

SERIES 200

**MODEL 120 EQUIPMENT OPERATORS'
MANUAL SUPPLEMENTARY INFORMATION
(TYPE 224 CARD READER/PUNCH)**

SUBJECT:

Programming and Operating Instructions for the Type 224 Card Reader/Punch When Used on the Model 120.

**SPECIAL
INSTRUCTIONS:**

Whenever the Type 224 Card Reader/Punch is used in lieu of a Type 214-1 or -2 on the Model 120, it is programmed as though it were the appropriate Type 214 device and operated as described herein. Type 214-1/-2 programming instructions are included in the Series 200 Programmers' Reference Manual (Model 120), Order No. 141.

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TYPE 224 CARD READER/PUNCH

The Type 224 Card Reader/Punch performs card processing in three operational modes: it (1) reads, (2) punches, or (3) reads a card and punches additional information into the card on the same pass. There are two models of the Type 224 reader/punch; these are the 224-1, which has a reading speed of 300 cards per minute, and the 224-2, which has a reading speed of 400 cards per minute. Cards are punched at speeds which vary between 50 and 270 cards per minute for the 224-1 and between 91 and 360 cards per minute for the 224-2, depending on the position of the last column punched. Standard 80-column, 12-row cards are fed endwise (column one first) through the read station, the punch station, and into the output stackers (see Figure 1).

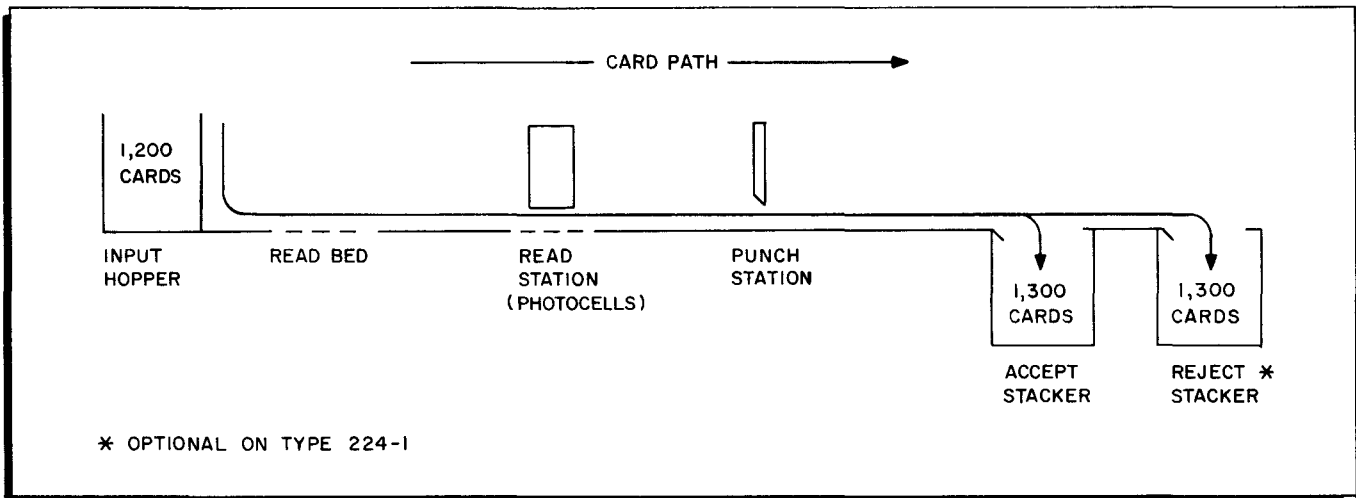
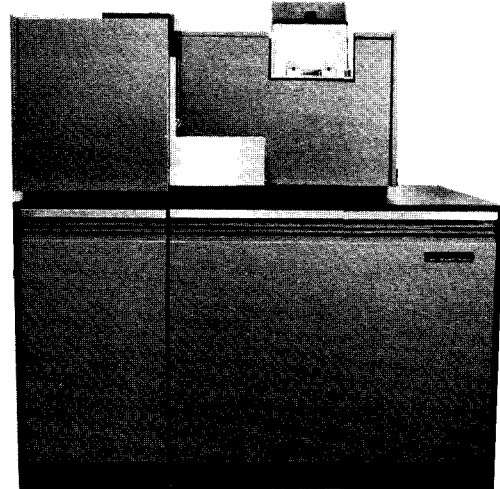


Figure 1. Card Path During Type 224 Reader/Punch Operations

Cards are loaded face down, nine-edge first into the 1,200-card-capacity input hopper. Each of the two output stackers (the reject stacker is optional on the 224-1) has a capacity of 1,300 cards. Both of the stackers may be unloaded while the device is operating.

READ AND PUNCH OPERATIONS

Reading and punching operations are implemented by means of the Peripheral Data Transfer (PDT) instruction and the Peripheral Control and Branch (PCB) instruction. Cards are fed into

the device endwise through the read station, through the punch station, and into the output stacker where they are stacked in file order. Appropriate operations are accomplished serially as the card passes from station to station. Reading and punching operations cannot occur simultaneously.

Starting with column one, information is read optically by means of 12 photocells; all columns are read serially until column 80 has been read. Each card column is translated into a character which is transferred to a programmer-defined image area in memory. A recordmark is required in the card-image area to terminate the read operation properly. The record-marked location in memory receives the last character read.

When a card is punched, it proceeds past the read station to the punch station; successive characters in memory (punch-image area) are translated into card code, and coded characters are punched in successive card columns until an entire record has been punched. A record mark is required in the punch-image area to terminate punching operations properly. The contents of the record-marked location are not punched.

PUNCH-FEED READ OPERATION

Operating the Type 224 Card Reader/Punch in the punch-feed read mode makes it possible to read a card, process the information just read, and punch additional information into the same card in the same pass. A PCB instruction places the card control in the punch-feed read mode. Then a PDT read instruction is issued to the control, causing the card registered at the read station to be read and moved to the punch station. Upon termination of the reading interval, the control becomes "not busy" and is then ready to receive another PDT instruction. If a PDT punch instruction is issued to the control, data is punched into the same card which has just been read and moved to the punch station. Following the punch operation, the card control becomes "not busy" again. It is important to note that, unlike a normal punch operation, the card just punched is not moved to the output stacker but remains in the punching station. The next PDT read instruction will move the punched card to the output stacker. Operation of the Type 224 reader/punch is unspecified if a second punch instruction is issued to the control while this card remains in the punch station. If there is no additional information to be punched into the card after it is read, another PDT read instruction may be issued as soon as reading of this card is completed.

DATA PROTECTION

Data protection is provided by an illegal-punch check in the reader and by a punch check feature in the punch. When cards are being read, the code in each column is tested to see if it is one of the legal configurations. When cards are being punched, errors are detected by sensing which punches have been activated and automatically comparing the result with the data specified for punching. Recognition of an error sets an indicator which may be tested by programmed

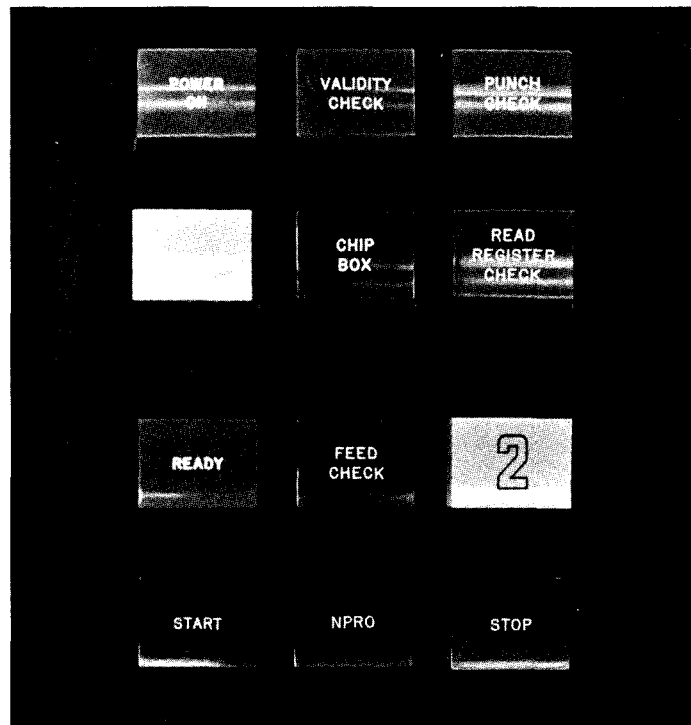
instruction. Under program control, the illegal card can be rejected and the unit may either proceed to process the next card or stop.

REJECT STACKER

The reject stacker is a standard feature on the Type 224-2 and is available as an option (Feature 065) on the Type 224-1. The reject stacker capability allows the programmer to file selected cards into the reject stacker under control of programmed instruction. If the option is not installed on the Type 224-1, error cards are stacked with correct cards. Whenever the option is not included, it is recommended that the Type 224-1 be programmed to "STOP" when an error condition occurs.

CONTROL PANEL SWITCHES AND INDICATORS

The layout of the switches and indicators on the operator's control panel for the Type 224 Card Reader/Punch is shown below.



Control Panel Switches

The switches on the control panel of the 224 are push buttons which are activated when pressed. A functional description of each switch follows:

START

If the card reader/punch is energized, depression of the START switch places the unit in a "ready" status (i. e., prepared to receive an instruction), provided that there are cards in the input hopper and/or in the card path. If the card path is empty when the START switch is pressed, one card will be moved to and registered at the read station.

START
(cont)

The punch station remains empty until the first read or punch instruction is performed

STOP

Activation of the STOP switch removes the 224 from the ready status. If an operation is in progress when the STOP switch is pressed, data transfer is completed.

NPRO

When the input hopper is empty and the NPRO (Non Process Runout) switch is pressed, the following events occur:

1. Cards are ejected from the card path of the reader/punch;
2. End-of-instruction signals are generated and sent to the central processor; and
3. The 224 is removed from the ready status. If the system stops because an error is detected, pressing the NPRO switch allows operations to be resumed after the restart procedure described on page 7 has been performed.

Control Panel Indicators

POWER ON

The POWER ON indicator is illuminated whenever the power supply for the 224 logic is energized.

CHIP BOX

The CHIP BOX indicator is illuminated whenever the chip box is full and whenever it is removed from the card reader/punch.

READY

The READY indicator is illuminated whenever the card reader/punch is in the ready status. The READY indicator is extinguished when any of the following events occurs:

1. The STOP switch is pressed;
2. The CHIP BOX indicator is illuminated;
3. The machine cover interlock switch is opened;
4. The NPRO switch is pressed while the hopper is empty;
5. The FEED CHECK indicator is illuminated; or
6. The last card in the input hopper is fed into the reader/punch.

If the READY indicator is extinguished during the progress of an operation due to the occurrence of one of the above-mentioned events, data transfer is terminated, and the control unit is not left with a stored instruction. The control is busy whenever the READY indicator is not illuminated.

FEED CHECK

The FEED CHECK indicator is illuminated under either of the following conditions:

1. Card jam — This condition may result in a stored instruction in the control unit; or

FEED CHECK
(cont)

2. Photocells-all-on failure — This condition does not result in a stored instruction in the control unit.

VALIDITY CHECK

The VALIDITY CHECK (illegal-punch) indicator is illuminated whenever an illegal combination of holes occurs in the card column being read. The indicator remains illuminated until the next PDT instruction is issued.

READ REGISTER CHECK

The READ REGISTER CHECK indicator is illuminated whenever a card is off registration (either when punched or when positioned in the feed mechanism) to the extent that accurate reading of the information on the card is impossible.

This indicator remains illuminated until the next PDT instruction is initiated.

PUNCH CHECK

The PUNCH CHECK (echo-check) indicator is illuminated whenever the punch mechanism does not punch the correct combination of holes in a card column. This indicator remains illuminated until the next PDT instruction is issued.

OPERATING PROCEDURES

The following operating procedures apply to both the 224-1 and the 224-2 reader/punches.

Process Meter Procedure

The card reader/punch is equipped with a process meter to record the time that the device is conditioned to operate. After the device has been prepared for operation, the process meter starts after the first read or punch operation is initiated and runs continuously until the card path is cleared. Because charges for the use of the 224 are based on the process meter readings, it is essential that the card path be cleared of cards (by pressing the NPRO button when the input hopper is empty) whenever the 224 is not required for a program run.

Last Card Procedure

Two cards may be added at the end of the input deck to terminate a card read or punch operation. When the 224 halts, these two cards may be removed from the card path by pressing the NPRO button.

Start Procedures

1. To perform an initial starting procedure:
 - A. Activate the CE (customer engineering) switch on the reader/punch. Verify that the central processor and the 224 have been energized (as evidenced by the illumination of the operator's control panel indicators and the POWER ON indicator on the 224 control panel).

NOTE: The CE switch is located inside the lower-rear cover of the 224 reader/punch.

- B. With the input hopper empty, press the NPRO button to ensure that the logic circuits are reset and the card path is clear; and
- C. Load the input deck into the feed hopper face down, nines-edge first, and press the START button.

Restart Procedures

1. To perform a restart procedure following a stop condition as a result of an empty input hopper during processing.

When the card supply is depleted, the program stops, and the READY indicator on the 224 control panel is extinguished. In addition, the control unit appears busy to all peripheral instructions.

- A. Press the NPRO button on the 224 control panel. This action clears the transport mechanism of any card(s) that may remain in the card feed path, initializes the control unit, and removes the device from the ready status.
 - B. Load any additional input cards needed for the run. Place the cards face down, nines-edge first.
 - C. If it is possible to determine the point in the program at which the last card was correctly processed, operations may be resumed from this point by positioning the program accordingly and proceeding with "D" below. If it is not possible to determine the last card processed, it is necessary to process the entire deck from the beginning to ensure that no program information is lost or perform a set of restart procedures specified locally by the installation.
 - D. Press the START button. This action causes one card to be moved into the device and registered at the read station. There will not be a card registered at the punch station. However, if punching is the first operation to be performed when operations are resumed, the first card (which is currently registered at the read station) will be moved to the punch station automatically when the punch PDT instruction is issued.
2. To restart following a stop condition for a machine cover interlock activation, a CHIP BOX indication, an empty input hopper, or a full output stacker:
 - A. Inspect the device to determine the cause of the stop condition and proceed accordingly. If a machine cover is not secured in place, completely enclose the device so that the device cover interlock is not activated. If the CHIP BOX indicator is illuminated, empty the chip box and replace it in position before enclosing the device. If necessary, refill the input hopper or if the output stacker is full, remove the cards from the stacker. After correcting the condition causing the stop condition, proceed with "B" below.
 - B. Press the START button to place the device in a ready status (as evidenced by the illumination of the READY indicator) and to register a card at the read station. Operations may be resumed when the READY indicator becomes illuminated.
 3. To restart following a stop condition for a FEED CHECK indication:
 - A. Remove the cards from the input hopper.
 - B. Check the device for a card jam condition in the transport mechanism. If a jam condition exists, carefully remove the cards. To avoid damaging the mechanism or changing the mechanical tolerances of the device, do not use any tools or unnecessary force in clearing the jam condition.
 - C. After removing the jam condition, press the NPRO button to clear any stored instruction(s) in the control unit.
 - D. Load the input cards in the feed hopper face down, nines-edge first.

- E. Proceed as in "C" above in restart procedure "1."
 - F. Press the START button to move the first card into the read station. If the FEED CHECK indication recurs as the first card is registered at the read station, a failure in the photocell reading circuits is indicated. In this event, the last card read may be in error, even though the error is not program-detectable. When a photocell circuit failure occurs, a service call is necessary.
4. To restart following a stop condition for an error check, i. e., a VALIDITY CHECK, a PUNCH CHECK, or a READ REGISTER CHECK indication (the READY indicator remains illuminated following the detection of an error-check condition):
- A. Remove the remaining program cards from the input hopper.
 - B. Press the NPRO button to extinguish the READY indicator and to clear the card path.
 - C. Load into the input hopper the program cards from "A" above and any cards run out in "B" above. Arrange the cards in the proper order and place them in the hopper face down, nines-edge first.
- NOTE: The position of the card(s) in the output stacker(s) following the detection of an error-check condition depends on the conditioning of the device by the program.
- D. Proceed as in "C" above in restart procedure "1."
 - E. Press the START button to prepare the device to process the first card in the deck.

The card control may be conditioned to handle a PUNCH CHECK, READ REGISTER CHECK, or VALIDITY CHECK in one or both of the following ways:

1. EJECT - If a PUNCH CHECK, READ REGISTER CHECK, or VALIDITY CHECK indication occurs, the card in error is automatically stacked in the reject stacker of the 224-2. (Eject action occurs in the 224-1 only if the optional reject stacker is present.) The control then proceeds normally to the next card, provided the control is not also conditioned to STOP.
2. STOP - If a PUNCH CHECK, READ REGISTER CHECK, or VALIDITY CHECK indication occurs when the control is conditioned to STOP, the control remains busy after the end-of-instruction signal has been sent to the central processor and card processing stops.

Bootstrap Procedure

The following is a recommended procedure for bootstrapping the Type 224 Card Reader/Punch.

1. Press the STOP button (if the system is not already in the STOP mode).
2. Press the INITIALIZE button.
3. If the character beyond the bootstrap area (A+80, where A is the starting location in memory) is to be retained in memory, display and record the character and punctuation so that they may be restored after the bootstrap operation.
4. Press the ADDRESS buttons (to designate the starting location in main memory, if other than zero).

5. Press the CONTENTS buttons to designate the reader/punch control.
6. Cycle up the reader/punch to accept a generated PDT instruction which will read in the bootstrap card.
7. Press the BOOTSTRAP button.

NOTE: After the card is read, the central processor will "stall" with both the "STOP" and "RUN" indicators extinguished, and the reader/punch will cycle down. If the 224 is to be used after the bootstrap operation has been completed, it must be cycled up again.

8. Press the STOP button.
9. Press the INITIALIZE button. This action terminates the bootstrap operation.
10. If necessary, restore the character and punctuation in location A+80.
11. Press the RUN button.

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SERIES 200
MODEL 120 EQUIPMENT OPERATORS'
TITLE: MANUAL SUPPLEMENTARY INFORMATION
(TYPE 224 CARD READER/PUNCH)
HARDWARE BULLETIN

DATED: MARCH 15, 1966
FILE NO: 112.0006.0600.0-285

ERRORS NOTED:

Fold

SUGGESTIONS FOR IMPROVEMENT:

Fold

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COMPANY _____

TITLE _____

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