NCR Criterion Series

New Product Announcement

I-8430: In September 1977, NCR added the largest interactive system to date to the 8000 Series computer family, bringing the product line to 11 models.

The I-8430 is based on the same 112-nanosecond microprogrammed processing unit that is the basis for the N-8450 and V-8450 systems that NCR announced in April 1977. The new computer is intended to provide a growth path from the I-8230 and I-8250 interactive systems into the larger 8000 Series models, and it supports all programming developed for the I-8200 systems after recompiling.

An important feature of the I-8430 is a minicomputer-type virtual memory system that provides many large-scale computer capabilities at minicomputer-level pricing. The system is supported by NCR-developed interactive COBOL programs in six major application areas: wholesale/distribution, manufacturing, transportation, health care, government, and education.

The latest 8000 Series member is very similar to the earlier N-8450 system and offers several significant enhancements over the smaller I-8200 systems, particularly in main memory capacity and mass storage capacity.

The basic I-8430 system includes the CPU, 128K bytes of 475-nanosecond MOS memory, and one 50KBS low-speed I/O trunk that is capable of attaching up to eight peripherals. Memory is expandable in 64K-byte increments to 384K bytes, and the I/O subsystem can be expanded through the addition of two I/O trunks—one low-speed and one very high-speed trunk or two very high-speed trunks. The maximum date transfer rate of the very high-speed trunk is 1,018 kilobytes per second.

Like the 8450 systems, the I-8430 features an integrated disk controller and an integrated data communications controller, but with slightly differing specifications. The I-8430 disk controller supports up to four of the new 67-megabyte 6590-0102 disk drives, while the 8450 disk controller can handle either 67-megabyte 6590-type drives or the 200-megabyte 658-type drives. The I-8430 system can also utilize the 9.96-megabyte 656-type disk drives through the optional very high-speed trunks. The I-8430 integrated communications subsystem supports up to thirteen 9600-bps CRT terminals, whereas the 8450 version supports up to 20 terminals. Both models are expandable in 5-line groups.

The I-8430 is a virtual-memory machine designed to serve up to 13 users executing independent interactive programs. In addition, each user terminal can initiate one non-interactive background task that executes concurrently with the foreground task.

The I-8430 also features a new operating system, the Interactive Resource Executive (IRX), and microcode enhancements that aid both the IRX operating system and the COBOL 74 compiler. NCR says that IRX, in conjunction with the microcode accelerators, provides the capability for direct processing through the CPU and permits the instantaneous updating of all active files.

A typical I-8430 system with 256K bytes of memory, a 67-megabyte 6590 disk subsystem, a 300-lpm 6420 line printer, and 10 CRT keyboard/display terminals is priced at $3,900 per month or $196,000 on purchase. Initial deliveries are scheduled for the second quarter of 1978.

6590-0201 DUAL DATA MODULE DRIVE: NCR also released a new high-performance dual disk drive for use with all members of the NCR 8400 and 8500 computer series.

The 6590-0102 disk drive is a new version of the unit originally released for use with the NCR Criterion Series. It is a dual-spindle unit that employs the removable "Winchester"-technology data modules used in the IBM 3340 disk units. The 6590-0102 stores 33.4 megabytes per spindle and 67 megabytes per dual-spindle unit. Average head positioning time is 10.1 milliseconds, and average rotational delay is 25 milliseconds. The data transfer rate of the sealed-head unit is 885,000 bytes per second.

MODEL 721 COMMUNICATIONS PROCESSOR: The minicomputer-based Model 721 Communications Processor is not really a new product but rather a product that is being officially introduced after more than two years of successful operation in several networks. The 721 is the successor to the NCR 621 Communications Processor and has been used in NCR's huge Sumitomo Bank network and also in the Montgomery Ward communications network.

The Model 721 Communications Processor can function either as a local front-end processor or as a remote communications processor. As a remote processor, it can be used as a message

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switching system or as a concentrator for large numbers of terminals. Its modular structure permits it to conform with NCR's recently announced Distributed Network Architecture (NCR/DNA).

The Model 721 is based on the NCR 605 minicomputer that also serves as the basis for several NCR computer systems. Memory capacity ranges from 32K to 128K bytes. The processor can control up to 253 communications lines which can be any mixture of asynchronous, bisynchronous, or SDLC in half- or full-duplex mode. Data transmission rates can range from 40 to 9600 bits per second for asynchronous lines and up to 56K bps for synchronous lines. The aggregate data rate for the system is 560K bytes per second, but practical line configurations and mixes will normally limit the system throughput rate to between 40K and 50K bytes per second.

The Model 721 employs a two-level cyclic scanning technique that scans groups of lines first, and scans individual lines only if there is one line in a group that requires service. This method permits greater system throughput without the expense of special dynamic configuration algorithms. System configuration and reconfiguration are accomplished only by operator action.

All lines are controlled by three types of single-line adapters: asynchronous, bisynchronous, and SDLC. Each type buffers messages directly into the processor memory and interrupts only when a complete message has been received. The adapters also perform line functions such as transparency mode, control character detection and insertion, and check sum calculation and checking.

Software for the Model 721 is the Data Communications Utility (DCU) package, a modularized, parameter-driven communications utility that makes all terminal characteristics transparent to the user or to the applications program. The DCU permits users to access terminals with the same ease that a file manager permits in accessing file records from a disk drive. The DCU code is sharable, and only those modules required by the system are included in the software package. All modules are unbundled and priced separately.

Pricing for the Model 721 Communications Processor and its associated options was not available at the time of this writing.

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Monthly Rental
PROCESSOR AND MEMORY				
5630-0303	I-8430 System: includes CPU with 128K bytes of memory, one low-speed trunk, console display and keyboard, and console stand	$71,500	$400	$2,050
5630-P320	64K bytes of memory; max. 384K bytes	9,500	32	300
I/O CONTROL AND OPTIONS				
5630-P340	Additional Low-Speed Trunk; max. 3 trunks per system	4,150	10	100
5630-P341	Very High-Speed Trunk; max. 3 trunks per system	9,300	22	225
5630-P349	Integrated Disk Control Module for 6590-0201 dual drive; requires 5630-P346 attachment; four spindles max.	8,700	80	300
5630-P346	6590 Disk Drive Attachment for 5630-P349 control module	1,500	—	40
5630-P347	8-Spindle Expansion for 5630-P349 control module	6,000	30	160
6590-0201	Dual Disk Drive; 67 megabytes; requires 5630-P349 control module	23,500	85	900
6590-P001	Drive String Attachment for multiple-drive configurations	1,125	8	40
6590-P003	Rotational Position Sensing for 6590-0201 drive	700	4	20
6591-0301	Data Module for 6590-0201; two required	1,500	—	70
5630-P600	Card Reader Interface	1,125	5	30
6831-021	Card Reader, 600 cpm; requires 5630-P600 interface	11,500	60	275
COMMUNICATIONS				
5630-P954	Communications Line Controller/Multiple Line Adapter Combination; 5 lines; max. of 3	6,000	70	200

SOFTWARE PRICES

		Monthly License
8210-2000	IRX III for 8400 systems	$125
8210-2001	IRX III Utilities	35
8210-2002	COBOL 74 Compiler for 8400 systems	90

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On April 28, 1977, NCR introduced eight new members of its Criterion 8000 Series of computers and revealed a more complete picture of the computer family that will totally replace the Century line. The 8000 Series was first introduced in April 1976 with the unveiling of the 8550 and 8570 models that replaced the Century 200 through 300 systems. These initial representatives showed only one-third of the scope of the entire 8000 Series, and the rest of the picture was made clear with the introduction of the new models.

The new systems, designated the N-8350, N-8450, V-8450, V-8550, N-8560, V-8560, N-8570, and V-8570, actually represent versions of three new procesors and three variations of previously announced Criterion 8550 and 8570 systems.

The most significant aspect of the 10-member 8000 Series is the ability to have versions of each basic system that have been microprogrammed for best performance in three specific application areas: NCR Century Emulation, Interactive, or Virtual. The nature of each version is indicated by the prefix letter N, I, or V preceding the system number. Theoretically, each model can be microprogrammed into three different processing systems, although some versions are not considered useful and will not be offered. Hence, the three new processors are the 8350, 8450, and 8560; but by counting the N and V versions separately, the number expands to five systems; and by including the N and V versions of the existing 8550 and 8570 systems, the number of new products is eight.

The N systems operate as NCR Century systems, permitting users to migrate to more cost-effective hardware without losing their established software. The I systems are microprogrammed for optimized interactive operation where there is frequent interaction between the operator and the system. The V systems include microprogramming and additional hardware to support virtual memory operations.

Currently, the only I (interactive) system available is the I-8250, the successor to the NCR 8200 system. Interactive systems will be among the last members of the series to be released, although one is scheduled for release in a few months.

All models can support between four and six I/O trunks. NCR offers three types of trunks: low-speed, medium-speed, and very high-speed. Each can connect up to eight peripherals. Models 8350 and 8450 can support only low-speed and very high-speed trunks, while the remaining systems can support all types in any mixture. The data transmission rate of each type of trunk depends on the processor, as summarized below:

Model	Low Speed	Medium Speed	Very High Speed	Maximum Trunks
8350	120 KBS	None	416 KBS	4
8450	50 KBS	None	1,018 KBS	4
8550	50 KBS	225 KBS	1,018 KBS	4
8560	75 KBS	225 KBS	1,060 KBS	5
8570	100 KBS	315 KBS	1,150 KBS	6

For medium and very high-speed trunks, the data transmission rates are additive; but for low-speed trunks, the figure given is the maximum rate.

Models 8450 and above employ the same integrated disk controller used in the 8550 and 8570; it can be connected to either 6590 Data Module Drives or 658 Disk Pack Drives. These same models also feature an integrated communications subsystem that can support up to 20 low-speed lines or 4 high-speed lines. Each high-speed line reduces the number of low-speed lines by 5. The 8350's integrated communications system can support a maximum of 10 low-speed lines, but can be expanded to 253 lines through a separate free-standing communications controller.

A card reader is required for all models, but Models 8550 and above can substitute a paper tape reader for the card reader.

The 8350 system is quite different internally from the other higher-numbered models. It is built around the same CPU that is used in the Century 101 and replaces the Century 50, 75, and 100 models. It is intended to provide a growth path for users of these older, discontinued systems and also to serve as the entry-level system for the Criterion line. The 8350 does not have the performance capabilities of the new 8000's. It uses core memory and has a capacity ranging from 32K to 128K ▷

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▷ bytes. Processor cycle time is 1.2 microseconds. A typical N-8350 configuration has 32K bytes of core memory, a cassette tape unit, 150-lpm line printer, and a 10-megabyte disk subsystem. This system is priced at $2,210 per month or can be purchased for $69,650. Operating software for the 8350 is NCR's standard B1 or B2 operating system.

The 8450 is a 112-nanosecond microprogrammed unit available in the N or V version. The N-8450 requires a minimum of 128K bytes of 475-nanosecond MOS memory, while the V-8450 requires at least 384K bytes. Aside from that, control storage capacity is the major difference between two systems: 42K bytes for the N-8450 and 48K bytes for the V-8450. The V-8450 is the smallest virtual memory system that will be offered. Both models include one low-speed and one very high-speed trunk, each capable of attaching up to eight peripherals.

The 8550 systems also use a 112-nanosecond CPU and start with 256K bytes of 475-nanosecond MOS memory (384K minimum for virtual systems). They include either 8K bytes (N) or 24K bytes (V) of control storage. Like the 8450, the 8550 basic system includes one low-speed and one very high-speed trunk; but unlike the smaller system the 8550 can also employ medium-speed trunks.

The 8560 systems are built around an 84-nanosecond processor with 10K bytes of control storage for the N-8560 and 24K bytes of control storage for the V-8560. Minimum memory for the N-8560 is 192K bytes, while the V-8560 starts at 384 bytes. Both systems have one low-speed, one medium-speed, and one very high-speed trunk in the basic system.

The 8570 systems now represent the top of the 8000 Series, although NCR officials have indicated that larger systems will follow. Based on a 56-nanosecond processor, the N-8570 and the V-8570 include 256K bytes and 384K bytes, respectively, of 475-nanosecond MOS memory and one each of the low-speed, medium-speed, and very high-speed trunks. The 8570 integrated disk controller, however, can support three 8-drive strings in either single- or dual-controller configurations.

Operating software for the various models includes the VRX virtual memory operating system for the V-8560 and V-8570 systems, and the scaled-down VS1 and VS3 virtual memory operating systems for the V-8550 and 8450, respectively. For the N (NCR Century emulation) models, the operating systems include RS3 for the 8450 and RS1 for the 8550, 8560, and 8570. □

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
N-8350 SYSTEMS				
N-8351	System; with 32K bytes of core memory, I/O trunks 0 and 7, CRT display/keyboard with single cassette drive, 150-lpm line printer, and 9.8-megabyte disk subsystem	$69,650	439	2,210
N-8352	System; with 32K bytes of core memory, I/O trunks 0 and 7, CRT display/keyboard with single cassette drive, 125-lpm line printer, and 9.8-megabyte disk subsystem	61,000	391	—
Note: The N-8352 system is available for purchase only; peripherals added to the N-3852 system must also be purchased.				
N-8359	System; similar to N-8351 with synchronous communications subsystem including two single-line adapters	81,775	506	2,665
5177-P101	Second Cassette Drive for N-8351, N-8352, and N-8359 console	1,340	11	55
5177-P102	Memory Expansion; 32K to 64K bytes; for N-8351, N-8352, and N-8359	6,000	14	230
649-P300	Substitute 300-lpm line printer for 150-lpm unit	8,000	—	520
N-8353	System; with 64K bytes of core memory, I/O trunks 0 and 7, CRT display/keyboard with dual cassette drives, 300 lpm line printer, and 19.6-megabyte disk subsystem	98,790	565	3,495
5177-P111	I/O Trunks 1 and 6 for N-8351, 8352, 8353, and 8359	4,500	11	125
0656-0832	9.8-Megabyte Disk Drive	12,950	101	480
N-8355	System; with 64K bytes of core memory and extended addressing logic; I/O trunks 0, 1, 6, and 7; CRT display/keyboard with dual cassette drives, 300-lpm line printer, serial thermal printer, and 60-megabyte disk subsystem	136,260	524	4,365
N-8356	System; similar to N-8355 with 600-lpm line printer	150,765	564	4,930
5177-P103	Memory Expansion; 64K to 94K bytes, for N-8355 and N-8356; requires 5177-0109 expansion cabinet	6,000	14	230
5177-0109	Memory Expansion Cabinet; required for systems greater than 64K bytes	800	—	30
0656-0831	60-Megabyte Disk Drive	24,980	119	840
N-8357	System; with 94K bytes of core memory and extended addressing logic; I/O trunks 0, 1, 6, and 7; CRT display/keyboard with dual cassette drives, 600-lpm line printer, memory expansion cabinet, serial thermal printer, and 96-megabyte disk subsystem	163,250	611	5,770
N-8358	System; similar to N-8357 with 1100-lpm train printer	168,850	819	6,190
0960-1XX	Print Train for 1100-lpm train printer	2,950	—	118

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OPTIONS AND PERIPHERALS				
5177-P110	Multiply-Divide Hardware	$4,500	11	125
5177-P112	Logic Command; adds logical operation instructions	2,350	—	60
5177-P113	Time of Day Clock	1,125	6	45
5177-P114	Software-Initiated Alarm	400	2	10
5177-P115	Remote Audible Alarm	800	1	20
0633-0837	Magnetic Tape Transport; 7-track, NRZI, 200/556/880 bpi, 10/28/40 KBS; requires controller	7,970	84	340
0633-0839	Magnetic Tape Transport; 9-track, NRZI, 800 bpi, 40 KBS; requires controller	8,900	84	375
0624-0839	Magnetic Tape Controller; 9-channel, NRZI	8,845	26	315
0624-0879	Magnetic Tape Controller; 7 or 9-track, NRZI, 200/556/800 bpi	9,000	26	320
0684-0101	Card Reader/Punch and Controller; 500/100-460 cpm	25,830	254	635
0260-0831	Read-Only Thermal Printer, 30 cps	2,495	15	90
0675-0101	MICR Reader/Sorter and Controller	58,000	425	1,350
CRITERION 8450 PROCESSOR AND MAIN MEMORY				
5630-0306	Processor for N-8450 System; with 128K-byte memory, low-speed trunk, 42K-byte instruction storage, console stand, console display and keyboard, and RS-3 operating system; max. four low or high-speed trunks	$88,950	$495	$2,425
5630-0304	Processor for V-8450 System; with 384K-byte memory, low-speed trunk, 48K-byte instruction storage, console stand, console display an keyboard, and VS-3 operating system; max. four low or high-speed trunks	140,300	733	4,025
Addition Main Memory:				
5630-P521	64K bytes; max of 8 (512K bytes)	9,500	32	300
5630-P527	128K bytes; max. of 4, (1024K bytes)	19,000	64	600
5600-P535	Memory Expansion; required for systems greater than 512K bytes; 1024K bytes max.	0	0	0
Required Additions:				
6831-0201	System Card Reader, 600 cpm	11,500	30	275
5630-P600	Card Reader Interface for 6831-0201	1,150	5	30
1001-A568	Table for 6831-0201 Card Reader	800	—	—
CRITERION 8550 PROCESSOR AND MAIN MEMORY				
5600-0301	Processor for N-8550 System; with 128K-byte memory, low-speed trunk, very high-speed trunk, 8K-byte instruction storage, card or paper tape interface, console display/keyboard and stand, console top, and RS-1 operating system; requires card reader or paper tape reader; max. four trunks	107,400	565	2,900
5600-0603	Processor for V-8550 System; with 384K-byte memory, low-speed trunk, very high-speed trunk, 24K-byte instruction storage, card or paper tape interface, console display/keyboard and stand, console top, and VS-1 operating system; requires card reader or paper tape reader; max. four trunks	156,500	843	4,700
Additional Main Memory:				
5600-P324	64K bytes; max. of 8 (512K bytes)	$9,500	32	300
5600-P326	128K bytes; for systems greater than 512K bytes; max of 4 (1024K bytes)	19,000	32	600
5600-P335	Memory Expansion; required for systems greater than 512K bytes; 1024K bytes max.	0	0	0
CRITERION 8560 PROCESSOR AND MAIN MEMORY				
5600-0502	Processor for N-8560 System; with 192K-byte memory, one low-speed trunk, one medium-speed trunk, one very high-speed trunk, 10K-byte instruction storage, card reader or paper tape interface, console display/keyboard and stand, console top, and RS-1 operating system; max. four trunks	195,200	787	5,030
5600-0702	Processor for V-8560 System; with 384K-byte memory, one low-speed trunk, one medium-speed trunk, one very high-speed trunk, 24-byte instruction storage, card reader or paper tape reader interface, console display/keyboard and stand, console top, and VRX operating system; max. five trunks	237,050	993	6,330
Additional Main Memory:				
5600-P521	64K bytes; max. of 8 (512K bytes)	9,500	32	300
5600-P526	128K bytes; max. of 4 (1024K bytes)	19,000	64	600
5600-P531	256K bytes; max. of 2 (1536K bytes)	38,000	128	1,200
5600-P335	Memory Expansion; required for systems greater than 512K bytes	0	0	0
5600-P536	Memory Expansion; required for systems greater than 1024K bytes; 1536K bytes max.	0	0	0
CRITERION 8570 PROCESSOR AND MAIN MEMORY				
5600-0902	Processor for N-8570 System; with 256K-byte two-way interleaved memory, one low-speed trunk, one medium-speed trunk, one very high-speed trunk, 24K-byte instruction storage, card reader or paper tape reader interface, console display/keyboard and stand, console top, and RS-1 operating system; max. six trunks	282,700	743	6,900
Additional Main Memory:				
5600-P420	128K bytes; max. of 4 (1024K bytes)	19,000	64	600
5600-P426	256K bytes; max. of 4 (2048K bytes)	38,000	128	1,200
5600-P436	Memory Expansion; required for systems greater than 1024K; 2048K bytes max.	0	0	0
REQUIRED ADDITIONS FOR 8550, 8560, AND 8570 SYSTEMS				
6831-0201	System Card Reader; includes stand; not required if 6640-0101 Paper Tape Reader is used	11,500	30	275
6640-0101	System Paper Tape Reader; includes stand; not required if 6831-0201 Card Reader is used	13,500	40	335
I/O CONTROL				
5600-P540	Low-Speed Trunk; max. three of any type	$4,150	10	100
5600-P341	Medium-Speed Trunk; max. three of any type	6,300	15	150
5600-P541	Very High-Speed Trunk; max. three of any type	9,300	22	225

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I/O CONTROL (Continued)				
5600-P545	Integrated Disk Controller (IDC) Control Module; max. one per suystem; requires 5600-P546 or 5600-P548 attachment; for all models	14,700	80	400
5600-P546	Integrated Disk Controller 6590 Attachment for use with 5600-P545 IDC; for all models	1,500	0	40
5600-P547	Integrated Disk Controller Expansion to 8 spindles; for all models	6,000	30	160
5600-P548	Integrated Disk Controller 658 Attachment for use with 5600-P545 IDC	5,500	0	150
5600-P549	Second 6590 String Control for IDC; for 8560 and 8570	4,100	10	100
5600-P550	Second 6490 String Control for IDC; for 8560 and 8570	4,100	10	100
5600-P450	Third 6590 String Control for IDC; for 8570	4,100	10	100
5600-P451	Third 658 String Control for IDC; for 8570	4,100	10	100
5600-P452	Third String/Mixed Device Adapter; for 8570	0	0	0
5600-P455	IDC, Dual Control Attachment; for 8570	20,700	100	600
5600-P456	658 Attachment for 5600-P455 dual control	1,100	2	25
COMMUNICATIONS				
5630-P950	Medium-Speed Line; max. of 4	2,500	45	100
5630-P954	Five Low-Speed Lines; max. of 20	6,000	70	200
MISCELLANEOUS				
5630-P910	Thermal Output Writer and Interface	3,000	15	85
5601-P103	Console Top with 260 Thermal Output Writer	3,700	20	100
5600-P301	Fast Floating-Point Assist	6,400	10	150
5600-P302	Additional Power Supply	9,200	20	240
5600-P903	Remote Audible Alarm	2,200	2	50
6440-0302	Console Printer, 173 cps	3,900	110	125
6440-P004	Console Printer Attachment	$3,100	8	$ 75
1001-A567	Auxiliary Table for 6440-0302 printer	800	0	20
5630-P902	Additional Console Channel for Dual-Console Option; not available for N-8450	1,500	3	35
796-101	Console Display	2,000	25	90
5603-0201	Dual Console Stand without Output Writer	800	0	20
5630-P370	Upgrade N-8450 to V-8450; additional memory ordered separately; requires 384K min.	13,350	—	—
5600-P371	Upgrade V-8550 Processor to V-8570 Processor	142,950	207	—
5600-P373	Upgrade V-8550 Processor to V-8560 Processor	74,250	173	—

*Rental prices include maintenance.