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IBM 29 CARD PUNCH REFERENCE MANUAL

Pages to be inserted and/or removed are:

Contents, Frontispiece
13, 14
19-24 (Text rearranged on page 23)
33, 34

A change to the text is indicated by a vertical line to the left of the change. A changed or added illustration is denoted by the symbol • to the left of the caption.

Summary of Amendments

Improved procedure for processing partially prepunched cards.
Clarification of programming for the Model C.

File this cover letter at the back of the manual to provide a record of changes.

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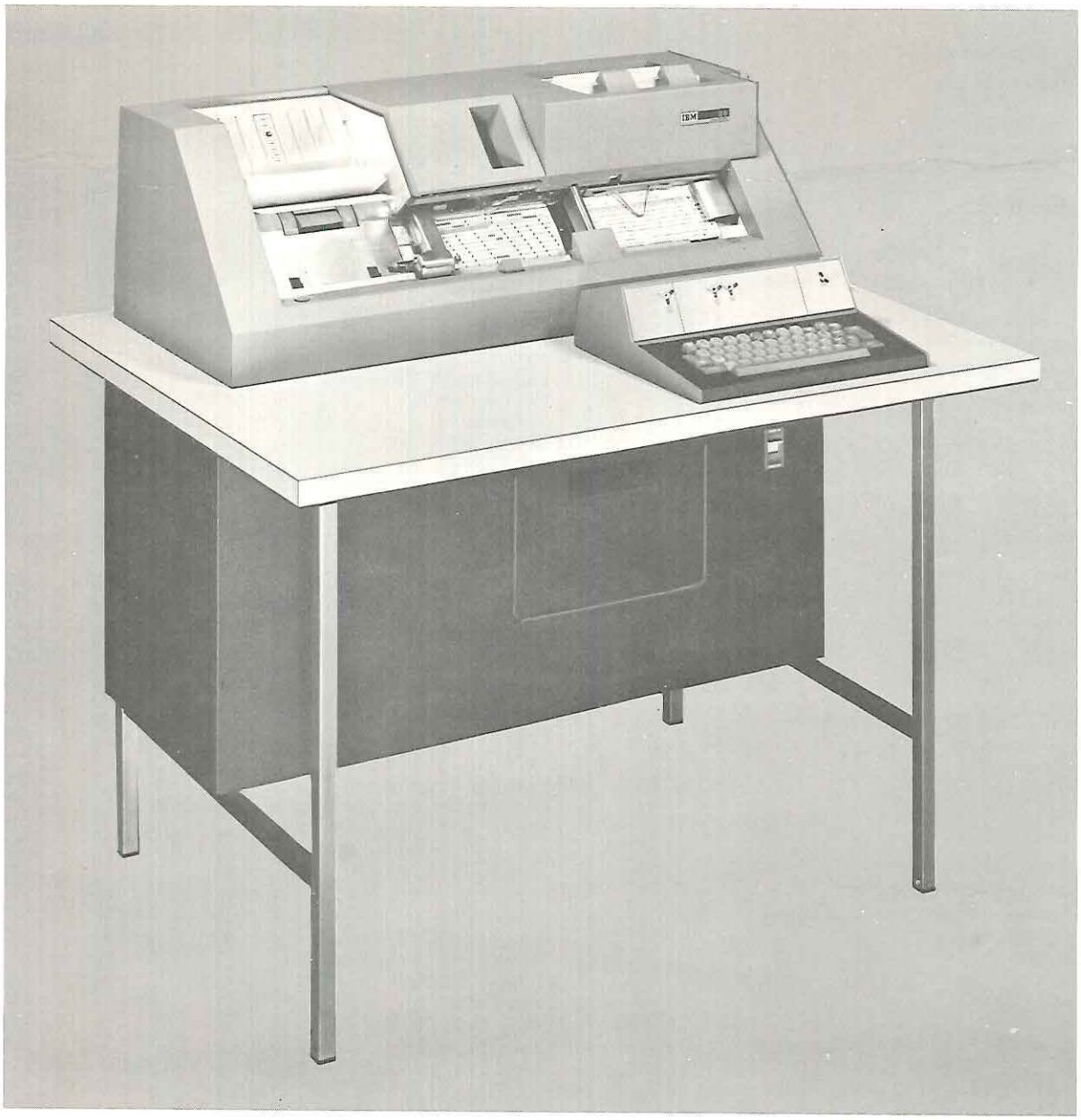


IBM 29 Card Punch

Program Card—Model A

A program card, which is a basic part of the program unit, is prepared for each punching application and can be used repeatedly. Proper punching in this program card controls the automatic operations for the corresponding columns of the cards being punched. Each row in the program card governs a specific function.

Field Definition (12, 4)

The 12-punch is the field definition punch for Program One; the 4-punch is the field definition punch for Program Two. A field definition punch for the program level being used must appear in every column except the first (left-hand position) of every field to be automatically skipped, duplicated, or manually punched.

The field definition punch causes any skip or duplication operation started within a defined field to continue to the end of that field. Several consecutive fields to be automatically skipped or duplicated as one field can be programmed as a single field. Do not program a single column field with a field definition punch.

Field definition codes punched in the program card for manually punched fields permit occasional skipping or duplicating. This skipping or duplicating is started by keyboard control keys.

Automatic Skip (11, 5)

The 11-punch is the auto-skip start code for Program One; the 5-punch is the auto-skip start code for Program Two. In either program level, punching the auto-skip start code in the first column of the field to be skipped starts an automatic skip, which continues to the end of the field defined by the field definition punches.

This operation is also under control of the functional control switch (AUTO SKIP/DUP) on the keyboard. If this switch is off, the program card codes for auto-skip start are not recognized.

Automatic Duplication (0, 6)

The 0-punch (zero) is the start-automatic-duplication code for Program One; the 6-punch is the start-automatic-duplication code for Program Two. In either program level, punching the start-automatic-duplication code in the first column of the field to be duplicated starts automatic duplication, which continues to the end of the field defined by the field definition punches.

This operation is also under control of the functional control switch (AUTO SKIP/DUP) on the keyboard. If the switch is off, the program card codes for start automatic duplication are not recognized.

Alphabetic Shift (1, 7)

The 1-punch is the alphabetic shift code for Program One; the 7-punch is the alphabetic shift code for Program Two. When a program card is in the machine, the combination keyboard is normally in numeric mode or shift. Therefore, to punch any alphabetic characters or special characters that are part of the alphabetic shift, the keyboard functions must be shifted to the correct mode. The shifting is accomplished by punching the alphabetic shift code, for the program level being used, into the columns of the program card that correspond to the columns of the card being punched with the alphabetic information. Every column to be punched as alphabetic must contain an alphabetic shift code in the program card. *Field definition does not extend alphabetic shift.*

Figure 7 shows a typical program card for a Model A machine, using Program One. For Program Two, the identical hole pattern would appear in punch rows 4-9, on the lower half of the card. For example; all the 12-punches would be 4-punches, all the 1-punches would be 7-punches, etc.

Figure 8 is a chart giving the codes just discussed for Model A, as well as all codes used in Models B and C.

Program Card—Model B

The Model B is the Left-Zero Insertion Card Punch. Preparing a Model B program card, except for fields where left zeros are to be inserted, is identical to preparing one for the Model A; the Model B too, can be programmed to auto skip, auto duplicate, and shift alphabetic.

To program a field for left-zero insertion, count the number of columns in the field and from the following table select the code in the proper program level, for the exact column count. Punch the chosen code into the first, or high-order column of the left-zero field. Punch the remaining columns of the field with field definition punches.

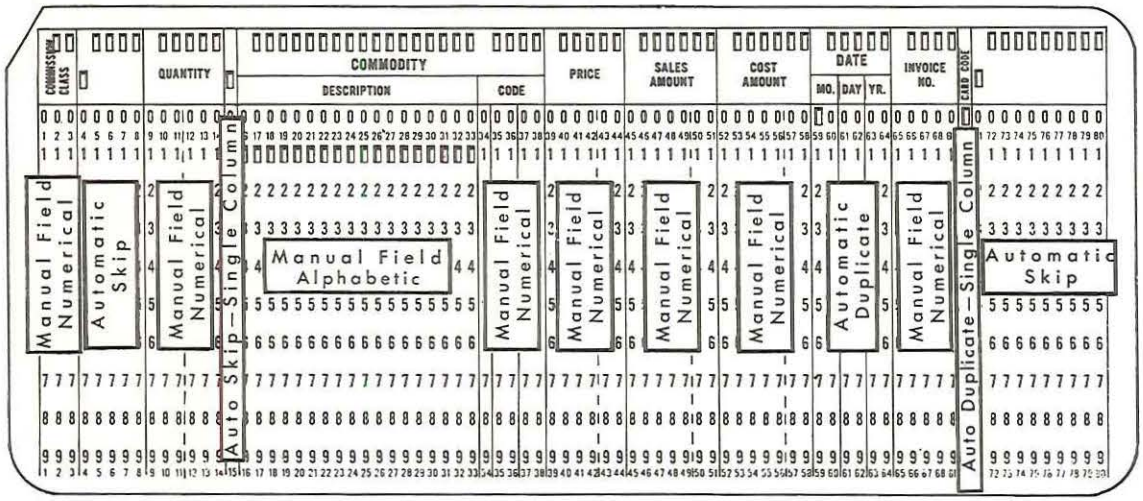


Figure 7. Program Card — Program One Level

FIELD SIZE (COLUMNS)	PROGRAM ONE	PROGRAM TWO
8	2	8
7	3	9
6	2-3	8-9
5	1-2	7-8
4	1-3	7-9
3	1-2-3	7-8-9

Left-zero fields of various lengths, from 3 to 8 columns, may be on one card; handle every left-zero field in the manner just described.

Program Card — Model C

The Model C, or Interpreting Card Punch, is a dual-mode machine controlled by a switch on the keyboard. When this switch, the punch/interpret switch, is set to PUNCH, operation of the Model C is identical to the Model A, and programming is exactly the same.

When the punch/interpret switch is set to INTERPRET, the machine does not perform any of the normal card punch functions; it only interprets prepunched cards. Programming for this operation merely requires that any column(s) or field(s) not to be interpreted, be skipped. Skipping is programmed the same as on the Model A. If desired, zero print control may also be programmed in the same manner as on the Model A.

11-12 Elimination

When programming for an interpreting operation, one other consideration is the elimination of overpunches

Program One	Function	Program Two	Where Punched	Used On
12	Field Definition	4	Each column except first	Models A,B,C
11	Start Auto-Skip	5	First column only	Models A,B,C
0	Start Auto-Duplicate	6	First column only	Models A,B Model C only when in punch mode
0	11/12 Elimination	6	Necessary column only	Model C only when in interpret mode
1	Alphabetic Shift	7	Each necessary column	Models A,B Model C only when in punch mode
2	8-Column Left-Zero Field	8	First column only	Model B only
3	7-Column Left-Zero Field	9	First column only	Model B only
2,3	6-Column Left-Zero Field	8,9	First column only	Model B only
1,2	5-Column Left-Zero Field	7,8	First column only	Model B only
1,3	4-Column Left-Zero Field	7,9	First column only	Model B only
1,2,3	3-Column Left-Zero Field	7,8,9	First column only	Model B only

Figure 8. Program Codes — Models A, B, and C

Some special character keys located to the left of the numeric section of the keyboard can cause the machine to unload storage and erroneously punch the left-zero field. Exercise care that these adjacent keys are not pressed accidentally, because this type of error cannot be corrected by the error reset key and card spoilage results.

The program level should not be changed during the keying of a left-zero field unless the error reset key is first pressed. To do so may leave information in storage that would cause erroneous punching of a subsequent left-zero field. The program level may be changed in the first column of a left-zero field before starting the left-zero keying.

Alphabetic and Numeric Punching with Program Control

Although the keyboard is normally in numeric shift when the program is turned on, alphabetic information can be punched by changing to alphabetic shift. This is done either manually by pressing the alphabetic-shift key or automatically by coding in the program card.

Columns 6-26 of Figure 13 illustrate the coding for the automatic shift to alphabetic position. Both Program One (1's) and Program Two (7's) are shown. (For the sake of illustration, both programs on this example are the same; either could be used.) If a field is to be punched with both alphabetic and numeric characters, program it for whichever are more frequent; if there is about an equal number of each, program the field for alphabetic punching.

In punching alphabetic names or descriptions that vary in length, it is usually desirable to skip over that part of the field, at the right, which is not used. In this illustration, a portion of the name field should be skipped on most cards. Because the starting point of this skipping varies from card to card, it must be controlled manually by pressing the skip key.

Another type of skipping that must be considered is in the trading area field (columns 75-77). The trading area code is to be punched for some customers but not for others. This skip, also, is started by pressing the skip key.

Card punches prior to the 29 Card Punch had a feature known as X-skipping, which allowed a skip to be started when the X or 11 key was pressed while operating in numeric shift. This is not standard on the 29 Card Punch. However, if X-skipping on a 29 is essential, it can be obtained by RPQ Special Order.

When a field is to be punched with the same information in a few successive cards, only the first card must be manually punched; the field in the following cards can be punched by pressing a *single* key. In this illustration (Figure 13), salesman number in columns 78 and 79 may be the same for several consecutive cards and can be duplicated by key.

Skip Key

Press this key to skip any field coded with 12's (or 4's) in the program card. Pressing the key starts the skip, and the 12's (or 4's) in succeeding columns of the field continue the skip for the rest of the field. This key is primarily for skipping the unused right-hand portion of an alphabetic field. The card punch skips at the rate of 80 columns per second.

Numeric fields skipped with this key are blank and cannot be duplicated later, as in correcting punching errors.

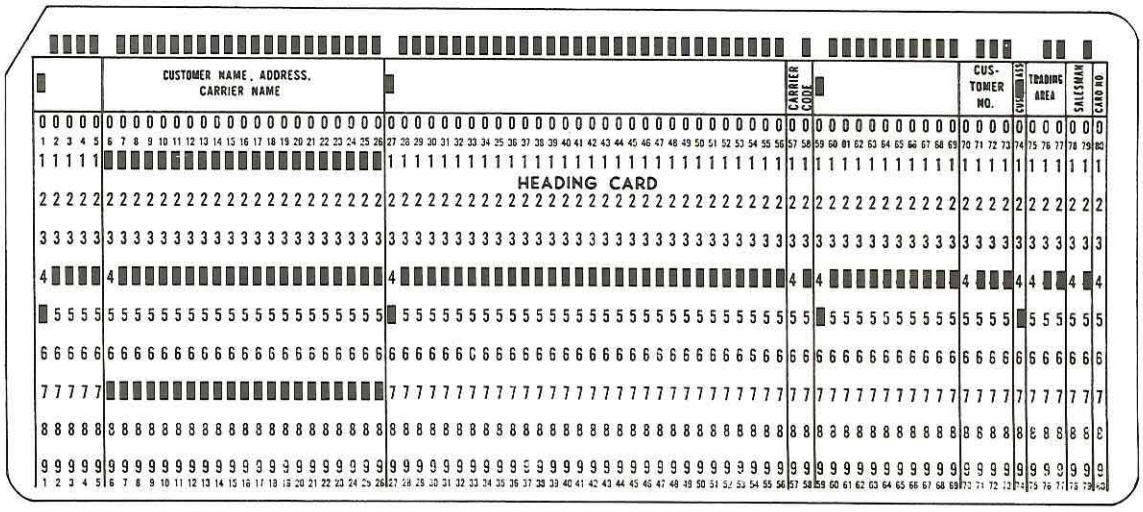


Figure 13. Alphabetic and Numeric Punching—Program One and Program Two

Duplicate Key

Use this key to duplicate any information manually punched in one card and common to one or more successive cards. Pressing this key at the beginning of a field starts duplication, and the 12's (or 4's) punched in the program card continue the duplication for the rest of the field.

With the machine under program control, one depression of the dup key starts the operation. Duplication continues at the rate of 18 (printing models) or 20 columns per second, until the end of field definition.

Without program control, duplication occurs at the rate of 9 or 10 columns per second and occurs only as long as the key is held down. This allows the operator precise column control in a card correction or make-over application.

Encountering a space during duplication of numeric fields locks the keyboard. The error reset key unlocks the keyboard and permits keying of the space, substitute data, or release. The alpha shift key can also be used to get over the space without pressing the error reset key.

Duplication of characters other than the standard 64 can cause damage to the print mechanism on printing models of the 29 Card Punch.

Procedure for Alphabetic and Numeric Punching with Program Control

Figure 13 shows the program card for this procedure. The instructions that follow describe Program One. They could apply to Program Two, also shown in Figure 13, by substituting codes 4-9 for the 12-3 used.

1. Place a deck of unpunched cards in the card hopper, and hold the feed key depressed. Two cards will feed down from the hopper.
2. The card punch automatically skips columns 1-5 (program card punched with an 11 in column 1 and 12's in columns 2-5). The auto skip/dup switch must be on.
3. Punch columns 6-26 with customer name, address, or carrier name (program card punched with 1's in columns 6-26). The 1's automatically shift the keyboard from numeric to alphabetic punching. When figures are to be punched in this field, press the numeric shift key.
4. Press the skip key at the end of the alphabetic punching to skip over the rest of the field (program card punched with 12's in columns 7-26).
5. Columns 27-56 are skipped automatically (program card punched with an 11 in column 27 and 12's in columns 28-56).
6. Punch the carrier code in columns 57 and 58 (program card punched with a 12 in column 58).
7. Columns 59-69 are skipped automatically (program card punched with an 11 in column 59 and 12's in columns 60-69).
8. Punch the customer number in columns 70-73 (program card punched with 12's in columns 71-73).
9. Column 74 is skipped automatically (program card punched with an 11).
10. The trading area field in columns 75-77 is coded in the program card for manual numeric punching (blank in column 75 and 12's in columns 76 and 77). Optional skipping of the field is controlled by pressing the skip key in column 75.
11. Punch columns 78 and 79. Salesman number is frequently the same for several successive cards. After punching the first card, duplicate the following ones by pressing the dup key in column 78.
12. Punch column 80, after which the next card feeds automatically. The auto feed switch must be on.

Error Correction — Normal

Errors in punching are often noticed and corrected by the operator at the time they are made. Usually this involves rekeying a large portion of the card. This card punch reduces rekeying to a minimum, requires no concern about the precise column in which the error occurred, minimizes the possibility of making another error while correcting the first, and practically eliminates card handling. As an example, the correction of an error in the order number field of the labor distribution card (Figure 14) is made as follows:

1. Press the release key immediately upon detecting the error. This advances the card without punching the fields coded for manual punching, but allows duplication of the fields programmed for automatic duplication beyond the point of release. Therefore, columns 34 and 35 are duplicated into the error card as it is being released. This retains the common information for duplication into the following cards. The three cards in the card bed advance to their proper stations and a new card is fed from the hopper.
2. Duplicate the kind field by pressing the dup key once.
3. Columns 3-6 are programmed to duplicate automatically, as shown in Figure 14.1.
4. Manually duplicate the regular rate, overtime rate, and part or account number fields by pressing the dup key at the beginning of each field. Duplication stops at the end of the part or account number field.
5. Rekey the order number field, and manually punch the remaining fields programmed for manual punching. Note that, in this example, the pieces field is a left-zero field, and only requires keying the significant digits and the left-zero key. Machine group is automatically duplicated, and columns 48-80 are automatically skipped.
6. Remove the error card from the stacker.

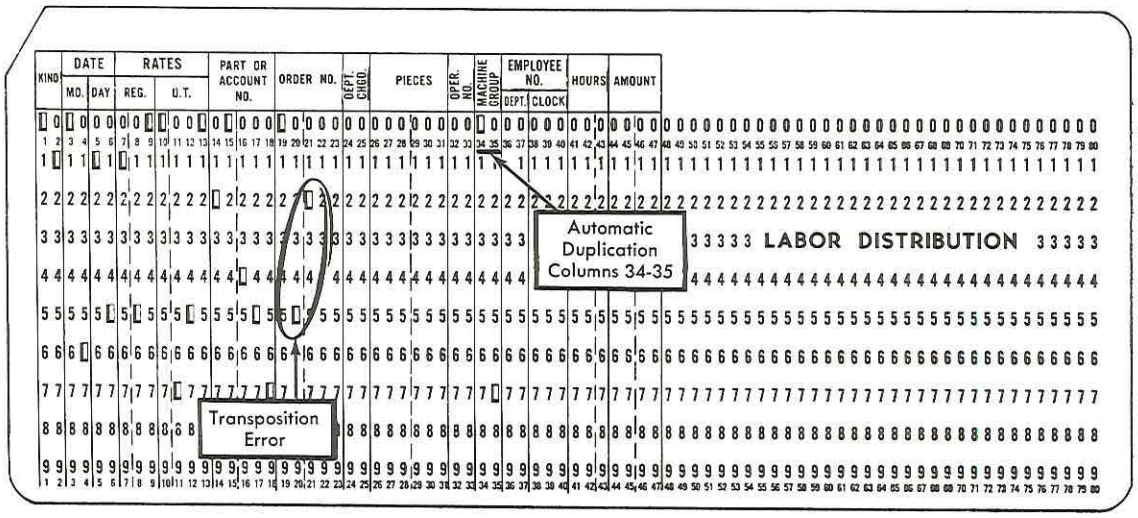
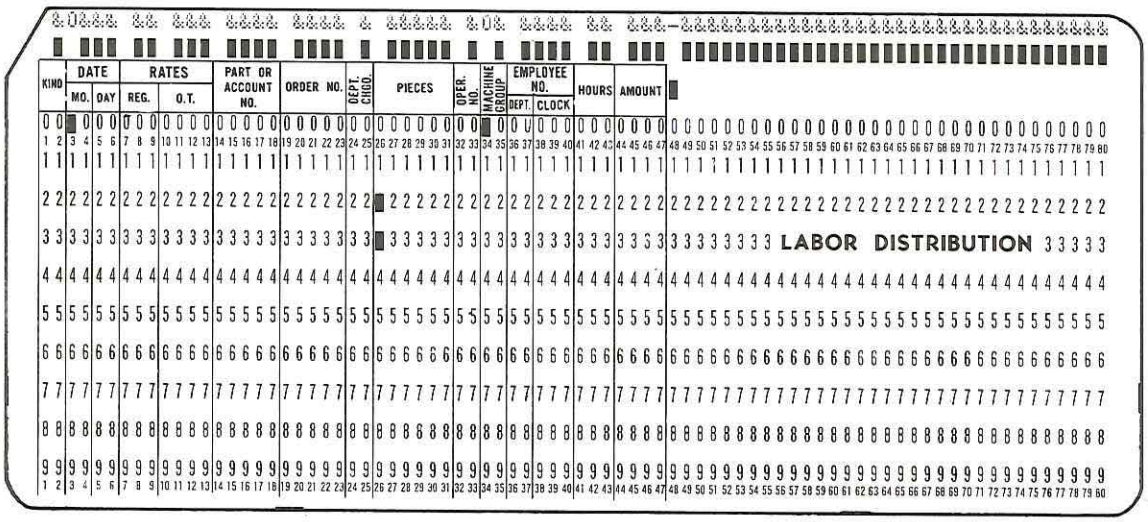


Figure 14. Error Correction



● Figure 14.1. Numeric Punching Program

Left-Zero Insertion Field

Keying errors recognized or sensed by the operator while keying a left-zero field (significant digits only) are corrected by pressing the error reset key. In a left-zero field, these keyed significant digits do not punch in the card as they are keyed; they enter into a storage device. Pressing the error reset key clears storage and erases all stored digits.

Partially Prepunched Cards

Partially prepunched cards may contain prepunched names or codes, or they may be serially numbered and punched. When an error is made in punching cards of this type and the correction is to be made immediately, automatic feeding from the hopper must be interrupted and a blank card must be inserted manually in the card bed. Because each card that feeds from the hopper contains some prepunched data, it is not possible to duplicate into the following card as outlined in "Error Correction—Normal."

The commodity card in Figure 15 illustrates a partially prepunched card for which the punching is to be completed. The commission class, commodity description, commodity code, and price fields are prepunched; the remainder of the card to be punched. The commodity code and description are interpreted for pull-

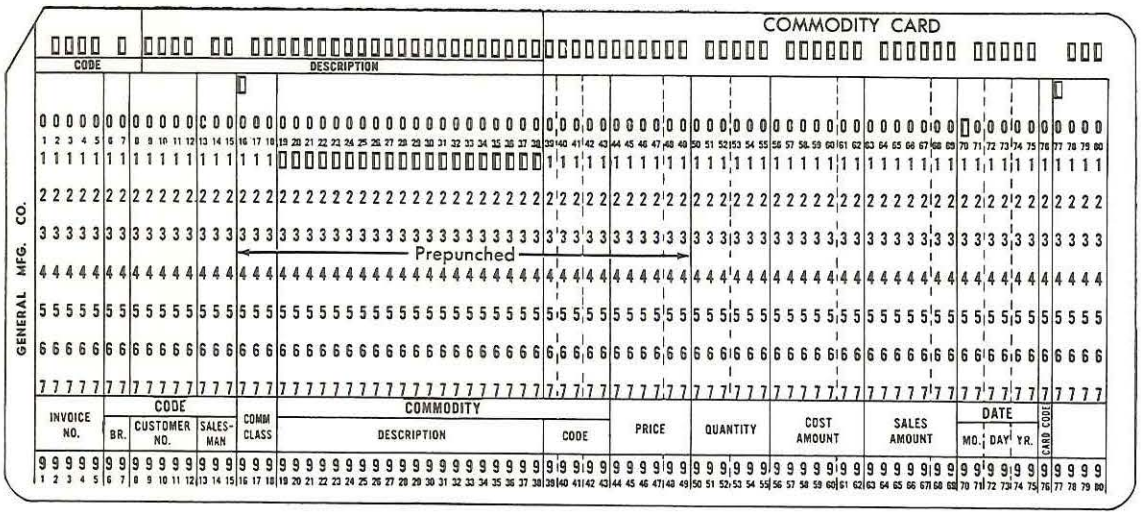


Figure 15. Error Correction — Partially Prepunched Cards

ing from a file. If an error is made in the keying of column 14 (salesman field):

1. Turn off the auto feed switch; press the release key and then the clear switch. The card in the read station, the error card in the punch station, and the card following in the preregister position all advance until they are stacked in the stacker. The date in columns 70-75 duplicates during the release operation. Feeding does not take place; the card bed is clear.

2. Remove the last card from the stacker and hold it aside.

3. Again, remove the last card from the stacker; this is the error card.

4. Manually insert the error card to the right of the read station. (Caution: Position card about 1 inch past the pressure roll; do not push card all the way in to the stop.)

5. Manually insert a blank card to the right of the punch station.

6. Turn off the auto skip/dup switch to prevent automatic skipping during the correction of the error card. The prepunched fields are programmed for automatic skipping, but when correcting an error, these fields must be manually duplicated into the blank card.

7. Press the register key to register the error card at the read station and the blank card at the punch station.

8. Manually duplicate the invoice number, branch, and customer number fields (which were punched correctly) by pressing the dup key at the beginning of each field.

9. Rekey the salesman field.

10. Manually duplicate the commission class, commodity description, commodity code, and price fields by pressing the dup key in column 16. These fields are programmed as one field for automatic skipping in the regular punching operation. The commodity description field is coded with 1's in the program card to permit automatic spacing over blank columns during the correction of errors made in the punching operation.

11. Turn on the auto skip/dup switch. Manually punch the remaining fields programmed for manual punching. The date is duplicated automatically and columns 77-80 are skipped automatically.

12. Replace in the card bed to the right of the punch station, the card removed in Step 2.

13. Turn on the auto feed switch.

14. Press the feed key to register the card replaced in Step 12 at the punch station, and to feed the next card from the hopper to the preregister position. The repunched card is in the master station, and in proper sequence. The error card, again, is the last card in the stacker; remove it for disposal.

15. Continue the operation that was interrupted by the error.

Prepunched Master Card Insertion

In an operation in which certain fields are to be duplicated from prepunched master cards, it is necessary to insert each master card manually before duplicating the first card of the group. Insert the master cards in the card bed at the right of the read station.

1. Turn off the auto feed switch before completing the punching of the last card of the preceding group.

2. After the last card is released from the punch station, manually move it to the left until it touches the feed rolls at the read station.

3. While still maintaining a slight pressure on the card against the feed rolls, press the release key to advance that card past the read station.

4. Place the master card in the card bed between the punch and read stations. Position it so that the left edge is just between the feed rolls and not in registered position.

5. Press the feed key to register the master card and the detail card that is at the right in the card bed, and to feed a new card from the hopper. Turn on the auto feed switch. Normal punching of the first card of the new group can then proceed, with automatic feeding of the following detail cards.

6. If the master card is not to be stacked with the detail cards, remove it immediately after completion of the punching of the first detail card.

7. This type of operation normally precludes the possibility of automatic duplication of any common information (such as date) from one group of cards to the next, because the continuity of such duplication is interrupted by insertion of the prepunched master cards. Consequently, when common-punching is required, the information must be manually punched in the first card of each new group. This keying can be avoided by use of the auxiliary duplication feature. (See "Special Features.")

Interpreting — Model C

With the punch/interpret switch set to INTERPRET, the machine will interpret up to 80 columns of information on prepunched cards. As the card progresses through the punch station, column-by-column, the information in each column is read and prints over the same column.

All 80 Columns

If all 80 columns are to be interpreted in each card of the group, it is not necessary to prepare a program card; nor does the program control lever have to be on. Put the cards in the hopper, turn on the auto feed switch, set the punch/interpret switch to INTERPRET and press the start key for two feed cycles. Interpretation, at 18 columns per second, starts and continues until cards run out.

Less than 80 Columns

Any fields or columns that are not to be interpreted, must be skipped. To cause this skipping, a program card must be used (see "Program Card Preparation"), the program control lever must be on, and the auto skip/dup switch must be on before the first card is fed into the interpreting position. Skipping speed is 80 columns per second.

Clear Switch: When the interpret operation is completed, or if it needs to be interrupted, set the punch/interpret switch to the punch position before operating the clear switch.

The special features described in this section provide additional flexibility for applications that require special handling on the IBM 29 Card Punch. These special features are compatible in groups as shown in the feature compatibility chart (Figure 16).

Auxiliary Duplication

This feature enables duplicating from a master card rather than from the card at the read station. The auxiliary duplicating unit is a separate drum unit that is mounted in the back of the machine below the program unit, complete with its own sensing circuitry and keyboard control.

The information duplicated from the auxiliary duplicating unit is punched in a master card, which is mounted on a drum, exactly as a program card is mounted, and the drum installed on the spindle of the auxiliary unit. The auxiliary duplicate (AUX DUP) key manually controls this duplication. Pressing this key starts auxiliary duplication, which continues to the end of the field defined by field definition punches in the program card. The information in the master card must be in the same columns that are defined in the program card.

This type of duplication is advantageous when common information is required for certain cards but not for others, when major-minor duplicating is performed, or when prepunched master cards are inserted.

When prepunched master cards are used, any information common to all cards (such as date) is dropped when a new master card is inserted. In this case, with the auxiliary duplication feature, the master information can readily be punched in the first detail card of each group by pressing the key once and without reference to a source document.

	Model A						B		C	
Auxiliary Duplication	X	X	X		X		X	X	X	X
Card Insertion		X			X	X		X		X
Character Inhibit	X	X	X	X	X	X	X	X	X	X
High-Speed Skip	X		X	X			X		X	
Interspersed Gang Punch		X			X	X		X		X
Reading Board Extension	X	X	X	X	X	X	X	X	X	X
Self Checking -- Modulus 10	X	X								
Self Checking -- Modulus 11				X		X				
Self Checking Number Generator	X	X		X		X				
Variable Length Card Feed	X		X	X			X		X	

Figure 16. Special Feature Compatibility Chart

Card Insertion

The card insertion feature simplifies the manual insertion of a master duplicating card in front of a group of cards to be punched, or the insertion of a blank or prepunched trailer card at the end of a group of punched cards.

To insert a new master card in front of a group:

1. Set the card insertion feature switch to INSERT. (This switch is mounted on the keyboard when the feature is installed.)
2. While punching the card that precedes the master card to be inserted, press the MC (master card) key (Figure 31, Key 46). When the card being punched is completed, it is released through the read station, but stops before it is stacked. There is no card at the read station, and the next card is in the preregister position, waiting to be registered for punching.
3. Manually insert the new master card in the read station.
4. Press the feed key to register both the master card at the read station and the next detail card at the punch station.
5. Resume normal operation. Any fields programmed for duplication are duplicated from the new master card.

To insert a new master card (or trailer card) behind a group of cards that have been punched:

1. Set the switch to STACK.
2. While punching the card that precedes the master card, press the MC (master card) key. When the card being punched is completed, it is released through the read station and stacked. There is no card at the read station. The next card is registered at the punch station ready to be punched.
3. Manually insert the master (trailer) card behind the cards in the stacker.
4. Resume normal operation.

Character Inhibit

This feature limits the active keyboard characters to 48. A switch just to the left of the program drum per-

Program Card Preparation

When a program card is to be prepared for a particular punching application, the card design should be carefully analyzed to code the program card for maximum punching efficiency. Proper use of the various features of the card punch reduces operator time and effort to a minimum. Greater programming flexibility is gained by using both program levels on the 29 Card Punch. The following explanations mention both program levels; the second code in parenthesis is Program Two. Also, refer to Figure 8.

Programming Common to All Models

To prepare a program card, the following anaylsis must be made of the cards to be punched:

1. Field definition coding, which determines the length of each field. Punch a field definition 12 (4) in each column except the first (left-hand) of every field regardless of the type of operation to be performed in that field. The 12's (4's) are used in skipped or duplicated fields to continue the skip or duplication across the field, once the operation is started. On the Model B, field definition is used to define the fields programmed for left-zero insertion; on the Model C, they are used to define the fields to be skipped and the fields in which zero printing is to be controlled (see "Zero Print and Suppression"). Field definition punches are also used in fields programmed for manual punching to make full use of the feature provided for the correction of errors made while punching. With all field-lengths defined, each *correct* field can be duplicated by a single depression on the dup key, and only the *field* containing the error must be rekeyed.

2. Automatic skipping for each field that is not to be punched at this time. If several successive fields are to be skipped on every card, program them as one large field with an 11 (5) in the first column and 12's (4's) in all successive columns.

3. Automatic duplication of each field that is punched with the same data for a group of cards. If several successive fields are to be duplicated on every card, program them as one large field with the zero (or 6) in the first column and 12's (4's) in all successive columns.

4. Alphabetic coding to shift the keyboard when letters are to be keyed. If all or most of a field is to be alphabetically punched, code it with 1's (7's) and use the numeric shift key for occasional numeric punching. In the duplication of alphabetic punching, the 1's (7's) permit duplication of blank columns.

Programming the Model B

The Model B is the Left-Zero Insertion Card Punch and the only additional program card requirement is a code in the high-order (first) column of each *left-zero field* to indicate the number of columns in the field. To determine the code, count the number of columns in the left-zero field(s). Refer to Figure 8 and select the proper code in the program level desired. For example, punch a 3 (9) in the first column if the field is seven columns long; punch a 1 and 3 (7 and 9) in the first column if the field is four columns long. The remainder of the field(s) is punched with field definition 12's (4's), and the remaining non-left-zero fields are programmed as described under "Programming Common to All Models."

Programming the Model C

The Model C, when being used to interpret, is programmed to skip, to eliminate recognition of 11 and 12 overpunches in numeric fields, and to control the printing of left-zeros.

To skip, as with any automatic skip, punch an 11 (5) in the first column and 12's (4's) in all the remaining columns of the portion of the card to be skipped. A single column skip is caused by the 11 (5) punch.

To eliminate interpreting either an 11 or 12 overpunch in a numeric column, punch the program card with a zero (or 6) in the corresponding column.

To eliminate interpreting left-zeros (dashes and ampersands), the program card must be punched with 12's in all but the first (high order) column of the field.

After the program is planned for these operations, punch the codes directly into a single card to serve as the program card. It is desirable to prepare the program card in a card of the same design as those to be punched. When punching the program card, punch all codes across the card in columns 1-80 without backspacing, to maintain accurate registration. When two codes are to be punched in one column, for Program One, use the proper letter or special character key on the combination keyboard (A for a 12-code and a 1-code, or the / symbol for a 0-code and a 1-code). These codes can also be punched by pressing each of the two numeric keys while holding the multipunch key depressed.

For Program Two codes (punch rows 4-9), the multipunch method must be used.

Program Two used for Alternate Programming

When it becomes necessary to alternate programs to handle two types of cards in one punching operation, all the preceding operations must be analyzed for the

alternate program, and the proper codes (4-9) must be punched. Consideration must be given to the time within the card cycle that the change to the alternate program is to be made. The change can be made either at the beginning of the card or at any time within the card cycle when it is desirable for the alternate coding to become effective. Once the alternate program is selected, by pressing the Program Two selection *key*, the alternate program codes are read for the remainder of the card, or until the other program selection key is pressed to return to the original program. Programs can be alternated at will in this manner during punching of a card. However, when the following card is fed, the normal program coding, determined by the program selection *switch* setting, becomes effective.

If the first field of a card is to be controlled by the alternate program, the auto feed switch should be turned off before the preceding card reaches column 80. This suppresses the feed cycle and allows the operator to select the alternate program by pressing the program two key. Pressing the key also causes a feed cycle; the new card is registered in the punch position.

Multiple Functions

When alternate program functions are used in addition to the basic program functions, the program card may require several codes in a column (Figure 26). In this case, punch a master deck of cards for the preparation of the program card. This deck consists of a maximum of 12 cards, one for each punching row: one card punched with all the required 12-codes, a second card with all the required 11-codes, a third card with all the required 0-codes, etc. After the cards of the master deck are punched, duplicate each card, one at a time, into a single card, which then becomes the program card. This method of preparing a program card facilitates the preparation of slightly changed or duplicate program cards on printing models of the 29 Card Punch because multiple punches other than standard must not be duplicated. *Duplicating other than standard multiple punch combinations causes print mechanism damage.*

Program Planning Card Form

A card form, usable as an aid in the preparation of program cards, is available on the reverse side of the installation supply form *Card Punching or Verifying Instructions*, Form X24-6299. As illustrated in Figure 27, this card is designed with 12 rows of column numbers, each row located in a punching position. The program codes, with the functions of each, are also listed for reference.

When analyzing the cards to be punched, mark the planning card for the functions to be performed in each column. For example, if columns 10-27 are to be punched with alphabetic characters under normal program control, draw a mark through columns 10-27 in the 1-row; if columns 59-80 are to be automatically skipped under normal program control, draw a mark through column 59 in the 11-row and columns 60-80 in the 12-row. Punch the program card, or the individual cards of the master deck, by reference to the planning card. After the program card is punched, check it by laying it over the planning card. The markings on the planning card should be visible through the holes in the program card.

Program Example

The functions listed on the card in Figure 27 constitute the program plan for the payroll master and deduction

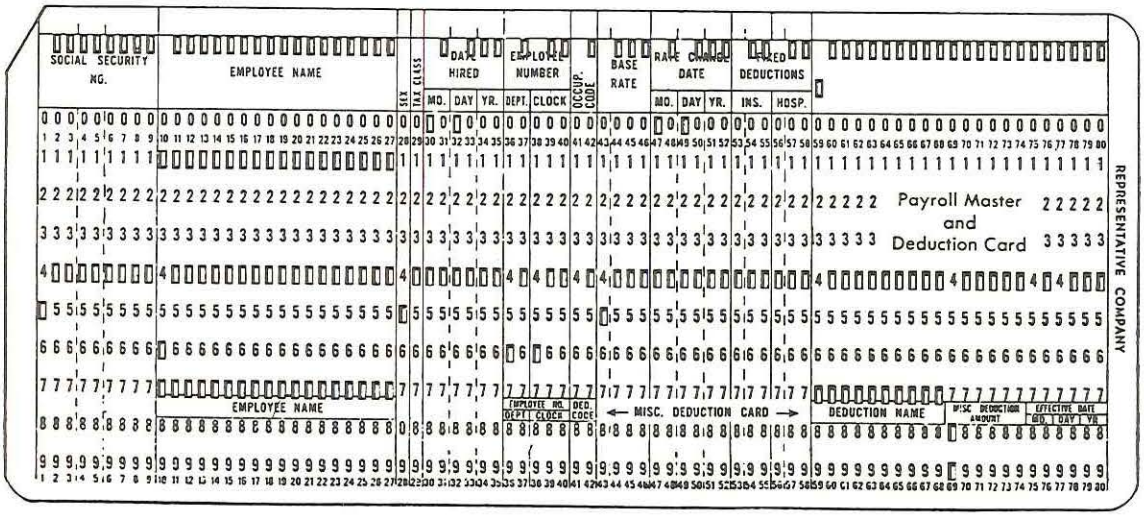


Figure 26. Program Card—Multiple Functions