Cado Tiger ATS Systems

MANAGEMENT SUMMARY

UPDATE: *The Cado Tiger ATS systems make up a line of four hardware- and software-compatible systems that allow for easy upgradability. Cado continues to enhance its Tiger ATS systems with the introduction of the ATS 8. The ATS 8 is positioned at the low end of the Tiger family, supporting up to eight workstations. Cado has also introduced two decision support workstations that can be used as stand-alone systems or can be attached to the Tiger ATS systems.*

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 10MB microWinchester hard disk, and either a 1.2MB floppy disk or a 20MB 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 72MB of hard disk storage can be accommodated by utilizing 10MB, 15MB, or 36MB disk drives. A 45MB streaming tape cartridge is also supported.

The two new decision support workstations offered by Cado, the Tiger DS/PC and Tiger DS/XT, can be used as standalone desktop computers for offline functions such as spreadsheet analysis and graphics. Or, the workstations can also be supported by the Tiger ATS family of computer systems emulating the Cado C-300 terminal. The DS/PC uses the 4.7MHz, 16-bit Intel 8088 processor, and provides 256KB of memory and two 360KB diskette drives. The ▷

The four Cado Tiger ATS systems are multiuser 16-bit systems marketed through a distributor network. All four models are hardware- and software-compatible and can be upgraded by replacing the CPU and adding additional peripherals. Up to 64 users can be supported by the largest system.

MODELS: ATS 8, ATS 16, ATS 32, and ATS 64.
MEMORY: 256KB to 1.1MB.
DISK CAPACITY: 10MB to 568MB.
WORKSTATIONS: 1 to 64.
PRICE: $7,650 to $23,235 (basic system suggested price).
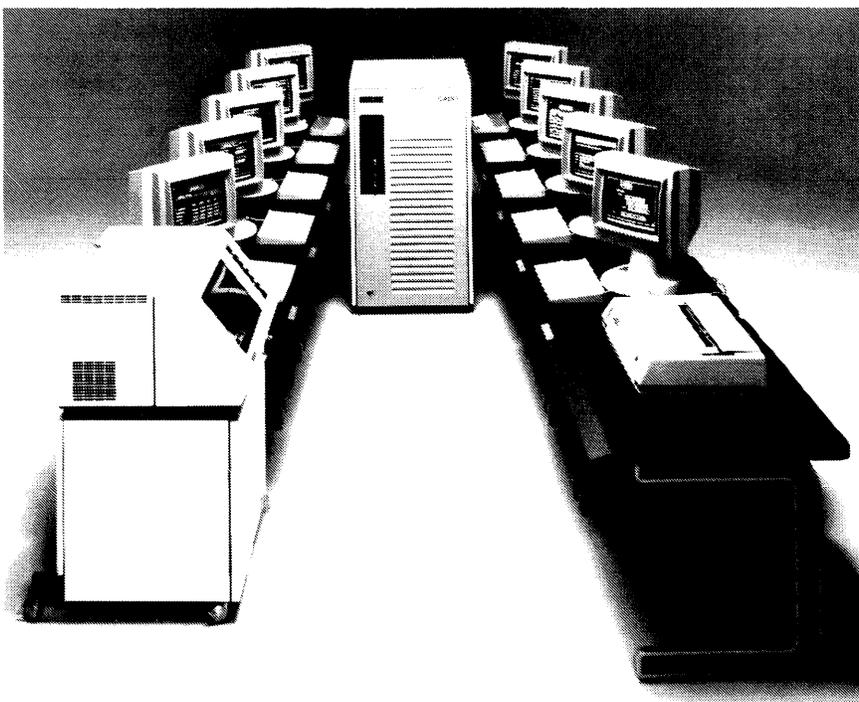
CHARACTERISTICS

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

CANADIAN ADDRESS: In Canada, as in most other countries, Cado products are supplied by a network of independent, full-service distributors. Currently there are distributors 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 triprocessor architecture that supports up to eight Transaction Processors, one Control Bi-Processor, two Intranet Processors, and two Global Memory Modules. The ATS 64 can accomodate 568MB of storage via 30MB, 60MB, or 143MB hard disks.

Cado Tiger ATS Systems

CHART A. SYSTEM COMPARISON

MODEL	Tiger ATS8	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, 8089	Intel 8086, 8089
Microprocessor cycle time	500ns	500ns	500ns	500ns
Operating system	Tiger ATS 8/16 OS	Tiger ATS 8/16 OS	MM/IOS	MM/IOS
Upgradable from	—	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	—
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)	10M	10M	10M	30M
Maximum capacity (bytes)	72M	72M	144M	1.1GB
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.

▷ DS/XT is like the DS/PC except it substitutes a 10MB Winchester hard disk drive for one of the two diskette drives. Both models incorporate compatible MS-DOS operating systems, making them compatible with IBM-PC software.

As for the other members of the ATS family, 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 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, Cado offers the ATS 64. Like the ATS 32, the ATS 64 features a triprocessor architecture; however, up to eight Transaction Processors and one Control Bi-processors 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.

► 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 trilevel architecture to accomodate 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.

The *Intranet Processor (IP)*, which serves as the system resource manager and resource scheduler, contains one ►

Cado Tiger ATS Systems

CHART B. DISK/DISKETTE DEVICES

MODEL	ATS Diskette	ATS Diskette	ATS Hard Disk	ATS Hard Disk
Type	Diskette	Diskette	Winchester	Winchester
Size (inches)	5¼	8	5¼	5¼
Number of surfaces	2	2	4	6
Formatted capacity per drive (bytes)	1.2M	1.2M	10MB	15M
Interface/controller	Proprietary	Proprietary	Proprietary	Proprietary
Average access time (nanoseconds)	—	260ms	65ms	65ms
Data transfer rate	500K bps	63K bps	5M bps	5M bps
Sectors/tracks per surface	8192	8192	8192	8192
Bytes per sector/track	256K	256K	8192	8192
Comments	Supported by system Models ATS 8, 16	Supported by system Models ATS 32, 64	Supported by system Models ATS 8, 16, 32	Supported by system Models ATS 8, 16, 32

CHART B. DISK/DISKETTE DEVICES (Continued)

MODEL	ATS Hard Disk	ATS Hard Disk	ATS Hard Disk	ATS Hard Disk
Type	Winchester	Winchester	Winchester	Winchester
Size (inches)	5¼	14	14	14
Number of surfaces	7	3	3	7
Formatted capacity per drive (bytes)	36M	30M	60M	142M
Interface/controller	Proprietary	Proprietary	Proprietary	Proprietary
Average access time (nanoseconds)	65ms	—	—	—
Data transfer rate	5M bps	7.7M bps	7.7M bps	7.7M bps
Sectors/tracks per surface	638	548	1099	1102
Bytes per sector/track	8192	18,432	18,432	18,432
Comments	Supported by system Models ATS 8, 16, 32	Supported by system Model ATS 64	Supported by system Model ATS 64	Supported by system Model ATS 64

▷ Cado provides data storage with diskette, hard disk, or tape cartridge backup. The ATS 8, ATS 16, and ATS 32 accept 5¼-inch 10MB, 15MB, or 36MB Winchester disks. The ATS 8 and the ATS 16 support one or two drives of the same capacity. Up to 144MB of data storage is available on the ATS 32. Fourteen-inch Winchester disks are available for the ATS 64, which can accommodate up to 568MB of storage via 30MB, 60MB, or 142MB hard disks.

Double-sided, double-density 5¼-inch and 8-inch 1.2MB diskettes are available. The ATS 8 and ATS 16 support 5¼-inch diskettes only; the ATS 32 and ATS 64 models run 8-inch diskettes only. A quarter-inch 20MB or 45MB 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 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 ▷

▶ 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.

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.

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.

INPUT/OUTPUT CONTROL

The Cadobus provides the routing between the IP, TP, CBP, and Global Memory. The TP provides the interface between ▶

Cado Tiger ATS Systems

CHART C. WORKSTATIONS

MODEL	C-300	C-301	DS/PC, DS/XT
DISPLAY PARAMETERS			
Max. chars./screen	2000	2000	2000
Buffer capacity	48KB	48KB	Various
Screen size (lines x chars.)	25 x 80	25 x 80	25 x 80
Tilt/swivel screen	Tilt, swivel	Tilt, swivel	No
Symbol formation	9 x 7 dot matrix	9 x 7 dot matrix	9 x 7, 9 x 16
Character phosphor	Green on black	Green on black	Green on black
Total colors/no. simult. displayed	None	None	Green on black
KEYBOARD PARAMETERS			
Style	Typewriter-style	Typewriter-style	Typewriter
Character/code set	ASCII	ASCII	256 ASCII
Detachable	Yes	Yes	Yes
Program function keys	All keys programmable	All keys programmable	10
TERMINAL INTERFACE	RS-423	RS-423	RS-232-C

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

module is a series of one- or multibyte subroutines that are interpreted by the operating system as the program runs.

Cado 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 Cado distributors. 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 Cado Tiger ATS systems are multiprocessing 16-bit systems designed for small- to medium-sized businesses. The area in which the Cado systems are competing is quite overrun with competitors. Some of the major systems competing with the Tiger ATS systems include the Burroughs B 90 systems, Hewlett-Packard Series 37 and 42, low-end Honeywell DPS/6 systems, the Texas Instruments Business Systems, and the Wang VS systems, to name a few.

The four Tiger ATS systems offer capabilities that overlap with other vendors' models. In choosing the Hewlett-Packard 3000 Series 37 system as an example in doing a system comparison with the Cado mid-range Tiger ATS 32, the Series 37 offers 2MB of memory versus 1MB on the ATS/32 and 2.1GB of storage capacity versus 144MB on the Tiger VS/32. However, the Tiger ATS 32 supports a larger number of workstations of 32 versus the 28 supported on the Series 37. The HP Series 37 is expandable up through two larger systems, whereas the ATS 32 has only one model up the line for expansion purposes.

Another item one might consider in comparing the two systems is that Hewlett-Packard provides the systems support for its products, whereas the Cado systems are sold and supported through Cado distributors. Whether this is a competitive advantage or not depends entirely upon the

the Cadobus and the terminals. The CBP provides the interface to the disk and tape devices. The ATS 8 supports 8 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 10MB microWinchester hard disk, and either a 1.2MB floppy disk or a 20MB 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 72MB of hard disk storage can be accommodated by adding one or two 10MB, 15MB, or 36MB disk drives. A 45MB streaming tape cartridge can also be attached.

The ATS 16 offers 16 ports and stores data on one or two 5¼-inch microWinchester disks. Disk formats include 10MB, 15MB, or 36MB capacities for a maximum of 72MB of storage. Backup storage is available in the form of either a 5¼-inch, 1.26MB dual-density diskette or a 20MB or 45MB 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 144MB and one 20MB streaming tape drive.

The ATS 64 supports up to 64 ports, and accommodates up to a total of eight 14-inch Winchester drives in 30MB, 60MB, or 142MB capacities for a maximum of 1.1GB disk storage. It also supports up to three 20MB streaming tape drives.

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

INPUT/OUTPUT UNITS

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

Cado offers two ¼-inch streaming tape cartridge devices for the Tiger ATS systems. Both offer 90 ips tape speed, 0.083M bps data transfer speed, and bit serial recording mode. The one tape drive has 4 tracks and a storage capacity

Cado Tiger ATS Systems

CHART D. PRINTERS (Continued)

MODEL	P-300	P-301	P-600	P601	P-811
Type	Line	Line	Line	Line	DP quality
Speed	300 lpm	300 lpm	600 lpm	600 lpm	150 cps
Bidirectional printing	No	No	No	No	Yes
Paper size	16"	16"	16"	16"	32."-15.5"
Character formation	9 x 7	9 x 7, 12 x 9	9 x 7	9 x 7, 12 x 9	9 x 7
Horizontal character spacing (char./inch)	13.3	13.3, 15, 16.7	13.3	13.3, 15, 17.1	10
Vertical line spacing lines/inch)	6 or 8	6, 8, 9, 10.2	6 or 8	6, 8, 9, 10.2	3, 6 or 8
Character set	96 ASCII	96 ASCII	96 ASCII	96 ASCII	64 ASCII
Controller/Interface	—	—	—	—	—
No. of printers per controller/interface	1/port	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	41.5 x 30 x 24.3	41.5 x 30 x 24.3	8 x 25.8 x 20
Graphics capability	60 dots per inch (H), 72 dots per inch (V)	No	No	60 dots per inch (H), 72 dots per inch (V)	No
Comments	—	—	—	—	—

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

CHART D. PRINTERS (Continued)

MODEL	P-1005	P-1006	P-2001	P-4001
Type	Letter-quality	Letter-quality	Near Letter-quality, dual mode	Near Letter-quality dual mode
Speed	80 cps	48 cps	288 cps/80 cps	160 cps/25 cps
Bidirectional printing	Yes	Yes	Yes	Yes
Paper size	4" to 16"	4" to 16"	6" to 16"	3.5"-10.5"
Character formation	Daisywheel	Daisywheel	360 x 180, 120 x 180	240 x 144, 121 x 72
Horizontal character spacing (char./inch)	10, 12, 15	10, 12, 15	10, 12, 18	10, 12, 17.1
Vertical line spacing (lines/inch)	3, 6, 8	3, 6, 8	Programmable	Programmable
Character set	96 ASCII	96 ASCII	96 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)	7.3 x 23.5 x 17.9	6.3 x 21.7 x 15.0	6.3 x 21.7 x 15.0	16.3 x 12.2 x 4.3
Graphics capability	No	No	No	Yes
Comments	—	—	—	80 Column printer dual I/O

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

▷ individual distributor, as discussed in the "Advantages and Restrictions" section.

ADVANTAGES AND RESTRICTIONS

The four Tiger ATS systems are fully compatible and upgradable, allowing users to start with the small ATS/8 system and expand up to the ATS/64. To expand, a user need only change the CPU and incorporate the required additional storage devices, terminals, and peripherals. This is a cost-effective manner in which a low-budget user can gain the advantages of a computer system without a large initial investment. In addition, no modifications are required to either systems or applications software when upgrading to a larger system.

All Cado systems and applications software are sold and serviced by distributors. Whether this is an advantage or disadvantage depends entirely upon the individual distributor, as the user interviews below demonstrate. Some users who are very happy with their Cado system attribute a good deal of that success to the software and service provided by ▷

▶ of 20MB. The other offers 9 tracks and a 45MB storage capacity.

Cado also offers an OCR reader that reads and enters up to 75 pages at a time. The device has a throughput of 25 seconds per page and automatically feeds documents ranging from 6 to 8½ by 14 inches in size. The OCR reads eight typewriter fonts. An async/sync interface and self-diagnostics are standard; RS-232-C ports are available.

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 Cado'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 ▶

▷ the distributor in addition to the reliability of the hardware. A definite advantage to a distributor network such as Cado'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 such as IBM.

Most Cado users feel the systems are flexible, reliable, and fairly easy to use. Such flexibility is a benefit in a small office where a data processing professional is not always available.

The compatibility of the DS/PC and DS/XT workstations with MS-DOS software is an added benefit, allowing users to take advantage of IBM PC-compatible software and still retain the processing power offered when the terminals are supported by the Tiger ATS systems.

USER REACTION

When Datapro performed its Computer Users Survey in 1985, not enough Cado users responded to do a reliable analysis of user satisfaction. Therefore, Cado supplied Datapro with a list of user names from which to do a telephone survey. Datapro then contacted seven of these users in July 1985 to provide an assessment of how users felt about the Cado Tiger systems. Three users had ATS 32 systems, three had ATS 64 systems, and one user wasn't sure of the system model. The average life of the ATS systems was one year.

Of the systems represented in the survey, two had 512KB of memory, one had 256KB of memory and four users were not sure of the memory capacity. Two systems supported 30MB of disk storage, one supported 60MB, one supported 15MB, and the other three users were uncertain of the amount of disk storage. When asked how many workstations were supported by their systems, one user said 16, one said nine, two said seven, and one said four; the balance of the users were not certain. Only one user's system supported a remote terminal; however, one user is planning to add remote terminals within a six-month period.

A variety of industries were represented in the survey and included two in the health care/medical industry, one in government, one in industrial contracting, one in retail, one in insurance/real estate, and one in banking and finance. The applications cited included payroll (five respondents), general ledger (five respondents), accounts payable (four respondents), word processing (three respondents), accounts receivable (three respondents), order processing/inventory (three respondents), financial (two respondents), patient billing (two respondents), and one respondent for each of the following applications: budgeting, tax administration, estimating/job costing, patient scheduling, medical reporting, purchasing, productivity reports, property management, and insurance. ▷

▶ 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 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: Cado'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, the trained distributor 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.

Cado's in-house message handling package, *Remote Terminal Communications Facility (RTCF),* provides access to public data bases and access 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: Cado distributors develop custom software tailored to each business operation. The distributor defines the software requirements, performs the programming, and provides software support. Ensuring that the systems meet customer needs is the responsibility of the distributor.

Cado has developed a software library that includes over 500 application packages developed by distributors and independent software firms. The Cado 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 Cado distributors.

ATS system distributors 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 tech- ▶

Cado Tiger ATS Systems

	Excellent	Good	Fair	Poor	WA*
Ease of operation	7	0	0	0	4.0
Reliability of system	7	0	0	0	4.0
Reliability of peripherals	4	3	0	0	3.6
Maintenance service:					
Responsiveness	3	3	1	0	2.9
Effectiveness	4	3	0	0	3.6
Technical support:					
Troubleshooting	5	1	1	0	3.6
Education	3	2	2	0	3.1
Documentation	3	1	2	1	2.4
Manufacturers software:					
Operating system	4	3	0	0	3.6
Compiler & assemblers	0	2	0	0	3.0
Application programs	5	1	1	0	3.6
Ease of programming	2	0	0	0	4.0
Ease of conversion	2	0	0	0	4.0
Overall satisfaction	5	2	0	0	3.7

*Weighted Average on a scale of 4.0 for Excellent.

As the ratings show, the users are very pleased with their system's reliability and ease of operation. While average ratings for the maintenance service were good, it must be noted that because the servicing is supplied by the distributors, this rating can vary considerably depending upon the distributor, not Cado. This also applies to the applications software category as most applications software is also supplied by the distributors, or third party vendors.

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

The first Cado user we spoke to represented a credit union on the East Coast utilizing a Tiger ATS/64 system. The system is used for processing banking/financial data and for general ledger transactions. This user spoke extremely high of the Cado system, and said he had converted from a Burroughs system because the Cado system was easier to use and the hardware had a good track record. He also said the third-party software vendor was providing better applications software updates than Burroughs. In addition, he felt the Cado multiprocessing capabilities were better than those of the Burroughs system because he was able to run programs both online and offline at the same time, which was not possible with the previously owned Burroughs system. He also stated that all 16 terminals could be operating at the same time without any degradation, and that the response time was instantaneous. The user felt the only disadvantage of the system was that a user did need to have a litte computer knowledge to operate the system even though all programs are menu driven. This user did admit that part of his satisfaction with the Cado system was due to having a very good distributor.

In talking with the second user, a Southeast insurance and real estate firm, we noted that we are hearing more Cado distributor complaints than Cado system complaints. This user was not sure of the system model, but had upgraded from the Cado Cat. The system applications included general ledger, accounts payable, property management, insurance analysis, and word processing. This user seemed to be quite happy with the hardware end of the system

niques 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.

BusiPlan, Cado'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 are 50 degrees F to 104 degrees F.

SUPPORT SERVICES

DOCUMENTATION: Cado documentation is distributed by the distributor.

TRAINING/EDUCATION: Cado maintains a training course curriculum for its distributors. User training is supplied by the distributors, either through on-site services (at the customers' locations) or in the distributor's classroom.

MAINTENANCE: A variety of maintenance service plans are provided by the distributors.

PRICING

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

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

stating that it was very easy to learn system operations and that the system can do a good job. With regard to preventive maintenance, she felt that the distributor fell short in this area, but responded quickly when the system was down. The user felt that most of her problems could be attributed to the software and service provided by the distributor, and that instead of clearing up a problem totally, the programmer only did patch jobs. Major problems noted were 1) the system offers security features, but because of poor response to required program changes, the security features could not be used, and 2) there are problems in backing up data to tape, which have been ongoing and have not been corrected. According to the user, this again is attributable to software problems that are not being resolved to the user's satisfaction. When asked if she would recommend the system to another user, she responded, "Only if they had a good distributor."

Cado Tiger ATS Systems

▷ The third user represented a Northeast medical center and rated the system as excellent in all categories but one. This user was very pleased with the Cado ATS/64 as well as with the service provided by the distributor. The system supports 256KB of memory, 60MB of disk storage, three terminals, and one personal computer. Applications performed include billing, dunning letters, and productivity reports. This user converted to the Cado system from a Standard Medical System and reviewed 10 other systems before choosing the Cado ATS/64. The major reasons stated for selecting the Cado ATS/64 were, "We liked the fact that one vendor backed both the hardware and software, and the system is flexible with providing reports as well as generation of bills." Another advantage mentioned by the user was the capability to attach a personal computer as well as Cado terminals for running other applications, such as a simplified accounting program. The user felt this was a very cost-effective solution to meeting their requirements. Only one problem was mentioned and that was a printer problem, which was promptly corrected.

The fourth user was from a lumber company located in the Northeast. This user was also extremely happy with their Cado Tiger ATS/32 system. Before making the purchasing decision, this user reviewed systems from Qantel, Dataline,

and Triad, but felt the Cado provided more of the features they were interested in, such as being able to expand to remote locations in an easy fashion. At present, the system supports eight local terminals, but the user plans to expand by adding additional terminals at a remote location within the next six months. She said they also plan to expand up to the Model ATS/64 within the next year. They also liked the two-screen option (one for word processing and one for data processing) provided by the Cado system, and opted for both screens. The user stated they have had the system for ten months and have had no downtime, so feel the system is very reliable. The user was also very happy with the support and integrated software supplied by the distributor. Applications supported by the system include accounts receivable, accounts payable, general ledger, inventory control, sales orders, payroll, invoicing, purchase orders, and word processing. She was also very happy with the Just Ask management system allowing them to obtain the various reports required.

Overall, the users we spoke to were extremely satisfied with their Tiger configurations; all but one of the users contacted said that the the systems did what was expected. And, all but one agreed they would recommend the Cado system to another user. □

EQUIPMENT PRICES

		Purchase Price ($)

The prices listed below are the suggested list prices provided by Cado; 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.

Basic Systems

ATS 8	Four-user system includes CPU CPU, 256KB RAM, 5¼" diskette, 10MB disk	7,650
ATS 16	Four-user system includes console with CPU, 512KB RAM, 5¼" diskette, 10MB disk	12,895
ATS 32	Eight-user system includes console with three CPUs, 512KB RAM, 20MB streaming tape drive	19,835
ATS 64	Eight-user system includes console with three CPUs, 512KB RAM, 20MB streaming tape drive	23,235

Processor Options

128KB increments for ATS 32 and ATS 64	1,000
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	1,750

Mass Storage

5¼-inch 1.2MB double-sided diskette	NC
8-inch 1.2MB double-sided diskette	NC
5¼-inch 10MB Winchester disk with controller	4,295
5¼-inch 15MB Winchester disk with controller	5,395
5¼-inch 36MB Winchester disk with controller	9,295
14-inch 30MB Winchester disk with controller	11,000
14-inch 60MB Winchester disk with controller	16,500
14-inch 143MB Winchester disk with controller	24,000

Magnetic Tape Equipment

¼-inch 20MB streaming tape cartridge with controller	4,995
¼-inch 45MB streaming tape cartridge with controller	5,495

NC—No charge.

▶

Cado Tiger ATS Systems

		Purchase Price ($)
Workstations		
C-300	Standard business video display and keyboard	1,495
C-301	Word processing video display and keyboard	1,745
DS/PC	Workstation, 256KB memory, two 360KB diskette drives (emulates the C-300 terminal)	2,960
DS/XT	Workstation, 256KB memory, one 360KB diskette drive, 10MB Winchester disk drive (emulates the C-300 terminal)	5,010
Printers		
P-300	300 lpm line printer	8,350
P-301	300 lpm line printer designed for word processing	8,995
P-600	600 lpm line printer	11,850
P-601	600 lpm line printer designed for word processing	12,250
P-1001	55 cps letter-quality word processing printer	3,895
P-1004	20 or 35 cps letter-quality word processing printer	2,395
P-811	150 cps DP printer	2,295
P-3404	100 or 400 cps near letter-quality printer	3,150
Other I/O Options		
	OCR Document Reader	10,995
Communication 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.

SOFTWARE PRICES

	License Fee ($)
Programming Languages	

Cadol, Cado'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.

	License Fee ($)
Database Management	
Just Ask II	NC
Office Automation	
WordBase	NC
Applications	
BusiPlan	850
Remote Terminal Communication Facility	TBA

TBA—To be announced.

NC—No charge.

Over 300 applications packages developed by distributors and third-party software firms are available for the Tiger systems. Contact a Cado distributor for applications areas and pricing. ■