All About Plug-Compatible Mainframes

The attractive cost savings offered by plug-compatible mainframes (PCM) have made users take a closer look at PCMs. In 1975 the PCM industry was to see its first entry with the installation of Amdahl's 470/V6 system. Since that time, other vendors have successfully competed for a share of the market. The primary thrust of the PCM manufacturers has been to provide cost-effective alternatives to the IBM System/370, 303X Series, 308X, and 4300 Series computers.

Plug-compatible mainframes can be installed easily, can replace or augment IBM mainframes with little or no need for changes in software or operating procedures, and can be expected to perform reliably and efficiently. What's more, most of the PCM suppliers have demonstrated their ability to provide first-class field maintenance and software support.

Should your organization install a PCM? And if so, which one? This report is designed to help you answer those questions by assessing the pros and cons of PCMs in general, profiling their current suppliers, and presenting the characteristics of 55 PCMs from 7 vendors in detailed comparison charts.

Plug-compatible mainframes offer attractive alternatives to IBM's medium– and large-scale computer systems. This report discusses the pros and cons of installing a PCM, profiles the current PCM suppliers, and provides detailed comparison charts describing 55 systems from 7 vendors.

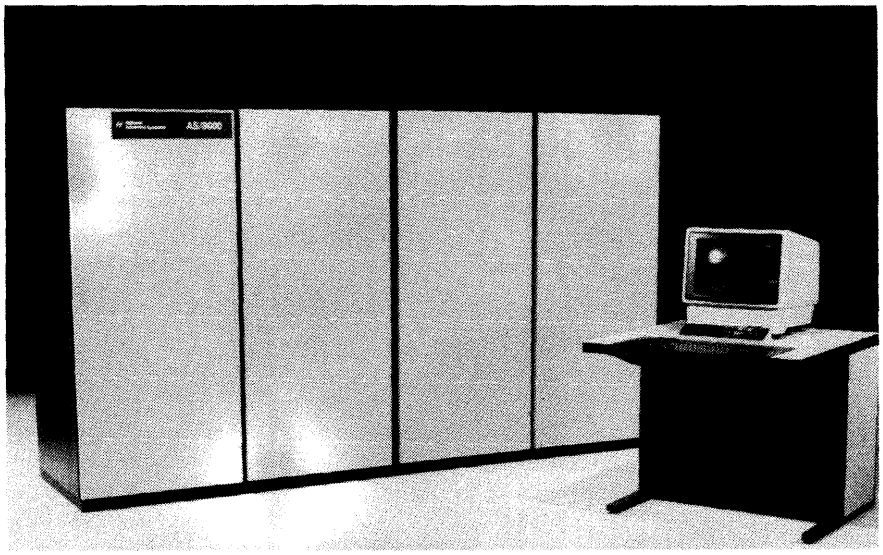
The PCM Concept

Plug-compatible mainframes are typically defined as computer mainframes that can directly execute all application programs and systems software written for the IBM System/370, 303X Series, 308X Series, and/or 4300 Series computers and can utilize the peripheral equipment available for these computers. The PCM concept would, of course, be equally applicable to the computers made by Burroughs, Honeywell, Sperry, or any other mainframe supplier. IBM, with its large user base, attracts the most serious attention from the PCM vendors. Two manufacturers, Telefile Computer Products (Irvine, CA) and Foonly, Inc. (Mountain View, CA), have developed systems that are compatible with non-IBM product lines. Telefile's T–85 is compatible with the Xerox Sigma family of systems, while Foonly's F1 through F5 systems are compatible with the Digital Equipment DECsystem–10 and DECSYSTEM–20 families.

The PCM industry resulted from the convergence of two important trends:

- The widespread availability and user acceptance of plug-compatible peripherals designed to directly replace IBM's own magnetic tape units, disk storage units, printers, terminals, and even main memory units. From there, the next logical step was to offer replacements for the IBM central processors themselves.

- The acknowledgement that the IBM System/360 and System/370 instruction set has become a de facto standard for the industry, and that most IBM computer users will not seriously consider switching to a computer that requires extensive reprogramming. A number of systems were developed in the 60s by RCA and Sperry which used the System/360 instruction set but were incompatible with systems software and peripherals. The next logical step, which was first taken by Amdahl Corporation, was to build computers which exhibited total functional com- ➢



National Advanced Systems' AS/8000 Series was introduced to the plug-compatible marketplace second quarter 1983. There are three models in the Series, the AS/8040, AS/8050, and the AS/8060. These uniprocessors compete with IBM's 3083. The AS/8040 competes with the 3083E, the AS/8050 competes with the 3083B, while the AS/8060 targets the 3083J. Memory available with the Series ranges from 8 megabytes to 32 megabytes. Both the AS/8040 and AS/8050 are field upgradable.

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	Amdahl	IPL	Magnuson	NAS	IBM S/370	IBM 4300	IBM 303X	IBM 308X
Ease of operation	3.37	3.75	3.58	3.18	3.09	3.20	3.13	3.25
Reliability of Mainframe	3.57	3.73	3.68	3.50	3.33	3.80	3.59	3.61
Reliability of Peripherals	3.17	3.38	3.31	2.93	3.05	3.36	3.30	3.25
Responsiveness of maintenance service	3.41	3.55	3.42	3.55	3.19	3.40	3.34	3.38
Effectiveness of maintenance service	3.41	3.55	3.26	3.41	3.13	3.36	3.32	3.35
Technical support								
Trouble-shooting	3.40	3.40	3.00	3.02	2.74	2.87	2.97	3.16
Education	2.95	3.00	2.59	2.61	2.64	2.72	2.87	2.96
Documentation	2.92	3.00	2.67	2.63	2.67	2.67	2.70	2.88
Ease of programming	3.00	3.20	3.23	2.96	2.96	2.95	2.62	2.93
Ease of conversion	3.09	3.50	3.57	3.21	2.95	2.95	2.94	3.21
Overall satisfaction	3.31	3.11	3.39	3.21	3.06	3.17	3.16	3.28

patibility with the IBM mainframes and could use all the same software and peripheral equipment.

To date, Amdahl, NAS and others, have proven the viability of the PCM concept, and it appears the industry will play an important role in the 1980s.

The current trend in the PCM industry is to target a family of systems toward a specific IBM product line, rather than be all things to all users. For example, Amdahl Corporation pits its 470 and 580 Series against IBM's high-end systems, the System/370 and 303X Series, and the 3081, respectively. Firms like Cambex, IPL Systems, and Magnuson compete with IBM's popular 4300 Series. Storage Technology Corporation, a maker of plug-compatible peripherals, has entered the PCM market to compete in the large mainframe arena. A new company, Trilogy, formed by Amdahl founder Gene Amdahl, intends to develop systems to compete in the 303X Series range. With high technology costs and the costs associated with maintenance and software support to consider, it is eminently more practical for a manufacturer to concentrate on a particular IBM product line. The various manufacturers and their product lines appear to bear this out.

User Reaction

Four PCM manufacturers—Amdahl, IPL, Magnuson, and NAS—were represented in Datapro's 1983 survey of computer users. We received a total of 46 responses from Amdahl 470 Series users, 19 responses from Magnuson M80 Series users, 32 responses from NAS AS Series users, and 12 responses from IPL 4400 Series users.

Using 11 of Datapro's rating criteria and our usual scale of 4.0 for Excellent, 3.0 for Good, 2.0 for Fair, and 1.0 for Poor, we've compiled the weighted average ratings these users have assigned to their systems, and present the results in the chart above.

For comparison we've also included the weighted averages of the IBM system families the PCMs compete with, the System/370 (126 responses), 4300 (171 responses), 303X (183 responses), and 308X (107 responses).

As you can see, the user ratings earned by the PCM vendors once again compared favorably with those of IBM in all 11 categories. The PCM vendors were rated comparable to and in some instances above IBM in key categories like overall satisfaction, ease of conversion, technical support, and both responsiveness and effectiveness of maintenance service. Equipment reliability was essentially a stand-off between IBM and the PCMs, with all the parties earning high ratings. Thus, it seems clear that a wisely chosen PCM can yield worthwhile cost savings without imposing offsetting penalties in any of the other areas that help to determine overall user satisfaction.

PCM Pros and Cons

The first and foremost advantage of plug-compatible mainframes is, of course, the prospect of substantial *increases in processing power per dollar.* The user can elect to realize this price/performance gain in either of two distinct ways: 1) by choosing a PCM that delivers performance comparable to that of a certain IBM mainframe but is offered at a lower price; or 2) by choosing a PCM that has a price tag comparable to that of a certain IBM mainframe but offers more processing power. The PCM vendors tend to position their product offerings so that users can elect either approach or, in some cases, a combination of the two (i.e., somewhat more power at a somewhat lower cost).

Faster delivery is another advantage that the PCM vendors have enjoyed over IBM. The slow delivery schedule of IBM's 4300 and 303X systems generated many sales opportunities for the PCM vendors, who typically could ship a system 30 to 60 days ARO. This situation is gradually diminishing, however, especially in the very large system arena. IBM's 3081 processor, the first in the H-Series, was scheduled for shipment late in 1981. Of its two announced competitors, the NAS AS/9000DPC was scheduled for a late-1981 first delivery, and the Amdahl 580 Model 5860 was slated for August 1982. The tide is gradually turning.

Becoming a *multiple-vendor shop* can be viewed as either an advantage or disadvantage of installing a PCM. Some users are still "true-blue" IBM loyalists, who fear that their IBM service will deteriorate and every hardware problem will result in a nasty "finger-pointing" session if they allow any non-IBM equipment into their shops. Conversely, other users are convinced that dealing with multiple vendors helps to "keep IBM honest" and leads to better overall service and support.

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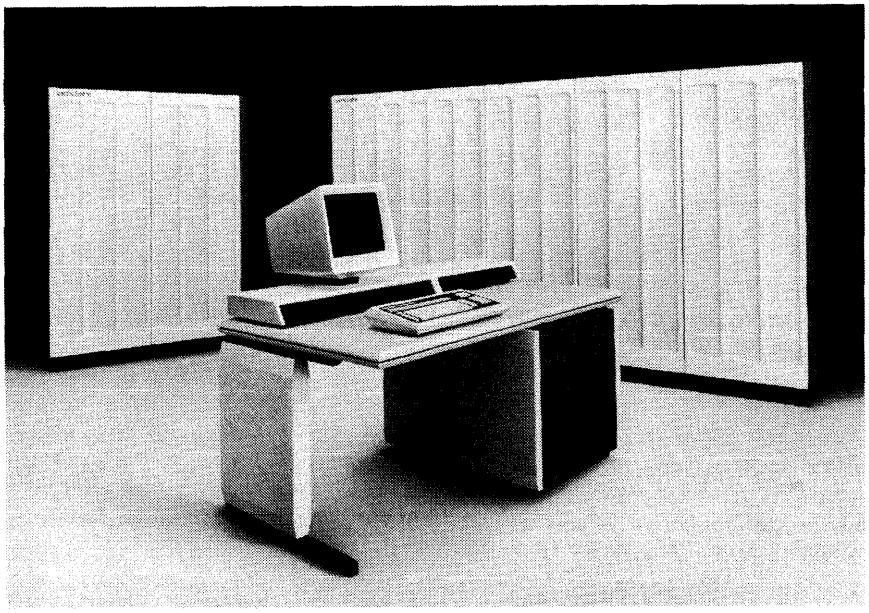

Amdahl Corporation has concentrated on technology that enables its computers to deliver more performance per dollar than comparable IBM models. Amdahl's 580 Series is targeted at IBM's 3081 processors and consists of five models, the single-processors 5840, 5850, 5860 (shown here) and the dual processors 5870 and 5880. The 580 Series processors feature from 16 to 32 megabytes of main memory and from 16 to 32 I/O channels per CPU. Amdahl is the original plug-compatible mainframe supplier and is also one of the most active PCM participants today.

Three potential disadvantages are commonly cited by prospective PCM users: the possibility of hardware or software incompatibilities, the possibility of weak vendor support, and the possibility that their PCM vendor may not survive. Each of these problems can be minimized through careful selection of a well-qualified vendor.

Incompatibilities in hardware or software were widely feared by early PCM users, but Datapro's user surveys have clearly shown that users who choose to deal with established PCM suppliers need have no fears. What's more, most PCM manufacturers have demonstrated their ability to develop the specialized hardware and/or software needed to maintain full compatibility when IBM adds new functions to its systems. Conversely, users who decide to deal with a newer PCM vendor should demand proof (in the form of a rigorous benchmark test) and/or an iron-clad guarantee that the new mainframe will be totally compatible with their IBM equipment, systems software, and application programs.

Poor vendor support is another frequently expressed worry of prospective PCM users. Our user survey results indicate that Amdahl, IPL, Magnuson, and NAS have all established viable field service and support organizations. These vendors attempt to be responsive and were found in our survey to be more responsive than IBM. As always, it's up to the buyers to determine the amount of service and support they need and are willing to pay for, and then to select a PCM vendor that can and will provide it.

Vendor survival has always been a topic of concern to PCM buyers, and the PCMs' long-term survival will depend upon their continued ability to maintain full compatibility together with a worthwhile price/performance advantage over the steadily improving mainframes that IBM will undoubtedly offer.

The PCM Suppliers

Amdahl Corporation, which was formed in 1971 and delivered its first computer in June 1975, is one of the leading suppliers of IBM-compatible mainframes, with several hundred installations nationwide. The firm's software development efforts have resulted in significant improvements over comparable IBM products. Amdahl also offers its Universal TimeSharing System (UTS), which is based on the Unix operating system developed by Bell Laboratories.

Amdahl focuses on the upper end of IBM's mainframe product line and has developed advanced technology that enables its computers to deliver more performance per dollar than the comparable IBM models. The current Amdahl 470 Series processor line ranges from the 470V/7 family which is comparable in performance to the IBM 3032 and 3033 uniprocessors, to the 470V/8, which is comparable to the dual-processor IBM 3033MP. These 470 systems are currently not in new production. Amdahl's largest systems, the 580 Series, are targeted at IBM's 3081, as well as future IBM offerings in that size range.

Cambex Corporation, formerly Cambridge Memories, Inc., is best known as a supplier of add-on memory for IBM System/360 and System/370 computers and for various minicomputers. Cambex entered the PCM market in 1977 with replacements for the System/370 Model 115 and 125, but the firm is now concentrating its attention on the IBM 4300 Series. The current product line consists of five models, the 1636-1, 1636-10, 1641-1, 1641-11 and 1651-1, that bracket the 4300 product line. The 1636-1, however, is not in new production.

Control Data Corporation has withdrawn from the plug-compatible market.

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IPL Systems, Inc. has been building PCMs for use since 1977, and the company currently supports OEM agreements with Masstor in the U.S., Olivetti and other distributors in Europe, the Middle East, and the Far East. The company also has a joint development agreement to design and build compatible CPUs with Mitsubishi Electric Corporation using advanced ECL large-scale integration gate array technology. IPL saw an opportunity for growth by selling directly to end users, and in October 1980, announced their 4400 Series. IPL has about 400 systems installed and on order worldwide, of which over 120 have been sold directly to end users in the U.S. IPL delivered the 4480 the first quarter 1983, and in the second quarter 1983 delivered their 4460.

Magnuson Systems Corporation has become a key PCM supplier. Magnuson's "Strategic Architecture" permits easy field upgrading of the processor, memory, and I/O channels, as well as rapid adaptation to maintain compatibility with new IBM functions or features. The current product line consists of the M80/30, which competes with the IBM 4331-1; the M80/20, which competes with the IBM 4321; the M80/31 and M80/32, which are targeted at the IBM 4331-2 market; the M80/41, which competes with the IBM 4341-10; and the M80/42 and M80/43, which compete with the IBM 4341-1. Magnuson has discontinued the larger M80/44.

National Advanced Systems Corporation (NAS) is the wholly owned subsidiary of National Semiconductor Corporation that was formed in October, 1979 to take over nearly all of Itel Corporation's IBM-compatible mainframe business. NAS took over Itel's worldwide computer activities, acquired Itel's inventory of computers, and assumed the maintenance and support responsibilities for all of Itel's installed computer base, including those systems manufactured by Hitachi, Ltd.

The company's current product line includes the AS/5000 Series, AS/7000 Series, AS/9000 Series, AS/6600 Series, AS/8000 Series.

Nixdorf Computer Corporation introduced the 8890 product family to the United States in the second quarter 1982. One of the largest subsidiaries of Nixdorf AG, Germany, Nixdorf Computer Corporation is offering a product line equivalent to the lower end of the IBM 4300 and System/370 mainframes but with a price/performance target of at least 15 percent over IBM. The 8890 product family features four models: the 8890/10, 8890/30, 8890/50, and 8890/70.

STC Ultimacc Inc. is a subsidiary of Storage Technology Corporation, one of the world's largest manufacturers of compatible storage devices. STC Ultimacc was formed in 1982 with the purpose of developing and marketing IBM-compatible alternative business systems. These systems are being marketed by another Storage Technology subsidiary, STC Systems, Inc.

Three systems are available from STC: the USX39 and USX40 systems, which were intially delivered first quarter 1983 and which compete with the IBM 4331-2, plus the USX44 system which was initially delivered second quarter 1983 and which competes with the 4341-2. The USX-series complete computer systems for business applications are said by STC to be 20 percent to 40 percent lower in price than comparable IBM-compatible systems.

The Comparison Charts

The principal characteristics of those processors that are plug-compatible with IBM computers are presented in the accompanying comparison charts. The entries for each model are spread across two facing pages to maximize the amount of useful information in the charts. All information in the charts was furnished by the seven vendors whose products are represented.

The entries on the left-hand pages of the comparison charts and their significance are explained in the following paragraphs:

Model refers to the product number as known in the equipment price book or list of the vendor or manufacturer.

Date of introduction indicates when the processor was first announced to the public in the U.S.

Production status indicates whether the processor is now in new production or being sold from returned and refurbished stocks.

Operating systems indicates the IBM monitoring software that will run on the processor. All operating systems that apply to a particular processor are specified.

Virtual storage capability defines the presence of a hardware/software feature enabling the user to access and utilize memory space without regard to its existence in real main memory or auxiliary memory space.

The *Clock comparator* is a hardware feature that causes an interruption when the time-of-day equals or exceeds the value specified by a program or virtual machine.

The *CPU timer* measures the elapsed processing unit time and causes an interruption when a previously specified amount of time has elapsed.

Control registers are used for operating systems control of relocation, priority interruption, program event recording, error recovery, and masking operations.

CPU one-level addressing is a synonym for direct addressing, where the instruction contains the actual address of the data being requested.

A *doubleword buffer* consists of a 64-bit area temporarily reserved for data used in performing an I/O operation.

The *interval timer* is a 32-bit decremental counter that is reduced by one several hundred times per second. The

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The USX-Series, marketed by STC Systems, Inc., are compatible 4300 series plug-compatible business systems. These systems include a processor, built to STC Ultimacc's specifications, and employ the latest high-performance disk, tape, and printer peripherals from Storage Technology. Local or remote terminals and front-end telecommunications processors and modems are available with each USX system.

timer generates an interrupt when the contained value is decremented from a positive to a negative number.

Machine check handling analyzes errors and attempts recovery by retrying the failed instruction if possible. If retry is unsuccessful, it attempts to correct the malfunction or to isolate the affected task.

Multiple bus architecture implies that the various segments of the processor (namely, memory, arithmetic and logic, central control, etc.) are tied together by more than one central bus.

Storage protection determines the right of access to main storage by matching a protection key associated with a store or fetch reference to main storage with a storage key associated with each block of main storage.

The *time-of-day-clock* is incremented once every microsecond and provides a consistent measure of elapsed time suitable for the indication of data and time.

Some channels have the capability to perform *channel command retry,* a channel and control-unit procedure that causes a command to be retried without requiring an I/O interruption.

Channel indirect addressing (CIA) is a companion feature to dynamic address translation, providing data addresses for I/O operations. CIA permits a single channel command word to control the transmission of data that crosses noncontiguous pages in real main storage. If CIA is not indicated, then channel one-level (direct) addressing is employed.

The *byte oriented operand feature* permits storage operands of most non-privileged operations to appear on any byte boundary. Instructions must appear on even byte boundaries. The feature does not pertain to instruction addresses.

The *extended precision floating point* feature provides instructions to handle floating point numbers with a fraction of 28 hexadecimal digits. The characteristic is seven bits plus sign in short and extended floating point numbers.

The *high speed floating point feature* provides a means for improved execution of the floating point instruction set.

The *System/370 Universal Instruction set* is composed of storage protection, standard instruction set, decimal arithmetic, extended precision, dynamic address translation, and instructions to facilitate programming and reduce execution times for record blocking and unblocking.

The *console audible alarm* is a device activated when predetermined events occur that require operator attention or intervention for system operation.

The *integrated console printer* is an integral part of the system console, furnishing hard copy output from the console display.

A *light pen* is a photosensitive stylus used to detect and identify elements displayed on the console CRT.

A *remote console* is a console attached to a system through a data link. The remote console is configured in addition to the standard console.

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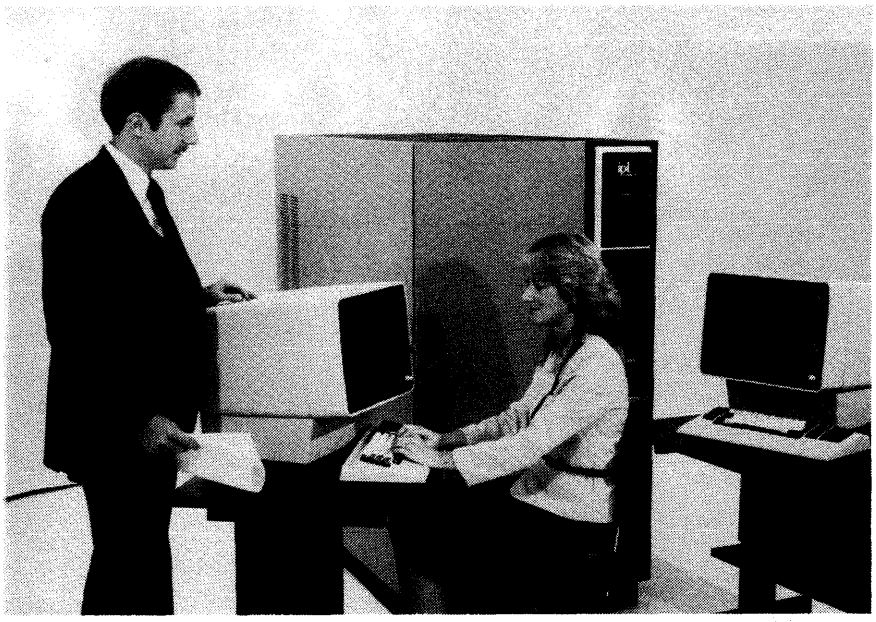


IPL Systems' 4480 (shown here) and the 4460 are IPL's newest models in the PCM marketplace and were delivered the first quarter 1983. Both models have memory sizes ranging from 1 to 16 megabytes and include from 3 to 10 channels. The model 4480 is claimed by IPL to be the industry's first and only fault tolerant IBM compatible computer. IPL has been making PCMs since 1977 and its product line includes, in addition to the 4460 and 4480, the IPL 4436, 4443, 4445, and 4446.

The *remote data link* allows establishment of communications with a technical data center to remotely diagnose system malfunctions.

The *console file* is the basic microprogram loading device for the system, containing a read-only file device. The medium read by this device contains all the microcode for field engineering device diagnostics, basic system features, and any optional system features.

The *CPU activity monitor* can be either hardware or software. It provides a measure of CPU utilization by various hardware or software elements.

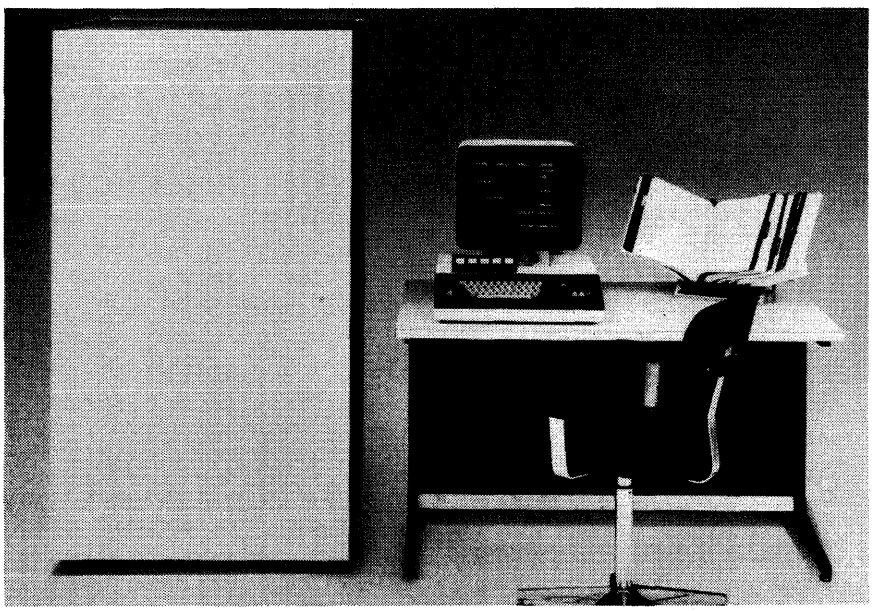
The *extended control mode* (EC) is a mode in which all features of the System/370 computing system, including dynamic address translation, are operational.

Program event recording is a hardware feature used to assist in debugging programs by detecting and recording program events.

The *virtual machine assist* feature provides an assist to VM/370 firmware emulation of certain privileged operations. The feature causes a reduction in real supervisor time used by VM/370 to control the operation of virtual storage operating system such as DOS/VS and OS/VS1.

Under *other features and comments* any additional information that may help to give you a feel for the distinctive attributes of each unit is included.

The right-hand pages of the charts compare Processor Performance, I/O Channels, Control Storage, Pricing, and Availability, and identify the manufacturer and vendor of each processor. These entries should all be self-explanatory.



The Magnuson M80 Series added to its product line a new entry level system, the M80/20, which was delivered in the fall of 1982. This system competes with the IBM 4321. There are seven models in the Magnuson M80 Series, all compatible with IBM's 4300 Series. There is an array of CPU and I/O configurations that permit the user to upgrade the M80 System to match his/her data processing requirements.

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Manufacturers/Vendors

Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, California 94086. Telephone (408) 746–6000.

Cambex Corporation, 360 Second Avenue, Waltham, Massachusetts 02154. Telephone (617) 890–6000.

IPL Systems Inc., 1317 Main Street, Waltham, Massachusetts 02154. Telephone (617) 890–6620.

Magnuson Systems Corporation, 2902 Orchard Park Way, San Jose, California 95134. Telephone (408) 946–8100.

National Advanced Systems, 800 East Middlefield Road, Mountain View, California 94043. Telephone (415) 962–6100.

Nixdorf Computer Corporation, 168 Middlesex Turnpike, Burlington, MA 01803. Telephone (617) 890–3600.

STC Ultimacc Systems, Inc., (STC Systems, Inc.) 4 North Street, Waldwick, New Jersey 07463. Telephone (201) 445–5050. □

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MODEL	Amdahl 470V/7	Amdahl 470V/7A	Amdahl 470V/7B	Amdahl 470V/7C
SYSTEM PARAMETERS				
Date of introduction	3/77	8/79	11/79	11/80
Date of first delivery	8/77	9/79	3/80	3rd Quarter 1981
Number installed to date	—	—	—	79
Production status	Not in new production	Not in new production	Not in new production	Not in new production
Operating systems				
DOS/VS	Yes	Yes	Yes	Yes
DOS/VSE	Yes	Yes	Yes	Yes
OS/VS1	Yes	Yes	Yes	Yes
SVS	Yes	Yes	Yes	Yes
MVS	Yes	Yes	Yes	Yes
MVS/XA	Yes	Yes	Yes	Yes
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	ACP, MFT, MVT, MVS/SP	ACP, MFL, MVT, MVS/SP	ACP, MFL, MVT, MVS/SP	ACP, MFL, MVT, MVS/SP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	—	—	—	—
Minimum in complex	—	—	—	—
Maximum in complex	—	—	—	—
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	Standard	Standard	Standard	Standard
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	No	No	No	No
Light pen	No	No	No	No
Remote console	Standard	Standard	Standard	Standard
Remote data link	Standard	Standard	Standard	Standard
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	Optional	Optional	Optional	Optional
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	VM/SA	VM/SA	VM/SA	VM/SA
OTHER FEATURES & COMMENTS	Air cooled; two-byte channel interface optional	Air cooled; 470 accelerator; two-byte channel interface optional	Air cooled; 470 accelerator; 470 extended performance accelerator; two-byte channel interface optional	Air cooled; 470 accelerator; two-byte channel interface optional

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Amdahl 470V/7	Amdahl 470V/7A	Amdahl 470V/7B	Amdahl 470V/7C	MODEL
				PROCESSOR PERFORMANCE
29	29	29	29	Machine cycle time, nanoseconds
				Relative performance*
IBM 3033U	IBM 3033N	IBM 3032	IBM 3033S	To
1.1	1.0 to 1.1	1.4 to 1.6	1.1	
IBM 3083B	—	IBM 3083E	—	Performance of
				To
1.0 to 1.1	—	0.9 to 1.0	—	
470V/8	470V/7	470V/7A	470V/7B	Performance of
				Field upgradable to
				MAIN STORAGE
Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Storage type
				Checking
Yes	Yes	Yes	Yes	Parity
Yes	Yes	Yes	Yes	Error detection & correction
1	1	1	1	No. of check bits per byte
—	—	—	—	No. of check bits per word
320	320	320	320	Read cycle, nanoseconds
320	320	320	320	Write cycle, nanoseconds
4	4	4	4	Bytes fetched per cycle
8M	8M	8M	8M	Minimum capacity, bytes
32M	32M	32M	16M	Maximum capacity, bytes
4M	4M	4M	4M	Increment size, bytes
Yes	Yes	Yes	Yes	Interleaving
8	8	8	8	Minimum number of ways
16	16	16	16	Maximum number of ways
Yes	Yes	Yes	Yes	BUFFER (CACHE) STORAGE
Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM	Storage type
58	58	58	58	Cycle time, nanoseconds
4	4	4	4	Bytes fetched per cycle
32K	32K	32K	32K	Minimum capacity, bytes
32K	32K	32K	32K	Maximum capacity, bytes
32 maximum	32 maximum	32 maximum		I/O CHANNELS
8	8	8	8	Selector channels standard
24	24	24	8	Selector channels optional
8	8	8	8	Block multiplexers standard
24	24	24	8	Block multiplexers optional
8	8	8	8	Byte multiplexers standard
24	24	24	8	Byte multiplexers optional
				Subchannels per channel
256	256	256	256	On a block multiplexer
256	256	256	256	On a byte multiplexer
256	256	256	256	On a selector
Yes	Yes	Yes	Yes	Channel to channel adapter
				Maximum channel data rates
2M	2M	2M	2M	Block multiplexer, bytes/sec.
110K	110K	110K	110K	Byte multiplexer, bytes/sec.
2M	2M	2M	2M	Selector channel, bytes/sec.
18M	18M	18M	18M	Aggregate data rate, bytes/sec.
Yes	Yes	Yes	Yes	Data Streaming
				CONTROL STORAGE
N/A	N/A	N/A	N/A	Storage type
—	—	—	—	Access time, nanoseconds
—	—	—	—	Word size, bits
—	—	—	—	Minimum number of words
—	—	—	—	Maximum number of words
—	—	—	—	Control storage usage
				PRICING & AVAILABILITY
$1,700,000	$1,375,000	$1,225,000	$1,150,000	Purchase of CPU with min. memory
Yes	Yes	Yes	Yes	Lease terms offered
Yes	Yes	Yes	Yes	Vendor's
—	—	—	—	Third party
$65,310/mo. (4-yr.)	$60,245/mo. (4-yr.)	$54,285/mo. (4-yr.)	$52,150/mo. (4-yr.)	Lease of CPU with min. memory (1-yr.)
4MB	4MB	4MB	4MB	Memory increment size
$150,000	$150,000	$150,000	$150,000	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
—	—	—	—	Prime time
—	—	—	—	Additional hours
$11,670/mo.	$11,440/mo.	$11,140/mo.	$9,550/mmo.	24 hour
—	—	—	—	Other plans
Amdahl	Amdahl	Amdahl	Amdahl	Manufacturer
Amdahl	Amdahl	Amdahl	Amdahl	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	Amdahl 470V/8	Amdahl 5840	Amdahl 5850	Amdahl 5860
SYSTEM PARAMETERS				
Date of introduction	10/78	2nd Quarter 1983	2nd Quarter 1983	11/80
Date of first delivery	9/79	4th Quarter 1983	3rd Quarter 1983	3rd Quarter 1982
Number installed to date	182	—	—	20
Production status	Not in new production	Active	Active	Active
Operating systems				
DOS/VS	Yes	Yes	Yes	Yes
DOS/VSE	Yes	Yes	Yes	Yes
OS/VS1	Yes	Yes	Yes	Yes
SVS	Yes	Yes	Yes	Yes
MVS	Yes	Yes	Yes	Yes
MVS/XA	Yes	Yes	Yes	Yes
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	ACP, MVS/SP, MFT, MVT	ACP, MVS/SP, MFT, MVT	ACP, MVS/SP, MFT, MVT	ACP, MVS/SP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	—	—	—	—
Minimum in complex	—	—	—	—
Maximum in complex	—	—	—	—
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	Standard	Standard	Standard	Standard
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	No	No	No	No
Light pen	No	No	No	No
Remote console	Standard	Standard	Standard	Standard
Remote data link	Standard	Standard	Standard	Standard
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	Optional	Standard	Standard	Standard
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	VM/SA	Standard	Standard	VM/SA
OTHER FEATURES & COMMENTS	Air cooled; two-byte channel interface optional			Distributed microcode; Macrocode in all models

All About Plug-Compatible Mainframes

Amdahl 470V/8	Amdahl 5840	Amdahl 5850	Amdahl 5860	MODEL
				PROCESSOR PERFORMANCE
29	23.25	23.25	23.25	Machine cycle time, nanoseconds
				Relative performance*
IBM 3033U	—	—	IBM 3081D	To
1.3			1.3	Performance of
IBM 3083J			—	To
0.9			—	Performance of
—			5870, 5880	Field upgradable to
				MAIN STORAGE
Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Storage type
Yes	Yes	Yes	Yes	Checking
Yes	Yes	Yes	Yes	Parity
1	Yes	Yes	1	Error detection & correction
—	1	1	—	No. of check bits per byte
320	280	280	280	No. of check bits per word
320	280	280	280	Read cycle, nanoseconds
4	8	8	8	Write cycle, nanoseconds
8M	16M	16M	16M	Bytes fetched per cycle
32M	32M	32M	64M	Minimum capacity, bytes
4M	8M	8M	8M	Maximum capacity, bytes
Yes	Yes	Yes	Yes	Increment size, bytes
8	16	16	16	Interleaving
16	16	16	16	Minimum number of ways
				Maximum number of ways
Yes			Yes	
Bipolar RAM	Bipolar RAM	Bipolar RAM	Two Bipolar RAMs	BUFFER (CACHE) STORAGE
52	—	—	—	Storage type
4	8	8	8	Cycle time, nanoseconds
64K	2X32K	2X32K	2 x 32K	Bytes fetched per cycle
64K	2X32K	2X32K	2 x 32K	Minimum capacity, bytes
				Maximum capacity, bytes
				I/O CHANNELS
12	—	—	—	Selector channels standard
24	—	—	—	Selector channels optional
12	14 or 15**	14 or 15**	14 or 15**	Block multiplexers standard
24	—	—	—	Block multiplexers optional
12	1 or 2**	1 or 2**	1 or 2**	Byte multiplexers standard
24	—	—	—	Byte multiplexers optional
				Subchannels per channel
256	256	256	256	On a block multiplexer
256	256	256	256	On a byte multiplexer
256			—	On a selector
Yes	—	—	Yes	Channel to channel adapter
	Yes	Yes		Maximum channel data rates
2M	6M	6M	6M	Block multiplexer, bytes/sec.
110K	200K	200K	200K	Byte multiplexer, bytes/sec.
2M	—	—	—	Selector channel, bytes/sec.
21M	50-80M	50-80M	50-80M	Aggregate data rate, bytes/sec.
Yes	Yes	Yes	Yes	Data Streaming
				CONTROL STORAGE
N/A	4K RAM	4K RAM	4K RAM	Storage type
—	7.5	7.5	7.5	Access time, nanoseconds
—	Variable	Variable	Variable	Word size, bits
—	Variable	Variable	Variable	Minimum number of words
—	Variable	Variable	Variable	Maximum number of words
—			Variable	Control storage usage
				PRICING & AVAILABILITY
$1,925,000	$2,000,000	$2,350,000	$2,700,000	Purchase of CPU with min. memory
Yes	Yes	Yes	Yes	Lease terms offered
Yes	Yes	Yes	Yes	Vendor's
—	—	—	—	Third party
$70,450 (4-yr.)	$71,298 (4-yr.)	$80,995 (4-yr.)	$100,541/mo.	Lease of CPU with min. memory (1-yr.)
4MB	8MB	8MB	8MB	Memory increment size
$150,000	$180,000	$180,000	$180,000	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
—	—	—	—	Prime time
—	—	—	—	Additional hours
$12,150	$8,200/mo.	$8,500/mo.	$9,850/mo. (4-yr.)	24 hour
—	—	—	—	Other plans
Amdahl	Amdahl	Amdahl	Amdahl	Manufacturer
Amdahl	Amdahl	Amdahl	Amdahl	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	Amdahl 5870	Amdahl 5880	Cambex 1636-1	Cambex 1636-10
SYSTEM PARAMETERS				
Date of introduction	10/81	11/80	August 1980	Jan. 1983
Date of first delivery	4th Quarter 1983	4th Quarter 1983	4th Quarter 1980	2nd Quarter 1983
Number installed to date	—	—	—	Proprietary
Production status	Active	Active	Not in new production	Active
Operating systems				
DOS/VS	Yes	Yes	Yes	Yes
DOS/VSE	Yes	Yes	Yes	Yes
OS/VS1	Yes	Yes	Yes	Yes
SVS	Yes	Yes	Yes	Yes
MVS	Yes	Yes	No	Yes
MVS/XA	Yes	Yes	—	—
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	ACP, MVS/SP	ACP, MVS/SP	ACP	MVS/SP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	No	No	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	Yes	Yes	—	—
Minimum in complex	2	2	—	—
Maximum in complex	2	2	—	—
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	No	No
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	Standard	Standard	Standard	Standard
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	No	No	Optional	Optional
Light pen	No	No	No	No
Remote console	Standard	Standard	Optional	Optional
Remote data link	Standard	Standard	Optional	Optional
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	Standard	Standard	No	No
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	VM/SA	VM/SA	Standard	Standard
OTHER FEATURES & COMMENTS	See 5860 Comments	See 5860 Comments	Formerly Cambridge Memories; 1636 upgraded from 1638	

All About Plug-Compatible Mainframes

Amdahl 5870	Amdahl 5880	Cambex 1636-1	Cambex 1636-10	MODEL
				PROCESSOR PERFORMANCE
23.25	23.25	50	50	Machine cycle time, nanoseconds
				Relative performance*
IBM 3081D	IBM 3081D	IBM 4331-2	IBM 4341-10	To
2.2	2.3	1.1 to 1.3	0.9-1.1	Performance of
—	—	—	—	To
—	—	—	—	Performance of
5880	—	Cambex 1641	CBX 1641-11	Field upgradable to
				MAIN STORAGE
Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Storage type
Yes	Yes	—	—	Checking
Yes	Yes	Yes	Yes	Parity
1	1.0	—	—	Error detection & correction
—	—	—	—	No. of check bits per byte
280	280	400	400	No. of check bits per word
280	280	400	400	Read cycle, nanoseconds
8	8	8	16	Write cycle, nanoseconds
16M	32M	1M	1M	Bytes fetched per cycle
64M	64M	4M	8M	Minimum capacity, bytes
8M	8M	1M	1M	Maximum capacity, bytes
Yes	Yes	No	No	Increment size, bytes
16	16	—	—	Interleaving
16	16	—	—	Minimum number of ways
				Maximum number of ways
Yes	Yes	No	Yes	BUFFER (CACHE) STORAGE
Two Bipolar RAMs	Two Bipolar RAMs	—	Bipolar RAM	Storage type
—	—	—	100	Cycle time, nanoseconds
8	8	—	16	Bytes fetched per cycle
4 x 32K	4 x 32K	—	8K	Minimum capacity, bytes
4 x 32K	4 x 32K	—	8K	Maximum capacity, bytes
				I/O CHANNELS
—	—	—	—	Selector channels standard
—	—	—	—	Selector channels optional
14 or 15**	28 to 30	2	2	Block multiplexers standard
—	—	2	2	Block multiplexers optional
1 or 2**	2 to 4	1	1	Byte multiplexers standard
—	—	0	0	Byte multiplexers optional
				Subchannels per channel
256	256	256	256	On a block multiplexer
256	256	256	256	On a byte multiplexer
—	—	—	—	On a selector
Yes	Yes	Yes	Yes	Channel to channel adapter
				Maximum channel data rates
6M	6M	1.86M	1.86M	Block multiplexer, bytes/sec.
200K	200K	50K	50K	Byte multiplexer, bytes/sec.
—	—	—	—	Selector channel, bytes/sec.
50-80M	50-80M	11M	11M	Aggregate data rate, bytes/sec.
Yes	Yes	No	No	Data Streaming
				CONTROL STORAGE
4K RAM	4K RAM	Bipolar RAM	Bipolar RAM	Storage type
7.5	7.5	25	25	Access time, nanoseconds
Variable	Variable	36	36	Word size, bits
Variable	Variable	72K	72K	Minimum number of words
Variable	Variable	144K	144K	Maximum number of words
Variable	Variable	Instruc. microcode, operating system assist	Instruction microcode, operating system assist	Control storage usage
				PRICING & AVAILABILITY
$4,500,000	$5,300,000 (32M memory)	$95,000	$98,500	Purchase of CPU with min. memory
Yes	Yes	Yes		Lease terms offered
Yes	Yes	Yes	Yes	Vendor's
—	—	Yes	Yes	Third party
$168,874/mo. (4-yr.)	$197,415/mo. (4-yr.)	Contact vendor	Contact vendor	Lease of CPU with min. memory (1-yr.)
8MB	8MB	1MB	1MB	Memory increment size
$180,000	$180,000	$15,000	$9,000	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
—	—	$445/mo.	$750/mo.	Prime time
—	—	Yes	Yes	Additional hours
$16,850	$18,715/mo.	Yes	Yes	24 hour
—	—	Third party is available	Third party available	Other plans
Amdahl	Amdahl	Cambex	Cambex	Manufacturer
Amdahl	Amdahl	Cambex	Cambex	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	Cambex 1641-1	Cambex 1641-11	Cambex 1651-1	IPL 4436
SYSTEM PARAMETERS				
Date of introduction	August 1980	Jan. 1983	August 1980	10/80
Date of first delivery	4th Quarter 1980	3rd Quarter 1983	3rd Quarter 1981	4th Quarter 1980
Number installed to date	—	Proprietary	—	Prop. Info.*
Production status	Active	Active	Active	Active
Operating systems				
DOS/VS	Yes	Yes	Yes	Yes
DOS/VSE	Yes	Yes	Yes	Yes
OS/VS1	Yes	Yes	Yes	Yes
SVS	Yes	Yes	Yes	Yes
MVS	No	Yes	Yes	Yes
MVS/XA	—	—	—	Yes
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	ACP	MVS/SP	ACP	MVS/SP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	—	—	—	—
Minimum in complex	—	—	—	—
Maximum in complex	—	—	—	—
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	No	No	No	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	Standard	Standard	Standard	No
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	Optional	Optional	Optional	Optional
Light pen	No	No	No	No
Remote console	Optional	Optional	Optional	No
Remote data link	Optional	Optional	Optional	Standard
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	No	No	No	No
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	Standard	Standard	Standard	Standard
OTHER FEATURES & COMMENTS	1641 upgraded from 1636		1651 available on field upgrade basis only	*Over 400 systems, all models, installed worldwide.

All About Plug-Compatible Mainframes

Cambex 1641-1	Cambex 1641-11	Cambex 1651-1	IPL 4436	MODEL
				PROCESSOR PERFORMANCE
50	50	50	50	Machine cycle time, nanoseconds
				Relative performance*
IBM 4341-1	IBM 4341-11	IBM 4341-2	IBM 4331-2	To
0.9 to 1.1	0.9-1.1	0.9 to 1.1	1.50	Performance of
—	—	—	—	To
—	—	—	—	Performance of
Cambex 1651	—	—	IPL 4443	Field upgradable to
				MAIN STORAGE
Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Storage type
				Checking
—	—	—	Yes	Parity
Yes	Yes	Yes	Yes	Error detection & correction
—	—	—	1	No. of check bits per byte
—	—	—	4	No. of check bits per word
400	400	400	500	Read cycle, nanoseconds
400	400	400	500	Write cycle, nanoseconds
16	16	16	8	Bytes fetched per cycle
2M	2M	2M	1M	Minimum capacity, bytes
16M	16M	16M	8M	Maximum capacity, bytes
1M	2M	1M	1M or 2M	Increment size, bytes
No	No	No	No	Interleaving
—	—	—	—	Minimum number of ways
—	—	—	—	Maximum number of ways
Yes	Yes	Yes	No	BUFFER (CACHE) STORAGE
Bipolar RAM	Bipolar RAM	Bipolar RAM	—	Storage type
100	100	100	—	Cycle time, nanoseconds
16	16	16	—	Bytes fetched per cycle
8K	8K	8K	—	Minimum capacity, bytes
8K	8K	8K	—	Maximum capacity, bytes
				I/O CHANNELS
—	—	—	—	Selector channels standard
—	—	—	—	Selector channels optional
2	4	4	2	Block multiplexers standard
2	1	1	3	Block multiplexers optional
1	1	1	1	Byte multiplexers standard
0	0	0	—	Byte multiplexers optional
				Subchannels per channel
256	256	256	256	On a block multiplexer
256	256	256	256	On a byte multiplexer
—	—	—	—	On a selector
Yes	Yes	Yes	Yes	Channel to channel adapter
				Maximum channel data rates
1.86M	1.86M	1.86M	2M	Block multiplexer, bytes/sec.
50K	50K	50K	180K	Byte multiplexer, bytes/sec.
—	—	—	—	Selector channel, bytes/sec.
11M	11M	11M	10M	Aggregate data rate, bytes/sec.
No	No	No	Yes	Data Streaming
				CONTROL STORAGE
Bipolar RAM	Bipolar RAM	Bipolar RAM	ECL	Storage type
25	25	25	20	Access time, nanoseconds
36	36	36	36	Word size, bits
72K	72K	72K	16K	Minimum number of words
144K	144K	144K	32K	Maximum number of words
Instruction microcode, operating system assist	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Control storage usage
				PRICING & AVAILABILITY
$150,000	$170,000	Upgrade only, see below	$128,000	Purchase of CPU with min. memory
Yes		Yes	Yes	Lease terms offered
Yes	Yes	Yes	Yes	Vendor's
Yes	Yes	Yes	Yes	Third party
Contact Vendor	Contact vendor	Contact Vendor	$5,440 24/mo.	Lease of CPU with min. memory (1-yr.)
1MB	2MB	1MB	1 or 2MB	Memory increment size
$15,000	$9,000/M	$15,000	$7,500	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
$750/mo.	$925/mo.	$925/mo.	$485/mo.	Prime time
Yes	Yes	Yes	Yes	Additional hours
Yes	Yes	Yes	Yes	24 hour
Third party available	Third party available	Third party available	Yes	Other plans
Cambex	Cambex	Cambex	IPL	Manufacturer
Cambex	Cambex	Cambex	IPL	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	IPL 4443	IPL 4445	IPL 4446	IPL 4460
SYSTEM PARAMETERS				
Date of introduction	10/80	11/81	10/80	—
Date of first delivery	2nd Quarter 1980	3rd Quarter 1980	3rd Quarter 1980	2nd Quarter 1980
Number installed to date	Prop. Info.*	Prop. Info.*	Prop. Info.*	Prop. Info.*
Production status	Active	Active	Active	Active
Operating systems				
DOS/VS	Yes	Yes	Yes	Yes
DOS/VSE	Yes	Yes	Yes	Yes
OS/VS1	Yes	Yes	Yes	Yes
SVS	Yes	Yes	Yes	Yes
MVS	Yes	Yes	Yes	Yes
MVS/XA	Yes	Yes	Yes	Yes
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	MVS/SP	MVS/SP	MVS/SP	MVSSP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	—	—	—	—
Minimum in complex	—	—	—	—
Maximum in complex	—	—	—	—
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	No	No	Yes	Yes
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	Optional	Optional	Optional	Optional
Light pen	No	No	No	No
Remote console	No	No	No	No
Remote data link	Standard	Standard	Standard	Standard
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	No	No	No	No
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	Standard	Standard	Standard	Standard
OTHER FEATURES & COMMENTS	*See 4436	*See 4436	*See 4436	*See 4436

All About Plug-Compatible Mainframes

IPL 4443	IPL 4445	IPL 4446	IPL 4460	MODEL
				PROCESSOR PERFORMANCE
50	50	50	50	Machine cycle time, nanoseconds
				Relative performance*
IBM 4341-1	IBM 4341-11	IBM 4341-2	IBM 4341-12	To
1.00	1.00	1.00	1.00	
—	—	—	13n 4361-5	Performance of
				To
—	—	—	1.20	
IPL 4445	IPL 4446	IPL 4460	IPL 4480	Performance of
				Field upgradable to
				MAIN STORAGE
Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Storage type
Yes	Yes	Yes	Yes	Checking
Yes	Yes	Yes	Yes	Parity
1	1	1	1	Error detection & correction
4	4	4	4	No. of check bits per byte
500	500	500	400	No. of check bits per word
500	500	500	500	Read cycle, nanoseconds
8	8	8	8	Write cycle, nanoseconds
2M	2M	2M	2M	Bytes fetched per cycle
8M	8M	16M	16M	Minimum capacity, bytes
2M	2M	2M	2M	Maximum capacity, bytes
No	No	No	No	Increment size, bytes
—	—	—	—	Interleaving
—	—	—	—	Minimum number of ways
				Maximum number of ways
Yes	Yes	Yes	Yes	BUFFER (CACHE) STORAGE
ECL	ECL	ECL	ECL	Storage type
100	100	100	100	Cycle time, nanoseconds
4	8	8	8	Bytes fetched per cycle
8K	8K	16K	24K	Minimum capacity, bytes
8K	8K	16K	24K	Maximum capacity, bytes
				I/O CHANNELS
—	—	—	—	Selector channels standard
—	—	—	—	Selector channels optional
2	5	5	5	Block multiplexers standard
3	—	—	—	Block multiplexers optional
1	1	1	1	Byte multiplexers standard
—	—	—	—	Byte multiplexers optional
				Subchannels per channel
256	256	256	256	On a block multiplexer
256	256	256	256	On a byte multiplexer
—	—	—	—	On a selector
Yes	Yes	Yes	Yes	Channel to channel adapter
				Maximum channel data rates
2M	3M	3M	3M	Block multiplexer, bytes/sec.
180K	180K	180K	180K	Byte multiplexer, bytes/sec.
—	—	—	—	Selector channel, bytes/sec.
10M	12M	12M	12M	Aggregate data rate, bytes/sec.
Yes	Yes	Yes	Yes	Data Streaming
				CONTROL STORAGE
ECL	ECL	ECL	ECL	Storage type
20	20	20	20	Access time, nanoseconds
36	36	36	36	Word size, bits
16K	16K	16K	16K	Minimum number of words
32K	32K	32K	32K	Maximum number of words
Instruction microcode, operating system assist	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Control storage usage
				PRICING & AVAILABILITY
$165,000	$215,000	$240,000	$265,000	Purchase of CPU with min. memory
Yes	Yes	Yes	Yes	Lease terms offered
Yes	Yes	Yes	Yes	Vendor's
Yes	Yes	Yes	Yes	Third party
$5,905 24/mo.	$7,745 24/mo.	$8,880 24/mo.	$10,810 24/mo.	Lease of CPU with min. memory (1-yr.)
2MB	8MB	8MB	2MB	Memory increment size
$7,500	$7,500	$7,500	$7,500	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
$605/mo.	$780/mo.	$880/mo.	$900/mo.	Prime time
Yes	Yes	Yes	Yes	Additional hours
Yes	Yes	Yes	Yes	24 hour
Yes	Yes	Yes	Yes	Other plans
IPL	IPL	IPL	IPL	Manufacturer
IPL	IPL	IPL	IPL	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	IPL 4480	Magnuson M80 Model 20	Magnuson M80 Model 30	Magnuson M80 Model 31
SYSTEM PARAMETERS				
Date of introduction	2/83	9/82	8/81	6/80
Date of first delivery	4th Quarter 1980	10/82	9/81	6/80
Number installed to date	Prop. Info.*	—	—	—
Production status	Active	Active	Active	Active
Operating systems				
DOS/VS		Yes	Yes	Yes
DOS/VSE		Yes	Yes	Yes
OS/VS1		Yes	Yes	Yes
SVS		Yes	Yes	Yes
MVS	Yes	Yes	Yes	Yes
MVS/XA	Yes	No	No	Yes
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	MVS/SP	ECPS:VSE	—	MVS/SP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	—	Yes	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	Yes	—	—	—
Minimum in complex	2	—	—	—
Maximum in complex	2	—	—	—
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	No	Standard	Standard
High speed floating point	Yes	Standard	No	No
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	No	Standarad	Standard
Integrated console printer	Optional	No	No	No
Light pen	No	Optional	No	No
Remote console	No	Optional	Optional	Optional
Remote data link	Standard	Standard	Optional	Optional
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	No	Standard	Standard	Standard
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	Standard	Standard	Standard	Standard
OTHER FEATURES & COMMENTS	IBM compatible computing complex consisting of two independent processing units sharing a partitioned dual ported main storage.	Optional— ECPS:VSE, ECPS:VS/1, ECPS:VM/370	Optional— ECPS:VSE, ECPS:VS/1, ECPS:VM/370	Optional— ECPS:VSE, ECPS:VS/1, ECPS:VM/370, ECPS:MVS, ECPS:Co-residency

All About Plug-Compatible Mainframes

IPL 4480	Magnuson M80 Model 20	Magnuson M80 Model 30	Magnuson M80 Model 31	MODEL
				PROCESSOR PERFORMANCE
50	100	100	100	Machine cycle time, nanoseconds
				Relative performance*
IBM 4381-2	IBM 4321	IBM 4331-1	IBM 4331-2	To
1.00	1.2	1.5	1.2	
IPL 4960	—	—	—	Performance of
				To
1.70	—	—	—	
—	M80/30	M80/31	M80/32	Performance of
				Field upgradable to
				MAIN STORAGE
Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Storage type
				Checking
Yes	Yes	Yes	Yes	Parity
Yes	Yes	Yes	Yes	Error detection & correction
1	1	1	1	No. of check bits per byte
4	4	4	4	No. of check bits per word
400	600	600	600	Read cycle, nanoseconds
500	500	500	500	Write cycle, nanoseconds
8	8	8	8	Bytes fetched per cycle
8M	0.5M	0.5M	1M	Minimum capacity, bytes
16M	8M	8M	8M	Maximum capacity, bytes
4M	0.5M	0.5M	1M	Increment size, bytes
No	No	No	No	Interleaving
—	—	—	—	Minimum number of ways
—	—	—	—	Maximum number of ways
Yes	No	No	No	BUFFER (CACHE) STORAGE
ECL	—	—	—	Storage type
100	—	—	—	Cycle time, nanoseconds
8	—	—	—	Bytes fetched per cycle
2 x 24KB	—	—	—	Minimum capacity, bytes
2 x 24KB	—	—	—	Maximum capacity, bytes
				I/O CHANNELS
—	0	0	0	Selector channels standard
—	5	5	13	Selector channels optional
8	1	1	2	Block multiplexers standard
—	5	5	13	Block multiplexers optional
2	1	1	1	Byte multiplexers standard
—	5	5	15	Byte multiplexers optional
				Subchannels per channel
256	255	255	255	On a block multiplexer
256	255	255	255	On a byte multiplexer
—	255	255	255	On a selector
Yes	Optional	Optional	Optional	Channel to channel adapter
				Maximum channel data rates
3M	2M	2M	2M	Block multiplexer, bytes/sec.
180K	100K	100K	100K	Byte multiplexer, bytes/sec.
—	2M	2M	2M	Selector channel, bytes/sec.
20M	10M	10M	10M	Aggregate data rate, bytes/sec.
Yes	No	No	Yes	Data Streaming
				CONTROL STORAGE
ECL	Static NMOS	Static NMOS	Static NMOS	Storage type
20	45	45	45	Access time, nanoseconds
36	32	32	32	Word size, bits
2 x 16K	16K	16K	16K	Minimum number of words
2 x 32K	16K	16K	16K	Maximum number of words
Instruction microcode, operating system assist	Instruction microcode, assist features	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Control storage usage
				PRICING & AVAILABILITY
$520,000	$59,000	$76,000	$95,000	Purchase of CPU with min. memory
Yes	Yes	Yes	Yes	Lease terms offered
Yes	Yes	Yes	Yes	Vendor's
Yes	Yes	Yes	Yes	Third party
$20,170 24/mo.	$3,075	3170	$4,970	Lease of CPU with min. memory (1-yr.)
4MB	0.5M	0.5MB	1MB	Memory increment size
$13,000	$5,000	$5,000	$10,000	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
$1,765/mo.	Yes	Yes	Yes	Prime time
Yes	Yes	Yes	Yes	Additional hours
Yes	Yes	Yes	Yes	24 hour
Yes	Yes	Yes	Yes	Other plans
IPL	Magnuson	Magnuson	Magnuson	Manufacturer
IPL	Magnuson	Magnuson	Magnuson	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	Magnuson M80 Model 32	Magnuson M80 Model 41	Magnuson M80 Model 42	Magnuson M80 Model 43
SYSTEM PARAMETERS				
Date of introduction	3/79	11/81	3/79	3/79
Date of first delivery	5/80	2/82	9/81	9/81
Number installed to date	—	—	—	—
Production status	Active	Active	Active	Active
Operating systems				
DOS/VS	Yes	Yes	Yes	Yes
DOS/VSE	Yes	Yes	Yes	Yes
OS/VS1	Yes	Yes	Yes	Yes
SVS	Yes	Yes	Yes	Yes
MVS	Yes	Yes	Yes	Yes
MVS/XA	Yes	Yes	Yes	Yes
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	MVS/SP	MVS/SP	MVS/SP	MVS/SP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	—	—	—	—
Minimum in complex	—	—	—	—
Maximum in complex	—	—	—	—
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	No	Standard	No	Optional
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	No	No	No	No
Light pen	No	No	No	No
Remote console	Optional	Optional	Optional	Optional
Remote data link	Optional	Optional	Optional	Optional
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	Standard	Standard	Standard	Standard
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	Standard	Standard	Standard	Standard
OTHER FEATURES & COMMENTS	Optional— ECPS:VSE, ECPS:VS/1, ECPS:VM/370, ECPS:MVS, ECPS:Co-residency	Optional— ECPS:VSE, ECPS:MVS, ECPS:VM/370	Optional— ECPS:VSE, ECPS:MVS, ECPS:VM/370	Optional— ECPS:VSE, ECPS:MVS, ECPS:VM/370

All About Plug-Compatible Mainframes

Magnuson M80 Model 32	Magnuson M80 Model 41	Magnuson M80 Model 42	Magnuson M80 Model 43	MODEL
				PROCESSOR PERFORMANCE
100	50	50	50	Machine cycle time, nanoseconds
				Relative performance*
IBM 4331-2	IBM 4341-10	IBM 4341-1	IBM 4341-1	To
1.5	1.1	1.1	1.3	Performance of
—	—	—	—	To
—	—	—	—	Performance of
M80/41	M80/42	M80/43	—	Field upgradable to
				MAIN STORAGE
Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Storage type
				Checking
Yes	Yes	Yes	Yes	Parity
Yes	Yes	Yes	Yes	Error detection & correction
1	1	1	1	No. of check bits per byte
4	4	4	4	No. of check bits per word
600	700	700	700	Read cycle, nanoseconds
500	700	700	700	Write cycle, nanoseconds
8	64	64	64	Bytes fetched per cycle
1M	2M	2M	2M	Minimum capacity, bytes
8M	16M	16M	16M	Maximum capacity, bytes
1M	1M	1M	1M	Increment size, bytes
No	No	No	No	Interleaving
—	—	—	—	Minimum number of ways
—	—	—	—	Maximum number of ways
				BUFFER (CACHE) STORAGE
Yes	Yes	Yes	Yes	Storage type
Static TTL	Static ECL	Static ECL	Static ECL	Cycle time, nanoseconds
300	50	50	50	Bytes fetched per cycle
8	4	4	4	Minimum capacity, bytes
16K	16K	32K	48K	Maximum capacity, bytes
16K	16K	32K	48K	
				I/O CHANNELS
0	0	0	0	Selector channels standard
13	13	13	13	Selector channels optional
2	2	2	2	Block multiplexers standard
13	13	13	13	Block multiplexers optional
1	1	1	1	Byte multiplexers standard
15	15	15	12	Byte multiplexers optional
				Subchannels per channel
255	255	255	255	On a block multiplexer
255	255	255	255	On a byte multiplexer
255	255	255	255	On a selector
Optional	Optional	Optional	Optional	Channel to channel adapter
				Maximum channel data rates
2M	3M	3M	3M	Block multiplexer, bytes/sec.
100K	100K	100K	100K	Byte multiplexer, bytes/sec.
2M	3M	3M	3M	Selector channel, bytes/sec.
10M	10M	10M	10M	Aggregate data rate, bytes/sec.
Yes	Yes	Yes	Yes	Data Streaming
				CONTROL STORAGE
Static NMOS	Static ECLS	Static ECLS	Static ECLS	Storage type
45	35	35	35	Access time, nanoseconds
32	80	80	80	Word size, bits
16K	8K	8K	8K	Minimum number of words
16K	16K	16K	16K	Maximum number of words
Instruction microcode, operating system assist	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Control storage usage
				PRICING & AVAILABILITY
$115,000	$135,000	$183,000	$228,000	Purchase of CPU with min. memory
Yes	Yes	Yes	Yes	Lease terms offered
Yes	Yes	Yes	Yes	Vendor's
Yes	Yes	Yes	Yes	Third party
$6,108	$6,892	$7,423	$8,557	Lease of CPU with min. memory (1-yr.)
1MB	1MB	1MB	1MB	Memory increment size
$10,000	$10,000	$10,000	$10,000	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
Yes	Yes	Yes	Yes	Prime time
Yes	Yes	Yes	Yes	Additional hours
Yes	Yes	Yes	Yes	24 hour
Yes	Yes	Yes	Yes	Other plans
Magnuson	Magnuson	Magnuson	Magnuson	Manufacturer
Magnuson	Magnuson	Magnuson	Magnuson	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	NAS AS/5000	NAS AS/5000E	NAS AS/5000N	NAS AS/7000
SYSTEM PARAMETERS				
Date of introduction	1/80	9/80	9/83	1/80
Date of first delivery	1/80	9/80	9/83	2nd Quarter 1980
Number installed to date	—	—	—	—
Production status	Limited new production	Limited new production	Limited new production	Active
Operating systems				
DOS/VS	Yes	Yes	Yes	Yes
DOS/VSE	Yes	Yes	Yes	Yes
OS/VS1	Yes	Yes	Yes	Yes
SVS	Yes	Yes	Yes	Yes
MVS	Yes	Yes	Yes	Yes
MVS/XA	No	No	No	No
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	No
Others	MVS/SP	No	—	MVS/SP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	—	—	—	—
Minimum in complex	—	—	—	—
Maximum in complex	—	—	—	—
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	No	No	No	No
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	Standard	Optional	Optional	Standard
Light pen	Standard	Standard	Standard	Standard
Remote console	Optional	Optional	Optional	—
Remote data link	No	No	No	No
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	Standard	Standard	Standard	Standard
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	Standard	Standard	Standard	Standard
OTHER FEATURES & COMMENTS				A second service processor console is available as an option

All About Plug-Compatible Mainframes

NAS AS/5000	NAS AS/5000E	NAS AS/5000N	NAS AS/7000	MODEL
				PROCESSOR PERFORMANCE
92	92	92	72	Machine cycle time, nanoseconds
IBM 3031	IBM 4341-2	IBM 4341-1	IBM 3033S	Relative performance*
				To
1.15	1.0	1.2	1.15	
—	—	—	—	Performance of
				To
—	—	—	—	
—	AS/5000	AS/5000E, AS/5000	AS/7000 DPC	Performance of
				Field upgradable to
				MAIN STORAGE
NMOS	NMOS	NMOS	NMOS	Storage type
				Checking
Yes	Yes	Yes	Yes	Parity
Yes	Yes	Yes	Yes	Error detection & correction
1	1	1	1	No. of check bits per byte
—	—	—	—	No. of check bits per word
460	460	460	360	Read cycle, nanoseconds
460	460	460	360	Write cycle, nanoseconds
8	8	8	8	Bytes fetched per cycle
2M	2M	2M	4M	Minimum capacity, bytes
8M	8M	8M	16M	Maximum capacity, bytes
2M	2M	2M	2M	Increment size, bytes
No	No	No	Yes	Interleaving
—	—	—	4	Minimum number of ways
—	—	—	4	Maximum number of ways
				BUFFER (CACHE) STORAGE
Bipolar ECL	Bipolar ECL	Bipolar ECL	Bipolar ECL	Storage type
184	184	184	144	Cycle time, nanoseconds
8	8	8	8	Bytes fetched per cycle
32K	32K	8K	64K	Minimum capacity, bytes
32K	32K	8K	64K	Maximum capacity, bytes
				I/O CHANNELS
—	—	—	—	Selector channels standard
—	—	—	—	Selector channels optional
4	4	4	6	Block multiplexers standard
1	1	1	6	Block multiplexers optional
1	1	1	2	Byte multiplexers standard
1	1	1	2	Byte multiplexers optional
				Subchannels per channel
256	256	256	256	On a block multiplexer
256	256	256	256	On a byte multiplexer
—	—	—	—	On a selector
Optional	Optional	Optional	Standard	Channel to channel adapter
				Maximum channel data rates
1.86M	1.86M	1.86M	1.5M	Block multiplexer, bytes/sec.
100K	100K	100K	100K	Byte multiplexer, bytes/sec.
—	—	—	—	Selector channel, bytes/sec.
6.75M	6.75	6.75M	21M	Aggregate data rate, bytes/sec.
No	No	No	Optional	Data Streaming
				CONTROL STORAGE
Bipolar ECL	Bipolar ECL	Bipolar ECL	Bipolar ECL	Storage type
10 to 20	10 to 20	10 to 20	10 to 20	Access time, nanoseconds
72	72	72	99	Word size, bits
16K	16K	16K	6K	Minimum number of words
16K	16K	16K	6K	Maximum number of words
Instruction microcode, operating system assist	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Control storage usage
				PRICING & AVAILABILITY
$450,000	$350,000	$250,000	$1,100,000	Purchase of CPU with min. memory
Yes	Yes	Yes	Yes	Lease terms offered
Yes	Yes	Yes	Yes	Vendor's
—	—	—	—	Third party
Contact vendor	Contact vendor	Contact vendor	Contact vendor	Lease of CPU with min. memory (1-yr.)
2MB	2MB	2MB	2MB	Memory increment size
$50,000	$50,000	$50,000	$100,000	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
Yes	Yes	Yes	Yes	Prime time
—	—	—	—	Additional hours
$3,542/mo.	$2,793/mo.	$2,646/mo.	$9,280/mo.	24 hour
—	—	—	—	Other plans
NAS	NAS	NAS	NAS	Manufacturer
NAS	NAS	NAS	NAS	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	NAS AS/7000 DPC	NAS AS/7000N	NAS AS/9000 DPC	NAS AS/9000N
SYSTEM PARAMETERS				
Date of introduction	1/80	1/80	9/81	1/81
Date of first delivery	2nd Quarter 1980	2nd Quarter 1980	4th Quarter 1981	4th Quarter 1981
Number installed to date	—	—	—	—
Production status	Active	Active	Active	Active
Operating systems				
DOS/VS	Yes	Yes	No	No
DOS/VSE	Yes	Yes	No	No
OS/VS1	Yes	Yes	No	Yes
SVS	Yes	Yes	No	No
MVS	Yes	Yes	Yes	Yes
MVS/XA	No	No	No	No
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	MVS/SP	MVS/SP	MVS/SP	MVS/SP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	—	Yes	—	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	Yes	—	Yes	—
Minimum in complex	2	—	2	—
Maximum in complex	2	—	2	—
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	No	No	No	No
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	Standard	Standard	Optional	Optional
Light pen	Standard	Standard	No	No
Remote console	—	—	—	—
Remote data link	No	No	No	No
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	Standard	Standard	Standard	Standard
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	Standard	Standard	Standard	Standard
OTHER FEATURES & COMMENTS	Two service processor consoles are standard; a third is optional	A second service processor console is available as an option	Two service processor consoles are standard; two additional consoles are optional	A second service processor console is available as an option

All About Plug-Compatible Mainframes

NAS AS/7000 DPC	NAS AS/7000N	NAS AS/9000 DPC	NAS AS/9000N	MODEL
				PROCESSOR PERFORMANCE
72	72	38	48	Machine cycle time, nanoseconds
IBM 3033N	IBM 3031	IBM 3081	IBM 3033U	Relative performance* To
1.25	Up to 2.0	1.4	1.1 to 1.3	Performance of To
—	—	—	—	
—	—	—	—	Performance of
No	AS/7000	—	AS/9000-2	Field upgradable to
				MAIN STORAGE
NMOS	NMOS	NMOS	NMOS	Storage type
				Checking
Yes	Yes	Yes	Yes	Parity
Yes	Yes	Yes	Yes	Error detection & correction
1	1	1	1	No. of check bits per byte
—	—	—	—	No. of check bits per word
360	360	266	336	Read cycle, nanoseconds
360	360	228	228	Write cycle, nanoseconds
8	8	8	8	Bytes fetched per cycle
4M	2M	16M	4M	Minimum capacity, bytes
16M	8M	32M	24M	Maximum capacity, bytes
2M	2M	4M	4M	Increment size, bytes
Yes	Yes	Yes	Yes	Interleaving
4	4	16	8	Minimum number of ways
4	4	16	8	Maximum number of ways
				BUFFER (CACHE) STORAGE
Bipolar ECL	Bipolar ECL	Bipolar ECL	Bipolar ECL	Storage type
144	144	76	96	Cycle time, nanoseconds
8	8	8	8	Bytes fetched per cycle
64K/CPU	16K	64K/CPU	32K	Minimum capacity, bytes
64K/CPU	16K	64K/CPU	32K	Maximum capacity, bytes
				I/O CHANNELS
—	—	—	—	Selector channels standard
—	—	—	—	Selector channels optional
9	5	12	5	Block multiplexers standard
14	1	18	10	Block multiplexers optional
1	1	1	1	Byte multiplexers standard
5	1	7	3	Byte multiplexers optional
				Subchannels per channel
256	256	256	256	On a block multiplexer
256	256	256	256	On a byte multiplexer
—	—	—	—	On a selector
Standard	Standard	Optional	Optional	Channel to channel adapter
				Maximum channel data rates
1.5M	1.5M	1.5M	1.5M	Block multiplexer, bytes/sec.
100K	100K	100K	100K	Byte multiplexer, bytes/sec.
—	—	—	—	Selector channel, bytes/sec.
21M	11M	80M	21M	Aggregate data rate, bytes/sec.
Optional	Optional	Standard	Optional	Data Streaming
				CONTROL STORAGE
Bipolar ECL	Bipolar ECL	Bipolar ECL	Bipolar ECL	Storage type
10 to 20	10 to 20	5.5	5.5	Access time, nanoseconds
99	99	160	160	Word size, bits
6K	6K	16K	16K	Minimum number of words
6K	6K	16K	16K	Maximum number of words
Instruction microcode, operating system assist	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Control storage usage
				PRICING & AVAILABILITY
$1,700,000	$950,000	$4,150,000	$1,950,000	Purchase of CPU with min. memory
Yes	Yes	Yes	Yes	Lease terms offered
Yes	Yes	Yes	Yes	Vendor's
—	—	—	—	Third party
Contact vendor	Contact vendor	Contact vendor	Contact vendor	Lease of CPU with min. memory (1-yr.)
2MB	2MB	4MB	4MB	Memory increment size
$100,000	$100,000	$100,000	$100,000	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
Yes	Yes	Yes	Yes	Prime time
—	—	—	—	Additional hours
$11/708/mo.	$8,000/mo.	$12,995/mo.	$9,953/mo.	24 hour
—	—	—	—	Other plans
NAS	NAS	Hitachi	Hitachi	Manufacturer
NAS	NAS	NAS	NAS	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	NAS AS/9000-2	NAS AS/6620	NAS AS/6630	NAS AS/6650
SYSTEM PARAMETERS				
Date of introduction	9/80	2/83	2/83	2/83
Date of first delivery	1981	3/83	3/83	3/83
Number installed to date	—	Proprietary information	Proprietary information	Proprietary information
Production status	Active	Active	Active	Active
Operating systems				
DOS/VS	No	Yes	Yes	Yes
DOS/VSE	No	Yes	Yes	Yes
OS/VS1	Yes	Yes	Yes	Yes
SVS	No	Yes	Yes	Yes
MVS	Yes	No	No	No
MVS/XA	No	Yes	Yes	Yes
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	MVS/SP	ACP, MFT, MVT	ACP, MFT, MVT	ACP, MFT, MVT
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	—	—	—	—
Minimum in complex	—	Standard	Standard	Standard
Maximum in complex	—	Standard	Standard	Standard
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	No	Standard	Standard	Standard
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	Optional	Optional	Optional	Optional
Light pen	No	No	No	No
Remote console	—	Standard	Standard	Standard
Remote data link	No	Standard	Standard	Standard
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	Standard	Standard	Standard	Standard
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	Standard	Standard	Standard	Standard
OTHER FEATURES & COMMENTS	A second service processor console is available as an option			

All About Plug-Compatible Mainframes

NAS AS/9000-2	NAS AS/6620	NAS AS/6630	NAS AS/6650	MODEL
				PROCESSOR PERFORMANCE
38	60	60	50	Machine cycle time, nanoseconds
				Relative performance*
IBM 3033U	4341-12	4341-12	4341-12	To
1.5 to 1.6	>1.0	>1.3	>1.55	Performance of
—	—	4341-1	4341-2	To
—	—	1.0	1.0	Performance of
AS/9000 DPC	AS/6630	AS/6650		Field upgradable to
				MAIN STORAGE
NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Storage type
				Checking
Yes	Yes	Yes	Yes	Parity
Yes	Yes	Yes	Yes	Error detection & correction
1	1	1	1	No. of check bits per byte
—	—	—	—	No. of check bits per word
266	—	—	—	Read cycle, nanoseconds
228	420	420	350	Write cycle, nanoseconds
8	420	420	350	Bytes fetched per cycle
12M	8	8	8	Minimum capacity, bytes
32M	2M	4M	4M	Maximum capacity, bytes
4M	16M	16M	16M	Increment size, bytes
Yes	2M	4M	4M	Interleaving
8				Minimum number of ways
8				Maximum number of ways
				BUFFER (CACHE) STORAGE
Bipolar ECL	Bipolar RAM	Bipolar RAM	Bipolar RAM	Storage type
76	60	60	60	Cycle time, nanoseconds
8	8	8	8	Bytes fetched per cycle
64K	64K	64K	64K	Minimum capacity, bytes
64K	64K	64K	64K	Maximum capacity, bytes
				I/O CHANNELS
—	—	—	—	Selector channels standard
—	6	6	8	Selector channels optional
9	4	4	4	Block multiplexers standard
14	2	2	4	Block multiplexers optional
1	2	2	1	Byte multiplexers standard
5	1	1	1	Byte multiplexers optional
				Subchannels per channel
256	256	256	256	On a block multiplexer
256	256	256	256	On a byte multiplexer
—				On a selector
Optional	16	16	16	Channel to channel adapter
	Yes	Yes	Yes	Maximum channel data rates
1.5M	3MB	3MB	3MB	Block multiplexer, bytes/sec.
100K	80KB	80KB	80KB	Byte multiplexer, bytes/sec.
—	3MB	3MB	3MB	Selector channel, bytes/sec.
21M	13MB	13MB	13MB	Aggregate data rate, bytes/sec.
Optional	Yes	Yes	Yes	Data Streaming
				CONTROL STORAGE
Bipolar ECL	Bipolar RAM	Bipolar RAM	Bipolar RAM	Storage type
5.5	18	18	18	Access time, nanoseconds
160	72	72	72	Word size, bits
16K	16K	16K	16K	Minimum number of words
16K	16K	16K	16K	Maximum number of words
Instruction microcode, operating system assist	Variable	Variable	Variable	Control storage usage
				PRICING & AVAILABILITY
$2,750,000	$255,000	$341,500	$417,500	Purchase of CPU with min. memory
Yes	Yes	Yes	Yes	Lease terms offered
Yes	—	—	—	Vendor's
—	—	—	—	Third party
Contact vendor	Contact vendor	Contact vendor	Contact vendor	Lease of CPU with min. memory (1-yr.)
4MB	2	4	4	Memory increment size
$100,000	$19,000	$38,000	$38,000	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
Yes	—	—	—	Prime time
—	—	—	—	Additional hours
$11,450/mo.	$668	$777	$927	24 hour
—	—	—	—	Other plans
Hitachi	—	—	—	Manufacturer
NAS	NAS	NAS	NAS	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	NAS AS/8040	NAS AS/8050	NAS AS/8060	NAS AS/9040
SYSTEM PARAMETERS				
Date of introduction	5/83	5/83	5/83	2nd Quarter 1982
Date of first delivery	5/83	5/83	5/83	3rd Quarter 1982
Number installed to date	Proprietary information	Proprietary information	Proprietary information	Proprietary information
Production status	Active	Active	Active	Active
Operating systems				
DOS/VS	Yes	Yes	Yes	Yes
DOS/VSE	Yes	Yes	Yes	Yes
OS/VS1	Yes	Yes	Yes	Yes
SVS	Yes	Yes	Yes	Yes
MVS	Yes	Yes	Yes	Yes
MVS/XA	Yes	Yes	Yes	Yes
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	ACP, MFT, MVT	ACP, MFT, MVT	ACP, MFT, MVT	ACP, MFT, MVT
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	—	—	—	—
Minimum in complex	—	—	—	—
Maximum in complex	—	—	—	—
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	Standard	Standard	Standard	Standard
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	Optional	Optional	Optional	Optional
Light pen	No	No	No	No
Remote console	Standard	Standard	Standard	Standard
Remote data link	Standard	Standard	Standard	Standard
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	Standard	Standard	Standard	Standard
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	Standard	Standard	Standard	Standard
OTHER FEATURES & COMMENTS				Contact vendor

All About Plug-Compatible Mainframes

NAS AS/8040	NAS AS/8050	NAS AS/8060	NAS AS/9040	MODEL
				PROCESSOR PERFORMANCE
40	40	35	38	Machine cycle time, nanoseconds
3083E	3083B	3083J	3083B	Relative performance*
1.2	1.0	1.0	>1.0	To
—	—	—	—	Performance of
—	—	—	—	To
—	—	—	—	Performance of
AS/8050	AS/8060	—	AS/9050	Field upgradable to
				MAIN STORAGE
Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Storage type
				Checking
Yes	Yes	Yes	Yes	Parity
Yes	Yes	Yes	Yes	Error detection & correction
1	1	1	1	No. of check bits per byte
—	—	—	—	No. of check bits per word
360	360	360	342	Read cycle, nanoseconds
360	360	360	342	Write cycle, nanoseconds
8	8	8	8	Bytes fetched per cycle
8M	8M	8M	8M	Minimum capacity, bytes
16M	32M	32M	32M	Maximum capacity, bytes
4M	4M	4M	8M	Increment size, bytes
4	4	4		Interleaving
			8	Minimum number of ways
			16	Maximum number of ways
				BUFFER (CACHE) STORAGE
Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM	Storage type
40	40	35	19	Cycle time, nanoseconds
8	8	8	8	Bytes fetched per cycle
32K	64K	60K	64K	Minimum capacity, bytes
32K	64K	60K	64K	Maximum capacity, bytes
				I/O CHANNELS
—	—	—	—	Selector channels standard
16	24	24	24	Selector channels optional
8	8	8	8	Block multiplexers standard
16	24	24	24	Block multiplexers optional
—	—	—	—	Byte multiplexers standard
2	6	6	6	Byte multiplexers optional
				Subchannels per channel
256	256	256	256	On a block multiplexer
256	256	256	256	On a byte multiplexer
				On a selector
16	16	16	16	Channel to channel adapter
Yes	Yes	Yes	Yes	Maximum channel data rates
3MB	3MB	3MB	3MB	Block multiplexer, bytes/sec.
100KB	100KB	100KB	100KB	Byte multiplexer, bytes/sec.
3MB	3MB	3MB	3MB	Selector channel, bytes/sec.
37	56	56	60MB	Aggregate data rate, bytes/sec.
Yes	Yes	Yes	Yes	Data Streaming
				CONTROL STORAGE
Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM	Storage type
7	7	7	7	Access time, nanoseconds
126	126	126	160	Word size, bits
16K	16K	16K	16K	Minimum number of words
16K	16K	16K	16K	Maximum number of words
Variable	Variable	Variable	Variable	Control storage usage
				PRICING & AVAILABILITY
$1,349,000	$1,758,000	$2,251,000	$1,804,000	Purchase of CPU with min. memory
Yes	Yes	Yes	Yes	Lease terms offered
—	—	—	—	Vendor's
Contact vendor	Contact vendor	Contact vendor	Contact vendor	Third party
				Lease of CPU with min. memory (1-yr.)
4	4	4	8	Memory increment size
$76,000	$76,000	$76,000	$152,000	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
—	—	—	—	Prime time
—	—	—	—	Additional hours
$5,264	$5,431	$6,494	$5,646/mo.	24 hour
—	—	—	—	Other plans
—	—	—	NAS	Manufacturer
NAS	NAS	NAS	NAS	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	NAS AS/9050	NAS AS/9060	NAS AS/9070	NAS AS/9080
SYSTEM PARAMETERS				
Date of introduction	2nd Quarter 1982	2nd Quarter 1982	2nd Quarter 1982	2nd Quarter 1982
Date of first delivery	3rd Quarter 1982	3rd Quarter 1982	1st Quarter 1983	1st Quarter 1983
Number installed to date	Proprietary information	Proprietary information	Proprietary information	Proprietary information
Production status	Active	Active	Active	Active
Operating systems				
DOS/VS	Yes	Yes	Yes	Yes
DOS/VSE	Yes	Yes	Yes	Yes
OS/VS1	Yes	Yes	Yes	Yes
SVS	Yes	Yes	Yes	Yes
MVS	Yes	Yes	Yes	Yes
MVS/XA	Yes	Yes	Yes	Yes
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	ACP, MFT, MVT	ACP, MFT, MVT	ACP, MFT, MVT	ACP, MFT, MVT
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	—	—	Yes	Yes
Minimum in complex	—	—	2-	2
Maximum in complex	—	—	2	2
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	Standard	Standard	Standard	Standard
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	Optional	Optional	Optional	Optional
Light pen	No	No	No	No
Remote console	Standard	Standard	Standard	Standard
Remote data link	Standard	Standard	Standard	Standard
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	Standard	Standard	Standard	Standard
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	Standard	Standard	Standard	Standard
OTHER FEATURES & COMMENTS	Contact vendor	Contact vendor	Contact vendor	Contact vendor

All About Plug-Compatible Mainframes

NAS AS/9050	NAS AS/9060	NAS AS/9070	NAS AS/9080	MODEL
				PROCESSOR PERFORMANCE
38	30	38	30	Machine cycle time, nanoseconds
3083J	3081G	3081K	3081K	Relative performance*
>1.0	>1.0	>1.0	>1.4	To
—	—	—	—	Performance of
—	—	—	—	To
AS/9060, AS/9070	AS/9080	AS/9080	AS/9080	Performance of Field upgradable to
				MAIN STORAGE
Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Storage type
Yes	Yes	Yes	Yes	Checking
Yes	Yes	Yes	Yes	Parity
1	1	1	1	Error detection & correction
—	—	—	—	No. of check bits per byte
342	270	342	270	No. of check bits per word
342	270	342	270	Read cycle, nanoseconds
8	8	8	8	Write cycle, nanoseconds
8M	16M	16M	16M	Bytes fetched per cycle
32M	32M	32M	64M	Minimum capacity, bytes
8M	8M	16M	16M	Maximum capacity, bytes
				Increment size, bytes
8	8	16	16	Interleaving
16	16	16	16	Minimum number of ways
				Maximum number of ways
				BUFFER (CACHE) STORAGE
Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM	Storage type
19	15	19	19	Cycle time, nanoseconds
8	8	8	8	Bytes fetched per cycle
64K	256K	2X64K	2X256K	Minimum capacity, bytes
64K	256K	2X64K	2X256K	Maximum capacity, bytes
				I/O CHANNELS
—	—	—	—	Selector channels standard
24	24	24	24	Selector channels optional
8	8	16	16	Block multiplexers standard
24	24	32	32	Block multiplexers optional
—	—	—	—	Byte multiplexers standard
6	6	12	12	Byte multiplexers optional
				Subchannels per channel
256	256	256	256	On a block multiplexer
256	256	256	256	On a byte multiplexer
				On a selector
16	16	16	16	Channel to channel adapter
Yes	Yes	Yes	Yes	Maximum channel data rates
3MB	3MB	3MB	3MB	Block multiplexer, bytes/sec.
100KB	100KB	100KB	100KB	Byte multiplexer, bytes/sec.
3MB	3MB	3MB	3MB	Selector channel, bytes/sec.
60MB	75MB	80MB	96MB	Aggregate data rate, bytes/sec.
Yes	Yes	Yes	Yes	Data Streaming
				CONTROL STORAGE
Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM	Storage type
7	7	7	7	Access time, nanoseconds
160	160	160	160	Word size, bits
16K	16K	16K	16K	Minimum number of words
16K	16K	16K	16K	Maximum number of words
Variable	Variable	Variable	Variable	Control storage usage
				PRICING & AVAILABILITY
$2,316,000	$3,003,000	$3,606,000	$4,907,000	Purchase of CPU with min. memory
Yes	Yes	Yes	Yes	Lease terms offered
—	—	—	—	Vendor's
Contact vendor	Contact vendor	Contact vendor	Contact vendor	Third party
				Lease of CPU with min. memory (1-yr.)
8	8	8	8	Memory increment size
$151,000	$152,000	$152,000	$152,000	Memory increment purchase
Yes	Yes	Yes	Yes	Vendor offered maintenance
—	—	—	—	Prime time
—	—	—	—	Additional hours
$6,709/mo.	$7,612/mo.	$9,253/mo.	$14,200/mo.	24 hour
—	—	—	—	Other plans
NAS	NAS	NAS	NAS	Manufacturer
NAS	NAS	NAS	NAS	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	Nixdorf 8890/10	Nixdorf 8890/30	Nixdorf 8890/50	Nixdorf 8890/70
SYSTEM PARAMETERS				
Date of introduction	*4th Quarter 1983	*2nd Quarter 1982	*2nd Quarter 1982	*2nd Quarter 1982
Date of first delivery	4th Quarter 1983	2nd Quarter 1983	3rd Quarter 1983	1st Quarter 1984
Number installed to date	**	See 8890/10	See 8890/10	See 8890/10
Production status	Active	Active	Active	Active
Operating systems				
DOS/VS	Yes	Yes	Yes	Yes
DOS/VSE	Yes	Yes	Yes	Yes
OS/VS1	Yes	Yes	Yes	Yes
SVS	Yes	Yes	Yes	Yes
MVS	Yes	Yes	Yes	Yes
MVS/XA	No	No	No	No
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes	Yes
Others	NIDOS/VSE, SSX/VSE	NIDOS/VSE, SSX/VSE	NIDOS/VSE, SSX/VSE	NIDOS/VSE, SSX/VSE
PROCESSING FEATURES				
Virtual storage capability	Yes	Yes	Yes	Yes
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Attached processor	—	—	—	—
Front end to	—	—	—	—
Back end to	—	—	—	—
Multiprocessor	—	—	—	—
Minimum in complex	—	—	—	—
Maximum in complex	—	—	—	—
Clock comparator	Standard	Standard	Standard	Standard
CPU timer	Standard	Standard	Standard	Standard
Control registers	Standard	Standard	Standard	Standard
CPU one-level addressing	Standard	Standard	Standard	Standard
Doubleword buffer	Standard	Standard	Standard	Standard
Interval timer	Standard	Standard	Standard	Standard
Machine check handling	Standard	Standard	Standard	Standard
Multiple bus architecture	Standard	Standard	Standard	Standard
Storage protection	Standard	Standard	Standard	Standard
Time-of-day clock	Standard	Standard	Standard	Standard
Channel command retry	Standard	Standard	Standard	Standard
Channel indirect addressing	Standard	Standard	Standard	Standard
Byte oriented operand feature	Standard	Standard	Standard	Standard
Extended precision floating point	Standard	Standard	Standard	Standard
High speed floating point	Standard	Standard	Standard	Standard
System/370 Universal Instruction set	Standard	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard	Standard
Integrated console printer	Optional	Optional	Optional	Optional
Light pen	—	—	—	—
Remote console	Standard	Standard	Standard	Standard
Remote data link	Standard	Standard	Standard	Standard
Console file	Standard	Standard	Standard	Standard
CPU activity monitor	Standard	Standard	Standard	Standard
Extended control mode	Standard	Standard	Standard	Standard
Program event recording	Standard	Standard	Standard	Standard
Virtual machine assist	Standard	Standard	Standard	Standard
OTHER FEATURES & COMMENTS	*In U.S. only **Approximately 300 world-wide customers with 1 or more systems See 8890/30***	*In U.S. only ***Integrated peripheral adaptors, for disk, tape, communications terminal display, printers, card readers, floppy diskettes.	*In U.S. only See 8890/30 ***	*In U.S. only See 8890/30 ***

All About Plug-Compatible Mainframes

Nixdorf 8890/10	Nixdorf 8890/30	Nixdorf 8890/50	Nixdorf 8890/70	MODEL
				PROCESSOR PERFORMANCE
200	200	200	200	Machine cycle time, nanoseconds
				Relative performance*
IBM 4321	IBM 4331-1	IBM 4341-9	IBM 4341-10	To
—	—	—	—	Performance of
—	—	—	—	To
—	—	—	—	Performance of
8890/30-50-70	8890/50-70	8890/70	—	Field upgradable to
				MAIN STORAGE
MOS	MOS	MOS	MOS	Storage type
Yes	Yes	Yes	Yes	Checking
Yes	Yes	Yes	Yes	Parity
Yes	Yes	Yes	Yes	Error detection & correction
1	1	1	1	No. of check bits per byte
4	4	4	4	No. of check bits per word
870	870	870	870	Read cycle, nanoseconds
870	870	870	870	Write cycle, nanoseconds
8	8	8	8	Bytes fetched per cycle
1MB	1MB	1MB	2MB	Minimum capacity, bytes
1MB	2MB	4MB	8MB	Maximum capacity, bytes
—	1MB	1MB	1MB	Increment size, bytes
Yes	Yes	Yes	Yes	Interleaving
2	2	2	2	Minimum number of ways
2	2	2	2	Maximum number of ways
				BUFFER (CACHE) STORAGE
—	—	—	MOS	Storage type
—	—	—	50	Cycle time, nanoseconds
—	—	—	8	Bytes fetched per cycle
—	—	—	64K	Minimum capacity, bytes
—	—	—	64K	Maximum capacity, bytes
				I/O CHANNELS
Integrated	—	—	—	Selector channels standard
Integrated	—	—	—	Selector channels optional
Integrated	0	0	0	Block multiplexers standard
Integrated	1	2	4	Block multiplexers optional
Integrated	0	0	0	Byte multiplexers standard
Integrated	1	1	2	Byte multiplexers optional
Integrated				Subchannels per channel
Integrated	256	256	256	On a block multiplexer
Integrated	32	32	32	On a byte multiplexer
Integrated	—	—	—	On a selector
Integrated	Yes	Yes	Yes	Channel to channel adapter
Integrated				Maximum channel data rates
Integrated	1.5MB	2MB	2MB	Block multiplexer, bytes/sec.
Integrated	140KB	140KB	140KB	Byte multiplexer, bytes/sec.
Integrated	—	—	—	Selector channel, bytes/sec.
Integrated	5MB	5MB	5MB	Aggregate data rate, bytes/sec.
—	—	Yes	Yes	Data Streaming
				CONTROL STORAGE
Multiple	Multiple	Multiple	Multiple	Storage type
Multiple	Multiple	Multiple	Multiple	Access time, nanoseconds
Multiple	Multiple	Multiple	Multiple	Word size, bits
Multiple	Multiple	Multiple	Multiple	Minimum number of words
Multiple	Multiple	Multiple	Multiple	Maximum number of words
Multiple	Multiple	Multiple	Multiple	Control storage usage
				PRICING & AVAILABILITY
$85,000-120,000 Avg. Sys.	$150,000-200,000 Avg. Sys.	$250,000-285,000 Avg. Sys.	$400,000-500,000 Avg. Sys.	Purchase of CPU with min. memory
Contact vendor	Contact vendor	Contact vendor	Contact vendor	Lease terms offered
—	—	—	—	Vendor's
Contact vendor	Contact vendor	Contact vendor	Contact vendor	Third party
—	—	—	—	Lease of CPU with min. memory (1-yr.)
—	—	—	—	Memory increment size
Contact vendor	1MB	1MB	1MB	Memory increment purchase
Contact vendor	Contact vendor	Contact vendor	Contact vendor	Vendor offered maintenance
Contact vendor	Contact vendor	Contact vendor	Contact vendor	Prime time
—	—	—	—	Additional hours
—	—	—	—	24 hour
—	—	—	—	Other plans
Nixdorf	Nixdorf	Nixdorf	Nixdorf	Manufacturer
Nixdorf	Nixdorf	Nixdorf	Nixdorf	Vendor

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	STC ULTIMACC USX39	STC ULTIMACC USX40	STC ULTIMACC USX44	
SYSTEM PARAMETERS				
Date of introduction	11/82	11/82	9/82	
Date of first delivery	3/83	2/83	5/83	
Number installed to date	8	12	2	
Production status	Active	Active	Active	
Operating systems				
DOS/VS	Yes	Yes	Yes	
DOS/VSE	Yes (370 Mode)	Yes	Yes	
OS/VS1	Yes	Yes	Yes	
SVS	Yes	Yes	Yes	
MVS	Yes	Yes	Yes	
MVS/XA	Yes	Yes	Yes	
VM/370	Yes	Yes	Yes	
VM/SP	—	—	—	
Others	DOS26	DOS26	DOS26	
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	
Attached processor	—	—	—	
Front end to	—	—	—	
Back end to	—	—	—	
Multiprocessor	—	—	—	
Minimum in complex	—	—	—	
Maximum in complex	—	—	—	
Clock comparator	Standard	Standard	Standard	
CPU timer	Standard	Standard	Standard	
Control registers	Standard	Standard	Standard	
CPU one-level addressing	Standard	Standard	Standard	
Doubleword buffer	Standard	Standard	Standard	
Interval timer	Standard	Standard	Standard	
Machine check handling	Standard	Standard	Standard	
Multiple bus architecture	Standard	Standard	Standard	
Storage protection	Standard	Standard	Standard	
Time-of-day clock	Standard	Standard	Standard	
Channel command retry	Standard	Standard	Standard	
Channel indirect addressing	Standard	Standard	Standard	
Byte oriented operand feature	Standard	Standard	Standard	
Extended precision floating point	Standard	Standard	Standard	
High speed floating point	No	No	No	
System/370 Universal Instruction set	Standard	Standard	Standard	
Console audible alarm	Standard	Standard	Standard	
Integrated console printer	Optional	Optional	Optional	
Light pen	No	No	No	
Remote console	Optional	Optional	Optional	
Remote data link	Optional	Optional	Optional	
Console file	Standard	Standard	Standard	
CPU activity monitor	Standard	Standard	Standard	
Extended control mode	Standard	Standard	Standard	
Program event recording	Standard	Standard	Standard	
Virtual machine assist	Standard	Standard	Standard	
OTHER FEATURES & COMMENTS	Sold only as complete system which includes 1270 MB Disk, 1 tape, 1 printer.	Sold only as complete system which includes 1270 MB Disk, 1 tape, 1 printer.	Sold only as complete system which includes Dual processor, 2.5GB Disk, 1 tape, 1 printer.	

All About Plug-Compatible Mainframes

STC ULTIMACC USX39	STC ULTIMACC USX40	STC ULTIMACC USX44		MODEL
				PROCESSOR PERFORMANCE
100	100	100		Machine cycle time, nanoseconds
				Relative performance*
4331-2	4331-2	4341-2		To
1.2	1.5	1.0		Performance of
—	—	—		To
—	—	—		Performance of
USX40	USX44	—		Field upgradable to
				MAIN STORAGE
Dynamic NMOS	Dynamic NMOS	Dynamic NMOS		Storage type
				Checking
Yes	Yes	Yes		Parity
Yes	Yes	Yes		Error detection & correction
1	1	1		No. of check bits per byte
4	4	4		No. of check bits per word
600	600	600		Read cycle, nanoseconds
500	500	500		Write cycle, nanoseconds
8	8	8		Bytes fetched per cycle
1M	1M	1M		Minimum capacity, bytes
16M	16M	16M		Maximum capacity, bytes
1M	1M	1M		Increment size, bytes
No	No	No		Interleaving
—	—	—		Minimum number of ways
—	—	—		Maximum number of ways
No	Yes	Yes		BUFFER (CACHE) STORAGE
—	Static TTL	Static TTL		Storage type
—	300	300		Cycle time, nanoseconds
—	8	8		Bytes fetched per cycle
—	16K	16K		Minimum capacity, bytes
—	16K	16K		Maximum capacity, bytes
				I/O CHANNELS
1	1	2		Selector channels standard
5	5	10		Selector channels optional
1	1	2		Block multiplexers standard
5	5	10		Block multiplexers optional
1	1	2		Byte multiplexers standard
5	5	10		Byte multiplexers optional
256	256	256		Subchannels per channel
256	256	256		On a block multiplexer
256	256	256		On a byte multiplexer
Optional	Optional	Optional		On a selector
				Channel to channel adapter
3M	3M	3M		Maximum channel data rates
500K	500K	500K		Block multiplexer, bytes/sec.
3M	3M	3M		Byte multiplexer, bytes/sec.
10M	10M	10M		Selector channel, bytes/sec.
Yes	Yes	Yes		Aggregate data rate, bytes/sec.
				Data Streaming
				CONTROL STORAGE
Static NMOS	Static NMOS	Static NMOS		Storage type
45	45	45		Access time, nanoseconds
32	32	32		Word size, bits
4K	4K	4K		Minimum number of words
16K	16K	16K		Maximum number of words
Instruction microcode, operating system assist	Instruction microcode, operating system assist	Instruction microcode, operating system assist		Control storage usage
				PRICING & AVAILABILITY
$182,282 (system)	$215,496 (system)	$321,529 (system)		Purchase of CPU with min. memory
				Lease terms offered
No	No	No		Vendor's
Yes	Yes	Yes		Third party
$8,906/mo. (2-yr.)	$10,471/mo. (2-yr.)	$15,623/mo. (2-yr.)		Lease of CPU with min. memory (1-yr.)
1MB	1MB	1MB		Memory increment size
$7,500	$7,500	$7,500		Memory increment purchase
Yes	Yes	Yes		Vendor offered maintenance
Yes	Yes	Yes		Prime time
Yes	Yes	Yes		Additional hours
No	No	No		24 hour
				Other plans
CPU-Magnuson*, I/O—STC	CPU-Magnuson*, I/O—STC	CPU-Magnuson*, I/O—STC		Manufacturer
STC ULTIMACC Systems, Inc.	STC ULTIMACC Systems, Inc.	STC ULTIMACC Systems, Inc.		Vendor

*As rated by the PCM vendor.