UNIVAC

DATA PROCESSING DIVISION

9200/9300

SYSTEMS

GANGPUNCH - REPRODUCE PROGRAM

REFERENCE MANUAL

UP-4089

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FIGURES

1. INTRODUCTION

1.1. GENERAL

This manual explains the use of the Gangpunch-Reproduce specification sheet and the nature and range of operations possible with the Gangpunch-Reproduce programs. The specification sheet is explained in terms of each column entry; the operation of the program is demonstrated by means of examples.

The Gangpunch-Reproduce program can perform all of the standard gangpunching and reproducing operations of a reproducing punch unit in addition to several special operations not available on such a unit.

The *standard* operations are as follows:

- Straight reproducing
- Selective reproducing (by control punch)
- Interspersed master card gangpunching
- Offset gangpunching
- Combined gangpunching and reproducing

The *special* operations are as follows:

- Sequence checking
- Selective reproducing by control field
- Punching counter-controlled consecutive numbers into detail cards
- Counter-controlled gangpunching
- Major-minor gangpunching

The Gangpunch-Reproduce program substantially reduces the amount of time needed to set up an operation because the control panel wiring usually required to use a reproducing punch unit is replaced by a single specification sheet which is filled out by the programmer. This sheet contains all of the control information necessary to run a gangpunch-reproduce operation.

2. GANGPUNCH-REPRODUCE PROGRAM CARD TYPES

2.1. GENERAL

Three basic card categories identical to those used by a standard reproducing punch unit are also used by the Gangpunch-Reproduce program. These card categories are as follows:

- Original cards, from which information is reproduced;
- Master cards, from which information is read for gangpunching purposes; and
- Detail cards, into which information is punched.

The Gangpunch-Reproduce program can process three types of original cards, two types of master cards, and three types of detail cards. The card types are identified in this manual as follows:

original cards are type A, B, or C;

master cards are type D or E; and

detail cards are type F, G, or H.

Figure 2–1 shows the functions of the card types within the Gangpunch-Reproduce program. In Figure 2–1, the primary feed is the punch feed, and the secondary feed is the read feed.

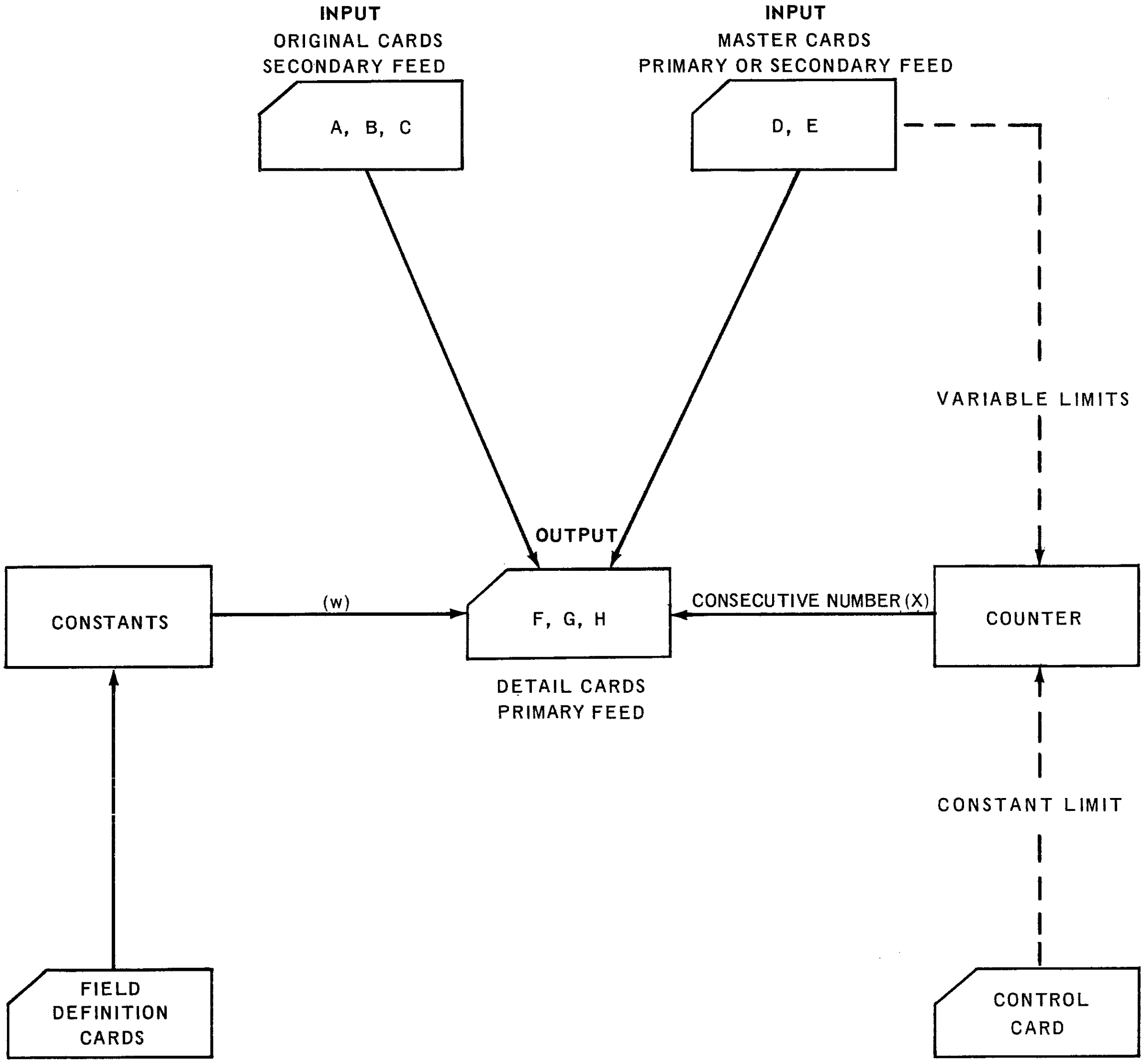


Figure 2–1. Gangpunch-Reproduce Program Card Types

2.2. CARD TYPES

Different card type designations are used to give maximum flexibility to the Gangpunch Reproduce program. In the case of original cards, they are assigned separate designations if the format differs, or if the individual fields are processed differently. Cards with different formats, different modes of processing, or a mixture of both, cannot exceed three distinct card types (designated A, B, or C). Detail cards have separate designations only if the *method of processing fields* assigned to them differs.

Figure 2–2 illustrates three original card type format variations. Note that the detail card type remains the same even though the positions of the punched fields shift.

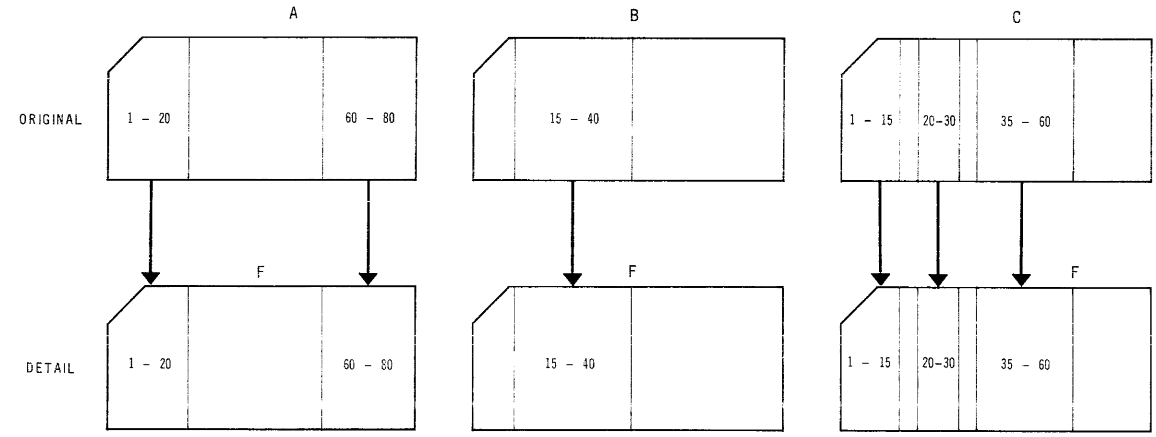


Figure 2–2. Original Card Type Format Variations

Figure 2–3 illustrates three original card types in which the format is constant but the manner of processing the fields varies. In the example shown, punching is inhibited for those fields that contain a control punch.

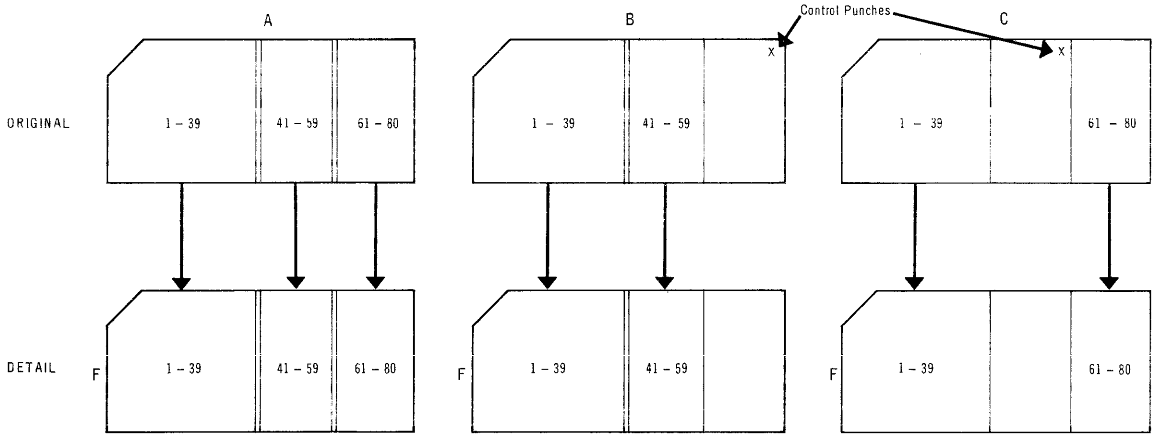
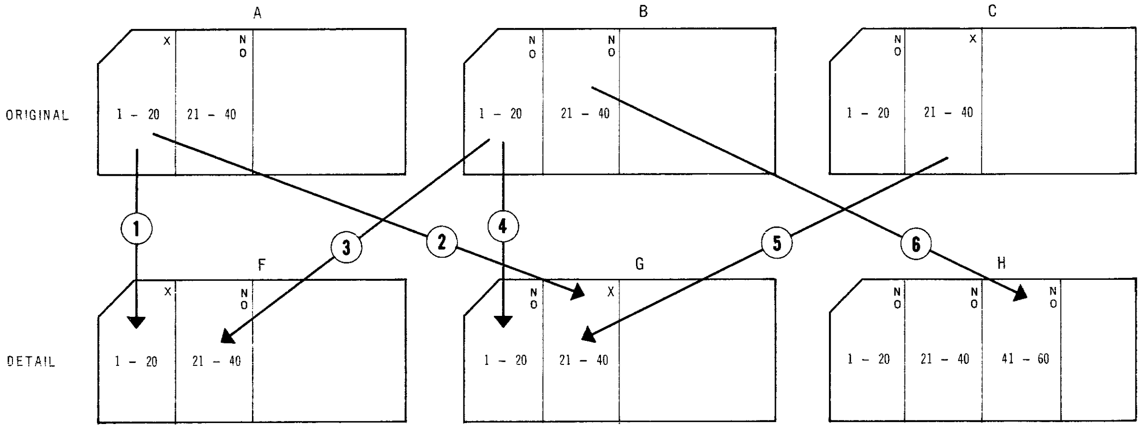


Figure 2–3. Original Card Type Processing Variations

Figure 2–4 is a comprehensive example of three original card types and three detail card types used in a hypothetical application. The various original and detail card types are identified by the program according to the pattern of control punches in each card. For example, a type A original card is unique because it is the only original card with an 11 punch in column 20 and no punch in column 40; a type G detail card is unique because it is the only detail card with no punch in column 20 and an 11 punch in column 40; and so forth. The table in Figure 2–4 shows the punching plan. The program identifies original and detail card types and punches the detail card in accordance with the definitions shown in the table. Punching does not occur if a relationship between an original and a detail card type is not defined by the table.



KEY	ORIG CARD TYPE	COLUMNS PUNCHED	DETAIL CARD TYPE	COLUMNS PUNCHED
1	A	1–20	F	1–20
2	A	1–20	G	21–40
3	B	1–20	F	21–40
4	B	1–20	G	1–20
5	C	21–40	G	21–40
6	B	21–40	H	41–60

Figure 2–4. Maximum Original and Detail Card Type Variations

Master cards with two different card formats (D or E) may be used in a gangpunch operation. They may be interspersed among the detail cards in the primary feed or may be read in the secondary feed; however, all cards of one type must be in the same feed. Whenever a D card is read, its data is stored and can be punched into each F, G, or H detail card that follows. This data continues to be punched until the next D card is read. The data from the new D card then replaces the data from the previous D card and is punched into subsequent F, G, and/or H cards.

Type E cards function in the same manner as D cards. Data punched from the E card is not altered by a D card but only by another E card.

One advantage of having two types of master cards is that the user can perform major-minor gangpunching operations. In this type of operation, several minor master cards are grouped behind each major master card.

Certain gangpunch data changes for each major card group, and other gangpunch data changes for each minor group. D cards may be used as major masters and E cards as minor masters (A-1 in Appendix A).

Data cannot be punched into D or E cards.

Detail cards, as mentioned earlier, may be of three types, F, G, or H. Data can be punched into and read from each type. All detail card types can be read only in the primary feed.

Data read from an F, G, or H card can be punched into the same card or into the next card read in theprimary feed. The data to be punched into these cards can originate from the following:

- master cards;
- original cards;
- a constant specified by the user and stored in the program;
- a card counter maintained by the program;
- an immediately preceding F, G, or H card; and
- the same F, G, or H card.

3. GANGPUNCH- REPRODUCE CONTROL SPECIFICATIONS

3.1. GENERAL

The Gangpunch-Reproduce program is *supplied with control specifications* by means of a form which is completed by the programmer. An object program is then generated to perform the required operations. The following three types of specification cards are used to generate an object program:

- *Field definition* cards define the data card fields and the manner in which they are to be processed.
- A *selector* card enables the program to identify each card type by examining the data cards for control punches that are to be associated with the various types.
- A *control* card specifies the stackers to be used, the fields to be used in matching and/or sequence checking operations, the card counting operations, whether an object program deck is to be punched, and the memory available at generation time.

3.2. FIELD DEFINITION CARDS

Field definition cards are used to define the data fields to be punched in a detail card and the source of this data. The source may be as follows:

- a data field in an original card, a master card, or the same or preceding detail card;
- an alphanumeric constant punched in the field definition card; or
- a card counter maintained by the program.

A separate field definition card must be prepared for each data field on each type of detail card. Refer to Appendix A for the Field Definition portion of the Gangpunch-Reproduce specification sheet. The following is a column-by-column explanation of the field definition specifications.

COLUMN	DEFINITIONS
1 – 2 Card No.	Defines the number of the card in the group of specification cards. This number is not sequence checked. *Note:* Column 1 of the last definition card must contain an asterisk.
3 Source	Defines the source of the information that is to be punched into a data field of a detail card. A, B, C = an original card for a reproduce operation. D, E, = a master card for a gangpunch operation. F, G, H = a detail card from which data is to be read and then punched elsewhere. (The data can be punched into the same or the next card. Column 10 of the definition cards specifies into which card the data is to be punched.) W = an alphanumeric constant found in columns 19 – 72 of this definition card. X = contents of a counter maintained by the program. (See information for counter operations, columns 26 – 46 of the control card.)
4 – 7 Source Field	Location of source field: Columns 4 and 5 indicate the first column of the field to be read. Columns 6 and 7 indicate the last column of the field to be read. *Note:* Columns 4–7 must be blank if the source (column 3) is W or X.

COLUMN	DEFINITIONS
8 Mode C, Z, D	Portion of source field to be processed: defines which portion of each *source data character* within the field is to be read. C = entire character D = digit portion of each character only. Z = zone portion of each character only. If this specification is made, the source field cannot be larger than one column. An example of how the D and Z specifications can be used in conjunction with each other is column-split reproducing (Figure A–3). *Note:* The possible punch combinations that can be read are subject to one restriction. Rows 1 through 7 in a card cannot contain more than one punch per column. Hollerith characters, including special characters, can be read successfully because they do not violate this restriction.
9 Output	Defines the card type into which the data will be punched. F, G, H = card type
10 Same Card	When the source card type and the punch card type (column 3 and column 9) are identical, this column indicates whether the punch field (columns 11 and 12) is to have data punched into it from the source field (determined by columns 4 – 7) of the same card or the previous card. 1 = punching is to take place in the card containing the source field Blank = the data to be punched in this detail card comes from the card which precedes this detail card in the primary feed (refer to Figure A–5).
11 – 12 Last Column for Punch	Defines the last column of the field into which the data is to be punched. 01 – 80 = last column of field to be punched.

COLUMN	DEFINITIONS
13 – 18	Blank
19 – 72 Gangpunch Constant	If column 3 of this definition card is W, the alphanumeric constant in this field is punched in each card of the type specified in column 9 (see Figure A–7). *Note:* Constants must be punched in the field definition cards exactly as the user expects them to be punched in the output cards produced by the object program.

3.3. SELECTOR CARD

The selector card enables the program to identify the type of each data card read. The identification is made by associating the card type with a unique control punch or punches in the data card.

A maximum of eight selectors are available for use in identifying the card types. Each selector is used to check one card column. If the card type is to be identified by control punches in more than one column, two or more selectors may be coupled together. All of the card types specified in a group of two or more selectors which are coupled together must be in the same feed. (See Figure A–1 for an example of a selector group for the primary feed.) The card types in the alternate feed must be specified in a separate selector group. If there is only one card type in the alternate feed, it need not be specified.

The selectors for card types A, B, and C check cards read only in the secondary feed, and the selectors for card types F, G, andH cards read only in the primary feed; therefore, the control punches in primary-feed card types need not be different from those in secondary-feed card types. However, D and E type cards must use distinctly different control punches because master cards can be read in either feed.

The selectors must be used in consecutive and uninterrupted order with selector 1 used first. When all the selectors desired have been specified, the remainder of the selector entries are left blank.

If there is only one primary-feed card type and one secondary-feed card type, no selector card is necessary. The following definitions explain the form entries for selector card specifications.

COLUMN	DEFINITIONS
1 – 2 Card No.	Defines the number of this card in the group of specification cards. This number is not checked by the program.
3 – 5 Card Ident.	These columns must always contain SEL.
6	Blank
7 – 8 Col. No.	Specifies the number of the card column to be checked by selector 1.
9 Char.	The contents of the card column specified in columns 7 and 8 are compared against this character.
10 C,Z,D	Defines the portion of the character in column 9 that is to be compared with the corresponding portion of the character in the data card column specified in columns 7 and 8. C = entire character. D = digit portion of the character only Z = zone portion of the character only

COLUMN **DEFINITIONS**

11 – 14

= ≠ > <

These four columns control the action to be taken in each of the four possible conditions that could result from the comparison.

The comparison is based on the character in the data card being equal to, unequal to, greater than, or less than the character in column 9 of the selector card. If a Z is punched in column 10, only equal and unequal comparisons can be specified.

Column 11 = equal to

Column 12 = unequal to

Column 13 = greater than

Column 14 = less than

The following entries can be made in each of these columns:

1. A card type indication (A through H). This indicates that the condition which has occurred has identified the data card to be of this type.

2. If it is desired to check more than one data card column, the number of the next selector to be used is specified. Branching to subsequent selectors must always be forward. For example, values 2 through 8 can be entered for selector 1, 3 through 8 for selector 2, and so forth (refer to Figure A–1).

Only the equal and unequal comparisons are necessary when checking a data card column for one specific control punch. When a card type can be any card within a range of characters, the greater than and less than comparisons are used.

For example, suppose card type A is any data card with either a 5, 6, 7, or 8 in column 80. Selector 1 will specify that if the character in column 80 is greater than 4, go to selector 2 for the next test. Selector 2 will specify that if column 80 is less than 9, the data card is type A.

Note: Column nine must contain exactly the punch combination expected for card type identification purposes.

15 – 22

Selector No. 2

The descriptions for these eight columns and for the groups of eight columns for the remaining six selectors are the same as for columns 7–14 (selector 1).

COLUMN	DEFINITIONS
23 – 30	Selector 3
31 – 38	Selector 4
39 – 46	Selector 5
47 – 54	Selector 6
55 – 62	Selector 7
63 – 70	Selector 8
71 – 80	Unused

3.4. CONTROL CARD

The purpose of the control card is to provide the user with several operations that are not available in a reproducing punch unit and to supply the program with information pertinent to the generation of an object program. The special operations are as follows:

- selection of stackers and feeds;
- designation of control fields to be used in matching and/or sequence checking operations; and
- maintenance of a card counter for counter-controlled gangpunching and/or consecutive-number gangpunching.

The information necessary for object program generation is whether an object program deck is to be punched and the amount of memory available at generation time.

If none of the special functions are desired, the control card can be omitted. The program then assumes that the core storage size is 8192 bytes and that an object program deck is not desired. The following definitions explain the control card fields.

COLUMN	DEFINITIONS
1 – 2 Card No.	Defines the number of this card in the group of specification cards. This number is not checked by the program. If there are no field definition or selector cards, column 1 of the control card must contain an asterisk.
3 – 5 Card Ident.	These columns must always contain CTL.

COLUMN	DEFINITIONS
6 – 13 Stacker Selection for Card Types	These columns designate the stacker into which card types A–H, respectively, are to be selected for the read or punch unit. For the online serial punch 1 = normal stacker 2 = error stacker For the Card Controller 1 = P1 (normal stacker) 2 = P2 3 = P3 4 = PC blank = normal stacker
14 Stacker Selection for Unmatched Primary cards	Primary cards lacking a matching secondary card can be directed to one of two stackers. This column specifies the stacker into which the unmatched cards are to be directed. When left blank or punched 1, unmatched primary cards are directed to stacker number 1; a 2 punch directs the cards to stacker number 2.
15 Stacker Selection for Unmatched Secondary Cards	When matching primary cards against secondary cards by control field, this column indicates the stacker into which unmatched secondary cards are to be stacked. 1, 2, 3, 4 = stacker numbers for the Card Controller 1 = P1 (normal stacker) 2 = P2 3 = P3 4 = PC blank = normal stacker

COLUMN **DEFINITIONS**

16 – 25

Control Field

The purpose of these columns is to direct the sequence check of a file and/or to direct the comparison of data in a specified control field of the cards of one file with the data in a specified control field of cards of another file.

Three operations can be performed when matching:

1. Gangpunching with one type of master card in the secondary feed and detail cards in the primary feed (see Figure A–9).
2. Reproducing with only original cards in the secondary feed and one type of detail card in the primary feed (see Figure A–11).
3. Matching two decks on a one-to-one basis, one deck being in the primary feed, the other in the secondary.

Column 16 is used to specify ascending or descending sequence. One of two codes may be used:

1 = file in ascending sequence

2 = file in descending sequence

If the user desires to specify matching by putting entries in columns 17-20 and 21-24, but he does not want the files he is matching to be sequence checked, he should leave column 16 blank.

Columns 17-20 are used to indicate the first and last columns of the primary card control field.

Columns 21-24 indicate the first and last columns of the secondary card control field.

Note: When a sequence and a control field are specified, the cards in the associated feed are checked for sequence. In addition, if control fields are specified for both feeds, the object program performs data transfers only when there is a match of control fields between feeds.

Column 25 specifies which portion of the characters in the control field(s) is to be compared and/or checked.

C = entire character.

D = only the digit portion of the character.

Note: The object program reads data cards in the compressed mode, manipulates the data in this mode, and ultimately punches it out in this mode. If a control field is specified for a feed, then the control data from that field is translated for sequence checking and matching purposes. (If 'D' is specified in column 25, the data in the control field is moved to a working storage and bits 6 and 7 of the compressed characters are erased before the translation takes place.) A standard translation table will be provided by Univac for this purpose. Any special tables must be supplied by the user.

26 – 46

Counter Operations

The program maintains a four-digit counter for:

1. Count-controlled gangpunching (Figures A–13 and A–15)
2. Consecutive-number gangpunching (Figure A–17)
3. Counting cards.

Columns 26 – 29 specify the card types (A–H) that are to be counted. As many as four types can be specified.

Column 30 indicates the circumstances under which a new master card is read and/or the counter is reset.

D or E = If the master cards are in the secondary feed and the detail cards are in the primary, a new master card is read and the counter is reset when the counter ending number is reached. (See explanation of columns 31–34 and columns 35–38 and Figures A–13 and A–15.) If master cards are interspersed among F, G, and/or H cards, the counter is reset when a new master card of the type specified is read or the counter ending number is reached, whichever occurs first.

Note: The counter can be reset to a number specified in each master card or to the number punched in columns 31–34 of the control card. (See explanation of columns 31–34 and 39–42.) The counter ending number can also come from the master card or can come from columns 35–38 of the control card. (See explanation of columns 35–38 and 43–46.)

If column 30 is left blank, the counter is reset when the counter ending number is reached.

Columns 31–34 specify the number to which the counter is to be set when either the counter ending number has been reached or a new master card is read. To furnish the starting number from the master card these columns are to be blank.

0001–9999 = the starting number for the counter. (If a new master card is read before the counter ending number is reached, the counter will be automatically reset to this number.)

blank = the starting number will be taken from each new master card read if columns 39–42 of the control card have an entry. The starting number will be 0001 if columns 39–42 of the control card are blank.

Columns 35–38 specify the number to which the counter is incremented before it is reset. The ending number may come from the master card if these columns are blank.

0001–9999 = number to which the counter is to be incremented (see Figure A–15).

blank = the ending number will come from each new master card read if columns 43–46 of the control card have an entry. (See Figure A–17). If columns 43–46 of the control card are blank, the ending number will be 9999.

Columns 39–42 designate the first and last columns of the master card field containing the number to which the counter is reset each time a master card of the type specified in column 30 is read. The master card field can be from one through seven columns in length. If the counter is to be reset to the number in columns 31–34, columns 39–42 are left blank.

Columns 43–46 designate the first and last columns of the master card field containing the number to which the counter is incremented before it is reset. The master card field can be from one to seven columns in length. If the counter is to be incremented to the number in columns 35–38, columns 43–46 are left blank.

Note: If the counter starting and ending numbers are to be read from master cards, the data translation table is used to translate these numbers. The numbers are then packed, since the object program keeps the counter in decimal. If the counter is to be punched in a card, it is first unpacked and translated by means of a counter translation table, which is supplied by the user.

COLUMN	DEFINITIONS
47 Punch Obj. Prog.	1 = punch the generated object program into cards. blank = do not punch the generated object program into cards. If no control card is used, the blank designation is assumed. Whether or not the object program is punched into cards, when the Gangpunch-Reproduce generator program completes its operation, it stops in a display. At this point the object program is stored in memory ready for execution. If the start button is depressed, execution of the object program begins.
48	Blank
49 Primary I/O Unit	1 = read-punch unit 2 = punch unit If this column is blank or if the control card is not used, a 1 is assumed.
50 Secondary I/O Unit	1 = read unit 2 = 1001 unit If this column is blank or if the control card is not used, a 1 is assumed. *Note:* If the Card Controller is specified, the secondary deck must be placed in the primary feed of the Card Controller.
51 – 52 Storage Size	08, 16, 24 or 32 = storage size (in thousands of bytes) of the machine on which the object program will be run. If these columns are blank or if the control card is not used, 08 is assumed.

3.5. SUBMISSION OF SPECIFICATION CARDS TO THE GENERATOR

Specification cards are submitted to the Gangpunch-Reproduce generator program in the following order:

1. The control card, if one is to be used.

2. The selector card, if one is to be used.

3. The field definition cards, in the order in which the user wants to have the object program perform the described operations.

APPENDIX A. EXAMPLES OF GANGPUNCH-REPRODUCE PROGRAM OPERATIONS

1. GENERAL

The following examples illustrate in detail the operations described in Sections 2 and 3 of this manual. In the following examples, the primary unit is assumed to be the read-punch unit, the secondary unit the online serial card reader.

2. MAJOR-MINOR GANGPUNCHING

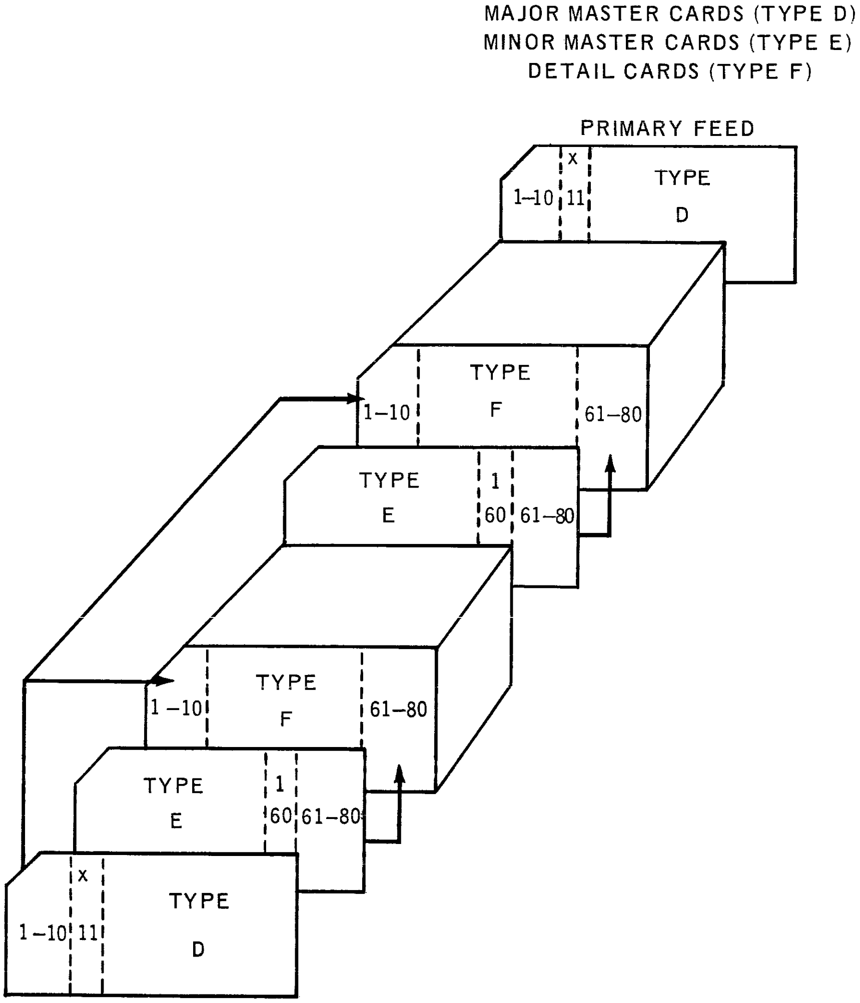
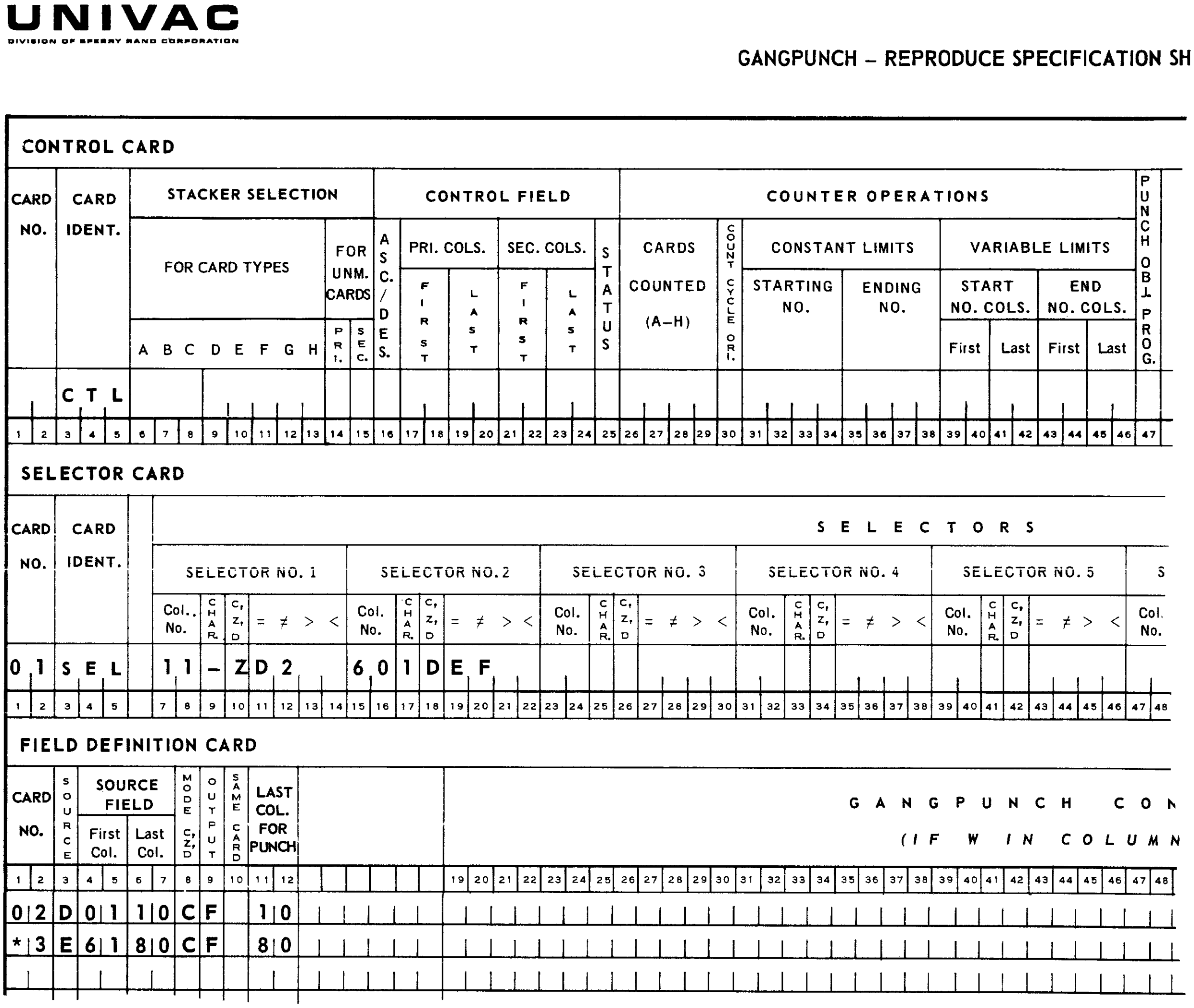


Figure A-1. Major-Minor Gangpunching, Data Flow

Columns 1–10 from a major master card (type D) will be gangpunched into columns 1–10 of all detail cards (type F). The punching of columns 1–10 can be altered only by the reading of another major master card. Columns 61–80 from the minor master cards will be punched into columns 61–80 of the detail cards. The information will change for each new minor master card read.

Major master cards contain an 11 punch in column 11 (type D); minor master cards are those with a 1 punch in column 60 (type E). Cards with neither an 11 punch in column 11 nor a 1 punch in column 60 are detail cards (type F).

Note the use of multiple selectors in the selector card. Selector 1 tests column 11 for an 11 punch. If an 11 punch is detected, an equal condition results, and the card is identified as type D. If there is no 11 punch, an unequal condition results, and selector 2 is directed to make the next test. Selector 2 tests column 60 for a 1 punch. If a 1 punch is detected, an equal condition results, and the card is identified as type E. Otherwise, an unequal condition results, and the card is assumed to be type F.



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GANGPUNCH – REPRODUCE SPECIFICATION SH

CONTROL CARD

CARD NO.	CARD IDENT.	STACKER SELECTION FOR CARD TYPES A B C D E F G H	FOR UNM. CARDS PRI.	FOR UNM. CARDS SEC.	ASC./DES.	CONTROL FIELD PRI. COLS. FIRST	PRI. COLS. LAST	SEC. COLS. FIRST	SEC. COLS. LAST	STATUS	COUNTER OPERATIONS CARDS COUNTED (A–H)	COUNT CYCLE OR I.	CONSTANT LIMITS STARTING NO.	CONSTANT LIMITS ENDING NO.	VARIABLE LIMITS START NO. COLS. First	START NO. COLS. Last	END NO. COLS. First	END NO. COLS. Last	PUNCH OBJ. PROG.
	C T L																		
1 2	3 4 5	6 7 8 9 10 11 12 13	14	15	16	17 18	19 20	21 22	23 24	25	26 27 28 29	30	31 32 33 34	35 36 37 38	39 40	41 42	43 44	45 46	47

SELECTOR CARD

CARD NO.	CARD IDENT.		SELECTORS SELECTOR NO. 1 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 2 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 3 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 4 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 5 Col. No.	CHAR.	C, Z, D	= ≠ > <	S Col. No.
0 1	S E L		1 1	–	Z	D 2	6 0	1	D	E F													
1 2	3 4 5		7 8	9	10	11 12 13 14	15 16	17	18	19 20 21 22	23 24	25	26	27 28 29 30	31 32	33	34	35 36 37 38	39 40	41	42	43 44 45 46	47 48

FIELD DEFINITION CARD

CARD NO.	SOURCE	SOURCE FIELD First Col.	SOURCE FIELD Last Col.	MODE C, Z, D	OUTPUT	SAME CARD	LAST COL. FOR PUNCH		GANGPUNCH CON (IF W IN COLUMN
1 2	3	4 5	6 7	8	9	10	11 12		19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
0 2	D	0 1	1 0	C	F		1 0		
* 3	E	6 1	8 0	C	F		8 0		

Figure A–2. Major-Minor Gangpunching, Coding Example

3. COLUMN-SPLIT REPRODUCING

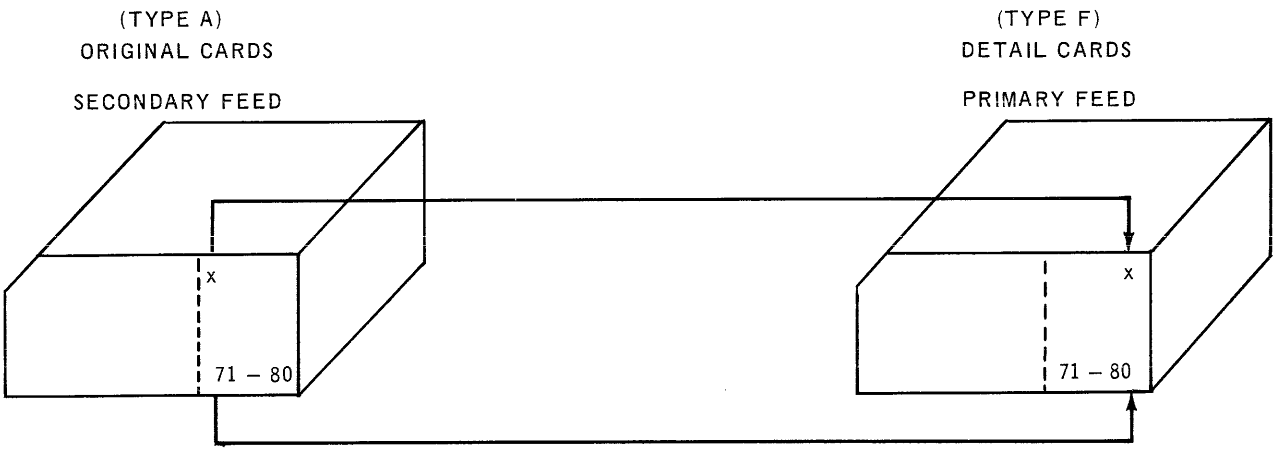
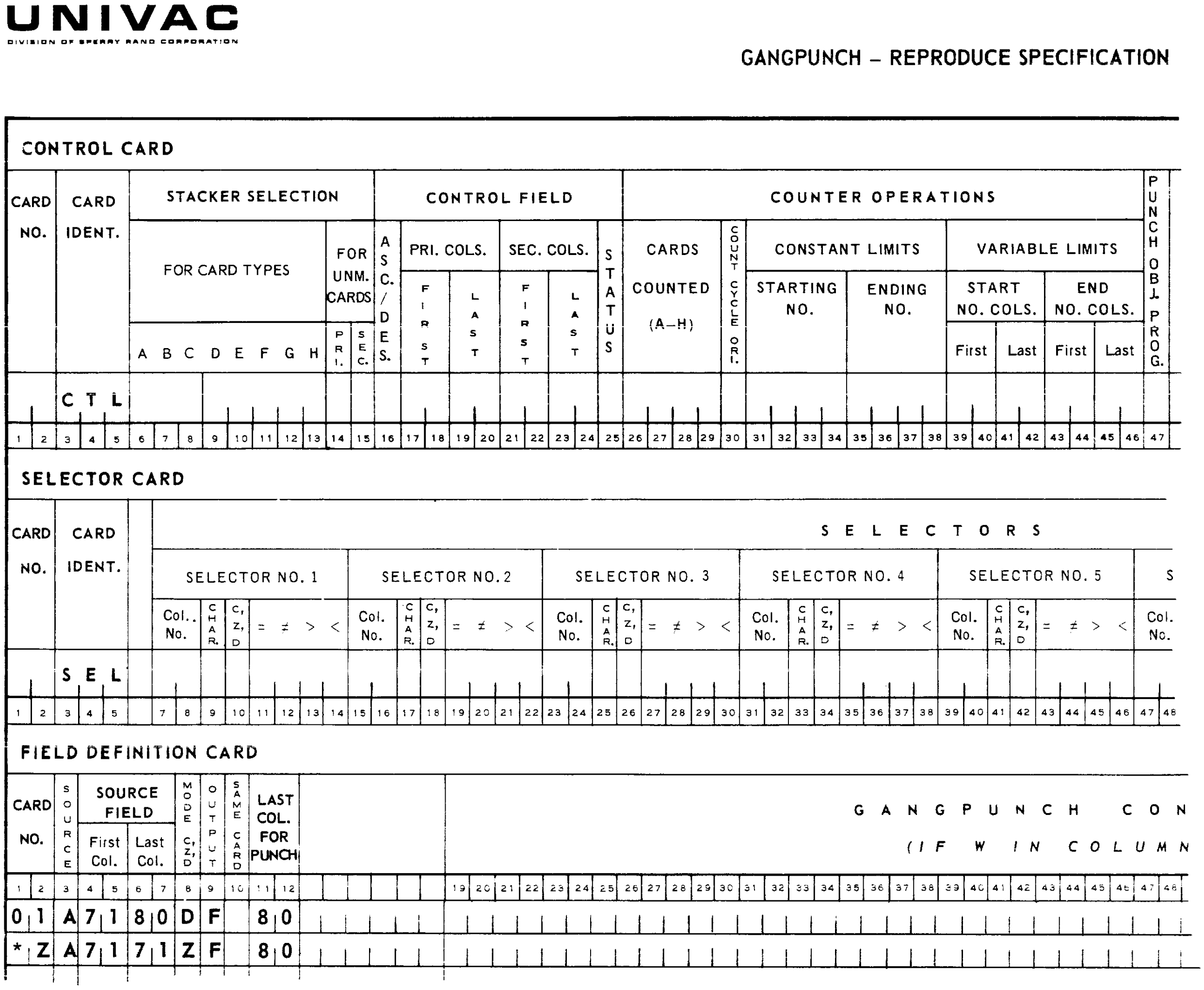


Figure A–3. Column-Split Reproducing, Data Flow

The 0–9 rows of columns 71–80 of an original card are to be reproduced into columns 71–80 of a detail card. The zone portion of column 71 of the original card is to be reproduced into column 80 of the detail card.



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GANGPUNCH – REPRODUCE SPECIFICATION

CONTROL CARD

CARD NO.	CARD IDENT.	STACKER SELECTION			CONTROL FIELD						COUNTER OPERATIONS									PUNCH OBJ. PROG.
		FOR CARD TYPES	FOR UNM. CARDS		ASC./DES.	PRI. COLS.		SEC. COLS.		STATUS	CARDS COUNTED (A–H)	COUNT CYCLE ORI.	CONSTANT LIMITS		VARIABLE LIMITS					
		A B C D E F G H	PRI.	SEC.		FIRST	LAST	FIRST	LAST				STARTING NO.	ENDING NO.	START NO. COLS. First	Last	END NO. COLS. First	Last		
	CTL																			
1 2	3 4 5	6 7 8 9 10 11 12 13	14	15	16	17 18	19 20	21 22	23 24	25	26 27 28 29	30	31 32 33 34	35 36 37 38	39 40	41 42	43 44	45 46		47

SELECTOR CARD

CARD NO.	CARD IDENT.		SELECTORS																			
			SELECTOR NO. 1				SELECTOR NO. 2				SELECTOR NO. 3				SELECTOR NO. 4				SELECTOR NO. 5				S
			Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.
	SEL																						
1 2	3 4 5		7 8	9	10	11 12 13 14	15 16	17	18	19 20 21 22	23 24	25	26	27 28 29 30	31 32	33	34	35 36 37 38	39 40	41	42	43 44 45 46	47 48

FIELD DEFINITION CARD

CARD NO.	SOURCE	SOURCE FIELD		MODE C, Z, D	OUTPUT	SAME CARD	LAST COL. FOR PUNCH		GANGPUNCH CON (IF W IN COLUMN
		First Col.	Last Col.						
1 2	3	4 5	6 7	8	9	10	11 12		19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
01	A	71	80	D	F		80		
*Z	A	71	71	Z	F		80		

Figure A–4. Column-Split Reproducing, Coding Example

4. REPRODUCING INTO SUCCESSIVE DETAIL CARDS

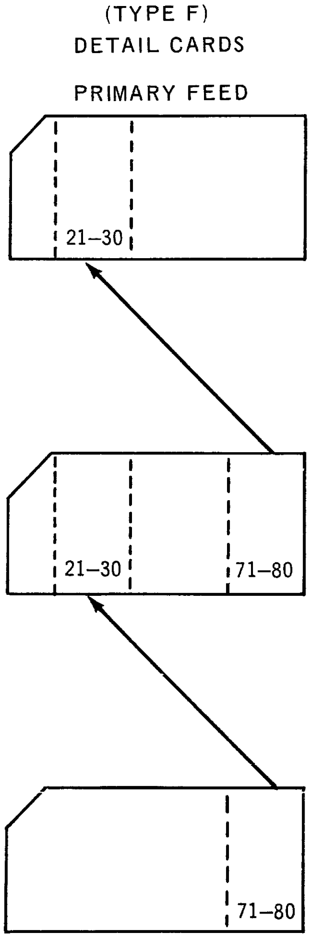
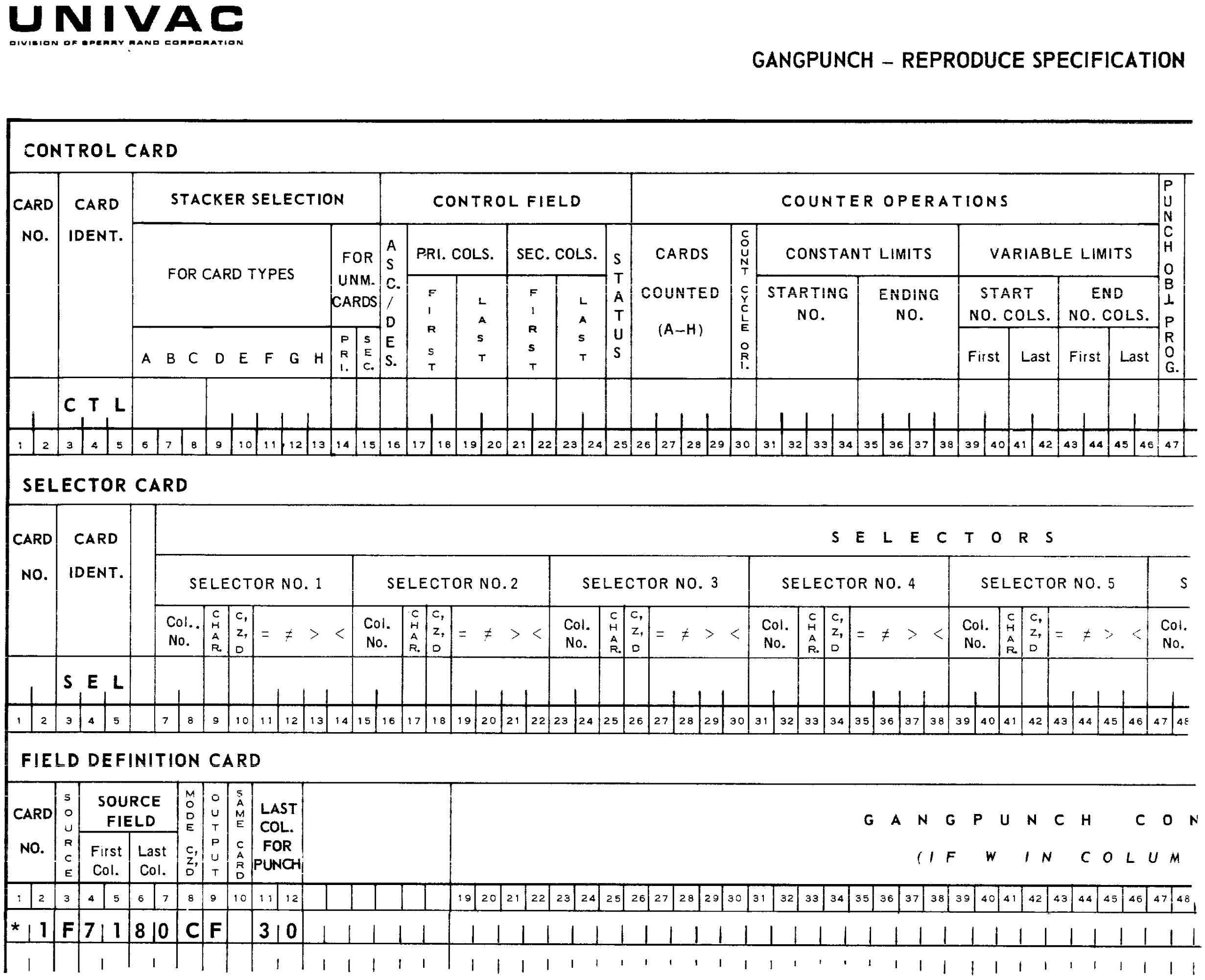


Figure A–5. Detail Card Reproducing, Data Flow

Columns 71–80 of each detail card (type F) are to be punched into columns 21–30 of each following detail card.



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CONTROL CARD

CARD NO.	CARD IDENT.	STACKER SELECTION			ASC./DES.	CONTROL FIELD				STATUS	COUNTER OPERATIONS								PUNCH OBJ. PROG.
		FOR CARD TYPES	FOR UNM. CARDS			PRI. COLS.		SEC. COLS.			CARDS COUNTED (A–H)	COUNT CYCLE OR I.	CONSTANT LIMITS		VARIABLE LIMITS				
													STARTING NO.	ENDING NO.	START NO. COLS.		END NO. COLS.		
		A B C D E F G H	PRI.	SEC.		FIRST	LAST	FIRST	LAST						First	Last	First	Last	
	C T L																		
1 2	3 4 5	6 7 8 9 10 11 12 13	14	15	16	17 18	19 20	21 22	23 24	25	26 27 28 29	30	31 32 33 34	35 36 37 38	39 40	41 42	43 44	45 46	47

SELECTOR CARD

CARD NO.	CARD IDENT.		SELECTORS																			
			SELECTOR NO. 1				SELECTOR NO. 2				SELECTOR NO. 3				SELECTOR NO. 4				SELECTOR NO. 5				S
			Col.. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.
	S E L																						
1 2	3 4 5		7 8	9	10	11 12 13 14	15 16	17	18	19 20 21 22	23 24	25	26	27 28 29 30	31 32	33	34	35 36 37 38	39 40	41	42	43 44 45 46	47 48

FIELD DEFINITION CARD

CARD NO.	SOURCE	SOURCE FIELD		MODE C, Z, D	OUTPUT	SAME CARD	LAST COL. FOR PUNCH		GANGPUNCH CON (IF W IN COLUM
		First Col.	Last Col.						
1 2	3	4 5	6 7	8	9	10	11 12		19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
* 1	F	7 1	8 0	C	F		3 0		

Figure A–6. Detail Card Reproducing, Coding Example

5. PUNCHING A CONSTANT

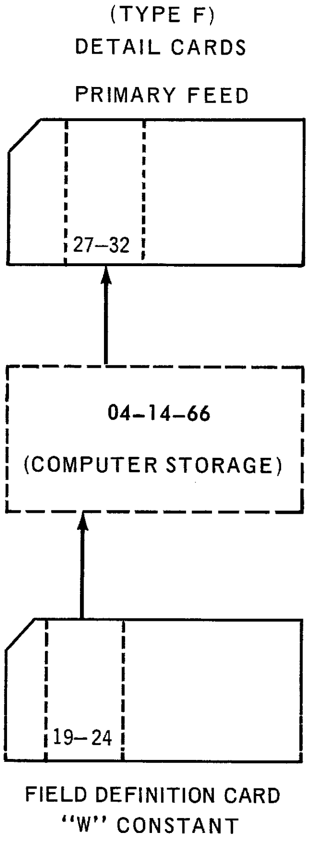
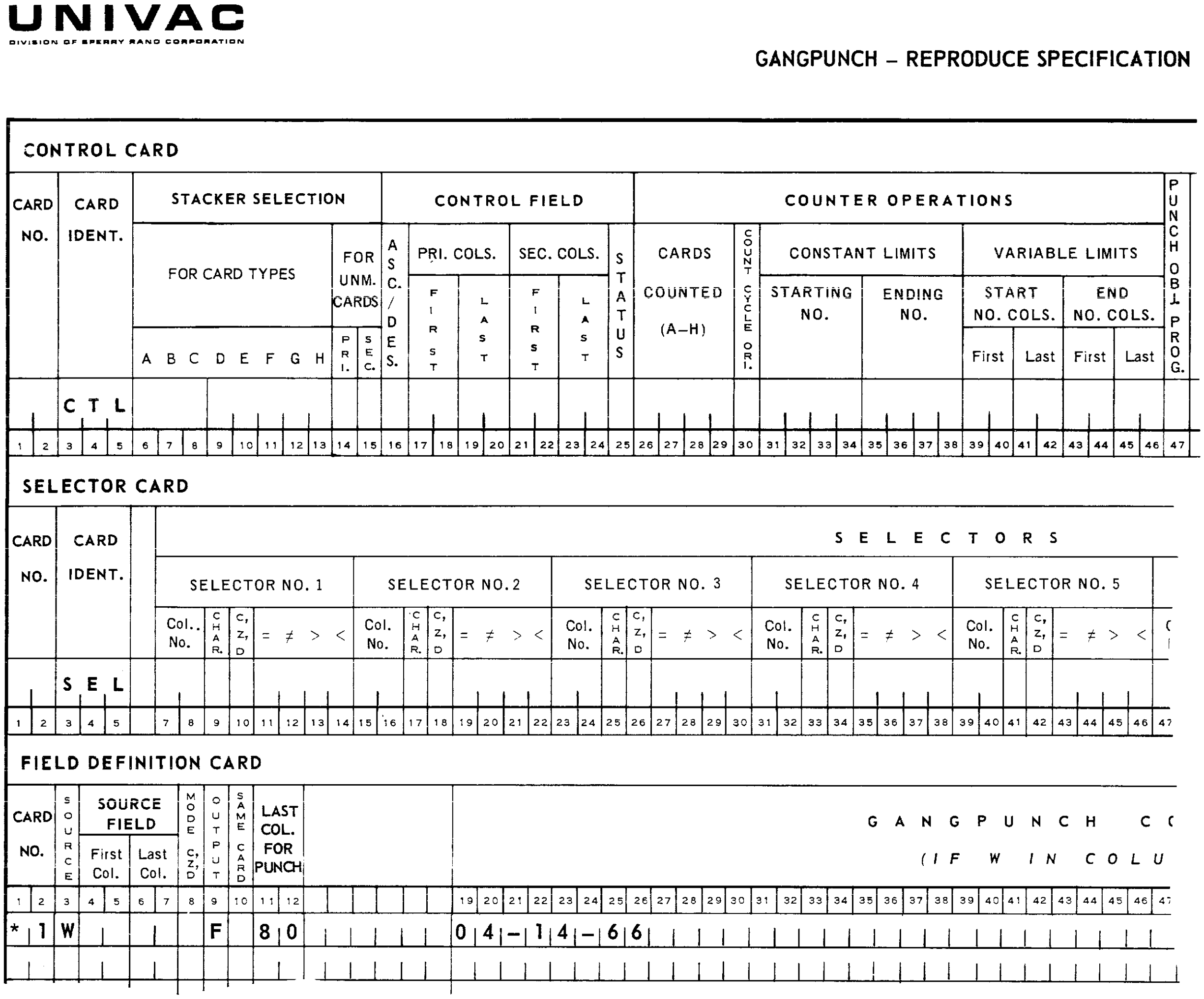


Figure A–7. Punching Constants, Data Flow

The constant specified in columns 19–26 of a field definition card are to be punched into columns 27–34 of all type F detail cards.



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CONTROL CARD

CARD NO.	CARD IDENT.	STACKER SELECTION										ASC./DES.	CONTROL FIELD				STATUS	COUNTER OPERATIONS							PUNCH OBJ. PROG.
		FOR CARD TYPES								FOR UNM. CARDS			PRI. COLS.		SEC. COLS.			CARDS COUNTED (A–H)	COUNT CYCLE ORI.	CONSTANT LIMITS		VARIABLE LIMITS			
																				STARTING NO.	ENDING NO.	START NO. COLS.		END NO. COLS.		
		A	B	C	D	E	F	G	H	PRI.	SEC.		FIRST	LAST	FIRST	LAST						First	Last	First	Last	
	CTL																									
1-2	3-5	6	7	8	9	10	11	12	13	14	15	16	17-18	19-20	21-22	23-24	25	26-29	30	31-34	35-38	39-40	41-42	43-44	45-46	47

SELECTOR CARD

CARD NO.	CARD IDENT.		SELECTORS																			
			SELECTOR NO. 1				SELECTOR NO. 2				SELECTOR NO. 3				SELECTOR NO. 4				SELECTOR NO. 5				
			Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	C
	SEL																						
1-2	3-5		7-8	9	10	11-14	15-16	17	18	19-22	23-24	25	26	27-30	31-32	33	34	35-38	39-40	41	42	43-46	47

FIELD DEFINITION CARD

CARD NO.	SOURCE	SOURCE FIELD		MODE C, Z, D	OUTPUT	SAME CARD	LAST COL. FOR PUNCH		GANGPUNCH C (IF W IN COLU
		First Col.	Last Col.						
1-2	3	4-5	6-7	8	9	10	11-12		19-47
* 1	W				F		80		04-14-66

Figure A–8. Punching Constants, Coding Example

6. SELECTIVE GANGPUNCHING BY CONTROL FIELD

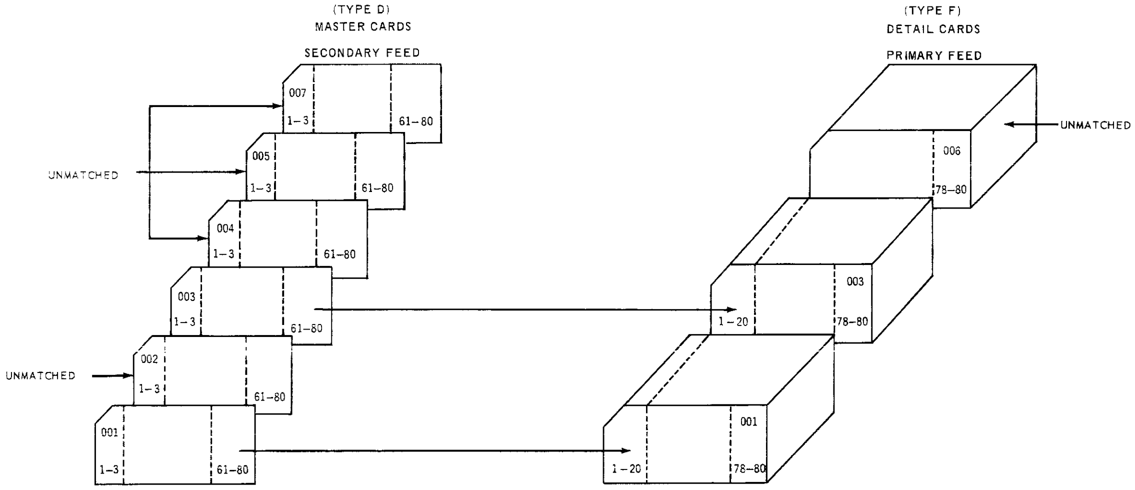
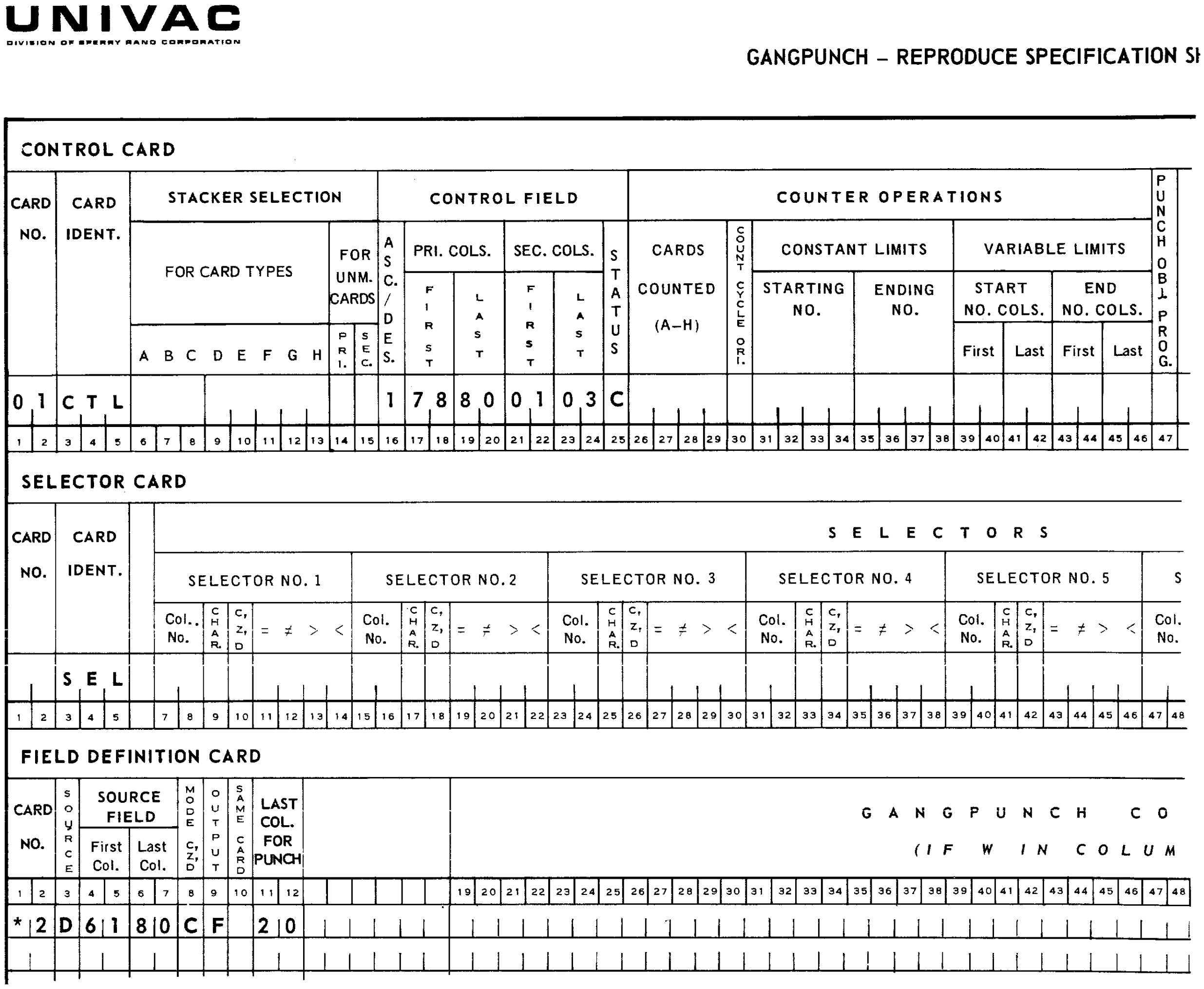


Figure A–9. Selective Gangpunching by Control Field, Data Flow

Columns 61–80 of a master card (type D) are to be gangpunched into columns 1–20 of a detail card (type F) when both master and detail cards have identical data in their respective control fields. The master card control field is columns 1–3; the detail card control field is columns 78–80.



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CONTROL CARD

CARD NO.	CARD IDENT.	STACKER SELECTION FOR CARD TYPES A B C D E F G H	FOR UNM. CARDS PRI.	FOR UNM. CARDS SEC.	ASC./DES.	CONTROL FIELD PRI. COLS. FIRST	PRI. COLS. LAST	SEC. COLS. FIRST	SEC. COLS. LAST	STATUS	COUNTER OPERATIONS CARDS COUNTED (A–H)	COUNT CYCLE ORI.	CONSTANT LIMITS STARTING NO.	CONSTANT LIMITS ENDING NO.	VARIABLE LIMITS START NO. COLS. First	START NO. COLS. Last	END NO. COLS. First	END NO. COLS. Last	PUNCH OBJ. PROG.
0 1	C T L				1	7 8	8 0	0 1	0 3	C									
1 2	3 4 5	6 7 8 9 10 11 12 13	14	15	16	17 18	19 20	21 22	23 24	25	26 27 28 29	30	31 32 33 34	35 36 37 38	39 40	41 42	43 44	45 46	47

SELECTOR CARD

CARD NO.	CARD IDENT.		SELECTORS SELECTOR NO. 1 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 2 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 3 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 4 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 5 Col. No.	CHAR.	C, Z, D	= ≠ > <	S Col. No.
	S E L																						
1 2	3 4 5		7 8 9	10	11	12 13 14	15 16 17	18	19	20 21 22	23 24 25	26	27	28 29 30	31 32 33	34	35	36 37 38	39 40 41	42	43	44 45 46	47 48

FIELD DEFINITION CARD

CARD NO.	SOURCE	SOURCE FIELD First Col.	SOURCE FIELD Last Col.	MODE C, Z, D	OUTPUT	SAME CARD	LAST COL. FOR PUNCH		GANGPUNCH CO (IF W IN COLUM
1 2	3	4 5	6 7	8	9	10	11 12		19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
* 2	D	6 1	8 0	C	F		2 0		

Figure A–10. Selective Gangpunching by Control Field, Coding Example

7. SELECTIVE REPRODUCING BY CONTROL FIELD

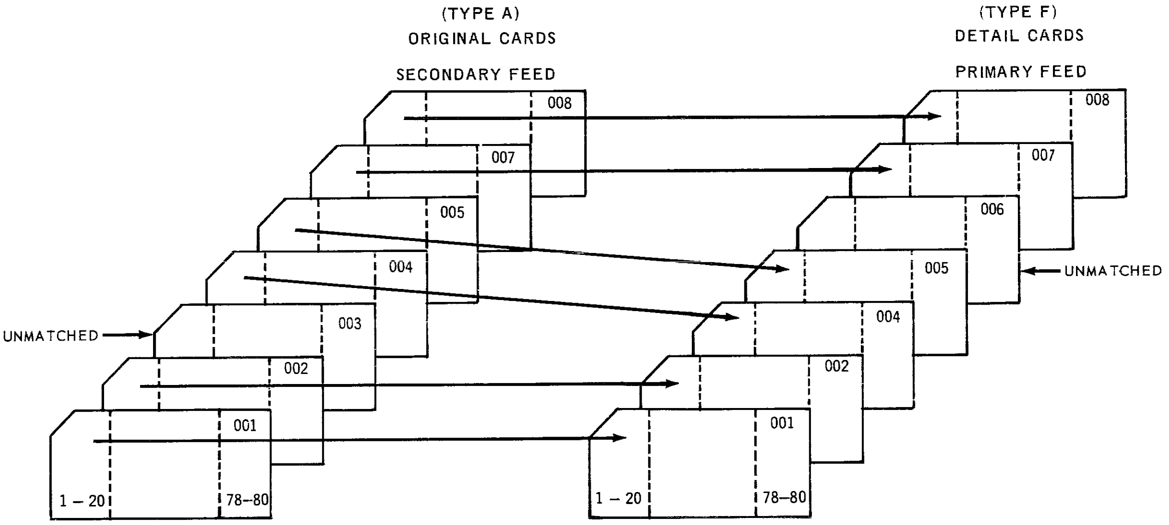
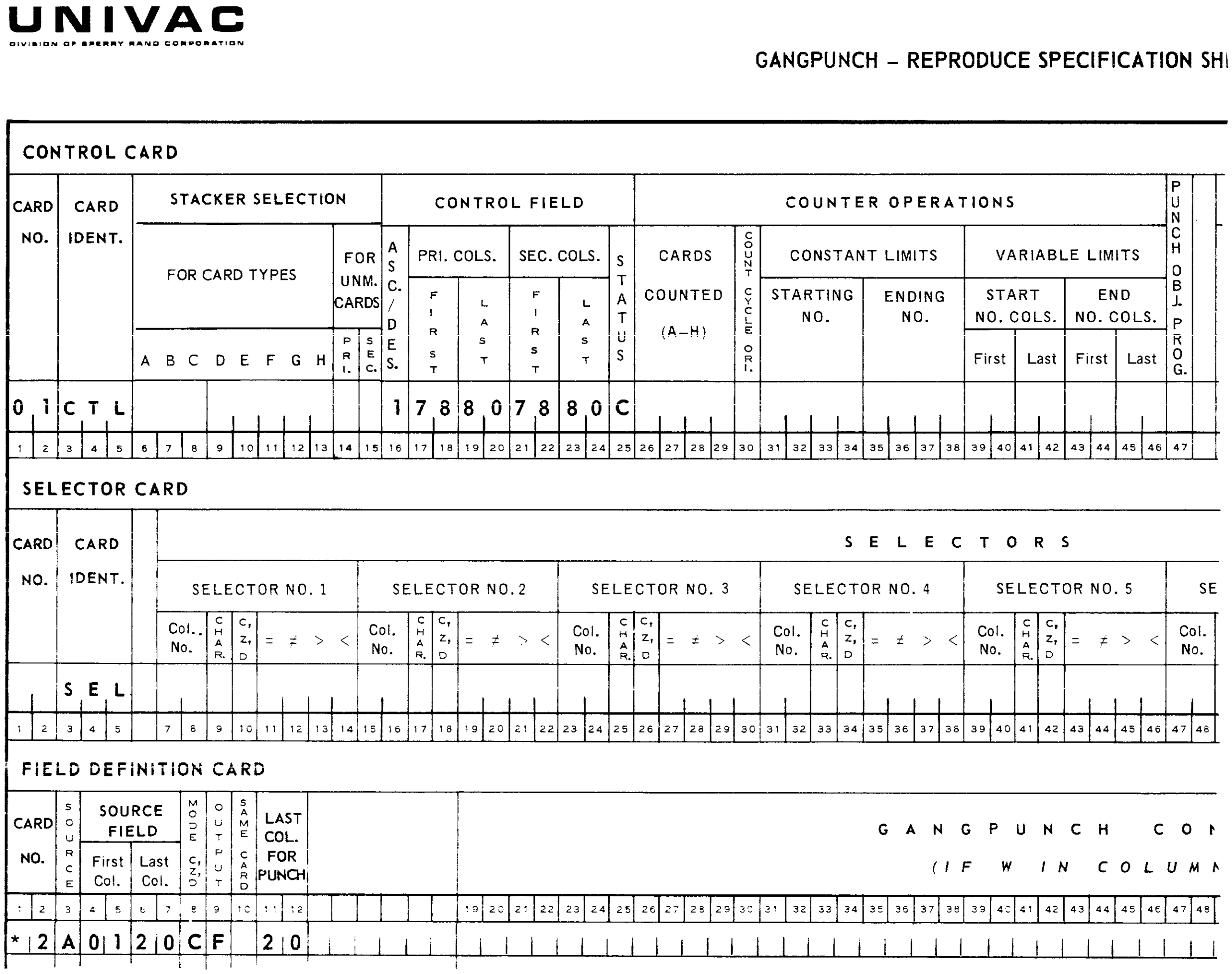


Figure A–11. Selective Reproducing by Control Field, Data Flow

Columns 1–20 of an original card (type A) are to be reproduced into columns 1–20 of a detail card (type F) when both cards have identical data in their respective control fields. The control field in each file is in columns 78–80.



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CONTROL CARD

CARD NO.	CARD IDENT.	STACKER SELECTION FOR CARD TYPES A B C D E F G H	STACKER SELECTION FOR UNM. CARDS PRI.	SEC.	CONTROL FIELD ASC./DES.	PRI. COLS. FIRST	PRI. COLS. LAST	SEC. COLS. FIRST	SEC. COLS. LAST	STATUS	COUNTER OPERATIONS CARDS COUNTED (A–H)	COUNT CYCLE ORI.	CONSTANT LIMITS STARTING NO.	CONSTANT LIMITS ENDING NO.	VARIABLE LIMITS START NO. COLS. First	Last	END NO. COLS. First	Last	PUNCH OBJ. PROG.
0 1	C T L				1	7 8	8 0	7 8	8 0	C									
1 2	3 4 5	6 7 8 9 10 11 12 13	14	15	16	17 18	19 20	21 22	23 24	25	26 27 28 29	30	31 32 33 34	35 36 37 38	39 40	41 42	43 44	45 46	47

SELECTOR CARD

CARD NO.	CARD IDENT.		SELECTOR NO. 1 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 2 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 3 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 4 Col. No.	CHAR.	C, Z, D	= ≠ > <	SELECTOR NO. 5 Col. No.	CHAR.	C, Z, D	= ≠ > <	SE Col. No.
	S E L																						
1 2	3 4 5		7 8	9	10	11 12 13 14	15 16	17	18	19 20 21 22	23 24	25	26	27 28 29 30	31 32	33	34	35 36 37 38	39 40	41	42	43 44 45 46	47 48

FIELD DEFINITION CARD

CARD NO.	SOURCE	SOURCE FIELD First Col.	SOURCE FIELD Last Col.	MODE C, Z, D	OUTPUT	SAME CARD	LAST COL. FOR PUNCH		GANGPUNCH CO (IF W IN COLUM
1 2	3	4 5	6 7	8	9	10	11 12		19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
* 2	A	0 1	2 0	C	F		2 0		

Figure A–12. Selective Reproducing by Control Field, Coding Example

8. COUNTER-CONTROLLED GANGPUNCHING, CONSTANT LIMIT

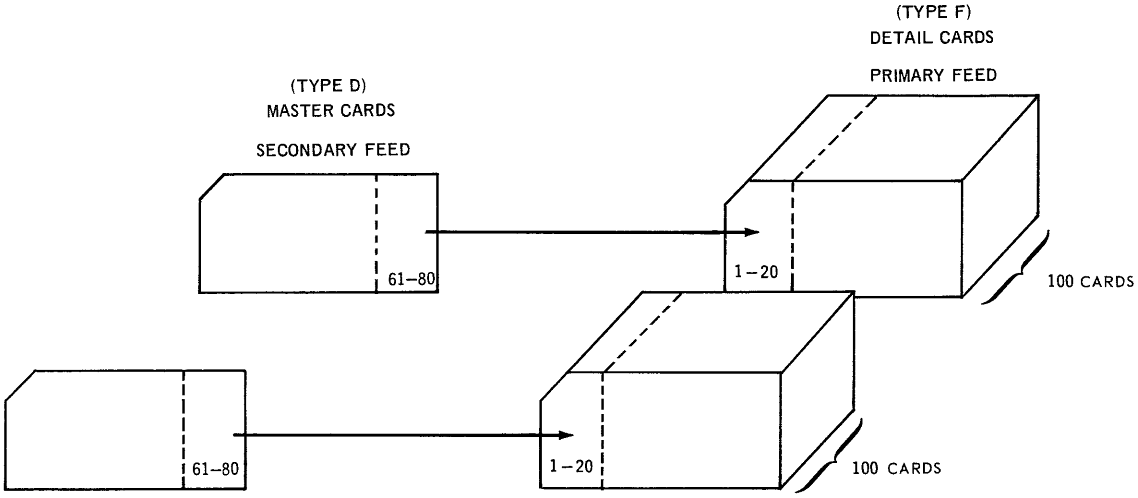
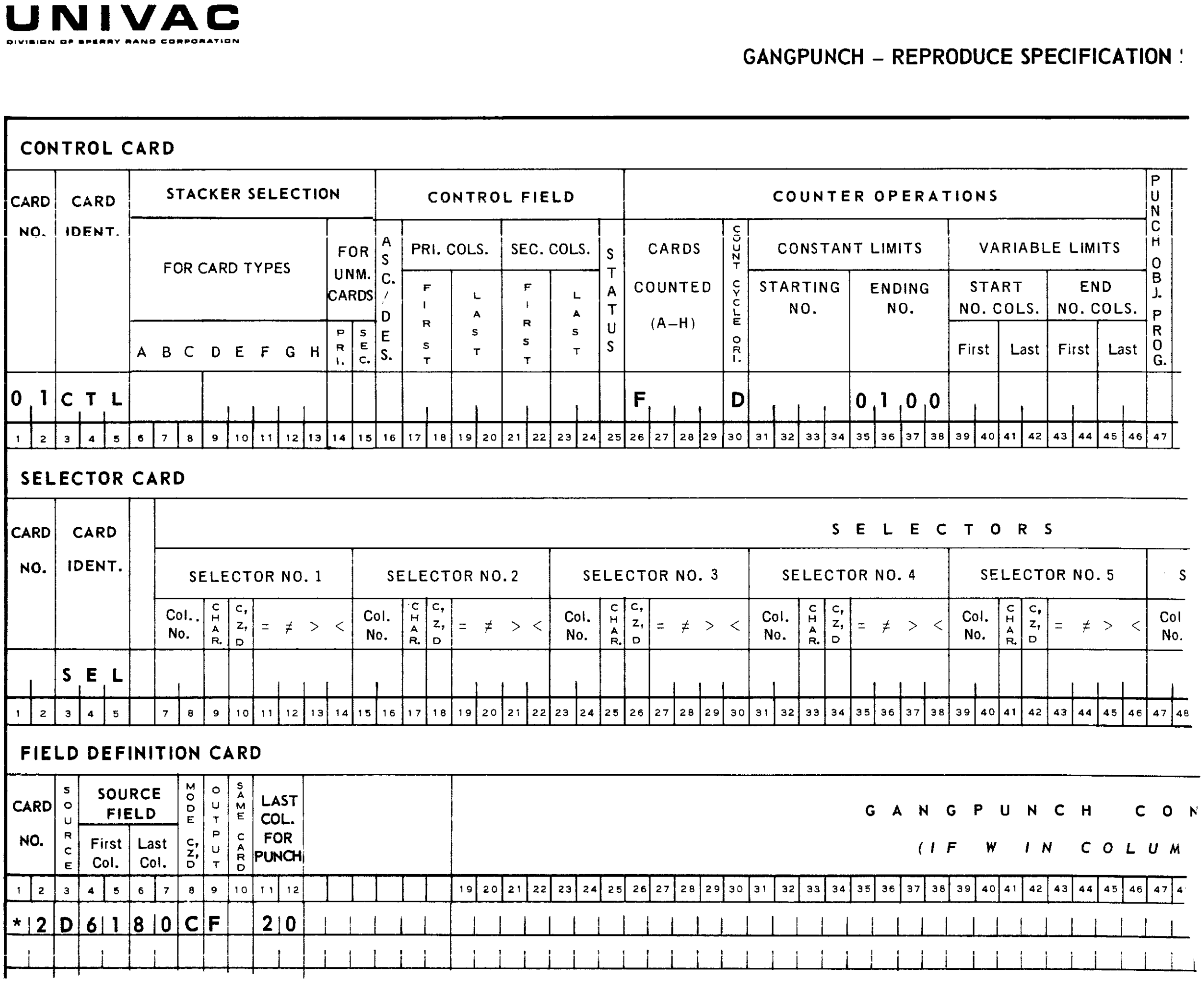


Figure A–13. Counter-Controlled Gangpunching Constant Limit, Data Flow

A constant number of detail cards (type F) are to be gangpunched for each master card (type D). Columns 61–80 of each master card are to be gangpunched into 100 detail cards.



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CONTROL CARD

CARD NO.	CARD IDENT.	STACKER SELECTION											CONTROL FIELD						COUNTER OPERATIONS								PUNCH OBJ. PROG.
		FOR CARD TYPES								FOR UNM. CARDS		ASC./DES.	PRI. COLS.		SEC. COLS.		STATUS	CARDS COUNTED (A–H)	COUNT CYCLE OR I.	CONSTANT LIMITS		VARIABLE LIMITS				
		A	B	C	D	E	F	G	H	PRI.	SEC.		FIRST	LAST	FIRST	LAST				STARTING NO.	ENDING NO.	START NO. COLS. First	START NO. COLS. Last	END NO. COLS. First	END NO. COLS. Last	
01	CTL																	F	D		0100					
1 2	3 4 5	6	7	8	9	10	11	12	13	14	15	16	17 18	19 20	21 22	23 24	25	26 27 28 29	30	31 32 33 34	35 36 37 38	39 40	41 42	43 44	45 46	47

SELECTOR CARD

CARD NO.	CARD IDENT.		SELECTORS																			
			SELECTOR NO. 1				SELECTOR NO. 2				SELECTOR NO. 3				SELECTOR NO. 4				SELECTOR NO. 5			S
			Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col No.
	SEL																					
1 2	3 4 5		7 8	9	10	11 12 13 14	15 16	17	18	19 20 21 22	23 24	25	26	27 28 29 30	31 32	33	34	35 36 37 38	39 40	41	42	43 44 45 46	47 48

FIELD DEFINITION CARD

CARD NO.	SOURCE	SOURCE FIELD First Col.	SOURCE FIELD Last Col.	MODE C, Z, D	OUTPUT	SAME CARD	LAST COL. FOR PUNCH		GANGPUNCH CON (IF W IN COLUM
1 2	3	4 5	6 7	8	9	10	11 12		19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 4
*2	D	61	80	C	F		20		

Figure A–14. Counter-Controlled Gangpunching Constant Limit, Coding Example

9. COUNTER-CONTROLLED GANGPUNCHING, VARIABLE LIMITS

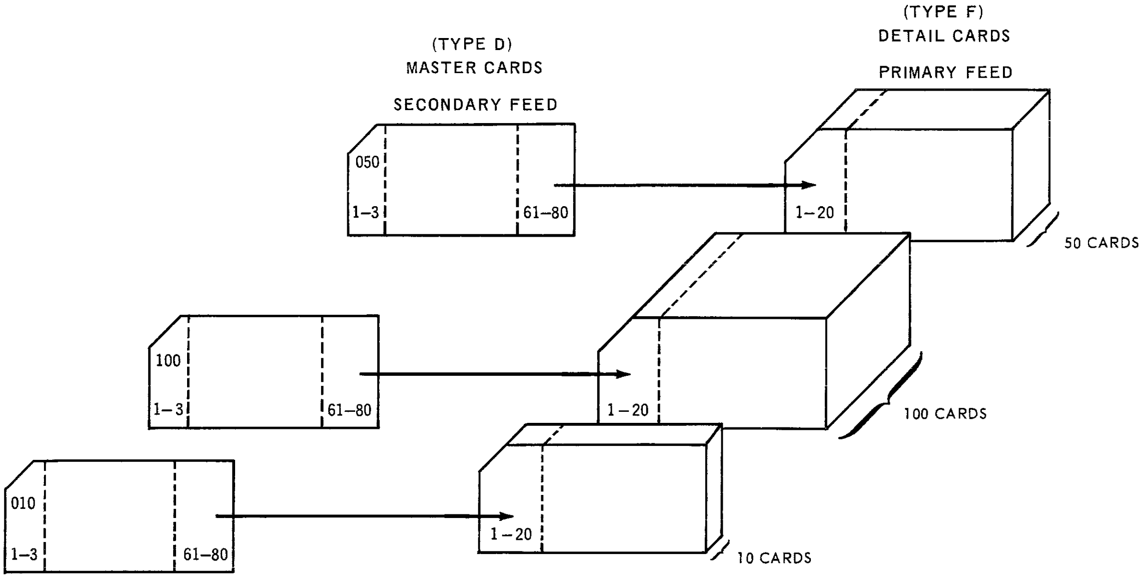
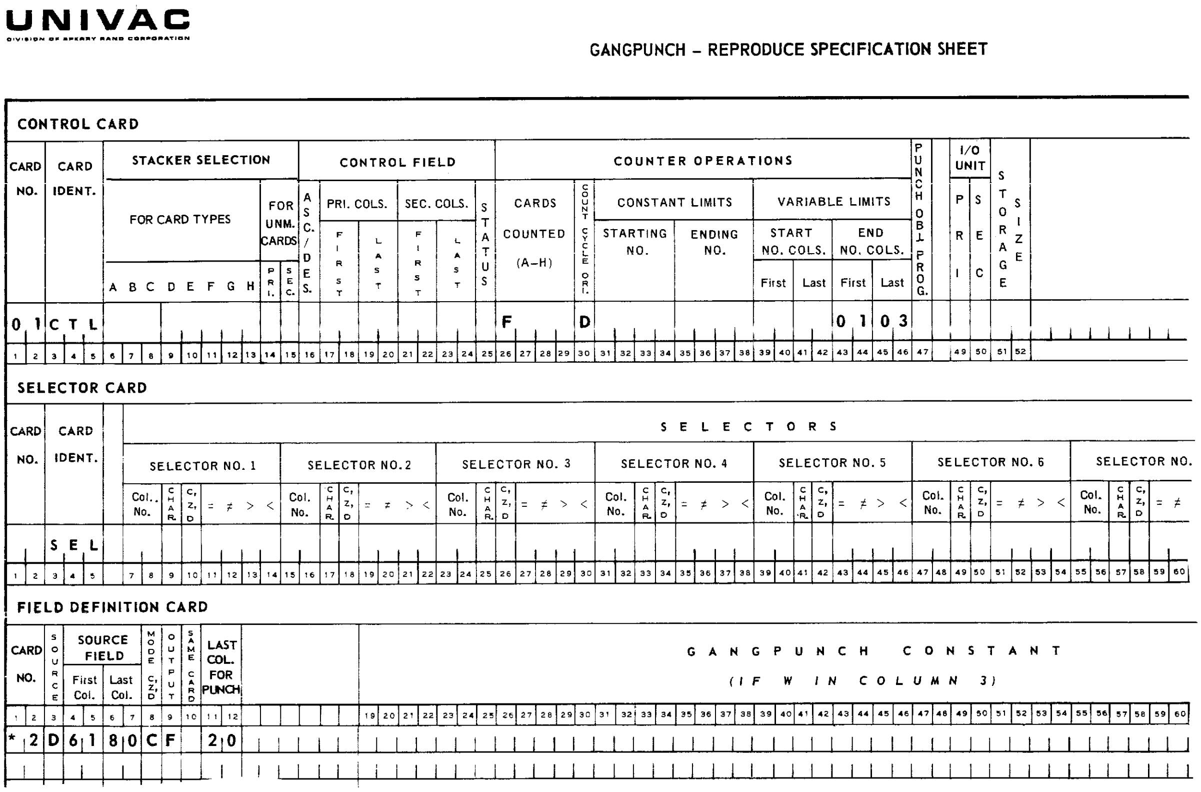


Figure A–15. Counter-Controlled Gangpunching, Variable Limits, Data Flow

A variable number of detail cards (type F) are to be gangpunched for each master card (type D). Columns 1–3 of each master card designate how many detail cards are to be gangpunched. Columns 61–80 of each master card are to be gangpunched into columns 1–20 of the designated number of detail cards.



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CONTROL CARD

CARD NO.	CARD IDENT.	STACKER SELECTION FOR CARD TYPES A B C D E F G H	FOR UNM. CARDS PRI.	FOR UNM. CARDS SEC.	ASC./DES.	CONTROL FIELD PRI. COLS. FIRST	PRI. COLS. LAST	SEC. COLS. FIRST	SEC. COLS. LAST	STATUS	COUNTER OPERATIONS CARDS COUNTED (A–H)	COUNT CYCLE OR.	CONSTANT LIMITS STARTING NO.	CONSTANT LIMITS ENDING NO.	VARIABLE LIMITS START NO. COLS. First	Last	END NO. COLS. First	Last	PUNCH OBJ. PROG.	I/O UNIT PRI.	I/O UNIT SEC.	STORAGE SIZE
0 1	C T L										F	D					0 1	0 3				

SELECTOR CARD

CARD NO.	CARD IDENT.	SELECTORS: SELECTOR NO. 1	SELECTOR NO. 2	SELECTOR NO. 3	SELECTOR NO. 4	SELECTOR NO. 5	SELECTOR NO. 6	SELECTOR NO.
		Col. No. / CHAR. / C, Z, D / = ≠ > <	Col. No. / CHAR. / C, Z, D / = ≠ > <	Col. No. / CHAR. / C, Z, D / = ≠ > <	Col. No. / CHAR. / C, Z, D / = ≠ > <	Col. No. / CHAR. / C, Z, D / = ≠ > <	Col. No. / CHAR. / C, Z, D / = ≠ > <	Col. No. / CHAR. / C, Z, D / = ≠
	S E L							

FIELD DEFINITION CARD

CARD NO.	SOURCE	SOURCE FIELD First Col.	SOURCE FIELD Last Col.	MODE C, Z, D	OUTPUT	SAME CARD	LAST COL. FOR PUNCH	GANGPUNCH CONSTANT (IF W IN COLUMN 3)
* 2	D	6 1	8 0	C	F		2 0	

Figure A–16. Counter-Controlled Gangpunching, Coding Example

10. CONSECUTIVE-NUMBER GANGPUNCHING

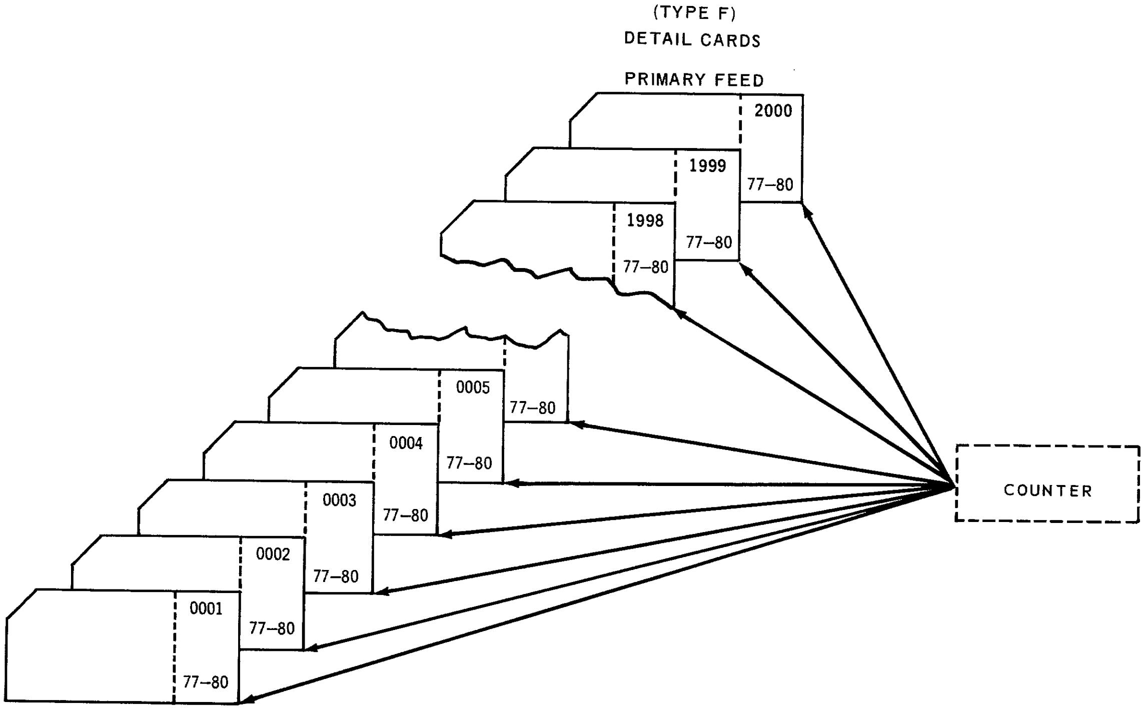

Figure A–17. Consecutive-Number Gangpunching, Data Flow

Consecutive numbers are to be punched into columns 77–80 of each card in a detail card file (type F). The numbers, provided from a program-controlled counter, start at 0001. The file volume is 2000 cards.

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CONTROL CARD

CARD NO.	CARD IDENT.	STACKER SELECTION			ASC./DES.	CONTROL FIELD				STATUS	COUNTER OPERATIONS								PUNCH OBJ. PROG.
		FOR CARD TYPES	FOR UNM. CARDS			PRI. COLS.		SEC. COLS.			CARDS COUNTED (A–H)	COUNT CYCLE ORI.	CONSTANT LIMITS		VARIABLE LIMITS				
		A B C D E F G H	PRI.	SEC.		FIRST	LAST	FIRST	LAST				STARTING NO.	ENDING NO.	START NO. COLS. First	START NO. COLS. Last	END NO. COLS. First	END NO. COLS. Last	
01	CTL										F		0001						
1 2	3 4 5	6 7 8 9 10 11 12 13	14	15	16	17 18	19 20	21 22	23 24	25	26 27 28 29	30	31 32 33 34	35 36 37 38	39 40	41 42	43 44	45 46	47

SELECTOR CARD

CARD NO.	CARD IDENT.		SELECTORS																			
			SELECTOR NO. 1				SELECTOR NO. 2				SELECTOR NO. 3				SELECTOR NO. 4				SELECTOR NO. 5			
			Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.	CHAR.	C, Z, D	= ≠ > <	Col. No.
	SEL																						
1 2	3 4 5		7 8	9	10	11 12 13 14	15 16	17	18	19 20 21 22	23 24	25	26	27 28 29 30	31 32	33	34	35 36 37 38	39 40	41	42	43 44 45 46	47 4

FIELD DEFINITION CARD

CARD NO.	SOURCE	SOURCE FIELD		MODE C, Z, D	OUTPUT	SAME CARD	LAST COL. FOR PUNCH		GANGPUNCH CO
		First Col.	Last Col.						(IF W IN COLUM
1 2	3	4 5	6 7	8	9	10	11 12		19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 4
*2	X				F		80		

Figure A–18. Consecutive-Number Gangpunching, Coding Example

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