

All About Plug-Compatible Mainframes

Plug-compatible mainframes (PCMs) are typically defined as computer mainframes that can directly execute all application programs and systems software written for specific IBM mainframes 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. However, IBM, with its large user base, attracts the most serious attention from the PCM vendors.

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.

The plug-compatible mainframe industry is currently dominated by Amdahl Corporation, the original PCM supplier, and National Advanced Systems (NAS). Other vendors have competed for a share of the market with some success, but the PCM industry is not for the faint of heart. IBM's aggressive pricing policies and improved delivery schedules have made survival increasingly difficult for the PCM vendors. The plug-compatible industry is a reactive industry, and is thus vulnerable to surprise moves by IBM. Because of its size, IBM also has the edge when it comes to manufacturing costs.

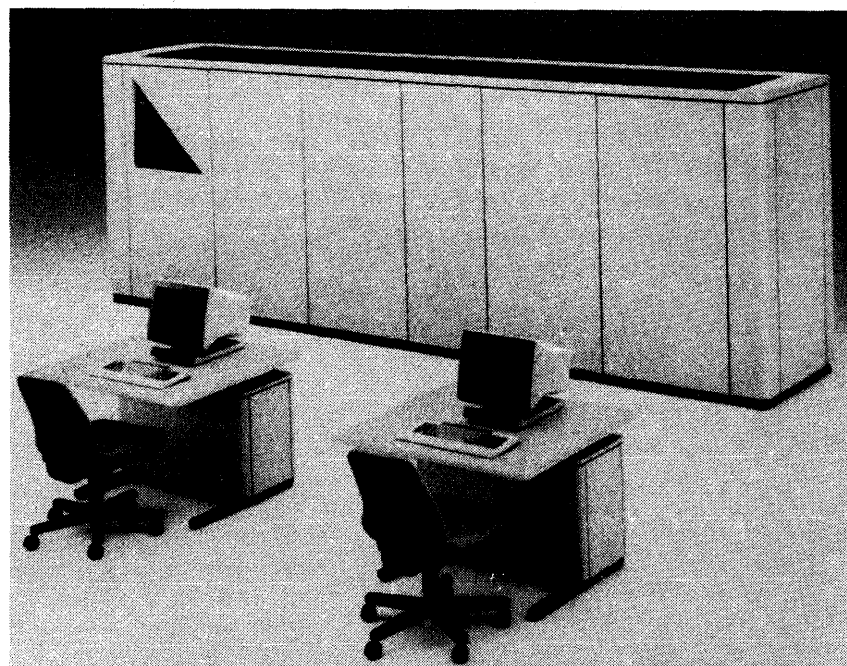
THE PCM CONCEPT

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

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 39 systems from 5 vendors.

- 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/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. In the 1960s, RCA and Sperry developed a number of systems that 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 compatibility with the IBM mainframes and could use all the same software and peripheral equipment.

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 580 Series against IBM's high-end systems, the 308X and 3090 Series. Firms like IPL Systems, Nixdorf,



The recently announced top-of-the-line AS/XL Series is available in two processor models that are compatible with IBM's 3090 Series. The AS/XL Series processors have from 32 to 256 megabytes of main memory and from 16 to 64 I/O channels. The system features VLSI circuits throughout, and a one-megabyte dynamic working storage caching system between the main memory and the cache buffer.

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▷ and Global-USI compete with IBM's popular 4300 Series. 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, although National Advanced Systems has entered both the 4300-compatible and the 308X/3090-compatible markets.

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). Users must be careful in comparing prices. Quite often the price of IBM's basic system may appear lower, but the PCM vendor includes more equipment in the basic price.

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 has changed, however, especially in the very large system arena. When IBM announced the 3090 Series in 1985, the scheduled delivery date for the Model 400 was the second quarter of 1987. This date was subsequently moved up to the fourth quarter of 1986. NAS has stated that its new AS/XL Series will be available in the second quarter of 1986, while Amdahl will have only one of its three 5890 models ready by then. The other two 5890 models are scheduled for delivery in the first quarter of 1987.

Becoming a *multiple-vendor shop* can be viewed as either an advantage or as a disadvantage. Some users are 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.

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 ironclad 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. However, Datapro's annual computer user surveys indicate that the plug-compatible vendors have established competent field service and support organizations. In fact, the survey respondents generally consider Amdahl and NAS 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 meet those needs.

Vendor survival has always been a topic of concern to PCM buyers, and Magnuson's demise illustrates the hazards of the PCM business. A PCM vendor's long-term survival will depend upon a continued ability to maintain full compatibility together with a worthwhile price/performance advantage over the steadily improving mainframes that IBM offers. During the past year, both Amdahl and NAS responded to IBM's announcement of the top-of-the-line 3090 Series, as well as to IBM's price reductions on the older 308X Series.

THE PCM SUPPLIERS

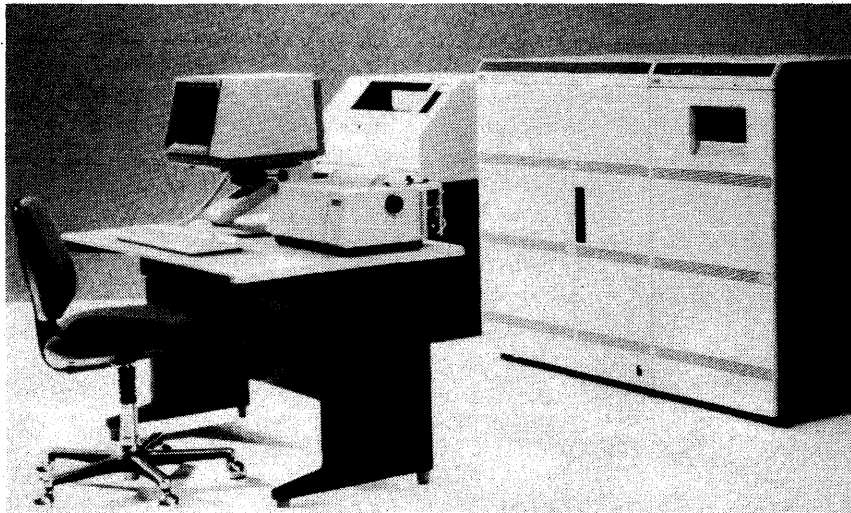
Amdahl Corporation, which was formed in 1971 and delivered its first computer in June 1975, is the leading supplier of IBM-compatible mainframes, with several hundred installations nationwide. The firm's software development efforts have resulted in significant improvements over comparable IBM products. 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. Amdahl's current systems, the 580 Series, are targeted at IBM's 3083, 3081, and 3084 systems. During the past year, Amdahl added three new models, the 5890 Models 200, 300, and 600, which are targeted at IBM's new 3090 Models 200 and 400. Amdahl's 5890 systems offer faster cycle times, more main memory, and more I/O channels than the comparable IBM models.

Global-USI, formerly STC Ultimacc Inc., sells software and turnkey systems as well as plug-compatible mainframes. In 1985, Global-USI signed an OEM agreement with NAS to market the AS/6600 Series processors under the Global-USI name.

Eight systems are now available from Global-USI. The USX40 system, which was initially delivered first quarter

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The Nixdorf 8890 Series now consists of the 8890 32C, 52C, and 72C, which are compact versions of the original 8890 models. According to Nixdorf, the new models are 50 percent smaller than the previous models. The 8890 systems compete with the IBM 4300 Series and offer from 4 to 8 megabytes of main memory.

▷ 1983, is plug-compatible with the IBM 4331-2 and 4361. The USX44 system was initially delivered in the second quarter of 1983; it is compatible with the 4341-2. (IBM no longer markets the 4331 or 4341.) The USX43 and USX46 are enhanced versions of the USX40 and USX44, respectively. The Global 50-1, 50-2, 50-3, and 50-5 are equivalent to the NAS AS/6620, AS/6630, AS/6650, and AS/6660, respectively.

IPL Systems, Inc. has been building PCMs for use since 1977, and the company currently supports OEM agreements with Masstor in the U.S. and with 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 the company announced the 4400 Series. The 4400 Series has been pared down to two models, the 4460 and 4480, that compete with the IBM 4361 and 4381.

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 Intel Corporation's IBM-compatible mainframe business. All of the old Intel models have been replaced with newer models, and the current NAS systems are manufactured by Hitachi, Ltd. of Japan.

The company's current product line includes the IBM 4300-compatible AS/6600 Series, the 3083-compatible AS/8000 Series, the 3081- and 3084-compatible AS/90X0 Series, and the 3090-compatible AS/XL Series. NAS now offers a total of 16 models in these four families of systems. Recent enhancements to the Advanced Systems product line include the AS/XL 60 and AS/XL 80 processors, increased memory capacity on the AS/8000 and AS/90X0 Series, and increased channel capacity on the AS/90X0 Series. NAS also offers the AS/91X0 vector processors, which are used in conjunction with the AS/90X0 Series processors.

Nixdorf Computer Corporation introduced the 8890 product family to the United States in the second quarter of 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 now features three models: the 8890/32C, 8890/52C, and 8890/72C, which are compact versions of the previous 8890/30, 8890/50, and 8890/70 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 vendors whose products are represented.

The absence of a company or a product from the comparison charts indicates: the company failed to respond to our repeated requests for information; the product is no longer actively marketed; or the company is no longer in business.

The entries in the comparison charts and their significance are explained in the following paragraphs. *NOTE: A dash (—) for an entry indicates that the information was not obtained from the vendor.*

SYSTEM PARAMETERS

Date of Introduction. This entry indicates when the processor was first announced to the public in the United States.

Operating Systems. All IBM operating systems that will run on the processor are specified.

PROCESSING FEATURES

Virtual Storage Capability. This entry indicates the presence of a hardware/software feature enabling the user to ▷

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▷ access and utilize memory space without regard to its existence in real main memory or auxiliary memory space.

Processor Arrangements. The charts indicate whether the processor is a uniprocessor or multiprocessor system. For multiprocessor systems, we list the minimum and maximum number of processors configured in the central processor complex.

Clock Comparator. This hardware feature causes an interruption when the time of day equals or exceeds the value specified by a program or virtual machine.

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

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

CPU One-Level Addressing. This feature is the same as direct addressing, where the instruction contains the actual address of the data being requested.

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

Interval Timer. The interval timer is a 32-bit decremental counter that is reduced by one, several hundred times per second. The timer generates an interrupt when the contained value is decremented from a positive to a negative number.

Machine Check Handling. This feature 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. With this feature, 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. 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.

Time-of-Day Clock. The clock is incremented once every microsecond and provides a consistent measure of elapsed time suitable for the indication of date and time.

Channel Command Retry. This capability is a channel and control-unit procedure that causes a command to be retried without requiring an I/O interruption.

Channel Indirect Addressing (CIA). 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.

Byte-Oriented Operand Feature. This capability permits storage operands of most nonprivileged operations to appear on any byte boundary. Instructions must appear on even byte boundaries. The feature does not pertain to instruction addresses.

Extended Precision Floating Point. This 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.

High-Speed Floating Point. High-speed floating point provides a means for improved execution of the floating-point instruction set.

System/370 Universal Instruction Set. The 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.

Console Audible Alarm. The alarm is activated when predetermined events occur that require operator attention or intervention for system operation.

Integrated Console Printer. The console printer is an integral part of the system console, furnishing hard copy output from the console display.

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

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

Remote Data Link. This feature allows establishment of communications with a technical data center to remotely diagnose system malfunctions.

Console File. 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.

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

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

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

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▷ **Virtual Machine Assist.** This 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 systems such as DOS/VS and MVS.

Other Features and Comments. This entry contains any additional information that may help to give you a feel for the distinctive attributes of each unit.

PROCESSOR PERFORMANCE

Machine Cycle Time. The CPU cycle time, given in nanoseconds, indicates the time interval in which the CPU performs a number of operations. It is the time required to change the information in a set of registers. The internal cycle time can be synchronous (fixed) or asynchronous (variable).

Relative Performance. This entry shows a comparison between the performance of the plug-compatible processor and its IBM counterpart. For example, an entry of 1.0 indicates that the performance of the PCM model is equal to that of the listed IBM model.

Field Upgradability. If the processor can be field-upgraded to another model, we list the appropriate model number or numbers.

MAIN STORAGE

Storage Type. Most plug-compatible vendors currently use either Metal Oxide Semiconductor (MOS) or N-Channel Metal Oxide Semiconductor (NMOS) main memory. MOS memories are reliable and compact.

Checking. This section of the charts indicates the availability of **Parity** checking capabilities and **Error Detection and Correction** facilities. With most systems, single-bit errors are detected and corrected, while multiple-bit errors are detected and flagged so that appropriate action can be taken. Also listed are the **Number of Check Bits** per byte and per word.

Read and Write Cycle Time. The cycle time for main memory is the time interval needed between the initiation of two successive, independent memory operations. In most of the systems covered in this report, read and write cycle times are the same.

Bytes Fetched per Cycle. This entry shows the number of bytes accessed by main memory in a single read operation. Usually, the more bytes fetched per cycle, the more efficient the system.

Minimum and Maximum Capacity. Minimum and maximum memory sizes are listed in bytes. The abbreviation "M" is used to denote millions.

Increment Size. This entry lists the size, in bytes, of the add-on units available to increase the system's main memory.

Interleaving. Interleaving improves memory speed by permitting overlapped accesses to two or more independently operating banks of main storage. For example, two-way interleaving can effectively double the maximum rate at which data can be transferred between a CPU and its associated main memory. The charts list the minimum and maximum number of ways the memory can be interleaved.

BUFFER (CACHE) STORAGE

Buffer storage is used to compensate for the difference in the rate of the flow of data or in the time of occurrence of events when transferring data from one device to another. In this section, we list the **Storage Type**, the **Cycle Time** in nanoseconds, the number of **Bytes Fetched Per Cycle**, and the **Minimum and Maximum Capacity** in thousands (K) of bytes.

I/O CHANNELS

Block Multiplexer. Block multiplexer channels interleave blocks of data and are used for high-speed input/output devices such as disk and tape drives. The charts list the number of block multiplexer channels that are standard on the system, plus the number of additional channels that are available as options. The sum of these two figures is the maximum number of block multiplexer channels that can be configured. With most systems, the use of byte multiplexer channels reduces the maximum number of block multiplexer channels that can be connected.

Byte Multiplexer. Byte multiplexer channels interleave bytes of data. They are used for low-speed I/O devices such as card readers and printers. We list the number of standard byte multiplexer channels provided and the number of additional channels available as options.

Subchannels per Channel. A subchannel is the channel facility required for sustaining a single I/O operation. The charts list the number of subchannels on each channel.

Channel-to-Channel Adapter. This hardware feature connects two channels on the same computer systems or on two different computer systems.

Maximum Channel Data Rates. The data transfer rate is a measure of the computer's ability to transfer data to and from peripheral devices through all available channels and ports. The maximum data transfer rates for the faster block multiplexer channels are indicated in millions (M) of bytes per second, while the data rates for the slower byte multiplexer channels are shown in thousands (K) of bytes per second. The aggregate data rate for all channels is also listed.

Data Streaming. This feature permits data transfer rates of up to 3 million bytes per second on a block multiplexer channel.

CONTROL STORAGE

Control storage controls microcode execution in the central processor, and is not available to user programs. This ▷

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▷ section of the charts lists the **Storage Type** used for control storage, the **Access Time** in nanoseconds, the **Word Size** in bits, the **Minimum and Maximum Number of Words**, and **Control Storage Usage**.

PRICING & AVAILABILITY

Purchase Price. The purchase price for the basic CPU and minimum main memory is listed.

Lease Terms Offered. This entry indicates the terms offered by the vendor as well as those offered by a third-party organization, if any.

Lease of CPU. Unless otherwise indicated, this entry lists the monthly charges for the basic CPU and minimum memory on a one-year lease.

Vendor-Offered Maintenance. We indicate the availability of prime-time, 24-hour, and other maintenance plans.

VENDORS

Listed below are the complete addresses and telephone numbers of the vendors whose plug-compatible mainframes are listed in the accompanying comparison tables.

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

Global-USI, 2902 Orchard Parkway, San Jose, CA 95134. Telephone (201) 836-1107 (Marketing Department).

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

National Advanced Systems (NAS), 800 East Middlefield Road, Mountain View, CA 94043. Telephone (415) 962-6100.

Nixdorf Computer Corporation, 300 Third Avenue, Waltham, MA 02154. Telephone (617) 890-3600. □

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Comparison Columns Follow

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MODEL	Amdahl Corporation 5840	Amdahl Corporation 5850	Amdahl Corporation 5860	Amdahl Corporation 5867
SYSTEM PARAMETERS				
Date of introduction	June 1983	September 1982	November 1980	March 1984
Date of first delivery	4th Quarter 1983	3rd Quarter 1983	3rd Quarter 1982	3rd Quarter 1984
Number installed to date	—	—	—	—
Operating systems				
DOS/VS	No	No	No	No
DOS/VSE	No	No	No	No
OS/VS1	No	No	No	No
SVS	No	No	No	No
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, ACP/TPF	MVS/SP, ACP/TPF	MVS/SP, ACP/TPF	MVS/SP, ACP/TPF
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	No
Multiprocessor	No	No	No	Yes
Minimum in complex	Does not apply	Does not apply	Does not apply	2
Maximum in complex	Does not apply	Does not apply	Does not apply	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	Optional	Optional	Optional	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	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				
	System supports a maximum of 32 I/O channels. Options include the 580/Accelerator, which increases CPU performance; the 580/Multiple Domain Feature, which consolidates multiple systems into one system; and the Two-Byte Channel Interface.	System supports a maximum of 32 I/O channels. Options include the 580/Accelerator, which increases CPU performance; the 580/Multiple Domain Feature, which consolidates multiple systems into one; and the Two-Byte Channel Interface.	System supports a maximum of 32 I/O channels. Options include the 580/Multiple Domain Feature, which consolidates multiple systems into one system, and the Two-Byte Channel Interface.	System supports a maximum of 32 I/O channels. Options include the 580/Multiple Domain Feature, which consolidates multiple systems into one system, and the Two-Byte Channel Interface.

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MODEL	Amdahl Corporation 5840	Amdahl Corporation 5850	Amdahl Corporation 5860	Amdahl Corporation 5867
PROCESSOR PERFORMANCE				
Machine cycle time, nanoseconds	23.25	23.25	23.25	23.25
Relative performance*				
To	IBM 3083BX	IBM 3083JX	IBM 3081GX	IBM 3081KX
Performance of	—	—	—	—
To	Amdahl 5860	Amdahl 5860	Amdahl 5840	Amdahl 5860
Performance of	0.6	0.8	1.6	1.25 to 1.4
Field upgradable to	5850	5860, 5867, 5868	5870, 5880	5868, 5870, 5880
MAIN STORAGE				
Storage type	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS
Checking				
Parity	Yes	Yes	Yes	Yes
Error detection & correction	Yes	Yes	Yes	Yes
No. of check bits per byte	1	1	1	—
No. of check bits per word	1	—	—	—
Read cycle, nanoseconds	280	280	280	280
Write cycle, nanoseconds	280	280	280	280
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	16M	16M	16M	24M
Maximum capacity, bytes	128M	128M	128M	128M
Increment size, bytes	8M or 16M	8M or 16M	8M or 16M	8M or 16M
Interleaving	Yes	Yes	Yes	Yes
Minimum number of ways	16	16	16	16
Maximum number of ways	16	16	16	16
BUFFER (CACHE) STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM
Cycle time, nanoseconds	—	—	—	—
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	2 x 32K	2 x 32K	2 x 32K	4 x 32K
Maximum capacity, bytes	2 x 32K	2 x 32K	2 x 32K	4 x 32K
I/O CHANNELS				
Block multiplexers standard	15	15	15	15
Block multiplexers optional	Up to 16	Up to 16	Up to 16	Up to 16
Byte multiplexers standard	1	1	1	1
Byte multiplexers optional	Up to 3	Up to 3	Up to 3	Up to 3
Subchannels per channel				
On a block multiplexer	256	256	256	256
On a byte multiplexer	256	256	256	256
Channel to channel adapter	Optional	Optional	Optional	Optional
Maximum channel data rates				
Block multiplexer, bytes/sec.	6M	6M	6M	6M
Byte multiplexer, bytes/sec.	200K	200K	200K	200K
Aggregate data rate, bytes/sec.	50M to 80M	50M to 80M	50M to 80M	50M to 80M
Data streaming	Yes	Yes	Yes	Yes
CONTROL STORAGE				
Storage type	4K RAM	4K RAM	4K RAM	4K RAM
Access time, nanoseconds	7.5	7.5	7.5	7.5
Word size, bits	Variable	Variable	Variable	Variable
Minimum number of words	Variable	Variable	Variable	Variable
Maximum number of words	Variable	Variable	Variable	Variable
Control storage usage	Variable	Variable	Variable	Variable
PRICING & AVAILABILITY				
Purchase of CPU with min. memory	\$1,300,000	\$1,550,000	\$1,800,000	\$2,570,000
Lease terms offered				
Vendor's	Month by month	Month by month	Month by month	Month by month
Third party	—	—	—	—
Lease of CPU with min. memory (1 yr.)	\$108,330/mo.	\$129,170/mo.	\$150,000/mo.	\$214,170/mo.
Vendor offered maintenance				
Prime time	—	—	—	—
24 hour	\$8,200/mo.	\$9,350/mo.	\$9,850/mo.	\$12,500/mo.
Other plans	—	—	—	—

*As rated by the PCM vendor.

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MODEL	Amdahl Corporation 5868	Amdahl Corporation 5870	Amdahl Corporation 5880	Amdahl Corporation 5890 Model 200
SYSTEM PARAMETERS				
Date of introduction	March 1984	October 1981	November 1980	October 1985
Date of first delivery	1st Quarter 1985	4th Quarter 1983	4th Quarter 1983	1st Quarter 1987
Number installed to date	—	—	—	Does not apply
Operating systems				
DOS/VS	No	No	No	No
DOS/VSE	No	No	No	No
OS/VS1	No	No	No	No
SVS	No	No	No	No
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, ACP/TPF	MVS/SP, ACP/TPF	MVS/SP, ACP/TPF	MVS/SP, VM/SP HPO, VM/XA Systems Facility, ACP/TPF
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	No	No	No	No
Multiprocessor	Yes	Yes	Yes	Yes
Minimum in complex	2	2	2	2
Maximum in complex	2	2	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	Optional	Optional	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	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				
	System supports a maximum of 48 I/O channels. Options include the 580/Multiple Domain Feature, which consolidates multiple systems into one system, and the Two-Byte Channel Interface.	System supports a maximum of 32 I/O channels. Options include the 580/Multiple Domain Feature, which consolidates multiple systems into one system, and the Two-Byte Channel Interface.	System supports a maximum of 48 I/O channels. Options include the 580/Multiple Domain Feature, which consolidates multiple systems into one system, and the Two-Byte Channel Interface.	System supports a maximum of 64 I/O channels. Options include the 580/Multiple Domain Feature, which consolidates multiple systems into one system; the Two-Byte Channel Interface; and the Hardware Monitor Attachment Feature, which permits attachment of commercially available hardware monitors for system tuning and capacity planning.

All About Plug-Compatible Mainframes

MODEL	Amdahl Corporation 5868	Amdahl Corporation 5870	Amdahl Corporation 5880	Amdahl Corporation 5890 Model 200
PROCESSOR PERFORMANCE				
Machine cycle time, nanoseconds	23.25	23.25	23.25	15
Relative performance*				
To	IBM 3081KX	IBM 3084QX	IBM 3084QX	IBM 3090 Model 200
Performance of	—	—	—	—
To	Amdahl 5860	Amdahl 5860	Amdahl 5860	Amdahl 5890 Model 300
Performance of	1.25 to 1.4	1.5 to 1.9	1.5 to 1.9	0.75
Field upgradable to	5880	5880	Does not apply	5890 Model 300 or 600
MAIN STORAGE				
Storage type	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS
Checking				
Parity	Yes	Yes	Yes	Yes
Error detection & correction	Yes	Yes	Yes	Yes
No. of check bits per byte	—	1	1.0	—
No. of check bits per word	—	—	—	—
Read cycle, nanoseconds	280	280	280	—
Write cycle, nanoseconds	280	280	280	—
Bytes fetched per cycle	8	8	8	16
Minimum capacity, bytes	32M	32M	32M	64M
Maximum capacity, bytes	256M	128M	256M	256M
Increment size, bytes	16M, 32M, or 64M	8M, 16M, or 32M	16M, 32M, or 64M	32M or 64M
Interleaving	Yes	Yes	Yes	—
Minimum number of ways	16	16	16	—
Maximum number of ways	16	16	16	—
BUFFER (CACHE) STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	—
Cycle time, nanoseconds	—	—	—	—
Bytes fetched per cycle	8	8	8	—
Minimum capacity, bytes	4 x 32K	4 x 32K	4 x 32K	2 x 96K
Maximum capacity, bytes	4 x 32K	4 x 32K	4 x 32K	2 x 96K
I/O CHANNELS				
Block multiplexers standard	30	15	30	32
Block multiplexers optional	Up to 16	Up to 16	Up to 16	Up to 32
Byte multiplexers standard	2	1	2	0
Byte multiplexers optional	Up to 6	Up to 3	Up to 6	Up to 16
Subchannels per channel				
On a block multiplexer	256	256	256	256
On a byte multiplexer	256	256	256	256
Channel to channel adapter	Optional	Optional	Optional	Optional
Maximum channel data rates				
Block multiplexer, bytes/sec.	6M	6M	6M	—
Byte multiplexer, bytes/sec.	200K	200K	200K	—
Aggregate data rate, bytes/sec.	50M to 80M	50M to 80M	50M to 80M	—
Data streaming	Yes	Yes	Yes	Yes
CONTROL STORAGE				
Storage type	4K RAM	4K RAM	4K RAM	—
Access time, nanoseconds	7.5	7.5	7.5	—
Word size, bits	Variable	Variable	Variable	—
Minimum number of words	Variable	Variable	Variable	—
Maximum number of words	Variable	Variable	Variable	—
Control storage usage	Variable	Variable	Variable	—
PRICING & AVAILABILITY				
Purchase of CPU with min. memory	\$3,030,000	\$3,070,000	\$3,530,000	\$4,250,000
Lease terms offered				
Vendor's	Month by month	Month by month	Month by month	Month by month
Third party	—	—	—	—
Lease of CPU with min. memory (1 yr.)	\$252,500/mo.	\$255,830/mo.	\$294,170/mo.	\$354,170/mo.
Vendor offered maintenance				
Prime time	—	—	—	—
24 hour	\$13,950/mo.	\$16,300/mo.	\$17,600/mo.	\$15,250/mo.
Other plans	—	—	—	—

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	Amdahl Corporation 5890 Model 300	Amdahl Corporation 5890 Model 600	Global-UI USX40	Global-UI USX43
SYSTEM PARAMETERS				
Date of introduction	October 1985	October 1985	November 1982	—
Date of first delivery	2nd Quarter 1986	3rd Quarter 1987	February 1983	—
Number installed to date	Does not apply	Does not apply	—	—
Operating systems				
DOS/VS	No	No	Yes	Yes
DOS/VSE	No	No	Yes	Yes
OS/VS1	No	No	Yes	Yes
SVS	No	No	Yes	Yes
MVS	Yes	Yes	Yes	Yes
MVS/XA	Yes	Yes	Yes	Yes
VM/370	Yes	Yes	Yes	Yes
VM/SP	Yes	Yes	—	Yes
Others	MVS/SP, VM/SP HPO, VM/XA Systems Facility, ACP/TPF	MVS/SP, VM/SP HPO, VM/XA Systems Facility, ACP/TPF	DOS26	—
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	No	No	Yes	Yes
Multiprocessor	Yes	Yes	No	No
Minimum in complex	2	4	Does not apply	Does not apply
Maximum in complex	2	4	Does not apply	Does not apply
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
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	Optional	Optional	Optional	Optional
Remote data link	Standard	Standard	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	System supports a maximum of 64 I/O channels. Options include the 580/Multiple Domain Feature, which consolidates multiple systems into one system; the Two-Byte Channel Interface; and the Hardware Monitor Attachment Feature, which permits attachment of commercially available hardware monitors for system tuning and capacity planning.	System supports a maximum of 128 I/O channels. Options include the 580/Multiple Domain Feature, which consolidates multiple systems into one system; the Two-Byte Channel Interface; and the Hardware Monitor Attachment Feature, which permits attachment of commercially available hardware monitors for system tuning and capacity planning.		

All About Plug-Compatible Mainframes

MODEL	Amdahl Corporation 5890 Model 300	Amdahl Corporation 5890 Model 600	Global-USI USX40	Global-USI USX43
PROCESSOR PERFORMANCE				
Machine cycle time, nanoseconds	15	15	100	100
Relative performance*				
To	IBM 3090 Model 200	IBM 3090 Model 400	IBM 4331-2	IBM 4341
Performance of	—	—	1.5	—
To	Amdahl 5870	Amdahl 5890 Model 300	IBM 4361	—
Performance of	1.7 to 1.9	1.7 to 1.9	—	—
Field upgradable to	5890 Model 600	Does not apply	USX44	USX44, USX46 II
MAIN STORAGE				
Storage type	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS
Checking				
Parity	Yes	Yes	Yes	Yes
Error detection & correction	Yes	Yes	Yes	Yes
No. of check bits per byte	—	—	1	1
No. of check bits per word	—	—	4	4
Read cycle, nanoseconds	—	—	600	—
Write cycle, nanoseconds	—	—	500	—
Bytes fetched per cycle	16	16	8	8
Minimum capacity, bytes	64M	128M	2M	2M
Maximum capacity, bytes	256M	512M	8M	8M
Increment size, bytes	32M or 64M	64M or 128M	2M	2M
Interleaving	—	—	No	No
Minimum number of ways	—	—	Does not apply	Does not apply
Maximum number of ways	—	—	Does not apply	Does not apply
BUFFER (CACHE) STORAGE				
Storage type	—	—	Static TTL	Static TTL
Cycle time, nanoseconds	—	—	300	—
Bytes fetched per cycle	—	—	8	8
Minimum capacity, bytes	2 x 96K	4 x 96K	16K	16K
Maximum capacity, bytes	2 x 96K	4 x 96K	16K	16K
I/O CHANNELS				
Block multiplexers standard	32	64	2	2
Block multiplexers optional	Up to 32	Up to 64	5	5
Byte multiplexers standard	0	0	1	1
Byte multiplexers optional	Up to 16	Up to 32	—	—
Subchannels per channel				
On a block multiplexer	256	256	256	256
On a byte multiplexer	256	256	256	256
Channel to channel adapter	Optional	Optional	Optional	Optional
Maximum channel data rates				
Block multiplexer, bytes/sec.	—	—	2M or 3M	2M or 3M
Byte multiplexer, bytes/sec.	—	—	180K	180K
Aggregate data rate, bytes/sec.	—	—	—	—
Data streaming	Yes	Yes	Yes	Yes
CONTROL STORAGE				
Storage type	—	—	Static NMOS	Static NMOS
Access time, nanoseconds	—	—	45	—
Word size, bits	—	—	32	—
Minimum number of words	—	—	4K	—
Maximum number of words	—	—	16K	—
Control storage usage	—	—	Instruction microcode, operating system assist	Instruction microcode, operating system assist
PRICING & AVAILABILITY				
Purchase of CPU with min. memory	\$5,000,000	\$9,330,000	Contact vendor	Contact vendor
Lease terms offered				
Vendor's	Month by month	Month by month	No	No
Third party	—	—	Yes	Yes
Lease of CPU with min. memory (1 yr.)	\$416,670/mo.	\$777,500/mo.	Contact vendor	Contact vendor
Vendor offered maintenance				
Prime time	—	—	Yes	Yes
24 hour	\$16,350/mo.	\$27,400/mo.	Yes	Yes
Other plans	—	—	Yes	Yes

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	Global-USI USX44	Global-USI USX46	Global-USI 50-1	Global-USI 50-2
SYSTEM PARAMETERS				
Date of introduction	September 1982	—	—	—
Date of first delivery	May 1983	—	—	—
Number installed to date	—	—	—	—
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
Others	DOS26	—	ACP	ACP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	No	No	Yes	Yes
Multiprocessor	Yes	Yes	No	No
Minimum in complex	2	2	Does not apply	Does not apply
Maximum in complex	2	2	Does not apply	Does not apply
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	Optional	Optional
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	Standard	Standard
Remote data link	Optional	Optional	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				

All About Plug-Compatible Mainframes

MODEL	Global-UI USX44	Global-UI USX46	Global-UI 50-1	Global-UI 50-2
PROCESSOR PERFORMANCE				
Machine cycle time, nanoseconds	100	50	60	60
Relative performance*				
To	IBM 4341-2	IBM 4341	IBM 4341-12	IBM 4381-1
Performance of	1.0	—	>1.0	>1.0
To	—	—	—	—
Performance of	—	—	—	—
Field upgradable to	—	—	50-2	50-3
MAIN STORAGE				
Storage type	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS
Checking				
Parity	Yes	Yes	Yes	Yes
Error detection & correction	Yes	Yes	Yes	Yes
No. of check bits per byte	1	1	1	1
No. of check bits per word	4	4	—	—
Read cycle, nanoseconds	600	—	420	420
Write cycle, nanoseconds	500	—	420	420
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	4M	2M	8M	8M
Maximum capacity, bytes	16M	32M	16M	16M
Increment size, bytes	2M	2M	8M or 12M	8M or 12M
Interleaving	No	No	Yes	Yes
Minimum number of ways	Does not apply	Does not apply	2	2
Maximum number of ways	Does not apply	Does not apply	2	2
BUFFER (CACHE) STORAGE				
Storage type	Static TTL	Static TTL	Bipolar RAM	Bipolar RAM
Cycle time, nanoseconds	300	—	60	60
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	16K	2 x 32K	64K	64K
Maximum capacity, bytes	16K	2 x 32K	64K	64K
I/O CHANNELS				
Block multiplexers standard	4	4	4	4
Block multiplexers optional	10	18	2	2
Byte multiplexers standard	2	2	1	1
Byte multiplexers optional	—	—	1	1
Subchannels per channel				
On a block multiplexer	256	256	256	256
On a byte multiplexer	256	256	256	256
Channel to channel adapter	Optional	Optional	Optional	Optional
Maximum channel data rates				
Block multiplexer, bytes/sec.	2M or 3M	2M or 3M	3M	3M
Byte multiplexer, bytes/sec.	180K	180K	80K	80K
Aggregate data rate, bytes/sec.	—	—	13M	13M
Data streaming	Yes	Yes	Standard	Standard
CONTROL STORAGE				
Storage type	Static NMOS	Static NMOS	Bipolar RAM	Bipolar RAM
Access time, nanoseconds	45	—	18	18
Word size, bits	32	—	72	72
Minimum number of words	4K	—	16K	16K
Maximum number of words	16K	—	16K	16K
Control storage usage	Instruction microcode, operating system assist	Instruction microcode, operating system assist	Variable	Variable
PRICING & AVAILABILITY				
Purchase of CPU with min. memory	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Lease terms offered				
Vendor's	No	No	No	No
Third party	Yes	Yes	Yes	Yes
Lease of CPU with min. memory (1 yr.)	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Vendor offered maintenance				
Prime time	Yes	Yes	Yes	Yes
24 hour	Yes	Yes	Yes	Yes
Other plans	Yes	Yes	Yes	Yes

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	Global-USI 50-3	Global-USI 50-5	IPL Systems, Inc. 4460	IPL Systems, Inc. 4480
SYSTEM PARAMETERS				
Date of introduction	—	—	October 1982	February 1983
Date of first delivery	—	—	2nd Quarter 1983	3rd Quarter 1983
Number installed to date	—	—	—	—
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, SSX/VSE	MVS/SP, SSX/VSE
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	No
Multiprocessor	No	No	No	Yes
Minimum in complex	Does not apply	Does not apply	Does not apply	2
Maximum in complex	Does not apply	Does not apply	Does not apply	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	Optional	Optional	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	Standard	Standard	No	No
Remote data link	Standard	Standard	Standard	Standard
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	Standard	Standard	Standard	Standard
OTHER FEATURES & COMMENTS				
			High-speed multiply/divide option is available.	IBM-compatible, fault tolerant computing complex consisting of 2 independent processing units sharing partitioned dual-ported main storage; high-speed multiply/divide option is available.

All About Plug-Compatible Mainframes

MODEL	Global-USI 50-3	Global-USI 50-5	IPL Systems, Inc. 4460	IPL Systems, Inc. 4480
PROCESSOR PERFORMANCE				
Machine cycle time, nanoseconds	50	43	50	50
Relative performance*				
To	IBM 4381-2	IBM 4381-2	IBM 4341-12	IBM 4381-2
Performance of	>1.0	>1.0	1.00	1.00
To	—	—	IBM 4361-5	IPL 4460
Performance of	—	—	1.20	1.70
Field upgradable to	50-5	—	IPL 4480	—
MAIN STORAGE				
Storage type	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS
Checking				
Parity	Yes	Yes	Yes	Yes
Error detection & correction	Yes	Yes	Yes	Yes
No. of check bits per byte	1	—	1	1
No. of check bits per word	—	—	4	4
Read cycle, nanoseconds	350	301	400	400
Write cycle, nanoseconds	350	301	500	500
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	8M	8M	4M	8M
Maximum capacity, bytes	16M	16M	16M	16M
Increment size, bytes	8M or 12M	8M or 12M	4M	4M
Interleaving	Yes	Yes	No	No
Minimum number of ways	2	2	Does not apply	Does not apply
Maximum number of ways	2	2	Does not apply	Does not apply
BUFFER (CACHE) STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM
Cycle time, nanoseconds	50	43	100	100
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	64K	64K	16K	2 x 24K
Maximum capacity, bytes	64K	64K	24K	2 x 24K
I/O CHANNELS				
Block multiplexers standard	4	4	5	8
Block multiplexers optional	2 to 6	2 to 6	—	—
Byte multiplexers standard	1	1	1	2
Byte multiplexers optional	1	1	—	—
Subchannels per channel				
On a block multiplexer	256	256	256	256
On a byte multiplexer	256	256	256	256
Channel to channel adapter	Optional	Optional	Yes	Yes
Maximum channel data rates				
Block multiplexer, bytes/sec.	3M	3M	3M	3M
Byte multiplexer, bytes/sec.	100K	100K	180K	180K
Aggregate data rate, bytes/sec.	16M	22M	12M	20M
Data streaming	Standard	Standard	Yes	Yes
CONTROL STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM
Access time, nanoseconds	18	18	20	20
Word size, bits	72	72	36	36
Minimum number of words	16K	16K	16K	2 x 16K
Maximum number of words	16K	16K	32K	2 x 32K
Control storage usage	Variable	Variable	Instruction microcode, operating system assist	Instruction microcode, operating system assist
PRICING & AVAILABILITY				
Purchase of CPU with min. memory	Contact vendor	Contact vendor	\$190,800	\$433,000
Lease terms offered				
Vendor's	No	No	No	No
Third party	Yes	Yes	No	No
Lease of CPU with min. memory (1 yr.)	Contact vendor	Contact vendor	None	None
Vendor offered maintenance				
Prime time	Yes	Yes	\$964/mo.	\$1,084/mo.
24 hour	Yes	Yes	Yes	Yes
Other plans	Yes	Yes	—	—

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	National Advanced Systems AS/6620	National Advanced Systems AS/6630	National Advanced Systems AS/6650	National Advanced Systems AS/6660
SYSTEM PARAMETERS				
Date of introduction	January 1983	October 1982	October 1982	September 1984
Date of first delivery	July 1983	October 1983	November 1982	December 1984
Number installed to date	Information not available	Information not available	Information not available	Information not available
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	ACP	ACP	—
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Multiprocessor	No	No	No	No
Minimum in complex	Does not apply	Does not apply	Does not apply	Does not apply
Maximum in complex	Does not apply	Does not apply	Does not apply	Does not apply
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	Optional	Optional	Optional	Optional
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	Supports a maximum of 8 I/O channels.	Supports a maximum of 8 I/O channels.	Supports a maximum of 12 I/O channels.	Supports a maximum of 12 I/O channels.

All About Plug-Compatible Mainframes

MODEL	National Advanced Systems AS/6620	National Advanced Systems AS/6630	National Advanced Systems AS/6650	National Advanced Systems AS/6660
PROCESSOR PERFORMANCE				
Machine cycle time, nanoseconds	60	60	50	43
Relative performance*				
To	IBM 4341-12	IBM 4381-1	IBM 4381-2	IBM 4381-2
Performance of	> 1.0	> 1.0	> 1.0	> 1.0
To	—	—	—	—
Performance of	—	—	—	—
Field upgradable to	AS/6630	AS/6650, AS/6660	AS/6660	Does not apply
MAIN STORAGE				
Storage type	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS
Checking				
Parity	Yes	Yes	Yes	Yes
Error detection & correction	Yes	Yes	Yes	Yes
No. of check bits per byte	1	1	1	—
No. of check bits per word	—	—	—	—
Read cycle, nanoseconds	420	420	350	301
Write cycle, nanoseconds	420	420	350	301
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	8M	8M	8M	8M
Maximum capacity, bytes	16M	16M	16M	16M
Increment size, bytes	4M or 8M	4M or 8M	4M or 8M	4M or 8M
Interleaving	Yes	Yes	Yes	Yes
Minimum number of ways	2	2	2	2
Maximum number of ways	2	2	2	2
BUFFER (CACHE) STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM
Cycle time, nanoseconds	60	60	50	43
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	64K	64K	64K	64K
Maximum capacity, bytes	64K	64K	64K	64K
I/O CHANNELS				
Block multiplexers standard	4	4	4	4
Block multiplexers optional	2	2	2 to 6	2 to 6
Byte multiplexers standard	1	1	1	1
Byte multiplexers optional	1	1	1	1
Subchannels per channel				
On a block multiplexer	256	256	256	256
On a byte multiplexer	256	256	256	256
Channel to channel adapter	Optional	Optional	Optional	Optional
Maximum channel data rates				
Block multiplexer, bytes/sec.	3M	3M	3M	3M
Byte multiplexer, bytes/sec.	80K	80K	100K	100K
Aggregate data rate, bytes/sec.	13M	13M	16M	22M
Data streaming	Standard	Standard	Standard	Standard
CONTROL STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM
Access time, nanoseconds	18	18	18	18
Word size, bits	72	72	72	72
Minimum number of words	16K	16K	16K	16K
Maximum number of words	16K	16K	16K	16K
Control storage usage	Variable	Variable	Variable	Variable
PRICING & AVAILABILITY				
Purchase of CPU with min. memory	\$255,000	\$341,500	\$417,500	\$475,000
Lease terms offered				
Vendor's	2, 3, 4, or 5 years	2, 3, 4, or 5 years	2, 3, 4, or 5 years	2, 3, 4, or 5 years
Third party	—	—	—	—
Lease of CPU with min. memory (1 yr.)	\$9,545/mo. (2-yr.)	\$11,785/mo. (2-yr.)	\$15,265/mo. (2-yr.)	\$17,435/mo. (2-yr.)
Vendor offered maintenance				
Prime time	Not available	Not available	Not available	Not available
24 hour	\$805/mo.	\$891/mo.	\$1,052/mo.	\$1,215/mo.
Other plans	—	—	—	—

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	National Advanced Systems AS/8023	National Advanced Systems AS/8043	National Advanced Systems AS/8053	National Advanced Systems AS/8063
SYSTEM PARAMETERS				
Date of introduction	April 1984	May 1983	May 1983	May 1983
Date of first delivery	July 1984	May 1983	May 1983	December 1983
Number installed to date	Information not available	Information not available	Information not available	Information not available
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	ACP	ACP	ACP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Multiprocessor	No	No	No	No
Minimum in complex	Does not apply	Does not apply	Does not apply	Does not apply
Maximum in complex	Does not apply	Does not apply	Does not apply	Does not apply
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	Optional	Optional	Optional	Optional
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	Supports a maximum of 24 I/O channels.	Supports a maximum of 24 I/O channels.	Supports a maximum of 24 I/O channels.	Supports a maximum of 24 I/O channels.

All About Plug-Compatible Mainframes

MODEL	National Advanced Systems AS/6620	National Advanced Systems AS/6630	National Advanced Systems AS/6650	National Advanced Systems AS/6660
PROCESSOR PERFORMANCE				
Machine cycle time, nanoseconds	60	60	50	43
Relative performance*				
To	IBM 4341-12	IBM 4381-1	IBM 4381-2	IBM 4381-2
Performance of	>1.0	>1.0	>1.0	>1.0
To	—	—	—	—
Performance of	—	—	—	—
Field upgradable to	AS/6630	AS/6650, AS/6660	AS/6660	Does not apply
MAIN STORAGE				
Storage type	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS
Checking				
Parity	Yes	Yes	Yes	Yes
Error detection & correction	Yes	Yes	Yes	Yes
No. of check bits per byte	1	1	1	—
No. of check bits per word	—	—	—	—
Read cycle, nanoseconds	420	420	350	301
Write cycle, nanoseconds	420	420	350	301
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	8M	8M	8M	8M
Maximum capacity, bytes	16M	16M	16M	16M
Increment size, bytes	4M or 8M	4M or 8M	4M or 8M	4M or 8M
Interleaving	Yes	Yes	Yes	Yes
Minimum number of ways	2	2	2	2
Maximum number of ways	2	2	2	2
BUFFER (CACHE) STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM
Cycle time, nanoseconds	60	60	50	43
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	64K	64K	64K	64K
Maximum capacity, bytes	64K	64K	64K	64K
I/O CHANNELS				
Block multiplexers standard	4	4	4	4
Block multiplexers optional	2	2	2 to 6	2 to 6
Byte multiplexers standard	1	1	1	1
Byte multiplexers optional	1	1	1	1
Subchannels per channel				
On a block multiplexer	256	256	256	256
On a byte multiplexer	256	256	256	256
Channel to channel adapter	Optional	Optional	Optional	Optional
Maximum channel data rates				
Block multiplexer, bytes/sec.	3M	3M	3M	3M
Byte multiplexer, bytes/sec.	80K	80K	100K	100K
Aggregate data rate, bytes/sec.	13M	13M	16M	22M
Data streaming	Standard	Standard	Standard	Standard
CONTROL STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM
Access time, nanoseconds	18	18	18	18
Word size, bits	72	72	72	72
Minimum number of words	16K	16K	16K	16K
Maximum number of words	16K	16K	16K	16K
Control storage usage	Variable	Variable	Variable	Variable
PRICING & AVAILABILITY				
Purchase of CPU with min. memory	\$255,000	\$341,500	\$417,500	\$475,000
Lease terms offered				
Vendor's	2, 3, 4, or 5 years	2, 3, 4, or 5 years	2, 3, 4, or 5 years	2, 3, 4, or 5 years
Third party	—	—	—	—
Lease of CPU with min. memory (1 yr.)	\$9,545/mo. (2-yr.)	\$11,785/mo. (2-yr.)	\$15,265/mo. (2-yr.)	\$17,435/mo. (2-yr.)
Vendor offered maintenance				
Prime time	Not available	Not available	Not available	Not available
24 hour	\$805/mo.	\$891/mo.	\$1,052/mo.	\$1,215/mo.
Other plans	—	—	—	—

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	National Advanced Systems AS/8023	National Advanced Systems AS/8043	National Advanced Systems AS/8053	National Advanced Systems AS/8063
SYSTEM PARAMETERS				
Date of introduction	April 1984	May 1983	May 1983	May 1983
Date of first delivery	July 1984	May 1983	May 1983	December 1983
Number installed to date	Information not available	Information not available	Information not available	Information not available
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	ACP	ACP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	Yes	Yes	Yes	Yes
Multiprocessor	No	No	No	No
Minimum in complex	Does not apply	Does not apply	Does not apply	Does not apply
Maximum in complex	Does not apply	Does not apply	Does not apply	Does not apply
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	Optional	Optional	Optional	Optional
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				
	Supports a maximum of 24 I/O channels.	Supports a maximum of 24 I/O channels.	Supports a maximum of 24 I/O channels.	Supports a maximum of 24 I/O channels.

All About Plug-Compatible Mainframes

MODEL	National Advanced Systems AS/8023	National Advanced Systems AS/8043	National Advanced Systems AS/8053	National Advanced Systems AS/8063
PROCESSOR PERFORMANCE				
Machine cycle time, nanoseconds	40	40	40	35
Relative performance*				
To	IBM 4381-2	IBM 3083EX	IBM 3083BX	IBM 3083JX
Performance of	—	1.2	1.0	1.0
To	—	—	—	—
Performance of	—	—	—	—
Field upgradable to	AS/8043	AS/8053	AS/8063	AS/8083
MAIN STORAGE				
Storage type	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS
Checking				
Parity	Yes	Yes	Yes	Yes
Error detection & correction	Yes	Yes	Yes	Yes
No. of check bits per byte	1	1	1	1
No. of check bits per word	—	—	—	—
Read cycle, nanoseconds	360	360	360	315
Write cycle, nanoseconds	360	360	360	315
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	16M	16M	16M	16M
Maximum capacity, bytes	64M	64M	64M	64M
Increment size, bytes	16M	16M	16M	16M
Interleaving	Yes	Yes	Yes	Yes
Minimum number of ways	4	4	4	4
Maximum number of ways	4	4	4	4
BUFFER (CACHE) STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM
Cycle time, nanoseconds	40	40	40	35
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	32K	32K	64K	64K
Maximum capacity, bytes	32K	32K	64K	64K
I/O CHANNELS				
Block multiplexers standard	6	6	6	6
Block multiplexers optional	Up to 18	Up to 18	Up to 18	Up to 18
Byte multiplexers standard	0	0	0	0
Byte multiplexers optional	Up to 6	Up to 6	Up to 6	Up to 6
Subchannels per channel				
On a block multiplexer	256	256	256	256
On a byte multiplexer	256	256	256	256
Channel to channel adapter	Optional	Optional	Optional	Optional
Maximum channel data rates				
Block multiplexer, bytes/sec.	3M	3M	3M	3M
Byte multiplexer, bytes/sec.	100K	100K	100K	100K
Aggregate data rate, bytes/sec.	18.7M to 51.3M	18.7M to 51.3M	18.7M to 51.3M	20M to 55M
Data streaming	Standard	Standard	Standard	Standard
CONTROL STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM
Access time, nanoseconds	7	7	7	7
Word size, bits	126	126	126	126
Minimum number of words	16K	16K	16K	16K
Maximum number of words	16K	16K	16K	16K
Control storage usage	Variable	Variable	Variable	Variable
PRICING & AVAILABILITY				
Purchase of CPU with min. memory	\$730,500	\$1,092,000	\$1,492,000	\$1,880,000
Lease terms offered				
Vendor's	2, 3, 4, or 5 years	2, 3, 4, or 5 years	2, 3, 4, or 5 years	2, 3, 4, or 5 yea
Third party	—	—	—	—
Lease of CPU with min. memory (1 yr.)	\$20,260/mo. (2-yr.)	\$25,845/mo. (2-yr.)	\$42,770/mo. (2-yr.)	\$54,305/mo. (2
Vendor offered maintenance				
Prime time	Not available	Not available	Not available	Not available
24 hour	\$3,382/mo.	\$4,594/mo.	\$4,740/mo.	\$5,504/mo.
Other plans	—	—	—	—

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	National Advanced Systems AS/8083	National Advanced Systems AS/9040	National Advanced Systems AS/9050	National Advanced Systems AS/9060
SYSTEM PARAMETERS				
Date of introduction	April 1984	September 1982	September 1982	May 1982
Date of first delivery	1st Quarter 1985	November 1982	September 1982	August 1982
Number installed to date	Information not available	Information not available	Information not available	Information not available
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	ACP	ACP
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	No	Yes	Yes	Yes
Multiprocessor	Yes	No	No	No
Minimum in complex	2	Does not apply	Does not apply	Does not apply
Maximum in complex	2	Does not apply	Does not apply	Does not apply
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	Optional	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				
	Supports a maximum of 32 I/O channels.	Supports a maximum of 24 I/O channels; can be upgraded to an AS/9140 Vector Processor.	Supports a maximum of 24 I/O channels; can be upgraded to an AS/9150 Vector Processor.	Supports a maximum of 24 I/O channels; can be upgraded to an AS/9160 Vector Processor.

All About Plug-Compatible Mainframes

MODEL	National Advanced Systems AS/8083	National Advanced Systems AS/9040	National Advanced Systems AS/9050	National Advanced Systems AS/9060
PROCESSOR PERFORMANCE				
Machine cycle time, nanoseconds	35	38	38	30
Relative performance*				
To	IBM 3081KX	IBM 3083BX	IBM 3083JX	IBM 3081GX
Performance of	—	> 1.0	> 1.0	> 1.0
To	—	—	—	—
Performance of	—	—	—	—
Field upgradable to	Does not apply	AS/9050 or AS/9140	AS/9060, AS/9070, or AS/9150	AS/9080 or AS/9160
MAIN STORAGE				
Storage type	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS	Dynamic NMOS
Checking				
Parity	Yes	Yes	Yes	Yes
Error detection & correction	Yes	Yes	Yes	Yes
No. of check bits per byte	1	1	1	1
No. of check bits per word	—	—	—	—
Read cycle, nanoseconds	315	342	342	270
Write cycle, nanoseconds	315	342	342	270
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	32M	8M	8M	16M
Maximum capacity, bytes	128M	64M	64M	64M
Increment size, bytes	16M or 32M	8M	8M	8M
Interleaving	Yes	Yes	Yes	Yes
Minimum number of ways	8	8	8	8
Maximum number of ways	8	8	8	8
BUFFER (CACHE) STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM
Cycle time, nanoseconds	35	19	19	15
Bytes fetched per cycle	8	8	8	8
Minimum capacity, bytes	2 x 64K	64K	64K	256K
Maximum capacity, bytes	2 x 64K	64K	64K	256K
I/O CHANNELS				
Block multiplexers standard	12	6	6	12
Block multiplexers optional	Up to 20	Up to 17	Up to 17	Up to 11
Byte multiplexers standard	0	1	1	1
Byte multiplexers optional	Up to 8	Up to 5	Up to 5	Up to 5
Subchannels per channel				
On a block multiplexer	256	256	256	256
On a byte multiplexer	256	256	256	256
Channel to channel adapter	Optional	Optional	Optional	Optional
Maximum channel data rates				
Block multiplexer, bytes/sec.	3M	3M	3M	3M
Byte multiplexer, bytes/sec.	100K	100K	100K	100K
Aggregate data rate, bytes/sec.	20M to 80M	60M	60M	72M
Data streaming	Standard	Standard	Standard	Standard
CONTROL STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	Bipolar RAM	Bipolar RAM
Access time, nanoseconds	7	7	7	7
Word size, bits	126	160	160	160
Minimum number of words	2 x 16K	16K	16K	16K
Maximum number of words	2 x 16K	16K	16K	16K
Control storage usage	Variable	Variable	Variable	Variable
PRICING & AVAILABILITY				
Purchase of CPU with min. memory	\$2,871,000	\$1,402,000	\$1,794,000	\$2,156,000
Lease terms offered				
Vendor's	2, 3, 4, or 5 years	2, 3, 4, or 5 years	2, 3, 4, or 5 years	2, 3, 4, or 5 years
Third party	—	—	—	—
Lease of CPU with min. memory (1 yr.)	\$86,440/mo. (2-yr.)	\$48,330/mo. (2-yr.)	\$58,110/mo. (2-yr.)	\$73,475/mo. (2-yr.)
Vendor offered maintenance				
Prime time	Not available	Not available	Not available	Not available
24 hour	\$7,378/mo.	\$4,288/mo.	\$5,052/mo.	\$5,865/mo.
Other plans	—	—	—	—

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	National Advanced Systems AS/9070	National Advanced Systems AS/9080	National Advanced Systems AS/XL 60	National Advanced Systems AS/XL 80
SYSTEM PARAMETERS				
Date of introduction	January 1982	May 1982	March 1985	March 1985
Date of first delivery	September 1983	December 1982	2nd Quarter 1986	2nd Quarter 1986
Number installed to date	Information not available	Information not available	Does not apply	Does not apply
Operating systems				
DOS/VS	Yes	Yes	No	No
DOS/VSE	Yes	Yes	No	No
OS/VS1	Yes	Yes	No	No
SVS	Yes	Yes	No	No
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	ACP	ACP/TPF	ACP/TPF
PROCESSING FEATURES				
Virtual storage capability	Standard	Standard	Standard	Standard
Processor arrangements				
Uniprocessor	No	No	Yes	No
Multiprocessor	Yes	Yes	No	Yes
Minimum in complex	2	2	Does not apply	2
Maximum in complex	2	2	Does not apply	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	—	—
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				
	Supports a maximum of 48 I/O channels; can be upgraded to an AS/9170 Vector Processor.	Supports a maximum of 48 I/O channels; can be upgraded to an AS/9180 Vector Processor.	Supports a maximum of 64 I/O channels.	Supports a maximum of 64 I/O channels.

All About Plug-Compatible Mainframes

MODEL	National Advanced Systems AS/9070	National Advanced Systems AS/9080	National Advanced Systems AS/XL 60	National Advanced Systems AS/XL 80
PROCESSOR PERFORMANCE				
Machine cycle time, nanoseconds	38	30	—	—
Relative performance*				
To	IBM 3081KX	IBM 3084QX	IBM 3090 Model 200	IBM 3090 Model 400
Performance of	> 1.0	1.4	1.0	1.0
To	—	—	NAS AS/9080	NAS AS/9080
Performance of	—	—	1.4	2.5
Field upgradable to	AS/9080 or AS/9170	AS/9180	AS/XL 80	Does not apply
MAIN STORAGE				
Storage type	Dynamic NMOS	Dynamic NMOS	CMOS	CMOS
Checking				
Parity	Yes	Yes	Yes	Yes
Error detection & correction	Yes	Yes	Yes	Yes
No. of check bits per byte	1	1	—	—
No. of check bits per word	—	—	—	—
Read cycle, nanoseconds	342	270	—	—
Write cycle, nanoseconds	342	270	—	—
Bytes fetched per cycle	8	8	—	—
Minimum capacity, bytes	16M	16M	64M	64M
Maximum capacity, bytes	64M	64M	256M	256M
Increment size, bytes	16M	16M	64M	64M
Interleaving	Yes	Yes	—	—
Minimum number of ways	16	16	—	—
Maximum number of ways	16	16	—	—
BUFFER (CACHE) STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	—	—
Cycle time, nanoseconds	19	15	—	—
Bytes fetched per cycle	8	8	—	—
Minimum capacity, bytes	2 x 64K	2 x 256K	256K	2 x 256K
Maximum capacity, bytes	2 x 64K	2 x 256K	256K	2 x 256K
I/O CHANNELS				
Block multiplexers standard	12	12	32	32
Block multiplexers optional	Up to 34	Up to 34	Up to 32	Up to 32
Byte multiplexers standard	2	2	0	0
Byte multiplexers optional	Up to 6	Up to 6	Up to 8	Up to 8
Subchannels per channel				
On a block multiplexer	256	256	256	256
On a byte multiplexer	256	256	—	—
Channel to channel adapter	Optional	Optional	Optional	Optional
Maximum channel data rates				
Block multiplexer, bytes/sec.	3M	3M	3M	3M
Byte multiplexer, bytes/sec.	100K	100K	—	—
Aggregate data rate, bytes/sec.	80M	96M	192M	192M
Data streaming	Standard	Standard	Standard	Standard
CONTROL STORAGE				
Storage type	Bipolar RAM	Bipolar RAM	—	—
Access time, nanoseconds	7	7	—	—
Word size, bits	160	160	—	—
Minimum number of words	2 x 16K	2 x 16K	—	—
Maximum number of words	2 x 16K	2 x 16K	—	—
Control storage usage	Variable	Variable	—	—
PRICING & AVAILABILITY				
Purchase of CPU with min. memory	\$3,041,000	\$3,878,000	\$4,840,000	\$8,470,000
Lease terms offered				
Vendor's	2, 3, 4, or 5 years	2, 3, 4, or 5 years	Not available	Not available
Third party	—	—	—	—
Lease of CPU with min. memory (1 yr.)	\$98,540/mo. (2-yr.)	\$105,910/mo. (2-yr.)	Does not apply	Does not apply
Vendor offered maintenance				
Prime time	Not available	Not available	Not available	Not available
24 hour	\$7,714/mo.	\$9,644/mo.	\$10,846/mo.	\$18,828/mo.
Other plans	—	—	—	—

*As rated by the PCM vendor.

All About Plug-Compatible Mainframes

MODEL	Nixdorf Computer Corporation 8890/32C	Nixdorf Computer Corporation 8890/52C	Nixdorf Computer Corporation 8890/72C
SYSTEM PARAMETERS			
Date of introduction	2nd Qtr. 1982 (U.S. only)	2nd Qtr. 1982 (U.S. only)	2nd Qtr. 1982 (U.S. only)
Date of first delivery	2nd Quarter 1983	3rd Quarter 1983	1st Quarter 1984
Number installed to date	Approximately 750 systems (all models) worldwide	Approximately 750 systems (all models) worldwide	Approximately 750 systems (all models) worldwide
Operating systems			
DOS/V5	Yes	Yes	Yes
DOS/V5E	Yes	Yes	Yes
OS/V51	Yes	Yes	Yes
SVS	Yes	Yes	Yes
MVS	Yes	Yes	Yes
MVS/XA	No	No	No
VM/370	Yes	Yes	Yes
VM/SP	Yes	Yes	Yes
Others	NIDOS/V5E, SSX/V5E, V5E/SP, VM/ESX	NIDOS/V5E, SSX/V5E, V5E/SP	NIDOS/V5E, SSX/V5E, V5E/SP, VM/ESX
PROCESSING FEATURES			
Virtual storage capability	Yes	Yes	Yes
Processor arrangements			
Uniprocessor	Yes	Yes	Yes
Multiprocessor	No	No	No
Minimum in complex	Does not apply	Does not apply	Does not apply
Maximum in complex	Does not apply	Does not apply	Does not apply
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	Standard	Standard	Standard
System/370 Universal Instruction set	Standard	Standard	Standard
Console audible alarm	Standard	Standard	Standard
Integrated console printer	Optional	Optional	Optional
Light pen	—	—	—
Remote console	Standard	Standard	Standard
Remote data link	Standard	Standard	Standard
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			
	Integrated peripheral adapters for disk, tape, communications terminals, printers, card readers, and diskettes.	Integrated peripheral adapters for disk, tape, communications terminals, printers, card readers, and diskettes.	Integrated peripheral adapters for disk, tape, communications terminals, printers, card readers, and diskettes.

All About Plug-Compatible Mainframes

MODEL	Nixdorf Computer Corporation 8890/32C	Nixdorf Computer Corporation 8890/52C	Nixdorf Computer Corporation 8890/72C
PROCESSOR PERFORMANCE			
Machine cycle time, nanoseconds	200	200	200
Relative performance*			
To	IBM 4331-1	IBM 4361-3	IBM 4361-4
Performance of	—	—	—
To	—	—	—
Performance of	—	—	—
Field upgradable to	8890/52C or 72C	8890/72C	—
MAIN STORAGE			
Storage type	MOS	MOS	MOS
Checking			
Parity	Yes	Yes	Yes
Error detection & correction	Yes	Yes	Yes
No. of check bits per byte	1	1	1
No. of check bits per word	4	4	4
Read cycle, nanoseconds	870	870	870
Write cycle, nanoseconds	870	870	870
Bytes fetched per cycle	8	8	8
Minimum capacity, bytes	1M	2M	4M
Maximum capacity, bytes	4M	6M	8M
Increment size, bytes	1M	1M	2M
Interleaving	Yes	Yes	Yes
Minimum number of ways	2	2	2
Maximum number of ways	2	2	2
BUFFER (CACHE) STORAGE			
Storage type	—	—	MOS
Cycle time, nanoseconds	—	—	50
Bytes fetched per cycle	—	—	8
Minimum capacity, bytes	—	—	64K
Maximum capacity, bytes	—	—	64K
I/O CHANNELS			
Block multiplexers standard	2	2	2
Block multiplexers optional	5 or 6	6 or 7	6 or 7
Byte multiplexers standard	1	1	1
Byte multiplexers optional	1 or 2	1 or 2	1 or 2
Subchannels per channel			
On a block multiplexer	256	256	256
On a byte multiplexer	32	32	32
Channel to channel adapter	Yes	Yes	Yes
Maximum channel data rates			
Block multiplexer, bytes/sec.	2.2M	2.2M	2.2M
Byte multiplexer, bytes/sec.	140K	140K	140K
Aggregate data rate, bytes/sec.	5M	5M	5M
Data streaming	—	Yes	Yes
CONTROL STORAGE			
Storage type	Multiple	Multiple	Multiple
Access time, nanoseconds	Multiple	Multiple	Multiple
Word size, bits	Multiple	Multiple	Multiple
Minimum number of words	Multiple	Multiple	Multiple
Maximum number of words	Multiple	Multiple	Multiple
Control storage usage	Multiple	Multiple	Multiple
PRICING & AVAILABILITY			
Purchase of CPU with min. memory	\$75,000-\$150,000 Avg. Sys.	\$100,000-175,000 Avg. Sys.	\$150,000-200,000 Avg. Sys.
Lease terms offered			
Vendor's	Contact vendor	Contact vendor	Contact vendor
Third party	Contact vendor	Contact vendor	Contact vendor
Lease of CPU with min. memory (1 yr.)	—	—	—
Vendor offered maintenance			
Prime time	Contact vendor	Contact vendor	Contact vendor
24 hour	Contact vendor	Contact vendor	Contact vendor
Other plans	Contact vendor	Contact vendor	Contact vendor

*As rated by the PCM vendor.