

**THE IBM 4300 SERIES
PRESENT AND FUTURE**

INPUT EUROPE

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THE IBM 4300 SERIES

PRESENT AND FUTURE

VENDOR WATCH REPORT # 1

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THE IBM 4300 SERIES - PRESENT AND FUTURE

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I. INTRODUCTION

I INTRODUCTION

- The IBM 4300 range of processors was launched in Europe on the last day of January 1979. This marked the unveiling of the first two processors from the development 'E' Series, to the whole of which INPUT had previously devoted a prospective evaluation of the likely announcements.

- The announcement was greeted by the industry with considerable attention, since IBM claimed that this was their fifth major step in computing from the time the company entered the market in 1953. The previous landmarks have been:
 - the 1401 second generation machine
 - the System/360 and OS
 - Virtual Storage (VS)
 - SNA

- INPUT's prospective evaluation of the IBM 'E' Series was made in November 1978. It included details on:
 - a range of four processors
 - their price performance relationship to other current and future products in the IBM spectrum of products
 - the competitive environment to be encountered by any new launch
 - necessary software developments
 - IBM's strategy in the next phase

- As predicted, the announcement only covered a portion of the series, - two out of four of the development processors. This report then will not only cover the current announcement but will serve to update the prospective evaluation of the remainder of the series.

- The aims of the report are:
 - to summarise the details of the announcements and highlight significant features.

 - to position the 4300 processors in IBM's future strategies

 - to determine the market impact on competitive mainframe vendors as well as on the plug-compatible manufacturers

- The announcement detail has been based on IBM documentation and attendance at a consultant seminar/study day.

- This report forms part of the European Market Intelligence, Distribution and Analysis Service (MIDAS/EUROPE).

- Comments and enquiries from clients on the information presented in this report are invited and welcomed.

II. MANAGEMENT SUMMARY

II MANAGEMENT SUMMARY

A. IMPACT OF 4300 LAUNCH ON CURRENT IBM PRODUCTS

- The two new processors launched are the 4331, the smallest of the 'E' series processors developed (INCA 1), and the 4341, the second largest of those developed (MAYA 1). The second and fourth processors developed have yet (if ever) to be announced.
- Both machines fall into the category of small to medium-size mainframes. They are provided with existing IBM operating systems and utility software. These software products have been issued in new releases with enhanced features and a new implementation philosophy.
- The range is a DPD product which replaces the lower end of the 370 series. The range has some overlap with the top-of-range product in GSD's 30 series, the System/38, but does not impact with DPD's previous announcement, the 8100 series.
- Whereas the 8100's are intended as satellite processors (to 370's or, now, to 4300's) for distributing processing power in a close-coupled mode, the 4300's have been designed principally as host or stand-alone processors. This is not to deny that 4300's will be distributed around organisations. It is certainly IBM's primary objective to replicate 4300 mainframes in an organisation, ensuring systems compatibility and using SNA for communication. The differences between the host and the satellite approaches are ones of:
 - size and processing power
 - mainline operating systems as opposed to specialised and limited program products.

- The 4331 has a reported MIP rate of up to 1.3 times the 370 Model 135. It is available with twice the storage and four times the power of the Model 115. It therefore replaces and obsoletes the 370 Models 115-2 and 125-2 and their earlier versions.

- The 4341 (with a quoted MIP rate 1.7 times that of 370 Model 148) has around 3 times the power of the 138, which it obsoletes together with the older 135 and the 148 itself.

- Besides making processors obsolete, the 4300's introduce obsolescence to a number of earlier disk drives. The new DASD's:

- 3310 with 64.5 MB for the 4331 processor
- 3370 with 570 MB for 4331 or 4341

are both non-removable with a fixed block mode of recording data in 512 byte blocks. For reasons of compatibility, selected earlier drives are also supported, but the new devices introduce a new standard which is bound to be preferred for mid-range processors in the future.

- More significant in the long term than the hardware news, is IBM's change of stance with regard to:

- the D.P. department
- the end-user
- marketing and support.

- Because of the price/performance improvements made possible by LSI technology, IBM must sell more processors to equal or better revenue budgets. Organisations will be targetted as multiple targets, able to absorb a hierarchy of processors at different corporate levels:

- 303X or large 370 system complexes at the centre
- multiple mid-range 370's or 4300's in operating sites

- 8100's, GSD systems and terminals at lower levels

- Installation of multiple 4300's must not be prejudiced by opposition from centralised D.P. departments fearing loss of control. 4300's will be sold as resilient "black-boxes", which will tolerate:

- being sited at a distance from systems and programming staffs
- little or no systems programmer attention
- a normal office environment, at least with the smaller models

- The end-user is expected to require the advanced features that the manufacturers have been selling to in recent years:

- interactive program development
- data communications (DC)
- database (DB)
- DB/DC combined.

The 4300's are claimed to make these facilities available as a matter of routine. The days of lengthy and painful implementation are to be banished; the user can choose at which level of sophistication he wishes to enter and progress from there.

- Post-sales support will be provided on a more stringent basis than hitherto. National support centres will provide first-line fixes through a telephone answering service. Follow-up software maintenance on-site is to be chargeable.

- Pre-sales support will be provided through Regional Customer Centres, again on a more tightly controlled basis, with customer d.p. staff attending at the centres.

- The sales force are seeing this as IBM giving a complete rethink of the way it does business. Low-volume high-cost systems are giving way to a requirement

for high-volume, low-cost sales. This is a 180° swing in attitude to the mid-range users, who have been among IBM's most loyal.

- Exhibit II-1 places the new processors in a price-performance chart alongside their obsolete counterparts.

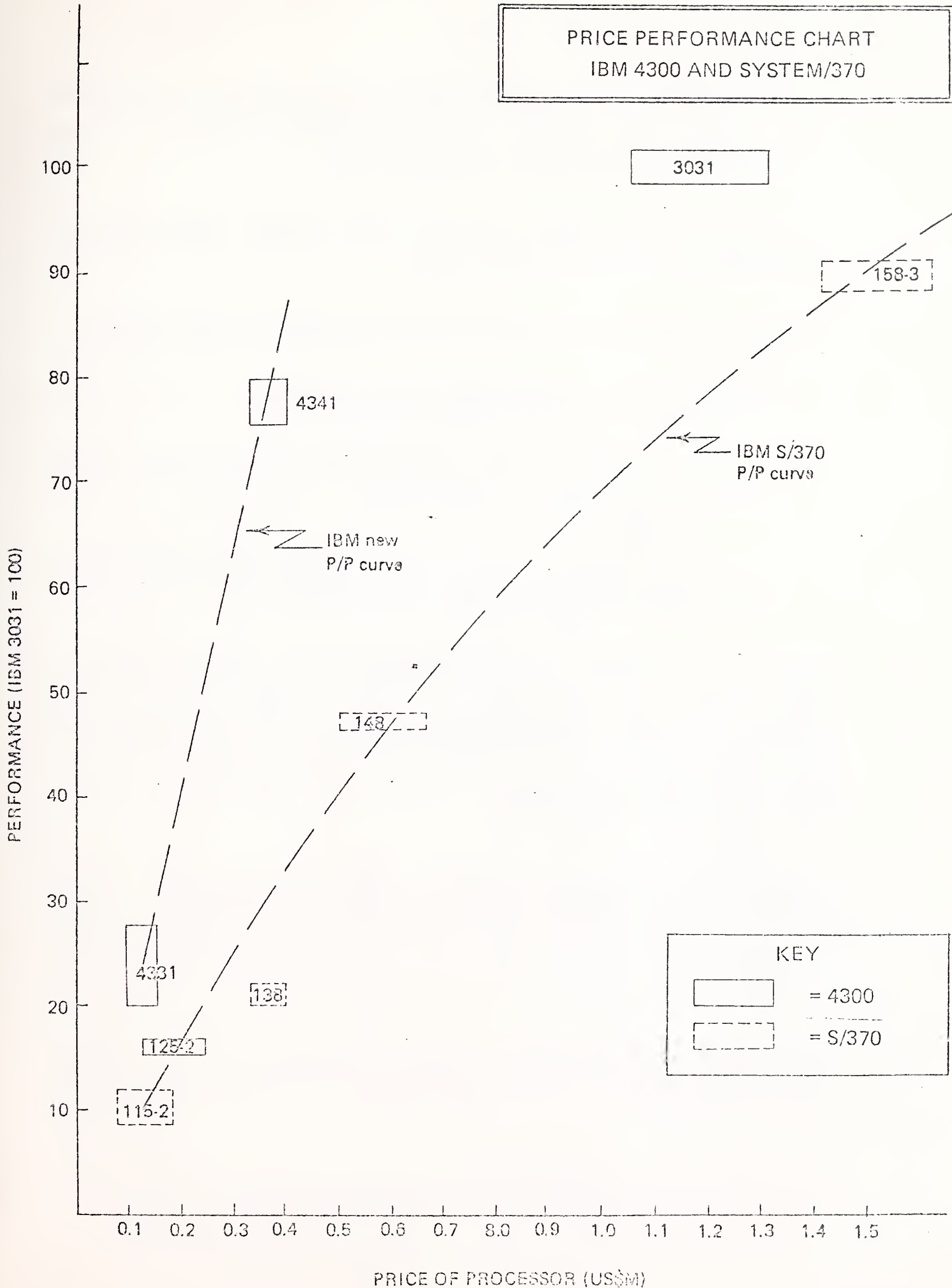
B. IMPACT OF 4300 LAUNCH ON THE COMPETITION

- Both plug-compatible processor manufacturers (PCMs) and IBM's mainframe competitors are impacted by 4300.
- The impact will also be felt at the top end of the minicomputer market and among the leasing companies.
- The sector of the industry most likely to profit (besides IBM) is the system/-software houses.
- With the dramatic improvements in price/performance shown by the 4331 and 4341 (See Exhibit II-1), IBM has got itself onto a completely new price/performance curve and one which if continued upwards would severely damage the prospects for the 303X series.

PLUG-COMPATIBLE MANUFACTURERS

- IBM has aimed a smashing blow at the PCM's, and there is more to come. However, there is still time for the PCM's to respond, because the full force of the blow has not yet been felt.
- First shipments of the 4341 are not due till the first quarter of 1980 at the same time as the new 570 MB disk, the 3370.

PRICE PERFORMANCE CHART
IBM 4300 AND SYSTEM/370



- Announcement of the top of the 'E' series (MAYA 2) cannot be made before second quarter 1980, because of the self-impacting nature of the new price/performance curve on that of the 303X range.
- This gives PCM's some time to reconfigure their strategy. Itel have already done so with the introduction of the AS3-5.
- Itel are in a relatively strong position to resist the IBM challenge, because:
 - the business is not entirely dependent on PCM sales
 - its chief strength as a PCM lies just above the 4341 level i.e. in the 'hole' between it and the vulnerable 3031
 - its policy of offering a complete system permits a full comparison with IBM's all-in prices (including software and support).
- With the greater degree of unbundling of system software announced with the 4300's, software license fees range from 14% to 17% of total hardware monthly rental (MRC). Since software will incur an additional maintenance fee (as from 1/1/80), as yet unpriced in Europe, the total add-on percentage is likely to be between 15% and 20%.
- In order further to confuse the opposition, IBM is not releasing all software information at the time of the hardware launch. No date has been given for the new VM release; neither release date nor price are available for the new version of VS1.
- Above Itel on price/performance, there is no impact on Amdahl from the present announcement. Amdahl is left fighting it out with the 303X series on points.
- Below Itel's AS5-3 however, the impact is greatest, on all of:

PRICE PERFORMANCE CHARTS
IBM vs. PCMS

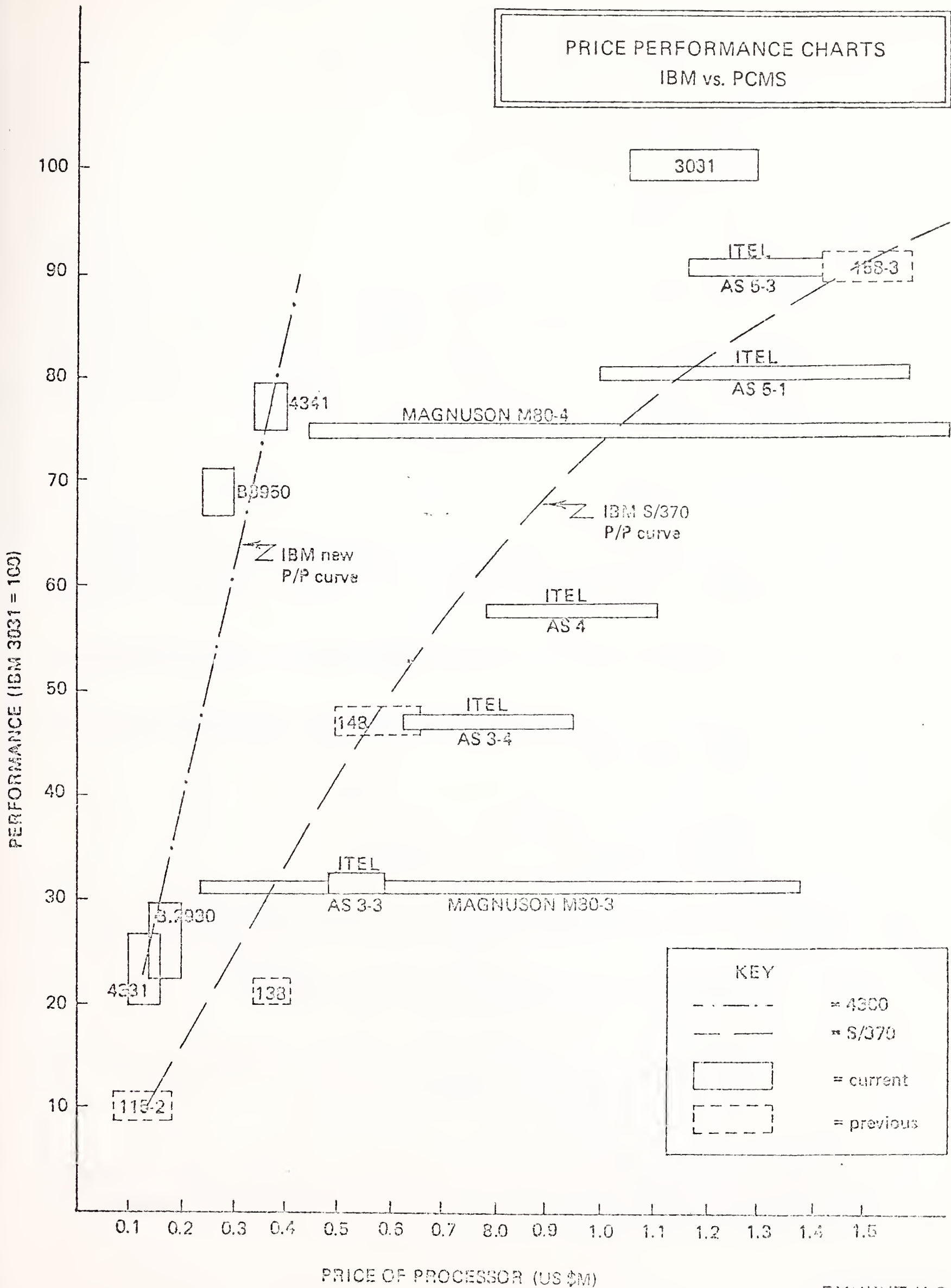


EXHIBIT II-2

- Magnuson's M80-3 and M80-4
- National Semiconductor's System 400
- Two Pi V32
- CDC's OMEGA.

Though little known in Europe, some secondary influence on the market will be felt through them, particularly on the on-site computing sector where RCS vendor companies are active in Europe or are looking at European market entry at this time. CDC and NCSS are two vendors with interest in PCM equipment for on-site computing.

• A useful comparison:

- Magnuson sell M80-3 memory up to 16 MB at \$80,000 per megabyte
- IBM are pricing 1MB of the new 64K chip memory on 4300's at \$20,000.

• Exhibit II-2 shows price/performance of 4300's against the plug-compatibles.

• Even more critical to the PCM's will be the impact of the DASD's announced for the 4300. These have:

- fixed block recording mode
- non-removable disks.

• Besides offering large capacity storage on-line with these new DASD's, IBM is:

- blocking off the opposition by these design changes
- tying in the user to a "black-box" information system concept, which will cost him dearly if he doesn't use his database efficiently.

• PCM's must for the immediate future exploit the conversion difficulties which IBM have put in the way of the user (see Section IV). For the longer-term they

PRICE PERFORMANCE CHARTS
IBM, BURROUGHS AND NCR. - PREVIOUS & NEW RANGES

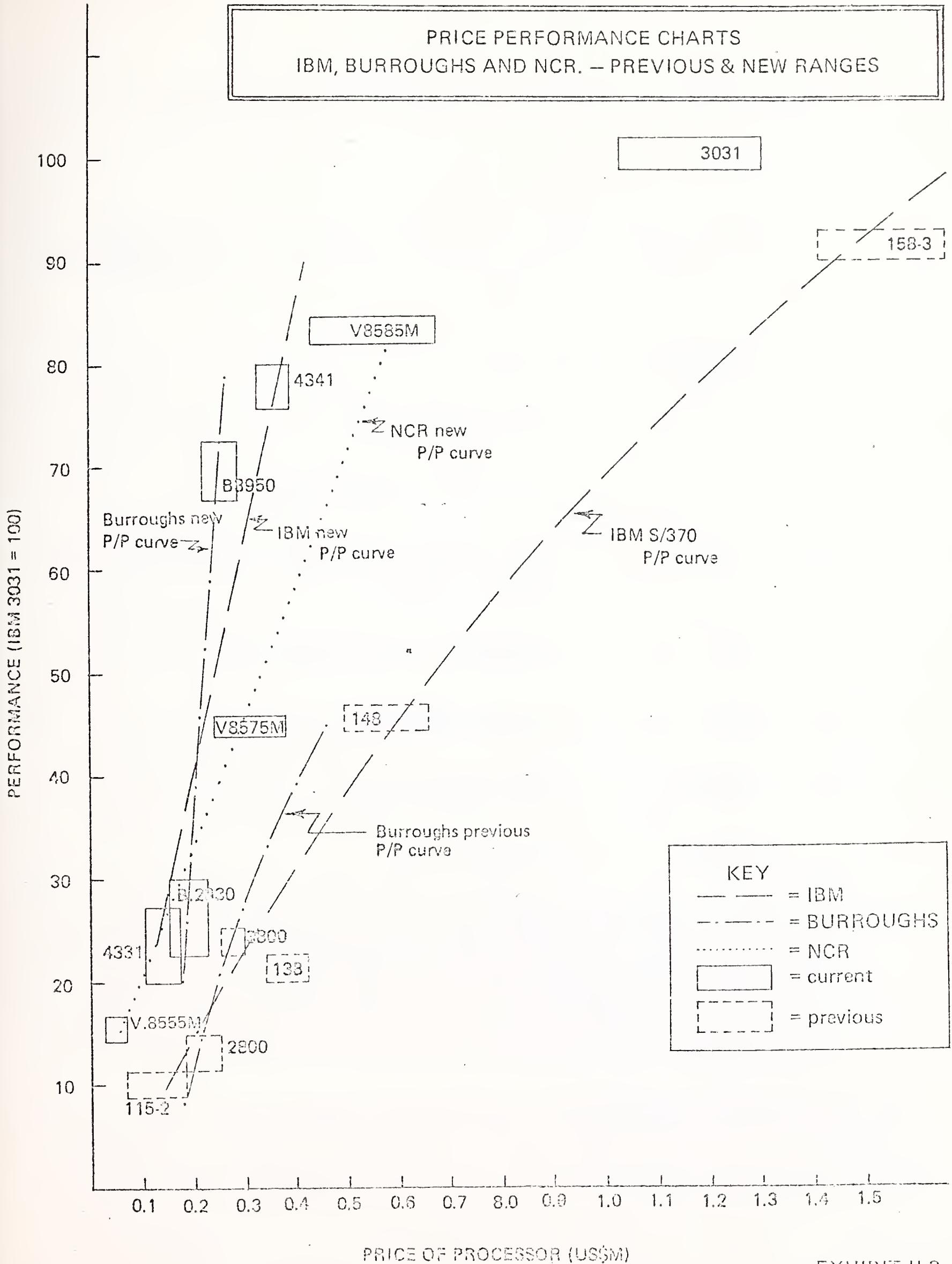


EXHIBIT II-3

must examine the trade-off between abandoning compatibility with IBM and being only able to offer earlier IBM concepts.

MAINFRAME COMPETITION TO 4300's

Exhibit II-3 places the 4331 and 4341 on a price/performance chart against the other mainframe vendor offerings.

The manufacturers impacted are:

- Burroughs - B1800 through B4800
- CII-HB - at Levels 62 and 64 of Series 60
- Digital - DECSYSTEM-20 range from 2020 through 2060 and the new VAX 11/780
- ICL - 2900 series - 2950 through 2960
- NCR - Criterion 8500 range
- Siemens - 7720 through 7750
- Univac - Series 90

Burroughs and NCR have been quick to respond with enhanced equipment ranges, using similar architecture but newer technology. Honeywell is due to make an announcement at the beginning of April, and ICL to break silence at the Hanover Fair. Digital in line with its previous policy is unlikely to want to match IBM, preferring to be seen to be different.

Univac and Siemens have so far given no sign of their intentions.

Top of range minicomputer vendors also impacted by 4300 are:

- Hewlett-Packard
- Prime Computer.

C. FORECASTED GROWTH OF 4300 ORDERS AND INSTALLATIONS
(1979-1983)

- Exhibit II-4 contains INPUT's forecasts of IBM's order intake level and annual shipments for the 4300 series. The forecasts cover the years 1979 through 1983, and are the aggregated estimates for all models within the series i.e. including likely future announcements.
- The forecasts are shown broken down by (i) the four largest country markets in Western Europe - UK, West Germany, France and Italy - and (2) the rest of Europe. This last accounts for some 21% of the European total and includes the Benelux countries, Scandinavia, Switzerland, Austria, Spain and Portugal. Totals for the whole of Western Europe and the world are provided.
- The exhibit also gives the estimated revenues to be gained by IBM in Western Europe, assuming an average shipment price of \$350,000. This figure includes an allowance for configuration expansion in the later years, but does not allow for price inflation i.e. all revenues are at 1979 dollar prices.
- In the initial period after launch and up to the 9th March 1979, a total of 50,000 orders world-wide is being mentioned around the computer industry. IBM's new tactic of closing the door on orders a fixed number of weeks after launch has the effect of inducing a lot of people to book provisional orders. INPUT's forecast has discounted this effect; hence the lower total of 18,000 orders worldwide in 1979.
- In Europe, West Germany is IBM's largest customer taking just under 30% of shipments. France and the U.K. are the next most important in that order, taking 22% and 16% respectively.

ORDERS AND SHIPMENTS (1979-1983)

COUNTRY		YEAR				
		1979	1980	1981	1982	1983
U.K.	Orders	750	1,000	1,250	1,450	1,550
	Shipments	150	720	1,200	1,800	1,700
FGR	Orders	1,360	1,810	2,260	2,630	2,810
	Shipments	270	1,305	2,175	3,260	3,080
FRA	Orders	985	1,310	1,640	1,900	2,035
	Shipments	195	945	1,575	2,360	2,230
ITALY	Orders	610	810	1,015	1,180	1,260
	Shipments	120	585	975	1,462	1,380
OTHER	Orders	945	1,320	1,635	1,890	2,035
	Shipments	205	945	1,575	2,368	2,235
WESTERN	Orders	4,650	6,250	7,800	9,050	9,690
EUROPE	Shipments	940	4,500	7,500	11,250	10,625
TOTAL*	Revenue (\$M)	329	1,575	2,625	3,940	3,720
WORLD**	Orders	18,125	24,150	30,000	35,000	37,450
TOTAL	Shipments	3,625	17,400	29,000	43,500	41,100

* Taken as 625% of UK units

** Taken as 387% of Western Europe units

EXHIBIT II-4

- Average annual growth throughout the five-year forecast period is taken to be at the rate of 20%.
- Approximately, 65% of shipments are expected to go into new sites, not necessarily for first time users. Of this total approximately 25% will be to organisations new to d.p. The remaining 40% will be second, third and further installations within the existing IBM user base. The final 35% of shipments will be displacements of competitors' equipments or of older IBM lines.
- Multiple installations within a single organisation offer good growth potential for the DDP concept.

D. IBM STRATEGY AND 4300 LONG-TERM GOALS

- With 4300 IBM has accepted the challenge thrown down by the PCM processor companies in recent years, from Amdahl through Magnuson. Doing so by traditional means, IBM has pushed forward to the next generation of hardware technology with the first 64K memory chips.
- At the same time, sticking to what the company does best, hardware and peripherals hardware at that, IBM has introduced a new pair of disk drives. The fixed disk concept has more implications than the fixed recording mode, which nevertheless will present format and conversion problems to some users.
- By offering DOS and VM and DOS under VM, the outline of a squeezing of users towards VM is discernible. It makes admirable sense:
 - VM is a user-orientated operating system
 - VM can host both DOS/VSE and OS/VSI
 - VM increases processor usage by both system and application software

- VM is a staging post between VS (virtual storage) and VP (virtual processor or 'H' series)
- VM complements the "black-box", 'easily implemented' approach to 4300 sales.
- IBM's main thrust has been made by aggressive pricing. A starter configuration on the 4300 can creep in under the psychological \$200,000 fence to provide the power of a 370/135.
- The assumption that IBM has made in all this is that, in spite of offering increased price/performance to the market, it can maintain revenue and profit levels by volume sales at acceptable sales costs.
- The implications of this need to keep to budget though having been forced to concede to the advance in technology are evident in IBM's new policies for:
 - support - sell DPD products through regional Customer Centres, which act as communal clearing-houses for customers' problems during presales, preinstallation periods.
 - service - package preconfigured, system software sets, pretested in the factory for immediate "load and go" after hardware installation, doing away with the old-fashioned, long-winded system generations.
 - support software post-sales by national telephone-answering systems which access the relevant specialists for calling back the user with verbal fixes over the telephone; all follow-up on-site visits are to be chargeable by monthly software maintenance fee or on demand per call-out.

-application - encourage the use of the VM/370 operating system environment by providing a VM remote on-line testing service software operated by the RCS group on the Warwick supercentre; thus relieving Branch Offices of individual on-site hand-holding during testing, or at least containing the amount of service required to a level where headcount increases are also lowered.

• The one missing component is any upgrade to database facilities. DL/1 has been selected to carry the DB flag until an improved IMS-level database manager can be offered. IBM has still not resolved contention between the relational database concept (practical at the small end and provided on S/38) and the CODASYL standard which the industry has accepted without recourse to IBM and which we can expect to see replacing IMS on the 'H' series VP's.

• Siting 4300 series squarely in the mid-range with the 4331 acting as a bottom stop and a 'hole' of necessity at the top end, IBM is breaking up DPD into Intermediate System Division handling 4300's and Large Scale Systems Division handling the 303X's. IBM is preparing to refute the accusations of monopoly practice which might follow from over-successful penetration of the DDP market with multiple sales.



III. THE IBM 4300 ANNOUNCEMENTS

III THE IBM 4300 ANNOUNCEMENTS

A. CURRENT HARDWARE

- The 4331 Processor offers 512K or 1MB of main (now called processor) storage -less between 64K and 128K for microcode. ECPS (microcoded) facility offers native mode operation or 370 compatibility mode. Diskette is the medium for loading alternative microcode.
- 4331 I/O is adapter based. Integral adapters are provided for system diskette, console, system printer and line printers. Other adapters handle disks, magnetic tape, cards and communications.
- Two new disk units are offered:
 - the large 3310, up to 16 x 64.5 MB via adapter
 - the very large 3370, up to 16 x 570 MB also via adapter.

Both units are non-removable and use a new fixed block mode (FBM) of recording in 512 byte blocks. The advent of these two units marks the IBM trend towards a new standard, reinforcing its reputation for reliability.

- Model 8809 magnetic tapes, first offered in 1978 with the 8100 series, allow up to six units and two speeds:
 - 20 KB/sec for normal record read/write
 - 160 KB/sec for system dump/reload necessary for backing off the large databases held on the new DASD's.

The higher speed is not available for standard read/write.

- Models 3289 and 3262 system line printers are new to DPD's product range.
- Entry level configurations of the 4331 can function in a normal office environment.
- The 4341 Processor offers 2MB or 4MB processor storage, less 100k (estimated by IBM) for microcode, plus the following features:- microcoded Control Storage , cache memory, diagnostic system diskette and separate Service Processor for CE use. Native or 370 operational modes are microcode alternatives. In 370 mode microcode support may be either to VM (ECPS:VM) or to OS/VSI (ECPS : VSI).
- Channel I/O, an option on the 4331, is the standard attachment method for the 4341.
- On 4341 the 3370 DASD attaches to a 2 MB/sec block multiplexer channel via a powerful new Disk Control Unit model 3880, which also allows connection of the older 3340 and 3344 disks.
- The new 3203 Model 5 1200 l.p.m. Line Printer can be connected via a channel to 4331 or 4341.

B. SOFTWARE AND ITS PACKAGING

- The 4331 is essentially a DOS machine though VM/370 in a new Release 6 is also provided. DOS/VSE (VSE for short) is the new DOS/VS, renamed in place of Release 35. Extensions have been hived off to a separate chargeable module VSE/Advanced Functions.
- VSE/AF is pre-requisite for:

- VSE/VSAM for disk access
- VSE/POWER for RJE and spooling
- ACE/VTAM-E for teleprocessing.

• VSE is assisted by the microcode ECPS: VSE, activated in native mode on both processors. A 20% performance improvement is claimed.

• VSE can be hosted by VM/370 on both machines.

• On the 4331, use of the FBM facility on 3310 or 3370 requires:

- ECPS:VSE when running native mode
- VM/370 with BSEPP Release 2 otherwise.

On the 4341, FBM requires the 3370/3880 hardware combination.

• The 4341 can be either a DOS or a VM/370 machine, but VM may also host either DOS/VSE or OS/VS1 Release 7, a new version of VS1 which has as yet no release date. When running VSE under VM, ECPS:VSE microcode assist is not available.

• The only software release dates currently announced are:

- VSE Version 1 June '79
- VSE Version 2 4th quarter '79

• MVS is not supported on either machine, though it is rumoured to run.

• "Full-function programming" - meaning the incorporation of DB, DC or DB/DC as a matter of course - is IBM's slogan for 4300. One of the assists towards this goal is the System IPO/E, a package of system software products, pre-configured and tested in the factory, delivered ready for 'load and go' immediately on installation.

• Though traditional on-site configuring is still provided, taking an IPO/E is recommended because:

- it save or cuts out systems programmer effort
- users without a system programmer needn't incur IBM SE time (now to be chargeable when on-site).

• IPO/E's to be available (FCS 3rd quarter '79) are:

- DOS/VSE System IPO/E
- VM/370 Release 6 System IPO/E
- VM/DOS/VSE System IPO/E

• New program products for the VSE user are:

- /ACF - the hived off part of the SCP
- /ICCF - an interactive workstation facility (based on the earlier ETSS) with a command language like CMS
- /VTAM-E (see subsection C under communications)
- /IPCS - interactive program diagnostic aid.

• VSE offers:

- CICS for DC
- DL1 for DB

• New program products for the VM user are:

- BSEPP - for support of new I/O devices, and CMS enhancement

- /IFS - allows filesharing between CMS machines
 - /DMS/CMS - permits interactive screen format definition
 - RSCS/Networking - a tool for interfacing to other VM, VSE or MVS systems.
- The new Release 7 of VS1 is not offered with an IPO/E. It is provided for 370 compatibility to users who do not wish to migrate to MVS and the 303X series. Microcode assist on 4341 is provided by ECPS: VS1.

C. COMMUNICATIONS

- The 4331 has an integral comms adapter supporting any two of start/stop, BSC or SDLC modes on up to 8 lines. 4331 can act as a member of an SNA network, as a host, a satellite or a node. The integral adapter does away with the need for a 370X Communications Controller and its control program (NCP).
- The 4341 accesses comms lines through a channel
- VSE access methods are:
 - ACF/VTAM-E for SDLC and BSC lines
 - BTAM-ES for BSC and Start/Stop lines
- ACF/VTAM-E combines the previous ACF/VTAM and ACF/NCP/VS functions, and provides support for multi-system networking.
- VM systems may also be included in a network using the enhanced product RSCS/Networking.

D. PRICING

- Exhibit III-1 shows the expected price ranges of the two processors. It includes a total monthly rental column which is the sum of hardware rental, maintenance and software licence charges. The figures have been derived from IBM data.
- The dollar prices are based on UK prices and an exchange rate of \$2 to £1. Therefore prices in any one European country may differ according to the relative strengths of the local currency, sterling and the dollar.
- Bottom of range costs are based on a system hardware price of two times that of a minimum processor configuration. Top-end costs are based on 4.5 times that of a maximum processor configuration. This range of factors reflects (1) the current trend for processors to contribute less to total system cost, and (2) the large DASD databases possible on 4300.
- On the day 4300 was announced, prices on System 3 and System 370 up to Model 148 were reduced by up to 15%.

E. STRENGTHS AND WEAKNESSES OF 4300

- The major strengths of 4300 are:
 - the price/performance ratings of the processors
 - compatibility with S/370
 - simplified installation with IPOE's
 - easy implementation of DB/DC

4300 SYSTEM DOLLAR PRICES

PROCESSOR MODEL	MEMORY	PURCHASE	RENTAL PER MONTH	24-MONTH LEASE PER MONTH	MAINTEN- ANCE PER MONTH	SOFTWARE* LICENCE PER MONTH	TOTAL MONTHLY RENTAL
	1 MEGABYTE	to 700,000	21,000	*17,520	to 2,905	3,000	26,905
4341	2 MEGABYTE	from 620,000	18,950	15,340	2,570	1,300	22,820
	4 MEGABYTE	to 1,700,000	51,500	42,060	7,060	3,500	62,060

*includes allowance for software maintenance.

- FBM locks users into a new disk standard
- SNA support increases DDP capability of mid-range
- continuing policy of unbundling and targetting users for multiple machines help to offset revenue losses brought about by aggressive pricing.

• From the user's viewpoint there are a number of weaknesses:

- conversion, particularly file conversion because of the new disk standard, will bring problems
- there is no end in sight to the use of cumbersome IBM software (consider the possibility of using the interactive program development aid IPCS in a VM/DOS/VSE environment)
- need to hold the complete database on-line (mandatory with non-removable disks) can advance the requirement for the second or further machines
- further unbundling of SCP and new software maintenance charges both offset hardware cost reductions
- the high volume, low-cost marketing policy and the sharper definition of support both tarnish IBM's image
- no DB enhancements have been announced

• For IBM's sales strategy there are two disadvantages:

- self-impact on S/38 from overlap with 4331

- potential overlap at top end of range with 3031 is a constraint on release dates.

F. FUTURE PLANS

- Delivery dates for current hardware announcements are:

- 4331 Processor configurations with 3310 DASD and 3289 Printer - FCS 6/79
- 4341 Processor with 3370 DASD and 3380 Control Unit - FCS 1Q/80
- 3262 Printer - FCS 3Q/79.

- Software release dates are as follows:

- VSE/AF Release 1 - FCS 6/79
- VSE/AF Release 2 - FCS 12/79
- VSE System IPO/E - FCS 8/79
- VM Release 6 - no date available
- VS1 Release 7 - no date available
- other system IPO/E's - no dates available.

- A policy of product overlap is being deliberately fostered at IBM (see Exhibit III-2 for the current product spectrum). This encourages competition between GSD and DPD, but also affects timing of future announcements.

- The 4331 has been launched as a DOS machine to maximise the number of migrants from S/3 and low-end S/370. When migration has ceased, or decreased to a trickle, and IBM has had a chance to evaluate user acceptance

of FBM, INCA 3 will be announced as an upgraded 4331. This will not happen before January 1980. It will have the added effect of overtrumping the competitive ripostes to 4300.

• The most conspicuous absentee in the clutch of new announcements is DB. The reasons for this are various:

- IMS users are the main sufferers from IBM's present DB offering but they have on the whole large-scale systems, currently on or moving to the 303X series
- IBM's 'H' Series (the Virtual Processor systems which will replace 303X and lie on the same price/performance curve as 4300) must arrive with a revamped DB
- IBM needs time to evaluate the new database on S/38 (relational techniques have so far been easier to implement in small-scale databases); meanwhile DL/1 should continue as mid-range standard and as a yardstick for evaluation
- Until IBM sees how many users opt for the new FBM storages (as opposed to staying with emulation of earlier disks), DB developments cannot be finalised.

• MAYA 2 will be announced as the 4351 not earlier than June 1980 for first customer shipment 2nd quarter 1981. This timing will not be related to the announcement of the 'H' Series, because by then large-scale systems will be sold by a different division and again management will be encouraging some healthy competition between divisions. MAYA 2 will outperform the 3031 and will plug the hole that currently exists around the 158.

• By 1980 IBM must have resolved the question of database standards for each of its ranges. It is significant that the 3370 disk unit with FBM has even more

THE IBM PRODUCT CONTINUUM

◦ H SERIES (1981-3)

▣ 303X SERIES (77-78)
3031 3032 3033

▣ 4300 (E) SERIES (1979-80)
4331 Inca 3 4341 Maya 2

▣ 8100
8130 8140

* 370 SERIES
370/115 /125 /138 /148 /158 /168

▣ 3X SERIES
32 34 (36) 38

S/3 *

COMMERCIAL POSTURE

- * Obsolete
- ▣ Current
- New Announcements

EXHIBIT III-2

recently (February '79) been announced for the System/38. This will afford a file migration path from Series 30 to 4300 and will enhance interconnections between 30's and 4300's in an SNA network.

- New query language (QBE) will be announced about the same time as INCA 3.
- The new range of large-scale systems incorporating multi-processors with a virtual processor environment ('H' Series) will be announced by 3rd quarter 1980. Its price/performance range is shown in Exhibit III-3.

PRICE-PERFORMANCE RATIOS
(158-3 PRIOR TO 3/77 = 1)

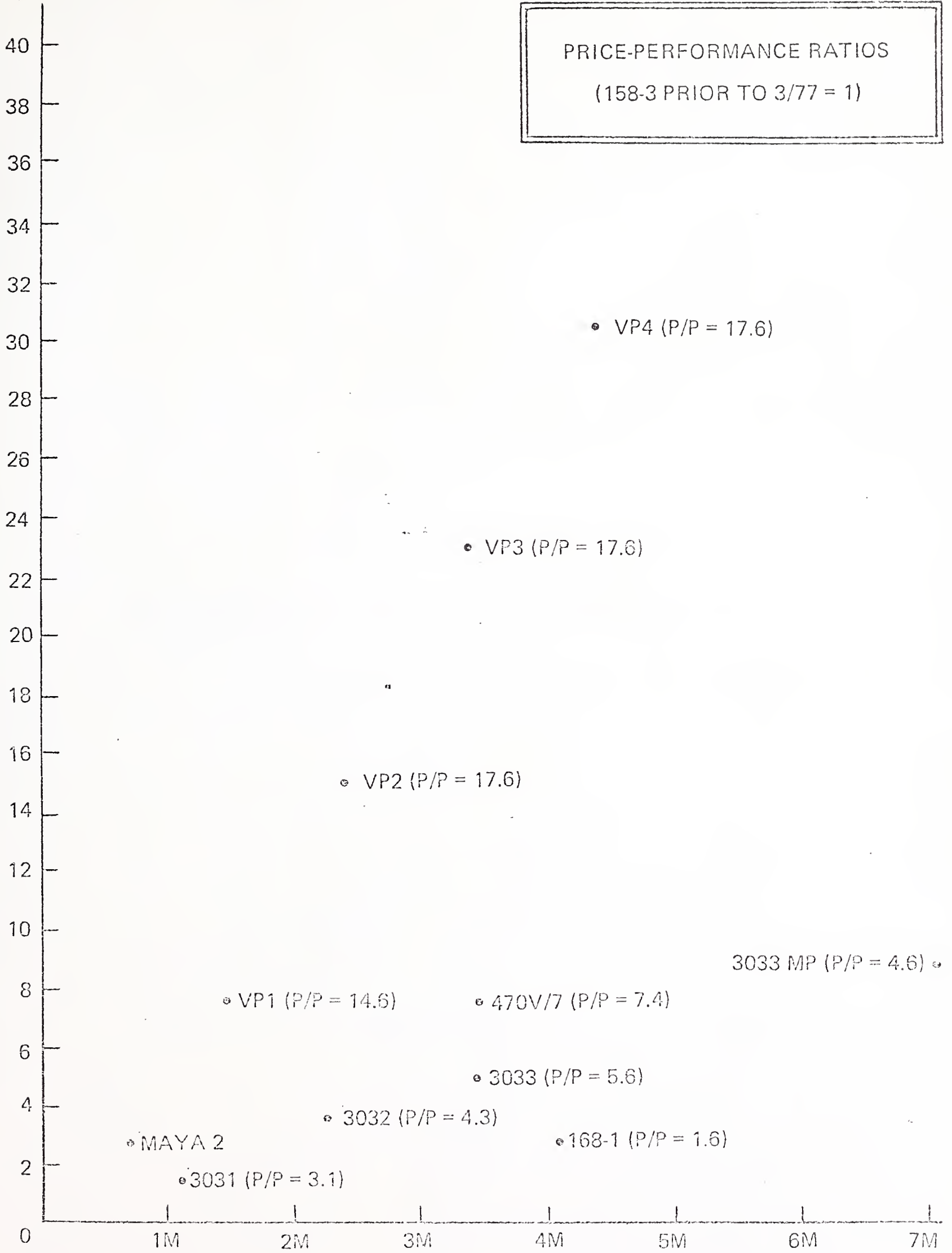


EXHIBIT III-3



IV. COMPATIBILITY OF 4300 WITH OTHER IBM LINES

IV COMPATIBILITY OF 4300 WITH OTHER IBM LINES

A. WITH SYSTEM/370 AND SYSTEM/3

- Both 4331 and 4341 processors are 370 compatible. Compatibility is aided and achieved by suitable microcode routines which reside in Control Storage and are loadable from system diskette at IML.
- The table below shows the availability of the different microcode assists (EPCS):

Assist	Processor	
	4331	4341
EPCS : VSE	X	X
EPCS : VM	X	X
EPCS : VSI	-	X

N.B. Only one EPCS can be in residence at a time.

- The two new DASD's are a different design from earlier units from IBM. They both (3310 and 3370) implement a Fixed Block Mode recording technique and have non-removable assemblies of disk and head. There are compatibility features available to migrants from 370.
- 3310 - only available on 4331 - can be mixed with the earlier 3340 DASD as well as the 3370.
- Under DOS/VSE only, 3310 can be used to emulate earlier 23XX series of DASD's.
- 2314 disks may be attached via Block Multiplexor Channel to 4331.

- On 4341, 3370 (via 3880) can be mixed with 3340 and 3344 disks. If the older 3830 Disk Control is attached, any of the 370 disks - 333X, 3344 and 3350 - can be connected.
- One reason for availability of 3340 on 4331 is to allow import of System 3 files. This facility is intended as a short-term conversion aid and is not designed to provide permanent access to an obsolescent filing system.
- Exhibit IV-1 tabulates the allowable DASD Attachments.
- The main obstacles to easy file conversion are:
 - The FBM recording technique requires file reformatting
 - new disks are only supported under the VSAM and SAM access methods, meaning that all files accessed by ISAM or DAM will require emulation or conversion.
- Furthermore, use of certain compilers, e.g. PL/I and COBOL, may be impacted by the absence of ISAM and DAM support.
- 4300 is intended as a full SNA machine, but the earlier BSC and start/stop modes allow communication to non-SNA networks. There is the constraint on the 4331 that only two out of the three modes can be used on the integral Communications Adapter.
- 4300 uses the same tape drives as 8100 DDP processors, but can also attach earlier 370 type magnetic tapes via a channel.

B. WITH 303X RANGE

- Since 303X series run 370 series programs, 4300 is essentially upwards compatible with 303X. However, the environments encountered are likely to be

SUMMARY OF DASD ATTACHMENTS

DASD	4331 DASD Adapter	4341 Via 3880	4341 Via 3830	Operating System
3310 FBM	Yes	No	No	VM/370 with BSE Rel 2 and DOS/VSE
With 23XX EMUL	Yes	No	No	DOS/VSE
3370 FBM	Yes	Yes	No	VM/370 with BSE Rel 2 DOS/VSE
333X	No	No	Yes	Any*
3340	Yes	Yes	Yes	Any*
3344	No	Yes	Yes	Any*
3350	No	No	Yes	Any*
*ANY—DOS/VSE, VM/370 Rel 6, VS1 Rel 7				

different and VM/370 will be the 'bridging' operating system with most overlap between the two series.

- MVS is the main OS on 303X. As from 1st January 1980, MVS will not be supported on 370.
- According to IBM the new disk units will not be made available on 303X. This has been justified by the difference in operating environments - mainly DOS/VSE for 4300 databases mainly MVS for 303X.

C. WITH GSD PRODUCTS

- Basically there is very little, or no, compatibility at this stage with GSD's products. It is IBM's policy to target GSD chiefly at the first time user and to target 4300 chiefly towards the existing user with potential requirements for more than one installation. By keeping these two apart it is hoped to develop the multiple-site DDP user with the current products of DPD.
- Two areas of compatibility exist:
 - the previously mentioned data import facility for System/3 files using the 3340 DASD into the 4331 Disk Adapter.
 - the migration capability provided for System/38 files, once 3370 becomes available for both it and 4300's.
- This latter facility presages a dropping of the barriers between GSD and mid-range DPD systems. There is already evidence of an intermediate systems division being set up in the US. There is an increasing weight of logic behind such moves since the GSD and midrange lines need to be sold in similar ways.

V. IBM'S MARKETING/SUPPORT - A RADICAL CHANGE

V IBM'S MARKETING/SUPPORT - A RADICAL CHANGE

A. SELLING STRATEGY FOR THE RANGE

- The development of LSI technology has had two profound effects on computing:
 - central processor prices have tumbled dramatically
 - it has now become economic to distribute intelligence into peripheral units, thus enhancing their capabilities.
- There are two implications for IBM and other mainframe vendors. Each price cut lowers the previously predicted revenue forecasts, and this revenue has to be won back from some other source. As intelligence is distributed to peripherals their capabilities can be enhanced and more sophisticated and ambitious configurations can be attempted.
- The means of achieving the previously budgeted revenues are
 - selling more complex units
 - selling more complex configurations
 - selling more units

With the 4300, IBM is committed to all of these techniques but most especially to the third.

- Selling of more complex units and configurations has been proceeding continually, partly by means of extensions and replacements to the DPD catalogue and partly by increasing the number of users with such things as data communications and database.

- Minicomputer and SBC vendors have for some years now accepted the challenge of selling large volumes of small-scale systems. IBM formally joined them at this game when General Systems Division got going, and with Series 1 being also now sold by GSD, the momentum is increasing. However, what is new is to find the high volume, low cost strategy applied within DPD.
- This change of direction is another move in IBM's grand strategy for the 1980's and 1990's of being able to provide computing and data processing facilities to all sizes of organisation and all levels within organisations:
 - personal computing to the home or to the executive at his desk
 - small businesses and the local shops
 - industrial companies
 - etc, up to the world-wide multinationals
- The 4300 range is cast as the general purpose workhorse to replace the 370's and to extend data processing throughout the sort of organisations that have previously concentrated on a single mainframe serviced by a centralised DP department.
- IBM recognises that DDP poses a potential threat to the DP department - loss of control has up to now seemed to threaten the large 370 sites with fragmentation. Wielding its present array of products, IBM with 4300 as well is now able to throw its energies behind DDP.
- 4300 can be offered flexibly:
 - at one or more user sites
 - as a stand-alone or in a network
 - as a host or as a satellite or as a node

Taken with the 8100 it offers the salesman a gamut of configuration possibilities for rationalising an organisation's hardware requirements. It fairly and squarely occupies the middle ground (or the compromise area)

between replicated stand-alone processors and the large over-centralised mainframes, without preventing either of those extreme options for selected cases or selected areas.

• The long-term problem of staffing the data processing industry with sufficient experienced, trained personnel has also influenced the software philosophy and sales strategy of 4300:

- replication of systems within organisations is going to be difficult if a DP department must be created to surround each site.
- selling multiple systems must be achieved with greater salesman productivity, if IBM growth is not to be retarded by take-on of new staff and the increased overheads which follow.

• Hence the policies of:

- presenting 4300 as a "black box" processor
- being more miserly with pre-installation services
- reorganising software support
- charging for software maintenance.

B. APPLICATION SOFTWARE

• IBM expect 4300's to be implemented in one of three ways:

- IBM provide SCP and utility software, and something called "application enabling" software
- besides normal system software IBM provide application "code" modules fully coded and documented, but requiring customer implementation and integration, if destined to run alongside other applications

- IBM provide dedicated "application machines" comprising system software and off-the-shelf application products.
- "Application enabling" software remains a nebulous concept. It appears to be a refurbished phrase for: "Lets by-pass the DP department and allow users to implement their own systems", a sentiment which though laudable in itself has been severely and consistently eroded by the increasing complexity of hardware and software. IBM has not given any examples of the concept. At its minimum, it could be taken to include languages, interactive development aids and data management facilities.
- "Code" modules mean fully developed application systems to run in a shared environment. Today's application systems from IBM are being developed using the best techniques for parameterising of module options and for progressive user take-on of facilities. IBM has not announced any new products of this category as part of 4300 launch but individual European managements are being encouraged to develop products with national applicability. One example of such is the UK product BARPICS for manufacturing companies. It is a development of the PRINCE product run on DCS bureau machines.
- Whereas the two methods already described, both require some support from the DP department, the third and last does not. The "application machine" is the complete "black box" installed and commissioned by IBM and available to the end-user at once without any intermediaries. IBM dream of the possibility of an organisation having, say, 10 such 4300 systems each servicing a dedicated end-user application. No software has yet been packaged in this way, however, but STAIRS and PLANCODE are admitted to be two contenders for this treatment.
- In IBM's mind, the new market stance represents a major opportunity for all types of service companies. There is no intention to offer turnkey solutions on 4300. IBM's in-house systems house effort is currently fully occupied servicing requirements on 303X range.

- IBM is prepared to sell under licence application systems developed by other organisations. An example is the computer-aided design system CADAM from Lockheed. In this case all support is handled by the original supplier.
- IBM does not offer volume discounts to service companies purchasing 4300, except that possibly very large numbers of terminals could attract a special price.

C. INSTALLATION AND TESTING ENVIRONMENT

- The sales organisation for 4300 is based on an idea imported from GSD, the Regional Customer Centre. For example, there are to be 3 Customer Centres in the UK. Each will have a team of managers, salesmen and SE's approximately 30 strong.
- Machine facilities will consist of a 4300 at each Customer Centre and access to timesharing facilities. At Branch Offices it will be possible for users to hire terminals under VM in unattended terminal rooms.
- Marketing seminars and education will take place at the Customer Centre. Prospective customers will receive demonstrations, presentations etc there.
- Post sales support consists of review meetings, "clinics" and a trouble desk phone-in service all mounted from the Customer Centre.
- Testing will attract the usual free allowance (PITA) which can be used on the Customer Centre machine or on a new service called VMPS running under VM/370 on the RCS section's large machines at the Warwick supercentre. This service can be accessed via the Branch Office terminals. It becomes chargeable at the expiry of the PITA, and because no software changes are necessary it gives a bonus to users who are intending to adopt VM as their production operating system.

D. SOFTWARE MAINTENANCE

Once 4300 hardware has been installed and commissioned, all on-site support becomes chargeable. The charges can be raised:

- on an ad hoc on demand basis
- by a monthly software maintenance rental

IBM have not currently issued software maintenance rates but state that the new arrangement does not put up the overall cost of unbundled software. With the price performance of the 4300 this implies software becomes an increasing proportion of IBM revenue.

This is a new policy. Its announcement accompanied the 4300 launch. It is to come into operation on 1st January 1980, and is to apply to all DPD products.

The way the customer will obtain software service is illustrated in Exhibit V-I.

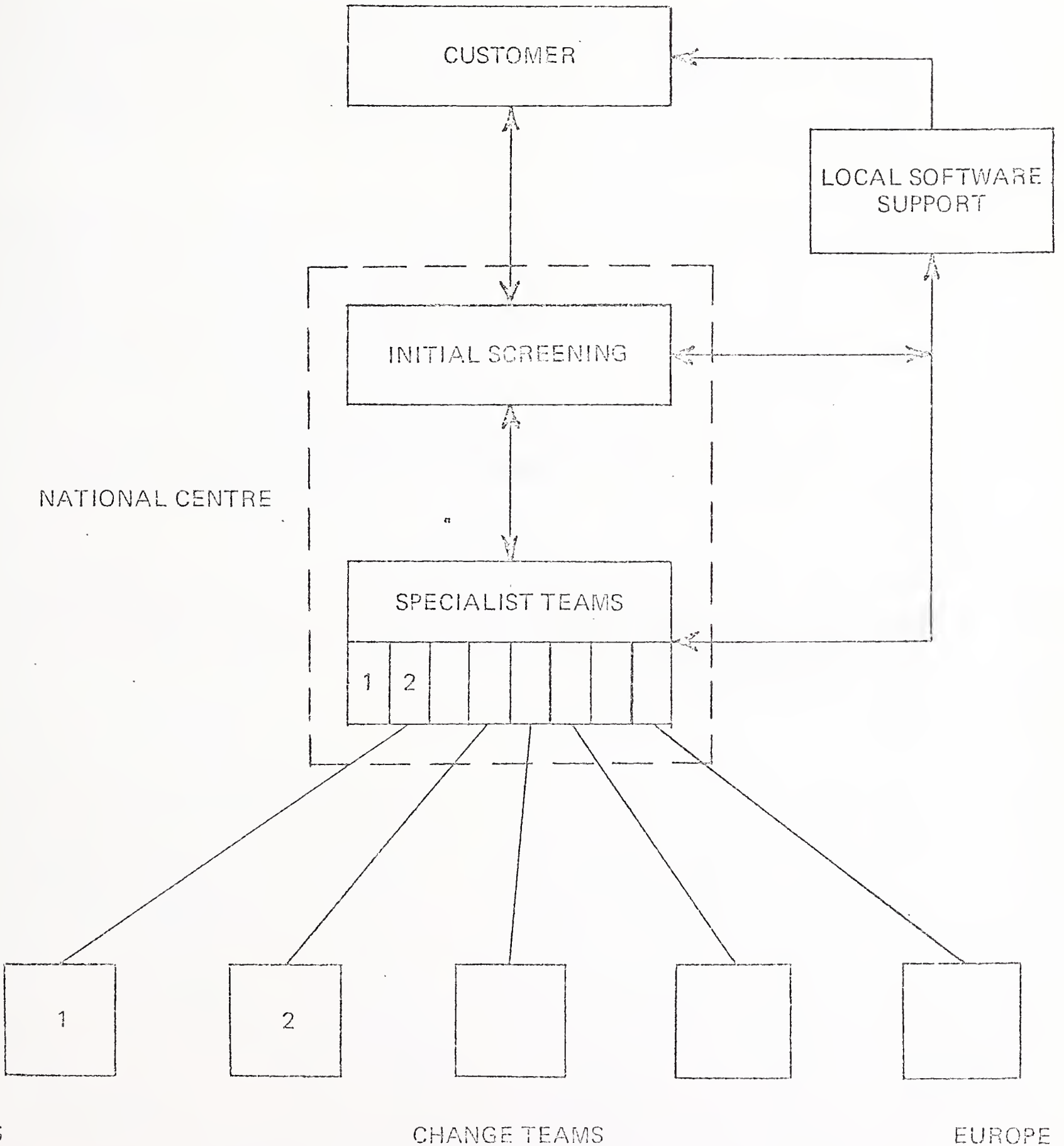
There are to be national support centres, supporting all licensed program products whether control programs, system, utility or application software.

The national centre will:

- accept telephone calls for software/support queries, note details and arrange to call back
- route the query to the relevant specialists who
- solve the problems if possible and
- call back the user with a verbal fix or
- notify the user of the need to call out local CE support from the nearest Branch and
- arrange to do so

NEW SOFTWARE SUPPORT ORGANISATION

DUE FOR IMPLEMENTATION 1/1/80



US

CHANGE TEAMS

EUROPE

EXHIBIT V-1

No charge accrues to the user until the local CE starts to leave his Branch (or travel from where he is located) to the user in trouble.

- o IBM claim to have tested this system in the US and report that 60% of calls result in fixes without on-site visits. Standard written fixes will continue to be issued when genuine bugs have been diagnosed and cleared through the formal channels.
- o The financial advantage to the user is that he can be selective in his choice of modules to be put on a maintenance agreement. Critical modules can be serviced under the agreement, while others less important can be left to be supported on demand. He can thus accept risks where he wants and get cover otherwise.
- o The new operating systems announced on 4300 are also to be available on S/370.
- o After 1/1/80, IBM will only support current releases of operating systems - presumably updated IPO/E's will be issued. On the same date support for MVS on S/370 will also be dropped.

VI. SUMMARY AND RECOMMENDATIONS

VI SUMMARY AND RECOMMENDATIONS

- IBM's pricing strategy on 4300's concentrates attention on processor price/performance at a time when processor costs form a declining proportion of total configuration revenue.
- IBM's latest DASD design philosophy leads to the totally on-line database on fixed disks, thus also fixing an absolute storage ceiling for each processor. Overflow onto off-line storage is prohibited. This will in time create enormous pent-up market demand for mass-storage, IBM's next money spinner.
- The totally on-line database is initially to be offered with a reserve of capacity in hand. The concept however, has enormous implications for the design of future systems. It will prove as inimical to good systems design as VS was inimical to good programming.
- The 4300 keeps IBM firmly in the front of the market for medium-scale mainframe equipment, while at the same time fulfilling a prime role in the company's DDP policy. 4300 enables IBM to:
 - abandon its previous containment strategy towards DDP.
 - go over onto the offensive with multiple host/satellite installations and networks.
- Recognising the industry manpower problems, 4300 software has been designed to:
 - ease migration from low-end 370's
 - lessen users' requirements for systems programmers
 - allow for smooth transition to DB/DC

- Recognising its own manpower needs, IBM has implemented organisational and commercial changes:
 - tight control of pre- and post-sales support
 - further software unbundling
 - a thawing of the relationships with services companies

A. MAINFRAME VENDORS

- Competitive manufacturers must match IBM processor price/performance. Burroughs and NCR have already announced the first models in upgraded series which are to replace their current lines.
- IBM's competitors must also re-examine their architecture and ensure that it can be sold as an up-to-date product, not necessarily imitating the IBM postures, but at least giving blow for blow.
- No mainframe vendor can afford to go into the 1980's without a strong communications capability. In the eyes of the market ICL has a weakness in this respect. Whether it is due mainly to hardware or mainly to software is immaterial. To survive with a full spectrum of products, a mainframe vendor must have in-depth credibility in the business of networking with those products. This will increase in importance as a criterion for survival through the next decade.
- Some mainframe vendors may wish to concentrate on specific market sectors e.g:
 - CDC in large scientific installations
 - DEC in timesharing systems
- If not, if the vendor wishes to remain in the mainstream commercial data processing sector, the impact of 4300 and its place in IBM's strategy must be fully evaluated.

- ④ PCM vendors have been posed a direct threat by 4300. On the face of it they will be hard put to survive. This time IBM has not delayed its reply until it was ready. The size of the impact would appear to be proportional to the delay in its arrival.
- ④ Intel is confident that it can match IBM on price and performance; being well established and to a degree conglomerate, it has a fighting chance. The other PCM's should copy Intel's policy of providing total systems. This is best done by forging links with expanding RCS and systems house vendors and developing improved system software tools to outperform 4300. With IBM controlling the hardware/firmware/software interface, this will be no mean task.
- ④ Component manufacturers should not enter the mainframe suppliers market. If they are already in it e.g. National Semiconductor, they should retire to a position of being a sub-contractor to a vendor making end-user sales.
- ④ The same advice applies to Japanese manufacturers wishing to enter the world market. The data processing market is not yet stable enough to be amenable to the Japanese treatment by mass production methods. It is necessary for the micro-computer revolution to have been fully digested for the correct degree of stability to have been gained. The main factor militating against the Japanese is the fluidity of software standards and the absence of accepted software interface specifications. This will change once extensive use of firmware has necessitated the establishment of these standards. Meanwhile, they should concentrate on the office products field where the size of the average unit system will allow for speedier standardisation of all components, thus becoming more quickly amenable to mass production. However, there are likely to be substantial losses incurred by adventurous Japanese firms in the next few years.
- ④ Leasing companies will feel substantial impact from IBM's 24 month/leasing contracts announced for 4300. Some US companies - Greyhound, DCL - had in any case been given poor futures, even before 4300 came out. However, CDC report increasing demand for leasing at the top end; and it remains to be seen

what scope there is for leasing companies to match IBM rates on multi-machine deals. INPUT's next residual value update will be available from the US in April 1979.

B. MINICOMPUTER VENDORS

• The impact on minicomputer manufacturers centres on the price/performance of the 4331 processor and its starting price at just below \$200,000. This visibly shows IBM in the same price bracket as the top end minis, and with IBM's name and credibility the impact could be severe if the systems do actually get into contention. However, mini vendors must still hope to be in contention more often with the products sold at the top of the GSD range, while DPD initially concentrates on existing IBM users and 370 replacements with 4300.

• The impact will be hardest felt by vendors who have deliberately moved up market to catch the lucrative sales in the medium scale commercial system sector - in the price range from \$200,000 to \$400,000. Two important names in this sector are:

- Hewlett Packard
- Prime Computer

Both have deliberately cultivated an "up-market" image to distinguish themselves from the mini vendors clustered at the small scale end.

• Hewlett-Packard's HP3000 series was reduced in price on the day of the 4300 launch.

• Prime pre-empted the 4300 by announcing three mainframe minis, the 750, 650 and 550 systems in January. Prime has always provided a virtual machine environment on its smaller systems, and the PRIMOS operating system has been retained on the larger additions to its range. These processors will prove an interesting performance yardstick to 4300, running under VM/370.

- ④ Marketing strategies for all mini vendors in contention with 4300 in whatever sector must include:
 - selling to the strengths of mini architecture, operating systems and reliability
 - fostering a distribution and support network with systems and software houses.
 - emphasising industry specialisations.
- ④ It would be totally unwise for vendors to indulge in a price war with IBM. This might result in short-term gains in terms of increased unit sales, but over the longer-term the cutting back on margins would affect vendors ability to invest in future product development. In any case the mini vendors are expected to be price competitive when IBM's software charges are taken into account.
- ④ The only area where IBM always has a price edge is on hardware maintenance. At just under 5% of purchase price per annum, IBM's maintenance charges are very competitive and of all things most accurately reflect the economies of scale and the increased reliability of the newer technology.

C. SERVICES SUPPLIERS

- ④ Though 4300 range poses both a threat and an opportunity to the services industry, the opportunity is greater than the threat.
- ④ The threat is present because:
 - IBM aims to sell 4300 directly to end users as "application machines"
 - besides reducing the involvement of the DP department this policy lessens the users requirements for software support.

Because of the absence of new application software for distributed data processing, and the relatively undeveloped usage of DB/DC in Europe, this threat is more imaginary than real.

• With multiple host processors in an organisation, the user is going to need lots of expertise to tie together and control the spread of data processing closer to his day-to-day operational fields.

• The opportunity for the services vendor hangs on the IBM name. The pricing of 4300's makes them good replacement machines for 360/370 in service bureaux but there is the added attraction of turnkey OEM sales on equipment with the IBM label. Though IBM will not offer discounts on 4300 at this stage, we may expect to see a change in policy on this question within two years. At least the precedent for volume discounts has now been set in the US on the Series/I.

• The other major attraction for services vendors is that 4300 is designed as a remote site machine:

- no system software generation is needed when taking an IPO/E
- on-line database reduces operator disk handling
- small configurations don't require air conditioning.

With the increasing awareness of the possibilities for on-site computing, 4300 must be evaluated carefully by prospective entrants to this field.

• Specific consultancy/training opportunities exist for service companies in:

- user planning and support consultancy
- user education by tutorial/workshop sessions to develop their self-sufficiency
- user training in individual industry-oriented products.

• Software opportunities comprise:

- maintenance and enhancement of obsolescent/unsupported IBM software
- adaptation of existing application programs/products to make use of new 4300 features
- production of system software (DBMS, interactive tools etc) to outperform IBM's offerings
- conversion and rewrites for 370 systems.

• Opportunities involving 4300 hardware sales include:

- Facilities management by 370 replacement at a reduced DP budget
- Off loading of central DP loads onto 'on-site' 4300
- 'On-site' cluster supervisory systems, where a 4300 handles satellite minis in distributed mode
- large scale turnkey systems for specific industries, e.g. POS controller for discount warehouse or multiple store
- joint turnkey sales with IBM.

