HONEYWELL

SERIES 200

NEW DIMENSIONS OF <u>PROVEN</u> COMPUTER PERFORM-ANCE WITH EXCEPTIONAL ABILITY TO MATCH THE EXACT DIMENSIONS OF YOUR BUSINESS

PERIPHERAL EQUIPMENT

SERIES 200 — PERIPHERAL DIMENSION

Computer "systems" consist of both central processors *and* peripherals, and the success of the former is dependent to a great extent upon the capabilities of the latter. This interrelationship is reflected in the integrated design of all Series 200 models through such features as simultaneity — the overlapping of computing and several peripheral operations; reliability — assurance from the peripheral device that the data to be processed is accurate; and flexibility — the ability of any one peripheral device to be used by all processors.

In the majority of announcements from the computer industry concerning faster processing speeds, larger memories, and program compatibility, too little is said about the devices that feed data to computers and receive data after processing. Series 200 *clearly* and *completely* satisfies the peripheral dimension of data processing requirements. This encompassing capability includes:

- Honeywell magnetic tape units, available in an array of tape densities and data transfer rates and industry-renowned for their data-protecting vacuum operation
- A number of different card capabilities, all featuring the latest card-handling techniques and superior cost/performance ratios
- High-density, fast-access magnetic drums
- A variety of printing capabilities with speeds ranging up to 1300 lines per minute
- Single- and multi-channel communication controls that offer a wide range of transmission speeds and that enable users to benefit from an unusual variety of communication services and remote terminal devices
- The Data Station, a remote communication terminal that features the fastest transmission speed of any multi-purpose terminal
- The Data Station's optical bar code reader, which accepts documents economically prepared by high-speed computer printers

Also included in this broad capability are paper tape reading and punching units, MICR control units, on-line adapter, interval timer, time-of-day clock, peripheral interface switching units, and others.

FEATURES SHARED BY ALL PERIPHERAL DEVICES

In addition to their outstanding individual characteristics, all Honeywell peripheral devices have the following features in common:

System Compatibility — Complete compatibility exists among all Series 200 models; therefore, every peripheral device can be used with any processor in the system. Peripheral interface switching units capitalize on this common identity, freely switching peripheral devices between various central processor models to provide economy and back-up security, or enabling one processor to use a great number of different peripherals via a minimum of input/output trunks.

Simultaneity — While any one peripheral device is operating, several other peripheral operations and computing may proceed simultaneously. The number of operations occurring at one time is largely determined by central processor speed and the number of available read/write channels; however in most cases where any one peripheral is operating, more than 95% of a data transfer cycle is available to the central processor for other peripheral operations and computing.

Growth Potential — The number of peripheral units which may be included in a Series 200 configuration depends upon the number of input/output trunks, which in turn varies with the processor used — from the minimum of 4 input/output trunks to a maximum of 64. A user can start with one magnetic tape unit, for instance, and gradually expand to a total tape capability of 256 units. Though such a high number of magnetic tape units is extremely unlikely in any installation, it illustrates the enormous peripheral capability of Series 200.

Series 200 input/output devices are worth emphasizing. We've put a lot into them. You'll get a lot out of them.
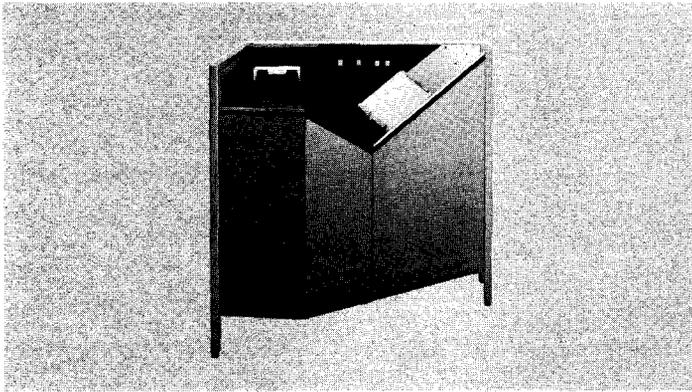
CARD EQUIPMENT

800 CPM CARD READER: This high-speed unit reads 80- or 51-column cards at the rate of 800 per minute, with optimum reliability guaranteed by optical reading techniques and solid-state circuitry throughout. *Demand feeding* sustains this continuous high reading rate without complex programming by eliminating clutch-point timing considerations. *Simultaneity* — End feeding (column by column) reduces to insignificance the time required for data transfer; other peripheral operations and computing can be performed during 99.9% of a card read operation. *Error detection* — A validity check detects illegal punches, while a cycle check assures the operator that the circuitry of the reader is functioning properly. *Ease of operation* — This Honeywell reader has been designed for easy card handling; the operator has convenient access to both the input hopper and the output stacker from either side of the unit.

400 CPM CARD READER: Model 120 card reading applications — low-cost and medium-speed — are handled by this economical card reader which processes 400 cards per minute. *Optical reading* techniques, solid-state circuitry, and a validity check insure the accuracy of transferred data. *End-feed operation* (column by column) reduces central processor access time, thereby permitting the simultaneous operation of other peripheral devices during 99.9% of a card reading cycle. *Demand feeding* frees the programmer from clutch-point timing considerations. *Data protection* — The validity check notifies the card reader that an illegal punch has been sensed, and an indicator is set which may be tested by the program.

400 CPM CARD PUNCH: The punching speed of this unit ranges from 100 to 400 cards per minute, depending upon the last column punched. *Two-column punching* employs a dual die mechanism to punch two characters (columns) simultaneously, which adds significantly to the high speeds and reliability of the unit. *Reliability/maintenance* — This punching device is designed for maximum reliability, resulting in minimum periodic maintenance; there are no cams, gears, or sliding parts in the punch and feed mechanisms. *Simultaneity* — Other processor and peripheral activities can occur during 99.9% of a card punch cycle. *Error detection*—

Punching errors are detected by a punch check; recognition of an error sets an indicator which may be tested by programmed instruction.

400 CPM CARD READER/CARD PUNCH: This dual-purpose device actually has three operational modes; it reads, or punches, or reads a card and punches additional information into the card on the same pass. Punching speed ranges from 100 cards to 400 cards per minute, depending upon the last column punched. Reading speed is 400 cards per minute when reading only; if reading and punching during the same pass, the unit operates at its punching speed. *Two-column punching* cuts in half the maximum number of times a card is stopped. *Optical reading* techniques insure optimum reading reliability. *Simultaneity* — Other peripheral data transfers and internal computation can be executed during 99.9% of a card processing cycle. *Error detection* — The reader portion detects illegal punches, and a punch check detects card punching errors. *Direct transcription mode* of reading and punching cards may be added to this unit, as well as to all Honeywell card equipment; Hollerith mode is standard.

TECHNICAL FACTS

800 CPM CARD READER
- 800 cards per minute
- 80- or 51-column cards
- Optical reading
- Demand feeding, column by column (end feed)
- Input hopper: 3,000 cards, accessible from two sides
- Output stacker: 2,500 cards; reject cards are offset-stacked
- Codes: Hollerith code standard; direct transcription optional
- Data protection: Validity check, cycle check

400 CPM CARD READER
- 400 cards per minute
- Optical reading
- Demand feeding, column by column (end feed)
- Input hopper: 1,200 cards
- Output stacker: 1,300 cards; reject cards are offset-stacked
- Hollerith code standard
- Data protection: Illegal punch check

400 CPM CARD PUNCH
- 100-400 cards per minute; varies with number of columns punched
- Two-column punching
- Demand feeding, column by column (end feed)
- Input hopper: 1,200 cards
- Output stacker: 1,300 cards; reject cards are offset-stacked
- Codes: Hollerith code standard; direct transcription optional
- Data protection: Punch check

400 CPM CARD READER/PUNCH
- Reading rate: 400 cards per minute
- Punching rate: 100-400 cards per minute; varies with number of columns punched
- Punch-feed read capability
- Optical reading
- Two-column punching
- Demand feeding, column by column (end feed)
- Input hopper: 1,200 cards
- Output stacker: 1,300 cards; reject cards are offset-stacked
- Codes: Hollerith code standard; direct transcription optional
- Data protection: Illegal punch check (reader); punch check (punch)
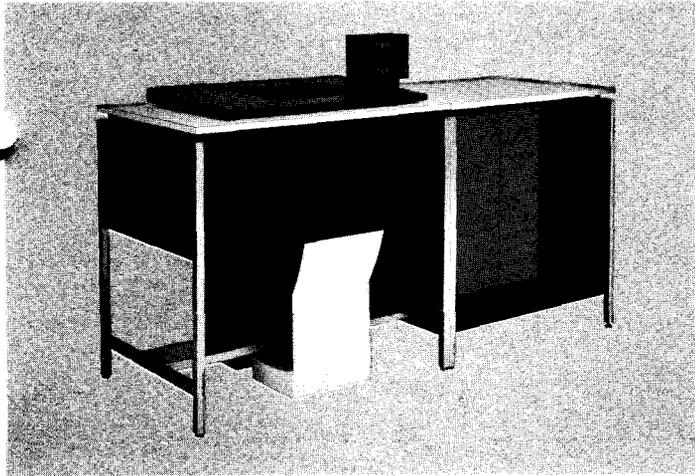
PRINTER EQUIPMENT

450 LPM PRINTER: This economical device, ideally suited for Model 120 processing, prints 450 lines of single-spaced copy per minute. This speed is maintained using any combination of 63 characters embossed on the standard type drum. *Expandable print positions* — The user has the option of selecting either 120 or 132 print positions per line. *Print quality* — A most significant feature of Honeywell printers is the exceptionally fine quality of the printed copy. Advanced designs in the printing mechanism and the print hammers themselves have made this quality possible. *Proportional skipping speed* increases as successive lines are skipped, up to 55 inches per second. *Drum interchangeability* is simplified to the point where it takes the operator less than two minutes to' replace one type drum with another.

650 LPM PRINTER: Using 96, 108, 120, or 132 print positions, this printer produces single-spaced copy at the rate of 650 lines per minute. The standard type drum is embossed with a total of 63 characters: 26 alphabetic, 10 numeric, and 27 special symbols. Any one of these characters can be printed in each of the available print positions. *Mixed character selection at high speeds* — The maximum printing speed of the device when the standard type drum is used can be achieved even when alphabetic, numeric, and special symbols are combined. *Increased speed* — The standard speed of 650 lines per minute is doubled (to 1,300 lines per minute) with the addition of a numeric print feature. *Interchangeable type drums* provide different type fonts or changes in character set. *Print quality* — The precise line registration and paper handling of this unit is the result of advanced mechanical design concepts. *Proportional skipping speeds* range up to 55 inches per second, depending upon the number of lines skipped.

950 LPM PRINTER: This high-speed device prints 950 lines per minute when using a standard character set and 1,266 lines per minute when using the special numeric set. Either 120 or 132 print positions can be used with each set of characters. *Print quality* — New design features insure extremely fine print quality, and paper

handling properties are precise in spite of the high printing speeds. *High skipping speeds* range up to 55 inches per second. *Mixed character selection at high speeds* is also achieved by the 950 lpm printer. *Drum interchangeability* is possible in less than two minutes, allowing the user to insert a type drum having a different character set or a different type font.

TECHNICAL FACTS

450 LPM PRINTER
- 450 lines per minute
- Skipping speed: 55 inches per second (maximum)
- Character set: 63-character drum
- Print positions: 120 or 132
- Paper stock: 4" to 18¾" wide
- Vertical spacing: 6 or 8 lines per inch
- Carbon copies: up to eight

650 LPM PRINTER
- Printing rate: 650 lines per minute (standard character set); 1,300 lines per minute (special numeric set)
- Skipping speed: 55 inches per second (maximum)
- Character set: 63-character drum (standard); 66-character drum (numeric drum)
- Print positions: 96, 108, 120, or 132
- Paper stock: 4" to 18¾" wide
- Vertical spacing: 6 or 8 lines per inch
- Carbon copies: up to eight

950 LPM PRINTER
- Printing rate: 950 lines per minute (standard character set); 1,266 lines per minute special numeric set)
- Skipping speed: 55 inches per second (maximum)
- Character set: 63-character drum (standard); 66-character drum (numeric drum)
- Print positions: 120 (expandable to 132)
- Paper stock: 4" to 18¾" wide
- Vertical spacing: 6 or 8 lines per inch
- Carbon copies: up to eight
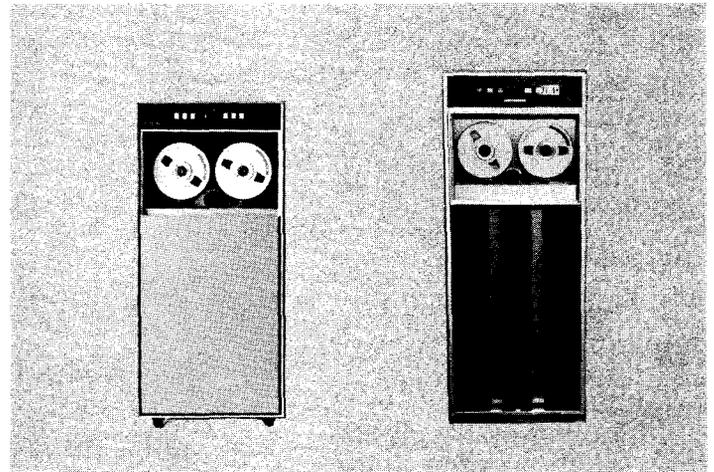
MAGNETIC TAPE EQUIPMENT

Two complete magnetic tape series — half-inch and three-quarter inch tape units and controls — offer a wide range of speed, compatibility, and throughput capabilities. The half-inch tape series can process data at speeds ranging from 7,200 characters per second to 83,300 characters per second. The speeds of the three tape units in the three-quarter inch series range from

32,000 to 88,800 characters per second. *Tape protection* — All tape units offer the protection of Honeywell's vacuum control technique; the reading surface of the tape comes into contact only with the read/write head, so that tape wear is reduced to an absolute minimum. *Faster stop/start times* and, in some instances, the elimination of stop/start times are made possible by the Honeywell-pioneered vacuum control technique. Tape units can rewind at up to 360 inches per second. *Compatibility* — All half-inch tape units and their associated controls can be equipped to process tapes of competitive systems and to translate the codes of these systems automatically to that of the Honeywell processor. Three-quarter inch units provide compatibility with certain Honeywell systems. *Throughput* — Half-inch tape units have the ability to read and write using either of two inter-record gap lengths. The shorter gap is normally used, leaving more tape surface available for data and providing higher throughput. The longer gap is used when processing non-Honeywell tapes which must be read and written with a longer gap. *Expandability* — As many as eight half-inch tape units can be directed by one tape control, offering an equipment-saving expansion capability. Up to four three-quarter inch units are handled by one tape control. *Simultaneity* — Two tape units connected to the same tape control can operate (for example, one reading while the other is writing) simultaneously except for 24 IPS units. Additionally, other data transfers and internal computation can occur during up to 99.9% of a tape processing operation, depending upon the tape unit and processor selected. *Error detection* — Standard features on all tape units insure the accuracy of data being transferred, while information on tape is doubly protected from accidental destruction by a write operation.

TECHNICAL FACTS — ½-INCH SERIES

24 IPS TAPE UNIT

- Read/write speed: 24 inches per second
- Rewind speed: 72 inches per second
- Recording density: 556 characters per inch
- Data transfer rate: 13,344 characters per second
- Cross-gap time: 18.7 ms (using 0.45" short gap) or 31.2 ms (using 0.75" gap)

36 IPS TAPE UNIT

- Read/write speed: 36 inches per second
- Rewind speed: 108 inches per second
- Recording densities: 556 or 200 characters per inch
- Data transfer rates: 20,000 characters per second (at 556 char./in. density) or 7,200 characters per second (at 200 char./in. density)
- Cross-gap time: 12.5 ms (using 0.60" short gap) or 20.8 ms (using 0.75" gap)

36 IPS TAPE UNIT (HIGH-DENSITY)

- Read/write speed: 36 inches per second
- Rewind speed: 108 inches per second
- Recording densities: 800/556 characters per inch or 800/200 characters per inch
- Data transfer rates: 28,800 characters per second (at 800

char./in. density); 20,000 characters per second (at 556 char./in. density); 7,200 characters per second (at 200 char./in. density)
- Cross-gap time: 12.5 ms (using 0.45" short gap) or 20.8 ms (using 0.75" gap)

80 IPS TAPE UNIT

- Read/write speed: 80 inches per second
- Rewind speed: 240 inches per second
- Recording densities: 556 or 200 characters per inch
- Data transfer rates: 44,400 characters per second (at 556 char./in. density) or 16,000 characters per second (at 200 char./in. density)
- Cross-gap time: 7.5 ms (using 0.60" short gap) or 9.4 ms (using 0.75" gap)

80 IPS TAPE UNIT (HIGH-DENSITY)

- Read/write speed: 80 inches per second
- Rewind speed: 240 inches per second
- Recording densities: 800/556 character per inch or 800/200 characters per inch
- Data transfer rates: 64,000 characters per second (at 800 char./in. density); 44,400 characters per second (at 556 char./in. density); 16,000 characters per second (at 200 char./in. density)
- Cross-gap time: 7.5 ms (using 0.60" short gap) or 9.4 ms (using 0.75" gap)

120 IPS TAPE UNIT

- Read/write speed: 120 inches per second
- Rewind speed: 360 inches per second
- Recording densities: 556 or 200 characters per inch
- Data transfer rates: 66,700 characters per second (at 556 char./in. density) or 24,000 characters per second (at 200 char./in. density)
- Cross-gap time: 5.8 ms (using 0.70" short gap) or 6.3 ms (using 0.75" gap)

150 IPS TAPE UNIT

- Read/write speed: 150 inches per second
- Rewind speed: 360 inches per second
- Recording densities: 556 or 200 characters per inch
- Data transfer rate: 83,300 characters per second (at 556 char./in. density) or 30,000 characters per second (at 200 char./in. density)
- Cross-gap time: 5.0 ms (0.75" gap)

TECHNICAL FACTS — ¾-INCH TAPE SERIES

60 IPS TAPE UNIT

- Read/write speed: 60 inches per second
- Rewind speed: 180 inches per second
- Recording density: 533 characters per inch
- Data transfer rate: 32,000 characters per second
- Cross-gap time: 11.0 ms (0.67" gap)

120 IPS TAPE UNIT

- Read/write speed: 120 inches per second
- Rewind speed: 360 inches per second
- Recording density: 533 characters per inch
- Data transfer rate: 64,000 characters per second
- Cross-gap time: 5.5 ms (0.67" gap)

120 IPS TAPE UNIT (HIGH-DENSITY)

- Read/write speed: 120 inches per second
- Rewind speed: 360 inches per second
- Recording density: 740 characters per inch
- Data transfer rate: 88,800 characters per second
- Cross-gap time: 5.5 ms (0.67" gap)
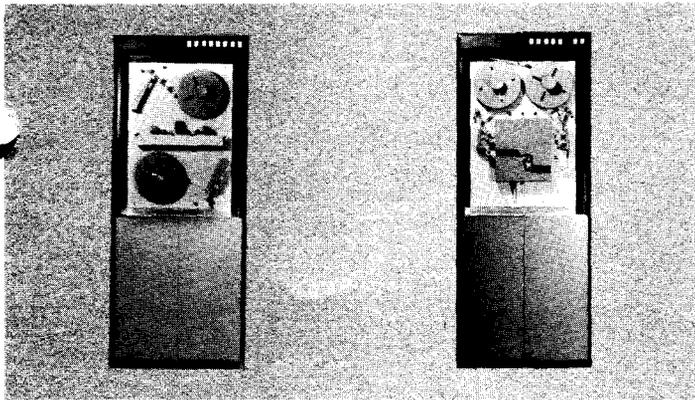
PAPER TAPE EQUIPMENT

600 FPS TAPE READER: *High-speed reading* is maintained by this device at the rate of 60 inches (600 frames) per second. *Variable tape sizes* — Five-, six-, seven-, or eight-channel tape ($1\frac{1}{16}''$ through 1") are accepted. The tape may be dry or oiled paper, spooled or fan-folded, or plain or aluminized Mylar.* *Dual storage* — Tape may be stored on reels or in strips (lengths of tape which are too short to be conveniently stored on reels). *Error detection* — Odd or even parity is checked one frame at a time. If incorrect parity is detected, an indicator is set which may be checked by programmed instruction.

120 FPS PAPER TAPE PUNCH: Any commercially available tapes of dry or oiled paper or non-aluminized Mylar* can be punched by this unit. *High speed*—Punching speed is 12 inches (120 frames) per second. *Variable tape sizes* — Five-, six-, seven-, or eight-channel paper tape ($1\frac{1}{16}''$ through 1") contained on 700-foot reels are accommodated. *Parity checking* — Odd or even parity is automatically computed and may be recorded for validity check when reading.

*Registered trademark of E. I. Du Pont de Nemours and Company (Inc.)

TECHNICAL FACTS

600 FPS PAPER TAPE READER
- 600 frames (characters) per second
- Tape size: 11/16", ⅞", or 1" chadded tape in reels up to 700 feet or in strips
- Tape can be Mylar*, metallic-coated, or dry or oiled paper (spooled or fan-folded)
- Tape density: 10 characters per inch
- Data format: 5- through 8-level codes
- Photoelectric read mechanism
- Data protection: odd or even parity check

120 FPS PAPER TAPE PUNCH
- 120 frames (characters) per second
- Tape size: 11/16", ⅞", or 1" non-metallic tape in reels up to 700 feet or in strips
- Tape density: 10 characters per inch
- Data format: 5- through 8-level codes
- Data protection: program-generated frame parity can be punched in preparation for reading

MICR EQUIPMENT

Two types of MICR (Magnetic Ink Character Recogni-

tion) controls are provided to handle banking and associated applications, such as check handling, sorting, etc. One model is used in conjunction with an MICR sorter-reader capable of reading magnetically imprinted cards or paper documents at the rate of 1,600 per minute. The central processor stores the data, updates accounts, prepares reports, analyzes the data, and sorts the documents under program control. A similar MICR control performs the same functions in conjunction with an MICR reader-sorter capable of reading 1,560 documents per minute.

TECHNICAL FACTS

MICR CONTROLS

1,600 DPM READER-SORTER
- Processing speed: 1,600 documents per minute
- Mixed document size: length — 6.0" to 8.75"
  width — 2.75" to 3.67"
  thickness — .003" to .007"
- Sort pocket capacity: 12 sort, 1 reject
- Off-line capability

1,560 DPM READER-SORTER
- Processing speed: 1,560 documents per minute; maximum processing speed for 6" documents: 1,500 documents per minute
- Mixed document size: length — 5.94" to 9.06"
  width — 2.69" to 4.06"
  thickness — .004" to .0075"
- Sort pocket capacity: 12 sort, 1 reject
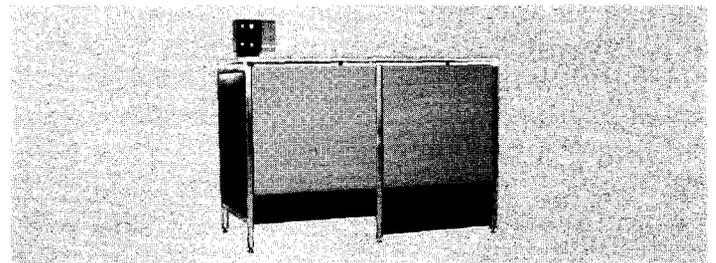
RANDOM ACCESS DRUM FILE

The random access drum file achieves an optimum combination of high-speed access to voluminous quantities of stored data and low cost per unit of information. Data are stored on the surface of a hollow cylindrical drum which is 20 inches in diameter. *Vast storage* — The storage capacity of each drum is 2,621,440 characters. Since as many as eight drum storage units can be connected to a single drum control, one drum file subsystem has the storage facilities for 20,971,520 characters. *High-speed access* to a record contained on any one of 512 data tracks takes an average of 27.5 milliseconds. *High-speed data transfer* occurs at the rate of 102,000 characters per second.

TECHNICAL FACTS

RANDOM ACCESS DRUM FILE
- Access time (average): 27.5 milliseconds
- Data transfer rate: 102,000 characters per second
- Data capacity: 2,621,440 characters per drum; up to eight drums per control
- Data format: 128-character or variable-length record (programmer selectable)
- Drum divided into 512 data tracks; each track has a read/write head
- Data protection: character parity automatically generated on read and checked on write

DATA STATION:
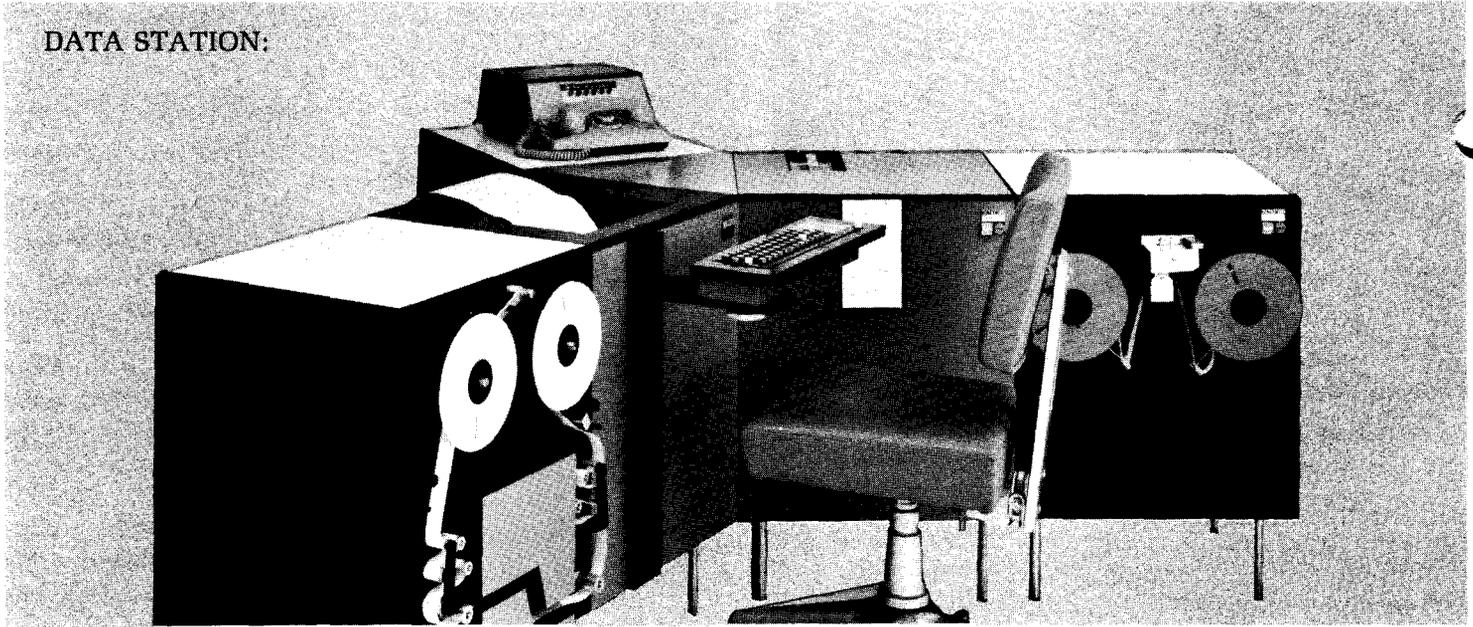
COMMUNICATION EQUIPMENT

COMMUNICATION CONTROLS: One of the most significant advantages of Honeywell's communication equipment is the wide range of communication services (lines, speeds, and terminal devices) to which any central processor can be connected. These extensive capabilities are made possible by two basic types of communication controls — a single-line control and a multi-line control — which act as interfaces between the communication lines and the processor.

High Speed — The single-line control features a high transmission rate of 5,100 characters per second; higher-speed units are possible and can be furnished upon request. The multi-line control is designed to accept lines having speeds of up to 300 characters per second. Combined line speeds vary according to the processor model; for example, Model 200 handles a combined rate of 2,400 characters per second. *Simultaneous transmission* — The multi-line unit receives and transmits data over as many as 63 communication lines simultaneously, although it requires only one input/output trunk. *Modularity* — Both communication controls handle 5-, 6-, 7-, and 8-level codes. The modular design of the controls makes it easy to add special units for other codes. *Transfer modes* — Communication between the lines and the processor occurs on a character-by-character basis when using the multi-line control. The single-line unit can operate in either the character mode (character-by-character) or the message mode. *Minimum interruption* — When the single-line unit operates in the message mode, it fills (or transmits from) a programmer-defined area in main memory, generating only two interrupts, one at the beginning and one at the end of the message. *Data protection* for information being transmitted or received is accomplished in many ways: check for transmission lapses, semi-automatic message receipting system, parity checks, and long checks. *Flexibility* — Switching units may be used by

two processors in order to share the same communication lines, thereby permitting system flexibility and equipment-sharing economy. *Wide choice of terminal devices* — Listed below is a small sample of the various combinations of lines and terminal devices which can be connected to the user's system via the single-line and multi-line control units. The actual selection, however, is even greater than that shown here, for there are still other combinations which can be utilized as long as they have similar transmission characteristics.

SERVICE & LINE	DATA SET	SPEED	TERMINAL
W.U. Telex	—	66 wpm	TTY 32
TWX Prime	103A	100 wpm	TTY 33,35
5-Level Telegraph	—	60-100 wpm	TTY 19,28
8-Level Telegraph	103F	100 wpm	TTY 35
TWX Prime	103A	15 cps	IBM 1050
Voice Lines	202C-D	50 cps	GE DAT. 600
Dialed Telex	—	66 wpm	TTY 32
Voice Lines	202C-D	105 cps	DATASPEED 2
AT&T 150-Baud Line	103F	15 cps	—
W.U. 180-Baud Line	Type 70	14.8 cps	IBM 1050
Voice Lines	202C-D	1200/1800 bps	HONEYWELL'S DATA STATION
Voice Lines	202C-D	1200/1800 bps	IBM 7701,7702,1013
Voice Lines	201A-B	2000/2400 bps	Series 200 processors and other computers and high-speed devices
Voice Lines	202C-D	1200/1800 bps	DIGITRONICS D505
Voice Lines	201A-B	2000/2400 bps	IBM 7702,1013
Voice Lines	201A-B	2000/2400 bps	DIGITRONICS D505
Voice Lines	402C	75 cps Paral. Send	DATASPEED
Voice Lines	402D	75 cps Paral. Rec.	DATASPEED
TELPAK A*	301B	5100 cps	Series 200 processors and other computers and high-speed devices

*Single-line control only.

TECHNICAL FACTS

SINGLE-LINE CONTROL

- Transmission rate: 5,100 characters per second
- Handles 5-, 6-, 7-, and 8-level codes
- Operation modes: character mode or message mode
- Data protection: transmission-lapse check, semi-automatic message receipting check, parity check (7- or 8-level codes), and long check

MULTI-LINE CONTROL

- Transmission rate: 300 characters per second per line; combined line speeds vary according to processor model
- Handles 5-, 6-, 7-, and 8-level codes
- Operation mode: character mode
- Simultaneity: up to 63 lines
- Data protection: transmission-lapse check, semi-automatic, message receipting check, parity check (7- and 8-level codes), and long check (15 to 63 lines)

DATA STATION: Honeywell's Data Station is an all-purpose remote communication terminal which can be used for a variety of applications involving direct, on-line transmission to and from the processor. *High-speed transmission* — The Data Station can transmit and receive data at the rate of 120 characters per second regardless of the speeds of its peripheral devices. *Flexibility* — The Data Station is completely modular, permitting flexible systems arrangements which involve several input and output devices. *Off-line capability* — When it is not being used for actual on-line transmission, the Data Station can be used off-line for such activities as data preparation and editing. *Optical Bar Code Reader* — This new Honeywell device is available with the Data Station to read coded information from documents such as premium notices, bills, invoices, and coupons at the rate of 50 characters per second. *High-speed printing* — The Data Station features a high-speed printer which operates at 40 characters per second and thus can be used for on-line operations. Card and paper tape equipment are also connectable to the Data Station. *Automatic operation* — Transmission is completely automatic. Program-controlled central processor operations turn the Data Station on or off, select the appropriate peripheral device for sending or receiving, and execute a full data transmission cycle. *Line sharing* — Many Data Stations can economically share a party line, each Data Station having its own coded address. *Error detection* — Transmission errors are detected by parity and long (channel) checks. *Error correction* — Blocks of data containing transmission errors can be retransmitted correctly. Such retransmission is immediate and fully automatic.

TECHNICAL FACTS

DATA STATION

- Transmission rate: 120 characters per second
- Code: 8-bit ASCII code which includes parity
- Connectable devices: paper tape reader, paper tape punch, paper tape reader/punch, card reader, page printer and keyboard, optical bar code reader, and high-speed printer
- Optical bar code reader speed: 50 characters per second
- High-speed printer speed: 40 characters per second

- Error detection: parity and long checks
- Error correction: immediate and fully automatic
- Automatic operation: central processor initiates transmission through program control

TIMING EQUIPMENT

INTERVAL TIMER: This device permits program interrupts to be caused at specific intervals via programmed instruction. The basic timer will cause interrupts at 100 millisecond intervals when requested. *Variable interrupt* — An optional capability gives the user a choice of any six time intervals within the range from .050 seconds to 262.143 seconds. *Major applications* of the timer are:

1. To control operations by the passage of time, as in industrial process control where a computer may be controlling a time-dependent manufacturing or chemical process.
2. To initiate a computer operation at specified time intervals (for example, polling a communication or data-collection network).
3. To produce a positive indication of elapsed time on the console typewriter or on the high-speed printer.
4. To obtain an accurate measurement of elapsed time between certain events being monitored by the computer, such as the time required for running a particular program or different versions of the same program.

TIME OF DAY CLOCK: This unit permits the program to determine the time of day within 0.1 second accuracy. Programmed instruction causes the actual time of day, recorded in hours, minutes, seconds, and tenths of seconds, to be relayed to the requesting program. *Current time insurance* — If the information contained in the seven-digit transfer (00:00:00.0 to 23:59:59.9) changes while time is being read into memory, the information transfer begins again and the new time is read. *Major applications* of the clock are:

1. Logging program start/stop times.
2. Timing computer runs (by program or by partial program).
3. Logging times of remote inquiries and information input.

TECHNICAL FACTS

INTERVAL TIMER

- Provides measurement and indication of elapsed time intervals
- Delivers automatic interrupt signals at 100 ms intervals
- Interval delay feature provides variable time-delay interrupt
- No read/write channel required
- Accuracy: operates in synchronism with 60-cycle power line frequency
- Intervals determined by programmed instruction; varying interval interrupts manually adjustable
- Housed in standard equipment drawer

TIME OF DAY CLOCK

- Provides actual time-of-day information
- Time information accuracy to one-tenth of a second
- 24-hour range (00:00:00.0 to 23:59:59.9 hours)
- Housed in standard cabinetry

SWITCHING UNITS

One obvious advantage of a system which uses the same peripheral devices throughout is that all of its components can communicate with one another. Several Honeywell interfaces (switching units) enable various combinations of processors, peripheral devices, and peripheral controls to take advantage of this common communication link. For instance, one or many peripheral devices can be alternated between processors, or two central processors can communicate directly with one another by the simple operation of a switch.

PERIPHERAL CONTROL SWITCHING UNIT: *Two processors share the same devices* — A peripheral control switching unit permits any two processors to share any peripheral devices. From one to eight peripheral controls can be attached to a switching unit and, consequently, to any one of two central processors. Each switching unit handles up to eight peripheral controls which are switched simultaneously. Additional switching unit modules may be added (up to three) to provide the capability of switching four groups of peripheral controls. Each module and the basic unit may be switched independently, while all controls handled by any one switching unit module are switched simultaneously.

MAGNETIC TAPE SWITCHING UNITS: *Two tape controls share each other's tape units* — A single switching unit allows one group of either half-inch or three-quarter inch units to be switched between two tape controls. *Two tape units share the same tape control* — An additional function of the tape switching unit selects one of the two tape units to be attached to a single tape control. All tape units connected to a switching unit are switched simultaneously. If independent switching of more than one group of tape units is desired, switching unit modules may be added to provide a group switching capability of up to 64 tape units in groups of four or eight. The size of these independently switched groups depends upon the capability of the tape control.

COMMUNICATION SWITCHING UNITS: This unit, like the magnetic tape switching unit, can also perform two switching functions. *Two processors share the same lines* — The communication switching unit allows any two processors to share a group (one to eight) of communication lines. *One processor shares different lines* — Additionally, a switching unit enables one processor to switch between different groups of communication lines. Additional expansion features can provide a group switching capability of up to 63 lines.

ON-LINE ADAPTER: *Memory-to-memory communication* — This unit provides for the interconnection of any configuration of central processors. A single on-line adapter produces a bi-directional, high-speed, memory-to-memory linkage between any two processors. Data transfer proceeds at a rate of 167,000 characters per second, is monitored under program control, and is initiated by a standard program instruction.

TECHNICAL FACTS

PERIPHERAL CONTROL SWITCHING UNIT
- Allows two processors to share the same peripheral devices
- One switching unit can switch from one to eight peripheral controls
- Additional switching unit modules: up to three per switching unit
- Maximum switching capability per central processor: 32 peripheral controls
- All peripheral controls connected to a switching unit module are switched simultaneously

MAGNETIC TAPE SWITCHING UNIT
- Allows one group of tape units to be switched between two tape controls
- Allows two tape units to share the same tape control
- Additional switching unit modules: up to four per switching unit
- All tape units connected to a switching unit module are switched simultaneously

COMMUNICATION SWITCHING UNIT
- Allows any two processors to share a group of communication lines
- Allows one processor to switch between different groups of communication lines
- Group switching capability: up to 63 lines
- All lines connected to one switching unit are switched simultaneously

ON-LINE ADAPTER
- Allows bi-directional memory-to-memory data transfer between two central processors
- Data transfer rate: 167,000 characters per second
- Transfer initiated by programmed instruction

OPERATOR CONSOLES: A series of consoles is available within Series 200 to give added monitoring and control facilities to the operator and increase the scope and power of the associated processors. Each gracefully designed unit contains a control panel and a console typewriter. *The control panel* provides a visual indication of the status of the entire system and permits manual intervention in the operation of the system. By using the various control switches, the operator can start and stop the machine and can load and interrogate memory locations. *Sense switches* can be used in conjunction with programmed instructions to stop processing or to select predetermined program paths.

Typewriter—the console typewriter can operate in two modes: a peripheral mode or a logging mode. *Peripheral mode* operations allow the typewriter to be used as a peripheral device utilizing a read/write channel under program control. *Logging mode* operations free the typewriter from program control, enabling the operator to make essential notes while monitoring the program's progress.

TECHNICAL FACTS

- Full program control as a peripheral input or output device
- Supplies the versatility of a logging function to the computer system
- Provides visual indication of program status
- Program start/stop and memory loading and interrogation facilities
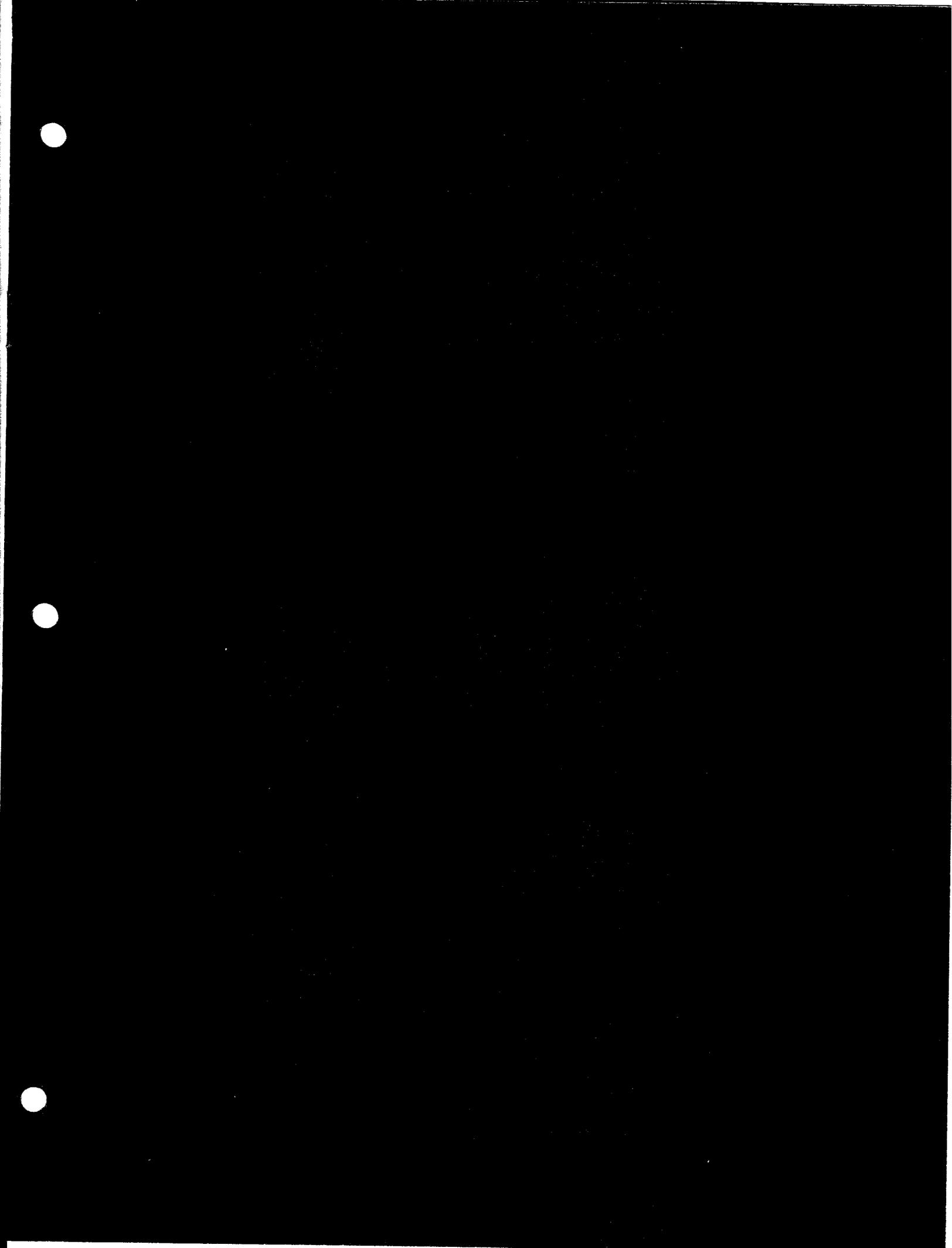
Honeywell

ELECTRONIC DATA PROCESSING

SALES OFFICES AND DATA CENTERS
IN PRINCIPAL CITIES OF THE WORLD