection

Yes (either)

No

31. What additional Series/1 product announcements do you think IBM will make over the next 18 months?

a) Hardware

b) Software

c) Other

32. What is the basis for your opinion?

IBM salesman said so

Read it in a journal or magazine

Other (identify) _____

_____

33. What other minicomputers have you in place?

Quantity	Manufacturer	Model and Configuration	Year of Installation	Applications

3. Competitor/PCM/Systems House
   Questionnaire

INPUT

Eur-S1-1978 _____

Company _____

Country _____

Contact _____

Title _____

BOTH   1. a) In what markets do you compete with the Series/1?

        b) In what situations have you won or lost? And for what major
            reason, in the user's eyes?

            Won   Lost

BOTH   2. What product announcements have you made in response to the Series/1?

        a) Hardware

        b) Software   —

        c) Price Change

        d) Can you give some examples of users who chose your product over
            the Series/1 in response to such announcements?

BOTH   3. In what Industry sector is the Series/1 most successful, and why?

BOTH   4. What new product announcements do you expect IBM to make on the Series/1? Have the recent announcements changed the product's effectiveness?

        a) Hardware

        b) Software

BOTH   5. In your opinion, how desirable would each of the following capabilities or features be for the Series/1? Please check one column for each row.

Feature/Capability	Not Required	Slightly Desirable	Moderately Desirable	Significantly Desirable
COBOL	___	___	___	___
APL	___	___	___	___
FORTRAN	___	___	___	___
PL/1	___	___	___	___
BASIC	___	___	___	___
RPG	___	___	___	___
CODASYL-type DBMS	___	___	//	___	___
DBMS oriented to distributed data processing	___	___	___	___
Time-Sharing	___	___	___	___
Transaction-oriented display system	___	___	___	___

BOTH   6. Has Series/1 had/or will have any effect on your volume of business?

	+/(-)	Product(s)
1978:	%	
1979-81:	%	

BOTH   7. What percentage of this country's total market do you think the Series/1 will capture?

Year-end

1978:	%
1981:	%

BOTH   8. What do you estimate will be the market for the Series/1 in
            this country?

                        1978   1979

        a) Customer:

        b) Units:

        c) Revenue:

BOTH   9. What, in your view, are the Series/1's main -

        a) Strengths

        b) Weaknesses

BOTH   10. How many Series/1 do you estimate have been installed as of
            8/1/78 in this country?

        11. What do you estimate is IBM's monthly ship rate for the Series/1?

BOTH   12. And estimated backlog?

HARDWARE 13. Have you lost any salesmen to IBM's Series/1 salesforce?
ONLY

HARDWARE 14. Describe your salesman's compensation plan and quota:
ONLY

HARDWARE 15. How do you compare with the Series/1 salesman's plan?
ONLY

HARDWARE 16. How many salesmen do you have in the field? By region:
ONLY

BOTH   17. What are the opportunities open to you, as a result of the IBM
            Series/1, for:

        a) peripheral add-ons_____

            _____

        b) terminal add-ons _____

            _____

        c) applications software _____

            _____

BOTH   18. What are your feelings toward the use of third party memory and
            peripherals? _____

            _____

BOTH   19. How would you like to see the maintenance of these devices handled?

            _____

            _____

4. Sample List of Series/1 Users Interviewed

APPENDIX 4.-

SAMPLE LIST OF SERIES/1 USERS INTERVIEWED

SEGMENTED BY TYPE AND GEOGRAPHIC LOCATION

COMPANY NAME	USER TYPE		GEOGRAPHIC LOCATION			
	END USER	SOFT/SYST. HOUSE	W.G.	FRANCE	ITALY	UK
GONDRAND	X				X	
H.F. REEMTSA	X		X			
CYPHER COMPUTERS LTD		X				X
MESSER GRIESHEIM	X		X			
GENTY CATHIARD	X			X		
MONTEDISON	X				X	
SOPRA	X	X		X		
THOMAS COOK	X					X
MOFFA	X		X			
MARZOTTO	X				X	
ORGAMEDA		X	X			
HAZET-WERKE	X		X			
HERMAN TRAUB	X		X			
SNIA VISCOSA	X				X	
MBP		X	X			
ASSOCIATED PORTLAND CEMENT	X					X
MARS GROUP	X					X
LANEROSSI	X				X	
HADRIAN COMPUTER SERVICES LTD		X				X
GERDES	X		X			
CERF	X			X		
CEMENTARIA DI CASSAGO	X				X	
SYSTEMS PROGRAMMING		X				X
KEIPER	X			X		
SOCIETE PROMODES	X			X		
ANIC	X				X	

SAMPLE LIST OF SERIES/1 USERS INTERVIEWED

SEGMENTED BY TYPE AND GEOGRAPHIC LOCATION

COMPANY NAME	USER TYPE		GEOGRAPHIC LOCATION			
	END USER	SOFT/SYST. HOUSE	W.G.	FRANCE	ITALY	UK
BIESTERFELD & CO	X		X			
G.B. HIGGINS DATA SERVICES LTD		X				X
STADTWERKE-HANNOVER	X		X			
AMBA SOFTWARE		X				X
TUBE INVESTMENTS	X					X
OSRAM	X		X			
AMERICAN MEDICAL INTERNATIONAL	X					X
CASSA DI RISPARMIO DI GENOVA	X				X	
RAFFINERIA DEL PO	X				X	
ALCAN	X				X	
SECAPA		X		X		
NORD RHEIN-WEST- PHALEN	X		X			
ALLIED BREWERIES	X					X
INCINERITORE DI MILANO	X				X	
COGRAM		X			X	
MEDATA	X		X			
NESTLE	X					X
DATAMONT		X			X	
AEROPORTO DI ROMA	X				X	
HEINRICH MACK	X		X			
STEWART WRIGHTSON	X					X
PRAGMA		X			X	
ITALSIDER	X				X	
PHARMA BAUER	X		X			
SIPE	X				X	
ZOLLET	X				X	
SEOTS		X			X	

INPUT

5. Price List United Kingdom

INPUT

APPENDIX 5

PRICE LIST IN UNITED KINGDOM

The prices stated are for your information only and are subject to change. Applicable taxes are not shown. Series/1 equipment is available on a purchase-only basis. Purchase of IBM machines will be by agreement subsequently signed by the purchaser and IBM. The purchase price includes installation and a three-month parts and warranty.

Hardware

Type/feature number	Component	Purchase price	MMMC*
1060	Analog Input Control	£ 522.00	£ 2.90
1065	Analog Output	342.00	3.20
1070	Amplifier—Multirange	597.00	3.20
1300	Programmable Communications Subsystem Controller for machine types 4953, 4955, and 4959	1,848	17.15
1560	Integrated Digital Input/Output Nonisolated	538.00	6.15
1565	Channel Repower	339.00	1.30
1590	Customer Access Panel	126.00	0.65
1593	Customer Access Panel—Integrated Digital Input/Digital Output Cable	251.00	0.65
1594	Customer Access Panel—Customer Direct Program Control Adapter Cable	176.00	0.35
1595	Channel Socket Adapter	48.00	0.35
1610	Asynchronous Communications Single-Line Control	711.00	5.20
2000	Communications Indicator Panel	163.00	1.95
2010	Communications Power	91.00	1.95
2055	Teletypewriter Cable	34.00	0.35
2056	Asynchronous Local Attachment Communications Cable	34.00	0.35
2057	EIA Dataset Cable	51.00	0.35
2058	BSC/High Speed Cable	91.00	0.35
2059	Teletypewriter Customer Access Panel Cable	26.00	0.35
2060	BSC V.35/High Speed DDN Cable	80.00	0.35
2074	BSC Single-Line Control	774.00	6.15
2075	BSC Single-Line Control/High Speed	898.00	6.15
2090	SDLC Single-Line Control	926.00	6.15
2091	Asynchronous Communications 8-Line Control	635.00	5.20
2092	Asynchronous Communications 4-Line Adapter	654.00	10.10
2093	BSC 8-Line Control	793.00	5.20
2094	BSC 4-Line Adapter	812.00	12.55
2100	Extension Cable	89.00	0.35
2724	UK Adapter Cable	51.00	0.35

*Minimum monthly maintenance charge. The services offered under MMMC are described in the customer engineering support section of "Support Services."

8-

Series/1 prices

Type/feature number	Component	Purchase price	MMMC
3525	Digital Input/Process Interrupt Nonisolated	£ 267.00	£ 2.90
3532	Digital Input/Process Interrupt Isolated	453.00	1.55
3535	Digital Output Nonisolated	232.00	2.90
3580	4962 Disk Storage Unit Attachment	531.00	3.70
3581	4964 Diskette Unit Attachment	476.00	3.10
3585	4979 Display Station Attachment	623.00	3.70
3600	Programmable Communications Subsystem Expansion Scanner	1,151.00	9.50
3920	Floating Point	774.00	4.00
4450	Forms Stand	35.00	N/C
4540	Rack Mounting Fixture	39.00	N/C
4700	Half Duplex DCE Attachment	327.00	2.15
4701	Full Duplex DCE Attachment	271.00	1.85
4704	TTY Current Attachment	418.00	3.10
4709	Asynchronous Local Attachment	342.00	1.55
4710	Synchronous Local Attachment	355.00	1.85
4719	Asynchronous Integrated Modem	643.00	7.65
4724	Synchronous Integrated Modem	600.00	7.05
4940	Multiplexer—Reed Relay	456.00	6.15
4950	Multiplexer—Solid State	466.00	3.70
4953	Processor	2,841.00	38.60
	Model A	3,380.00	35.50
	Model B	3,824.00	42.60
	Model C	4,363.00	40.10
	Model D		
4955	Processor	4,015.00	37.10
	Model A	4,015.00	37.10
	Model B	5,156.00	42.00
	Model C	5.156.00	42.00
	Model D		
4959	Input/Output Expansion Unit Model A	1,763.00	23.50

Type/feature number	Component	Purchase price	MMMC
4962	Disk Storage Unit	£4,490.00	£28.00
	Model 1	5,055.00	38.10
	Model 1F	5,584.00	38.10
	Model 2	6,149.00	48.20
	Model 2F	5,597.00	31.20
	Model 3	6,691.00	42.90
	Model 4		
4964	Diskette Unit	1,570.00	10.80
	Model 1		
4973	Line Printer	5,619.00	54.90
	Model 1	8,092.00	72.20
	Model 2		
4974	Printer	1,817.00	16.25
4978	Display Station (The 4978 is an RPQ item and prices can be quoted by your IBM representative)		
4979	Display Station	1,129.00	8.00
4982	Sensor Input/Output Unit	1,091.00	7.00
4987	Programmable Communications Subsystem Model 1	2,591.00	26.00
4990	Communications Console Model 1	486.00	1.25
4997	Rack Enclosure		
	Model 1A	567.00	1.30
	Model 2A	755.00	3.20
	Model 1B	670.00	1.30
	Model 2B	857.00	3.20
4999	Battery Backup Unit		
	Model 1	1,234.00	7.65
	Model 2	.1,221.00	8.00
5430	Customer Direct Program Control Adapter	430.00	4.60
5620	4974 Printer Attachment	606.00	2.25
5630	4973 Line Printer Attachment	612.00	3.50
5650	Programmer Console	303.00	1.55
5700	4973 Printer Attachment Cable Increment	10.00	N/A
5701	4973 Printer Replacement Attachment Cable Basic	54.00	N/A
5720	4974 Printer Replacement Attachment Cable Increment	10.00	N/A
5721	4974 Printer Replacement Attachment Cable Basic	54.00	N/A
5740	4979 Replacement Attachment Cable Increment	10.00	N/A
5741	4979 Replacement Attachment Cable Basic	54.00	N/A
5821	Additional Print Belt for 4973 Model 1 or 2, 48-Character EBCDIC	132.00	N/A
5822	Additional Print Belt for 4973 Model 1 or 2, 64-Character EBCDIC	132.00	N/A
5823	Additional Print Belt for 4973 Model 1 or 2, 96-Character EBCDIC	132.00	N/A

Series/1 prices

Type/feature number	Component	Purchase price	MMMC
6305	4982 Sensor Input/Output Unit Attachment	£ 424.00	£3.10
6315	Storage Addition (16,384 bytes—4953 Processor)	983.00	3.10
6316	Storage Addition (32,768 bytes—4953 Models C and D only)	1,580.00	7.65
6325	Storage Addition (16,384 bytes—4955 Processor)	1,139.00	3.10
6326	Storage Addition (32,768 bytes—4955 Models C and D only)	1,855.00	6.45
6335	Storage Address Relocation Translator	525.00	4.00
7840	Timers	371.00	2.55
7850	Teletypewriter Adapter	365.00	3.10

IBM Series/1 licensed programs

	Program number	Charges* Monthly	Charges* One-time
Realtime Programming System Version 1	5719-PC1	£ 13.35	£ 780.00
Realtime Programming System Version 2	5719-PC2	16.50	977.00
Realtime Programming System Version 3	5719-PC3	20.95	1,256.00
Realtime Programming System Version 4	5719-PC4	25.25	1,492.00
Program Preparation Subsystem Version 1	5719-AS1	11.45	720.00
Program Preparation Subsystem Version 2	5719-AS2	13.35	787.00
Program Preparation Subsystem Version 3	5719-AS3	14.65	865.00
PL/I Compiler and Resident Library	5719-PL1	29.90	1,814.00
PL/I Transient Library	5719-PL3	3.20	188.00
FORTRAN IV Compiler and Object Support Library	5719-FO1	8.90	563.00
FORTRAN IV Realtime Subroutine Library	5719-FO3	3.20	188.00
Mathematical and Functional Subroutine Library Version 1	5719-LM1	4.45	266.00
Mathematical and Functional Subroutine Library Version 2	5719-LM2	5.10	328.00
Programmable Communications Subsystem Preparation Facility	5719-CS0	5.55	327.00
Programmable Communications Subsystem Execution Support	5719-CS1	3.70	220.00
Base Program Preparation Facilities	5719-PA1	58.40**	1,401.60
Facility Control/Power Management 1	5719-U11	85.00***	4,080.00
Facility Control/Power Management 2	5719-U12	122.40***	5,875.20
Facility Control/Power Management 3	5719-U12	33.65***	1,615.20

Series/1 prices

IBM Series/1 programming RPQs

Program	Program number	Monthly* charge	Paid-up cost
Control Program Support	5799-TAA	£10.15	£243.60
Control Program Support Extensions I	5799-TAL	1.30	31.20
Control Program Support Extensions II	5799-TAQ	1.30	31.20
Control Program Support Extended Function	5799-TBQ	1.85	44.40
Indexed Access Method Control Program Support	5799-TAH	3.20	76.80
Control Program Support Commercial Arithmetic	5799-TBD	1.25	30.00
Binary Synchronous Communication Control Program Support	5799-TAF	2.55	61.20
4979 Display Station Control Program Support	5799-TAE	1.30	31.20
4978 Display Station Control Program Support	5799-TAK	3.85	92.40
Control Program Support Disk Table of Contents	5799-TAW	0.65	15.60
Control Program Support Sort/Merge	5799-TAT	3.50	84.00
Control Program Support Disk Spooling	5799-TAY	1.95	46.80
Control Program Support Format/Print	5799-TBA	1.95	46.80
Control Program Support Operator Station/Debug Package	5799-TBB	5.20	124.80
Control Program Support 4978/4979 Display Map	5799-TBE	3.05	73.20

Realtime Programming System PRPQs

Program	Program number	Monthly* charge	Paid-up cost
Series/1 Indexed Access Method	5799-TBN	4.45	106.80
Series/1 Basic Sort	5799-TBP	1.95	46.80
Series/1 IBM 4978 Display Support	5799-TBM	2.55	61.20
Series/1 Disk Spooling	5799-TBL	2.55	61.20
Series/1 Remote Job Entry	5799-TBK	20.95	502.80
Series/1 Address Translator Transient Support for RPS V1	5799-TBW	1.85	44.40
Series/1 Address Translator Transient Support for RPS V2	5799-TBX	1.85	44.40
Series/1 Address Translator Transient Support for RPS V3	5799-TBY	1.85	44.40

IBM Series/1 field-developed programs

Program	Program number	Monthly* charge	Paid-up cost
Series/1 Intelligent Terminal Subsystem	5798-NLG	77.00**	924.00
Series/1 Event Driven Executive Basic Supervisor and Emulator	5798-NND	8.00	438.00
Series/1 Event Driven Executive Utilities	5798-NNC	6.00	337.00
Series/1 Event Driven Executive Macro Library	5798-NNB	16.00	961.00
System/370 Program Preparation Facilities for Series/1	5798-NNQ	350.00	4,200.00
Series/1 Native Application Load Facility	5798-NNR	41.00	492.00
Series/1 Intelligent Data Entry System	5798-NPY	36.00**	432.00
Series/1 Remote Job Entry for Control Program Support	5798-NPZ	16.30**	195.60

*These licensed programs will be distributed under the Agreement for IBM licensed programs with a monthly fee. Upon billing for 24 consecutive months for a licensed program, IBM will waive all future monthly charges for that licensed program.

**Future charges waived after payment of 12 consecutive months.

Installed user programs	Program number	Monthly* charge	Paid-up cost
Series/1 Debugging Aid	5796-NPP	£ 0	£ 106.00†
Series/1 Waterloo Interactive Direct Job Entry Terminal System	5796-NQE	93.00**	1,116.00

---

*These licensed programs will be distributed under the Agreement for IBM licensed programs with a monthly fee. Upon billing for
  consecutive months for a licensed program, IBM will waive all future monthly charges for that licensed program.
**Future charges waived after payment of 12 consecutive months.
†One-time charge.

6. Price List France

INPUT

GENERAL TARIFF (FRANCS, TAX NOT INCLUDED)

TYPE.MODELE.R.N. / OU .I. / DISPO .C.C.	DESIGNATION PRODUIT	POINTS QUOTA	REGIME	PRIX FRANCO. MATERIELS NEUFS / VENTE78-04-01	REDEVANCE .G.G / MENS MINI .P.E / ENTRETIEN .E.A — ENTR. 70-04-01
A953.A0X	DEMI MODULE PROCESSEUR 16K ADD.	109	VTE SEULT	24.644.D	436.51.B.K
.A00	DEMI MODULE PROCESSEUR 16K	109	VTE SEULT	24.644.D	427.92.B.K
.B0X	MODULE PROCESSEUR 16K ADD.	130	VTE SEULT	29.343.D	425.80.B.K
.B00	MODULE PROCESSEUR 16K	130	VTE SEULT	29.343.D	393.53.B.K
.C0X	DEMI MODULE PROCESSEUR 32K ADD.	147	VTE SEULT	33.188.D	479.36.B.K
.C00	DEMI MODULE PROCESSEUR 32K	147	VTE SEULT	30554 33.188.D	472.02.B.K
.D0X	MODULE PROCESSEUR 32K ADD.	168	VTE SEULT	37.887.D	479.36.B.K
.D00	MODULE PROCESSEUR 32K	168	VTE SEULT	35269 37.887.D	446.41.B.K
.0128	LANGAGE FRANCAIS		SPECIF		147.92
.1300	CONTROLEUR PCS	71	VTE SEULT	16.014.	68.67
.1560	DI/PI/DO NON ISOLES INTEGRES	21	VTE SEULT	4.667.	10.71
.1565	REALIMENTATION DU CANAL	13	VTE SEULT	2.942.	5.35
.1590	PANNEAU ACCES CLIENT	5	VTE SEULT	1.089.	5.35
.1593	CABLE E/S NUM.INTEG.PANN.CLIE.	10	VTE SEULT	2.178.	2.67
.1594	CABLE PANN.CLIENT ADAPT.EQU.EX.	7	VTE SEULT	1.527.	2.67
.1595	CONNEXION DIRECTE SUR LE CANAL.	2	VTE SEULT	411.	55.47
.1610	CONT.TRANSM.ASYNCHRONE 1 LIG.	27	VTE SEULT	6.167.	16.06
.2000	PANNEAU VOYANTS TRANSMISSION	6	VTE SEULT	1.415.	16.06
.2010	DISPOSITIF ALIM.TRANSMISSIONS	3	VTE SEULT	779.	2.67
.2055	CABLE TELETYPE	1	VTE SEULT	293.	2.67
.2056	CABLE LOCAL COMMUNIC.ASYNCHR.	2	VTE SEULT	293.	2.67
.2057	CABLE MODEM	3	VTE SEULT	443.	2.67
.2058	CABLE POUR MODEM WEST.ELEC.303.	3	VTE SEULT	779.	2.67
.2059	CABLE TELETYPE PANN.ACCES.CLIE.	1	VTE SEULT	224.	2.67
.2060	CABLE POUR MODEM AUTRE QUE W.E.	3	VTE SEULT	688.	68.67
.2074	CONTROLE TRANS.BSC 1 LIGNE	30	VTE SEULT	6.728.	68.67
.2075	CONTROLE TRANS.BSC 1 LIGNE GV	35	VTE SEULT	7.796.	68.67
.2090	CONTROLE SDLC 1 LIGNE	36	VTE SEULT	8.036.	55.47
.2091	CONTROLE TRANS.ASYNCHR 8 LIGN.	24	VTE SEULT	5.526.	113.58
.2092	CONTROLE TRANS.ASYNCHR 4 LIGNES	25	VTE SEULT	5.687.	55.47
.2093	ADAPT.BSC 4 LIGNES	30	VTE SEULT	6.861.	139.99
.2094	CONTROLE BSC 8 LIGNES	31	VTE SEULT	7.048.	
.2964	CLAVIER FRANCAIS AZERTY		SPECIF		
.2970	CLAVIER FRANCAIS QWERTY		SPECIF		39.62
.3580	ADAPT.UNITE DISQUE 4962	20	VTE SEULT	4.608.	34.33
.3581	ADAPT.UNITE MINIDISQUE 4964	18	VTE SEULT	4.127.	39.62
.3585	ADAPT.ECRAN CLAVIER 4979	24	VTE SEULT	5.393.	
.4540	FIXATION DEMI TIROIR	1	VTE SEULT	336.	
.5430	ADAPT.EQUIPEMENTS EXTERNES	17	VTE SEULT	3.732.	50.18
.5620	ADAPT.IMPRIMANTE 4974	23	VTE SEULT	5.259.	18.74
.5630	ADAPT.IMPRIMANTE 4973	24	VTE SEULT	5.313.	29.45

GT

TYPE.MODELE.R.N. OU .C.I. .DISPO .C.C.	DESIGNATION PRODUIT	POINTS QUOTA	REGIME	VENTE78-04-01 PRIX FRANCO. MATERIELS NEUFS	ENTR. 78-04-01 REDEVANCE MENS MINI ENTRETIEN	G.C P.E E.A
4953.5650	CONSOLE PROGRAMMEUR	12	VTE SEULT	2.627.	15.84	
.6004	CONNECTEUR 4 POSITIONS		VTE SEULT	52.	GT	
.6005	CONNECTEUR 26 POSITIONS		VTE SEULT	173.	GT	
.6006	CONNECTEUR 160 POSITIONS		VTE SEULT	863.	GT	
.6007	PINCE SERTISSEUSE ET EXTRACT.		VTE SEULT	2.865.	GT	
.6305	ADAPT.UNIT E/S INDUSTR.4982	16	VTE SEULT	3.673.	34.33	
.6315	MEMOIRE ADDITIONNELLE 16K	38	VTE SEULT	8.544.	34.33	
.6316	MEMOIRE ADDITIONNELLE 32K	61	VTE SEULT	12590 13.722	84.52	
.7840	COMPTEURS DE TEMPS	14	VTE SEULT	3.225.	21.42	
.7850	ADAPTATEUR DE TELETYPE	14	VTE SEULT	3.166.	34.33	
.8911	1ER ANAL. 1 A 4 LIG. 1ER PCS.		SPECIF			
.8912	1ER ANAL. 5 A 8 LIG. 1ER PCS.		SPECIF			
.8913	ANAL.SUPP. 9 A 16 LIG. 1ER PCS.		SPECIF			
.8914	1ER ANAL. 17 A 32 LIG. 1ER PCS.		SPECIF			
.8916	ANAL.SUPP. 1 A 4 LIG. 1ER PCS.		SPECIF			
.8917	ANAL.SUPP. 5 A 8 LIG. 1ER PCS.		SPECIF			
.8918	ANAL.SUPP. 9 A 16 LIG. 1ER PCS.		SPECIF			
.8921	1ER ANAL. 1 A 4 LIG. 2EME PCS.		SPECIF			
.8922	1ER ANAL. 5 A 8 LIG. 2EME PCS.		SPECIF			
.8923	1ER ANAL. 9 A 16 LIG. 2EME PCS.		SPECIF			
.8924	1ER ANAL. 17 A 32 LIG. 2EME PCS.		SPECIF			
.8926	ANAL.SUPP. 1 A 4 LIG. 2EME PC.		SPECIF			
.8927	AL.SUPP. 5 A 8 LIG. 2EME PCS		SPECIF			
.8928	ANAL.SUPP. 9 A 16 LIG. 2EME PCS.		SPECIF			
.9001	VENTE A INTERMEDIAIRE		SPECIF			
.9002	VENTE A UTILISATEUR FINAL		SPECIF			
.9010	COLLECTE INFORMATIONS ATELIER		SPECIF			
.9011	SYST.AVEC TERMINAUX BANCAIRES		SPECIF			
.9012	SYST.AVEC TERMINAUX VENTES		SPECIF			
.9019	SYST.AVEC TERMINAUX DIVERS		SPECIF			
.9021	CONTROLES DE QUALITE		SPECIF			
.9022	CONTROLE DE PROCESSUS		SPECIF			
.9023	AUTOMATISATION DE LABORATOIRES.		SPECIF			
.9024	CONTROLE D ENERGIE FC/PM		SPECIF			
.9025	CONTROLE D ENERGIE HORS FC/PM		SPECIF			
.9029	CONTROLE DE BATIMENTS SECURITE.		SPECIF			
.9030	AUTRES AUTOMATISATIONS INDUSTR.		SPECIF			
.9031	CONCENTRATION ET MULTIPLEXAGE		SPECIF			
.9032	FRONTAL DE GRANDS SYSTEMES G.O.		SPECIF			
.9033	FRONTAL DE SYSTEMES DSGD		SPECIF			
.9034	COMMUTATION DE MESSAGES		SPECIF			
.9039	COMMUTATION TELEPHONIQUE		SPECIF			
.9050	APPLIC.DIVERSES DE COMMUTATION.		SPECIF			
.9051	CALCUL SCIENTIFIQUE		SPECIF			
	ENSEIGNEMENT ASSISTE PAR ORDIN.		SPECIF			

INPUT

```
*TYPE.MODELE.R.N.            .POINTS          *VENTE 78-04-01  *ENTR. 78-04-01
*     OU   .I.  DESIGNATION PRODUIT            .PRIX FRANCO.G  .REDEVANCE  G.C
*   .DISPO.C.C.              .QUOTA    REGIME   .MATERIELS MINI .A.MENS MINI P.E
*                                               .NEUFS          .R.ENTRETIEN E.A
```

TYPE.MODELE / DISPO	DESIGNATION PRODUIT	QUOTA	REGIME	PRIX FRANCO.G MATERIELS NEUFS	REDEVANCE G.C / R.ENTRETIEN
4953.9070	RJE ENTREE DONNEES CONTROLEE	—	SPECIF		
9071	GESTION DECENTR.AVEC ORD.MAITR.	—	SPECIF		
9072	GESTION DECENTRALISEE AUTONOME	—	SPECIF		
9073	GESTION DANS PETITES ENTREPRIS.	—	SPECIF		
9074	APPLICATIONS DIVERSES GESTION	—	SPECIF		
9079	APPLICATIONS DIVERSES	—	SPECIF		
9090	APPLICAT.INCONNUES A CE JOUR...	—	SPECIF		
9095	DISQUE IPL PRIMAIRE	—	SPECIF		
9133	DISQUE IPL SECONDAIRE	—	SPECIF		
9134	MINIDISQUE IPL PRIMAIRE	—	SPECIF		
9136	MINIDISQUE IPL SECONDAIRE	—	SPECIF		
9137	IPL PRIMAIRE TELETYPE	—	SPECIF		
9146	IPL SECONDAIRE TELETYPE	—	SPECIF		
9147	IPL A DISTANCE BSC	—	SPECIF		
9154	IPL A DISTANCE BSC GRDE VITESS.	—.—	SPECIF		
9155					
4955.A0X	MODULE PROCESSEUR 16K ADDIT.	154	VTE SEULT*	34.870.D*	420.44.B.K*
A00	MODULE PROCESSEUR 16K	154	VTE SEULT*	34.870.D*	412.07.B.F*
B0X	MODULE PROCESSEUR 16K ADDIT.	154	VTE SEULT*	34.870.D*	420.44.B.K*
B00	MODULE PROCESSEUR 16K	154	VTE SEULT*	34.870.D*	412.07.B.K*
C0X	MODULE PROCESSEUR 32K ADDIT.	198	VTE SEULT*	44.749.D*	474.00.B.K*
C00	MODULE PROCESSEUR 32K	198	VTE SEULT*	44.749.D*	467.54.B.K*
D0X	MODULE PROCESSEUR 32K ADDIT.	198	VTE SEULT*	44.749.D*	474.00.B.K*
D00	MODULE PROCESSEUR 32K	198	VTE SEULT*	44.749.D*	467.54.B.K*
0128	LANGAGE FRANCAIS	—	SPECIF		
1300	CONTROLEUR PCS	71	VTE SEULT*	16.014.	147.92.
1560	DI/PI/DO NON ISOLES INTEGRES	21	VTE SEULT*	4.667.	68.67.
1565	REALIMENTATION DU CANAL	13	VTE SEULT*	2.942.	10.71.
1590	PANNEAU ACCES CLIENT	5	VTE SEULT*	1.089.	5.35.
1593	CABLE E/S NUM.INTEG.PANN.CLIE.	10	VTE SEULT*	2.178.	5.35.
1594	CABLE PANN.CLIENT ADAPT.EQU-EX.	7	VTE SEULT*	1.527.	2.67.
1595	CONNEXION DIRECTE SUR LE CANAL.	2	VTE SEULT*	411.	2.67.
1610	CONT.TRANSM.ASYNCHRONE 1 LIG.	27	VTE SEULT*	6.167.	55.47.
2000	PANNEAU VOYANTS TRANSMISSION	6	VTE SEULT*	1.415.	16.06.
2010	DISPOSITIF ALIM.TRANSMISSIONS	3	VTE SEULT*	779.	16.06.
2055	CABLE TELETYPE	1	VTE SEULT*	293.	2.67.
2056	CABLE LOCAL COMMUNIC.ASYNCHR.	1	VTE SEULT*	293.	2.67.
2057	CABLE MODEM	2	VTE SEULT*	443.	2.67.
2058	CABLE POUR MODEM WEST.ELEC.303	3	VTE SEULT*	779.	2.67.
2059	CABLE TELETYPE PANN.ACCES.CLIE.	1	VTE SEULT*	224.	2.67.
2060	CABLE POUR MODEM AUTRE QUE W.E.	3	VTE SEULT*	688.	2.67.
2074	CONTROLE TRANS.BSC 1 LIGNE	30	VTE SEULT*	6.728.	68.67.
2075	CONTROLE TRANS.BSC 1 LIGNE GV	35	VTE SEULT*	7.796.	68.67.
2090	CONTROLE SDLC 1 LIGNE	36	VTE SEULT*	8.036.	68.67.

(handwritten annotations: 42091 / 42091 in VENTE column; 62583 and 718,48 as column totals; 498 E00 at lower left)

INPUT

TYPE.MODELE.R.N. OU DISPO .I. .C.C.	DESIGNATION PRODUIT	POINTS QUOTA	REGIME	PRIX FRANCO MATERIELS NEUFS	REDEVANCE AUMENS MPNI R ENTRETIEN
4955.2091	CONTROLE TRANS ASYNCHR 8 LIGN.	24	VTE SEULT	5.526.	55.47.
.2092	ADAPT.TRANS.ASYNCHR 4 LIGNES	25	VTE SEULT	5.687.	113.50.
.2093	CONTROLE BSC 8 LIGNES	30	VTE SEULT	6.861.	55.47.
.2094	ADAPT.BSC 4 LIGNES	31	VTE SEULT	7.048.	139.99.
.2964	CLAVIER FRANCAIS AZERTY	—	SPECIF	.	
.2970	CLAVIER FRANCAIS QWERTY	—	SPECIF	.	
.3580	ADAPT.UNITE DISQUE 4962	20	VTE SEULT	4.608.	39.62.
.3581	ADAPT.UNITE MINIDISQUE 4964	18	VTE SEULT	4.127.	34.33.
.3585	ADAPT.ECRAN CLAVIER 4979	24	VTE SEULT	5.393.	39.62.
.3920	VIRGULE FLOTTANTE	30	VTE SEULT	6.728.	44.90.
.4540	FIXATION DEMI TIROIR	1	VTE SEULT	336.	
.5430	ADAPT.EQUIPEMENTS EXTERNES	17	VTE SEULT	3.732. GT	50.18.
.5620	ADAPT.IMPRIMANTE 4974	23	VTE SEULT	5.259.	18.74.
.5630	ADAPT.IMPRIMANTE 4973	24	VTE SEULT	5.313.	29.45.
.5650	CONSOLE PROGRAMMEUR	12	VTE SEULT	2.627.	15.84.
.6004	CONNECTEUR 4 POSITIONS	—	VTE SEULT	52.	
.6005	CONNECTEUR 26 POSITIONS	—	VTE SEULT	175.	
.6006	CONNECTEUR 160 POSITIONS	—	VTE SEULT	863.	
.6007	PINCE SERTISSEUSE ET EXTRACT.	—	VTE SEULT	2.865. GT	
.6305	ADAPT.UNIT E/S INDUSTR.4982	16	VTE SEULT	3.673. GT	34.33.
.6325	MEMOIRE ADDITIONNELLE 16K	44	VTE SEULT	9.905. GT	34.33.
.6326	MEMOIRE ADDITIONNELLE 32K	71		16.126. GT	73.96.
.6335	TRADUCTION D'ADRESSE	20	VTE SEULT	4.549.	44.90.
.7840	COMPTEURS DE TEMPS	14	VTE SEULT	3.225.	21.42.
.7850	ADAPTATEUR DE TELETYPE	14	VTE SEULT	3.166.	34.33.
.8911	.1ER ANAL. 1 A 4 LIG. 1ER PCS.	—	SPECIF		
.8912	.1ER ANAL. 5 A 8 LIG. 1ER PCS.	—	SPECIF		
.8913	.1ER ANAL. 9 A 16 LIG. 1ER PCS.	—	SPECIF		
.8914	.1ER ANAL. 17 A 32 LIG. 1ER PCS.	—	SPECIF		
.8916	.ANAL.SUPP. 1 A 4 LIG. 1ER PCS.	—	SPECIF		
.8917	.ANAL.SUPP. 5 A 8 LIG. 1ER PCS.	—	SPECIF		
.8918	.ANAL.SUPP. 9 A 16 LIG. 1ER PCS.	—	SPECIF		
.8921	.1ER ANAL. 1 A 4 LIG.2EME PCS.	—	SPECIF		
.8922	.1ER ANAL. 5 A 8 LIG.2EME PCS.	—	SPECIF		
.8923	.1ER ANAL. 9 A 16 LIG.2EME PCS.	—	SPECIF		
.8924	.1ER ANAL. 17 A 32 LIG.2EME PCS.	—	SPECIF		
.8926	.ANAL.SUPP. 1 A 4 LIG.2EME PCS.	—	SPECIF		
.8927	.ANAL.SUPP. 5 A 8 LIG.2EME PCS.	—	SPECIF		
.8928	.ANAL.SUPP. 9 A 16 LIG.2EME PCS.	—	SPECIF		
.9001	VENTE A INTERMEDIAIRE	—	SPECIF		
.9002	VENTE A UTILISATEUR FINAL	—	SPECIF		
.9010	COLLECTE INFORMATIONS ATELIER	—	SPECIF		
.9011	SYST.AVEC TERMINAUX BANCAIRES	—	SPECIF		
.9012	SYST.AVEC TERMINAUX VENTES	—	SPECIF		
.9019	SYST.AVEC TERMINAUX DIVERS	—	SPECIF		

*14803 (handwritten annotation near model .6326)

INPUT

TYPE.MODELE.R.N. OU .I. .DISPO .C.C.	DESIGNATION PRODUIT	POINTS QUOTA	REGIME	VENTE 78-04-01 PRIX FRANCO MATERIELS NEUFS	ENTR. 78-04-01 REDEVANCE MENS MINI ENTRETIEN
4955.9020	CONTROLES DE QUALITE	—	SPECIF		
.9021	CONTROLE DE PROCESSUS	—	SPECIF		
.9022	AUTOMATISATION DE LABORATOIRES.	—	SPECIF		
.9023	CONTROLE D ENERGIE FC/PM	—	SPECIF		
.9024	CONTROLE D ENERGIE HORS FC/PM.	—	SPECIF		
.9025	CONTROLE DE BATIMENTS SECURITE.	—	SPECIF		
.9029	AUTRES AUTOMATISATIONS INDUSTR	—	SPECIF		
.9030	CONCENTRATION ET MULTIPLEXAGE	—	SPECIF		
.9031	FRONTAL DE GRANDS SYSTEMES G.O.	—	SPECIF		
.9032	FRONTAL DE SYSTEMES DSGD	—	SPECIF		
.9033	COMMUTATION DE MESSAGES	—	SPECIF		
.9034	COMMUTATION TELEPHONIQUE	—	SPECIF		
.9039	APPLIC.DIVERSES DE COMMUTATION.	—	SPECIF		
.9050	CALCUL SCIENTIFIQUE	—	SPECIF		
.9051	ENSEIGNEMENT ASSISTE PAR ORDIN.	—	SPECIF		
.9070	RJE	—	SPECIF		
.9071	ENTREE DONNEES CONTROLEE	—	SPECIF		
.9072	GESTION DECENTR.AVEC ORD.MAITR.	—	SPECIF		
.9073	GESTION DECENTRALISEE AUTONOME.	—	SPECIF		
.9074	GESTION DANS PETITES ENTREPRIS.	—	SPECIF		
.9079	APPLICATIONS DIVERSES GESTION	—	SPECIF		
.9095	APPLICATIONS DIVERSES	—	SPECIF		
.9095	APPLICAT.INCONNUES A CE JOUR...	—	SPECIF		
.9133	DISQUE IPL PRIMAIRE	—	SPECIF		
.9134	DISQUE IPL SECONDAIRE	—	SPECIF		
.9136	MINIDISQUE IPL PRIMAIRE	—	SPECIF		
.9137	MINIDISQUE IPL SECONDAIRE	—	SPECIF		
.9146	IPL PRIMAIRE TELETYPE	—	SPECIF		
.9147	IPL SECONDAIRE TELETYPE	—	SPECIF		
.9154	IPL A DISTANCE BSC	—	SPECIF		
.9155	IPL A DISTANCE BSC GRDE VITESS.	—	SPECIF		
.9900	ALVEOLE A RESERV.POUR CAB.CAN..	—	SPECIF		
4959.A00	UNITE D'EXTENSION	63	VTE SEULT	15.299.D	200.85.B.K
.1300	CONTROLEUR PCS	71	VTE SEULT	16.014.	147.92.
.1560	DI/PI/DO NON ISOLES INTEGRES	21	VTE SEULT	4.667.	68.67.
.1565	REALIMENTATION DU CANAL	13	VTE SEULT	2.942.	10.71.
.1590	PANNEAU ACCES CLIENT	5	VTE SEULT	1.089.	5.35.
.1593	CABLE E/S NUM.INTEG.PANN.CLIEN.	10	VTE SEULT	2.178.	5.35.
.1594	CABLE PANN.CLIENT ADAPT.EQU.EX.	—	SPECIF		
.1595	CONNEXION DIRECTE SUR LE CANAL.	2	VTE SEULT	411.	2.67.
.1610	CONT.TRANSM.ASYNCHRONE 1 LIG.	27	VTE SEULT	6.167.	55.47.
.2000	PANNEAU VOYANTS TRANSMISSION	6	VTE SEULT	1.415.	16.06.
.2010	DISPOSITIF ALIM.TRANSMISSIONS	3	VTE SEULT	779.	16.06.
.2055	CABLE TELETYPE	1	VTE SEULT	293.	2.67.

INPUT

TYPE.MODELE.R.N. OU DISPO .C.C.	DESIGNATION PRODUIT	POINTS QUOTA	REGIME	PRIX FRANCO.G MATERIELS NEUFS	REDEVANCE.G.C MENS MINI ENTRETIEN
4959.2056	CABLE LOCAL COMMUNIC.ASYNCHR.	1	VTE SEULT	293.	2.67.
.2057	CABLE MODEM	2	VTE SEULT	443.	2.67.
.2058	CABLE POUR MODEM WEST.ELEC.303.	3	VTE SEULT	779.	2.67.
.2059	CABLE TELETYPE PANN.ACCES.CLIE.	1	VTE SEULT	224.	2.67.
.2060	CABLE POUR MODEM AUTRE QUE W.E.	3	VTE SEULT	688.	2.67.
.2074	CONTROLE TRANS.BSC 1 LIGNE	30	VTE SEULT	6.728.	68.67.
.2075	CONTROLE TRANS.BSC 1 LIGNE GV	35	VTE SEULT	7.796.	68.67.
.2090	CONTROLE SDLC 1 LIGNE	36	VTE SEULT	8.036.	68.67.
.2091	CONTROLE TRANS ASYNCHR 8 LIGN..	24	VTE SEULT	5.526.	55.47.
.2092	ADAPT.TRANS.ASYNCHR 4 LIGNES	25	VTE SEULT	5.687.	113.58.
.2093	CONTROLE BSC 8LIGNES	30	VTE SEULT	6.861.	55.47.
.2094	ADAPT.BSC 4 LIGNES	31	VTE SEULT	7.048.	139.99.
.2964	CLAVIER FRANCAIS AZERTY	I	SPECIF		
.2970	CLAVIER FRANCAIS QWERTY	I	SPECIF		
.3580	ADAPT.UNITE DISQUE 4962	20	VTE SEULT	4.608.	39.62.
.3581	ADAPT.UNITE MINIDISQUE 4964	18	VTE SEULT	4.127.	34.33.
.3585	ADAPT.ECRAN CLAVIER 4979	24	VTE SEULT	5.393.	39.62.
.5430	ADAPT.EQUIPEMENTS EXTERNES	17	VTE SEULT	3.732.	50.18.
.5620	ADAPT.IMPRIMANTE 4974	23	VTE SEULT	5.259.	18.74.
.5630	ADAPT.IMPRIMANTE 4973	24	VTE SEULT	5.313.	29.45.
.6305	ADAPT.UNIT E/S INDUSTR.4982	16	VTE SEULT	3.673.	34.33.
.7840	COMPTEURS DE TEMPS	14	VTE SEULT	3.225.	21.42.
.7850	ADAPTATEUR DE TELETYPE	14	VTE SEULT	3.166.	34.33.
.8911	IER ANAL. 1 A 4 LIG. 1ER PCS.	—	SPECIF		
.8912	IER ANAL. 5 A 8 LIG. 1ER PCS.	—	SPECIF		
.8913	IER ANAL. 9 A 16 LIG. 1ER PCS.	—	SPECIF		
.8914	IER ANAL. 17 A 32 LIG. 1ER PCS.	—	SPECIF		
.8916	ANAL.SUPP. 1 A 4 LIG. 1ER PCS.	—	SPECIF		
.8917	ANAL.SUPP. 5 A 8 LIG. 1ER PCS.	—	SPECIF		
.8918	ANAL.SUPP. 9 A 16 LIG. 1ER PCS.	—	SPECIF		
.8921	IER ANAL. 1 A 4 LIG. 2EME PCS.	—	SPECIF		
.8922	IER ANAL. 5 A 8 LIG. 2EME PCS.	—	SPECIF		
.8923	IER ANAL. 9 A 16 LIG. 2EME PCS.	—	SPECIF		
.8924	IER ANAL. 17 A 32 LIG. 2EME PCS.	—	SPECIF		
.8926	ANAL.SUPP. 1 A 4 LIG. 2EME PCS.	—	SPECIF		
.8927	ANAL.SUPP. 5 A 8 LIG. 2EME PCS.	—	SPECIF		
.8928	ANAL.SUPP. 9 A 16 LIG. 2EME PCS.	—	SPECIF		
.9133	DISQUE IPL PRIMAIRE	—	SPECIF		
.9134	DISQUE IPL SECONDAIRE	—	SPECIF		
.9136	MINIDISQUE IPL PRIMAIRE	—	SPECIF		
.9137	MINIDISQUE IPL SECONDAIRE	—	SPECIF		
.9146	IPL PRIMAIRE TELETYPE	—	SPECIF		
.9147	IPL SECONDAIRE TELETYPE	—	SPECIF		
.9154	IPL A DISTANCE BSC	—	SPECIF		
.9155	IPL A DISTANCE BSC GDE VITESSE.	—	SPECIF		

TYPE.MODELE.R.N. OU .I. DISPO .C.C.	DESIGNATION PRODUIT	POINTS QUOTA	REGIME	VENTE 78-04-01 PRIX FRANCO.G MATERIELS NEUFS .A.R	ENTR. 78-04-01 REDEVANCE .G MENS MINI .P ENTRETIEN .E.A
4962.001	UNITE DE DISQUE 9.3M	172	VTE SEULT	38.982.D	241.02.B.K
.002	UNITE DE DISQUE 9.3M MINIDISQ	214	VTE SEULT	48.487.D	326.71.B.K
.003	UNITE DE DISQUE 13.9 M	215	VTE SEULT	48.594.D	348.67.B.K
.004	UNITE DE DISQUE 13.9M MINIDISQ	257	VTE SEULT	58.099.D	478.11.B.K
.01F	UNITE DE DISQUE 9.3M T.FIXES	194	VTE SEULT	43.894.D	326.71.B.K
.02F	UNIT.DISQUE 9.3M T.FIXES MDISQ	236	VTE SEULT	53.373.D	415.09.B.K
4964.001	UNITE DE MINIDISQUE	60	VTE SEULT	13.617.D	93.73.B.K
4973.001	IMPRIMANTE 155 LIGNES/MINUTE	216	VTE SEULT	48.780.D	474.00.C.K
.002	IMPRIMANTE 414 LIGNES/MINUTE	311	VTE SEULT	70.274.D	808.29.C.K
.2767	1ERE CHAINE 48 CAR.EBCDIC	—	SPECIF		
.2768	1ERE CHAINE 64 CAR.EBCDIC	—	SPECIF		
.2799	1ERE CHAINE 96 CARACT.EBCDIC	—	SPECIF		
.2867	CHAINE SUPPLEM.48 CAR.EBCDIC	—	VTE SEULT	867.	GT
.2868	CHAINE SUPPLEM.64 CAR.EBCDIC	—	VTE SEULT	867.	GT
.2899	CHAINE SUPPLEM.96CARACT.EBCDIC	—	VTE SEULT	867.	GT
.2970	CHAINE LANGAGE FRANCAIS	—	SPECIF		
.4450	RECEPTEUR DE PAPIER	—	VTE SEULT	304.	GT
.5700	CABLE SUPP.IMPRIM.4973 ADAPTAT	—	VTE SEULT	85.	GT
.5701	CABLE DE SECOURS ATTACH.4973	2	VTE SEULT	464.	GT
4974.001	IMPRIMANTE CARACTERES	70	VTE SEULT	15.779.D	179.62.B.K
.4450	RECEPTEUR DE PAPIER	—	VTE SEULT	304.	GT
.5720	CABLE SUPP IMPRIM 4974 ADAPTAT	—	VTE SEULT	85.	GT
.5721	CABLE DE SECOURS ATTACH.4974	3	VTE SEULT	464.	GT
4979.001	ECRAN CLAVIER	43	VTE SEULT	9.798.D	89.81.B.K
.2964	CLAVIER FRANCAIS AZERTY	—	SPECIF		
.2970	CLAVIER FRANCAIS QWERTY	—	SPECIF		
.5740	CABLE SUPP.ECRAN 4979 ADAPTAT.	—	VTE SEULT	85.	GT
.5741	CABLE DE SECOURS ATTACH 4979	2	VTE SEULT	464.	GT
4982.001	UNITE E/S INDUSTRIELLES	41	VTE SEULT	9.478.D	58.91.B.K
.1060	CONTROLE ENTREES ANALOGIQUES	20	VTE SEULT	4.522.	24.10.
.1065	SORTIES ANALOGIQUES	13	VTE SEULT	2.969.	26.78.
.1070	AMPLIFICATEUR MULTIGAIN	23	VTE SEULT	5.174.	26.78.
.3525	ENTREES NUMER.INTERR.NON ISOL.	10	VTE SEULT	2.317.	24.10.
.3532	ENTREES NUMER.INTERR.ISOLEES..	17	VTE SEULT	3.930.	15.84.
.3535	SORTIES NUMERIQUES NON ISOLEES	9	VTE SEULT	2.007.	24.10.
.4950	MULTIPLEXEUR RELAIS AMPOULES	16	VTE SEULT	3.951.	68.67.
.4950	MULTIPLEXEUR TRANSISTORISE	18	VTE SEULT	4.042.	39.62.
.6008	CONNECTEUR 56 POSITIONS	—	VTE SEULT	79.	GT

INPUT

TYPE	MODELE.R.N. OU .I. .DISPO .C.C.	DESIGNATION PRODUIT	POINTS QUOTA	REGIME	PRIX FRANCO.G MATERIELS .A NEUFS .R	REDEVANCE .G.C MENS MINI .P.E ENTRETIEN .E.A
*4982	.9174	.PREMIER POINT SORT.AN.-10,+10V.	—	SPECIF		
	.9175	.PREMIER POINT SORT.AN. -5,+5V.	—	SPECIF		
	.9176	.PREMIER POINT SORT.AN. -0,+10V	—	SPECIF		
	.9177	.2EME POINT SORT.AN. -10,+10V	—	SPECIF		
	.9178	.2EME POINT SORT.AN. -5, +5V	—	SPECIF		
	.9179	.2EME POINT SORT.AN. -0,+10V	—	SPECIF		
*4987	.001	S/SYST.PROGRAMMABLE COMMUNIC.	99	VTE SEULT	22.468.B	224.52.D.K
	.2100	CABLE SEUR SUPPLEMENTAIRE	3	VTE SEULT	763.	2.64.
	.3600	ANALYSEUR SUPPLEMENTAIRE PCS	44	VTE SEULT	9.982.	81.88.
	.4700	CONNEXION DCE SEMI DUPLEX	13	VTE SEULT	2.828.	18.49.
	.4701	CONNEXION DCE DUPLEX	10	VTE SEULT	2.344.	15.84.
	.4704	CONNEXION TELETYPE	16	VTE SEULT	3.619.	26.41.
	.4709	CONNEXION LOCALE ASYNCHRONE	13	VTE SEULT	2.965.	13.20.
	.4710	CONNEXION LOCALE SYNCHRONE	14	VTE SEULT	3.081.	15.84.
	.4719	MODEM ASYNCH.1200BPS LIG.LOUEE	25	VTE SEULT	5.557.	66.03.
	.4724	MODEM SYNCH.1200 HORL.L.LOUEE	23	VTE SEULT	5.199.	60.75.
	.8510	2 LIGN.LOUE.RESEAU H.DPX ANAL1	—	SPECIF		
	.8512	L.LOUE.ET L.COM.RES.H.DX ANAL1	—	SPECIF		
	.8518	2 LIGN.COMM.RESEAU H.PPX ANAL1	—	SPECIF		
	.8530	2 LIGNES INFER.A 150 BPS ANAL1	—	SPECIF		
	.8531	1 LIGN.B.VIT.ET 1 LIG.GV ANAL1	—	SPECIF		
	.8532	1 LIGN G.VIT ET 1 LIG.BV ANAL1	—	SPECIF		
	.8533	2 LIGNES SUPER.A 150 BPS ANAL1	—	SPECIF		
	.8550	LIGNE ASYNCHRONE LOCALE ANAL	—	SPECIF		
	.8560	LIGNE SYNCHONE LOCALE ANALYS.1	—	SPECIF		
	.8570	APPEL AUTO.L.LOUEE R HDX ANAL1	—	SPECIF		
	.8573	APPEL AUTO.L.COMM R HDPX ANAL1	—	SPECIF		
	.8580	LIGNE LOUEE FULL DUPLEX ANAL.1	—	SPECIF		
	.8581	LIGNE COMMUT FULL DUPLEX ANAL1	—	SPECIF		
	.8597	MODEM 1200 BPS INTEGRE ANALYS1	—	SPECIF		
	.8610	2 LIGN.LOUE.RESEAU H.DPX ANAL2	—	SPECIF		
	.8612	L.LOUE.ET L.COM.RES.H.DX ANAL2	—	SPECIF		
	.8618	2 LIGN.COMM.RESEAU H.PPX ANAL2	—	SPECIF		
	.8620	2 LIGNES INFER.A 150 BPS ANAL2	—	SPECIF		
	.8631	1 LIGN.B.VIT.ET 1 LIG.GV ANAL2	—	SPECIF		
	.8632	1 LIGN G.VIT ET 1 LIG.BV ANAL2	—	SPECIF		
	.8633	2 LIGNES SUPER.A 150 BPS ANAL2	—	SPECIF		
	.8650	LIGNE ASYNCHRONE LOCALE ANAL 2	—	SPECIF		
	.8660	LIGNE SYNCHRONE LOCALE ANALYS.2	—	SPECIF		
	.8670	APPEL AUTO.L.LOUEE R HDX ANAL2	—	SPECIF		
	.8673	APPEL AUTO.L.COMM R HDPX ANAL2	—	SPECIF		
	.8680	LIGNE LOUEE FULL DUPLEX ANAL.2	—	SPECIF		
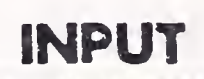
- 158 -

TYPE.MODELE.R.N. OU DISPO	.I. .C.C.	DESIGNATION PRODUIT	POINTS QUOTA	REGIME	VENTE 78-04-01 PRIX FRANCO.G MATERIELS MINI NEUFS	ENTR. 78-04-01 REDEVANCE .G.C AMENS MINI .P.E R.ENTRETIEN .E.A
4987.0681		LIGNE COMMUT FULL DUPLEX ANAL2	–	SPECIF		
.8697		MODEM 1200 BPS INTEGRE ANALYS2	–	SPECIF		
.8910		PREMIER PCS	–	SPECIF		
.8920		DEUXIEME PCS	–	SPECIF		
4990.001		CONSOLE DU 4987	19	VTE SEULT	4.209.D	10.56.D.K
4997.01A		ARMOIRE 1 METRE	22	VTE SEULT	4.918.D	10.71.B.K
.01B		ARMOIRE 1 METRE PEINTE	26	VTE SEULT	5.793.D	10.71.0.K
.02A		ARMOIRE 1 METRE 80	29	VTE SEULT	6.568.D	26.78.B.K
.02B		ARMOIRE 1 METRE 80 PEINTE	33	VTE SEULT	7.449.D	26.78.B.K
.9197		1ERE ARMOIRE DU SYSTEME	–	SPECIF		
.9198		ARMOIRES SUPPLEMENTAIRES	–	SPECIF		
4999.001		UNITE ALIMENT.SECOURS 120 V	47	VTE SEULT	10.706.D	84.52.C.K
.002		UNITE ALIMENT.SECOURS 220 V	47	VTE SEULT	10.999.D	89.01.C.K

INPUT

SOFTWARE

PROGRAMME TYPE.MDL.DISPO.D.	R. DESIGNATION	POINTS QUOTA	REDEVANCE MENSUELLE	TYPE DE FACTURAT	REDEVANCE FORFAITAIRE	CLASSE SCE	PERIODE ESSAI	LIC. INST.
*5719.PA1.	.UTILITAIRES PREPAR.PROGRAMMES .9001-9099	90.0	508.82	24 MOIS	---	0	30 JOURS	NON
.SUP DI. .2000	.MRM SOUS LICENCE	---	---		---			
*5719.PC1.	.SYSTEME EXPLOIT.TEMPS REEL .9099-9500-9501	20.0	112.47	CONTINUE	6.802,12	0	30 JOURS	NON
.SUP DI. .2001	.MRM DE BASE SOUS LICENCE	---	1.580.02					
.2928	.LANGUE FRANCAISE	---	---					
.3001	.MRM OPTION SOUS LICENCE	---	530.24					
*5719.PC2.	.RPS V2 RECOUVREMENT MEMOIRE .9099-9514-9515	25.0	144.61	CONTINUE	8 516,04	0	30 JOURS	NON
.SUP DI. .2002	.MRM DE BASE SOUS LICENCE	---	1.580.02					
.3002	.MRM OPTION SOUS LICENSE	---	530.24					
*5719.PC3.	.RPS V3 SUPPORT MEMOIRE 128K .9099-9534-9535	32.0	181.59	CONTINUE	10 840,56	0	30 JOURS	NON
.SUP DI. .2003	.MRM DE BASE SOUS LICENCE	---	2.213.57					
.3003	.MRM OPTION SOUS LICENCE	---	1.024.90					
*5719.PC4.	.RPS V4 SUPPORT SNA .9099-9538-9539	38.0	218.57	CONTINUE	12 874,51	0	30 JOURS	NON
.SUP DI. .2004	.MRM DE BASE SOUS LICENCE	---	2.213.57					
.3004	.MRM OPTION.SOUS LICENCE	---	1.024.90					
*5719.PL1.	.PL1 COMPILATEUR BIBL.RESIDENT .9099-9506-9507	46.0	262.44	CONTINUE	15 800.20	0	30 JOURS	NON
*5719.PL3.	.PL1 BIBLIOTHEQUE TRANSITOIRE .9099-9504-9505	5.0	26.78	CONTINUE	1 633,58	0	30 JOURS	NON
.SUP DI. .2028	.MRM DE BASE SOUS LICENCE	---	117.83					

INPUT

PROGRAMME .R. DESIGNATION / TYPE.MDL.DISPO .D.	POINTS QUOTA	REDEVANCE MENSUELLE .FACTURAT	TYPE DE FACTURAT.FORFAITAIRE	REDEVANCE FORFAITAIRE	CLASSE SCE	PERIODE ESSAI	LIC INST
*5719.AS3. .SUP DI. .PPS V3 SUPPORT MEMOIRE 128 K .9099-9536-9537	22.0*	123.03.	CONTINUE	7 505,48	0	30 JOURS	NON
.2008 .MRM DE BASE SOUS LICENCE / .3008 .MRM OPTION SOUS LICENCE	--*	--		1.410,56 / 523,01			
*5719.CS0. .SUP DI. .UTILITAIRE DE PREPARATION PCS .9099-9522-9523	8.0*	47,54.	CONTINUE	2 842,25	0	30 JOURS	NON
.2032 .MRM DE BASE S/LICENCE.AVEC PAI. / .2033 .MRM BASE S/LICENCE AS1 AS2 AS3	--*	--		-- / --			
*5719.CS1. .SUP DI. .SUPPORT D EXECUTION PCS .9099-9524-9525	6.0*	31,69.	CONTINUE	1 907,16	0	30 JOURS	NON
.2024 .MRM DE BASE SOUS LICENCE / .3024 .MRM OPTION.SOUS LICENCE	--*	--		142,64 / 380,37			
*5719.F01. .SUP DI. .FORTRAN IV COMPILATEUR BIB.OBJ. .9099-9508-9509	14.0*	80,34.	CONTINUE	4 900,74	0	30 JOURS	NON
*5719.F03. .SUP DI. .FORTRAN IV BIBL.TEMPS REEL .9099-9510-9511	5.0*	26,78.	CONTINUE	1 633,58	0	30 JOURS	NON
.3026 .MRM OPTION SOUS LICENCE	--*	--		460,61			
*5719.LM1. .SUP DI. .BIBLIOTHEQUE MATHEMATIQUE .9099-9512-9513	7.0*	37,49.	CONTINUE	2 313,79	0	30 JOURS	NON
.3016 .MRM OPTION SOUS LICENCE	--*	--		369,56			
*5719.LM2. .SUP DI. .BIBLIOTHEQUE MATHEMATIQUE V2 .9099-9518-9519	8.0*	42,77.	CONTINUE	2 847,37	0	30 JOURS	NON
.3020 .MRM SOUS LICENCE	--*	--		364,52			

PROGRAMME .R. DESIGNATION / TYPE.MDL.DISPO .D.	POINTS QUOTA	REDEVANCE MENSUELLE	TYPE DE FACTURAT.	REDEVANCE FORFAITAIRE.	CLASSE. SCE	PERIODE ESSAI	LIC.. INST..
*5718.H12.8005			*				
.8005 .COPIE SUPPL DOCUMENT LY20 0649.	---	---	*	123.63.			
.8007 .COPIE SUPPL DOCUMENT LY20 0670.	---	---	*	8.90.			
*5718.P81. SUP DI. .CONDUITE PROCESS PROSPRO2 1800. .9015-9099	313.0	1.831,13. CONTINUE	*	---	C	30 JOURS	NON
.7027 .FACULTATIF BANDE 9/800	---	---	*	---			
.8000 .COPIE SUPPL DOCUMENT LY20 0503.	---	---	*	63.19.			
.8004 .COPIE SUPPL DOCUMENT LY20 0502.	---	---	*	144.25.			
*5718.RG1. SUP DI. .GAP 1800 .9015-9099	66.0	385.48. CONTINUE	*	---	C	30 JOURS	NON
.7025 .FACULTATIF BANDE 7/800	---	---	*	---			
.7027 .FACULTATIF BANDE 9/800	---	---	*	---			
.7029 .FACULTATIF BANDE 9/1600	---	---	*	---			
.8003 .COPIE SUPPL DOCUMENT LY20 0522.	---	---	*	52.19.			
.8006 .COPIE SUPPL DOCUMENT LYB0 0534.	---	---	*	16.48.			
*5718.XX1. SUP DI. .ANALYSE CHROMATOGRAPHIQUE 1800. .9058-9099	176.0	1.027,99. CONTINUE	*	---	C	30 JOURS	NON
.7040 .DOCUMENTS FACULTATIFS	---	---	*	---			
.8002 .COPIE SUPPL DOCUMENT LY20 0594.	---	---	*	35.93.			
*5719.AS1. SUP DI. .SYSTEME PREPARATION PROGRAMMES. .9099-9502-9503	18.0	101.76. CONTINUE	*	6 266,52.	0	30 JOURS	NON
.2006 .MRM DE BASE SOUS LICENCE	---	---	*	792.68.			
.2928 .LANGUE FRANCAISE	---	---	*	---			
.3006 .MRM OPTION SOUS LICENCE	---	---	*	530.24.			
*5719.AS2. SUP DI. .RECOUVR.MEM.PROG.PREP.SYST.V2 .9099-9516-9517	20.0	112.47. CONTINUE	*	6 855,68.	0	30 JOURS	NON
.2007 .MRM DE BASE SOUS LICENCE	---	---	*	792.68.			
.3007 .MRM OPTION SOUS LICENCE	---	---	*	530.24.			

- 162 -

TYPE	MODEL	SALES PRICE (Francs, Tax N.I.)	MAINTENANCE (Francs, Tax N.I.)
4955	EOO	62583	718.48
4963	64A	64822	335.47
	64B	54523	319.62
	58A	69195	433.20
	58B	58896	417.35
4966	001	26761	338.11
4993	001	14934	95.09
4955	6327	21625	219.24
4953 } 4955 } 4959 } —	1200	12379	60.75
	1205	11378	23.77
	2064	426	2.64
	2065	426	2.64
	3590	8692	23.77
4959	7900	14513	44.90

TYPE	MODEL	SALES PRICE	
4953	COO	30554	)
	DOO	35269	)
4955	COO	42091	)
	DOO	42091	) REDUCED SALES PRICE
4952	6316	12590	) (Reduction of 5.9to 8.30%)
4955	6326	14803	)

7. Price Elements Germany

NB : To identify English description of hardware
     and software items, refer to Type and Model numbers.

INPUT

HARDWARE EXAMPLE

TYPE	MODEL NO.	DESCRIPTION	V A	PURCHASE DM	MAINT. MONTHLY DM	∅ POINTS
4955	E00	PROZESSOR-MODUL	15	28.270	323	275
	2000	ANZEIGEFELD FUER DFV	15	676	7	6
	2057	MODEMKABEL	15	211	1	2
	2074	BSC-ANSCHLUSS FUER 1 LEITUNG		3.220	32	30
	3560	ANSCHLUSS F. FLATTENSPEICHER		2.200	18	20
	3581	ANSCHLUSS FUER DISKETTE		1.970	16	18
	3920	GLEITKOMMA-EINRICHTUNG		3.222	22	30
	5650	PROGRAMMIERER KONSOLE		1.255	8	12
	6327	SPEICHERERWEITERUNG 64 KB		29.310	300	285
	7840	ZWEI ZEITGEBER		1.540	11	14
	9900	E/A-ANSCHLUSSPLATZ A				
4959	A00	E/A-ERWEITERUNGS-MODUL		7.330	97	63
	1200	S/370-KANALANSCHLUSS		5.590	28	54
	3585	ANSCHLUSS FUER TYP 4979		5.170	36	48
	3590	STEUERUNG FUER FLATTENSPEICHER		7.860	22	76
	5620	ANSCHLUSS FUER TYP 4974		2.510	9	23
	5630	ANSCHLUSS FUER TYP 4973		2.535	16	24
4993	001	S/370-KANALANSCHLUSS-MODUL		6.745	43	66
4962	02F	PLATTENSPEICHER-MODUL		25.500	198	236
4963	58A	PLATTENSPEICHERLEITMODUL		29.360	172	286
4963	64A	PLATTENSPEICHERLEITMODUL		27.500	133	268
4973	002	ZEILENDRUCKER		33.590	378	311
4974	001	MATRIXDRUCKER		7.535	84	70
	4450	FORMULARSTAENDER		193		
4979	001	DATENSICHTGERAET		9.380	84	66
499702B		GEHAUSE		7.100	26	66

EZ = one-off payment.   Standard contract   DM249.772 purchase,

                               on reduced price   239.688 (2.064 maint

ZM = Maintenance on time
       and materials basis

                               Total Offer   239.688 (2.064 maint

Prices quoted are open. VAT calculated separately.

This quote gives only complete DM amounts. Therefore, maximum

discounts given for training and research are up to DM 0.50 of

the total bill.

SOFTWARE EXAMPLE

TYPE MODEL NO.	DESCRIPTION	RENTAL PER UNIT MONTHLY DM		RENTAL TOTAL MONTHLY DM		∮ POINTS
5719 PC3 2003 9535	REALTIME PROGR.SYST.VERSION 3 DISKETTE MONATL.LIZENZGEB.FUER PP PC3	EZ	964 83	EZ	964 83	-32
5719 AS3 2008 9537	PROGR.F.EPARAT.SUBSYST.VERS.3 DISKETTE MONATL.LIZENZGEB.FUER PP AS3	EZ	614 58	EZ	614 58	22
5719 PL1 9507	COMP.RESIDENTE PROGR.BIBLIOT MONATL.LIZENZGEB.FUER PP PL1		122		122	46
5719 PL3 2028 9505	TRANSIENT BIBLIOTHEK DISKETTE MONATL.LIZENZGEB.FUER PP PL3	EZ	53 14	EZ	53 14	5
5796 NQE 2001 9001	WATERLOO INTERAC.DIR.JOB ENTRY BASIC MACHINE READ. MATERIAL LICENSED USER	EZ	357 49	EZ	357 49	145
5799 TCB 9519	INDEXIERTE ZUGRIFFSMETHODE MONATL.LIZENZGEBUEHR PP TCB		17		17	6
5799 TBP 9507	BASIC SORT SERIE /1 MONATL.LIZENZGUEHR F.PP TBP		7		7	2
5799 TCH 9531	DISK SPOOLING MONATL.LIZENZGEBUEHR		10		10	3

- 165 -

8. Price Elements Italy

EXHIBIT 8

PRICE ELEMENTS ITALY

Processor Models		Lire Sales Price	(MMMC)
3953C	32K (maximum memory 64K)	5.933.000	(85.800)
4953D	32K (maximum memory 64K)	6.772.000	(85.800)
4955D	32K (maximum memory 128K)	7.998.00	(84.800)

Add-on Memory			
6316	32K (model 4953)	2.448.000	(21.700)
6326	32K (model 4955)	2.879.000	(13.700)
4959A	Channel expansion unit	2.737.000	(36.300)
3920	Floating point hardware	1.203.000	(10.900)
4964/1	Diskette Unit 606K Bytes	3.172.000	(24.600)
4962/001	Disk Unit 9.3MB	7.790.000	(51.000)
4962/003	Disk Unit 13.9MB	9.508.000	(75.500)
4962/2	Disk Unit 9.3MB + diskette 606k Bytes	10.228.000	(74.700)
4962/004	Disk Unit 13.9MB + Diskette 606K Bytes	11.942.000	(102.900)
4979/1	VDU	2.718.000	(34.800)
4974/1	Character printer 120 cps	3.758.000	(36.300)
4973/1	Line printer 155 lpm	9.670.000	(90.100)
4973/2	Line printer 414 lpm	13.510.000	(163.100)

INPUT

Communications

1610 Single Asynchronous line	1.104.000	(16.500)
2091 +		
2X(2092) 8 Asynchronous lines	3.013.000	(71.400)
2074 Single medium speed (9600bps)		
synchronous line	1.203.000	(18.400)
2075 Single high speed (56K bps)		
synchronous line	1.393.000	(20.300)
2093 +		
2X(2094) 8 Synchronous lines	3.747.000	(80.800)
2090 SDLC	1.435.000	(18.400)
7850 TTY line	567.000	(10.900)

Sensor I/O

1560 32DI + 32DO	834.000	(13.700)
4982/1	2.349.000	(21.800)

Analogue I/O

1060 +		
1070 Adapter	1.734.000	(9.100)
4940 8 AI	707.000	(15.600)
4950 16 AI	723.000	(8.500)
1065 2 AO	531.000	(4.800)

Digital I/O

3525 16 DI/PI	414.000	(4.300)
3535 16 DO	359.000	(4.300)

INPUT

<u>Timer</u>

7840 (2)   576.000   (3.800)

<u>Cabinets</u>

4997/1B   1 metre high   1.037.000   (1.900)
4997/2B   1.8 metres high   1.331.000   (4.800)

<u>Software</u>

o Operating system rental is L. 37,000 per month.

o FORTRAN rental is L. 18,600 per month and sales price
  of L. 1.135.000.

o PL/1 has a rental of L. 49,900 and sales price of
  L. 3.023.000.

彩
照

姓名：_____
Name

职务：_____
Post

单位：_____
Unit

No: Date:

002   装得快文具

24ColorCard CameraTrax.com