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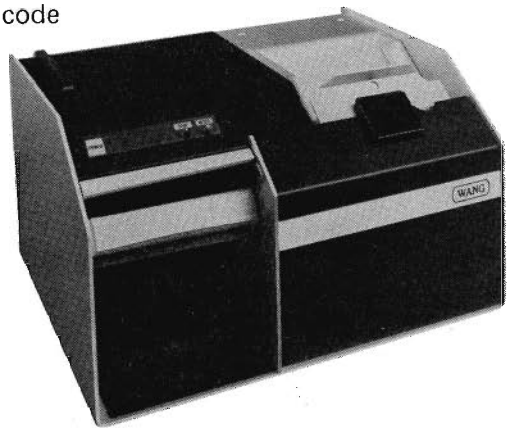
DATA SHEET

The Model 2244A Hopper-Feed Punched/Mark Sense Card Reader provides program and data entry from punched or mark sense cards to a Wang System 2200. The Model 2244A is a versatile reader capable of handling a variety of card formats and character codes. The following types of cards can be read:

1. Standard 80-column punched cards. Cards may be punched in Hollerith code (the character code used by most keypunch devices), or any non-Hollerith code.
2. Standard 80-column cards printed in reflective ink for marking and/or punching. Hollerith or non-Hollerith codes may be used.
3. Custom cards with fewer than 80 columns. Columns of non-standard width must be delimited by printed index marks. Cards may be marked (if printed in reflective ink) and/or punched. Hollerith or non-Hollerith codes can be used.
4. Two types of BASIC Mark Sense Program Cards, specially designed for marking program text and data.

Cards read by the Model 2244A must conform to industry standards, as detailed in two publications of the American National Standards Institute (ANSI), ANSI X3.21-1967, and ANSI X3.11-1969. Specifications required for designing custom cards are included in the Card Reader Reference Manual.

Programs and data punched or marked in Hollerith code (or in the special BASIC Mark Sense Program Card code) are automatically converted by the card reader into ASCII, the code used internally by the System 2200. Data cards punched or marked in non-standard code can be processed by reading the data in binary form, and interpreting it in the application program.



MODEL 2244A HOPPER-FEED PUNCHED/MARK SENSE CARD READER

The Model 2244A utilizes a vacuum-type pick mechanism to pick cards from the input hopper and pass them through the reading head. After being read, the cards are automatically stacked in the output stacker. Both the input hopper and the output stacker have a capacity of 550 cards (assuming the standard card thickness of 7 mils). The vacuum pick mechanism inflicts less wear and tear on cards and is less easily jammed than a mechanical picker, and enables the Model 2244A to attain maximum reading speeds of 300 cards per minute. (The actual reading rate in any application is, however, largely determined by the amount of CPU processing required per card.)

In many applications, total throughput time for processing data cards can be improved by using the card reader's "Look-Ahead" buffer. Data can be read from a card, converted to ASCII, and temporarily stored in the Look-Ahead buffer while processing continues in the CPU. When the CPU is ready, it simply calls in the data from the Look-Ahead buffer. This feature permits card reading to be carried on concurrently with CPU processing.

READING MODES

The Model 2244A is an extremely versatile reader which offers a total of eight different reading modes:

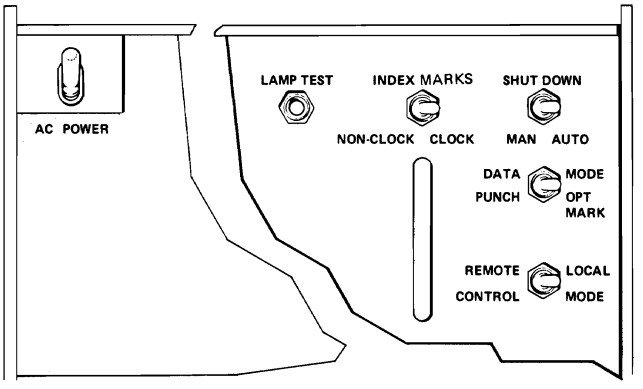
1. DATA (Hollerith Data Values) – Discrete data values (separated by commas) are read, converted from Hollerith to ASCII, and stored sequentially in a list of receiving variables. (Available on all systems.)
2. DATA (Hollerith Card Image) – An 80-column card is read as a single continuous value, each character of which is translated from Hollerith to ASCII and stored in a receiving alphanumeric array. The resultant 80-character value represents an exact "image", in ASCII, of the original card. (Not available on the 2200A or standard versions of the 2200S.)
3. DATA (Binary Card Image) – An 80-column card is read as one continuous value, with each column interpreted as 12 binary digits. The 12-bit value is divided into a pair of 6-bit values; each of which is stored in one byte in a receiving array. The resultant 160-byte value represents an exact "image", in binary, of the original card. The binary data can be analyzed and interpreted under program control. (Not available on the 2200A or standard versions of the 2200S.)
4. DATA (BASIC Mark Sense Program Cards Used for Data) – Discrete data (separated by commas) are read, converted to ASCII, and assigned sequentially to receiving variables. (Available on all systems.)
5. PROGRAM (Hollerith Program Cards) – BASIC program cards are read, automatically converted from Hollerith to ASCII, and either stored in memory or immediately executed as part of a batch job stream. (Available on all systems.)
6. PROGRAM (BASIC Mark Sense Card) – BASIC programs are read, converted to ASCII, and either stored in memory or executed as part of a batch job stream. (Available on all systems.)
7. LOOK-AHEAD (Hollerith Card Image) – An 80-character Hollerith card image is read, converted to ASCII, and held in the card reader Look-Ahead buffer until the CPU is finished with current processing. (Not available on 2200A or standard versions of 2200S.)
8. LOOK-AHEAD (Binary Card Image) – A 160-byte binary image is read and held in the card reader Look-Ahead buffer until the CPU is finished with current processing. (Not available on the 2200A or standard versions of 2200S.)

LANGUAGE RESTRICTIONS (2200A and 2200S)

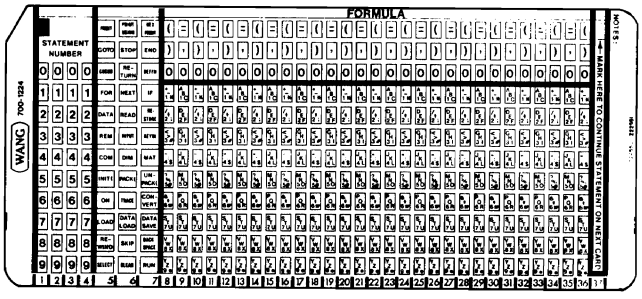
The Model 2244A is designed to interface to all 2200 series systems except the 2200VS. Limitations in the BASIC language structure of the System 2200A and standard versions of the 2200S, however, restrict the card reader to the following four reading modes with those systems:

1. DATA – Hollerith Data Values.
2. PROGRAM – Hollerith Program Cards.
3. PROGRAM – Mark Sense Program Cards.
4. DATA – Special Mark Sense Program Cards used for loading data.

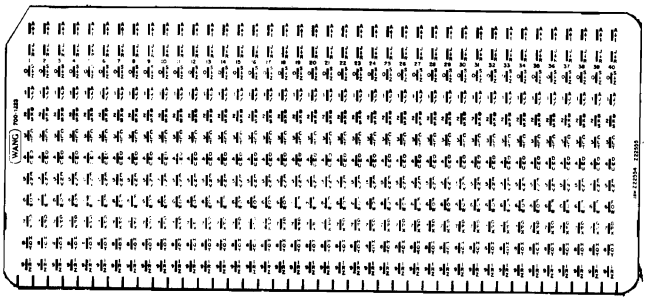
In these four modes, the card reader is selected for Console Input or INPUT.



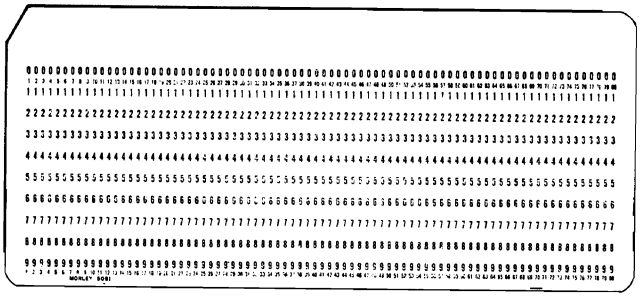
BASIC MARK SENSE PROGRAM CARD



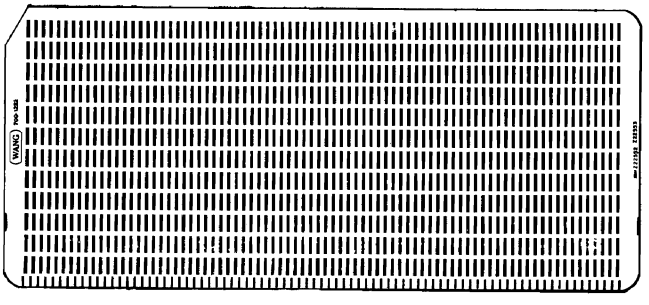
40-COLUMN MARK SENSE CARD



80-COLUMN PUNCH CARD

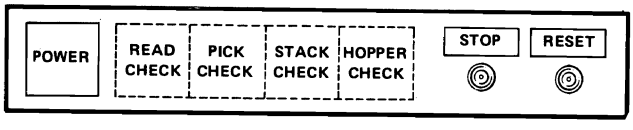


80-COLUMN PUNCH/MARK SENSE CARD



READER CONTROLS

1. STOP Switch — stops operation after current card has been completely read.
2. RESET Switch — automatically resets the counter and initializes the Card Reader, or restarts card reading operation after a STOP operation.
3. CONTROL MODE Switch — has two settings, LOCAL and REMOTE. LOCAL Mode is used for off-line card reader operation (chiefly for maintenance purposes). REMOTE Mode is used for on-line operation. In REMOTE Mode, the System 2200 controls all card input operations (normal operating mode with System 2200).
4. DATA MODE Switch — has two settings, PUNCH and OPT MARK. PUNCH enables the Model 2244A to read punched cards only. OPT MARK enables the Model 2244A to read mark sense and/or punched cards.
5. INDEX MARKS Switch — has two settings, CLOCK and NON-CLOCK. CLOCK enables the Model 2244A to read cards of 80-columns or fewer with index marks. NON-CLOCK enables the Model 2244A to read standard 80-column cards without index marks.
6. SHUT DOWN Switch — has two settings, AUTO and MANUAL. AUTO-Mode causes the card reader vacuum/blower motor to shut down automatically when input hopper is empty. MANUAL Mode causes the vacuum/blower motor to continue operation as long as AC power is available, even if there are no more cards in the input hopper (used chiefly for maintenance).



ERROR DETECTION

READ-CHECK Alarm — indicates that a card is torn or mutilated on leading edge, or is punched or marked before the first column.

STACK CHECK Alarm — indicates that previous card is not seated correctly in output stacker.

PICK CHECK Alarm — indicates card has not been picked from the hopper or not read within a certain amount of time.

HOPPER CHECK Alarm — activated if input hopper is empty or output stacker is full.

All error codes are available to the controlling program in modes 2 and 3 (Hollerith and Binary Card Image), enabling the programmer to perform error checking under program control.

DATA SHEET

BATCH PROCESSING

A number of individual program decks and their associated data decks can be loaded from the card reader and run automatically in sequence without normal user intervention. Automatic sequential processing of programs and data is called "batch processing," and is initiated by selecting the card reader as the Console Input device.

Cards containing system commands such as CLEAR, RUN, LIST, etc., are inserted between the individual program decks in the input hopper. Each program then can be automatically loaded from cards, listed, and run. As a program is loaded, any statement lines having syntax errors are listed or displayed, along with the appropriate error codes, to simplify debugging. When a program has completed execution, the system command cards are read in, instructing the system to clear memory and load the next program automatically.

Batch processing is a particularly useful feature for educational applications, where program decks from an entire class can be processed rapidly as a batch. Syntax errors in each program are immediately listed or displayed as the program is loaded.

SPECIFICATIONS

Size

Height	11 in. (27.9 cm)
Width	19 in. (48.9 cm)
Depth	14 in. (35.5 cm)

Weight

60 lb (27.3 kg)

Power Requirements:

Voltage 115 VAC ± 10% single phase, 60 Hz ± 1 cps
230 VAC ± 10% single phase, 50 Hz ± 1 cps

Power 1650 VA (max) starting load for 3 sec
570 VA (max) running load

Operating Environment

50°F to 90°F (10°C to 32°C)
40% to 68% relative humidity

Hopper Size

4.0 in. (approx. 550 cards of 7 mil thickness)

Stacker Size

4.0 in. (approx. 550 cards of 7 mil thickness)

Read Rate

300 cards per minute (max)

Pick Mechanism

Vacuum

Transport Mechanism

Rollers

ORDERING SPECIFICATIONS

A Hopper-Feed Punched/Mark Sense Card Reader for entering data or programs into the Wang System 2200 (except the 2200VS). The unit must be able to read marked or punched cards at a maximum rate of 300 cards per minute. The reader must be versatile enough to read non-standard cards as well as standard 80-column cards, and must atuomatically decode Hollerith to ASCII. The input/output Hoppers must have a capacity of 550 cards. The Card Reader must be capable of reading the special Wang BASIC Mark Sense Card.

Wang Laboratories reserves the right to change specifications without prior notice.

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