

Cado Tiger ATS Systems

MANAGEMENT SUMMARY

The Cado Tiger ATS systems make up a line of three hardware- and software-compatible systems that allow for easy upgradability. The Tiger ATS 16, introduced in May 1984, is the newest addition to the ATS family; it replaces the Cado 20/20 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, 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 two Intranet Processors, four Transaction Processors, one Control Bi-Processors, 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 are supported. While the ATS 64 is ➤

The ATS 16, ATS 32, and ATS 64 make up Cado's hardware- and software-compatible systems in the multiuser Tiger ATS product line. Each system can be upgraded by replacing the CPU and adding additional peripherals when needed.

MODELS: ATS 16, ATS 32, and ATS 64.
MEMORY: 256KB to 1.1MB.
DISK CAPACITY: 10MB to 568MB.
WORKSTATIONS: 1 to 64 (current limit is 56).
PRICE: \$14,390 to \$68,450 (typical suggested prices).

CHARACTERISTICS

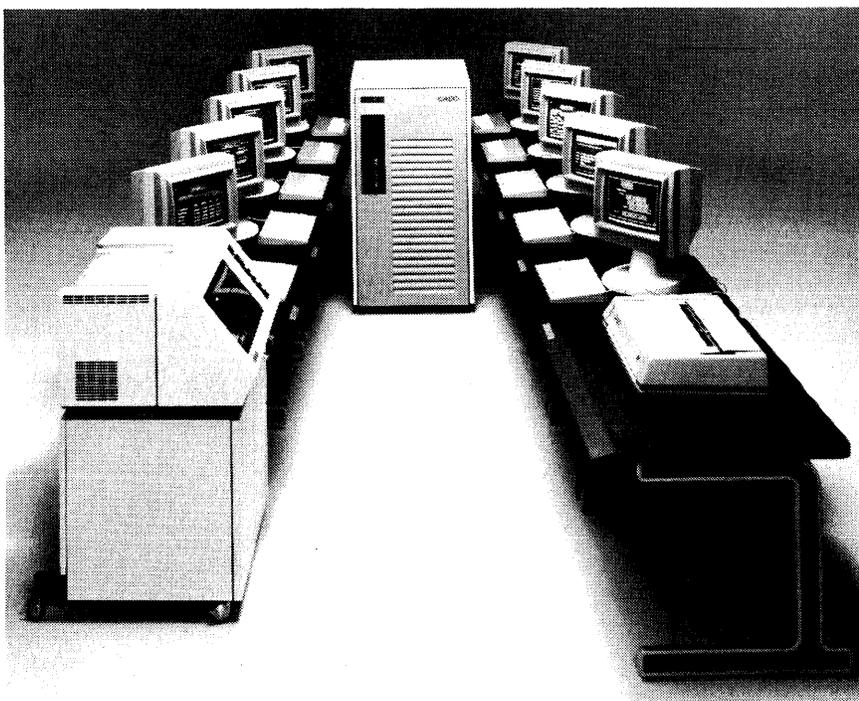
MANUFACTURER: Cado Systems Corporation, 2055 West 190th Street, P.O. Box 3759, Torrance, CA 90510. Telephone (213) 323-8170.

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.

Cado Systems Corporation, a subsidiary of Continental Telecom (Contel), manufactures computers for small businesses and professionals.

DATA FORMATS

BASIC UNIT: 16-bit word. ➤



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

Cado Tiger ATS Systems

CHART A. SYSTEM COMPARISON

MODEL	Tiger ATS 16	Tiger ATS 32	Tiger ATS 64
SYSTEM CHARACTERISTICS			
Date of introduction	May 1984	July 1983	March 1983
Date of first delivery	May 1984	October 1983	March 1983
Operating system	Tiger ATS 16 C/S	MM/IOS	MM/IOS
Upgradable from	NA	ATS 16	ATS 32
Upgradable to	ATS 32	ATS 64	NA
MIPS	—	—	—
Relative performance (based on a rating of the ATS 16 at 1.0)	1.0	—	—
MEMORY			
Minimum capacity, bytes	512KB	256KB	256KB
Maximum capacity, bytes	512KB	1.1MB	1.1MB
Type	MOS RAM	MOS RAM	MOS RAM
Cache memory	None	None	None
Cycle time, nanoseconds	500	500	500
Bytes fetched per cycle	2	2	2
INPUT/OUTPUT CONTROL			
Number of channels	16	32	64
High-speed buses	5M bps	5M bps	7.4M bps
Low-speed buses	—	—	—
MINIMUM DISK STORAGE			
	10MB	15MB	30MB
MAXIMUM DISK STORAGE			
	72MB	144MB	568MB
NUMBER OF WORKSTATIONS			
	16	32	64
COMMUNICATIONS PROTOCOLS			
	IBM 2770, 2780, 3780; BSC, TTY	IBM 2770, 2780, 3780; BSC, TTY	IBM 2770, 2780, 3780; BSC, TTY

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

➤ theoretically a 64-user system, the maximum number currently supported by user configuration is 56. Two Intranet Processors and two 512KB GM Modules can be used with the ATS 64. The ATS 32 and ATS 64 systems are built around a common bus, Cadobus, which allows the GM and processor cards to communicate with one another.

Cado provides hard disk storage with diskette or tape cartridge backup for ATS users. Both the ATS 16 and ATS 32 accept 5¼-inch 10MB, 15MB, or 36MB Winchester disks. The ATS 16 supports 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 143MB hard disks.

Double-sided, double-density 5¼-inch and 8-inch 1.2MB diskettes are available. The ATS 16 supports 5¼-inch diskettes only; the ATS 32 and ATS 64 models run 8-inch diskettes only. A ¼-inch 20MB or 45MB streaming tape cartridge is also available for backup. All three models accept the tape cartridge; however, only one backup medium can be used with the ATS 32. The ATS 16 and ATS 64 can be configured with two backup storage devices.

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.

Tiger ATS 16 O/S and MM/IOS are the standard operating systems used with the Tiger systems. The Tiger ATS 16 ➤

➤ **FIXED POINT OPERAND:** Information unavailable from the vendor.

FLOATING POINT OPERAND: Information unavailable from the vendor.

INSTRUCTIONS: Information unavailable from the vendor.

INTERNAL CODE: ASCII.

MAIN STORAGE

TYPE: The Tiger systems feature Global Memory. Global Memory (GM) is available in 128KB increments and 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 four different assemblies—128KB, 256KB, 384KB, 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.

CYCLE TIME: The CPU minimum cycle time is 500 nanoseconds for each of the three models. The cycle/access time for the main storage is 625 nanoseconds for the ATS 32 and ATS 64, and 500 nanoseconds for the ATS 16.

CAPACITY: Main memory capacities range from 256KB to 1.1MB for the ATS 32 and ATS 64. The ATS 16 has a fixed memory capacity of 512KB.

CHECKING: Memory parity error detection and generation is 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. ➤

Cado Tiger ATS Systems

CHART B. MASS STORAGE

MODEL	ATS Diskette	ATS Diskette	ATS Hard Disk	ATS Hard Disk
Type	5 1/4" diskette	8" diskette	5 1/4" Winchester	5 1/4" Winchester
Controller model	Proprietary	Proprietary	Proprietary	Proprietary
Drives per subsystem/controller	1	1	2	2-4
Formatted capacity per drive, megabytes	1.2MB	1.2MB	10MB	15MB
Number of usable surfaces	2	2	4	6
Number of sectors or tracks per surface	8192	8192	8192	302
Bytes per sector or track	—	—	—	8192
Average seek time	—	—	—	85 MS
Average rotational/relay time	—	—	—	—
Average access time	—	—	—	—
Data transfer rate	—	—	5M bps	5M bps
Supported by system models	ATS 16	ATS 32, ATS 64	ATS 16, ATS 32	ATS 16, ATS 32
Comments	—	—	—	—

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

➤ O/S, which is bundled with the 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 it is designed for the multiple microprocessor-based systems.

COMPETITIVE POSITION

The Cado Tiger ATS Systems compete for the multiuser market with some of the big names in the minicomputer area. All three models offer features which overlap some of the capabilities of the IBM System/36 family. The IBM product line provides a main memory capacity that supports up to 1.1MB; the Tiger family offers a maximum of 1MB. The hard disk capacity ranges from 30MB to 800MB for the System/36 and from 10MB to 568MB for the Tiger. Both manufacturers provide 1.2MB diskettes, but IBM also offers other capacities. IBM also supports additional workstations. The suggested price for the base systems are comparable; the maximum system price is about \$30,000 higher for the IBM.

The Hewlett-Packard HP 250 is a multiuser system supporting up to 10 workstations. While the number of users supported is closer to the ATS 16 characteristics, the memory and disk storage capacities overlap the entire ATS line. Each of the six HP 250 system includes 192KB of system memory along with 64KB user memory per terminal; the maximum capacity is 896KB. The HP 250 disk storage capacity is slightly lower than the Tiger family; the 250 system offers a range of 4.7MB to 260MB. Price is also less; the low end HP costs less than \$8,500.

Wang's low-end VS Systems also offer some competition for the ATS 16. The VS15 provides 256KB to 1MB memory, 33MB to 76MB disk storage, and support for up to 10 users. The VS25 adds to the memory by supporting up to 1MB. Price is a competitive factor. A V15 with 256KB RAM, one 33MB hard disk, and one 360KB diskette is \$13,000.

➤ **STORAGE PROTECTION:** Information is unavailable from the vendor.

RESERVED STORAGE: Information is unavailable from the vendor.

CENTRAL PROCESSOR

GENERAL: The Tiger ATS 16 is built around an 8M Hz Intel 80186 microprocessor. The Tiger ATS 32 and ATS 64 models are powered by multiple 8M Hz Intel 8086 and 5M Hz Intel 8089 processors arranged in a trilevel architecture in order 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 ATS 32 and ATS 64 are built around the Cadobus, which operates at a speed of 1M Hz.

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 processor's 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. There are two versions of the TP: a four-port version and an eight-port version. The eight-port TP provides seven asynchronous ports and one async/sync port for full data set control. Four async/sync full-modem ports are included with the four-port version. A third 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

Cado Tiger ATS Systems

CHART B. MASS STORAGE (Continued)

MODEL	ATS Hard Disk	ATS Hard Disk	ATS Hard Disk	AST Hard Disk
Type	5¼" Winchester	14" Winchester	14" Winchester	14" Winchester
Controller model	Proprietary	Proprietary	Proprietary	Proprietary
Drives per subsystem/controller	2-4	2-4	1-4	1-4
Formatted capacity per drive, megabytes	36MB	30MB	60MB	143MB
Number of usable surfaces	7	3	3	7
Number of sectors or tracks per surface	658	548	1099	1102
Bytes per sector or track	8192	18,432	18,432	18,432
Average seek time	30 ms	40 ms	40 ms	40 ms
Average rotational/relay time	—	—	—	—
Average access time	—	—	—	—
Data transfer rate	5M bps	7.7M bps	7.7M bps	7.7M bps
Supported by system models	ATS 16, ATS 32	ATS 64	ATS 64	ATS 64
Comments	—	—	—	—

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

ADVANTAGES AND RESTRICTIONS

➤ A main advantage of the Tiger systems is that the three models are compatible and upgradable. Users can start computing with the ATS 16 and upgrade to the 32 or 64 by changing the CPU and incorporating additional storage devices, terminals, and peripherals. Also, the users who converted from other Cado systems felt the conversion process went fairly smooth.

A disadvantage cited by two users was the performance and capabilities of the Just Ask database management program. Examples of some problems are that a file locks on the screen when a report is requested from it; the program's screen display ability is limited to 80 characters (one user requires 132); and a lot of editing is required because spelling corrections are not made automatically and the search file has to be reorganized to make corrections. While these problems are not major disadvantages, they do become annoyances when Just Ask is used a lot.

The distributor network, which provides one source for obtaining a system and servicing and maintaining the hardware and software, is a positive feature. If the user has a problem with both the system and its software, one call will provide the service. The negative side is that not all distributors provide the same type of service. The locations of the distributors ranged from approximately 2 to 75 miles from the users in our survey. The satisfaction of the service did not correspond with distance or time required for the distributor to reach a user site. Notice that two users rated the maintenance responsiveness as fair and poor.

The majority of users looked at other systems before deciding on the Cado Tiger. Price and software were two main selling points. The distributor's ability to provide custom programming for specific needs is another advantage. The user does not have to rely on a limited number of programs.

USER REACTION

Because the Cado Tiger Systems were not used by the respondents to Datapro's recent Computer User's Survey, Cado distributors provided Datapro with current ATS 32 ➤

➤ card connectors for a maximum of 17 cards in the ATS 64 and 9 cards in the ATS 32.

CONTROL STORAGE: Information unavailable from the vendor.

REGISTERS: Information is unavailable from the vendor.

ADDRESSING: Information is unavailable from the vendor.

INTERRUPTS: The 8086-2 included in the IP is subject to external interrupts: a nonmaskable interrupt and a maskable interrupt. 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-IR4 means currently unassigned; IR5, system bus time-out; IR6, currently unassigned; and IR7, realtime clock.

OPERATING ENVIRONMENT: The Tiger systems are housed in free-standing metal cabinets. These cabinets include the CPU(s), memory, magnetic media, and circuit boards. The ATS 16 system is housed in the 26 by 8 by 19 inches cabinet. ATS 32 measures 29½ by 15¼ by 25¼ inches. The ATS 64 dimensions are 46¾ by 24½ by 32 inches. The electrical requirements for all three systems are 115 volts (±) 10 percent AC, 50 Hz. The operating temperature ranges for the system are 50 degrees F to 104 degrees F.

INPUT/OUTPUT CONTROL

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 16 and ATS 32 is 5M bps. A transfer rate of 7.7M bps is featured on the ATS 64.

CONFIGURATION RULES

GENERAL: The members of the Tiger series are compatible in all areas except the diskette and hard disk storage areas. The configuration specifications for individual devices and peripherals are listed below.

WORKSTATIONS: The Tiger systems support Cado's C-300 word processing and C-301 business-oriented terminals. Both models include inverse video, half-intensity, and protected field attributes. The word processing capability is restricted to the C-300; the C-301's individual feature is a slave printer port. In the United States, the ➤

Cado Tiger ATS Systems

CHART C. WORKSTATIONS

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

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

▷ and ATS 64 customers. Datapro was able to contact 10 of the 16 names provided; four users worked with the ATS 32 and six had ATS 64 configurations. The ATS 32 systems had been installed from 4 to 7 months and the ATS 64 installation time ranged from 4 to 12 months. The Tiger ATS 16 is not included in this poll because it is relatively new to the marketplace and the users have not been working with it very long.

▷ monochrome color is green on black; overseas, the terminals are available with amber on black screens. The number of workstations supported corresponds with the model name: ATS 16 can attach up to 16 workstations; ATS 32, up to 32; and ATS 64, theoretically up to 64 (current limit is 56). Tiger users can attach terminals manufactured by other vendors, as well as personal computers. This requires a special interface which has been developed and is available through the distributor network.

	Excellent	Good	Fair	Poor	WA*
Ease of operation	9	1	0	0	3.9
Reliability of system	6	4	0	0	3.6
Reliability of peripherals	4	6	0	0	3.4
Maintenance service:					
Responsiveness	3	5	1	1	3.0
Effectiveness	4	6	0	0	3.4
Technical support:					
Troubleshooting	2	3	2	0	3.0
Education	2	5	1	1	2.4
Documentation	0	6	3	0	2.6
Manufacturers software:					
Operating system	1	8	0	0	3.1
Compiler & assemblers	1	5	0	0	3.2
Application programs	3	5	0	0	3.4
Ease of programming	1	3	0	0	3.3
Ease of conversion	4	1	0	0	3.8
Overall satisfaction	5	5	0	0	3.5

*Weighted Average on a scale of 4.0 for Excellent.

As the ratings show, the users are pleased with the reliability and ease of operation. While average ratings for the maintenance service was good, two users were not pleased with the responsiveness. Since the servicing is the distributors responsibility, its not surprising that the support might vary.

The lowest ratings received were for the education and documentation categories. Depending upon the users computer experience, the hardware and software educational services were informative or not in-depth enough. The users felt the documentation was not written for the novice computer user. Some operations—ones that became simple once they were explained—were omitted from the manual.

Overall, the users we spoke to were satisfied with their Tiger configurations; the systems did what was expected. Everyone agreed they would recommend the Cado system to another user. □

DISK STORAGE: The Tiger ATS 16 stores data on one 5¼-inch Winchester disk. Supporting 10MB, 15MB, or 36MB disks, the ATS 16 provides a maximum of 72MB total storage while the ATS 32 offers up to 144MB of data storage. The Tiger ATS 64 accepts 14-inch Winchester disks in 30MB, 60MB, or 143MB formats. The ATS 64 can accommodate four drives and offers a maximum storage capacity of 568MB. Cado provides 5¼- and 8-inch, 1.2MB double-sided, double-density diskettes for backup. The 5¼-inch diskette can only be used with the ATS 16. The ATS 16 and ATS 64 support two backup devices while the ATS 32 accommodates one.

MAGNETIC TAPE: Cado offers a ¼-inch 20MB or 45MB streaming tape cartridge for data backup on the Tiger systems. Either a tape cartridge or a diskette (not both) can be used with the ATS 16. The ATS 16 and ATS 64 will support both types of backup storage at the same time.

PRINTERS: Cado provides data processing printers, line printers, and word processing printers for ATS users. Any serial port can support one printer; however, each processor must be configured with at least one terminal.

MASS STORAGE

For information on available mass storage devices for the Tiger ATS systems, please refer to Chart B, Mass Storage Devices.

INPUT/OUTPUT UNITS

For information on available terminals please refer to Chart C, Terminals. For information on available printers please refer to Chart D, Printers. For information on available magnetic tape equipment please refer to Chart E, Magnetic Tape Equipment.

OTHER I/O: 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 the eight typewriter fonts that are most widely used in business. An async/sync interface and self-diagnostics are standard; RS-232-C ports are available. ▶

Cado Tiger ATS Systems

CHART D. PRINTERS

MODEL	P-300	P-301	P-600	P601
Type	Line	Line	Line	Line
Speed	300 lpm	300 lpm	600 lpm	600 lpm
Bidirectional printing	No	No	No	No
Paper size	16"	16"	16"	16"
Character formation	9 x 7	9 x 7, 12 x 9	9 x 7	9 x 7, 12 x 9
Horizontal character spacing (char./inch)	13.3	13.3, 15, 16.7	13.3	13.3, 15, 17.1
Vertical line spacing (lines/inch)	6 or 8	6, 8, 9, 10.2	6 or 8	6, 8, 9, 10.2
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)	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
Graphics capability	60 dots per inch (H), 72 dots per inch (V)	No	No	60 dots per inch (H), 72 dots per inch (V)
Comments	—	—	—	—

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

CHART D. PRINTERS (Continued)

MODEL	P-1001	P-1004	P-3404	P-811
Type	Letter-quality	Letter-quality	Near Letter-quality, dual mode	DP quality
Speed	55 cps	55 cps	400 cps/120 cps	150 cps
Bidirectional printing	Yes	Yes	Yes	Yes
Paper size	17.5"	16"	3.2"-15.5"	32."-15.5"
Character formation	Print thimble	Print thimble	5 x 9, 6 x 18	9 x 7
Horizontal character spacing (char./inch)	13.6	13.6	10, 12, 13.1, 16.7	10
Vertical line spacing (lines/inch)	6, 8	6, 8	3, 4, 6, 8, 12	6 or 8
Character set	128 ASCII	128 ASCII	128 ASCII	64 character 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)	8.7 x 21.6 x 14.6	8.66 x 24.8 x 16.34	5 x 24.6 x 15.6	8 x 25.8 x 20
Graphics capability	No	No	No	No
Comments	—	—	—	—

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

► COMMUNICATIONS CONTROL

GENERAL: Both asynchronous and synchronous communications, operating at speeds up to 19.2K bps, are featured with the Tiger ATS systems. The number of lines supported by the ATS 16 ranges from 2 to 4; the ATS 32 supports from 4 to 12; and the ATS 64, between 8 and 24.

SOFTWARE

OPERATING SYSTEM: The Tiger ATS 16 runs under the Tiger ATS 16 O/S, while the ATS 32 and ATS 64 support Cado's MM/IOS (Multi-Master/Interpretive Operating System). Tiger ATS 16 supports 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 projects. The computer can execute applications simultaneously in international languages. The MM/IOS system is similar to Tiger ATS 16, but it is designed specifically for the multiple microprocessor implementation. The operating systems reside in ROM.

DATABASE MANAGEMENT SYSTEM: Cado's relational database and forms generator, Just Ask III, manipulates 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 analysis in various formats. Users have the ability to open, merge, or close data files chosen from records already retained within the system's regular database. 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- or multibyte subroutines that are interpreted by the operating system as the program runs. The operating systems accommodate the modules in the form of program overlays. Tiger ATS 16 and MM/IOS can accept an infinite number of overlays.

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

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

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

UTILITIES: 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

Cado Tiger ATS Systems

CHART E. MAGNETIC TAPE EQUIPMENT

MODEL	ATS Tape Drive	ATS Tape Drive
TYPE	Streaming tape cartridge	Streaming tape cartridge
FORMAT		
Number of tracks	4	9
Recording density, bits per inch	—	—
Recording mode	Bit serial	Bit serial
CHARACTERISTICS		
Controller model	—	—
Drives per controller	1	1
Storage capacity, bytes	20MB	45MB
Tape speed, inches per second	90 ips	90 ips
Data transfer rate, units per second	0.083M bps	0.083M bps
Streaming technology	Yes	Yes
Start/stop mode; speed	—	—
Switch selectable	—	—

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

► files, security, diagnostics, backup data transfer, and communications functions.

OFFICE AUTOMATION: 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 techniques and output control. WordBase features include the ability to produce business correspondence, create and process forms, capture data, create new files, maintain a tickle file, and perform business mathematics.

APPLICATIONS: Cado distributors develop custom software tailored to each business operation. The distributor will define the software requirements, perform the programming, and provide software support. Ensuring that the systems meets customer needs is the responsibility of the distributor.

Cado has developed a software library that includes over 300 application packages developed by distributors and independent software firms. The Cado library includes software for banking, medical, legal, 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 16 O/S to run. The documentation for these programs is available from Cado distributors.

BusiPlan, Cado's financial planning, permits users to build financial models around a number of variables. Structured for multitasking use, a number of operators can work at the same time on different models.

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 capable staff.

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.

SUPPORT: The Cado distributors provide supported for the total system. In addition to sales and marketing, distributor services include requirement analysis, software development, installation, user-training, software support, and equipment maintenance.

TRAINING: 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 distributors' classroom.

TYPICAL CONFIGURATIONS: Sample configurations of the ATS 16, ATS 32, and ATS 64 are given below. Complete equipment and software prices follow these configurations.

Tiger ATS 16:

One microprocessor with 2 four-user serial I/O boards, 512KB memory, 20MB streaming tape backup, one 15MB Winchester disks, one printer, 16 terminals \$29,845

Tiger ATS 32:

Four microprocessors, two Transaction Processors, one Intranet Processor, one Control Bi-Processor, 512KB RAM, 20MB streaming tape, 36MB Winchester disk, six terminals, one printer, 16 ports \$43,230

Tiger ATS 64:

Four microprocessors, two Transaction Processors, 512KB RAM, 45MB streaming tape, 60MB Winchester hard disk, 10 terminals, one line printer, one dot matrix printer, 16 ports \$68,685

Cado Tiger ATS Systems

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% per month of the total configuration cost. The rental costs are dependent upon the distributor.

Basic Systems

ATS 16	Four-user system includes console with CPU, 512KB RAM, 5¼" diskette	8,600
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

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		4,994
¼-inch 45MB streaming tape cartridge with controller		5,495

Workstations

C-300	Standard business video display and keyboard	1,495
C-301	Word processing video display and keyboard	1,745

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.

Cado Tiger ATS Systems

**License
Fee
(\$)**

▶ Operating System and Utilities

The Tiger ATS 16 O/S is bundled with the ATS 16. 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.

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. ■