NIAKWA

No. 14   April 1, 1988

Newsletter

Product Update Status

Basic-2C is now supported in the following environments:

Single-User MS-DOS Systems

AMSTRAD PC1512	IBM PC XT 286	NEC APC IV
AT&T 6300, 6300 PLUS	IBM PS/2 MODELS 30,50,60,80	SPERRY PC,PC/IT
COMMODORE PC-10, PC-20	ITT XTRA XP	TANDY 3000
COMPAQ DESKPRO	KAYPRO 1610	TELEVIDEO TELE-PC
COMPAQ PLUS	KAYPRO 16/E	TELEVIDEO TELE-XT
COMPAQ PORTABLE	KAYPRO PC,PC10,PC30	TI BUSINESS PRO
COMPAQ PORTABLE III	KAYPRO 286i	TOSHIBA T3100
COMPAQ 286 DESKPRO	KAYPRO 386	TULIP COMPACT
COMPAQ 286 PORTABLE	KAYPRO 2000+	WANG PC,APC
COMPAQ 386 DESKPRO	LEADING EDGE PC (D)	WANG PC280
COMPUTERLAND PC	MAI/BASIC4 PC	WYSE PC,PC286,2108,2200
DEC VAXMATE	MULTITECH LAN 500 (ACER)	XEROX 6060PC
EPSON EQUITY I,II,III	MULTITECH 700,710 (ACER)	XEROX 6065
HONEYWELL PC AP	MULTITECH 900,910 (ACER)	ZENITH 150 SERIES
HP VECTRA	MULTITECH 1100 (ACER)	ZENITH 248 SERIES
IBM PC,XT,AT	NCR PC6	

Multi-User Shared Logic Systems

Computer	Operating System
ALTOS 686	XENIX 3.0
ALTOS 886	XENIX 3.0
ALTOS 1086	XENIX 3.0
ALTOS 2086	XENIX 3.0
ALTOS 3086	XENIX 3.0
* ALTOS SERIES 2000	XENIX V
DEC MICROVAX II	VMS
DEC VAX 8000 SERIES	VMS
HONEYWELL XPS100	UNIX V
* IBM AT	SCO XENIX V 286 AT
IBM PC,XT,AT	SUPERDOS
IBM PS/2 SERIES	SUPERDOS
** INDUSTRY STANDARD 386	SCO XENIX V 386 AT
WYSE PC 286 SERIES	SUPERDOS
WYSE PC 386 SERIES	SUPERDOS
WANG APC	XENIX 3.0
* WANG APC	XENIX V

Multi-User Distributed Logic Systems (Networking)

NOVELL E/TI NETWORKING
SPERRY USERNET
(PLUS 35 OTHERS)
IBM & ALL APPROVED
COMPATIBLES
(SEE SINGLE USER MS/DOS)

*   In Beta Test

**   Not yet tested by Niakwa

Bluebird Systems is pleased to publish this newsletter which details the following Niakwa Basic-2C product and policy announcements.

SUPERDOS PROTECTED MODE - A new release of Basic-2C for SuperDOS that will increase the number of terminals supported, enhance performance and provide new features for our SuperDOS users.

SCO XENIX V - A new release of Basic-2C that will allow you to operate on XENIX V from Santa Cruz Operations.

WANG APC XENIX V - A new release of Basic-2C that will support Wang's XENIX V operating system for the APC. New features include support of serial terminals and Niakwa's Science and Communication Drivers Package.

WANG APC XENIX 3 - An updated release of our existing product for the Wang APC.

ALTOS XENIX 3 - An updated release of our existing product for the Altos 686, 886, 1086, 2086 and 3086.

XENIX V FOR THE ALTOS 2000 - A new release of Basic-2C that supports the 80386 based Altos 2000.

RELEASE 2.1 FOR DOS AND NOVELL - A Basic-2C release that will make our DOS and Novell products more consistent with recent Basic-2C implementations. Features such as larger disk images and install/deinstall security will now be available to DOS and Novell users.

BASIC-2C RELEASE III - A preview of a major Niakwa development project. Release III will offer significant language enhancements to Basic-2C users that are designed to keep your applications at the leading edge of the software industry.

LOCAL SALES SUPPORT FOR BASIC-2C RESELLERS - A sales program that will allow you increased sales through the support of the Bluebird sales organization.

NEW PRICING STRUCTURE - The unveiling of our new pricing strategy. A strategy that is based on value pricing.

Release dates, pricing and a more detailed description of these exciting products and policies follows.

SUPERDOS PROTECTED MODE

Basic-2C Revision 2.01.13 is now available for SuperDOS. This release is available both for new installations and as an upgrade for existing installations using Basic-2C Revision 2.01.08. Key features of this release are:

Supports operation under both SuperDOS Protected Mode and Real Mode. Operation under Protected Mode is very significant for Basic-2C users for the following reasons:

Under Protected Mode, up to 16 terminals (with RTP) or 15 terminals (with RTI) may be configured on a 640K base system with 2 MB extended memory with the/S option (120K user partition).

Under Protected Mode, up to 28 terminals (RTP) or 27 terminals (RTI) may be configured on a 640K base system with 2 MB extended memory with a 56K user partition.

Under Protected Mode, performance is improved significantly on machines which have a clock rate faster than 6 Mhz. This includes the Wyse 2200, Wyse 2108, IBM AT with 386 accelerator board, and the Wyse 3216 (386 based). This is due to the ability of Protected Mode SuperDOS to access memory as linear extended memory rather than incur the overhead of bank switched expanded memory.

In addition to support for Protected Mode operation, two new features are present in this release. These features will function in both Protected Mode and Real Mode.

Support for raw access to 360K and 1.2 MB format (512 bytes per sector) diskettes is now present.

Applications may now access their own security code via a special $GIO instruction. This allows application programs to be physically copy protected independent from the Basic-2C RunTime Program.

Configuration requirements for Revision 2.01.13 of Basic-2C are the same as for the previous version of Basic-2C when operated under SuperDOS Real Mode (see chapter 2 of the SuperDOS Supplement or Newsletter Number 11). Under Protected Mode, the only difference in configuration is the number of users that can be configured with different memory configurations. The table below summarizes the memory requirements for operation under Protected Mode. Please refer to the Basic-2C Addendum for Protected Mode (delivered with the 2.01.13 Development Package) for further details.

Number of Basic-2C Users Supported Under Protected Mode

Calculation of memory requirements under SuperDOS is made easy by using the following memory configuration chart.

| | RTI | | |
	120K (2) Partition	56K Partition	35K (1) Partition
A)	1 user	2 users	2 users
B)	2 users	4 users	4 users
C)	8 users	14 users	18 users
D)	8 users	15 users	19 users
E)	15 users	26 users	34 users
F)	15 users	27 users	35 users

| | RTP | | |
	120K (2) Partition	56K Partition	35K (1) Partition
A)	1 user	3 users	3 users
B)	2 users	4 users	5 users
C)	8 users	15 users	19 users
D)	9 users	16 users	20 users
E)	15 users	27 users	35 users
F)	16 users	28 users	36 users

Explanation of configuration codes:

A) = 512K base system
B) = 640K base system
C) = 512K base system + 1MB extended memory
D) = 640K base system + 1MB extended memory
E) = 512K base system + 2MB extended memory
F) = 640K base system + 2MB extended memory

Explanatory Notes:

(1) Even on systems where no user partition greater than 35K is required, the shareable task of the RunTime must be allocated enough memory for at least two overflow areas. This factor has been accounted for in the maximum number of users specified for configurations with only 'base' memory.

(2) To achieve a configuration consisting of a 120K partition requires the use of the Separate Program Segment (/S) option of the RunTime Program.

(3) Maximum number of users for a given system will be determined by CPU memory, serial slots and available CPU chasis slots. Release 4.0 of SuperDOS will include support of 7 MB extended memory thus increasing the number of Basic-2C users on SuperDOS platforms.

Additional Notes:

These configurations do not include optional tasks such as tape backup or the use of the Compiler (B2C). If these additional tasks are necessary, the number of Basic-2C users must be reduced accordingly. When these optional tasks are used, these configurations will have minimal cache buffers configured.

SuperDOS 'Protected Mode' Performance Benchmarks

OVERVIEW

Niakwa has conducted an extensive performance evaluation of SuperDOS running under 'Protected Mode'. The purpose of this evaluation is to give Basic-2C Licensees a realistic guideline as to the performance that can be expected from Basic-2C applications running under SuperDOS 'Protected Mode'.

As a convenience to our licensees, previously published benchmarks for SuperDOS 'Real Mode' are included.

HARDWARE USED

1. Wyse 3216

   80386 Processor 16Mhz
   2MB high speed memory
   330 MB SCSI disk drive
   4 Wyse 60 terminals running at 38400 baud
   12 Wyse 50 terminals running at 38400 baud

2. IBM AT w/386 Accelerator Board

   80386 Processor 16Mhz
   512K base memory
   2MB memory expansion board
   71 MB priam disk drive
   16 Wyse 60 terminals running at 38400 baud

3. Wyse PC Model 2200

   80286 Processor 16Mhz
   640K base memory
   2MB memory expansion board
   71 MB priam disk drive
   16 Wyse 60 terminals running at 38400 baud

BENCHMARKS

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

1. CPU INTENSIVE: This test involved iterating various constructs of the Basic-2C langauge to test memory 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

2. SCREEN INTENSIVE: This test focused on screen speed and screen I/O system performance. Ten thousand iterations of the PRINT AT instructions were performed.

3. DISK INTENSIVE: This test focused on disk and I/O system performance. Five hundred 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). Detailed timings of each test can be found on the accompanying chart.

GENERAL INTERPRETATION OF SUPERDOS 'PROTECTED MODE' RESULTS

The difference is performance between 'Real Mode' and 'Protected Mode' is due to the fact that memory transfer operations in expanded memory (Real Mode) are slower because of the paging that must be done by the processor. Memory transfer operation in extended memory (Protected Mode) do not use paging techniques and therefore allow more efficient use of the processor. Note that this increased performance does not affect disk I/O operations.

Test 1 - CPU Performance

In the CPU Intensive test, 'Protected Mode' was determined to be between 20 to 60 percent faster than 'Real Mode'. This wide range is due primarily to the fact that 'Protected Mode' takes advantage of the increased clock speeds.

Test 2 - Screen Performance

In the Screen Intensive test, 'Protected Mode' was determined to be approximately 10% faster than 'Real Mode'. This is due to the increased CPU performance noted in Test 1.

Test 3 - Disk Performance

As seen by the results, 'Protected Mode' delivers the same excellent disk performance as 'Real Mode'. This is due to the fact that disk I/O is not affected by the change to 'Protected Mode'.

Test 4 - Overall Mix

Results of this test are the most important indicator of 'Protected Mode' performance. This test mixes all aspects of system performance, CPU speed, screen speed, and disk I/O speed (not quite so random) in a typical processing environment.

The results indicate that SuperDOS 'Protected Mode' will perform from 10% to 20% faster than 'Real Mode'.

Benchmarks - Wyse 286PC Protected Mode vs. Real Mode

TEST CPU INTENSIVE	WYSE 286 PC PROTECTED MODE	WYSE 286 PC REAL MODE	%FASTER/ <SLOWER>	TEST SCREEN	WYSE 286 PC PROTECTED MODE	WYSE 286 PC REAL MODE	%FASTER/ <SLOWER>
FOR/TO							
1	7.00	10.00	30.00%	1	31.00	34.00	8.82%
2	14.50	18.50	21.62%	2	44.50	50.50	11.88%
4	28.50	37.00	22.97%	4	88.00	99.75	11.78%
8	58.25	73.88	21.16%	8	160.38	199.00	19.41%
16	115.38	147.75	21.91%	16	349.63	397.00	11.93%
IF THEN							
1	11.00	13.00	15.38%	RANDOM I/O			
2	23.50	26.50	11.32%	1	14.00	14.00	0.00%
4	47.25	52.00	9.13%	2	28.00	29.00	3.45%
8	94.63	104.13	9.13%	4	58.00	57.50	-0.87%
16	190.81	207.75	8.15%	8	186.00	120.75	1.96%
ADDITION				16	249.31	249.50	0.08%
1	9.00	11.00	18.18%				
2	19.00	23.00	17.39%	DISK WRITE			
4	39.00	45.25	13.81%	1	22.00	N/P	N/P
8	77.88	91.23	14.64%	2	45.50	N/P	N/P
16	156.44	181.63	13.87%	4	91.75	N/P	N/P
CONVERT				8	186.00	N/P	N/P
1	4.00	5.00	20.00%	16	387.25	N/P	N/P
2	8.50	10.00	15.00%				
4	17.00	20.50	17.07%	OVERALL MIX			
8	34.63	40.00	13.44%	1	12.00	13.00	7.69%
16	69.69	80.19	13.10%	2	19.00	20.00	5.00%
LET				4	34.75	37.50	7.33%
1	7.00	10.00	30.00%	8	68.75	75.75	9.24%
2	14.00	20.50	31.71%	16	141.19	151.00	6.50%
4	29.00	40.25	27.95%				
8	58.88	80.13	26.53%				
16	118.31	160.44	26.26%				
MAT COPY							
1	5.00	9.00	44.44%				
2	12.50	19.00	34.21%				
4	26.00	37.25	30.20%				
8	52.00	74.00	29.73%				
16	105.06	149.31	29.63%				

Benchmarks IBM AT with 80386 Protected Mode vs. Real Mode

TEST CPU INTENSIVE	IBM AT W/386 PROTECTED MODE	IBM AT W/386 REAL MODE	%FASTER/ <SLOWER>	TEST SCREEN	IBM AT W/386 PROTECTED MODE	IBM AT W/386 REAL MODE	%FASTER/ <SLOWER>
FOR/TO							
1	4.00	7.00	42.86%	1	25.00	28.00	10.71%
2	7.50	14.50	46.43%	2	31.50	39.00	19.23%
4	12.00	27.50	56.36%	4	61.00	77.00	20.78%
8	29.63	54.38	45.52%	8	120.88	155.25	22.14%
16	82.13	108.75	24.48%	16	299.38	310.00	3.43%
IF THEN							
1	6.00	10.00	40.00%	RANDOM I/O			
2	12.50	19.00	34.21%	1	11.00	11.00	0.00%
4	20.00	38.00	47.37%	2	21.00	22.00	4.55%
8	48.00	76.38	37.16%	4	41.50	44.00	5.68%
16	149.94	153.75	2.48%	8	84.50	88.00	3.98%
ADDITION				16	190.13	191.00	0.46%
1	6.00	9.00	33.33%				
2	10.50	18.50	43.24%	DISK WRITE			
4	16.75	36.00	53.47%	1	19.00	N/P	N/P
8	40.25	71.38	43.61%	2	38.00	N/P	N/P
16	122.88	143.25	14.22%	4	75.50	N/P	N/P
CONVERT				8	186.00	N/P	N/P
1	2.00	3.00	33.33%	16	387.25	N/P	N/P
2	3.50	6.00	41.67%				
4	6.25	13.00	51.92%	OVERALL MIX			
8	15.88	25.88	38.66%	1	10.00	11.00	9.09%
16	43.19	51.88	16.76%	2	14.00	16.00	12.50%
LET				4	24.00	30.00	20.00%
1	4.00	9.00	55.56%	8	45.88	61.00	24.80%
2	9.50	19.00	50.00%	16	112.69	124.00	9.12%
4	15.00	36.75	59.18%				
8	36.13	73.25	50.68%				
16	115.56	147.69	21.75%				
MAT COPY							
1	4.00	10.00	60.00%				
2	7.50	18.00	58.33%				
4	12.25	35.75	65.73%				
8	30.00	71.25	57.89%				
16	105.63	143.44	26.36%				

General Performance Benchmarks

We have updated the benchmark table that compares benchmark results from various Basic-2 platforms to include the benchmarks from SuperDOS Protected Mode. Tests are scheduled using SuperDOS on the IBM PS/2 Model 30, 60 and 80. The results will be published when available.

The benchmark table has also been updated to include results from tests performed on an IBM AT using the SCO XENIX V operating system. Basic-2C for SCO XENIX is described in detail later in this newsletter.

Configuration used for SCO XENIX benchmarks:

> IBM AT - 6Mhz 80286
> Priam Drive
> Arnet Multiport serial controllers (see below for details)
> Wyse 60 terminals at 9600 baud (SCO does not support higher baud rates)
> 4 MB highspeed memory
> SCO 286 XENIX V Version 2.2

Tuning:

SCO Open file tables were expanded (needed for 16 terminal usage).

SCO Disk buffers were expanded to the maximum allowed to maximize disk performance. Note that only the random disk read/write were affected by this.

Arnet Board:

The boards we used were non-intelligent 8 port, interrupt driven, boards with 16450 uarts. These boards are supported directly by SCO and do not require driver installation. The 16450 uarts are recommended for use with 386 machines (8250 uarts are too slow for 386 based machines according to Arnet and SCO).

We had tried Arnet Smartport cards which are intelligent (80186 processor) 8 port cards with 2681 duarts. Although these boards gave better screen performance (about 25% improvement over the multiport cards), these cards caused 30% degradation in CPU performance because they required a background task to poll the boards rather than being interrupt driven.

Benchmarks are scheduled for SCO XENIX operating on an Intel 80386 based, 16 Mhz Wyse 3216. Results will be published when available.

INTERPRETATION OF SCO RESULTS:

Test 1 - CPU Performance

As expected, SCO XENIX CPU results are very similar to SuperDOS Protected Mode in average execution time. However, a much wider variance between terminals occurs under SCO particularly at 8 and 16 terminals. This is pretty typical for XENIX and is an effect of the XENIX timeslicing methodology.

Test 2 - Screen Performance

SCO screen results were very poor. It seemed that the screen test was actually CPU bound, even running on one terminal at 9600 baud. Results were linear going from one to two to four terminals, even if terminals used were on different 8 port cards. Other XENIX implementations (Altos 1086 for example) show that the screen test is screen bound at 9600 baud up to 4 terminals.

We do not have a good explanation for the poor screen results on SCO. Our best guess is that the SCO driver is simply not handling the screen I/O requests efficiently. It is possible that screen I/O may be more efficient with other types of 8 port controllers. However, time restraints did not allow for further investigation of this.

Test 3 - Disk Performance

Up to 4 terminals, SCO performs well. However, above 4 terminals, SCO performance degrades in a non-linear fashion becoming much slower than other Basic-2C platforms such as SuperDOS and DEC. Above 8 terminals, SCO is clearly overloaded and performs very poorly.

Test 4 - Overall Mix

Primarily because of screen and disk I/O, most Basic-2C platforms significantly outperform SCO on this test. As the number of terminals rises, so does the performance gap. Note that above 4 terminals, SCO performance becomes non-linear.

Performance Perception:

As noted in the Altos newsletter, XENIX timeslicing and priority scheduling yield very inconsistent performance results particularly on heavily loaded systems. This is true with SCO also. This leads to a poor perception of performance. An operator attempting to do data entry on a heavily loaded system will experience inconsistent response time with significant pauses during which no system response occurs.

Conclusions:

SCO performance on the AT is adequate for small systems. However, for systems which require heavy batch processing or which require more terminals, SCO on the AT is not a good choice.

An article pulished later in this newsletter announces Basic-2C for the Altos 2000 operating under XENIX V. We have not performed benchmarks for the Altos 2000 because Altos did not supply adequate equipment to perform the benchmarks.

General Performance Benchmarks

	ALTOS 2086 80286 8Mhz	IBM AT 286 SCO XENIX	Bluebird IBM/AT 386 80386 16Mhz	Bluebird Wyse PC286 80286 10Mhz	Bluebird Wyse PC3216 80386 16Mhz	Dec MicroVAX	Honeywell XPS-100	Novell 80386 16Mhz	Wang 2200
CPU INTENSIVE									
ONE TERMINAL	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	21.14	59.00
IF/THEN	11.24	18.62	6.00	11.00	6.00	11.99	9.00	28.56	80.00
ADD	8.52	15.34	6.00	9.00	5.00	10.25	8.00	24.50	75.00
CONVERT	6.66	7.04	2.00	4.00	2.00	6.71	3.00	18.67	8.00
ALPHA LET	2.64	11.04	4.00	7.00	5.00	9.19	7.00	23.46	42.00
MAT COPY	6.12	9.56	4.00	5.00	2.00	5.96	6.00	20.92	40.00
TWO TERMINALS									
FOR/TO	13.07	23.13	7.50	14.50	7.00	17.36	8.00	21.14	118.00
IF/THEN	22.17	37.11	12.50	23.50	12.00	23.99	19.00	28.56	160.00
ADD	17.24	30.86	10.50	19.00	10.00	20.48	15.00	24.50	150.00
CONVERT	13.57	14.05	3.50	8.50	4.00	13.48	7.00	18.67	17.00
ALPHA LET	14.62	22.03	9.50	14.00	9.00	18.39	14.00	23.46	84.00
MAT COPY	12.68	19.06	7.50	12.50	5.00	12.12	13.00	20.92	80.00
FOUR TERMINALS									
FOR/TO	25.60	46.89	12.00	28.50	15.00	34.39	16.00	21.14	240.00
IF/THEN	44.93	73.37	20.00	47.25	24.00	47.98	38.00	28.56	320.00
ADD	34.90	62.61	16.75	39.00	20.00	41.47	31.00	24.50	300.00
CONVERT	25.30	28.04	6.25	17.00	8.00	26.96	14.00	18.67	32.00
ALPHA LET	30.80	44.05	15.00	29.00	18.00	36.80	28.00	23.46	169.00
MAT COPY	25.90	38.82	12.25	26.00	11.00	24.49	25.00	20.92	160.00
EIGHT TERMINALS									
FOR/TO	53.04	95.43	29.63	58.25	29.00	68.43	32.00	21.14	480.00
IF/THEN	86.18	149.06	48.00	94.63	47.00	95.81	76.00	28.56	640.00
ADD	68.13	124.61	40.25	77.88	39.00	82.17	60.00	24.50	600.00
CONVERT	52.58	51.30	15.88	34.63	16.00	53.76	28.00	18.67	64.00
ALPHA LET	62.56	89.23	36.13	58.88	36.00	73.65	54.00	23.46	340.00
MAT COPY	50.83	76.85	30.00	52.00	21.00	49.21	51.00	20.92	320.00
SIXTEEN TERMINALS									
FOR/TO	102.00	168.23	82.13	115.38	58.00	NP	67.00	21.14	NA
IF/THEN	181.00	276.28	149.94	190.81	92.00	NP	154.00	28.56	NA
ADD	144.00	238.49	122.88	156.44	77.00	NP	123.00	24.50	NA
CONVERT	103.00	104.25	43.19	69.69	31.00	NP	54.00	18.67	NA
ALPHA LET	122.00	164.14	115.56	118.31	70.00	NP	107.00	23.46	NA
MAT COPY	NP	143.34	105.63	105.06	42.00	NP	107.00	20.92	NA

NA = NOT AVAILABLE   NP = NOT PERFORMED

General Performance Benchmarks

	ALTOS 2086 80286 8Mhz	IBM AT 286 SCO XENIX	Bluebird IBM/AT 386 80386 16Mhz	Bluebird Wyse PC286 80286 10Mhz	Bluebird Wyse PC3216 80386 16Mhz	Dec MicroVAX	Honeywell XPS-100	Novell 80386 16Mhz	Wang 2200
SCREEN INTENSIVE									
ONE TERMINAL	37.00	85.74	25.00	31.00	20.00	61.00	36.00	23.89	49.00
TWO TERMINALS	62.50	171.50	31.50	44.50	22.00	68.00	43.00	NP	69.00
FOUR TERMINALS	121.00	341.90	61.00	88.00	43.00	137.00	84.00	23.89	133.50
EIGHT TERMINALS	246.00	688.21	120.88	160.38	87.00	280.00	168.00	23.89	198.00
SIXTEEN TERMINALS	435.00	NP	299.38	349.63	170.00	NP	349.00	23.89	NA
RANDOM DISK I/O									
ONE TERMINAL	27.00	14.26	11.00	14.00	10.00	18.00	16.00	24.66	16.00
TWO TERMINALS	42.00	26.88	21.00	28.00	18.00	27.00	32.00	NP	31.00
FOUR TERMINALS	80.00	49.61	41.50	58.00	37.00	51.00	63.00	82.68	62.00
EIGHT TERMINALS	163.00	137.25	84.50	186.00	81.00	94.00	127.00	165.73	122.50
SIXTEEN TERMINALS	321.00	1207.56	190.13	249.31	154.00	NP	258.00	328.19	NA
OVERALL MIX									
ONE TERMINAL	14.00	17.00	10.00	12.00	8.00	22.00	9.50	15.00	22.00
TWO TERMINALS	22.00	32.50	14.00	19.00	11.00	25.00	11.50	NP	33.50
FOUR TERMINALS	28.00	64.50	24.00	34.75	19.00	41.00	19.00	21.00	64.00
EIGHT TERMINALS	63.00	131.88	45.88	68.75	38.00	84.00	38.00	33.48	108.00
SIXTEEN TERMINALS	113.00	299.81	112.69	141.19	74.00	NP	71.00	61.30	NA

SCO XENIX V

Niakwa will expand its support of XENIX based solutions with the announcement of Basic-2C for Santa Cruz Operations (SCO) XENIX for Intel 80286 and 80386 based processors.

SCO XENIX is a derivative of Microsoft XENIX. SCO XENIX allows PC platforms to operate in a multi-user environment.

The "general 2.1 enhancements" made on previous Basic-2C releases for DEC, SuperDOS and Honeywell Bull will be available in the Basic-2C implementation of SCO XENIX. These enhancements consist of:

1. Support for diskimage files larger than 16 MB

2. Extensions to $PACK/$UNPACK

3. Printer translation capability

4. Built in math co-processor support

5. Extensions to keyboard entry (for non-English keyboards)

6. User definable table method for determination of terminal number (#TERM)

7. Support for direction of output from Print Control to specified print address

8. User determination of Separate Program Segment (/S option)

9. Limited input from serial port

10. Expanded support for serial terminals. New terminals supported (see chapter 7 of the new Supplement for specific details) include:

> Altos 5
> VT200
> Wyse 50
> Wyse 60

11. Built-in support of local printers (this works much better than native XENIX support for local printers). Refer to Chapters 6 and 7 of the new XENIX Supplement for further details.

12. Support for 132 column mode on terminals which have this capability.

For a more complete description of these features refer to Appendix F of the XENIX Supplement.

Enhancements designed specifically for XENIX will consist of:

1. Much simplified installation procedure. It will no longer be necessary to modify the XENIX kernel for use with Basic-2C. Please refer to Chapter 2 and to the hardware specific addendum in the new XENIX Supplement to the Niakwa language reference guide for details.

2. Basic-2C will now respect "umask" values when creating files. Previous versions of Basic-2C overrode the user's "umask" value and created files with access for all users.

TERMINALS - The serial port boards used for serial I/O devices (terminals/printers/modems), should be an approved compatible for the XENIX implementation. Note that SCO publishes lists of approved serial board compatibles which should be used for configuration purposes. Niakwa will only support the implementation of Basic-2C on XENIX systems which are using approved compatible serial boards.

VERSIONS - Niakwa supports use of Basic-2C running under SCO 286AT XENIX V Version 2.2 and SCO 366AT XENIX V Version 2.2.

CPU'S - The CPU used for any SCO XENIX system, should be an approved compatible for that XENIX implementation. Note SCO publishes lists of approved CPU's which should be used for configuration purposes. Niakwa will only support the implementation of Basic-2C on XENIX systems which are using approved compatible CPU's.

MEMORY REQUIREMENTS - The memory requirements are operating system dependent, however a brief analysis of memory requirements is listed below:

	Interpretive RunTime	Non-interpretive RunTime
A. OVERHEAD		
Base RunTime (Shareable)	141K	83K

Note that the SCO XENIX operating system requires approximately 881K of overhead.

B. PER USER		
Non-shareable RunTime	199K	197K

NOTE: These figures include a 32K allocation for graphics memory (only used on the Wang APC) and a 64K allocation for /S memory option (whether or not /S is specified). These areas are not dynamically allocated because on some releases of the XENIX kernel dynamically allocating memory areas while shared memory is in use causes a system panic.

Plus

Required for "INVOKE"   ?   ?

NOTE: The "?" indicates that the memory required is that of the task specified via the "INVOKE" option.

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 8 user system using the Interpreter with no allotment for the INVOKE feature would be calculated as follows:

Per user - 199K x 8 users	= 1592K
System Overhead - 881K for XENIX + 141K for Interpreter	= 1022K
Total Requirements	= 2614K

NOTES:

* The minimum requirement for any SCO XENIX configuration is 1.5 MB.

* The guidelines given here will allow for all users to operate with no swapping. If a system does not have sufficient memory to permit all users to operate with no swapping, users will be able to execute programs. However, performance will degrade substantially!

* If both the Interpreter and non-interpretive RunTime versions are to be used on the same system, the "shareable" portion of both must be included in the calculations.

STATUS - Basic-2C is currently in Beta testing for use with SCO XENIX and is scheduled for first customer shipments in the second quarter.

We will accept Basic-2C orders immediately for SCO XENIX. Pricing information is detailed later in this newsletter.

WANG APC XENIX V

Niakwa is currently Beta testing a new implementation of Basic-2C that supports Wang's release of XENIX V for the APC.

This version of Basic-2C will support serial terminals on the APC, enhance the Science and Communication Drivers and support the standard XENIX V enhancements over XENIX 3.

The "general 2.1 enhancements" described in the SCO XENIX article will be supported on the APC Xenix V.

The serial terminal support will be for the Wang 2110A terminal which is designed for use with the Wang MTC card. The MTC card requires use of the Wang 9821 single board system board in the APC. Other supported serial terminals are the Altos 5, VT 200, Wyse 50 and Wyse 60.

The Science and Communication Drivers will be supported on the APC under XENIX V and the current XENIX 3 release of Basic-2C.

> The 2227 driver will be supported only on the built-in serial port (sp00), not on the MTC ports.

> The 2227 driver will contain support for flow control and limited support for half duplex operations.

> Due to Wang APC/XENIX restrictions one significant restriction exists regarding the 2227 driver. Even when using flow control, use of baud rates above 2400 may result in framing errors or loss of characters on data reception.

> The plot driver will be supported only on the Wang monochrome monitor or IWS workstations. Use of serial terminals with the plot driver is not supported.

It is no longer required that the XENIX kernel be modified for use with Basic-2C. However, an unmodified kernel will not support 'true' box graphics or downloadable fonts on the Wang APC Monochrome Monitor or IWS Workstation. If these features are required, it will be necessary to modify the XENIX kernel as described in the APC Addendum.

A kernel previously modified for use with revision 2.00.04 of Basic-2C under XENIX 3.20 should not be used with this release. Rather, the new versions of the box drivers should be installed and a new kernel should be made following the procedure in the APC Addendum.

We will accept orders for new Wang APC RunTime Packages immediately. Pricing information is detailed later in this newsletter. We will also accept orders to upgrade XENIX 3 RunTime Packages to XENIX V RunTime Packages. Refer to your Support and Distribution Agreement for upgrade pricing.

Basic-2C is currently in Beta testing for use with XENIX V for the Wang APC and is scheduled for first customer shipments in the second quarter.

MEMORY REQUIREMENTS - 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 8 user system using the Interpreter with no allotment for the INVOKE feature would be calculated as follows:

Per user - 199K x 8 users   = 1592K

System Overhead - 419K for XENIX
+ 141K for Interpreter   = 560K

Total Requirements   = 2152K

Notes:

* The minimum requirement for any Wang XENIX V configuration is 1 MB.

* The guidelines given here will allow for all users to operate with no swapping. If a system does not have sufficient memory to permit all users to operate with no swapping, users will be able to execute programs. However, performance will degrade substantially!

* If both the Interpreter and non-interpretive RunTime versions are to be used on the same system, the "shareable" portion of both must be included in the calculations.

Wang XENIX 3

Niakwa is currently Beta testing a new implementation of Basic-2C under Wang XENIX 3.20 on the Wang APC.

This version of Basic-2C will support the Wang Monochrome Monitor and the IWS Workstation. There is no serial terminal support under Wang XENIX 3.20.

The "general 2.1 enhancements" described in the SCO XENIX article will be supported under this release of Basic-2C.

The new Science and Communication Drivers described in the Wang APC XENIX V article will be supported under Wang APC XENIX 3.

MEMORY REQUIREMENTS - 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 8 user system using the Interpreter with no allotment for the INVOKE feature would be calculated as follows:

Per user - 199K x 8 users   = 1592K

System Overhead - 344K for XENIX
+ 141K for Interpreter   = 485K

Total Requirements   = 2077K

Notes:

* The minimum requirement for any Wang XENIX 3 configuration is 1 MB.

* The guidelines given here will allow for all users to operate with no swapping. If a system does not have sufficient memory to permit all users to operate with no swapping, users will be able to execute programs. However, performance will degrade substantially!

* If both the Interpreter and non-interpretive RunTime versions are to be used on the same system, the "shareable" portion of both must be included in the calculations.

Altos XENIX 3

Currently there is a new version of Basic-2C in Beta Testing for support of Altos XENIX 3.

This new version of Basic-2C will support XENIX 3.2f on the Altos 686, 886, and XENIX 3.4b on the Altos 1086, 2086, and 3086.

It is no longer required that the XENIX kernel be modified for use with Basic-2C. If using Basic-2C with an unmodified XENIX kernel there will be no support for the Wang 2200 format diskettes. If this feature is required, you can use the previously modified kernel for use with revision 2.00.05 of Basic-2C under XENIX 3 with this new release.

The "general 2.1 enhancements" described in the SCO XENIX article will be supported under this release of Basic-2C.

MEMORY REQUIREMENTS - 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 8 user system using the Interpreter with no allotment for the INVOKE feature would be calculated as follows:

Per user - 199K x 8 users   = 1592K

System Overhead - 612K for XENIX
+ 141K for Interpreter   = 753K

Total Requirements   = 2345K

Notes:

* The minimum requirement for any Altos XENIX 3 configuration is 1 MB.

* The guidelines given here will allow for all users to operate with no swapping. If a system does not have sufficient memory to permit all users to operate with no swapping, users will be able to execute programs. However, performance will degrade substantially!

* If both the Interpreter and non-interpretive RunTime versions are to be used on the same system, the "shareable" portion of both must be included in the calculations.

XENIX V FOR ALTOS 2000

We are pleased to announce support of XENIX V for the Altos 2000 processor.

The Altos 2000 is based on the Intel 80386 microprocessor and supports up to 64 users using intelligent file and communication processors. The entry level system includes a 65MB (formatted) disk drive, 10 RS-232 ports, a 1.2 MB floppy drive and a 60MB 1/4 inch streaming tape drive. We view the model 2000 as a mid to high end solution that become price competitive at the 14 to 16 user level.

The "general 2.1 enhancements" described in the SCO XENIX article will be supported on the Altos 2000 with the exception of the Wang 2110A terminal.

MEMORY REQUIREMENTS - 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 8 user system using the Interpreter with no allotment for the INVOKE feature would be calculated as follows:

Per user - 199K x 8 users   = 1592K

System Overhead - 1584K for XENIX
+ 141K for Interpreter   = 1725K

Total Requirements   = 3317K

Notes:

The number allocated for system overhead (1584K) includes 1000K set up for buffers. It appears that on the Altos 2000, XENIX sets up buffers based on number of users. On this particular configuration, a 32 user kernel was in use. The amount of memory allocated to buffers will increase in accordance with the number of users.

The guidelines given here will allow for all users to operate with no swapping. If a system does not have sufficient memory to permit all users to operate with no swapping, users will still be able to execute programs. However, performance will degrade substantially!

If both the Interpreter and non-interpretive RunTime versions are to be used on the same system, the "shareable" portion of both must be included in the calculations.

The Series 2000 is distributed directly by Altos to qualified VAR's or through Altos' distribution network for lower volume VAR's.

Pricing information is detailed later in this newsletter.

We will accept orders for Altos XENIX V RunTime Packages immediately.

Basic-2C is currently in Beta testing for the Altos 2000 and is scheduled for first customer shipments in the second quarter.

RELEASE 2.1 FOR DOS AND NOVELL

Release 2.1 will be an upgraded version of the Basic-2C Development Package, RunTime Package and Science and Communication Drivers Package for the Wang PC/APC operating under MS/DOS, IBM PC operating under MS/DOS and IBM PC operating under Novell.

The improvements will fall into four broad categories:

- General enhancements.

- Specific enhancements to take advantage of specific features on the IBM and compatible PC's.

- Bug corrections.

- A new release of the Science and Communication Drivers Package for MS/DOS and Novell.

The general enhancements will be available on all three hardware versions affected by this release and will include:

- Support for diskimage files larger than 16 MB.

- Extensions to $PACK and $UNPACK.

- Built in math co-processor support.

- Support for 'raw' access to 360K and 1.2 MB diskettes.

- Printer translation capability.

- Extensions to keyboard entry. (For non-English keyboards)

- User definable table method for determining terminal numbers on Novell. (#TERM)

- User determination of Separate Program Segment. (/S option)

- Support for direction of output from Print Control to specified print address.

- Limited input from serial port.

Release 2.1 enhancements specifically designed for the IBM PC and compatibles operating under MS/DOS and Novell will consist of:

- Install/Deinstall security for 5 1/4" RunTimes. (As currently implemented on Basic-2C 3-1/2" versions)

Specific enhancements for the IBM PC and compatibles under MS-DOS:

Support for 'true' box graphics on EGA, VGA, and Hercules controllers/monitors.

Improved support for 'pixel' graphics on EGA, VGA, Hercules.

Support for color output on CGA/EGA monitors (compatible with Computer Concepts color support).

Bug corrections will basically be minor but will resolve two significant problems:

Operation of the Wang version of Basic-2C on the Wang PC/APC under Wang MS-DOS 3.20 will be supported.

Operation of RTP on the console (non-dedicated file server) under Novell ELS software will be supported.

In addition, a new release of the Science and Communications Drivers for MS-DOS (they will operate

under Novell) will be included. Enhancements to this product will be:

The 2227 drive will be upgraded to incorporate Wang communications enhancements made in the Wang 2.6 Basic-2 release. The primary enhancement is flow control.

The 2227 driver will contain limited support for half-duplex mode.

The 2227 driver will support the use of COM1 or COM2 serial ports on IBM PCs under MS-DOS or Novell (current version supports use of COM1 only).

Several bug corrections are included in the 2227 driver.

BASIC-2C RELEASE III

Release III marks the first time in Niakwas' history that we have embarked on an aggressive development program dedicated 100% to new language enhancements. This major development program will involve a series of Basic-2C releases and a significant amount of Niakwa's R & D energy. Enhancements that are under consideration for Release III include, but are not limited to:

EXTERNAL CALL CAPABILITY - The ability to call programs written in other languages from within Basic-2C.

DYNAMIC PARTITION SIZES - The ability to have very large Basic-2C programs with dynamic partition sizing (expand and contract on the fly as needs dictate).

TRANSPARENT PARTITION SWAPPING - From a single workstation, the ability to operate and swap between any number of independent partitions.

STRUCTURED PROGRAMMING ENHANCEMENTS - Numerous language enhancements that will increase the ease of Basic-2C development in a structured environment.

AND MANY MORE SUBSTANTIAL ENHANCEMENTS TO THE LANGUAGE.

Release III is currently under development. We will report progress on this exciting project as is appropriate.

LOCAL SALES SUPPORT FOR BASIC-2C RESELLERS

In our continuing effort to improve the level of services to our customers, we are pleased to announce local sales support for Basic-2C resellers. Our staff of Bluebird sales professionals will support your sales efforts for all multi-user Basic-2C products. Multi-user products can still be obtained from our Mundelein office in addition to all single user sales support.

Your Niakwa Account Representatives are:

NORTH AMERICA: Jennifer Mondy (312) 634-8700

INTERNATIONAL: Cyndee Philyaw (312) 634-8700

In addition to providing local, personal support, our team of Area managers is dedicated to helping our value-added resellers be more successful in their businesses. Qualified North American resellers may elect to participate in one or more of the following programs. These programs are designed to solve some of the more pressing problems common to many VAR's. International resellers should contact your Bluebird Director of International Operations for details on programs available in your country.

RECRUITING - A simple, attractive program that will deliver to you qualified, pre-screened, professional sales representative candidates ready for interviewing. This program was custom tailored for Bluebird by a large sales representative recruiting agency. It not only helps you find high caliber sales professionals, but the bulk of the search fees is tied directly to that sales person's sales productivity.

PROSPECTING AND QUALIFYING - Bluebird Area managers will work with you and your sales staff to conduct a vigorous, structured on-site training, prospecting and qualifying campaign designed to put prospective buyers in front of your product. Designed expressly for Bluebird by an internationally known consultant, the program is daily proving its value to Bluebird resellers.

LEASING - An attractive, flexible, low-interest rate leasing program designed to help you overcome what is frequently the last objection in a sales campaign; the lack of ready cash on the part of the prospective customer.

HARDWARE MAINTENANCE - Through the services of the premier third-party maintenance organization in North America, you may now offer your end-users the security of a national service company while building a recurring maintenance revenue base for your business.

These innovative and aggressive programs are typical of the many ways our Area Managers dedicate themselves to helping you succeed in your business. The following is a list of Area Managers and their geographic territories:

VICE PRESIDENT VAR SALES: Kay Sakata (619) 438-2220

EASTERN REGION SALES MANAGER:

Connecticut, Maine, Massachussetts, New Hampshire, New Brunswick, Newfoundland, New Jersey, New York, Rhode Island, Vermont

AREA MANAGER: Bob McKelvey (201) 984-1014

Pennsylvania, Delaware

WESTERN REGION SALES MANAGER: Jim Lackey (619) 438-2220

AREA MANAGER: Craig Arnoff (619) 438-2220

Alaska, Colorado (Northern), Idaho, Nevada (except Las Vegas), Oregon, Washington, Wyoming

AREA MANAGER: Bob Guthmiller (303) 790-4588

Arizona, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, Texas (El Paso only), Wyoming, Utah

AREA MANAGER: Terry Hutt (214) 888-6038

Arkansas, Oklahoma, Texas (except El Paso)

AREA MANAGER: Steve Kurtz (619) 438-2220

California (Southern; 619 & 714 area codes only), Hawaii

SOUTHERN REGION SALES MANAGER: Ralph Nesmith (404) 564-0060

AREA MANAGER: Jim Griffin (404) 564-0060

Kentucky, South Carolina, Tennessee, West Virginia

AREA MANAGER: Dick Mace (404) 564-0060

Alabama, Florida, Georgia, Louisiana, Mississippi

AREA MANAGER: Bob Tarbutton (404) 564-0060

Maryland, North Carolina, Virginia, Washington D.C.

CENTRAL REGION SALES MANAGER: Larry Fredrich (312) 634-8700

Cook and Lake County, Illinois

AREA MANAGER: John Fuller (312) 634-8700

Iowa, Michigan, Minnesota, North Dakota, South Dakota, Wisconsin

AREA MANAGER: Mark Phinick (312) 634-8700

Indiana, Illinois, Ohio, Missouri

INTERNATIONAL SALES MANAGER (acting): Kay Sakata (619) 438-2220

DIRECTOR OF INTERNATIONAL OPERATIONS: Drew Ogden (619) 438-2220

Pacific Rim, Central America, South America

DIRECTOR OF INTERNATIONAL OPERATIONS: Derek Woodman (619) 438-2220

Canada, Europe, Africa, Middle East

NEW PRICING STRUCTURE

Over the years, Niakwa has dramatically expanded the hardware/operating system platforms that are supported by Basic-2C. Basic-2C supported platforms now range in price from a few thousand dollars to hundreds of thousands of dollars - yet Basic-2C has been priced the same regardless of the platform. Often times grossly underpriced in relation to the platform Basic-2C is being used on. (The price of Basic-2C only changes with the number of users.)

With this announcement, we are introducing a pricing strategy that is in common use throughout the software industry that addresses the issue of - value pricing.

The Basic-2C RunTime Package price will be determined from this time forward by two elements:

1) The number of users. (Our current method)

2) The operating system and/or machine that the RunTime Package will be used on.

We have a set of five groups of Basic-2C products. The following chart details the new product groupings and the platform on which they operate.

GROUP 1

IBM PC/DOS
Wang PC/DOS

GROUP 2

Novell
SuperDOS/88 (PS/2 Model 30)

GROUP 3

Altos/XENIX 3
Wang APC/XENIX 3
DEC MicroVAX II

GROUP 4

XENIX System V for
    IBM PC/AT and Compatibles
Wang APC/XENIX V
SuperDOS/286
SuperDOS (PS/2 - 60 and 80)

GROUP 5

Altos 2000 XENIX V
DEC VAX
Honeywell Bull XPS 100

NOTES:

Each SuperDOS Basic-2C RunTime Package that is ordered at the same time as a SuperDOS license will be at Group 1 pricing.

For additional details on our new APC pricing refer to the enclosed price list. The effective date of the new pricing is May 15, 1988. Pricing for the XENIX V products that were announced in this newsletter will be based upon the new structure.

If you have questions on the new pricing contact your Bluebird Area Manager or Niakwa Account Representative.

TECH CORNER

We are always trying to get the latest information of product irregularities out to our licensees, listed below are 5 hot topics which have been inquired about recently.

1. **AST 286 Premium**

Due to the increasing popularity of this machine we have taken the time to evaluate it again. Previously our tests showed that this machine was not an approved compatible for Basic-2C.

The configuration we used for testing was the following:

AST 286 Premium
    80286 Processor with variable clock
    speeds (6,8,10) 640K memory
    1.2 MB diskette drive
    20 MB fixed disk drive
    AST-3G Plus graphics adaptor
    Phoenix ROM Rios 3.03 MS-DOS 3.3

Overall this was a quick machine with acceptable increase in performance when clock speed was changed. However, as in the past a serious problem was encountered when trying to pass the security check. Therefore, as of this time, we are unable to approve the AST 286 Premium computer as an approved Basic-2C compatible. We will retest this machine when our new release (2.1) of MS-DOS becomes available.

2. SuperDOS local printing problem (Rev. 2.01.08)

There is a known problem with printing to local printers under the original release of SuperDOS. This problem occurs when 2 or more users simultaneously attempt to access their local printers. One user will hang or receive a busy message until the first user finishes printing.

We have been able to replicate this problem and have included the fix in the next release (2.01.13) of the SuperDOS RunTime Program. For information on obtaining this new release, please contact your local Bluebird Area Manager.

3. SuperDOS Compiling problem (Rev. 2.01.08)

There is a known problem with compiling 2200 atomized code from a floppy diskette into SuperDOS diskimage file. We have found that this problem is confined to SuperDOS systems which are using only base memory. We are able to work around this problem by simply using the 2CCOPY program to copy the contents of the diskette into a diskimage file, then compile the contents of the diskimage file, instead of the floppy.

We have been able to replicate this problem and have included the fix in the next release (2.01.13) of the SuperDOS Development Package. For information on obtaining this new release, please contact your local Bluebird Area Manager.

4. SuperDOS Controlled Release Problems (Rev. 2.01.13)

The controlled release for SuperDOS allows users to take advantage of Protected Mode on SuperDOS, this release is currently available from Bluebird. We have found some problems with this release that should be noted, they are as follows:

1. Screen Print from Console will print garbage, other terminals are not affected.

2. $CLOSE may not close all devices, if more that 1 device is open. Note a temporary fix for this particular problem would be to execute a series of $CLOSE/XXX statements, when XXX is the designated address of the opened device.

3. $CLOSE issued to a $OPENed Printer that has LCL=Y specified could cause a system error. Note a temporary fix for this particular problem would be to execute a $CLOSE/XXX where XXX is the designated address of the local printer.

Note that all of these problems will be addressed prior to final release.

5. Novell Non-Dedicated File Server

We have discovered a problem that only occurs on a Novell system running in Non-Dedicated mode. The problem occurs when a workstation nodes Network interface card (NIC) is set to a value of 2. The problem is that the terminal task running on the non-dedicated file server always reports a physical station number of 2 no matter what the NIC is set to. This causes 2 nodes to create the same #ID value (2) under Basic-2C. This problem can be worked around by making sure that none of the NIC's on the system are set to a value of 2.