

NEC Update

Highlights:

1

Product Announcement

NECIS Perspective
NECIS Astra XL Specs
Astra Micro XL Specs
Astra XL/8 Specs
Astra XL/16 Specs
Astra XL/32 Specs

2

Configuration and Porting Considerations

Basic-2C Configuration Requirements
Porting Considerations

3

NEC Astra XL Performance

Overview
Benchmark Programs
Hardware Used for Benchmarks
General Performance Benchmarks
General Interpretation

4

NEC Distribution and VAR Policies

NEC Ad Reprint

Product Announcement

Niakwa is pleased to announce the immediate availability of Basic-2C for the NEC Information Systems, Inc. (NECIS) Astra XL family of multi-user systems which are based upon the Unix operating system and the Motorola 68020 processor.

NECIS Perspective

NEC Information Systems, Inc., (NECIS) headquartered in Boxborough, Mass., is a broad-based supplier of computers and peripheral equipment.

A subsidiary of NEC Corporation, NECIS was established in 1977 to market the Spinwriter series of letter quality printers. The company added 10 printer models to the series during the first two years, and now markets and distributes over 90 printer, disk drive, personal computer, multi-user system, and supplies/accessories products in the North American market. Since its beginning, NECIS has grown at a better than 40-percent annual rate to more than \$340 million in annual sales.

In addition to the facilities in Boxborough (about 30 miles west of Boston), NECIS has a West Coast Distribution Center, 39 U.S. sales offices and 70 maintenance service centers. The company employs over 1,700 people in the U.S.

NECIS' parent company, NEC Corporation, was founded in 1899 to manufacture telephone sets and switchboards. Today, the company is one of the world's leading suppliers of communications systems, computers and industrial electronic systems, electronic devices, and home electronic products. According to recently published independent surveys, NEC is the largest semiconductor manufacturer, the largest manufacturer of 24-wire dot-matrix printers, the fourth largest producer of disk drives, the fifth largest communications company, and the world's third largest supplier of personal business computers. NEC revenues currently exceed \$17 billion.

NEC Corporation has 52 manufacturing plants in Japan. Its affiliates operate 24 plants, and 21 marketing and service firms in 20 nations. Employing over 95,000 people worldwide, NEC Corporation markets some 15,000 products in 140 countries. It has 49 consolidated subsidiaries, including NEC Information Systems, Inc.

NEC Astra XL Series

The NECIS Astra XL Family of multi-user systems includes four models -- the Astra MicroXL, XL/8, XL/16, and XL/32.

NECIS' Vice President of Systems Marketing, Frank Girard has said "The Astra XL models share the same hardware and software features, eliminating the need to modify software or retrain users when upgrading to a larger XL system. The investment in an Astra XL is protected because we provide a clear and easy path to upward system migration."

Girard explained that the XL/8 can be upgraded to a 16- or 32- user system in the field, protecting the end user investment. The eight-user Astra MicroXL -- targeted for entry level users who do not require expandability beyond 16 users -- can be upgraded with an add-on expansion cabinet.

The Astra XL family incorporates the NEC ASTR-IX operating system based on the UNIX System V operating system with BSD 4.2 extensions.

The Astra XL series is based on the Motorola 68020 CPU, running at 16.7 MHz. All models feature a Motorola MC68881 floating point coprocessor and Motorola MC68851 memory-management processor. The XL series employs a 32 bit data and 24 bit address high speed memory/disk bus and a 16 bit data and 24 bit address system bus.

Standard with 2MB of memory, each Astra XL model can be expanded accordingly: Astra MicroXL to 6MB; XL/8 to 10MB; XL/16 to 18MB plus 8KB of cache memory; and XL/32 to 34MB plus 16KB of cache memory.

Maximum data storage capabilities of the Astra XL series range from the Astra MicroXL's 520MB to the XL/32's 4GB capacity. Every machine provides a standard 1.2MB 5.25" floppy disk drive and a 1.2MB 8" tabletop unit is optional.

The Astra XL family has a MCP controller for higher throughput at 19.2 baud per channel.

Networking capabilities includes an IEEE 802.3 Ethernet controller and TCP/IP software. This option allows the Astra XL series to network with other multi-user systems, personal computers, or engineering workstation groups. An eight-port I/O controller is standard with all models and communications options such as a synchronous/SNA controller can be added to interface with mainframes and other multi-user systems.

Astra Micro XL Specs

Memory Capacity

2 MB-6 MB

Expansion Slots

memory/disk bus-3 slots
system bus-3 slots standard
- 8 slots with expansion cabinet

Communications Controllers

MCP asynchronous controller
- 8-channel RS-232C
- 8086-based
- 128K DRAM

Hard Disk Storage

520 MB maximum disk capacity

standard disk
- 3-1/2-inch 40 MB
- 28 ms access time
- 625 KB/sec data transfer rate
- ST506 interface

optional disk
- 5-1/4-inch 130 MB
- 18 ms access time
- 1.25 MB/sec data transfer rate
- ESDI interface

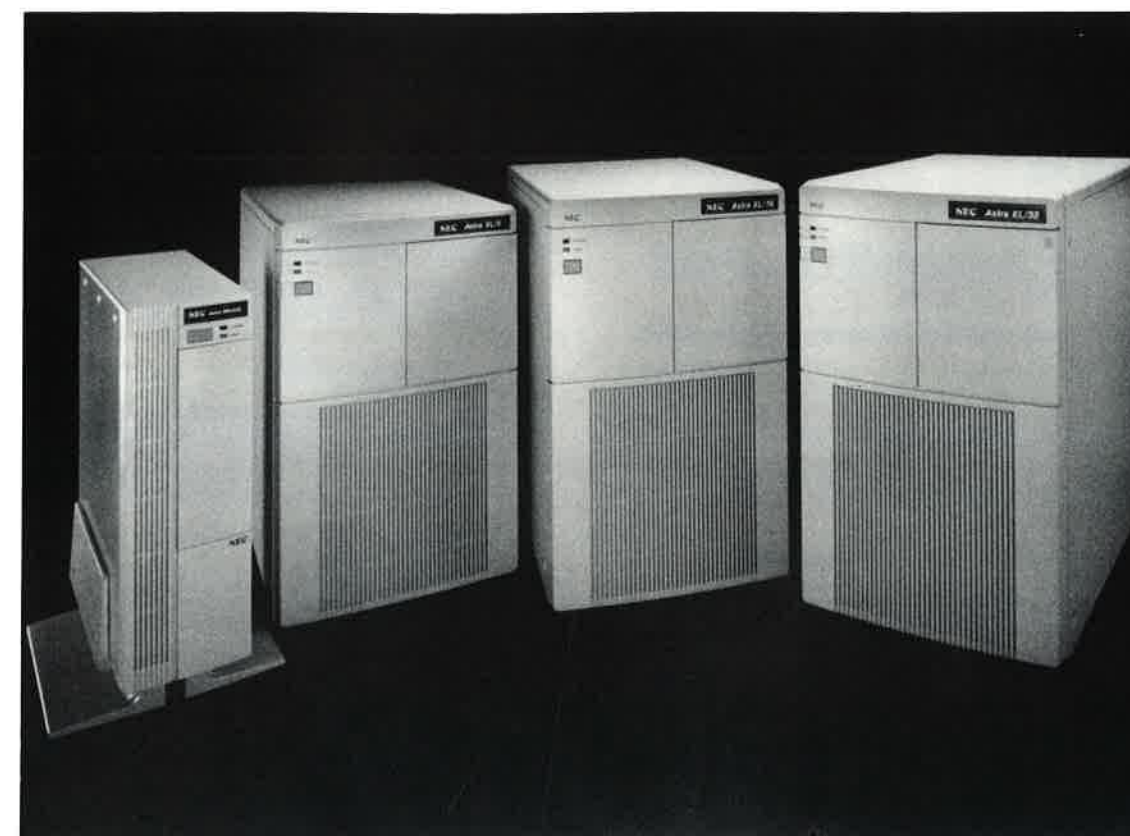
- tape (optional)
- 50 MB cartridge
- 120 MB cartridge

Number of Workstations

8 maximum with system cabinet

Basic Processing Unit Dimensions

height: 19.7 in. (500 mm)
width: 6.3 in. (160 mm)
depth: 18.8 in. (477 mm)



Astra XL/8 Specs

Memory Capacity

2 MB-10 MB

Expansion Slots

memory/disk bus-4 slots

system bus-9 slots

Communications Controllers

MCP asynchronous controller
- one standard with base unit
- 8086 based
- 128k DRAM

optional DCMA synchronous controller
- 8086-based
- 256K DRAM
- supports SNA 3270 and SNA 3770

optional sync/async controller
- supports multiple simultaneous async, byte, and bit-sync protocols
- supports HASP, X.25, BSC 3270, BSC 3780

Hard Disk Storage

520 MB maximum disk capacity

standard disk
- 3-1/2-inch 40 MB
- 28 ms access time

optional disk
- 5-1/4-inch 130 MB
- 18 ms access time

- tape (optional)
- 50 MB cartridge
- 120 MB cartridge
- 9-track 800/1600 BPI

Number of Workstations

8 maximum

Basic Processing Unit Dimensions

height: 27.3 in. (700 mm)
width: 15.7 in. (400 mm)
depth: 27.0 in. (680 mm)

Astra XL/16 Specs

Memory Capacity

2 MB-18 MB

Expansion Slots

memory/disk bus-4 slots

system bus-9 slots

Communications Controllers

MCP asynchronous controller

- one standard with base unit
- 8086 based
- 128k DRAM
- two controllers maximum

optional DCMA synchronous controller

- 8086 based
- 256k DRAM
- supports SNA 3270 and SNA 3770

optional sync/async controller

- supports Hasp, X.25, BCS 3270, BCS 3780

Hard Disk Storage

4.0 GB maximum disk capacity

standard disk

- 5-1/4-inch 130 MB
- 18 ms access time

optional disk

- 5-1/4-inch 290 MB
- 18 ms access time

- tape (optional)

- 50 MB cartridge
- 120 MB cartridge
- 9 track 800/1600 BPI

Number of Workstations

16 maximum

Basic Processing Unit Dimensions

height: 27.3 in. (700 mm)

width: 15.7 in. (400 mm)

depth: 27.0 in. (680 mm)

Astra XL/32 Specs

Memory Capacity

2 MB-34 MB

Expansion Slots

memory/disk bus-4 slots

system bus-9 slots

Communications Controllers

MCP asynchronous controller

- one standard with base unit
- 8086 based
- 128k DRAM
- four controllers maximum

optional DCMA synchronous controller

- 8086 based
- 256k DRAM

optional sync/async controller

- supports Hasp, X.25, BCS 3270, BCS 3780

Hard Disk Storage

4.0 GB maximum disk capacity

standard disk

- 5-1/4-inch 130 MB
- 18 ms access time

optional disk

- 5-1/4-inch 290 MB

- tape (optional)

- 50 MB cartridge
- 120 MB cartridge
- 9 track 800/1600 BPI

Number of Workstations

32 maximum

Basic Processing Unit Dimensions

height: 27.3 in. (700 mm)

width: 15.7 in. (400 mm)

depth: 27.0 in. (680 mm)

New Features in Basic-2C

The Basic-2C language enhancements that have been incorporated into recent Niakwa releases have been included in the NEC implementation. Here is a summary of those features:

1. Diskimage files larger than 16 MB are supported. This has been accomplished by use of three byte addresses within the Basic-2C diskimage index (previously unused bytes 7 and 8 of each index entry are used).
2. \$PACK/\$UNPACK have been extended to allow for storage of signed or unsigned binary numbers using the field format specification.
3. LINPUT and INPUT have been extended to optionally accept characters above HEX(80). This enhancement is primarily intended for non-English users.
4. Printer translation capabilities are supported via a \$PRINTER system variable. The translation capabilities are similar in concept to the screen translation capabilities in prior versions.
5. 132 column mode can now be accessed on terminals which have this capability.
6. Output from PRINT functions of the HELP and ERROR processor can now be directed to a specified Basic-2C print address.
7. Alternate character fonts supplied on various terminals can now be accessed under Basic-2C by specification of the desired font via a \$OPTIONS byte. This allows access to non-English characters on terminals where these are not part of the standard font.
8. Limited support for direct input from serial devices without the need of the 2227 emulation driver has been introduced in this release. This support is intended to be sufficient for simple interface requirements to serial devices such as plotters, digitizers, bar code readers, cash registers, etc. However, applications which require the more sophisticated features of the 2227 emulation driver will not be supported on this release. Note that existing programs will require modification to utilize this feature.

9. Terminal identification (#TERM) is now supported by use of a user defined file.
10. The determination of terminal type is no longer dependant on Unix configuration files. A user designed system variable may be used.

Basic-2C Features not Supported

The following Basic-2C features are not supported on this release:

1. The Science and Communications Drivers package is not supported on this release of Basic-2C. This includes non support of the math coprocessor.
2. Access to 320k and 360k "raw" diskettes is not supported. Note that access to 1.2 MB 'raw' diskettes is supported.

Supported Terminals

The following terminals are supported for use with Basic-2C on the NEC Astra XL under ASTR-IX:

Wyse 50

Wyse 60

Altos III

Altos V

DEC VT100 Series

Ampex 232 (in VT100 mode)

DEC VT200 Series

Wang 2110A

The above terminals, although they work well with Basic-2C, are not necessarily well suited for use in the NEC Astra XL native operating system.

The following terminals have been found to work well within the ASTR-IX environment:

Ampex 232 (in VT100 mode)

DEC VT100 Series

DEC VT200 Series

Wyse 60

Configuration and Porting Considerations

Basic-2C Configuration Requirements

The NEC version of Basic-2C is designed to operate on a NEC Astra XL using the ASTR-IX Release 3.1 and above. Hardware specifications are listed below:

CPU: NEC Astra XL

Memory:

	<u>Interpretive Runtime</u>	<u>Non-interpretive Runtime</u>
Overhead:		
ASTR-IX Operating System	804K	804K
Base Runtime (Shareable)	<u>219K</u>	<u>86K</u>
Total Overhead	1023K	890K

Per User:

Non-shareable Runtime	178K	133K
User Partition	56K	56K
Optional 64K Extended Partition	64K	64K

Memory Requirements per User

<u>Without</u> the Extended Partition	234K	189K
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Memory Requirements per User

<u>With</u> the Extended Partition	298K	253K
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In calculating the memory requirements for a given installation, multiply the per user requirements by the number of users and add the overhead. For example, an eight user system using the Interpreter, with no extended user partition and no allotment for the INVOKE feature, would be calculated as follows:

Per user - 234K x 8 users	= 1872K
System Overhead - 804K for Unix + 219K for the Base Runtime	= <u>1023K</u>
Total Requirements	2895K (3.0MB)

Note: The minimum requirement for any ASTR-IX configuration is 2 MB.

The guidelines given here will allow for all users to operate without program swapping. If a system does not have sufficient memory to permit all users to operate without swapping, users will still be able to execute programs. If this is the case, performance could degrade substantially.

Diskette: In order to install the Basic-2C Runtime Package, you must have a 5-1/4" 1.2 MB diskette drive which is standard with all NEC Astra XL systems.

Disk: No special requirements, but allow 9 MB for the Astra XL Operating System at your end users sites and 12 MB for the ASTR-IX development system. Basic-2C Development and RunTime Packages require approximately 800K of disk storage.

Terminals: See related section on supported terminals.

Printers: Under Astra XL both system and local printers are supported. In addition, parallel and serial system printers are supported.

Porting Considerations

To port your programs and data from an existing system to the NEC Astra XL, Niakwa is providing a series of porting techniques. Please note, the Astra XL will not support 5-1/4", 320KB and 360KB raw diskettes.

Wang 2200/CS Systems - For the Wang 2200/CS systems, you may transfer your program and data files to an MS-DOS based system. Once all files have been ported to a PC, you may now easily transfer your program and data files to the NEC Astra XL. For details on porting from an MS-DOS system, refer to the following section.

MS-DOS Systems (i.e. IBM PC and Wang PC/APC) - For MS-DOS systems with Revision 2.01.20 of Basic-2C, you may use 1.2MB 'raw' diskettes to transfer your program and data files between the PC and the NEC Astra XL. The Basic-2C backup and restore utilities may be used.

Xenix Systems (i.e. Wang APC and Altos) - For Xenix systems, you may use 1.2 'raw' diskettes to transfer your programs and data to the Astra XL. Once the appropriate device equivalency is entered, these diskettes may be formatted and scratched under Basic-2C for 4799 sectors.

Serial Communications - On systems which have serial communications, you may use a file transfer utility (e.g. Reflections 2), to transfer your programs and data between one computer system (i.e. generally a PC) and the NEC Astra XL.

Reflections 2 offers a PC to a Astra XL based system file transfer facility, by connecting the PC to the host just as you would connect a terminal. Most users will find this an easy package to use. Two files are required on the PC side to control the link and upload. Reflections 2 is Function Key driven and provides a help screen for key references, and commands. For further information contact:

Walker, Richer & Quinn, Inc.
2825 Eastlake Ave. E.
Seattle, WA 98102
(206) 324-0350

NEC XL Performance

Overview

Niakwa has conducted an extensive performance evaluation of the NEC XL series. The purpose of this evaluation is to give Basic-2C licensees realistic guidelines as to the performance that can be expected from Basic-2C applications running under Unix on the NEC XL series.

Hardware Used

The following NEC Astra XL systems were used for the NEC benchmarks.

For 1-8 Terminal Test

NEC Astra XL/32
(68020 processor, 16.67 MHz)
6 MB main memory
130 MB ESDI drive
MCP serial I/O board (see below for details)
8 terminals running at 4800 baud

For 1-16 Terminal Test

NEC Astra XL/32
(68020 processor, 16.67 MHz)
6 MB main memory
130 MB ESDI drive
2 MCP serial I/O board (see below for details)
1 terminal running at 4800 baud

Benchmark Programs

Four tests were devised for the evaluation, and each was executed on all systems with an increasing number of terminals. The tests used were:

- CPU Intensive:** This test involved iterating various constructs of the Basic-2C language to test in-core operations of the CPU only. The following operations were performed:

--FOR/TO LOOP 200,000 iterations
 --IF/THEN 100,000 iterations
 --Scalar ADD 100,000 iterations
 --CONVERT 10,000 iterations
 --Alpha LET 50,000 iterations
 --MAT COPY 30,000 iterations

3. **Disk Intensive:** This test focused on disk and I/O system performance. 500 iterations of random DATALOAD BA's were performed within a 10,000 sector diskimage.

4. **Overall Mix:** This test combined all of the above tests to illustrate overall system performance. A general accounting system was used, which read a disk file of customer records, sorted them according to operator supplied parameters, and printed the results to the screen for the entire customer file (TOM Speed I).

Our general interpretation and opinion of the findings, together with detailed timings of each test, follow.

2. **Screen Intensive:** This test focused on screen speed and screen I/O system performance. 10,000 iterations of the PRINT AT instructions were performed.

Hardware used for Benchmarks

	CPU Mod. #	Clock Speed	Processor	Memory	Disk	Terminals	Baud Rate
Altos	2086	8 mhz	80286	4MB	80MB	Altos V	19.2K
Bluebird - IBM	AT-386	16.67 mhz	80386	2MB	71MB	Wyse 60	38.4K
Bluebird-Wyse	PC-2200	10 mhz	80286	2MB	71MB	Wyse 60	38.4K
Bluebird-Wyse	3216	16.67 mhz	80386	2MB	330MB	Wyse 60	38.4K
Dec	MicroVAX II	N/A	Prop.	5MB	71MB	VT220	9,600
Honeywell	XPS-100 Model 20	16.67 mhz	68020	6MB	72MB	HDS 3	19.2K
IBM-SCO	IBM AT	6 mhz	80286	4MB	44MB	Wyse 60	19.2K
NEC	Astra XL/32	16.67 mhz	68020	6MB	130MB	Wyse 60	4,800
Novell	Acer 1100	16.67 mhz	80386	1MB	70MB	Acer 700 8086	N/A
Wang	2200 MVP	N/A	Prop.	512k	80MB Phoenix	2236DE	19.2K

General Performance Benchmarks

	ALTOS 2086 80286	IBM AT 286 SCO XENIX	Bluebird IBM/AT 386 80386	Bluebird Wyse PC286 80286	Bluebird Wyse PC3216 80386	Dec MicroVAX	Honeywell XPS-100	NEC ASTRA XL	Novell 80386	Wang 2200
CPU INTENSIVE										
ONE TERMINAL	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG
FOR/TO	6.54	11.62	4.00	7.00	4.00	8.76	4.00	4.00	21.14	59.00
IF/THEN	11.24	18.62	6.00	11.00	6.00	11.99	9.00	7.00	28.56	80.00
ADD	8.52	15.34	6.00	9.00	5.00	10.25	8.00	7.00	24.50	75.00
CONVERT	6.66	7.04	2.00	4.00	2.00	6.71	3.00	2.00	18.67	8.00
ALPHA LET	2.64	11.04	4.00	7.00	5.00	9.19	7.00	7.00	23.46	42.00
MAT COPY	6.12	9.56	4.00	5.00	2.00	5.96	6.00	4.00	20.92	40.00
TWO TERMINALS										
FOR/TO	13.07	23.13	7.50	14.50	7.00	17.36	8.00	9.00	21.14	118.00
IF/THEN	22.17	37.11	12.50	23.50	12.00	23.99	19.00	14.00	28.56	160.00
ADD	17.24	30.86	10.50	19.00	10.00	20.48	15.00	13.00	24.50	150.00
CONVERT	13.57	14.05	3.50	8.50	4.00	13.48	7.00	4.00	18.67	17.00
ALPHA LET	14.62	22.03	9.50	14.00	9.00	18.39	14.00	15.00	23.46	84.00
MAT COPY	12.68	19.06	7.50	12.50	5.00	12.12	13.00	8.00	20.92	80.00
FOUR TERMINALS										
FOR/TO	25.60	46.89	12.00	28.50	15.00	34.39	16.00	18.00	21.14	240.00
IF/THEN	44.93	73.37	20.00	47.25	24.00	47.98	38.00	28.00	28.56	320.00
ADD	34.90	62.61	16.75	39.00	20.00	41.47	31.00	26.00	24.50	300.00
CONVERT	25.30	28.04	6.25	17.00	8.00	26.96	14.00	9.00	18.67	32.00
ALPHA LET	30.80	44.05	15.00	29.00	18.00	36.80	28.00	30.00	23.46	169.00
MAT COPY	25.90	38.82	12.25	26.00	11.00	24.49	25.00	16.00	20.92	160.00
EIGHT TERMINALS										
FOR/TO	53.04	95.43	29.63	58.25	29.00	68.43	32.00	36.00	21.14	480.00
IF/THEN	86.18	149.06	48.00	94.63	47.00	95.81	76.00	58.00	28.56	640.00
ADD	68.13	124.61	40.25	77.88	39.00	82.17	60.00	51.00	24.50	600.00
CONVERT	52.58	51.30	15.88	34.63	16.00	53.76	28.00	17.00	18.67	64.00
ALPHA LET	62.56	89.23	36.13	58.88	36.00	73.65	54.00	61.00	23.46	340.00
MAT COPY	50.83	76.85	30.00	52.00	21.00	49.21	51.00	32.00	20.92	320.00
SIXTEEN TERMINALS										
FOR/TO	102.00	168.23	82.13	115.38	58.00	NP	67.00	83.68	21.14	NA
IF/THEN	181.00	276.28	149.94	190.81	92.00	NP	154.00	131.60	28.56	NA
ADD	144.00	238.49	122.88	156.44	77.00	NP	123.00	113.43	24.50	NA
CONVERT	103.00	104.25	43.19	69.69	31.00	NP	54.00	40.12	18.67	NA
ALPHA LET	122.00	164.14	115.56	118.31	70.00	NP	107.00	129.50	23.46	NA
MAT COPY	NP	143.34	105.63	105.06	42.00	NP	107.00	77.50	20.92	NA

NA = NOT AVAILABLE

NP = NOT PERFORMED

General Performance Benchmarks (cont.)

	ALTOS 2086 80286	IBM AT 286 SCO XENIX	Bluebird IBM/AT 386 80386	Bluebird Wyse PC286 80286	Bluebird Wyse PC3216 80386	Dec MicroVAX	Honeywell XPS-100	NEC ASTRA XL	Novell 80386	Wang 2200
SCREEN INTENSIVE										
ONE TERMINAL	37.00	85.74	25.00	31.00	20.00	61.00	36.00	142.00	23.89	49.00
TWO TERMINALS	62.50	171.50	31.50	44.50	22.00	68.00	43.00	142.00	NP	69.00
FOUR TERMINALS	121.00	341.90	61.00	88.00	43.00	137.00	84.00	142.00	23.89	133.50
EIGHT TERMINALS	246.00	688.21	120.88	160.38	87.00	280.00	168.00	172.00	23.89	198.00
SIXTEEN TERMINALS	435.00	NP	299.38	349.63	170.00	NP	349.00	330.60	23.89	NA
RANDOM DISK I/O										
ONE TERMINAL	27.00	14.26	11.00	14.00	10.00	18.00	16.00	14.00	24.66	16.00
TWO TERMINALS	42.00	26.88	21.00	28.00	18.00	27.00	32.00	26.00	NP	31.00
FOUR TERMINALS	80.00	49.61	41.50	58.00	37.00	51.00	63.00	52.00	82.68	62.00
EIGHT TERMINALS	163.00	137.25	84.50	121.00	81.00	94.00	127.00	104.00	165.73	122.50
SIXTEEN TERMINALS	321.00	1207.56	190.13	249.31	154.00	NP	258.00	211.75	328.19	NA
OVERALL MIX										
ONE TERMINAL	14.00	17.00	10.00	12.00	8.00	22.00	9.50	24.00	15.00	22.00
TWO TERMINALS	22.00	32.50	14.00	19.00	11.00	25.00	11.50	26.00	NP	33.5
FOUR TERMINALS	28.00	64.50	24.00	34.75	19.00	41.00	19.00	31.00	21.00	64.00
EIGHT TERMINALS	63.00	131.88	45.88	68.75	38.00	84.00	38.00	44.00	33.48	108.00
SIXTEEN TERMINALS	113.00	299.81	112.69	141.19	74.00	NP	71.00	94.18	61.30	NA

General Interpretations of NEC Astra XL Results:

Test 1 - CPU Performance

As expected, the results of the NEC are very similar to the Honeywell Bull XPS-100. Both of these machines use the same 68020 16Mhz "engine" and results are indicative of this.

Test 2 - Screen Performance

The terminal I/O for NEC Astra XL series is handled by the NEC MCP serial I/O board. Unfortunately because of a limited bandwidth, this card is unable to handle more than 2 or 3 terminals running at 9600 baud. NEC recommends that the terminals connected to this board run at a 4800 baud rate. Note that NEC is now shipping a serial board supporting 19,200 Baud. This board was not available to us at the time of our testing.

Due to the lower transmission rate between the CPU and the terminals (4800 baud) the NEC results in this area were significantly slower than other machines when performed at a lower number of users (1, 2 and 4). The performance however does improve (relative to other machines) when more terminals are added, since the CPU becomes the "bottleneck" with higher terminal usage rather than the transmission rate.

Test 3 - Disk Performance

The ESDI drive used in this machine has an average seek time of approximately 23ms. The ESDI drive uses the latest in drive technology to produce a considerably faster drive than the old standards. The NEC XL ESDI drive compares favorably with other machines in its class.

Test 4 - Overall Mix

The NEC machine, primarily because of screen performance was significantly outperformed by other machines in its class at lower levels (1, 2 and 4). However, as noted before, the differences in timing between other machines will gradually disipate at higher user levels, when actual CPU speed and Disk I/O become the determining factors for performance.

Conclusions

Except for the slower screen performance, the NEC Astra XL series offers a high performance solution to Basic-2C users.

The benchmark test for terminals 1 through 8 were run on a NEC Astra XL 32 with 6MB of main memory and one MCP I/O board. The tests for the 16 terminals were run on a NEC Astra XL 32 with 6MB of main memory and two MCP I/O boards. The results of the 16 terminal test were not linear to the 8 terminal test. The fact that the results are not linear is caused by the different hardware configuration. The NEC Astra XL 16 terminal configuration required more CPU time for serial I/O and memory management during normal operations, resulting in a small increase in the test results. We would expect this machine to maintain a linear performance between 16 and 32 users.

NEC Distribution and VAR Policies

NECIS computer systems can be purchased through NECIS's 39 sales offices. One of NECIS's philosophies is that their sales force is there to help VAR's - not compete with them. To that end, NECIS products are only available through VAR's. NECIS has no end-user sales force. All leads generated through NECIS's national advertising are funneled back to their VAR's.

The NECIS sales force is available to its VAR's for consultation on advertising programs, seminars, open houses and for help with prospecting, presentations and closings.

NECIS has an interesting co-op advertising program that gives credit for newspaper, radio and television advertising; yellow page listing; business, trade and civic magazine ads; outdoor advertising; audio-visual programs; and trade shows devoted to NECIS products.

Most NECIS field offices are staffed with technical support people to help with configuration and on going support issues.

NECIS offers its VAR's an accelerated profit plan with aggressive VAR discounts beginning at the <\$100,000 annual volume level.

In house technical training is available for a fee.

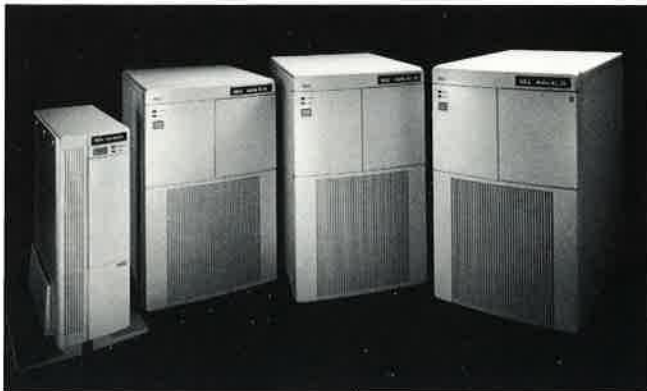
Technical hotline support is available anytime between 8:30 AM and 8:00 PM EST by calling a toll-free number.

Service is provided through NECIS's 70 field service offices. NECIS has a commission program available to VAR's who sell NECIS maintenance agreements.

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