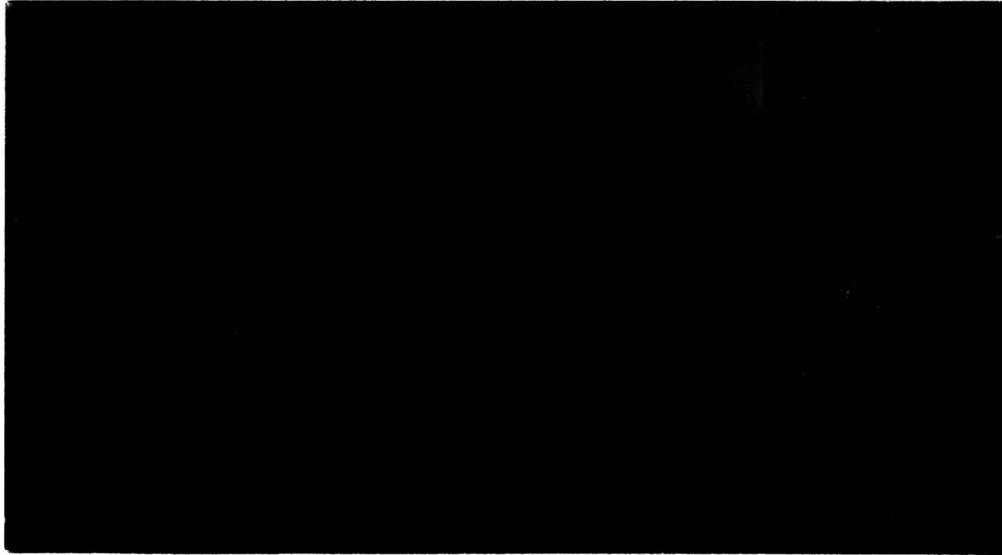


A Datapro Feature Report

**Word Processing—
Selected
Magnetic Keyboards**



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CPT Cassetype 4200 Series

MANAGEMENT SUMMARY

The first CPT (Cassette Power Typewriter) modules were introduced in early 1972, based at that time on a modified IBM Model 71 Selectric typewriter. The autotyper system met with very rapid acceptance in the marketplace, and elevated the young company to profitability by September of that same year. As such, CPT was the first publicly owned company exclusively manufacturing a word processing typewriter to become profitable.

Newer versions of the CPT system employ a modified IBM Selectric II as the printing keyboard. CPT replaces the basic electromechanical keyboard with electronic assemblies, and configures the adapted Selectric with a dual cassette auto typing control console of their own design and manufacture.

The keyboard replacement results in the removal of about 10 pounds of hardware (1000+ parts), and a more reliable keying and tabbing assembly. This, in conjunction with the strengthening of the remaining electro-mechanical parts, has resulted in a ruggedized version of the basic IBM typewriter that has been patented by CPT. The Cassetype is the only automatic typing system based upon a modified *standard* IBM Selectric that can boost heavy-duty capability equal to or better than systems using IBM's heavy-duty Selectric.

The CPT typewriter layout differs only slightly from the standard IBM machine. There are six additional keys; the tab set/clear switch has been moved near to the left platen knob (next to the multicopy control lever); and the system on/off switch has been relocated on the cassette control console. Typing output speed ➤

The CPT Cassetype boasts price-performance features that have made this low cost, dual cassette autotyper quite popular. Estimates place installations at the 9,500 level with current deliveries at the 275 per month level — impressive statistics for an independent manufacturer. Printout is performed on a Rotary II (modified Selectric II) or Rotary III (Qume wheelprinter) module. Options include a high-speed printer, 16-speed communicator, and a 14-line (1,024-character) video display.

CHARACTERISTICS

MANUFACTURER: CPT Corporation, 1001 Second Street South, Hopkins, Minnesota 55343. Telephone (612) 935-0381, local offices, or dealers. In Canada: Superior Business Machines, 449 Ste. Helene Street, Montreal, Quebec H2Y 2K9. Telephone (514) 842-1744 or local branches.

MODEL: CPT Cassetype 4200 Series.

TYPEWRITER

KEYBOARD; The CPT Cassetype Rotary II uses a modified IBM Selectric II typewriter with the mechanical mechanism replaced by the all-electronic keyboard. Forty-four standard alphanumeric keys are provided with 86 different characters, including upper and lower case alphabets, and 34 numeric/special characters. All keys can repeat by a single depression in conjunction with the Repeat key. In repeating (or automatic mode) the underscore key operates as a rate faster than normal typing speed. The Rotary III option employs a Qume daisy wheelprinter with a standard 44-key typewriter layout, and 86 alphanumeric and special characters. ➤



CPT Cassetype 4200 with Rotary III (Qume) Wheelprinter.

CPT Cassetype 4200 Series

➤ for the Cassetype is rated at up to 170 words per minute, and sustained rates are close to this rate as a result of speeding up space and tab functions. Each cassette can contain about 50 typewritten pages (2500 characters per page). Input typing and minor corrections can be handled at full rough draft speed, with major corrections and revisions done after completion of the draft.

The latest Royal III printer option for the system offers the user a Qume daisy wheel printer with a print speed of 45 characters per second in place of the Rotary II (modified Selectric II) mechanism. The new Rotary III Qume printer was first shipped in November, 1976.

During April, 1976, CPT announced the Visual Memory, a medium-sized (14, 96-character lines) optional display screen. The 5.25 inch by 7 inch display is positioned over the typewriter keyboard in an integral metal case/cassette rack. With the Visual Memory, CPT users gain two additional printer features. The operator may choose to print text displayed on the screen, with each line being printed as it is scrolled off the display. Also, the operator may Duplex; this involves printing from one cassette while entering material, via the keyboard and screen, on the second cassette. This feature significantly increases amount of throughput for a "busy" system. CPT also announced the Communicator, a communications option with a choice of 16 transmittal speeds, from 5 to 960 characters per second; the Communicator is used with an acoustic coupler or a Bell 103-A modem.

European users viewed a full-page display, diskette-based CPT system at the Hanover Trade Fair this past May. U.S. distribution of this system is scheduled for third quarter, 1977.

An interesting aspect is the semi-portability of the system. There are only two, cable connected, components in each system—the typewriter (36.5 pounds) and the cassette console (37 pounds). Another interesting aspect is the low purchase-to-lease ratio that yields a full payout of the system in less than 2 years. This short payout period means that CPT systems are usually purchased rather than leased. It also explains how CPT turned a profit so quickly—strong cash flow support being provided by this customer base.

The Cassetype is more than holding its own in competition with IBM and also with the more sophisticated text editing systems on the market. Reasons for this acceptance are the familiar typewriter-like configuration, feel of the equipment, and the greatly simplified ease of operation. CPT advertises an average 3 to 4 hour operator training period, with users confirming this claim. The Storage cost of less than 10¢ per page (compared with \$1.00 or more per page on magnetic card or tape cartridge systems such as IBM's MC/ST's or MT/ST's) is another strong point in favor of the Cassetype.

➤ **CONTROL KEYS:** Each CPT Cassetype has nine basic typing control keys for margin release, tab, backspace, carrier return, index, line return without index (for under scoring), lock, and two shift keys. A tab set/clear lever is also provided on top of the typewriter instead of the usual position to the left of the keyboard.

Six word processing function keys are arrayed to the left and right of the standard typewriter keyboard. They include:

| KEY | FUNCTION | DESCRIPTION |
|-----|-------------------|--|
| K | KEEP | Converts hyphens, spaces, tabs and carrier returns to require commands; will not be suppressed or converted during margin adjustments. |
| R | REPEAT | Converts any alphanumeric or function key into a repeating key. |
| S | STOP CODE | Stops payout to permit the manual insertion of variable data or the changing of typewriter settings. |
| | LINE RETURN | Returns to the left margin without indexing. |
| L | LINE CORRECT | Erases the line being recorded from the buffer and carrier returns; no carrier return is recorded. |
| C | CHARACTER CORRECT | Simultaneously back spaces one character at a time and erases the character from the buffer to permit a correction. |

Fifteen push-button controls are located in the base of the cassette console, cable connected to the CPT keyboard. These controls include:

| KEY | DESCRIPTION |
|-----------------------|--|
| REWIND /1 REWIND 2 | Rewinds the cassette in Cassette Station 1 (lower slot) or 2 (upper slot). |
| READ | Activate reading or recorded text from Station 1 or 2. |
| READ 2 | Used in conjunction with Read button to permit reading of text from Station 2. |
| DUPLICATE | Transfers recorded information from tape to tape; allows a revised tape to be prepared from a combination of pre-recorded and manually keyed text. |
| CODE | Used in conjunction with certain alphanumeric and function keys to request additional commands. |
| RECORD | Allows information to be recorded on the cassette in Station 1. |
| ADJUST | Activates right-hand margin adjust feature; used when text has been inserted or deleted. |
| SEARCH | Records Search Codes to permit access when in Record Mode; Searches to the next Search Code in Read Mode. |

CPT Cassetype 4200 Series

CPT presently provides direct sales and service from offices in Minneapolis, Milwaukee, Chicago, Detroit, St. Louis, Dallas, Jacksonville, and Washington, D.C. Over 100 dealers across the U.S. also offer the system. CPT markets internationally through distributors in Canada, England, Germany, Switzerland, and the Far East. Hermes Precisa International also markets the CPT Cassetype under their own HPI logo in about twenty countries. About 9500 CPT systems have been delivered to date, and current production is about 275 units per month.

Users contacted by Datapro report an overall degree of satisfaction with the system reliability, and cite the extra-charge high speed search option (for document merging) as one of the system's best assets. Drawbacks mentioned include the fact that recording can occur on only one cassette station. Datapro feels that this is not a functional limitation for conventional word processing applications. Users with correspondence typing and text editing requirements are advised to give serious consideration to the CPT Cassetype. □

| | |
|-----------|--|
| ➤ SKIP | Allows words, lines, paragraphs or pages of material to be skipped without erasing or overrecording. |
| STOP | Halts tape motion. |
| WORD | Enables system to read or skip, word by word. |
| LINE | Enables system to read or skip, or duplicate by line. |
| PARAGRAPH | Enables system to read, skip, or duplicate by paragraph. |
| PAGE | Enables system to read, skip, or duplicate by page. |

Key buttons on the console illuminate when a function key is depressed.

A few alphanumeric or function keys are used in conjunction with the Code key to access additional system commands. They include:

| COMMAND | DESCRIPTION |
|---|--|
| CODE +6 or CODE + Space (Switch) | Switches the system to the other tape station. |
| CODE +0 or CODE + Tab (Auto Rewind) | Automatically rewinds the cassette. |
| CODE + or CODE + Stop (End of page) | Stops system. |

Each tape station has a tape release button. A two-digit text reference number display is centered on the tape console between the two cassette stations.

Search and Adjust command capability are priced separately as options. The most popular CRT Cassetype models include both options, and CPT offers them with the basic system (both Rotary II and Rotary III models) as a package, at a small discount. The Record Locator feature, formerly an option, is now included in all basic models; it allows the operator to back up on the tape for correction or to locate a previously recorded line.

DISPLAY: The CPT Cassetype may be augmented by an optional 14-line (96 characters per line) video display. The 5.25-inch by 7-inch screen is built into a metal case which positions the screen above the keyboard and acts as a cassette rack. The cathode ray tube (CRT) has a 1,024-character buffer (memory); individual characters are accessed for editing via page numbers, backlining, and backspacing.

PRINTER: The printer used in the Cassetype Rotary II is based upon IBM's replaceable Selectric ball typing element. The system is a "single-pitch" machine and can have either 10



CPT Cassetype 4200 with Rotary II (Selectric II) Printer.

CPT Cassetype 4200 Series

► (Pica) or 12 (Elite) character-per-line horizontal spacing (selectable at time of order or field changeable). Print speed is 170 words per minute.

The maximum paper width is 15½ inches with a 13-inch writing line. Tech III ribbon is standard; correcting tape is available as an option. Each model has five basic printer features for multiply copy control (settings A-E), single or double spacing, paper release, paper restraining bail, and platen variable knob for permanent vertical line position change.

The Rotary III model employs a Qume daisy wheelprinter, with printout in 10 or 12 pitch at a speed of 45 characters per second. Maximum paper width is 15½ inches, with a 13-inch writing line. The printer uses fabric or film (carbon) ribbon, loaded in interchangeable cartridges. The printer has features for multiple copy control; impression control; single line, line and one-half, and double line spacing; paper release; paper restraining bail; and platen variable knob for change of line positioning. Other Rotary III features include automatic formatting (recording of margins and tabs), form feed, programmable form length, vertical tabbing, and end of ribbon and paper controls. Reverse indexing is available as an option.

Both Rotary II and Rotary III models, when equipped with the Visual Memory, can print text one line at a time, while entering text via the display and keyboard; text prints as it is scrolled off the screen. Such systems can also Duplex—that is, print from one cassette while entering text via the keyboard and display onto the other cassette.

TEXT EDITING

GENERAL: The CPT Cassetype provides the following edit capability:

| | |
|-----------------------------|----------|
| Automatic Paragraph Indent | Yes* |
| Automatic Tabulation | Yes |
| Full Line Justification | No |
| Automatic Input Underlining | No |
| Backspace Correction | Yes |
| Control Character Printout | Yes** |
| Direct Reverse Search | Yes |
| Document Assembly/Merge | Yes |
| Automatic Centering | No |
| Automatic Decimal Alignment | No |
| Automatic Tab Memory | No* |
| Automatic Margin Adjust | Optional |

* Available with Visual Memory option.

**In "Adjust" mode.

DOCUMENT REVISION: The Cassetype system can revise "on-line" by skipping text stored on the tape and/or inserting material directly from the keyboard and/or the alternate tape station. When insert material is taken from the second tape, a fairly high degree of sophistication in the use of serial record structures is required. Correction while recording can either be done by character or line.

TEXT SEARCH: The method used generally requires that a hard-copy (printed) reference book be maintained with a sample of text stored on the magnetic tape(s). Searches are performed by skipping pages, paragraphs, lines, or words under operator control. With the Search option, the operator searches automatically to any pre-recorded location (up to 99).

HYPHENATION: A 6-character "hot zone" technique is used. Any word that starts 7 or more characters before the right hand margin, and which will not end before the margin is reached, causes the system to stop in mid-word as soon as the hot zone is reached. The operator then allows typing to proceed character-by-character until a suitable place to hyphenate is reached. At this time the operator performs a hyphenation and returns the system to automatic typing mode.

CONFIGURATION

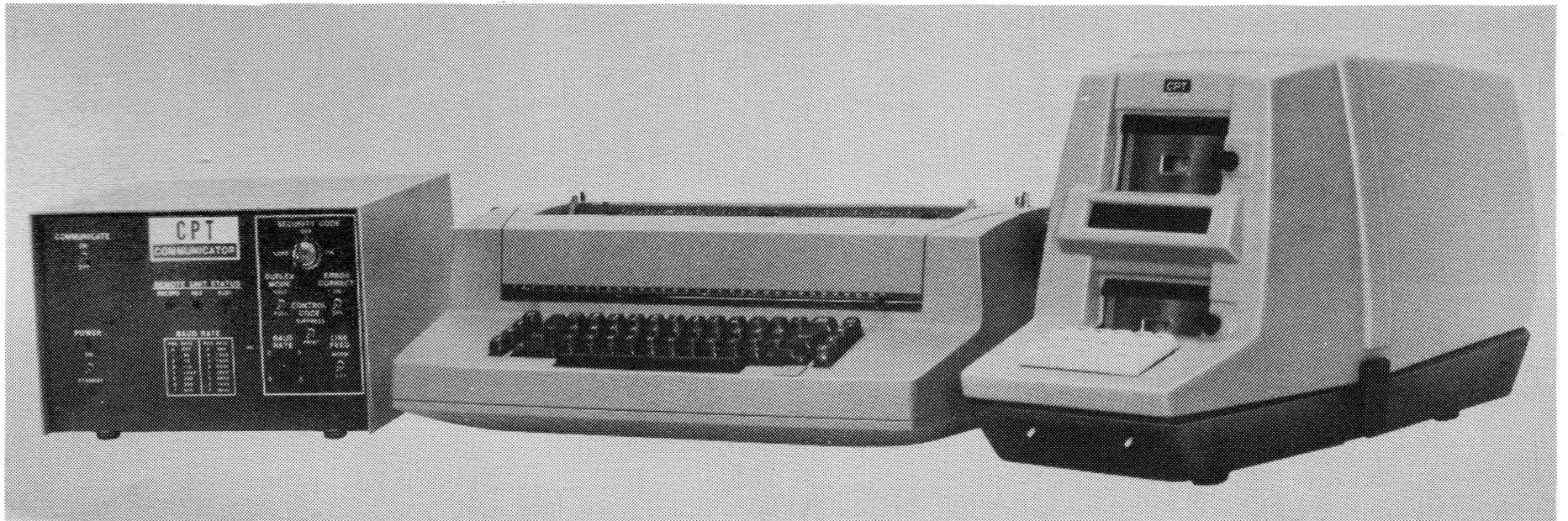
GENERAL: The elements in each system are a typewriter I/O device, and a dual station magnetic tape cassette console. Both components are portable, and fit on top of existing desk or pedestal surfaces.

These options are available: High Speed Search; an Adjust feature to adjust pre-recorded copy to the margin settings; reverse index; and correcting or lift off ribbons. An automatic form positioner, high speed printer, photocomposition, 14-line video display. Qume display wheel I/O device and communications are available as external options to the Cassetype. A tape converter for handling 800 BPI or 1600 BPI 9-track computer mag tapes and CPT cassettes is also available.

STORAGE MEDIUM

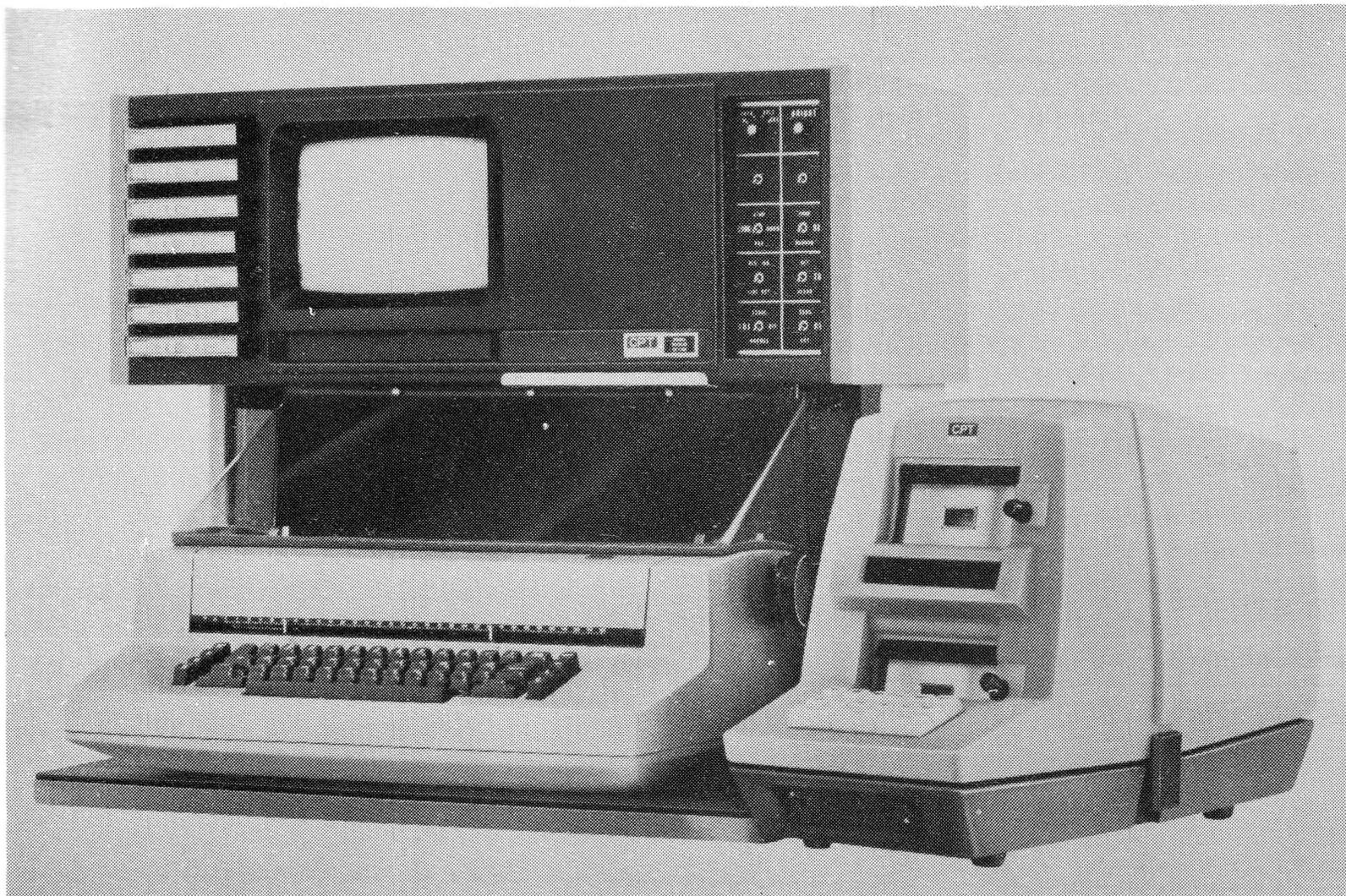
TYPE: A standard Philips-type magnetic tape cassette is used for the data storage. The tapes are recorded at a density of 800 bpi on one side only.

CAPACITY: Each tape is used to store 125,000 characters or about 50 full pages of text. With a fully loaded cassette in each tape station, the total on-line capacity of the CPT Cassetype is 250,000 characters or about 100 full pages of text.



The CPT Communicator option provides for half- or full-duplex communications at rates of up to 9600 baud.

CPT Cassetype 4200 Series



The CPT Cassetype 4200 equipped with the Visual Display option. The display buffer memory holds a maximum of 1024 characters, the screen capable of displaying up to 14 lines with a maximum line length of 96 characters.

► **SPEED:** With the High Speed Search option, automatic programmed tape search can proceed at 6,000 characters per second; otherwise, tape search takes place at the rate of 400 characters per second. Data can be transferred between magnetic tape stations at the rate of 400 characters/second.

AUXILIARY PERIPHERALS: CPT supplies an Automatic Form Positioner, a GE TermiNet 1200 (120 cps) high speed printer, a 14-line video display, and an interface for the Singer 8400 photocomposer as options to the Cassetype.

COMMUNICATIONS: CPT provides half duplex communications as a system option. A choice of 16 data transmission rates of up to 9600 baud is available in ASCII format.

PROGRAMMING: The CPT Cassetype systems are pre-programmed by CPT to accept eight edit commands as indicated by the operator through control keys. The sequence of commands is stored with the text in appropriate positions on the magnetic tape for subsequent use in producing output.

PRICING

POLICY: CPT provides the 4200 on a purchase or rental basis through a nationwide network of dealers.

SUPPORT: A self-instructional operator manual is provided with each system. Normally, CPT provides a one-half day training session for the user.

A self-paced audio-visual training package for operator training and packages for document survey and analysis are also available.

Maintenance for purchased systems is separately priced. Special field engineering service is available at \$20 per hour portal-to-portal (\$30 per hour with a minimum of \$50 outside normal working hours) while the basic maintenance plan provides preventive maintenance coverage during normal working hours, Monday through Friday. Special Engineering Requests (SER's) are available on a quote basis directly from CPT; contact CPT for details. ■

SPECIFICATIONS

| Model | CPT Cassetype |
|---|-----------------------------------|
| Power Requirements | 115V, 60Hz, 2.0A |
| Rotary II Typewriter Dimensions (HxWxD) Weight | 7.1" x 20.5" x 15.8" 36.5 lbs. |
| Rotary III Typewriter Dimensions (HxWxD) Weight | 7" x 22.5" x 13.5" 26 lbs. |
| Console Dimensions (HxWxD) Weight | 12" x 8.5" x 20.5" 37 lbs. |
| Video Display Dimensions (HxWxD) Weight | 22" x 26" x 18" 35 lbs. |
| Communicator Dimensions (HxWxD) Weight | 8" x 12" x 12" 15 lbs. |

CPT Cassetype 4200 Series

SUMMARY DATA

| MODEL | CPT Cassetype Rotary II | CPT Cassetype Rotary III |
|------------------------|-------------------------|--------------------------|
| Typewriter Model | IBM Selectric II* | Qume Daisy Wheel Printer |
| Announcement Date— | | October 1976 |
| First Shipment Date | June 1972 | November 1976 |
| Automatic Typing Speed | 170 wpm | 45 cps |
| Basic Storage Medium | Cassette | Cassette |
| No. Basic Stations | 2 | 2 |
| Number Installed | 9500 | — |
| Communications | Optional | Optional |

*Modified by CPT.

PRICING

| DESCRIPTION | PURCHASE | RENTAL* | MAINT. (YR.) |
|---|----------|---------|--------------|
| CPT Cassetype Rotary II | \$ 5,395 | \$215 | \$378 |
| CPT Cassetype Rotary II with Search | 5,895 | 235 | 423 |
| CPT Cassetype Rotary II with Search & Adjust | 6,195 | 250 | 450 |
| Rotary II Options | | | |
| Correcting Ribbon Option | 300 | 15 | 30 |
| Reverse Index Option | 375 | 15 | 30 |
| Automatic Form Positioner | 300 | — | — |
| CPT Cassetype Rotary III | 7,395 | 280 | 538 |
| CPT Cassetype Rotary III with Search | 7,895 | 300 | 583 |
| CPT Cassetype Rotary III with Search & Adjust | 8,195 | 315 | 610 |
| Rotary III Options | | | |
| Swap from Selectric T/W to Rotary III | 4,400 | 175 | 330 |
| Pin Feed Platen | 275 | 15 | 28 |
| Reverse Index Option | 50 | 3 | 5 |
| High Speed Printer Interface** | 2,000 | — | — |
| Photocomposer Interface*** | 1,300 | — | — |
| Visual Memory | 2,495 | 125 | 200 |
| Visual Memory with Adjust | 2,995 | 150 | 240 |
| Communicator (plus modem) | 2,495 | 125 | 200 |
| 800 BPI Tape Converter | 7,500 | — | — |
| 1600 BPI Tape Converter | 11,500 | — | — |
| Cassettes (each) | 4.75 | N/A | N/A |
| Bell & Howell Projector & A/V Program | 562.50 | — | — |

*Per month, including maintenance. **Printer priced separately and available from GE. ***Photocomposer priced separately and available from Singer.

IBM Mag Card Typewriters

MANAGEMENT SUMMARY

When IBM announced the first member of its magnetic card typing system family—the Magnetic Card/Selectric Typewriter (MC/ST) or “Mag Card I”—in October 1969, it appeared that a reverse step in word processing had been taken by the computer giant. For this simple unit-record magnetic card system was released almost five years after IBM’s first automatic typing system—the Magnetic Tape/Selectric Typewriter (MT/ST)—which uses more advanced sequential magnetic tape for data storage.

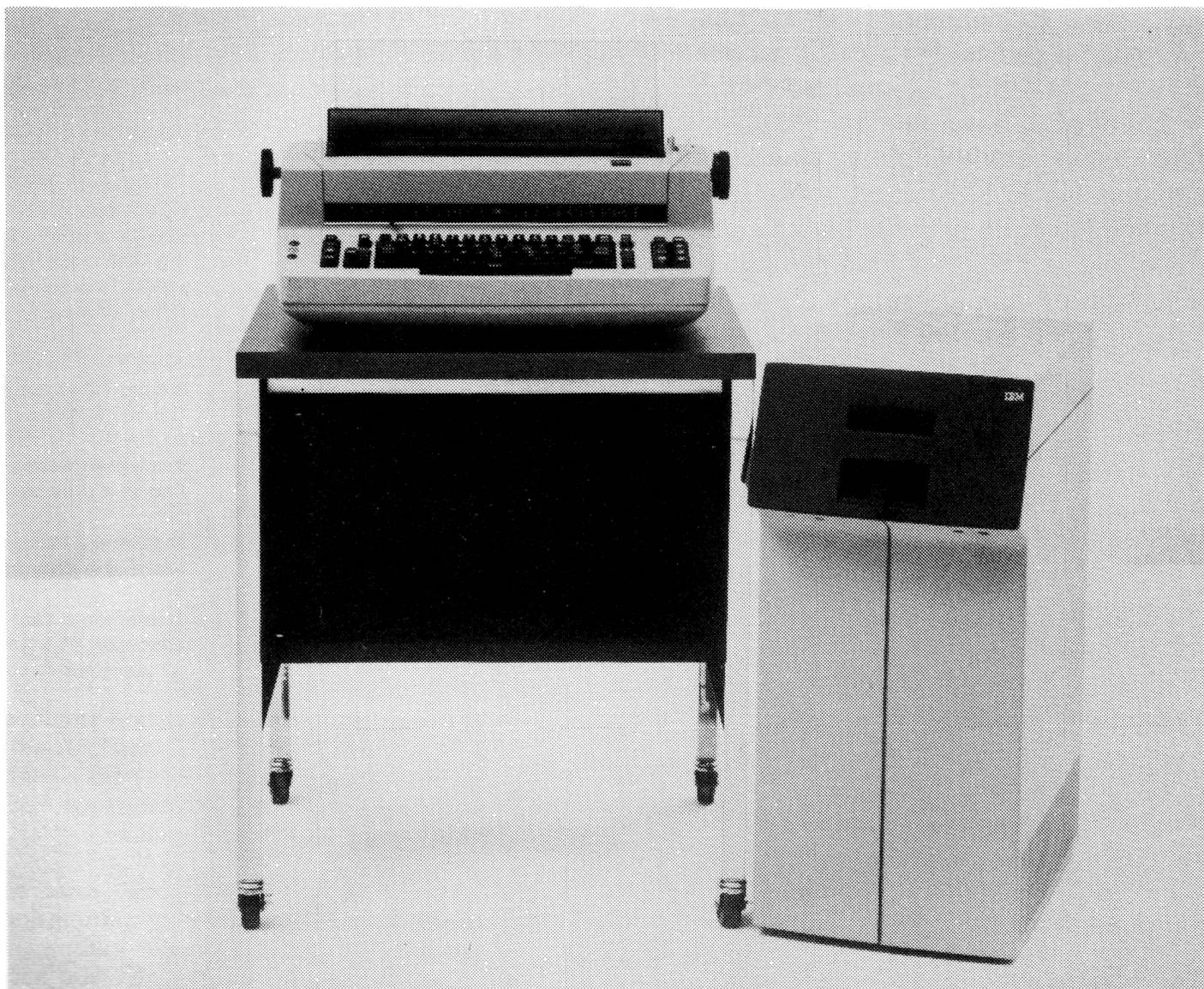
But, in fact, IBM had responded to marketplace demands for a system that combined the power of the magnetic recording and automatic playout of the MT/ST with a page-oriented media that would be easier for the typist to conceptualize. It is no coincidence that IBM’s next four automatic typewriter announcements were based on widely accepted magnetic card storage (the same card can be used interchangeably in all models), and that the seemingly more sophisticated tape systems are no longer in production. In fact, one IBM magnetic keyboard entry unit—the Memory typewriter released in March 1974—is media-less to all outward appearances, with no removable media at all (text recording occurs on an internal, non-changeable belt). ➤

With an installed base estimated at more than 170,000 units, the IBM mag card typewriters set the price/performance standards for the word processing industry. The MC/ST family offers basic word processing functions on several levels and employs the page-oriented magnetic card media for text storage. IBM now markets their mag card keyboards as both standalone word processors and as text input stations for the more sophisticated Office System 6 and WP/32 lines of products. With the introduction of two new OS/6 models in January 1978, IBM reduced the purchase price of the mag card line substantially, as an inducement to present lease customers to buy their installed machines.

CHARACTERISTICS

MANUFACTURER: International Business Machines Corporation, Office Products Division, Parson’s Pond Drive, Franklin Lakes, New Jersey 07417. Telephone (201) 848-1900 or local offices. In Canada: IBM Canada Ltd., 1150 Eglinton Avenue East, Don Mills, Ontario M3C 1H7. Telephone (416) 443-2111 or local offices.

MODELS: IBM Mag Card Selectric Typewriter (MC/ST-I); IBM Communicating Mag Card Selectric Typewriter ➤



IBM MC/A Mag Card Typewriter

IBM Mag Card Typewriters



IBM MC/ST-II

▷ While the basic contemporary automatic typewriter market is overwhelmingly aimed at direct replacement of existing electric typewriters, the earlier MT/ST's proved to be complex and awkward enough to require extensive operator training. The specialized MT/ST operator skills outweighed the original general-purpose secretarial skills of the would-be operators, and effective use of the MT/ST's was no longer incidental to the traditional secretarial background. Specialization became necessary for use of the MT/ST's, and the tape-oriented MT/ST systems tended to be installed not at the huge number of individual secretarial typing stations currently found in most companies, but rather in centralized pools. In this type of word processing environment the systems could no longer be considered direct electric typewriter replacements, and entailed organizational changes, specialized training, and a generally new way of doing business. ▷



The IBM 6640 Ink Jet Printer can accept input from cards recorded on IBM Mag Card typewriters. A 200-card stack feeder allows input to be batched for unattended playout at up to 92 cps.

▷ (CMC/ST); IBM Mag Card Executive Typewriter (MC/ET); IBM Mag Card II Selectric Typewriter (MC/ST-II); IBM Communicating Mag Card II Selectric Typewriter; IBM Mag Card/A Typewriter (MC/A).

INPUT/OUTPUT DEVICE

KEYBOARD: Each of the IBM mag card systems employs a standard 44-key alphanumeric keyboard layout that provides up to 86 different characters and space (both period and comma are repeated in upper and lower case). Each keyboard also has five repeating keys — carrier return, index, space, backspace and hyphen/underscore. A backspace command on the MC/ST-II and the MC/A will also activate a lift-off tape and erase the contents of typewriter memory in an automatic mode of operation, or will perform similar functions under operator control in a typewriter mode.

CONTROL KEYS: In addition to an On/Off switch, each mag card typewriter has nine basic keys to control basic typing functions (margin release, tab, backspace, index, carrier return, tab set/clear, shift, and shift lock).

Word processing functions are implemented on IBM mag card typewriters by a number of dedicated control keys located to the right and left of the main alphanumeric keyboard, and by compound code key plus alpha or control key commands.

MC/ST-I, CMC/ST & MC/ET CONTROL KEYS

| CONTROL KEY | FUNCTION |
|-----------------|--|
| REC (Record) | Records keyed text onto card. |
| PLAY (Playback) | Implements card playback in conjunction with AUTO, LINE, WORD or CHAR keys. |
| ADJ (Adjust) | Implements special card playback where carrier return is activated by entering a Carrier Return Zone rather than by coded carrier returns. Allows for changes in line length to fit in new copy. |
| SKIP | Implements special card playback where text may be omitted from playback print-out without changing text recorded on card. Also works in conjunction with AUTO, LINE, WORD or CHAR keys. |
| AUTO | Implements card playback until a Card Eject code is read or the CHAR/STOP key is depressed. |
| LINE | Implements card playback on a line at a time basis. |
| WORD | Implements card playback on a word at a time basis. |
| CHAR/STOP | Implements card playback on a character at a time basis, or stops all playback operations. |

The mag card read/write station employed with the MC/ST-I, CMC/ST and MC/ET also has control keys for selecting particular card tracks (lines). Such controls move a track selector to higher or lower numbered tracks in conjunction with a visual 0-to-50 track pointer display.

The CMC/ST has additional communications-oriented control keys for implementing transmission start, attention/end interrupt, CPU (computer transmission) and line hold (pause) commands. The MC/ET also has a Space Expand key for aligning numerical columns during proportionally spaced typing.

IBM Mag Card Typewriters



IBM MC/ST-II Keyboard

compensating for insertion/deletion problems using magnetic cards would be to have two card stations; the contents of one card would be copied onto another card insofar as possible to create a revised version of the text. This is a common approach for most non-IBM text-editing magnetic card systems. Another approach for easier handling of longer documents and heavy text editing is to use dual serial (tape) or single random (disc) media. The tape approach is, of course, available on the older MT/ST tape units and on a number of non-IBM systems. Disc media is becoming rapidly more popular in high-end systems and is now offered by IBM in the Office Systems 6 and WP/32 products.

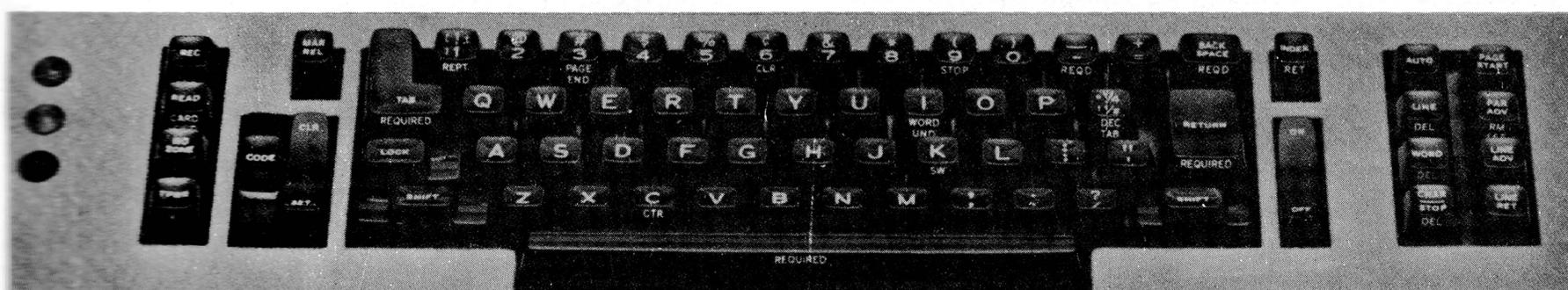
The IBM MC/ST-II, with its 8000-character internal memory offers the ability to hold at least two pages of text in accessible or fluid form at one time. This system permits powerful manipulative text editing to be exercised by the operator in a simplified, straight-forward manner for documents that typically do not exceed 2 or 2½ typed pages. The MC/ST-II thus is very similar to the new Memory Typewriter, and appears to be the best bet in the IBM magnetic keyboard lineup for extensive text editing of short documents. Longer documents are still more easily handled, both from a length as well as a text editing point of view, by the MC/ST-II than by other IBM magnetic card word processing systems.

Originally, IBM sold its magnetic card systems as being most applicable to the large center situation, in conjunction with other equipment (central dictation and copiers) to provide efficient production of typed material. Lately, IBM has revised its thinking on large centers and feels that many users may be better served by establishing small centers, in departments or work groups, in order to most efficiently handle the needs of the office as it exists today.

IBM word processing announcements over the past 2 years have provided a path for existing mag card installa-

► MC/ST-II & MC/A CONTROL KEYS

| CONTROL KEY | FUNCTION |
|--|---|
| REC (Record) | Records keyed text stored in typewriter memory onto a card. |
| READ | Transfers or reads text stored on a card into typewriter memory. |
| ALT SECT (Alternate Section) (MC/ST-II only) | Partitions typewriter memory into two sections. Constant text is read into main section memory, and variable text into the alternate section. Provides means for performing automatic letter writing and other repetitive text plus variable data typing tasks. |
| NO ZONE | Allows playback printing of text exactly as it was initially keyed. Used for typing tabular material without changing line lengths. |
| TPWR (Typewriter) | Enters keyed text into memory when in an "up" position. Locks out keyboard and allows text transfer from memory to cards without erasing memory when in a "down" position. |
| AUTO | Implements playback from memory until the end of the document. |
| LINE | Implements playback from memory until a carrier return (line at a time playback). |
| WORD | Implements playback from memory until a space, tab or carrier return (word at a time playback). |
| CHAR/STOP | Implements playback from memory on a character at a time basis, or stops all playback operations. |
| PAGE START | Positions system back to text at the start of memory or to text following last Page End instruction code. |
| PAR ADV (Paragraph Advance) | Positions system to the beginning of the next paragraph in memory. ► |



IBM MC/A Keyboard

IBM Mag Card Typewriters

➤ tions to migrate to higher-capability machines without obsoleting the older automatic typewriters. The IBM Office System 6 offers users such third-generation capabilities as diskette storage, an 8-line display, records processing and high-speed printing, but retains mag card compatibility with the MC/ST line of products. The mag card typewriters, in the system environment envisioned by IBM, are used as text input stations where mag cards are recorded for later editing and high-speed playout on the OS/6 line.

The initial product of the OS/6 family was a standalone ink jet printer, the 6640. Introduced in June 1976, the printer allows text recorded on mag cards to be printed off-line at speeds of 77 to 92 characters per second via a high quality ink-jet printer. The unit includes sheet paper (choice of two sizes or types) and envelope feeds and stackers, and can run unattended. In effect, this announcement turns each of the 170,000 (industry estimate) mag card IBM and IBM-compatible systems into an input station for later high-speed output. IBM's General Systems Division also announced the Word Processor/32 in June 1976. The Word Processor/32 consists of a software package plus hardware enhancements which allows System/32 users to add word processing to their mini-computer's capabilities. The Word Processor/32 is sophisticated, flexible and expensive, with a base system in the \$34,000 range. IBM also offers the 5321 Mag Card Unit (MCU) in conjunction with the System/32 WP offering.

This unit allows the System/32 to accept text from mag cards and output manipulated text to mag cards, for output on any standalone mag card system or the 6640 Document Printer.

In January 1977, the Ink Jet printer was coupled with keyboard/display and diskette and mag card storage modules in the Office System 6 word processors. The OS 6/430 and 6/450 have mag card media that is compatible with earlier IBM mag card typewriters. These standalone display word processors brought IBM into the most competitive part of the current word processing marketplace, but left them without high-speed impact printing for those applications that require carbon and forms typing. This "gap" in the IBM product line was filled with two subsequent announcements: the 6240 daisy wheel mag card typewriter in May 1977 and the OS 6/442 and 6/452 in January 1978. These products employ Qume 55-cps daisy wheel printers, with a price/performance level between the Selectric and the Ink Jet printers. Also in January 1978, IBM announced reductions in the purchase prices of the mag card typewriter line.

By making the OS 6 line mag card-compatible, IBM has again affirmed the preeminent position of the MC/ST line and the magnetic card storage medium. Other word processing vendors have also realized the de facto standard set by the IBM mag card, and have offered products that are code-compatible with it. Systems that use IBM-compatible mag cards include the Norelco WPS and A.B. Dick Magna I; other systems that offer mag card readers as optional peripherals include the Linolex 4000 VTE, Lexitron Videotype and Xerox 850 DTS. □

| ➤ CONTROL KEY | FUNCTION |
|---|--|
| LINE ADV (Line Advance) | Positions system to the beginning of the next line in memory. |
| LINE RET (Line Return) | Positions system to the beginning of the previous line in memory. |
| MC/ST-II & MC/A COMPOUND CODE KEY COMMANDS | |
| CODE + READ | Card Skip instruction for ejecting card from read/write station without changing the contents of the typewriter memory. |
| CODE + TAB | Required Tab instruction for paragraph indents, etc., and for setting up temporary left margins. |
| CODE + 1 | Repeat instruction for continuous printing of text stored in memory. Automatically positions system to beginning of memory. |
| CODE + 3 | Page End instruction for marking the end of a page of text. The end of a playback page may not necessarily coincide with the end of text in the memory. |
| CODE + 6 | Clear instruction for erasing the contents of memory. |
| CODE + 9 | Stop instruction for stopping playback at any point in memory. |
| CODE + - | Required Hyphen instruction for ensuring that hyphens or dashes are typed during playback. |
| CODE + BACKSPACE | Required Backspace instruction for moving the typewriter carrier back without erasing memory; used to underscore columns; to center over decimal tab columns, and to enter hanging indents. Also used when in TWPR "down" mode to correct an error (keyboard is usually locked out). |
| CODE + INDEX | Index Return instruction for returning typewriter carrier to the left margin. Used to ensure that each new document begins on the left margin. |
| CODE + RETURN | Required Carrier Return instruction for ensuring that a carrier return is implemented in playback. Used with short lines, names, addresses, serial numbers, etc. |
| CODE + SPACE | Required Space instruction for ensuring that spaces are not implemented as carrier returns in playback. Ensures that names, addresses, serial numbers, dates, etc. are typed without a return as a single line or phrase. |
| CODE + i | Word Underscore instruction for automatic underlining. |
| CODE + 1½ | Decimal Tab instruction for automatic alignment of numeric columns on the decimal. |
| CODE + k | Switch instruction for implementing switching between main and alternate sections of memory. Note that this code may be recorded on either the MC/ST-II or the MC/A, but the instruction may only be implemented on the MC/ST-II (see ALT SEC Control Key Function description). |

IBM Mag Card Typewriters

| | |
|---------------------------------------|---|
| CODE + c | Center instruction for automatic centering of a line or phrase. |
| CODE + LINE | Line Delete instruction. |
| CODE + WORD | Word Delete instruction. |
| CODE + CHAR/STOP | Character Delete instruction. |
| CODE + PAR ADV | Right Margin Set instruction for changing line length. |
| CODE + AUTO (MC/ST-II only) | Unattended Playback instruction for generating forms or letters on the MC/ST-II from card packs onto continuous form paper. |
| CODE + LINE RETURN (MC/ST-II only) | Line Count instruction for entering the number of lines to be typed per page. |

Pilot lamps to the left of the keyboard are employed to indicate mag card typewriter status or possible malfunctions in card input/output procedures.

MC/ST-I, CMC/ST & MC/ET PILOT LAMP DISPLAYS

| LAMPS | STATUS/CONDITION |
|--|---|
| Red | Character did not record or playback. |
| Yellow & Red | Card track is filled. |
| Red "on" first, then Yellow as card ejects | Nothing has been recorded on card, or card is dirty. |
| Yellow | Card has not been loaded, or only one record space remains on card. Will also activate each time text is skipped in SKIP mode operations. |

The CMC/ST communicating typewriter has two additional lamps for indicating send/receive status. The MC/ST-II and MC/A add an additional Green pilot lamp to the keyboard; status conditions indicated by the three lamps on these typewriters are as follows:

MC/ST-II & MC/A PILOT LAMP DISPLAYS

| LAMPS | STATUS/CONDITION |
|------------------------|---|
| Green | Card is required to complete the recording of a page from typewriter memory. |
| Green (blinking) | (1) — Page is recorded on two cards; second card must be read. (2) — Read key was depressed while card was being read. |
| Yellow | Memory is full and keyboard is locked. |
| Yellow (blinking) | Memory does not have enough space to store all of the text recorded on the card. |
| Red | Error code in memory must be cleared by character deletes, and the deleted characters then re-recorded. |
| Red (blinking) | Card is dirty, or cannot be read correctly, or there is an Error code in memory. |
| Green & Red (blinking) | Dusty or damaged card. |

PRINTER: The printer employed with IBM's mag card series is based upon their popular Selectric replaceable ball typing element mechanism. The MT/ST-I and CMC/ST

employ the Model 975 OEM Selectric. The proportional spacing MC/ET uses the Model 965 Correcting Selectric. The MC/ST-II and MC/A both utilize the newer Model 545 Correcting Selectric.

Automatic playback printout typing speed is at 15 cps or about 150 words per minute on all IBM mag card models. The MC/ST-I and CMC/ST are single-pitch machines which may be ordered with either a 10-pitch Pica or 12-pitch Elite character-per-inch font. The MC/ET employs a proportional mechanism where each character has its own unique spacing increment. The MT/ST-II and MC/A are dual-pitch machines offering the ability to be switched back and forth between 10- and 12-pitch character per inch fonts.

Maximum paper width accommodated by the typewriter carriages are 15½" for the MC/ST-I, CMC/ST and MC/ET; and 15⅞" for the MC/ST-II and MC/A. "Writing" or print line width is 13" for the MC/ST-I and CMC/ST, and 12-5/6" on the MC/ET, MC/ST-II and MC/A. The memory-based MC/ST-II and MC/A have a normal default (adjust playback) mode which automatically sets up a 6" writing line. This line width may also be changed by the operator.

Each model has seven basic typewriter printer controls for multiple copy carriage control (settings of "A" to "E"); single or double line spacing; paper release; paper restraining bar; variable platen knob for line alignment changes; line release lever for temporary line adjustments; and a page-end indicator dial. The MC/ST-II and MC/A also have additional controls for dual-pitch selection.

Note that the IBM 6640 Document Printer system (see Report S13-491-501) and the Office System 6 models 6/450 and 6/452 may also be used for the off-line, high speed, printing of text from IBM mag card typewriter cards.

TEXT EDITING

GENERAL: IBM mag card Selectric typewriter systems have the following edit capabilities.

| MODEL | MC/ST-I | CMC/ST | MC/ET | MC/ST-II | MC/A |
|-----------------------------|---------|--------|-------|----------|------|
| Automatic Paragraph Indent | Yes | Yes | Yes | Yes | Yes |
| Automatic Tabulation | Yes | Yes | Yes | Yes | Yes |
| Full Line Justification | No | No | No | No | No |
| Automatic Underlining | No | No | Yes | Yes | Yes |
| Backspace Correction | Yes | Yes | Yes | Yes | Yes |
| Control Character Printout | No | No | No | No | No |
| Direct Reverse Search | Yes | Yes | Yes | Yes | Yes |
| Document Assembly/Merge | No | No | No | Yes | No |
| Automatic Centering | No | No | No | Yes | Yes |
| Automatic Decimal Alignment | No | No | Yes | Yes | Yes |

IBM Mag Card Typewriters

| MODEL | MC/ST-I | CMC/ST | MC/ET | MC/ST-II | MC/A |
|-------------------------|---------|--------|-------|----------|------|
| Automatic Tab Memory | No | No | No | Yes | Yes |
| Automatic Margin Adjust | Yes | Yes | Yes | Yes | Yes |

DOCUMENT REVISION: The MC/ST-I, CMC/ST, MC/ET, and MC/ST-II can revise "on-line" by skipping text stored on the card and/or inserting material directly from the keyboard. For all systems but the MC/ST-II and MC/A, the length of data that can be inserted must not overflow 100 characters per line, or the difference between the existing line and 100 characters, whichever is less. Should more data insertion be required, a carryover to the next line must occur with overflow considerations taken into account for that line as well, etc.

The MC/ST-II operates directly out of its 8K character internal memory. Extensive text editing requires care only in case of overflow on the 8K character memory (note that when the memory is partitioned into 2 sections, the section boundary sets a smaller limit on the size of the document before overflow occurs). Upon completion of the text editing, the contents of internal memory can be dumped to one or more magnetic cards depending upon document length and page spacing requirements.

Revisions are accomplished on the MC/A by reading card text into the 6K character typewriter memory. The text is then played back on the typewriter, revised, and/or stored on another card for future use. Line lengths need not be respected since storage norms are by card and page.

TEXT SEARCH: The method employed with the mag card systems requires that a hard-copy (printed) reference book be maintained with a sample of each document that is stored on cards. Searches on the MC/ST-I, CMC, and MC/ET are performed by skipping (advancing) through a document by paragraphs, lines, words, or characters under operator control. On the MC/ST-II and MC/A, searches are performed by advancing by paragraph, line, word or character within a document after a card has been dumped into memory.

CORRECTION FEATURES: The MC/ST-II and MC/A employ a special mechanism which will simultaneously back up and clear data in memory, and erase the typed characters from the printed page. Erasures are virtually invisible with the special "lift-off" adhesive tape employed, allowing first draft copies to be used as final documents when no further changes are required. Each erasure tape will perform about 2000-character changes, and the carbon typewriter ribbon cartridge is good for over 120,000 impressions.

HYPHENATION: A 6-character "hot zone" technique is used. Any word that starts 7 or more characters before the right-hand margin, and which will not end before the margin is reached, causes the system to stop in mid-word. The operator then allows typing to proceed character-by-character until a suitable place to hyphenate is reached. At this point the operator performs a hyphenation and returns the system to automatic typing mode. As an alternative to hyphenation, the operator can choose not to hyphenate by depressing the "auto" button when the unit stops in mid-word, and the full word will be typed. The operator may also choose to place discretionary hyphens in long words so that hyphenation will occur without operator intervention; unnecessary (non-required) hyphens will be dropped if they do not occur at the end of a line.

OTHER FEATURES: The MC/ST-II and the MC/A offer a Format Option which allows the operator to record such format functions as single or double spacing, clearing and

setting tabs, changing line lengths, and printing in adjust or non-adjust. The system will then place these functions in memory, change machine settings, and implement them whenever encountered. With this option, the operator can enter format statements before printout via the keyboard or a mag card.

CONFIGURATION

GENERAL: The elements in each system are a typewriter I/O device, and a single-station magnetic card console. Options for each of the systems are enumerated in the Equipment Price Listings.

IBM mag card equipment may also be used as keyboarding stations for editing and printout on Office Systems 6 equipment, with the attached Ink Jet or daisy wheel printers, or for formatting and printout on the stand-alone 6640 Document Printer. In either configuration, the Ink Jet Printer provides high speed printout from cards onto paper and envelopes, with sophisticated formatting and type style considerations available. Thus, the IBM mag card equipment may become part of a larger, sophisticated configuration, with different levels of equipment provided for varying tasks.

IBM-formatted mag cards may also be fed into the IBM Word Processor/32 system for more complex editing and formatting.

STORAGE MEDIUM

TYPE: All IBM mag card typewriters employ a flexible 3½" by 7⅜" tab-size magnetic film card for text storage. The MT/ST-II and MC/A, in addition, have internal memories.

CAPACITY: A mag card is formatted to store 50 lines (card tracks) of 100 characters each, for a total per card capacity of 5000 characters. Based upon the maximum printable writing line width and typewriter pitch size criteria, this equates to a maximum line of 78 or 130 characters on the MC/ST-I and CMC/ST; and a maximum line of 77 or 125 characters on the MC/ST-II and MC/A. The proportional spacing MC/ET has a 77 to 125 character line maximum, dependent on the character mix (each individual character occupies a different line space). Note that each space, backspace, underline, carrier return, etc. instruction code will occupy a character space on the mag card.

The internal MC/ST-II memory can hold up to 8000 characters of text. A dynamic boundary allows the operator to partition the memory into two sections (see ALT SECT Control Key function description). One section may be loaded with the body of a letter while the other contains variable address information, etc. A Switch code is used to implement automatic switching and card loading from the read/write unit stack feed for unattended automatic letter writing and similar tasks using this MC/ST-II memory feature.

The MC/A has a 6000 character memory that is used to store keyboarded text for eventual loading onto cards, or to receive recorded text from cards. The memory, however, may not be partitioned or used in Switch code type operations.

The MC/ST-II employs a pack feed plus single card feed mag card read/write module; the pack feed can process up to 50 mag cards. The MC/A employs a single card read/write module.

SPEED: Text transfer to and from read/write module and memory is 200 characters per second for the MC/ST-II. Text transfer on the MC/A is at 240 characters per second for card-to-memory dumps, and 200 characters per second for memory-to-card.

IBM Mag Card Typewriters

► AUXILIARY PERIPHERALS

REVERSE INDEX: IBM mag card typewriters may be equipped with a Reverse Index feature that allows for half-line indexing upwards or downwards. This keyboard-implemented feature allows the generation of text containing super- or subscripts. The MC/ST-II and MC/A, in addition, may be equipped with a Format Option (described previously).

INK JET PRINTER: Mag cards prepared on IBM mag card typewriters are compatible with the 6640 Ink Jet Printer, and the Office System 6. The ink jet printer generates typewriter-quality copy at speeds of 77 to 92 characters per second in 10-pitch, 12-pitch, and proportionally-spaced fonts. The printer may be formatted via a control card to automatically generate copy containing different pitch/proportional characters and type styles on letterhead and envelope stocks.

DAISY WHEEL PRINTER: IBM mag card typewriters are also compatible with the coding formats used on the 6240 and OS 6/442 and 452 daisy wheel printer word processors. The Qume printers on these systems offer 55-cps bidirectional printing in 10-pitch, 12-pitch and proportional spacing. These high-speed impact printers are especially useful in applications requiring forms or carbon typing.

COMMUNICATIONS: Communications capability is provided for the CMC/ST (the CMC/ST is an MC/ST-1 plus a communications option). The communications feature turns the magnetic card station into a "casual" communications terminal able to communicate either with another CMC/ST, or directly with a suitably equipped IBM System/360 or 370 computer as well as compatible systems made by other manufacturers. The unit is recognized by the computer as an IBM 2741 Communications Terminal, and transmits data at the rate of 14.8 characters per second (135 baud). The IBM Mag Card II (MC/ST-II) may also be optionally equipped with communications, enabling the system to communicate in 2770-compatible mode at speeds up to 2400 bauds. This option may be retrofitted to existing MC/ST-II installations. The communications feature integrally includes dial inter-

face, receive interrupt, transmit interrupt, and Typamatic (repeating) keys. Special communications options (SER) include automatic terminal identification and communications mode key lock. In conjunction with the communications feature for computer-terminal operation, the user must provide a Bell equivalent 103G5 type modem. A point-to-point automatic answer capability is provided in conjunction with a 103 A2 modem for unattended operation.

PROGRAMMING: The IBM mag card typewriters are pre-programmed by IBM to accept edit command instructions as indicated by the operator through the control keys. The sequence of commands is stored with the text in appropriate positions on the magnetic cards for subsequent use in producing output. For the MC/ST-II and MC/A the edit commands are stored in internal "fluid" memory until transferred to magnetic cards.

PRICING

POLICY: IBM markets their mag card typewriters on a direct purchase, rental, or two-year Extended Term Lease (ETL) basis.

SUPPORT: IBM provides a self-instructional operator's manual with each mag card typewriter. If the mag card unit is part of an overall word processing operation, IBM will provide group training for supervisors at their Dallas, Texas facility. On-site training is also provided by an IBM Marketing Support Representative (MSR). In some instances, IBM will also offer branch office training for customer personnel (usually for the MC/ST-II). For other mag card units, the user should depend upon the self-teaching manual with initial installation demonstration and training support. This will be followed up by MSR calls and regular seminars at the IBM local office.

Maintenance costs are included in rental and lease charges; mag card units on purchase only require extra cost maintenance contracts. These basic maintenance plans cover normal working hour service calls on a Monday through Friday basis. Special customer engineering service is available at \$34.50 per hour; overtime calls are billed at \$45.00 per hour.■

SPECIFICATIONS

| MODEL | MC/ST-I | CMC/ST | MC/ET | MC/ST-II | MC/A |
|--------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Power Required | 115V, 60Hz, 2A |
| Typewriter Console | | | | | |
| H x W x D | 7.1" x 20.5" x 15.6" | 7.1" x 20.5" x 15.6" | 7.1" x 20.3" x 15.6" | 7.6" x 20.3" x 15.6" | 7.6" x 20.3" x 15.6" |
| Weight | 50 lbs. |
| Mag Card Console | | | | | |
| H x W x D | 32" x 10.5" x 20" | 32" x 10.5" x 20" | 32" x 10.5" x 20" | 26.5" x 12" x 19" | 26.5" x 12" x 19" |
| Weight | 75 lbs. | 75 lbs. | 78 lbs. | 65 lbs. | 64 lbs. |

IBM Mag Card Typewriters

SUMMARY DATA

| MODEL | MC/ST-I | CMC/ST | MC/ET | MC/ST-II | MC/A |
|----------------------|--------------------|---------------|--------------------------|-------------------------------------|-------------------------------------|
| Typewriter Model | 975 Selectric | 975 Selectric | 965 Correcting Selectric | 545 Correcting Selectric | 545 Correcting Selectric |
| Announcement Date | October 1969 | July 1971 | April 1972 | April 1973 | September 1975 |
| Auto Typing Speed | 150 wpm | 150 wpm | 150 wpm | 150 wpm | 150 wpm |
| Storage Medium | Magnetic Card | Magnetic Card | Magnetic Card | Magnetic Card 8K Internal Memory | Magnetic Card 6K Internal Memory |
| No. Storage Stations | 1 | 1 | 1 | 2* | 1 |
| Basic Mo. Lease** | \$170 | \$225 | \$205 | \$275 | \$230 |
| No. Installed*** | 75,000 | 9,000 | 9,000 | 35,000 | 7,000 |
| Communications | Option (as CMC/ST) | Standard | None | Option | None |

*Card stack and single card feed ports. **Two-year term. ***Estimated installation figures; IBM does not release official installation statistics.

EQUIPMENT PRICING (1)

| MODEL/ITEM | PURCHASE | RENTAL | ETL LEASE | MONTHLY MAINT. (2) |
|-----------------------------|----------|----------|-----------|--------------------|
| MC/ST | \$ 5,400 | \$195 | \$170 | \$25 |
| CMC/ST (3) | 9,550 | 255 | 225 | 33 |
| MC/ST | 5,890 | 235 | 205 | 36 |
| MC/ST-II | 11,150 | 310 | 275 | 42 |
| CMC/ST-II (4) | 14,680 | 412 | 365 | 45 |
| MC/A | 9,360 | 230 | 260 | 38 |
| Reverse Index | 900 | 20 | 18 | 2 |
| Auto Paragraph Indent (5) | N/C | N/C | N/C | 2 |
| Selective Ribbon System (5) | 140 | 5 | 4 | N/C |
| Format (6) | 400 | 10 | 9 | N/C |
| Roll Paper Holder | 80 | unavail. | unavail. | N/C |

(1) Government GSA schedule available.

(2) Rental and 2-year ETL lease plans include maintenance.

(3) \$1,463 for field-installed communications on existing MC/ST.

(4) \$3,720 for field-installed communications on existing MC/ST-II.

(5) Standard feature of MC/ET, MC/ST-II and MC/A.

(6) Option available on MC/ST-II and MC/A only.

SUPPLIES PRICING

Magnetic Cards (Box of 25): 1 to 3 @ \$31; 4 to 9 @ \$25; 10 to 29 @ \$23.75; 30 to 99 @ \$22.50

Xerox 800 Electronic Typing System

MANAGEMENT SUMMARY

Xerox entered the word processing marketplace in October 1974, with the introduction of the 800 Electronic Typing System (800 ETS). The 800 ETS series consists of six models: the 122 single cassette; 124 single mag card; 126 dual card; 128 dual cassette; and single and dual cassette communicating models, the 151 and 152. The ETS series was among the first to employ the Diablo daisy wheel in a keyboard/printer configuration. The ETS line is aimed at the first-time automatic typewriter user, or at IBM MC or MT series users seeking a more advanced mag media keyboard.

Since 1974, Xerox has continued to expand technological and marketing efforts outside of their traditional copier and facsimile markets, and is now generally regarded as number two in the word processing industry. The establishment of the Office Systems Division in 1977 unified the Xerox word processing effort, which includes Diablo (daisy wheel printers) and Daconics (shared-logic word processors), as well as a new line of Xerox word processors, the 850 Display Typing System (850 DTS). Xerox has also recently acquired Shugart Associates, one of the original developers of the floppy disk drive which is a component in many word processors.

The 800 ETS is compatible with higher-level Xerox offerings; in June 1976, communications hardware was introduced that allows the ETS to transmit to the Daconics Visual Type shared-logic system. Part of the original 850 DTS announcement in October 1977 were two "black box" modules that read text stored on ETS cards or cassettes onto diskettes. This interface capability allows the 2 systems to be used in a mixed-media word processing center, with the 800 used for initial text entry, and the 850 for editing and formatting operations. ➤

The 800 ETS series has brought Xerox to the number two position in the word processing industry since its introduction in 1974. The ETS is based on a daisy wheel keyboard/printer, with mag card or cassette media in single or dual station configurations. Xerox has given the 800 line several advantages over Selectric-based automatic typewriters, including 30 cps bidirectional printout, character string search, and line justification. The 800 ETS can communicate with the Xerox/Daconics Visual Type system, and interface with the 850 Display Typing System through mag card or cassette media reader/convertors.

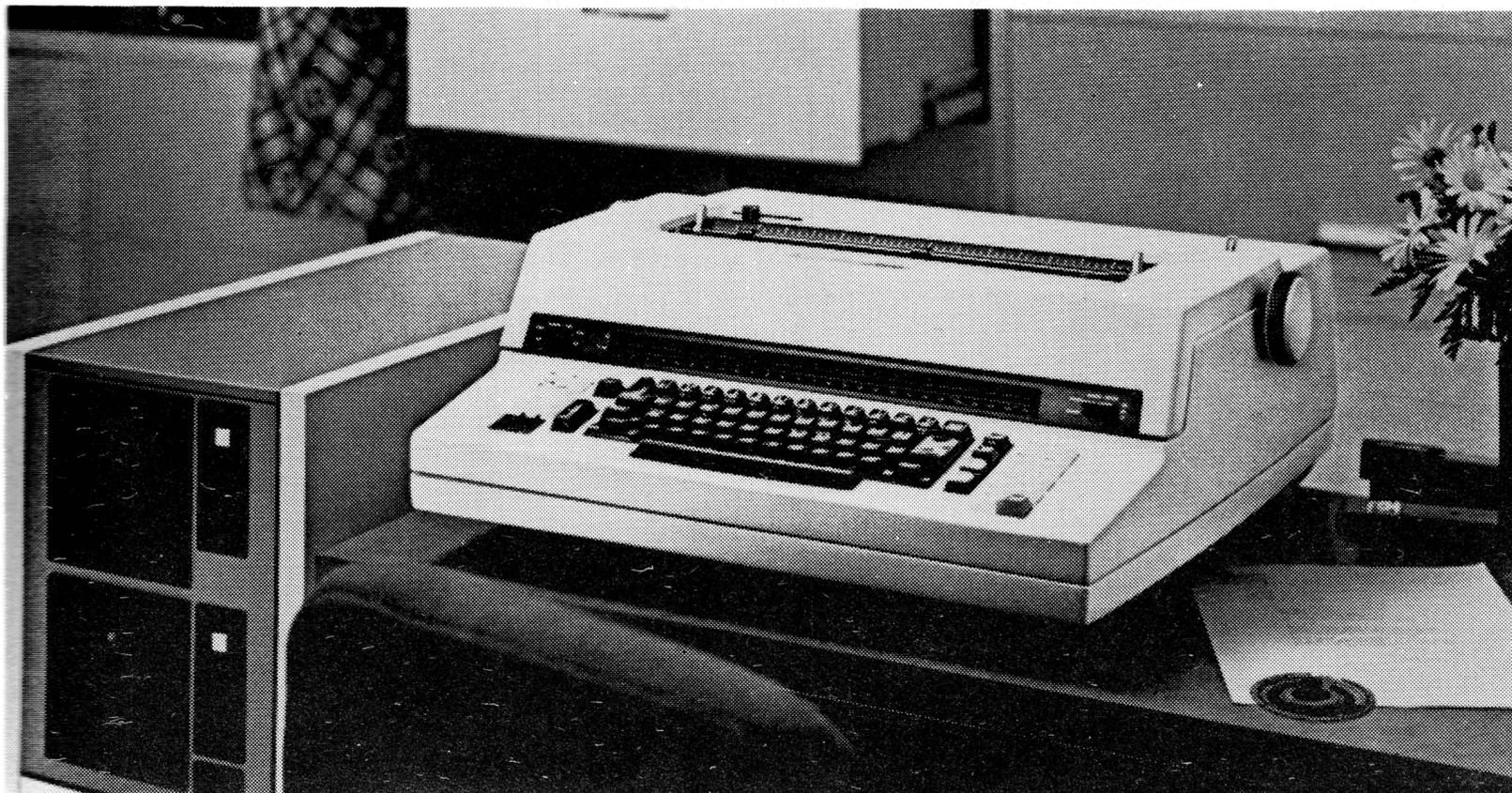
CHARACTERISTICS

MANUFACTURER: Xerox Corporation, Office Systems Division, 1341 West Mockingbird Lane, Dallas, TX 75247. Telephone (214) 630-2611 or local branch offices. In Canada: Xerox of Canada, Ltd., 703 Don Mills Road, Don Mills, Ontario M3C 1S2. Telephone (416) 429-6750 or local branch offices.

MODELS: 800/122 Single Tape, 800/124 Single Card, 800/126 Dual Card, 800/128 Dual Tape, 800C/151 Communicating Dual Tape and 800C/152 Communicating Single Tape.

INPUT/OUTPUT DEVICE

KEYBOARD: Each Xerox 800 ETS model has a standard, 44-key alphanumeric keyboard providing up to 86 different characters and space (both the period and comma are repeated in upper and lower case), including upper and lower case alphabetic and 34 special or numeric characters. The ➤



Xerox 800 Electronic Typing System

➤ The 800 ETS line constituted an important advance over the IBM Selectric-based automatic typewriters because of the improved print speed (30 cps vs. 15 cps), as well as such text editing features as automatic carrier return, full line justification, and bi-directional printing and carrier indexing. □

➤ ETS keyboard has eight repeating keys — space, backspace, index, reverse index, carriage return, x/X character, period, and hyphen/underscore.

CONTROL KEYS: ETS 800s have nine basic typing control keys for margin release, tab, backspace, carrier return, lock, two shift keys, index, and reverse index. Other common control keys include right/left margin set, tab set/clear, line space (1, 1½, 2), and pitch (10, 12, proportional space). The main On/Off switch for the systems is located on the card or tape recorder consoles.

In addition to typing controls, other controls for record, edit and playback functions are activated by using a Code key plus several of the alphanumeric keys on the main keyboard, or by utilizing two separate control keypads located to the left and right of the main keyboard.

Code key plus alphanumeric keyboard activated control codes common to both card and tape 800 ETS systems are:

CODE + 1 **FORMAT PRINTOUT** — Activates a printout of format in ETS memory. This format is not recorded on card or tape media, and resides in internal typewriter memory. Used to check tabs and margins.

CODE + 3 **STOP** — Stops transfer or playback action without recording a Stop code on other storage media station. Will also stop in Skip mode operations.

CODE + 4 **TSTOP** — Stops playback and simultaneously records a TStop on the storage media. Will not be recognized during Skip mode operations.

CODE + 5 **SWITCH** (dual media models only) — Allows merge between dual media stations.

CODE + 8 **LINE SPACING** — Allows the recording of line spacing information.

CODE + 9 **FIRST LINE FIND** — Used with continuous form for unattended playback of repetitive letters.

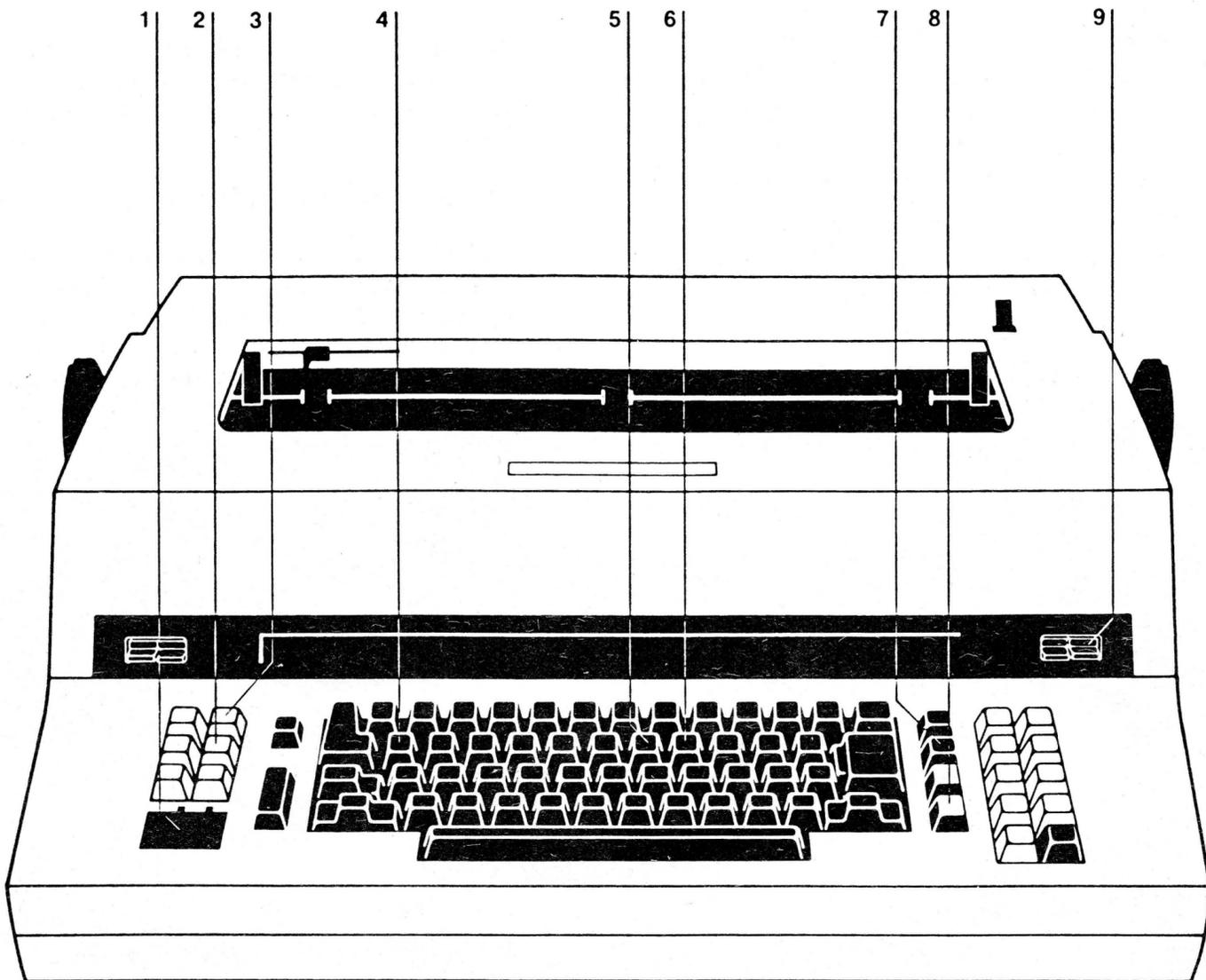
CODE + 0 **LINK** — Used to eliminate an entire line plus carrier return. Also used on ETS units to allow extensive revisions by "borrowing" character spaces from following line.

CODE + — **REQUIRED HYPHEN** — Maintains hyphen in before hot zone conditions.

CODE + = **BACKSPACE ½** — Used with proportional space font wheels to condense words for print-out on limited space.

CODE + BS **CODED BACKSPACE** — Activates a reverse indent where first line is not indented and following lines are.

CODE + INDEX **SPECIAL CARRIER RETURN (SCR)** — Returns carrier on paper but not on recording media. Allows the recording of several lines of printout material on one "line" of storage media to conserve card or tape storage.



Xerox 800 ETS Magnetic Card Console — (1) Track Search Control initiates automatic search for a specific line; (2) Code Print Button generates printout of special instruction codes on rough-draft copy; (3) Insert Revision Button for the insertion of up to 80+ characters per line; (4) Code Format Key to set printout margins and tabs; (5) Automatic Underscoring Key; (6) Automatic Centering Key; (7) Reverse Index Key; (8) Justification Button for generating fully justified right-margin text; (9) Switch Pitch Control for selecting 10-pitch, 12-pitch or proportional printout spacing.

Xerox 800 Electronic Typing System

| | |
|------------|---|
| CODE + TAB | REQUIRED TAB — Records initial paragraph indent. |
| CODE + Q | CODE FORMAT — Records margin and tab settings. |
| CODE + W | FIRST LINE SET — Used in conjunction with First Line Find and a two digit number to set paper advance for continuous forms repetitive typing. |
| CODE + E | PAGE END — Locks keyboard when a preset number of lines have been typed and recorded. Used when processing a document of several pages. |
| CODE + Y | COLUMN CENTER — Automatic centering of columnar headings between tab settings. |
| CODE + U | WORD UNDERSCORE — Automatic underscore code positioned after word to be underscored. (See also Space Expand key.) |
| CODE + I | CENTER — Automatic centering of heading or line between the set margins. |
| CODE + CR | CODED CARRIER RETURN — Activates playback to start at left margin. |
| CODE + SP | REQUIRED SPACE — Maintains space between words in hot zone. |
| CODE + X | TEST LAMP — Tests display lamps and beep alarm on ETS typewriters. |

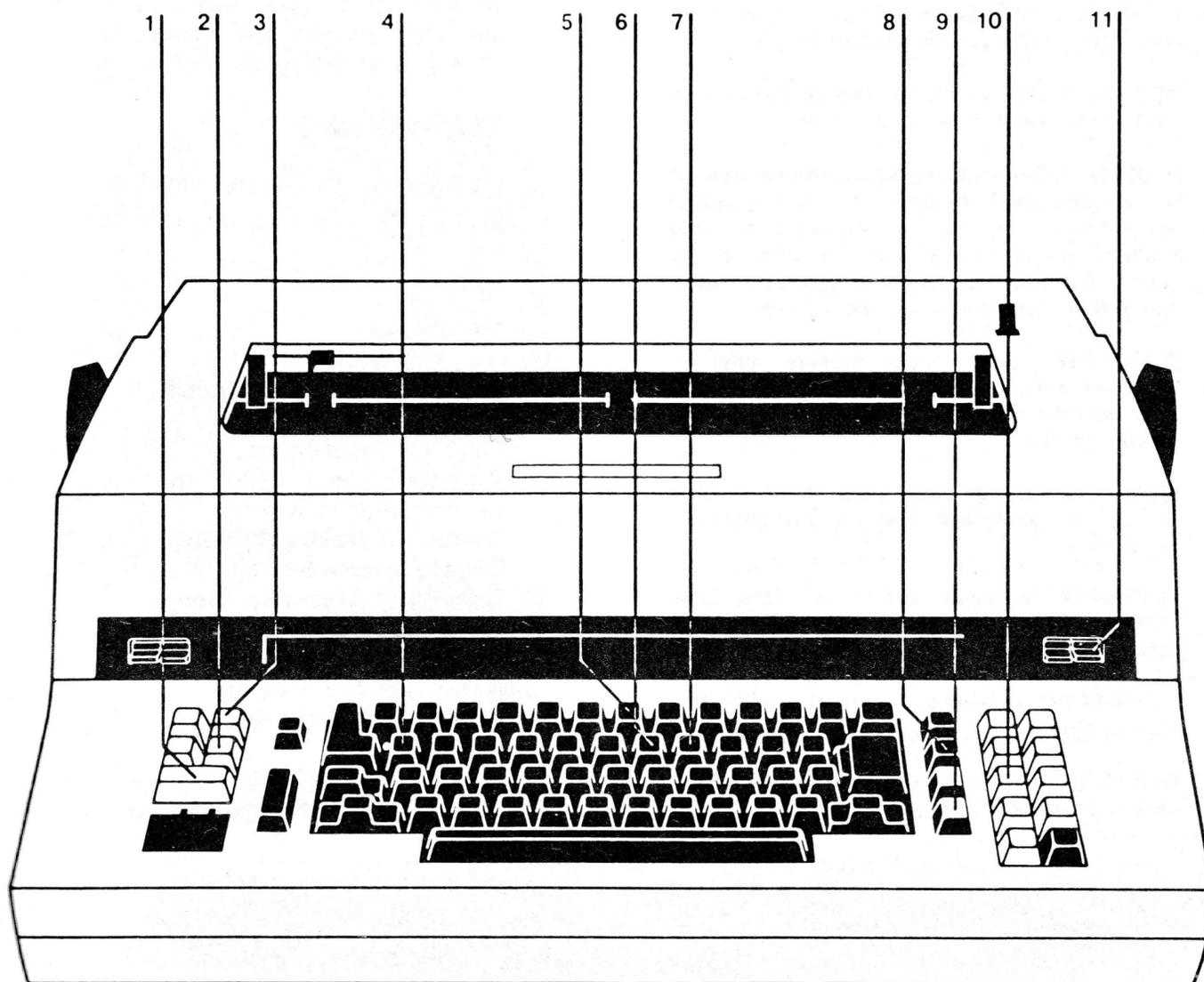
Code key plus alphanumeric keyboard activated control codes common to only ETS 800 card models are:

| | |
|----------|---|
| CODE + 2 | CARD EJECT — Releases RECOrd control key and ejects card from reader console. |
| CODE + 7 | CARD REPEAT — Returns card recorder to beginning of recorded document for repeat playback of form letter. |

Code key plus alphanumeric keyboard activated control codes common only to ETS 800 tape models are:

| | |
|----------|---|
| CODE + 2 | REFERENCE CODE — Identifies each unique block of information or document automatically with a two digit number. |
| CODE + 6 | SEARCH — Keying a Search plus two digits returns tape to Reference coded document. |
| CODE + 7 | SWITCH & SEARCH (dual tape model only) — Controls Reference searching and switching between the two tape transports. |
| CODE + R | SKIP OFF — Instructs ETS not to skip variable information (see also Switch & Skip). |
| CODE + T | SWITCH & SKIP — Instructs the ETS to switch to other tape transport and skip everything until a Skip Off code is encountered. |

Other control functions keys common to both card and tape ETS models are located to the left and right of the main keyboard. They include:



Xerox 800 ETS Magnetic Tape Console — (1) Text String Search Key advances tape to specified word or phrase; (2) Code Print Button generates printout of special instruction codes on rough-draft copy; (3) Insert Revision Button for the Insertion of up to 50 characters per line; (4) Code Format Key to set payout margins and tabs; (5) Switch & Search Key for implementing automatic search operations; (6) Automatic Underscoring Key; (7) Automatic Centering Key; (8) Reverse Index Key; (9) Justification Button for generating fully justified right-margin text; (10) Duplication Button for cassette duplication; (11) Switch Pitch Control for selecting 10-pitch, 12-pitch or proportional printout spacing. 800 ETS Magnetic Tape units equipped with the communications option also have controls for transmission functions.

Xerox 800 Electronic Typing System

LEFT KEYPAD CONFIGURATION & REFERENCE INDICATOR/SELECTOR

| | |
|------------|--|
| REC | RECORD — Activates Record on card or tape transports. Also functions as automatic erase on tape models when used with Code key. |
| REV | REVISE — Revision control used when editing or correcting copy. |
| ALT RDR | ALTERNATE READER (dual media models only) — Switches "read" function from one transport to another. |
| CODE PRINT | CODE PRINT — Prints out instruction codes during record or playback for verification. |
| SEARCH | SEARCH (tape models only) — Used with Reference selector levers to search out a particular document or block of text. |
| TRK PLUS | TRACK PLUS (card models only) — (1) Moves mag card forward one track at a time. (2) Used with Code key and Reference selector levers to search out a particular document line or paragraph (card track). |
| TRK MINUS | TRACK MINUS (card models only) — Moves card back one track at a time. |

RIGHT KEYPAD CONFIGURATIONS

| | |
|--------------|--|
| SPACE EXPAND | SPACE EXPAND — (1) Allows statistical typing in proportional type fonts. (2) Code + Space Expand continuously underscores a series of words (see also Word Underscore). |
| RIGHT JUST | RIGHT JUSTIFICATION — Copy is played back with right margin justified automatically. |
| LINE CORR | LINE CORRECT — Moves carrier, paper, and card or tape back to beginning of line. |
| MARG CONT | MARGIN CONTROL — Automatically adjusts line lengths within margins after text revisions or deletions. In this mode, regular and required hyphens are automatic; also, all CR's are required. Automatically CR's to correct indentation and records correct number of tabs. |
| DUP | DUPLICATE (dual media models only) — Transfers recorded information from the lower card or tape transport to the upper station, without printout. |
| SKIP | SKIP — Used with Para, Line, Word or Char to skip over paragraph, line, word or character in playback. |
| PLAY | PLAYBACK — Used with Auto, Para, Line, Word or Char to playback entire document, paragraph, line, word or character. |
| AUTO | AUTOMATIC — Used in conjunction with Playback control. |
| PARA | PARAGRAPH — Used in conjunction with Playback and Skip controls. |

| | |
|------|--|
| LINE | LINE — Used in conjunction with Playback and Skip controls. |
| WORD | WORD — Used in conjunction with Playback and Skip controls. |
| CHAR | CHARACTER — Used in conjunction with Playback and Skip controls. |

Individual key cap lights are activated when the Rec, Rev, Trk Plus/Minus or Search, Space Expand, Right Just, Auto, Marg Cont, Para, Dup, Line, Skip, Word, Play and Char keys are depressed. A beeping tone also signifies carrier location five spaces from margin (one beep); skip function has been accomplished (one beep) or not accomplished (two beeps); end-of-card or end-of-tape conditions (long continuous beep); and incorrect incoding (continuous beep).

PRINTER: The 800 ETS systems employ a Diablo daisy wheelprinter with a print speed of 30 characters per second (approximately 350 words per minute). Printout may be in 10- or 12-pitch, or proportional spacing. Xerox offers 18 type styles for the ETS line, including 7 proportional fonts, 6 10-pitch and 5 12-pitch styles.

A unique feature of the Xerox daisy printer is bi-directional printing in both horizontal and vertical directions. The 800 ETS printer is thus able to type from right-to-left or left-to-right, as well as index up or down.

Maximum paper width accepted by the printer is 15 inches, with a 13-inch maximum writing line. Interchangeable film or fabric ribbon cartridges are used. The printer has controls for paper release, multiple copy, impression, line spacing (1, 1½ or 2), and platen release for off-line positioning.

TEXT EDITING

GENERAL: Xerox 800 ETS series card or tape systems provide the following edit capabilities:

| MODEL | SINGLE CARD/TAPE | DUAL CARD/TAPE |
|-----------------------------|------------------|----------------|
| Automatic Paragraph Indent | Std. | Std. |
| Automatic Tabulation | Std. | Std. |
| Full Line Justification | Std. | Std. |
| Automatic Input Underlining | Std. | Std. |
| Backspace Correction | Std. | Std. |
| Control Character Printout | Std. | Std. |
| Direct Reverse Search | Std. | Std. |
| Document Assembly/Merge | None | Std. |
| Automatic Centering | Std. | Std. |
| Automatic Decimal Alignment | Std. | Std. |
| Automatic Tab Memory | Std. | Std. |
| Automatic Margin Adjust | Std. | Std. |

DOCUMENT REVISION: The 800 ETS uses a temporary storage buffer (150 characters for card, and 256 characters

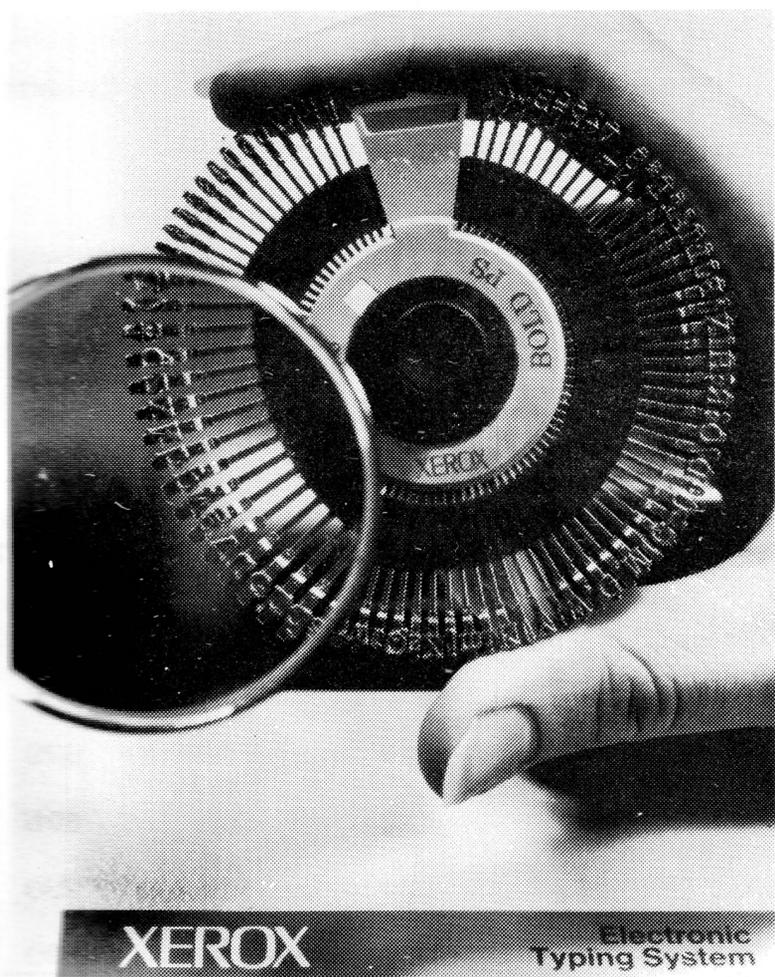


Xerox 800 Electronic Typing System

for cassette) to store text prior to transfer onto card or tape (input) or printing (output). Since a standard typed line, with control codes, will not use that many characters, a certain amount of extra space is reserved for expansion of each line, and is stored on card or tape with that line. Single card or tape 800 ETS's are therefore able to perform a certain amount of text revision using internal typewriter buffers and the empty spaces on the card or tape media. Link code control operations also allow the borrowing of extra line space from following lines. In dual media systems, revision material may be taken from the second card or tape as well as from the keyboard.

Note that in dual media systems, the top transport can both playback and record, while the bottom one can only playback.

TEXT SEARCH: The method used generally requires that a hard copy (printed) sample book be maintained with a copy of each document stored on the card or tape. On cassette systems, the main search method is by character string within a document; any number of characters (up to 50) which uniquely identify the desired location may be used. On card systems, search proceeds by line number. Searches may also be performed by skipping characters, words, lines, or paragraphs. Codes may also be recorded on the media for more general searches. Up to 99 codes may be set anywhere by the operator, and retrieved by using Reference selector levels and Trk Plus or Search keys.



The Xerox 800 ETS employs a modified and enhanced Diablo-type printing mechanism to produce copy. The new and improved mechanism has superior character and alignment features when compared to earlier Diablo units, and also uses a special, heavy duty print or daisy wheel replaceable typing element. As illustrated, the new wheel has been modified by the removal of several character petals to allow operator verification of the typed characters — a feature not found on previous Diablo models. The new wheels are also able to make over 30 million impressions per petal without degradation in print quality. Xerox provides a choice of 18 different wheels for the 800 ETS in 10-pitch, 12-pitch and proportional space fonts.

HYPHENATION: The normal setting for a hot zone on the 800 ETS is 5 characters. The operator may, however, set the hot zone anywhere from zero to 15 characters by using the Code and Margin Control keys. The lower the setting, the more even the margins will be, but more hyphenations will be required. The higher the setting, the more irregular the margin, but fewer hyphenations will be needed.

As each line is being typed and nears the righthand margin, the ETS will automatically sense the line ending and return the carrier to the beginning of the next line. In playback, with Margin Control activated, the ETS will automatically make conversions on recorded material before and inside the hot zone. When a hyphenation falls in the middle of a line before the hot zone, the ETS will drop the hyphen and close up the word. Likewise, a carrier return before the hot zone will be converted to a space. A space read inside a hot zone is automatically converted to a carriage return. Otherwise, the ETS will stop playback as the hot zone is reached to allow the operator to make a hyphenation decision on a character-by-character basis.

CONFIGURATION

GENERAL: The system elements in both single and dual, card or tape 800 ETS models are a typewriter I/O device and a separate floor-standing media console. The typewriter fits on an existing desk surface while the transport console stands upright on the floor.

STORAGE MEDIUM

TYPE: (1) Card Models — ETS card units employ a standard 3½" by 7-3/8" magnetic film card for data storage. The dimensions of the card are the same as those used with computers. (2) Tape Models — Standard Philips-type cassettes containing approximately 150 (low capacity) or 300 (high capacity) feet of tape are used on ETS tape models.

CAPACITY: (1) Cards — Each card is used to store 72 lines (tracks) of 150 characters per line or a total capacity of 10,800 characters per card. This is equivalent to a full, legal-length page, together with codes and extra capacity for revisions or corrections. (2) Tapes — Each high capacity tape can store up to 35,000 characters, the equivalent of about 25 average length letters with reserve capacity for corrections and revisions.

SPEED: (1) Card Models — Record and playback operations with cards occurs at 20 inches per second. For dual card systems, the contents of one card may be recorded onto another in about one minute. (2) Tape Models — Record and playback operations with tape cassettes occurs at 20 inches per second, while fast search can be performed at 70 inches per second (nominally 3600 characters per second).

AUXILIARY PERIPHERALS

XEROX 850 INTERFACE: Two modules of the Xerox 850 Display Typing System interface that system with the magnetic media of the 800 ETS units. Text recorded on mag cards or cassettes may be read onto an 850-compatible diskette for further editing and formatting using the more powerful capabilities of the display systems. Conversions can be made in either direction so mixed-media facilities can have maximum flexibility. One possible configuration would use ETS machines for initial text entry and revision, and the 850 DTS for editing and formatting operations. (See Report WP11-931-201 for more information on the Xerox 850 Display Typing System.)

COMMUNICATIONS: A communications option is available for the 800 ETS cassette models only. Four protocols are supported, including Xerox Internal, TTY-compatible, IBM CMC and 2741-compatible; all four use asynchronous.

Xerox 800 Electronic Typing System

► half-duplex facilities. The Xerox 800 ETS can communicate with other ETS systems, the Daconics Visual Type, IBM mag card products, and other word processors or host computers.

PROGRAMMING: Common to all 800 ETS card or tape models is a command set of twenty program codes. Dual media models, in addition, have one other program code. Likewise, card units have two additional program codes, single tape units four more program codes, and dual tape units five more codes. All command codes are stored with the text in appropriate positions for subsequent use in playback.

PRICING

POLICY: Xerox offers 800 ETS systems for sale or rental in terms of 6 months, 1 year or 2 years. Systems currently under rental plans may be purchased, with 70% of rental charges paid in the first six months, and 50% of charges paid thereafter, being credited against the purchase price, up to a maximum of 35% of the current list price of the equipment.

SUPPORT: Xerox markets the 800 ETS in most major U.S. and Canadian cities, and in the United Kingdom, Sweden, Germany, France, Italy, and Spain.

Xerox provides a variety of customer seminars, training programs and instruction packages in support of the 800 ETS. They include a one-day management briefing; an intensive two-week customer support seminar for managers of word processing operations; a five-day seminar for word processing supervisors; a five-day seminar for administrative support supervisors; and instruction packages for operators, managers, and administrative secretaries.

Xerox also offers, at no charge, media conversion equipment to transfer information from IBM cards or tapes onto 800 ETS media. The converter is available to users for transfer and formatting at Xerox or customer site, depending on volume. ■

SPECIFICATIONS

| | |
|-------------------------------|----------------------------|
| MODEL | Xerox 800 ETS (all models) |
| Power Requirements | 115V, 60Hz, 15A |
| Typewriter Dimensions (HxWxD) | 8¼" x 21½" x 19½" |
| Typewriter Weight | 50 lbs. |
| Console Dimensions (HxWxD) | 30½" x 12" x 23¼" |
| Console Weight | 140 lbs. |

SUMMARY DATA

| | |
|----------------------|----------------------------------|
| MODEL | Xerox 800 ETS (all models) |
| Announcement Date | October, 1974 |
| First Shipment Date | October, 1974 |
| Printer | Xerox/Diablo daisy wheel |
| Auto. Typing Speed | 30 cps |
| Basic Storage Medium | Mag Card or Cassette |
| No. Media Stations | 1 or 2 |
| Number Installed | — |
| Communications | Optional on Cassette Models only |

EQUIPMENT PRICES

| MODEL/ITEM | PURCHASE | 6-MONTH RENTAL | 1-YEAR RENTAL | 2-YEAR RENTAL | ANNUAL MAINT. (1) |
|--|----------|----------------|---------------|---------------|-------------------|
| 800/122 Single Cassette ETS | \$ 9,500 | \$260 | \$245 | \$230 | \$515 |
| 800/124 Single Mag Card ETS | 8,700 | 230 | 215 | 205 | 515 |
| 800/126 Dual Mag Card ETS | 9,800 | 330 | 310 | 290 | 675 |
| 800/128 Dual Cassette ETS | 10,300 | 340 | 320 | 300 | 675 |
| 800C/152 Communicating Single Cassette ETS | 11,700 | 345 | 325 | 305 | 730 |
| 800C/151 Communicating Dual Cassette ETS | 12,600 | 430 | 405 | 380 | 890 |

(1) Rental prices include maintenance.

Xerox 800 Electronic Typing System

SUPPLIES PRICING

| ITEM | PURCHASE |
|---|-------------|
| Print Wheels | \$25.00 ea. |
| Multi-Strike Printer Ribbons | |
| 2 to 5 doz. | 27.70 doz. |
| 6 to 11 doz. | 27.10 doz. |
| 12 to 23 doz. | 26.40 doz. |
| 24 to 35 doz. | 25.75 doz. |
| 36 to 59 doz. | 25.10 doz. |
| 60 to 83 doz. | 24.25 doz. |
| 84 to 144 doz. | 23.80 doz. |
| 145 to 299 doz. | 23.10 doz. |
| 300 or more doz. | 22.50 doz. |
| Cassettes, high capacity (3 per package) | |
| 1 to 3 pkgs. | 30.00 pkg. |
| 4 to 9 pkgs. | 25.50 pkg. |
| 10 to 49 pkgs. | 24.45 pkg. |
| 50 to 99 pkgs. | 23.70 pkg. |
| Cassettes, low capacity (3 per package) | |
| 1 to 3 pkgs. | 28.80 pkg. |
| 4 to 9 pkgs. | 21.65 pkg. |
| 10 to 49 pkgs. | 20.80 pkg. |
| 50 to 99 pkgs. | 19.90 pkg. |
| Magnetic Cards (25 per box) | |
| 1 to 3 boxes | 30.50 box |
| 4 to 9 boxes | 24.50 box |
| 10 to 49 boxes | 23.00 box |
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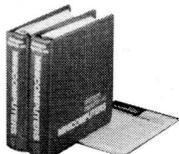
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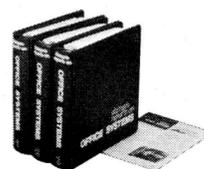
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