CONTEL Tiger ATS Systems

MANAGEMENT SUMMARY

UPDATE: *The name of the Cado Tiger ATS Systems has been formally changed to CONTEL Tiger ATS Systems. CONTEL has changed its marketing approach in that it now sells through value added retailers (VARs) and direct sales offices (DSOs) rather than distributors. A DSO is a previous distributor that has been purchased by CONTEL; there are currently a total of 17 DSOs across the country. CONTEL has enhanced the Tiger ATS Systems by introducing new printers and workstations, and by increasing the capacity of the 10MB Winchester disk device to 15MB and the capacity of the 20MB streaming tape cartridge to 45MB-60MB. The operating system, data base management system, and word processing system have also been enhanced. The two decision support workstations, Tiger DS/PC and Tiger DS/XT, are no longer marketed by CONTEL.*

The new workstations, C320 and C321, provide AT-type keyboards offering extra function keys, while maintaining previously offered keyboard functions. The Model C320 is a data processing terminal only. The Model C321 is both a word processing and data processing terminal. The terminals also offer a smaller footprint than CONTEL's previously offered terminals.

CONTEL has introduced four new printers for use with the Tiger ATS Systems. Model P-2002 is a 24-wire, dot matrix impact printer offering speeds of 80, 160, or 288 characters per second (cps). Model P-3404 provides speeds of from 100 to 500 cps, and offers graphics features. Models P-4002 and P-4010 are 9-wire, dot matrix printers also offering graphics printing capabilities. The P-4002 and P-4010 are

The CONTEL Tiger ATS Systems make up a line of four hardware- and software-compatible systems that allow for easy upgradability. The systems are multiuser 16-bit systems marketed through value added retailers (VARs) and direct sales offices (DSOs). The systems can be upgraded by replacing the CPU and adding additional peripherals.

MODELS: ATS 8, ATS 16, ATS 32, and ATS 64.
MEMORY: 256KB to 1.1MB.
DISK CAPACITY: 15MB to 568MB.
WORKSTATIONS: Up to 64.
PRICE: $12,000 to $38,500 (basic system suggested price).

CHARACTERISTICS

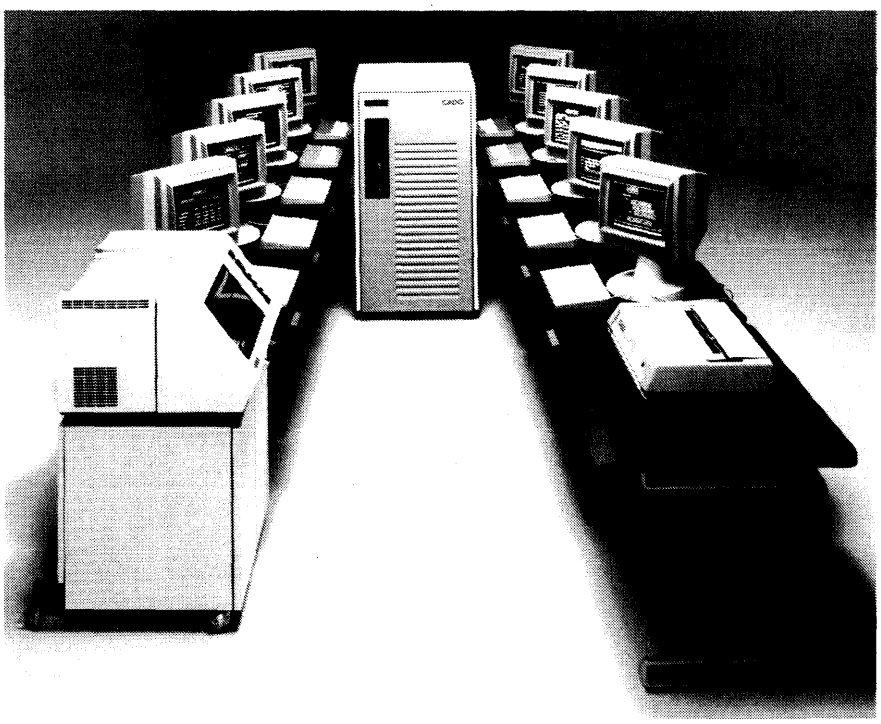
VENDOR: CONTEL Computer Systems, 2055 West 190th Street, P.O. Box 3759, Torrance, CA 90510. Telephone (213) 323-8170.

CANADIAN ADDRESS: In Canada, as in most other countries, CONTEL products are supplied by a network of value added retailers (VARs) and direct sales offices (DSOs). Currently, there are VARs or DSOs based in 12 Canadian cities.

DATA FORMATS

BASIC UNIT: 16-bit word.

INTERNAL CODE: ASCII.



The Tiger ATS 64, shown here, is built around a tri-processor architecture that supports up to eight Transaction Processors, one Control Bi-Processor, two Intranet Processors, and two Global Memory Modules. The ATS 64 can accommodate 568MB of storage via 30MB, 60MB, or 143MB hard disks.

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CHART A. SYSTEM COMPARISON

MODEL	Tiger ATS 8	Tiger ATS 16	Tiger ATS 32	Tiger ATS 64
SYSTEM CHARACTERISTICS				
Date of introduction	May 1985	May 1984	July 1983	March 1983
Date of first delivery	May 1985	May 1984	October 1983	March 1983
Microprocessor type	Intel 80186	Intel 80186	Intel 8086-2, 8089	Intel 8086-2, 8089
Microprocessor cycle time	500 ns	500 ns	500 ns	500 ns
Operating system	Tiger ATS 8/16 OS	Tiger ATS 8/16 OS	MM/IOS	MM/IOS
Upgradable from	Not applicable	ATS 8	ATS 8, ATS 16	ATS 8, ATS 16, ATS 32
Upgradable to	ATS 16, ATS 32, ATS 64	ATS 32, ATS 64	ATS 64	Not applicable
Number of users	Up to 8	Up to 16	Up to 32	Up to 64
Number of serial/parallel I/O ports	8	16	32	64
Number of expansion slots	—	—	9	17
MEMORY				
Minimum capacity (bytes)	256K	512K	256K	256K
Maximum capacity (bytes)	512K	512K	1.1M	1.1M
DISK STORAGE				
Minimum capacity (bytes)	15M	15M	36M	60M
Maximum capacity (bytes)	134M	134M	268M	568M
NUMBER OF WORKSTATIONS	8	16	32	64
COMMUNICATIONS PROTOCOLS	IBM 2770, 2780, 3270, 3280; BSC; TTY	IBM 2770, 2780, 3270, 3280; BSC; TTY	IBM 2770, 2780, 3270, 3280; BSC; TTY	IBM 2770, 2780, 3270, 3280; BSC; TTY

Note: A dash (—) in a column indicates that the information is unavailable from the vendor.

identical except that the P-4002 is an 80-column printer, and P-4010 is a 136-column printer.

At the software end, the operating systems have been upgraded; the most significant enhancement is the support of increased printer speeds. The enhanced Just ASK data base management system offers more program capabilities and an almost English-like data processing language. The new features of the WordBase word processing system include indexing and cross-referencing capabilities.

The Tiger ATS 8 entry-level system is fully compatible with the other ATS family systems and can be upgraded to any of the other models. The basic Tiger ATS 8 consists of a 4-port processor module using an 8MHz Intel 80186 microprocessor, 256KB of memory, a 15MB microWinchester hard disk, and a 45MB or 60MB streaming tape cartridge for backup. Expansion to eight ports is achieved by the addition of an expansion board that contains four additional RS-423 serial I/O ports and 256KB of additional memory. Up to 134MB of hard disk storage can be accommodated by utilizing 15MB, 36MB, or 67MB disk drives.

The ATS 16 is based on a 16-bit Intel 80186 microprocessor and features 512KB Global Memory (GM), 16 I/O ports, and support for up to 16 terminals. The ATS 16 can be upgraded to an ATS 32 by replacing the CPU and adding storage devices, terminals, and peripherals when needed.

The ATS 32 is a 32-user system that is built around three 16-bit microprocessors: two Intel 8086-2s and one Intel 8089. One 8086-2 chip is included with the Intranet Processor, which acts as the system resource manager and resource scheduler. The second 8086-2 is contained in the Transaction Processor. The Transaction Processor executes short-duration tasks while supporting concurrent asynchronous or bisynchronous communications with a

MAIN STORAGE

The Tiger systems feature Global Memory. Global Memory (GM) is available in 256KB increments to provide for a maximum of 1MB. GM has the ability to provide full track buffering for each user's disk I/O. The GM card is available as one or two of two different assemblies—256KB or 512KB—depending on the amount of memory desired. Each card is custom built according to its intended capacity.

GM is organized as 2 bytes wide with access to either a single byte or a full word (2 bytes) during one memory cycle. The GM communicates, as a slave, with other cards in the system via a common bus, Cadobus, a modified Intel Multibus.

The memory cycle time is 500 nanoseconds.

Memory parity error detection and generation are standard. The GM allows testing of parity circuits by providing the capability of writing bad parity for each byte. The Cadobus master activates the test/signal during the memory cycle, which causes incorrect parity to be written for the bytes accessed.

PROCESSING COMPONENTS

The Tiger ATS 8 and ATS 16 are built around an 8MHz Intel 80186 microprocessor.

The Tiger ATS 32 and ATS 64 models are powered by multiple 8MHz Intel 8086 and 5MHz Intel 8089 processors arranged in a tri-level architecture to accommodate a number of terminals without a significant degradation of performance or response speed. The CPUs perform preallocated system tasks and operate interactively with microprocessors at other levels. A base system with three microprocessors supports up to eight terminals. As more than eight terminals are needed, other processors are added. The three processors incorporated in the ATS 32 and ATS 64 are the Intranet Processor, Transaction Processor, and Control Bi-Processor. The ATS 32 and ATS 64 are built around the Cadobus, which operates at a speed of 1MHz.

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CHART B. DISK/DISKETTE DEVICES

MODEL	ATS Diskette	ATS Disk	ATS Disk
Type	Diskette	Winchester	Winchester
Size (inches)	5¼	5¼	5¼
Number of surfaces	2	6	7
Formatted capacity per drive (bytes)	1.2M	15M	36M
Interface/controller	Proprietary	Proprietary	Proprietary
Average access time (nanoseconds)	—	65 ms	65 ms
Data transfer rate	500K bps	5M bps	5M bps
Sectors/tracks per surface	77	302	638
Bytes per sector/track	8192	8192	8192
Comments	Supported by system Models ATS 8, 16	Supported by system Models ATS 8, 16, 32	Supported by system Models ATS 8, 16, 32

Note: A dash (—) in a column indicates that the information is unavailable from the vendor.

CHART B. DISK/DISKETTE DEVICES (Continued)

MODEL	ATS Disk	ATS Disk	ATS Disk
Type	Winchester	Winchester	Winchester
Size (inches)	5¼	14	14
Number of surfaces	7	3	7
Formatted capacity per drive (bytes)	67M	60M	142M
Interface/controller	Proprietary	Proprietary	Proprietary
Average access time (nanoseconds)	30 ms	—	—
Data transfer rate	5M bps	7.7M bps	7.7M bps
Sectors/tracks per surface	1156	2472	2480
Bytes per sector/track	8192	8192	8192
Comments	Supported by system Models ATS 8, 16, 32	Supported by system Model ATS 64	Supported by system Model ATS 64

Note: A dash (—) in a column indicates that the information is unavailable from the vendor.

full data set interface. The Control Bi-Processor (CBP), which houses the 8089 CPU, accepts task assignments from other processors and interfaces with storage drives. The ATS 32 offers a Global Memory range of 256KB to 1.1MB RAM. The ATS 32 has the capability to use one Intranet Processor, four Transaction Processors, one Control Bi-processor, and two Global Memory Modules.

For additional user support, CONTEL offers the ATS 64. Like the ATS 32, the ATS 64 features a tri-processor architecture; however, up to eight Transaction Processors and one Control Bi-processor can be supported. The ATS 64 is a 64-user system using eight Transaction Processors, one Intranet Processor, and two 512KB GM Modules. The ATS 32 and ATS 64 systems are built around a common bus, Cadobus, which allows the GM and processor cards to communicate with each other.

CONTEL provides data storage with diskette, Winchester disk, or tape cartridge backup. The ATS 8, ATS 16, and ATS 32 accept 5¼-inch 15MB, 36MB, or 67MB Winchester disks. The ATS 8 and the ATS 16 support one or two drives of the same capacity. Up to 268MB of data storage are available on the ATS 32. Fourteen-inch Winchester disks are available for the ATS 64, which can accommodate up to 568MB of storage via 60MB or 142MB hard disks.

Double-sided, double-density, 5¼-inch, 1.2MB diskettes are available. A quarter-inch 45MB or 60MB streaming tape cartridge drive is also available for backup. All four models accept the tape cartridge; however, only one backup medium can be used with the ATS 32. The ATS 8, ATS 16,

The *Intranet Processor (IP)*, which serves as the system resource manager and resource scheduler, contains one 8086-2 processor, 32KB local RAM, and 16KB local PROM expandable to 32KB. The RS-232-C port included with the IP provides access to the processor for firmware and software debugging purposes. As with all the microprocessors on the Cadobus, IP can access both its own local memories and the Global Memory. Individual processors cannot address the other processors' local memories.

The 8086-2 included in the IP is subject to two types of external interrupts: nonmaskable and maskable. Signs of the nonmaskable interrupt are a power fail signal from the power supply, a voltage warning signal generated on the IP, or a temperature warning on the IP. A maskable interrupt signal generated by a programmable interrupt controller is indicated by IR0 for a parity error; IR1 through IR4 means currently unassigned; IR5, system bus time-out; IR6, currently unassigned; and IR7, realtime clock.

One *Transaction Processor (TP)* card is allocated for each eight terminals in the system. Each TP contains an 8086-2 chip with 16KB local RAM, and 16KB local PROM expandable to 32KB. The eight-port TP provides seven asynchronous ports and one async/sync port for full data set control. A second eight-port version provides long-distance, hard-wired communication with devices which interface via RS-423.

The *Control Bi-Processor (CBP)* is based on an 8089 I/O processor and is designed specifically for interfacing with high-speed I/O devices. It also provides the capability for direct memory access operations on the common bus. The electronics for the Tiger systems are contained on 12-by-9 inch, four-layer printed circuit cards which plug into the card cage from the front of the system. The card cage backplane is also a printed circuit card with printed circuit card connectors for a maximum of 17 cards in the ATS 64 and 9 cards in the ATS 32.

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CHART C. WORKSTATIONS

MODEL	C-300	C-301	C320/C321
DISPLAY PARAMETERS			
Max. chars./screen	2,000	2,000	1,920
Buffer capacity	—	—	—
Screen size (lines x chars.)	25 x 80	25 x 80	24 x 80
Tilt/swivel screen	Tilt, swivel	Tilt, swivel	Tilt, swivel
Symbol formation	9 x 7 dot matrix	9 x 7 dot matrix	7 x 9
Character phosphor	Green on black	Green on black	Green, amber
Total colors/no. simult. displayed	None	None	None
KEYBOARD PARAMETERS			
Style	Typewriter-style	Typewriter-style	Typewriter-style
Character/code set	ASCII	ASCII	—
Detachable	Yes	Yes	Yes
Program function keys	All keys programmable	All keys programmable	10
TERMINAL INTERFACE	RS-423	RS-423	RS-423 (RS-232-C compat.)
COMMENTS			Model 320 is a data processing terminal. Model 321 performs both word processing and data processing functions.

Note: A dash (—) in a column indicates that the information is unavailable from the vendor.

and ATS 64 can be configured with two backup storage devices.

Tiger ATS 8/16 O/S and MM/IOS are the standard operating systems used with the Tiger Systems. The Tiger ATS 8/16 O/S, which is bundled with the ATS 8 and ATS 16, supports intertask program sharing and enables the computer to execute applications simultaneously in international languages. MM/IOS (Multi-Master/Interpretive Operating System) is used with the ATS 32 and ATS 64. MM/IOS is similar to the ATS 16 operating system, but is designed for multiple microprocessor-based systems.

Cadol, a proprietary programming language, is bundled with the ATS systems. This business-oriented language contains parts of the Basic and Cobol languages. Programs are written and debugged with Cadol's text editor and then converted into a semicompiled run-time module. Each module is a series of one- or multibyte subroutines that are interpreted by the operating system as the program runs.

CONTEL Tiger ATS Systems support both asynchronous and bisynchronous data communications. Standard terminal emulation features include IBM 2770, 2780, 3780, and 3270. TTY and BSC protocols are also supported.

Over 500 applications software systems developed by distributors and independent software firms are available through CONTEL VARs and DSOs. These packages are available for industries that include banking, medical, legal, construction, transportation, wholesale, distribution, manufacturing, and retail, to name a few.

COMPETITIVE POSITION

The CONTEL Tiger ATS 16-bit systems are marketed for general purpose computing and are aimed at small-to-medium sized businesses. However, so are a number of other vendors' systems, thus supplying CONTEL with an abundance of competitors. These systems vying for the

INPUT/OUTPUT CONTROL

The Cadobus provides the routing between the IP, TP, CBP, and Global Memory. The TP provides the interface between the Cadobus and the terminals. The CBP provides the interface to the disk and tape devices. The ATS 8 supports eight I/O channels; the ATS 16 supports 16 I/O channels; the ATS 32 supports 32; and the ATS 64 supports 64. The data transfer rate for the ATS 8, the ATS 16, and ATS 32 is 5M bps. A transfer rate of 7.7M bps is featured on the ATS 64.

CONFIGURATION RULES

The members of the Tiger series are compatible in all areas except the diskette and hard disk storage areas.

The Tiger ATS 8 basic system offers four ports for workstation support, a 15MB microWinchester hard disk, and either a 1.2MB diskette or a 45MB or 60MB streaming tape cartridge for backup. The system can be expanded to eight ports by the addition of an expansion board which contains four more RS-423 serial I/O ports and 256KB of additional memory. Up to 134MB of hard disk storage can be accommodated by adding one or two 15MB, 36MB, or 67MB disk drives.

The ATS 16 offers 16 ports and stores data on one or two 5¼-inch microWinchester disks. Disk formats include 15MB, 36MB, or 67MB capacities for a maximum of 134MB of storage. Backup storage is available in the form of a 45MB-60MB streaming tape cartridge.

The ATS 32 provides up to 32 ports and uses the same 5¼-inch microWinchester drives as the ATS 16. The ATS 32 can also host two additional disks for a maximum capacity of 268MB and one 45MB-60MB streaming tape drive.

The ATS 64 supports up to 64 ports, and accommodates up to eight 14-inch Winchester drives in 30MB, 60MB, or 142MB capacities for a maximum of 568MB disk storage. It also supports up to three 45MB-60MB streaming tape drives.

Any serial port can support one printer; however, each processor must be configured with at least one terminal.

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CHART D. PRINTERS

MODEL	P-301	P-601	P-811	P-1005
Type	Line	Line	DP quality	Letter quality
Speed	300 lpm	600 lpm	150 cps	80 cps
Bidirectional printing	No	No	Yes	Yes
Paper size	16″	16″	3.2″-15.5″	4″ to 16″
Character formation	9 x 7, 12 x 9	9 x 7, 12 x 9	9 x 7	Daisywheel
Horizontal character spacing (char./inch)	13.3, 15, 16.7	13.3, 15, 17.1	10	10, 12, 15
Vertical line spacing (char./inch)	6, 8, 9, 10.2	6, 8, 9, 10.2	3, 6, or 8	3, 6, 8
Character set	96 ASCII	96 ASCII	64 ASCII	96 ASCII
Controller/Interface	—	—	—	—
No. of printers per controller/interface	1/port	1/port	1/port	1/port
Printer dimensions, in. (h x w x d)	41.5 x 30 x 24.3	41.5 x 30 x 24.3	8 x 25.8 x 20	7.3 x 23.5 x 17.9
Graphics capability	No	60 dots per inch (H), 72 dots per inch (V)	No	No
Comments				

Note: A dash (—) in a column indicates that the information is unavailable from the vendor.

CHART D. PRINTERS (Continued)

MODEL	P-1006	P-2002	P-3404	P-4002/P-4010
Type	Letter quality	Dot matrix	Dot matrix	Dot matrix
Speed	48 cps	80/160/288 cps	100/500 cps	44/220 cps
Bidirectional printing	Yes	Yes	Yes	Yes
Paper size	4″ to 16″	6″ to 16″	6.1″ to 15.5″	4″ to 16.5″
Character formation	Daisywheel	24-wire dot matrix	4 x 7, 5 x 9, 6 x 18	9-wire dot matrix
Horizontal character spacing (char./inch)	10, 12, 15	10, 12, 18	10, 12, 13.1, 16.7	10, 12, 15, 17.1
Vertical line spacing (char./inch)	3, 6, 8	3, 6, 8	3, 4, 6, 12, 1/144	Programmable, 1/144
Character set	96 ASCII	96 ASCII, Int'l	96 ASCII/ISO plus, 16 Nat'l	96 ASCII, 8 Nat'l
Controller/Interface	—	—	—	—
No. of printers per controller/interface	1/port	1/port	1/port	1/port
Printer dimensions, in. (h x w x d)	6.3 x 21.7 x 15	6.3 x 21.7 x 15	5 x 24.6 x 15.6	4.7 x 17.2 x 13.6
Graphics capability	No	No	Yes	Yes
Comments				P-4002—80 column; P-4010—136 column

Note: A dash (—) in a column indicates that the information is unavailable from the vendor.

same market as CONTEL include the ever-present IBM System/36, Burroughs B 90 and B 1900, Hewlett-Packard HP 3000 low-end systems, Honeywell DPS 6 16-bit systems, Datapoint 8600, McDonnell Douglas M6527, and Digital Equipment Corporation PDP-11 low-end systems, as well as other 8- and 16-bit systems. The CONTEL systems also run into competition from the 32-bit supermicrocomputer systems, which are, in many instances, aimed at the same market.

While most of the above systems offer comparable features and capabilities, we chose the Honeywell DPS 6/45 to do a one-on-one comparison with the ATS 64. Both are 16-bit systems offering a proprietary operating system. The Honeywell DPS 6/45 provides twice the memory and storage capacity at 2MB and 1GB, respectively, than the CONTEL Tiger ATS 64, which offers 1.1MB of memory and 568MB of storage. However, the ATS 64 doubles the number of users supported with support of 64 users versus the 32 supported on the DPS 6/45. At the present time, however, because the CONTEL Tiger ATS 64 is the high-end system in the CONTEL family, no upgrade path is offered for system expansion. In contrast, the DPS 6 family provides several 16-bit systems above the 6/45 for upgradability, and is also software compatible with the high-end, DPS 6 32-bit systems.

INPUT/OUTPUT UNITS

See Chart B for disk and diskette devices, Chart C for workstations, and Chart D for printers.

CONTEL offers a ¼-inch streaming tape cartridge device for the Tiger ATS Systems. It offers 90 ips tape speed, 0.083M bps data transfer speed, and bit serial recording mode. The tape drive has 9 tracks and a storage capacity of 45MB-60MB.

COMMUNICATIONS

Both asynchronous and synchronous communications lines, operating at speeds up to 19.2K bps, are featured with the Tiger ATS Systems. Only one line is supported by the ATS 8; 2 to 4 lines are supported by the ATS 16; the ATS 32 supports from 4 to 12; and the ATS 64, between 8 and 24.

SOFTWARE

OPERATING SYSTEM: The Tiger ATS 8 and ATS 16 run under the Tiger *ATS 8/16 O/S*, while the ATS 32 and ATS 64 support CONTEL's *MM/IOS (Multi-Master/Interpretive Operating System)*. The Tiger ATS 8 and ATS 16 support intertask program sharing, which allows I/O ports or devices to be clustered so that multiple operators can work as a team on a single project. The computer can execute applications simultaneously in international languages. The MM/IOS system is similar to Tiger ATS 8/16

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Another factor one might consider in comparing the two systems is that Honeywell provides the systems support for its products, whereas the CONTEL systems are supported by CONTEL only when sold through DSOs. Those sold through VARs are supported by that particular VAR. Whether this is a competitive advantage or not depends entirely upon the individual VAR and the training and support they are capable of providing, as discussed in the "Advantages and Restrictions" section.

ADVANTAGES AND RESTRICTIONS

The CONTEL systems offer small businesses the advantage of being able to purchase a small system with a good cost/performance ratio, and expand up to 64 users as their needs increase with a minimum of effort. The systems offer total compatibility. To expand, a user need only change the CPU and incorporate the required additional storage devices, terminals, and peripherals. In addition, because the systems are software compatible, no software conversion is required.

Previously, all CONTEL systems and applications software were sold and serviced by distributors (the systems are now sold through VARs or DSOs). Whether this is an advantage or disadvantage depends entirely upon the individual distributor, VAR, or DSO. Most users contacted in our survey are extremely happy with the CONTEL systems and attribute the success of the system not only to the reliability, speed, and architecture of the system, but also to the distributor who supports both the system hardware and software. A definite advantage of a distributor network such as CONTEL's is that the distributor is quite often better able to devote more time to the user and to provide individualized service, such as customized software, than is the manufacturer itself. Such personal attention is not always possible with larger vendors.

We were impressed with the enthusiasm expressed by the users when talking about their CONTEL systems. The CONTEL users we contacted could not seem to say enough about how pleased they are with their systems. Each listed the system's advantages as being extremely reliable, easy to learn and use, and offering good response time.

USER REACTION

When Datapro performed its Computer Users Survey in 1986, not enough CONTEL users responded to do a reliable analysis of user satisfaction. Therefore, CONTEL supplied Datapro with a list of user names from which to do a telephone survey. Datapro then contacted seven of these users in August 1986 to provide an assessment of how users felt about the CONTEL Tiger Systems. Three users had ATS 32 systems, two had ATS 64 systems, and two users had ATS 16 systems. The average life of the ATS systems was 14 months.

Of the systems represented in the survey, two had 512KB of memory and one had 1024KB of memory; the other four users were not sure of the memory capacity. Three systems

operating system, but is designed specifically for the multiple microprocessor implementation. The operating systems reside in RAM or ROM. The operating system is bundled with the Tiger systems.

The Tiger systems support a number of utilities, which are available at no additional charge at the time of purchase or at a later date. These utilities support disk management, program management, data files, text files, security, diagnostics, backup data transfer, and communications functions.

DATA BASE MANAGEMENT SYSTEM: CONTEL's relational data base and forms generator, *Just Ask III,* manipulates data without engaging help from the user. Just Ask III commands are written in English or the host foreign language to produce lists, tallies, bar charts, and statistical analyses in various formats. Users can open, merge, or close data files chosen from records already retained within the system's regular data base. Data files may be accessed by application or by Just Ask III.

LANGUAGES: *Cadol,* a proprietary programming language, is a business-oriented language that contains constructs of Basic and Cobol. Programs are written and debugged with a Cadol text editor, which is supplied as a utility. The compiler, also bundled, converts each program into a semicompiled run-time module. Each module is a series of one-byte or multibyte subroutines interpreted by the operating system as the program runs. The operating systems accommodate the modules in the form of program overlays. The Tiger ATS 8/16 OS and MM/IOS operating systems can accept an infinite number of overlays.

Cadol is not normally intended for the user programmer; however, trained VAR programmers can use it to write and modify turnkey applications packages.

COMMUNICATIONS: Standard terminal emulation features include IBM 2770, 2780, 3780 and 3270. All three systems support TTY and BSC protocols.

CONTEL's in-house message handling package, *Remote Terminal Communications Facility (RTCF),* provides access to public data bases and to outside services, such as Telex, TWX, and DDD. RTCF also allows any individual terminal to access files in any Tiger system networked with its "home" system.

APPLICATIONS: CONTEL VARs develop custom software tailored to each business operation. The VAR defines the software requirements, performs the programming, and provides software support. Ensuring that the systems meet customer needs is the responsibility of the VAR.

CONTEL has developed a software library that includes over 500 application packages developed by VARs and independent software firms. The CONTEL library includes software for the banking, medical, legal, construction, transportation, restaurant, farm, wholesale, distribution, manufacturing, sports, leisure, consumer retail, and service industries. The packages are menu-driven, multiuser, and multitasking, and require either the MM/IOS or Tiger 8/16 O/S to run. The documentation for these programs is available from CONTEL VARs.

ATS system VARs provide office automation features that combine *WordBase,* the Tiger communication capabilities, and individual application programs. WordBase is a word processing package that includes data capture techniques and output control. WordBase features include the ability to produce business correspondence, create and process forms, capture data, create new files, maintain a tickler file, and perform business mathematics.

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supported 36MB of disk storage, two supported 142MB, and one supported 108MB.

When asked how many local workstations were supported by their systems, two users said eight, two said five, two said two, and one said 13. Three users reported their system supported one remote terminal, and two users are planning to add remote terminals within the next year.

A variety of industries was represented in the survey and included a credit union, rental firm, publisher, manufacturing firm, importer, service bureau, and transportation company. The applications cited included accounting (seven users), payroll and personnel (five users), order processing and sales and distribution (three users each), purchasing (two users), and manufacturing and banking (one user each). Most of the users also had customized packages to meet the specific needs of their particular business.

Several of the users replied that they planned to expand their systems within the next year, with three planning expansion in the communications area, two adding additional terminals, and two adding additional disk storage. One user plans to upgrade to a new CONTEL system.

All of the users contacted said their systems were used as organizational systems performing all the functions of the company, and not just as departmental systems.

CONTEL Tiger ATS users rated their systems as shown in the following table.

	Excellent	Good	Fair	Poor	WA*
Ease of operation	5	2	0	0	3.8
Reliability of system	5	2	0	0	3.8
Reliability of peripherals	4	3	0	0	3.6
Maintenance service:					
Responsiveness	5	2	0	0	3.8
Effectiveness	5	2	0	0	3.8
Technical support:					
Troubleshooting	4	3	0	0	3.6
Education	1	5	1	0	2.7
Documentation	1	3	3	0	2.8
Manufacturers software:					
Operating system	2	5	0	0	3.3
Compiler & assemblers	2	1	0	0	3.7
Application programs	3	2	0	0	3.6
Ease of programming	1	0	0	0	4.0
Ease of conversion	2	1	1	0	3.3
Overall satisfaction	3	4	0	0	3.8

*Weighted Average on a scale of 4.0 for Excellent.

All of the seven users contacted said that their systems performed as expected, and all said they would definitely recommend the CONTEL systems to another user. All the CONTEL users were more than pleased with their system; in fact, five of the users had upgraded from smaller CONTEL systems, and because of their satisfaction with their previous system, did not even bother to look at other vendors' systems. However, one new CONTEL user said that he did look at at least 17 other vendors' systems before purchasing; he said he came upon the CONTEL system quite by accident (he had never heard of them previously)

***BusiPlan*, CONTEL's financial planning package, permits users to build financial models around a number of variables. The system is structured for multitasking use, so a number of operators can work at the same time on different models.**

OPERATING ENVIRONMENT

The Tiger systems are housed in freestanding metal cabinets. These cabinets include the CPU(s), memory, magnetic media, and circuit boards. The ATS 8 system measures 8 inches high by 15 inches wide by 17⅜ inches deep. The ATS 16 system's cabinet is 26 inches high by 8 inches wide by 19 inches deep. The ATS 32 measures 29⅛ inches high by 15¼ inches wide by 25¾ inches deep. The ATS 64 dimensions are 46¾ inches high by 24½ inches wide by 32 inches deep. The electrical requirements for all four systems are 115 or 230 volts ±10 percent AC, 50 or 60 Hz. The operating temperature range for the systems is 50 to 104 degrees Fahrenheit.

SUPPORT SERVICES

DOCUMENTATION: CONTEL documentation is distributed by the VAR or DSO.

TRAINING/EDUCATION: CONTEL maintains a training course curriculum for its VARs. User training is supplied by the VARs, either through on-site services or in the VAR's classroom.

MAINTENANCE: A variety of maintenance service plans is provided by the VARs.

PRICING

POLICY: CONTEL products are sold through VARs in some 200 worldwide cities. The VARs are independently owned and operated by computer specialists who have demonstrated financial stability and who employ a staff that CONTEL feels is capable.

Lease terms are available for the Tiger systems; contact the VARs for information. Purchase discounts are available for quantities over 25 units. The hardware carries a 90-day warranty.

and was more impressed with the CONTEL system than with the other vendors' systems.

One thing that should be noted regarding the ratings above is that all the systems were purchased through CONTEL distributors. Therefore, the systems support ratings apply to the distributors and not to CONTEL. This applies with most of the software support also, as all but one of the users obtained their software from the distributor; this one user developed his software in-house.

In conducting the telephone survey, we captured additional thoughts and comments from four users.

The first user was from a service company located in the East. The service company utilizes a CONTEL ATS 64; the company also has several smaller CONTEL systems. Before purchasing the ATS 64 system, the user considered an IBM System/34, but went with the CONTEL system because of the upgradability potential in both the hardware and software areas. The system supports five local workstations, 512KB of memory, and 140MB of disk storage. The user stated that the system features he liked best were the

CONTEL Tiger ATS Systems

ease of programming, ease of learning, and the ability to expand from the smallest CONTEL system to the largest with ease; he said it took them a total of 10 hours to upgrade to the ATS 64. Reliability is another key word he used in referring to the system; the ATS 64 has had no downtime. The only problem he could mention was with the printers; but he said they literally "beat them to death" so he didn't consider it a printer fault.

The company plans to expand by adding an ATS 8 with 256KB of memory and 67MB of disk storage at a separate location and tying their systems together with modems and the Cadolink program. When asked if the CONTEL systems would always be able to meet his firm's needs, he responded that they were a little concerned in that area and felt the CONTEL systems could always handle the accounting application needs, but felt they may have to look for a larger system for their marketing needs as his company grows. This user purchased his system through a CONTEL distributor and, therefore, gets all his support from the distributor.

The second user represented a Northeast publishing company who just recently upgraded from a CONTEL ATS 8 to an ATS 64. The user chose to stay with the CONTEL system family because of software compatibility and because the hardware performance was good. The system runs applications such as production and order entry, circulation, word processing, and accounting; the user mentioned that they are about to add typesetting to this list. The system supports 11 workstations, 1024KB of main memory, 142MB of disk storage, and a 45MB tape device. This user especially likes the ATS 64 because it provides good speed and performance for the dollar. He states its main disadvantage is its lack of compatibility with other vendor's products in both hardware and software areas. When asked what he would like to see CONTEL add to the system, he responded, "The ability to run canned software, such as Lotus 1-2-3." This user leases his system through a third-party vendor and obtains both software and hardware support from the CONTEL distributor.

The third user contacted was with a Southwestern import company. This user recently upgraded from a smaller CONTEL system to the ATS 32, which supports 13 local workstations and 1 remote workstation. She was unsure of the amount of memory and disk storage supported. When asked what applications were run on the system, she responded, "everything" (we assume that means every application an importer would have need of, such as accounting, order processing, and payroll, among others). She said they did not even consider other vendor's systems when upgrading, as they were happy with their previous CONTEL systems and the support provided by the distributor in both the hardware and software areas. This user, who said she has also worked on IBM systems, considered the CONTEL to be a very reliable system with no downtime and no software problems.

The fourth user, representing a Midwestern manufacturing firm, stated she was "in love with her computer." This user has had an ATS 32 for approximately two years; they had a smaller CONTEL system previous to that. Her company considered IBM, Burroughs, and other vendor's systems before upgrading, but didn't want to go through the programming problems again. She said that the systems were working fine and they didn't want to upset that. She listed speed and reliability as the system's advantages. She said the system provides her with timely information and they have had no downtime to speak of. This user is also happy with the support from the distributor. The company has no immediate plans to expand. □

EQUIPMENT PRICES

The prices listed below are the suggested list prices provided by CONTEL; prices may vary depending upon the distributor. The monthly maintenance fee is 1¼ percent per month of the total configuration cost. The rental costs are dependent upon the distributor.

		Purchase Price ($)
BASIC SYSTEMS		
ATS 8	Four-user system includes CPU, 256KB RAM, 45-60MB streamer tape drive, 15MB disk drive, 1 C301 terminal	12,085
ATS 16	Four-user system includes console with CPU, 512KB RAM, 45-60MB streamer tape drive, 36MB disk drive, 1 C301 terminal	17,600
ATS 32	Eight-user system includes console with three CPUs, 512KB RAM, 45-60 MB streamer tape drive, 67MB disk drive, 1 C301 terminal	23,650
ATS 64	Eight-user system includes console with three CPUs, 512KB RAM, 45-60MB streamer tape drive, 142MB disk drive	46,000
PROCESSOR OPTIONS		
	256KB increments for ATS 32 and ATS 64	3,000
	Four-user I/O board on the ATS 16	1,250
	Transaction Processor for ATS 32 and ATS 64	2,600
	Four-user I/O board with 256KB RAM on Tiger 8	2,000

NC—No charge.
TBA—To be announced.

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		Purchase Price ($)
MASS STORAGE		
	5¼-inch 1.2MB double-sided diskette	NC
	5¼-inch 15MB Winchester disk with controller	2,230
	14-inch 30MB Winchester disk with controller	6,575
	14-inch 60MB Winchester disk with controller	8,220
	14-inch 142MB Winchester disk with controller	10,525
	5¼-inch 67MB Winchester disk with controller	4,085
	5¼-inch 36MB Winchester disk with controller	3,400
MAGNETIC TAPE EQUIPMENT		
	¼-inch 45-60MB streaming tape cartridge with controller	2,085
WORKSTATIONS		
C-300	Standard business video display and keyboard	950
C-301	Word processing video display and keyboard	1,575
C-320	Standard business video display and keyboard with programmable function keys	TBA
C-321	Word processing video display and keyboard with programmable function keys	TBA
PRINTERS		
P-301	300 lpm line printer designed for word processing	6,890
P-601	600 lpm line printer designed for word processing	9,045
P-811	150-cps DP printer	2,155
P-3404	100- or 500-cps near-letter quality printer	3,070
P-1005	80-cps word processing printer	2,455
P-1006	48-cps word processing printer	1,575
P-2002	Dot matrix, dual mode printer, 288/160/80 cps	1,770
P-4002	Dot matrix, dual mode, 220/44 cps, 80-column printer	615
P-4010	Dot matrix, dual mode, 220/44 cps, 136-column printer	770
COMMUNICATIONS OPTIONS		
	Four-user serial I/O board for ATS 16	1,250
	Serial I/O board for ATS 32 and ATS 64	2,600

NC—No charge.
TBA—To be announced.

SOFTWARE PRICES

		License Fee ($)
PROGRAMMING LANGUAGES		

Cadol, CONTEL's proprietary programming language, is bundled with the Tiger ATS systems.

OPERATING SYSTEM AND UTILITIES

The Tiger ATS 16 O/S is bundled with the ATS 16 and ATS 8. The MM/IOS operating system is included with the ATS 32 and ATS 64. Any number of available utilities can be bundled with the Tiger systems.

DATA BASE MANAGEMENT		
	Just Ask III	VAR priced
OFFICE AUTOMATION		
	WordBase	VAR priced
APPLICATIONS		
	Remote Terminal Communication Facility	TBA

TBA—To be announced.
Over 500 applications packages developed by distributors and third-party software firms are available for the Tiger systems. Contact a CONTEL VAR or DSO for applications areas and pricing. ■