PART IV

FLEXOWRITER MODEL FG

DESCRIPTION

Figure 1-1 Model FG-40

Figure 1-2 Model FG-80

The Model FG Flexowriter was specifically de-signed for preparing tape for operating the Auto-matic Graphotype machine. This model uses a six unit binary code which is specially adapted to this application and the tapes prepared on the Model FG are not interchangeable with tapes prepared on other model Flexowriters.

There are several Model FG Flexowriters avail-able which are designed to be used with specific Graphotype models.

The two Model FG's that will be discussed in this manual are the Model FG-40 (Figure 1-1) and the Model FG-80 (Figure 1-2).

The Model FG-40 is used with Graphotype Models 6740 and 6741. It is equipped to print capital letters only, plus figures, special char-acters and punctuation marks.

The Model FG-80 is used with the Graphotype Model 6781 and is equipped to print both upper and lower case characters.

There are three available combinations of both the Model FG-40 and Model FG-80, namely; Recorder, Reproducer, and Recorder — Repro-ducer. The latter combination has the combined capabilities of the Recorder and the Reproducer in that it will type copy, punch tape, read tape and make a tape from a tape. It consists of a writing machine, code selector, tape punch, tape reader and code translator.

BASIC FUNCTIONAL PRINCIPLES

The functional principles of the Model FG writing machine, code selector, tape punch, tape reader and code translator are the same as the Model FL explained in Part II, Section 1, with the exception of the following:

Model FG-40 - This model does not have a case shift operation, thus it prints capital case letters only. There are four switches controlling punch operation, namely; punch on, code delete, stop code and line space. The start read and stop read switches control the tape reader operation.

Model FG-80 - This model is equipped with a case shift mechanism. It has six switches control-ling tape punch operation including; punch on, code delete, stop code, skip, non-skip and line space. The start read and stop read switches control the tape reader operation.

Both models have a line length indicating light which indicates to an operator the amount of characters in a line during tape recording.

KEYBOARD

The Model FG-40 keyboard is a specially arranged four-bank keyboard with the shift keys omitted. This keyboard is shown in Figure 1-3. It uses a total of 50 keylever positions, 43 of which are used for character operation. Four of the remaining seven keylevers are used for functional operation such as, carriage return, space, repeat space and tabulation. The remain-ing three keylever positions are used to per-forate special codes in the tape. These key-levers are, plate discharge, non-skip and skip, and do not perform any function of the writing machine.

The Model FG-80 keyboard is a four-bank key-board with both upper and lower case shift operation and is shown in Figure 1-4. It uses a total of 52 keylever positions, 43 of which are used for character operation. Eight of the re-maining nine positions are used for functions such
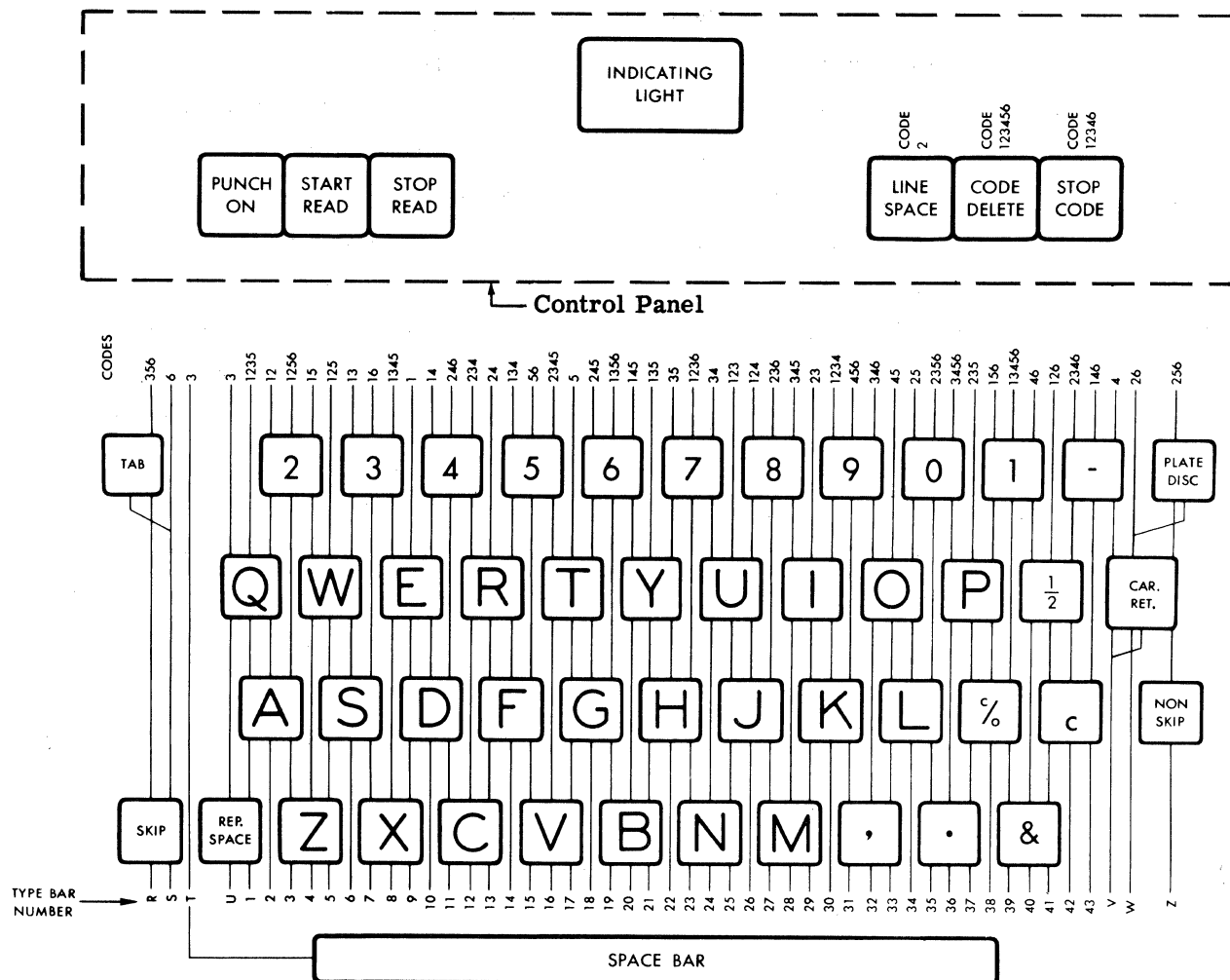
Figure 1-3 Keyboard Chart - Model FG-40

as upper and lower case shift, carriage return, repeat space, space and tabulation. The W position is used for a plate discharge code and does not cause writing machine operation.

CODE SYSTEM

The Model FG uses a six unit binary code system which provides a maximum of 64 possible code combinations. As can be seen from the keyboard chart in Figure 1-3 and Figure 1-4, 43 of these combinations are used for character codes

in both the Model FG-40 and Model FG-80.

Figure 1-5 shows the character and function codes in a tape.

A seven-eighth inch wide tape is used for both Model FG's and is shown in Figure 1-5. The code holes are numbered 6-1-2-3-4-5 facing the leading edge of the tape. The feed hole is between the 2 and 3 code holes and is .4375 inch from the right edge of the tape. The feed hole is advanced .013 inch with respect to the code holes in order to conform with the feed mechanism on the Automatic Graphotype.
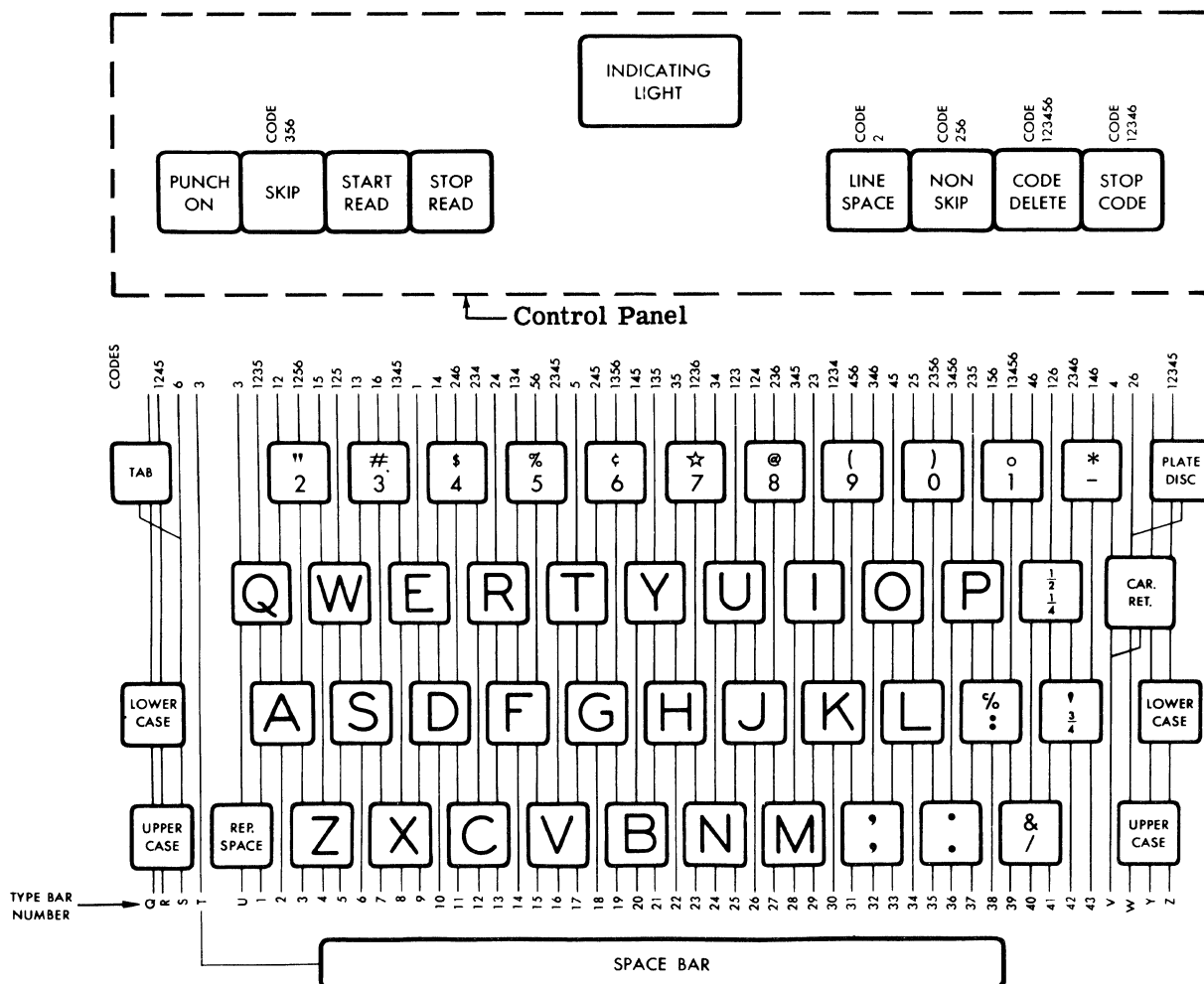
Figure 1-4 Keyboard Chart - Model FG-80

The plate discharge, skip, non-skip keylevers on the Model FG-40 do not perform a Flexowriter function other than perforate individual codes in the tape. When these codes are read by the Graphotype, they will automatically cause various functional operations necessary when embossing an Addressograph plate.

The above applies to the plate discharge keylever on the Model FG-80 also.

The repeat space key spaces the carriage and perforates a consecutive series of space codes (3) in the tape as long as it is depressed.

CONTROL PANEL - MODEL FG-40

The Model FG-40 Recorder-Reproducer control panel is shown in Figure 1-3 and consists of the following switches.

Punch On - The Punch On switch controls the tape punch for automatically perforating a paper tape. When this switch is depressed, each character or function operated on the keyboard is automatically perforated in the tape in the form of a predetermined binary code.

Code Delete - When this switch is held de-

Description

Figure 1-5 Coded Tape

Figure 1-5 Coded Tape

Lower Case / Upper Case row: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z " # $ % ¢ * @ ( ) o • ⅛ % ' , . & U.C. Tab Rep. Space C.R. Plate Disc. L.C. Skip Line Space Non Skip Code Delete Stop Code

Tape Movement

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pressed, a consecutive series of delete codes is perforated in the tape. When this switch is struck quickly, however, a single delete code results.

Stop Code - The stop code switch, when depressed, will perforate a 1-2-3-4-6 code in the tape. When this code is read by the Flexowriter tape reader or the Graphotype reader, it will automatically stop operation.

Line Space - This switch, when depressed, will perforate a 2 code hole in the tape, but does not cause a line spacing operation of the Flexowriter. When the 2 code is read by the Graphotype, the plate will advance one line without changing its horizontal position.

Start Read - When the start read switch is depressed and released, the tape reader automatically starts operation, thus reading and feeding the tape continuously.

Stop Read - When the stop read switch is depressed during automatic operation, the reader will stop operation, thus stopping the automatic typing operation. In order to resume automatic operation, the start read switch must be depressed.

CONTROL PANEL - Model FG-80

The Model FG-80 control panel is shown in Figure 1-4 and consists of the following switches:

Punch On - Same as Model FG-40

Code Delete - Same as Model FG-40

Stop Code - Same as Model FG-40

Skip - This switch, when depressed, will perforate a 3-5-6 code in the tape. It does not perform any other function of the Model FG-80. When the 3-5-6 code is read in the Graphotype, none of the following codes will be embossed on the plate until a non-skip code 2-5-6 is sensed.

Non-Skip - This switch, when depressed, will perforate a 2-5-6 code in the tape. This code, used in conjunction with the skip code (above) is used to activate the skipper attachment on the Graphotype.

Line Space - Same as Model FG-40.

Start Read - Same as Model FG-40.

Stop Read - Same as Model FG-40.

An indicating light is also located on both the Model FG-40 and Model FG-80 control panel. This light indicates when any desired character position has been reached. This position is set by moving a stop, similar to a margin stop which is located behind the paper table. The light will stay on for seven character spaces.

PERFORATING A TAPE

The procedure for making a tape for a standard three line name and address plate is as follows:

1. Perforate a series of space codes (by depressing the repeat space key) to obtain a tape lead of approximately 12 to 13 inches.

2. Perforate a plate discharge code (by depressing the plate discharge key), then a carriage return code and begin typing the name.

3. After the last letter of the first line is typed, use the carriage return key which returns the carriage and simultaneously line spaces.

4. The second line is again followed by a carriage return code.

5. At the end of the last character in the third line, make a plate discharge code.

6. Perforate a carriage return code and proceed to type the first line of the next plate.

7. When the tape is to be ended, instead of making a plate discharge code followed by a carriage return code, make four plate discharge codes and feed out the tape by making about 30 consecutive delete codes, plus a stop code. Tear off the tape.

SPECIFICATIONS

Power Supply - The Model FG may be specified with one of the following power supplies:

Volts	Cycles	Phase	Amperes
115	DC	-	2.3
115	60	1	2.3
115	50	1	2.3
115	25	1	2.3
230	60	1	1.5
230	50	1	1.5

Weight and Dimensions - The width of the Model FG is $17\frac{1}{2}''$, the depth is 20" and the height is 10".

The shipping weight of all 12 inch carriage Flexowriters is approximately 115 pounds, while the unpacked weights of the two Model FG combinations are as follows:

Recorder-Reproducer - 85 lbs.
Recorder -   74 lbs.

Type Style - The standard type style on the Model FG is as follows:

Pica - 10 characters to the inch.
Elite - 12 characters to the inch.

Keyboard - The Model FG-40 is equipped with a specially arranged four-bank keyboard with the shift keys ommitted.

The Model FG-80 has a four-bank keyboard with more special characters available than the Model FG-40 due to the use of the case shift.

Carriage - The Model FG may be equipped with any one of the following carriages:

12 inch carriage - will accept an 11 inch wide sheet with a maximum writing line of $9\frac{1}{2}$ inches.

16 inch carriage - will accept a 15 inch wide sheet with a maximum writing line of $13\frac{1}{2}$ inches.

20 inch carriage - will accept a 19 inch wide sheet with a minimum writing line of $17\frac{1}{2}$ inches.

Platens and Ratchets - See Part II, Section 2, Page 2-56 for available platens and ratchets.

Tabulation - This Model FG is equipped with a standard tab mechanism. The tab code is 6.

Repeat Space Key - A repeat space key is provided in addition to the regular space bar. The space bar operation allows the carriage to move only one letter space per operation, while the repeat space key will cause successive letter spacing movement of the carriage as long as the key is held down.

Back Space - There is no back space mechanism on the Model FG.

Case Shift - The Model FG-40 is not equipped with case shift movement and the type basket is locked in the lower position.

The Model FG-80 provides a type basket shift to select between printing of upper and lower case characters.

Line Length Indicator - An indicating light located on the control panel is provided to show when a line of predetermined length has been typed. It is adjustable by the operator and remains on for seven letter spaces of carriage movement.

Carriage Return - The Model FG has a power operated carriage return with line spacing operation incidental to the carriage return operation. The line space function can be a separate function on the Graphotype and accordingly a separate line space switch has been provided which punches a code in the tape but does not otherwise operate the Flexowriter.

Record Tape - The Model FG uses a seven-eighth inch wide tape with the feed hole .013 inch advanced with respect to the code holes.

Operating Speed - The operating speed of the tape punch is approximately 850 cycles per minute and will respond to any two isolated key operations occurring at the rate of 1200 per minute.

The tape reader speed is approximately 570 cycles per minute, thus resulting in an automatic typing operation at the rate of approximately 570 characters per minute.

MAINTENANCE OF UNITS

All Model FG Recorder-Reproducers consist of five major units, namely: writing machine, code selector, tape punch, tape reader and code translator. These units are all basically the same as the units described in Part II, Sections 2 through 7. Therefore, the maintenance procedures and adjustments will be the same for each, with the exception of the following:

WRITING MACHINE

Model FG-40 — This model has a fourbank keyboard, but does not use a shift mechanism. The type basket is locked in lower case position with the type having capital characters only.

The R, W, and Z keylever positions do not cause a character or functional operation of the writing machine. These positions are used to perforate a code in the tape only. The repeat space keylever (position U), when held operated, will cause continuous spacing of the carriage. This is accomplished by using a double lobe cam having one lug removed on the release lever. Therefore, when the keylever is held depressed, there is nothing to prevent repeat operation of the
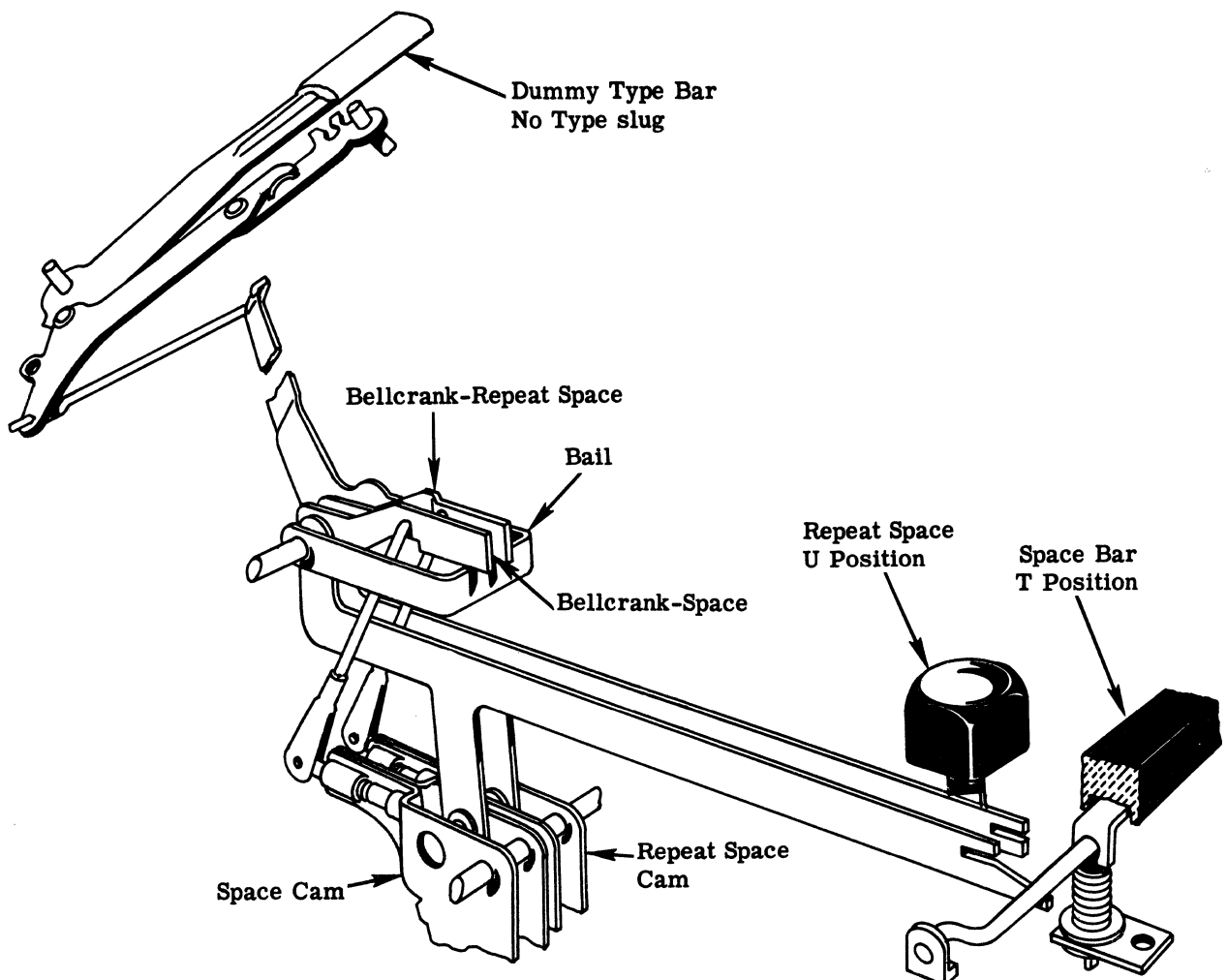
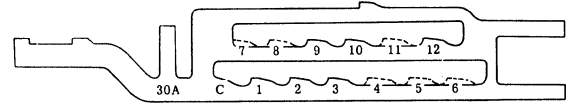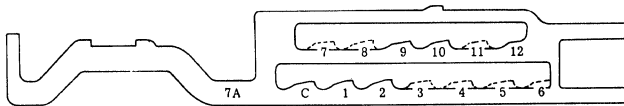Figure 2-1 Standard & Repeat Space Mechanism

Maintenance of Units

FRONT SLIDE   REAR SLIDE
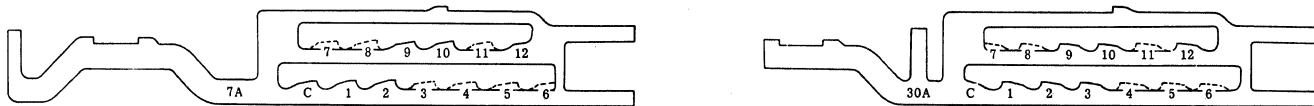
Position Number	Cam Surface
1(49A)	C-3-5-6
3A	8-11
	C-3
5(3A)	8-11
	C-3
7A	9-10-12
	C-1-2
9A	9-10-12
	C-1-5
11A	9-12
	C-1-3
13A	9-10-12
	C-1-3-4-5
15A	9-10-12
	C-1-4
17A	9-10-12
	C-2-3-4
19A	8-10-12
	C-1-3-4
21A	9-10-12
	C-2-3-4-5
23A	9-10-12
	C-2-4-5
25A	9-10-12
	C-1-4-5
27A	9-10-12
	C-3-5
29A	9-10-12
	C-3-4
31A	8-12
	C-1-2-4
33A	8-9-11-12
	C-3-4-5
35A	9-10-12
	C-1-2-3-4
37A	8-11
	C-3-4-6
39A	8-10-12
	C-2-5
41(1A)	C-3-4-5-6
43C	7-8-9-10-11-12
	C-1-5-6
45(41A)	8-11
	C-4-6
47C	7-8-9-10-11-12
	C-2-3-4-6
49C	C-4
51(45C)	7-8-9-10-11-12
	C-2-5-6

Position Number	Cam Surface
2D	C-6
4	Dummy
6A	9-10-12
	C-1-2-3-5
8C	7-8-9-10-11-12
	C-1-2-5-6
10A	7-9-11-12
	C-1-2-5
12(32A)	9-12 2
	C-1-6
14A	9-10-12
	C-1
16(46A)	9-12
	C-2-4-6
18A	9-10-12
	C-2-4
20C	7-8-9-10-11-12
	C-5-6
22A	8-10-12
	C-5
24C	7-8-9-10-11-12
	C-1-3-5-6
26A	9-10-12
	C-1-3-5
28(8A)	9-10-12
	C-1-2-3-6
30A	9-10-12
	C-1-2-3
32C	7-8-9-10-11-12
	C-2-3-6
34A	8-11
	C-2-3
36C	7-8-9-10-11-12
	C-4-5-6
38A	9-10-12
	C-4-5
40C	7-8-9-10-11-12
	C-2-3-5-6
42A	9-10-12
	C-2-3-5
44C	7-8-9-10-11-12
	C-1-3-4-5-6
46(12A)	9-12
	C-1-2-6
48(20A)	9-10-12
	C-1-4-6
50D	7-8-9-10-11-12
	C-2-6

Figure 2-2 Selector Coding - Model FG-40

FRONT SLIDE   REAR SLIDE

Position Number	Cam Surface		Position Number	Cam Surface
1B	8-11		2D	
	C-1-2-4-5			C-6
3A	8-11		4	
	C-3			Dummy
5(3A)	8-11		6A	9-10-12
	C-3			C-1-2-3-5
7A	9-10-12		8C	7-8-9-10-11-12
	C-1-2			C-1-2-5-6
9A	9-10-12		10A	7-9-11-12
	C-1-5			C-1-2-5
11A	9-12		12(32A)	9-12
	C-1-3			C-1-6
13A	9-10-12		14A	9-10-12
	C-1-3-4-5			C-1
15A	9-10-12		16(46A)	9-12
	C-1-4			C-2-4-6
17A	9-10-12		18A	9-10-12
	C-2-3-4			C-2-4
19A	8-10-12		20C	7-8-9-10-11-12
	C-1-3-4			C-5-6
21A	9-10-12		22A	8-10-12
	C-2-3-4-5			C-5
23A	9-10-12		24C	7-8-9-10-11-12
	C-2-4-5			C-1-3-5-6
25A	9-10-12		26A	9-10-12
	C-1-4-5			C-1-3-5
27A	9-10-12		28(8A)	9-10-12
	C-3-5			C-1-2-3-6
29A	9-10-12		30A	9-10-12
	C-3-4			C-1-2-3
31A	8-12		32C	7-8-9-10-11-12
	C-1-2-4			C-2-3-6
33A	8-9-11-12		34A	8-11
	C-3-4-5			C-2-3
35A	9-10-12		36C	7-8-9-10-11-12
	C-1-2-3-4			C-4-5-6
37A	8-11		38A	9-10-12
	C-3-4-6			C-4-5
39A	8-10-12		40C	7-8-9-10-11-12
	C-2-5			C-2-3-5-6
41(1A)			42A	9-10-12
	C-3-4-5-6			C-2-3-5
43C	7-8-9-10-11-12		44C	7-8-9-10-11-12
	C-1-5-6			C-1-3-4-5-6
45(41A)	8-11		46(12A)	9-12
	C-4-6			C-1-2-6
47C	7-8-9-10-11-12		48(20A)	9-10-12
	C-2-3-4-6			C-1-4-6
49C			50D	7-8-9-10-11-12
	C-4			C-2-6
51B				
	C-1-2-3-4-5			

Figure 2-3 Selector Coding - Model FG-80

Maintenance of Units

cam. The repeat space cam operates the same dummy type bar as the space bar in position T. See Figure 2-1.

There is no back space or color shift mechanism on the Model FG-40. A ribbon color change lever protrudes through the right side of the base, permitting ribbon color change by hand.

Model FG-80 — This model has a four bank keyboard and uses a shift mechanism. Operation of the keylever in position W does not cause a character or functional operation in the writing machine. A repeat space key in position U is the same as explained for Model FG-40.

There is no back space or color shift mechanism used in the Model FG-80.

The Model FG-40 and FG-80 are equipped with a line length indicating light. This light is controlled by an adjustable stop to light after a line has been typed to a predetermined length. The light remains on for seven spaces of carriage travel or until the carriage is returned. The stop is located on a rack behind the margin and tab racks and is set by pressing down on the left end and sliding the stop along the rack.

The Model FG machines use a mono-spacing escapement.

Note: Other Model FG machines are used having a three-bank communications keyboard. These models are: Model FG-51, Model FG-53, Model FG-54 and Model FG-55. All of the writing machine component adjustments and maintenance procedures may be found in Part II, Section 2.

CODE SELECTOR

The Model FG code selectors are basically the same as the code selector described in Part II, Section 3, for the coding arrangement. This is explained in the charts in Figures 2-2 and 2-3.
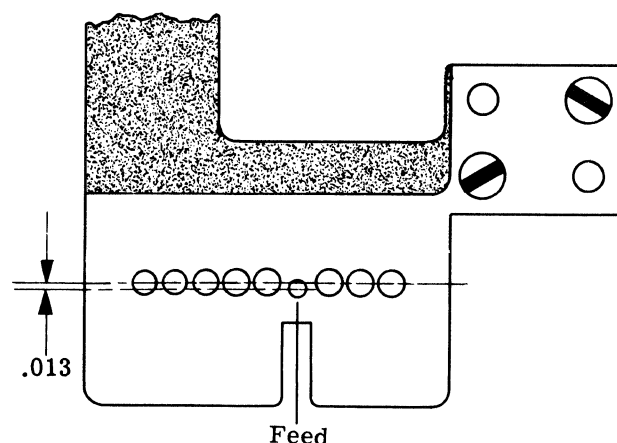
Figure 2-4 Punch Die Block

TAPE PUNCH

The tape punch used in the Model FG machines uses a die block having the feed punch position .013" advance in relation to the code punch positions. (See Figure 2-4.) Also, the feed hole is located in the transverse center of the tape. (See Figure 2-5.) Thus, with a seven-eighth inch wide tape, the center line of the feed holes is located .4375" from the edge of the tape (edge nearest number five code position).
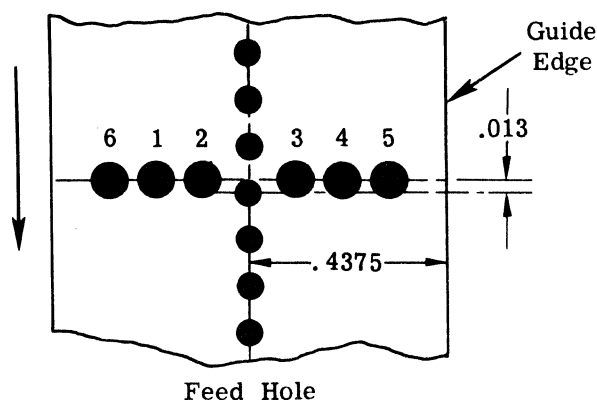
With the exception of the above, the FG tape

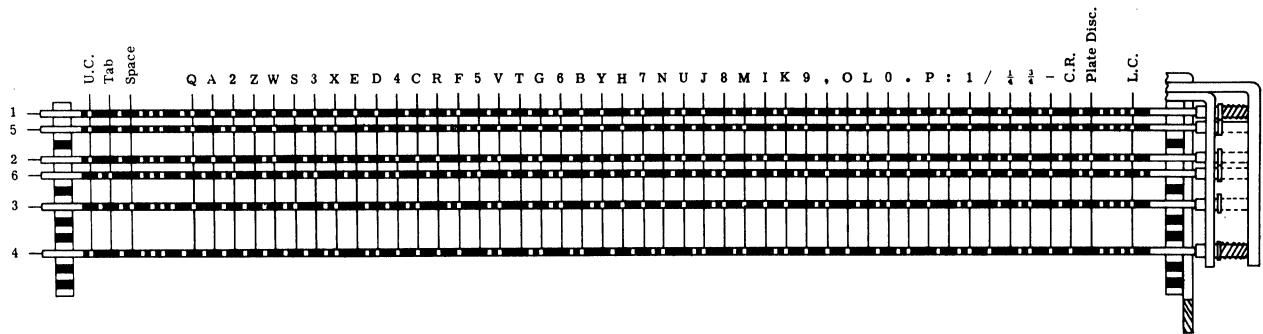Figure 2-5 Transverse Centered Feed Hole

Figure 2-6 Permutation Bar Coding Arrangement

punch has the same adjustments and maintenance procedure as explained in Part II, Section 5.

TAPE READER

The FG tape reader is the same as the reader explained in Part II, Section 6 except for the following:

1. It is adjusted to accept the transversely centered, advance feed hole tape.

2. The contact stackup for the Model FG-40 and FG-80 is as follows:

RC1 - 1 break, 1 transfer (or 1B, 1C)

RC2 - 1 break, 1 transfer (or 1B, 1C)

RC3 - 1 break, 1 transfer (or 1B, 1C)

RC4 - 2 transfer (2C)

RC5 - 1 make, 1 transfer (1A, 1C)

RC6 - 2 transfer (2C)

CODE TRANSLATOR

The Model FG translators are basically the same in operation and adjustment as explained in Part II, Section 7.

The coding of the permutation bars (Figure 2-6) however, is different.

CIRCUIT DESCRIPTION

The following circuit description is for the Model FG-80 Recorder-Reproducer and is based on wiring diagram 1055255. (See Figure 3-9.) The Model FG-40 circuits are basically the same as the Model FG-80 and the wiring diagram (1055283) is shown in Figure 3-10.

POWER CIRCUITS

These circuits are the same as explained in Part II, Section 8, Page 8-5.

PUNCH CIRCUITS

Keylock Magnet — Same as described in Part II, Section 8, Page 8-6.

Punch Magnet Circuit — Same as described in Part II, Section 8, Page 8-6.

Clutch Magnet Circuit — Same as described in Part II, Section 8, Page 8-6.

Anti-Repeat Circuit — Same as described in Part II, Section 8, Page 8-7.

Stop Code Circuit — (Figure 3-1) When the stop
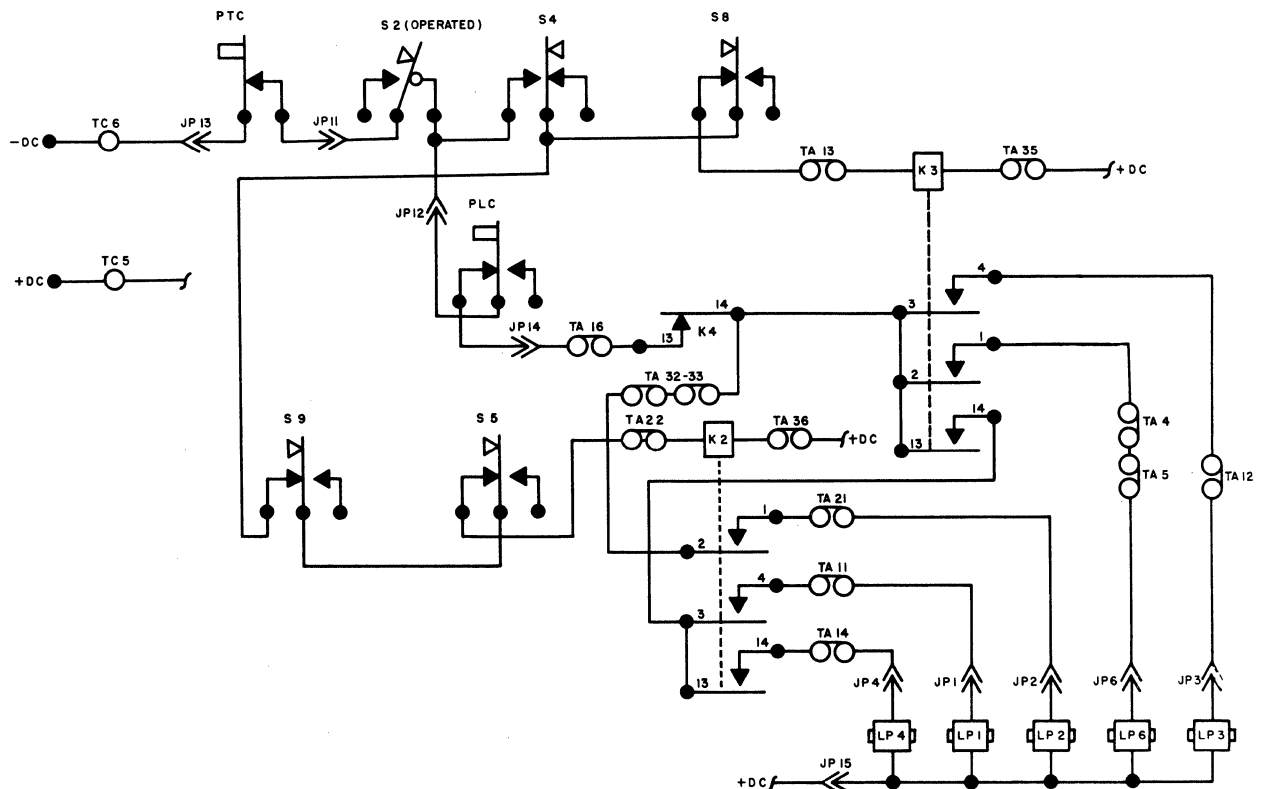
Figure 3-1   Stop Code Circuit

Circuit Description

code switch S4 is depressed, the code 1-2-3-4-6 is perforated in the tape. This code, when sensed by the reader, will automatically stop reader operation.

The K2 and K3 relays will pick up when S4 is depressed resulting in LP1, LP2, LP3, LP4, LP6 and LPC being energized.

The circuit to K2 is as follows: from -DC, TC6, JP13, PTC, JP11, N/O S2, N/O S4, N/C S9, N/C S5, TA22, K2 coil, TA36, TC5, to +DC. With K2 energized, a DC circuit is completed to LP2 as follows: from -DC, TC6, JP13, PTC, JP11, N/O S2, JP12, PLC, JP14, TA16, K4 - 13 and 14, TA - 33 and 32, K2 - 2 and 1, TA21, JP2, LP2, JP15, TC5, to +DC.

With K3 - 13 and 14 contact closed, a circuit is complete to LP1 and LP4 as follows: from -DC,

TC6, JP13, PTC, JP11, N/OS2, JP12, PLC, JP14, TA16, K4 - 13 and 14, K3 - 13 and 14, K2 - 3 and 4 - 13 and 14, TA11 and TA 14, JP1 and JP4, LP1 and LP4, JP15, TC5, to DC.

The circuit to K3 is as follows: from -DC, TC6, JP13, PTC, JP11, N/O S2, N/O S4, N/C S8, TA13, K3 coil, TA35, TC5, to +DC.

The circuit to LP3 and LP6 is as follows: from -DC, TC6, JP13, PTC, JP11, N/O S2, JP12, PLC, JP14, TA16, K4 - 13 and 14, K3 - 3 and 4 - 2 and 1, TA12 and TA4 - 5, JP3 and JP6, LP3 and LP6, JP15, TC5, to +DC.

The circuit to the clutch magnet (LPC) is completed at the same time as the above mentioned circuits to the punch magnets. The clutch magnet circuit is as follows: (Figure 3-2) from -DC, TC6, JP13, PTC, JP11, N/O S2, N/C S3, TA6 and 7, K3 - 12 and 11 and K2 - 12 and 11, K4 - 12 and 11,
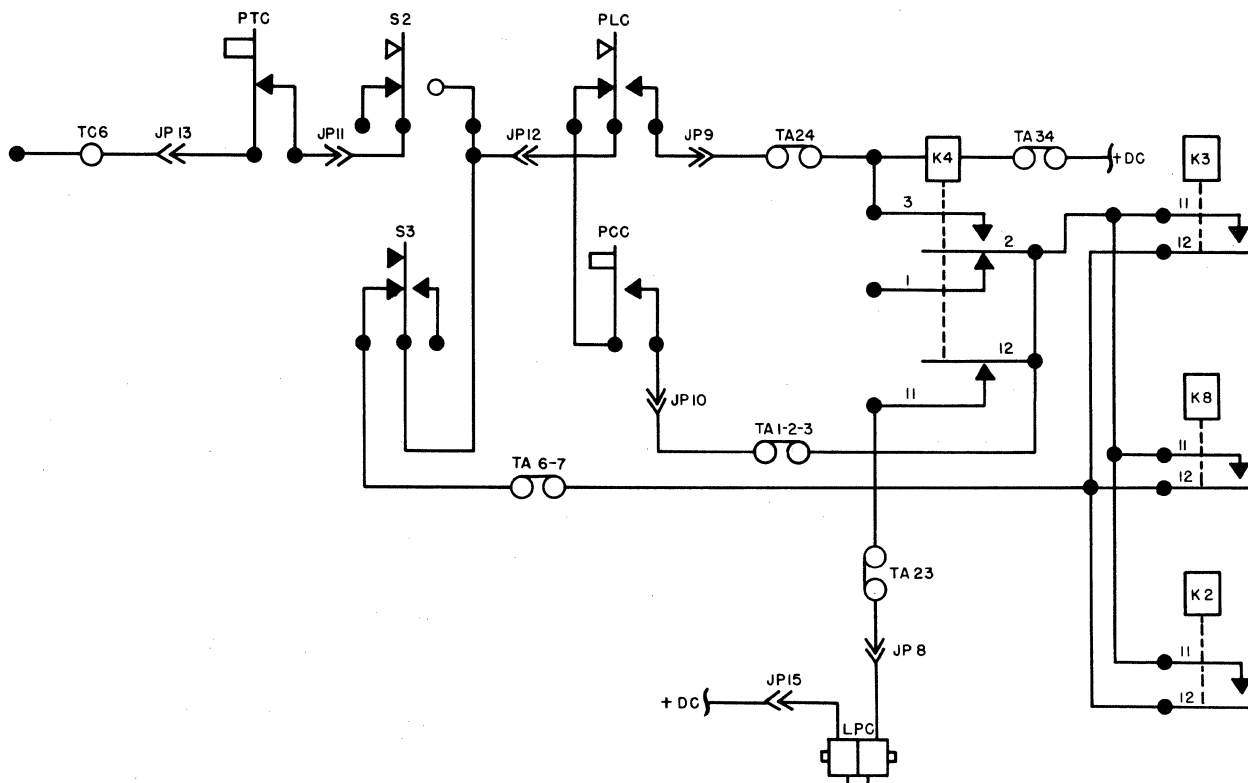

Figure 3-2 Anti-Repeat Circuit

TA23, JP8, LPC, JP15, TC5, to +DC.

Due to an anti-repeat circuit, the stop code will be punched only once in the tape for each operation of the stop code switch S4. This circuit is explained in the following paragraph.

Anti-Repeat Circuit — (Figure 3-2) When any one of the S4, S5, S8 or S9 switches are operated, the punch will complete one cycle of operation for as long as the particular switch is held depressed. This is due to a holding circuit to the anti-repeat relay (K4) which, when energized, will break the circuits to the six punch magnets and the clutch magnet (the punch magnet circuits are broken by contact K4 - 13 and 14 while the clutch magnet circuit is broken by K4 - 11 and 12 contact).

The anti-repeat relay (K4) is energized during the punch cycle (when the punch lock contacts (PLC) transfer). Thus, if any one of the control

relays K2, K3 or K8 remain energized after the punch cycle has been completed and the S3 is not operated, the K4 remains energized through the following holding circuit: from -DC, TC6, JP13, PTC, N/O S2, N/C S3, TA6 and 7, K2 - K3 or K8 - 11 and 12 contacts, K4 - 2 and 3, K4 coil, TA34, TC5, to +DC. Note that the circuit is through the normally closed portion of the code delete switch (S3). Therefore, if this switch is operated the holding circuit to K4 will not be complete (see Code Delete Circuit).

Skip Code Circuit — When the skip code switch S5 is operated, a 3-5-6 code is perforated in the tape. This is due to the K3 and K8 relays being energized and completing circuits to punch magnets L3, L5 and L6. The circuit to K8 is as follows: (Figure 3-3) from -DC, TC6, JP13, PTC, JP11, N/O S2, N/O S5, N/C S9, N/C S4, TA25, K8 coil, TA37, TC5, to +DC. With K8 energized, the circuit
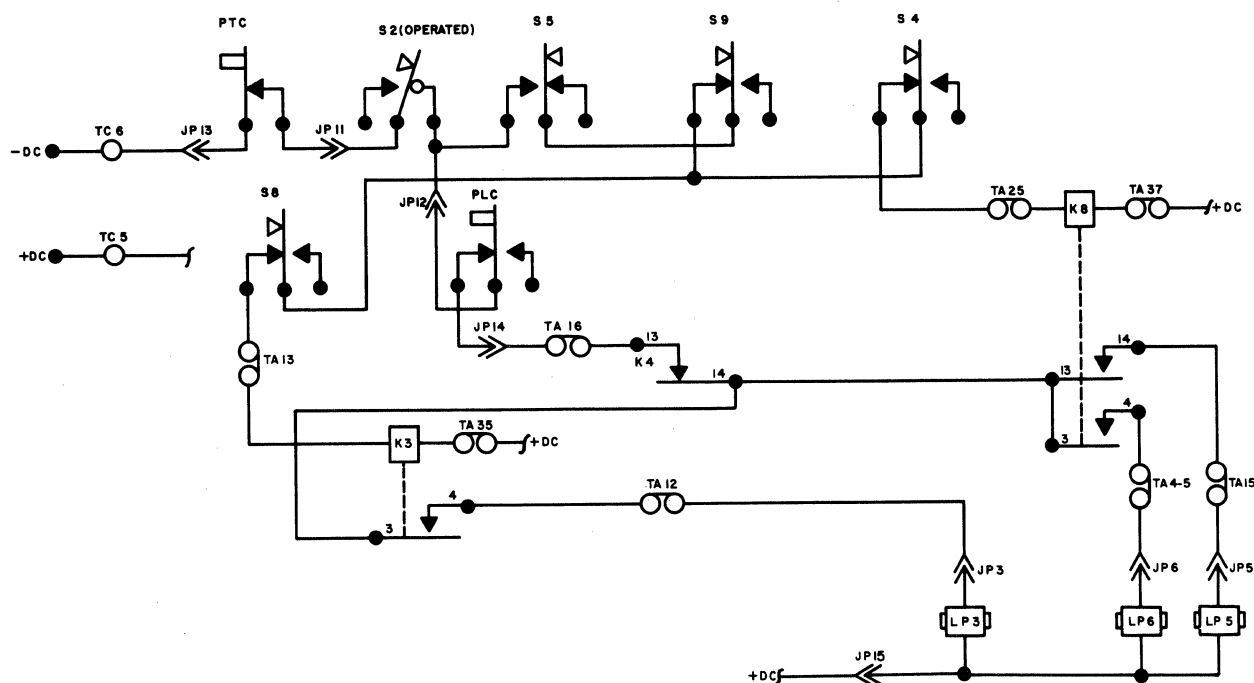

Figure 3-3   Skip Code Circuit

Circuit Description

to LP5 and LP6 is as follows: from -DC, TC6, JP13, PTC, JP11, N/O S2, JP12, PLC, JP14, TA16, K4 - 13 and 14, K8 - 13 and 14 - 3 and 4, TA - 4 and 5 - TA15, JP5 and JP6, LP5 and LP6, JP15, TC5, to +DC.

The K3 relay is energized as follows: from -DC, TC6, JP13, PTC, JP11, N/O S2, N/O S5, N/C S9, N/C S8, TA13, K3 coil, TA35, TC5, to +DC. With K3 relay energized, the circuit to LP3 is as follows: from -DC, TC6, JP13, PLC, JP11, N/O S2, JP12, PLC, JP14, TA16, K4 - 13 and 14, K3 - 3 and 4, TA12, JP3, LP3, JP15, TC5, to +DC.

The circuit to the clutch magnet, causing punch operation, is the same as explained in Stop Code Circuit.

Non-Skip Code Circuit — (Figure 3-4) When the S8 switch is operated, a 2-5-6 code is perforated in the tape. This is due to the K2 and K8 relays

being energized and completing circuits to LP2, LP5 and LP6. The circuit to K2 is as follows: from -DC, TC6, JP13, PTC, JP11, N/O S2, N/O S8, N/C S5, TA22, K2 coil, TA36, TC5, to +DC. With K2 energized, the circuit to LP2 is as follows: from -DC, TC6, JP13, PTC, JP11, N/O S2, JP12, PLC, JP14, TA16, K4 - 13 and 14, TA32 and 33, K2 - 2 and 1, TA21, JP2, LP2, JP15, TC5, to +DC.

The circuit to K8 is as follows: from -DC, TC6, JP13, PTC, JP11, N/O S2, N/O S8, N/C S4, TA25, K8 coil, TA37, TC5, to +DC. With K8 energized, the circuit to LP5 and LP6 is as follows: from -DC, TC6, JP13, PTC, JP11, N/O S2, JP12, PLC, JP14, TA16, K4 - 13 and 14, K8 - 13 and 14 - 3 and 4, TA15, TA4 and 5, JP5 and JP6, LP5 and LP6, JP15, TC5, to +DC.

The circuit to the clutch magnet, causing punch operation, is the same as explained in Stop Code
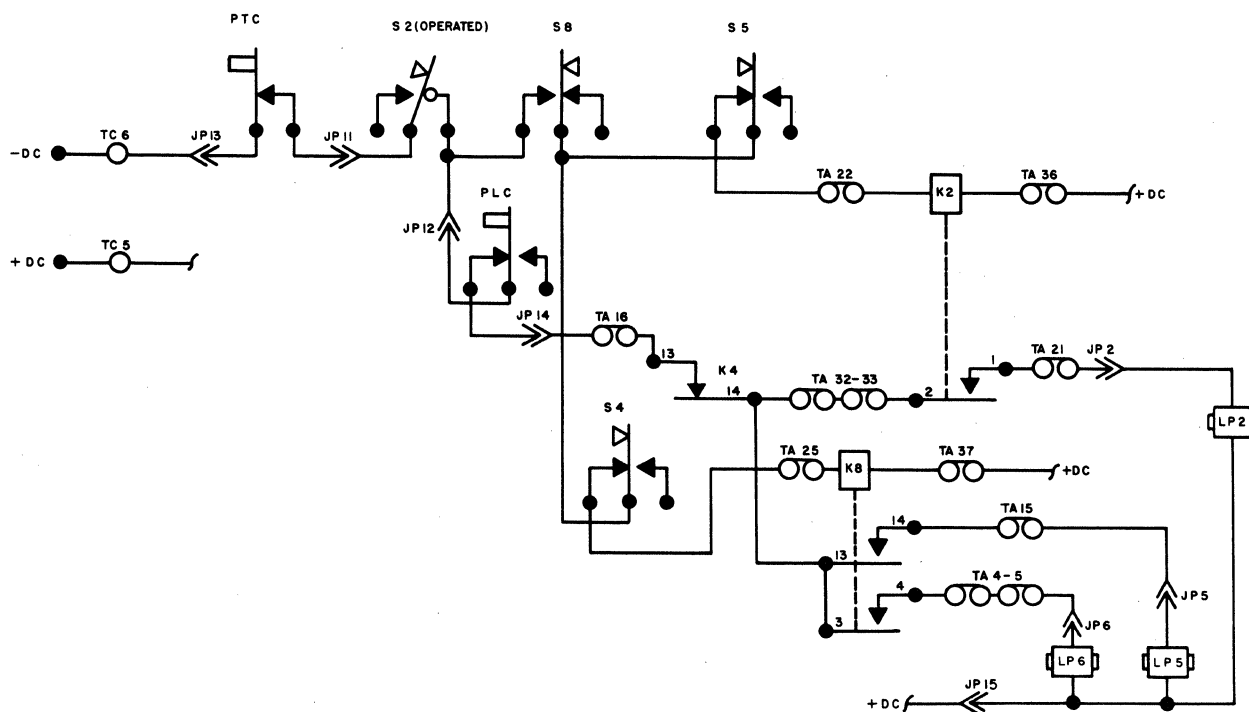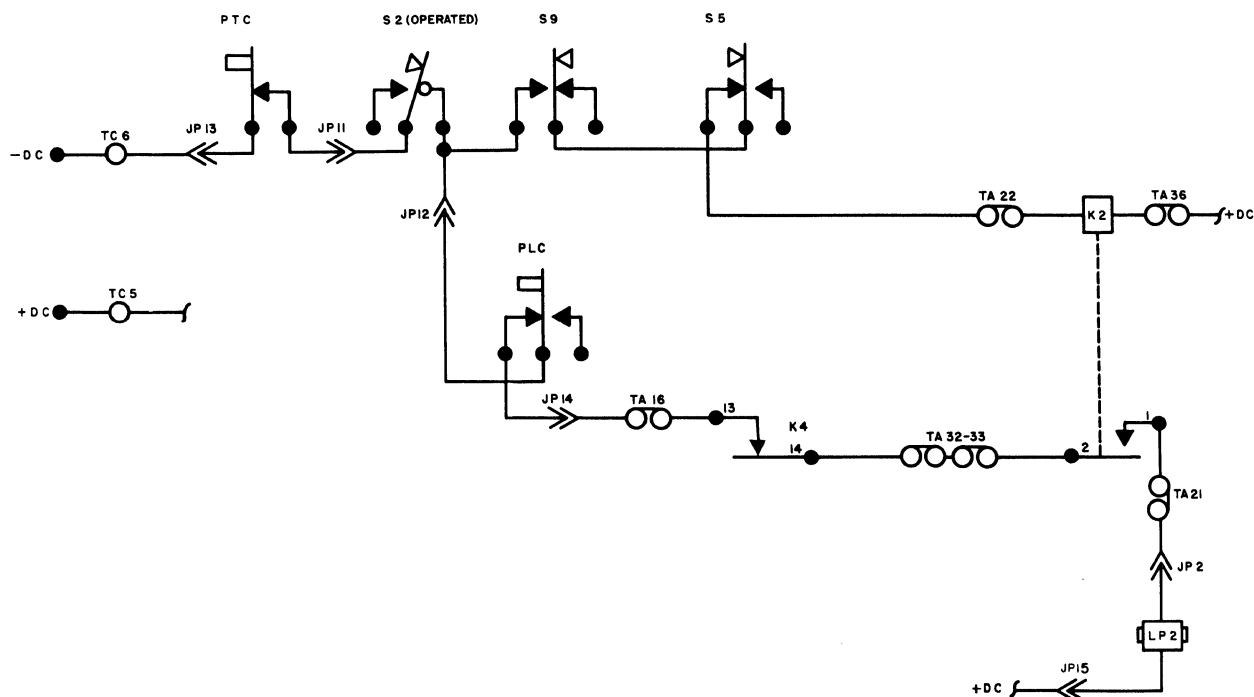

Figure 3-4   Non Skip Code Circuit

Figure 3-5   Line Space Code Circuit

Circuit.

Line Space Code Circuit — (Figure 3-5) When the line space switch (S9) is operated, a 2 code is perforated in the tape. This is due to the K2 relay being energized, completing a circuit to LP2. The circuit to K2 is as follows: from -DC, TC6, PTC, JP11, N/O S2, N/O S9, N/C S5, TA22, K2 coil, TA36, TC5, to +DC. With K2 energized, the circuit to LP2 is as follows: from -DC, TC6, JP13, PTC, JP11, N/O S2, JP12, PLC, JP14, TA16, K4 - 13 and 14, TA32 and 33, K2 - 2 and 1, TA21, JP2, LP2, JP15, TC5, to +DC.

The circuit to the clutch magnet, causing punch operation, is the same as explained in Stop Code Circuit.

Code Delete Circuit — When the code delete switch S3 is operated, the K2, K3, and K8 relays are energized, completing circuits to all six punch magnets and the clutch magnet. The circuits

to the K2, K3 and K8 relays are similar to the circuits previously explained (Stop Code, Skip Code, etc.).

With the S3 switch operated, the clutch magnet circuit is complete when the PCC (punch common contacts) close. Also, due to S3 being operated, there will not be an anti-repeat circuit (holding circuit to K4 relay — see Figure 3-2). Therefore, as long as the S3 switch is held operated, the punch will continue to perforate the code 1-2-3-4-5-6.

READER AND TRANSLATOR CIRCUITS

Start and Stop Circuits — (Figure 3-6) The start read switch (S6), when depressed and released, will energize the reader magnet (LRM) and start a reader cycle of operation. In order to energize the reader magnet, a circuit is first completed to the reader control relay (K7) as follows:

Circuit Description

from -DC, TC6, JR10, RTC, JR13, N/O S6, N/C S7, TA29, K7 coil, TA37, TC5 to +DC. The K7 relay is energized, closing all three of its normally open contacts. When K7 contacts 3 and 4 close, a holding circuit to K7 is completed as follows: from -DC, TC6, JR10, RTC, the normally closed transfer contacts of RC1-RC2-RC3-RC4 and RC6, JR8, TA18, K7 - 3 and 4, TA8, N/C S7, TA29, K7 coil, TA37, TC5, to +DC.

When the S6 switch is released, the reader magnet is energized as follows: from -DC, TC6, JR10, RTC, JR13, N/C S6, CRTC, TA19, K6 - 12 and 11, TA20, K7 - 12 and 11, TA28, JR11, LRM, JR12, TC5, to +DC. Once the circuit to the reader magnet is established it will remain energized and the reader will operate continuously until either; the reader magnet circuit is broken auto-

matically (explained under Delay Control and Stop Code Circuits) or, the stop read switch S7 is manually depressed.

When the stop read switch S7 is depressed, the holding circuit to the K7 relay is broken. Thus, when the K7 contacts 11 and 12 open, the reader magnet is de-energized, stopping reader operation.

Translator Magnet Circuits — When a reader pin senses a code in the tape, a corresponding reader contact closes, completing a circuit to the translator magnet related to the reader contact.

For an example circuit, assume that a 1-2 code is read in the reader tape. The translator magnets LT1 and LT2 will be energized as follows: (Figure 3-7) from -DC, TC6, JR10, RTC, RC1 and RC2, JR1 and JR2, JTA1 and JTA2, LT1 and
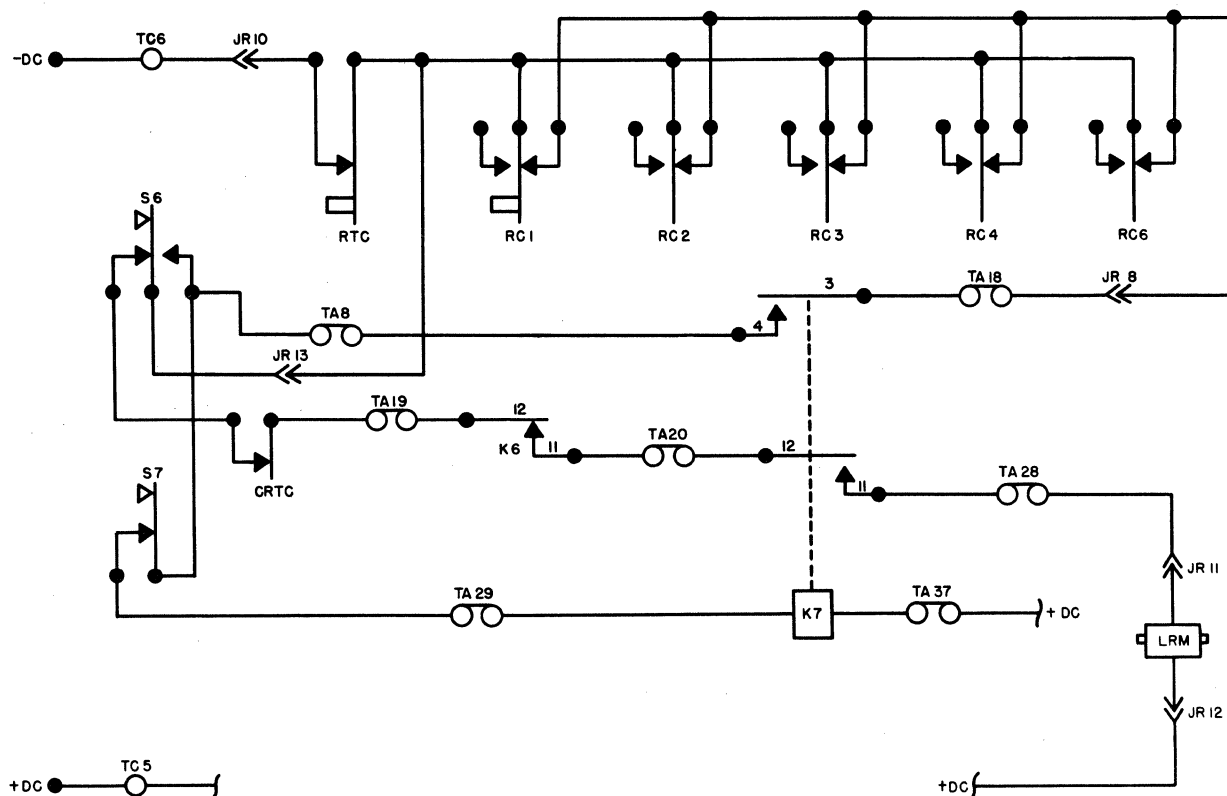
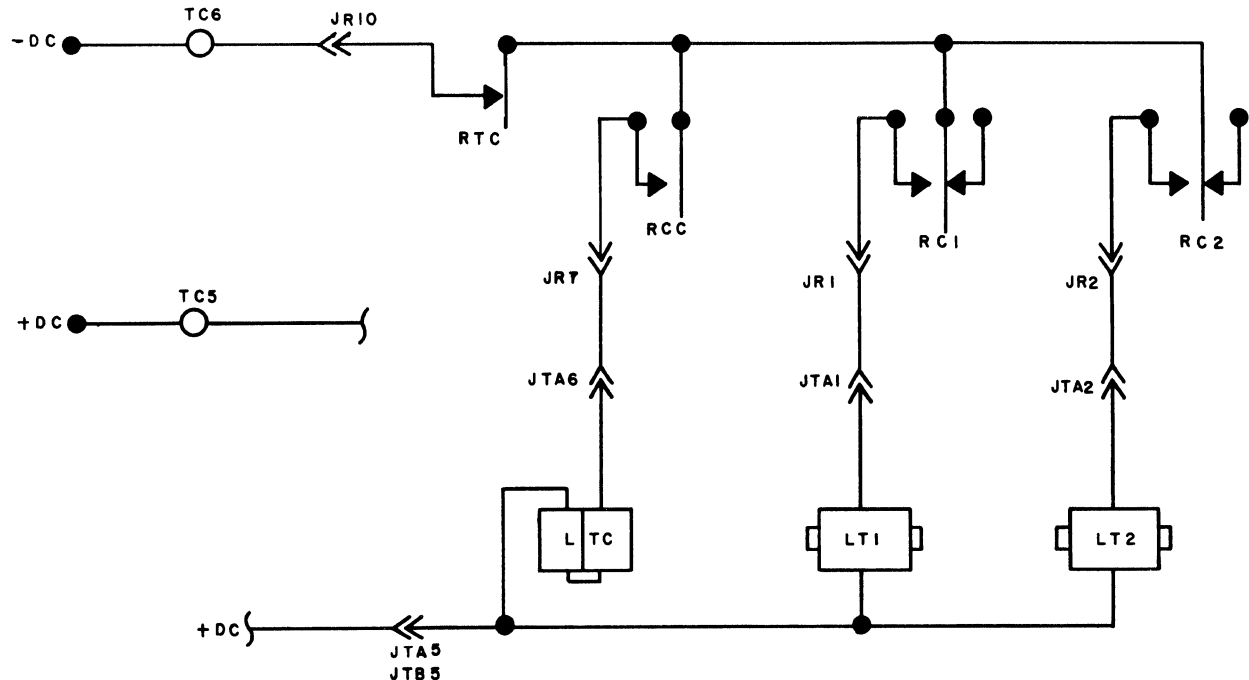

Figure 3-6   Start and Stop Circuit

Figure 3-7   Example Translator Magnet Circuit

LT2, JTA5, TC5, to +DC. The reader common contact (RCC) closes during each reader cycle of operation, completing a circuit to the translator clutch magnet as follows: from -DC, TC6, JR10, RTC, RCC, JR7, JTA6, LTC, JTB5, TC5, to +DC.

Delay Control Circuit (Figure 3-8) An automatic delay control circuit is used in the Model FG machine in order to delay the operation of the tape reader until the carriage return or tab function has been completed in the writing machine. The code for carriage return is 4, while the tab code is 6. Thus, when either RC4 or RC6 contacts operate, a circuit is completed to the delay control relay (K6), breaking the circuit to the reader magnet and stopping reader operation.

For an example operation, assume that a carriage return code 4 is read by the tape reader. A circuit would be completed to the K6 relay as follows: from -DC, TC6, JR10, RTC, RC5, RC3, RC1, RC2, RC4, RC6, JR9, TA9 and 10, K7 - 1

and 2, TA30, K6 coil, TA36, to +DC. When K6 is energized, K6 contact transfers (12 strap breaks with 11 strap and makes with 13 strap) thus breaking the energizing circuit to the reader magnet, stopping reader operation. Also, when K6-12 and 13 makes, a holding circuit to K6 coil is completed.

At the same time the above circuit is completed to K6, a circuit is also completed to the LT4, and the translator clutch magnet LTC. Thus, translator operation takes place, causing carriage return operation. As a result of the carriage return function, the CRTC contact breaks, thus breaking the holding circuit to K6. The K6 contacts return to their normal position but the circuit to the reader magnet will not be complete until the carriage returns to the left hand margin and the clutch toggle unlocks. When this happens, the CRTC contact closes, completing the energizing circuit to the reader magnet, starting reader

Circuit Description
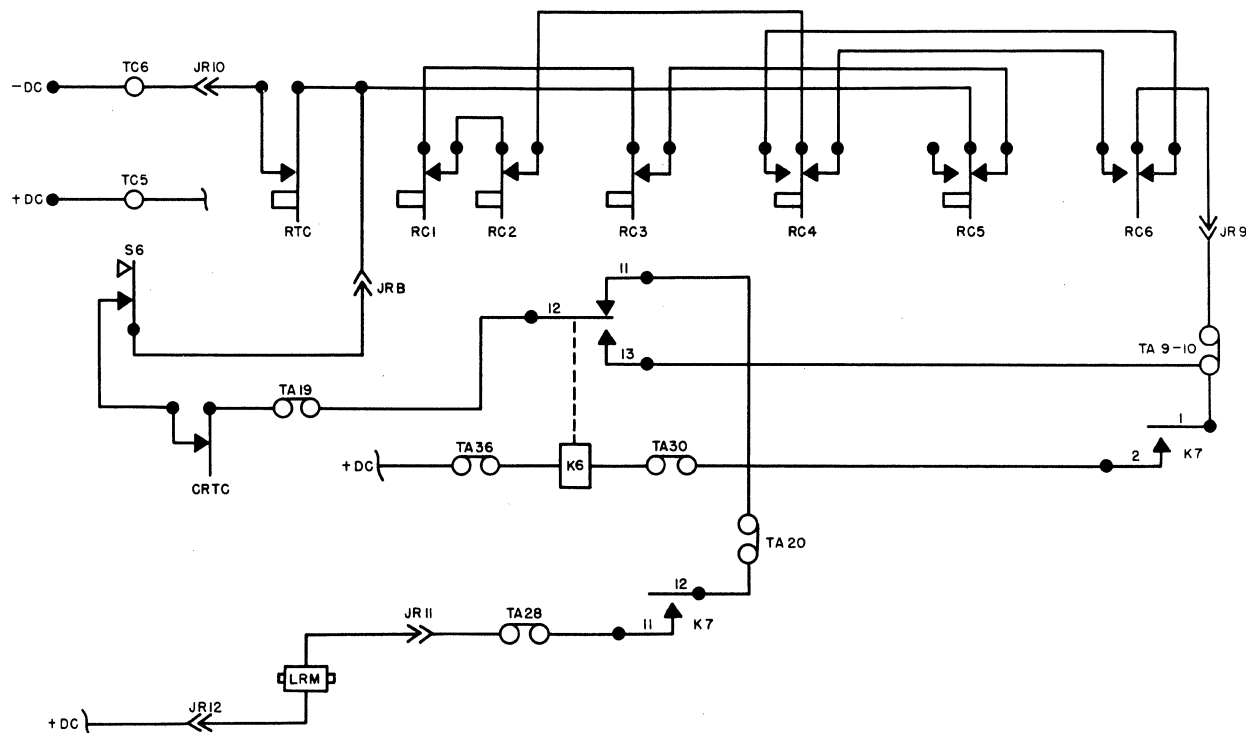
Figure 3-8   Delay Control Circuit

operation again.

Stop Code Circuit — When a stop code 1-2-3-4-6 is read by the reader, the holding circuit for the K7 relay will be broken (Figure 3-6), thus de-energizing the reader magnet and stopping the reader operation. A normally closed contact on RC1, RC2, RC3, RC4 and RC6 completes a holding circuit through K7 contact 3 and 4 to the K7 coil. If all these contacts were to open simultaneously, the K7 relay would de-energize, opening contact K7 - 11 and 12, breaking circuit to LRM.

A normally open contact on RC5 is provided to hold the K7 energized when the delete code 1-2-3-4-5-6 is read by the reader.

Figure 3-9 Model FG-80 Wiring Diagram

1055283

Figure 3-10 Model FG-40 Wiring Diagram

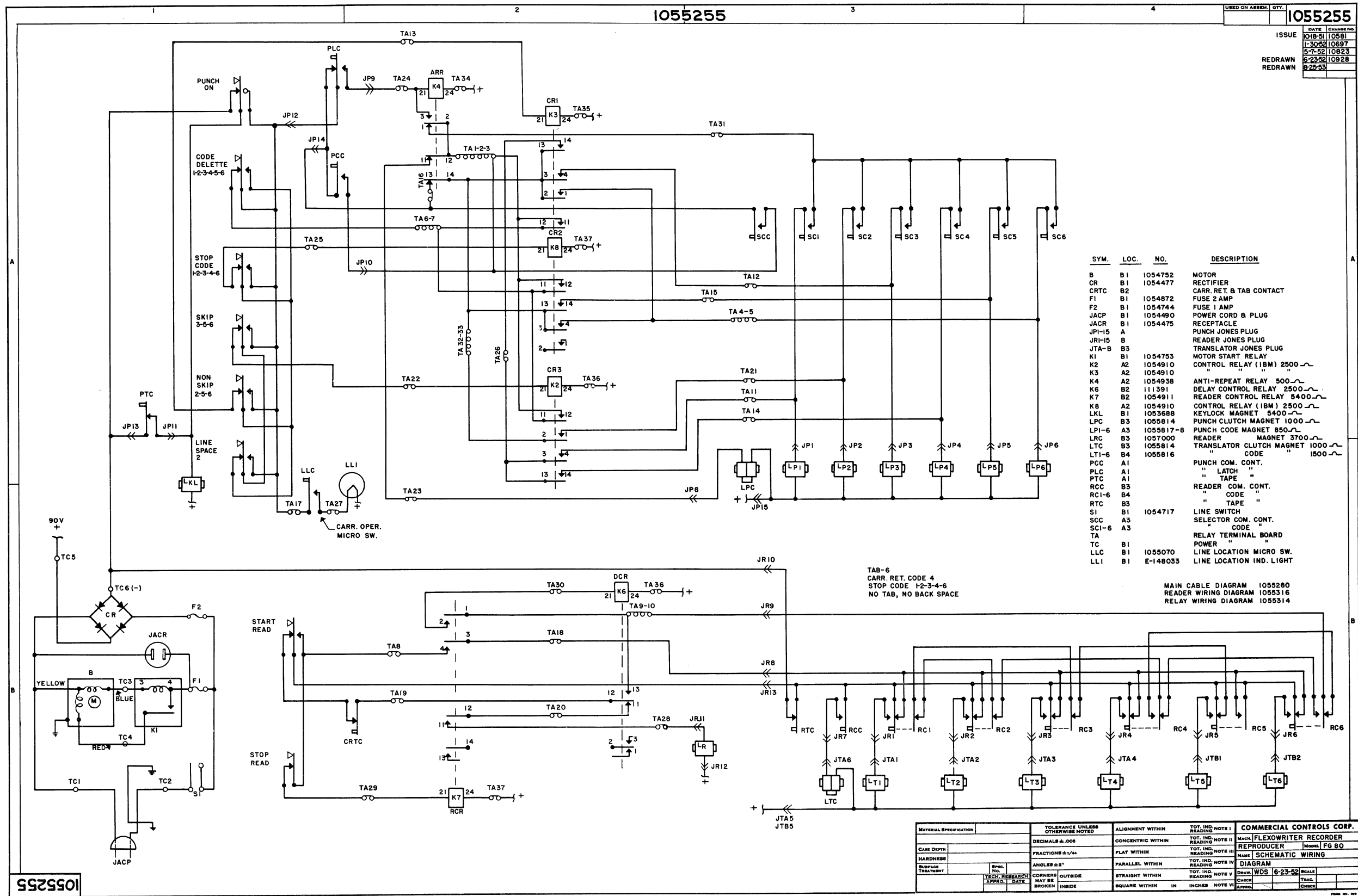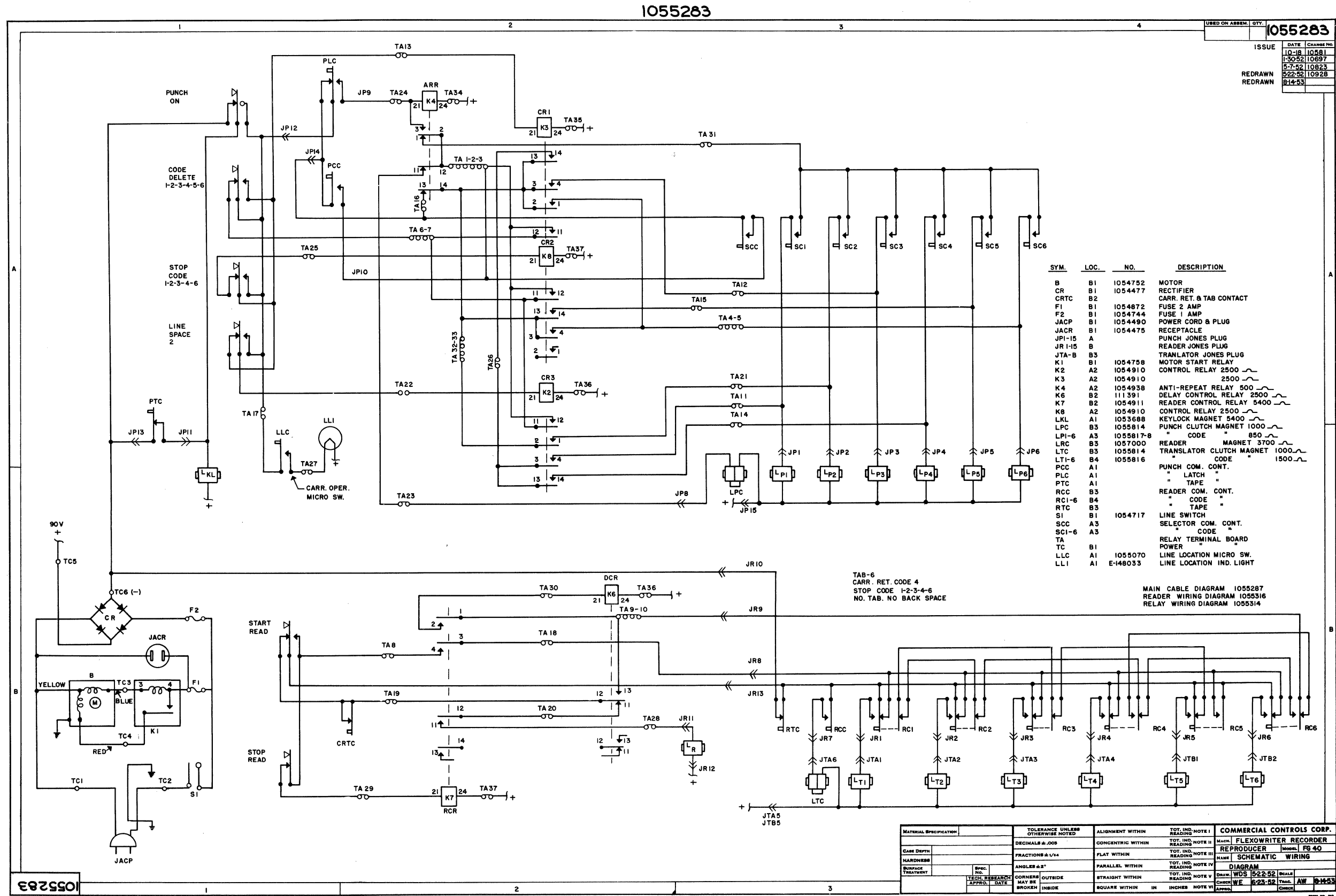| SYM.	LOC.	NO.	DESCRIPTION
B	B1	1054752	MOTOR
CR	B1	1054477	RECTIFIER
CRTC	B2		CARR. RET. & TAB CONTACT
F1	B1	1054872	FUSE 2 AMP
F2	B1	1054744	FUSE 1 AMP
JACP	B1	1054490	POWER CORD & PLUG
JACR	B1	1054475	RECEPTACLE
JP1-15	A		PUNCH JONES PLUG
JR1-15	B		READER JONES PLUG
JTA-B	B3		TRANLATOR JONES PLUG
K1	B1	1054758	MOTOR START RELAY
K2	A2	1054910	CONTROL RELAY 2500
K3	A2	1054910	2500
K4	A2	1054938	ANTI-REPEAT RELAY 500
K6	B2	111391	DELAY CONTROL RELAY 2500
K7	B2	1054911	READER CONTROL RELAY 5400
K8	A2	1054910	CONTROL RELAY 2500
LKL	A1	1053688	KEYLOCK MAGNET 5400
LPC	B3	1055814	PUNCH CLUTCH MAGNET 1000
LP1-6	A3	1055817-8	" CODE 850
LRC	B3	1057000	READER MAGNET 3700
LTC	B3	1055814	TRANSLATOR CLUTCH MAGNET 1000
LT1-6	B4	1055816	" CODE 1500
PCC	A1		PUNCH COM. CONT.
PLC	A1		" LATCH
PTC	A1		" TAPE
RCC	B3		READER COM. CONT.
RC1-6	B4		" CODE
RTC	B3		" TAPE
S1	B1	1054717	LINE SWITCH
SCC	A3		SELECTOR COM. CONT.
SC1-6	A3		" CODE
TA			RELAY TERMINAL BOARD
TC	B1		POWER
LLC	A1	1055070	LINE LOCATION MICRO SW.
LL1	A1	E-148033	LINE LOCATION IND. LIGHT

TAB-6
CARR. RET. CODE 4
STOP CODE 1-2-3-4-6
NO. TAB. NO BACK SPACE

MAIN CABLE DIAGRAM 1055287
READER WIRING DIAGRAM 1055316
RELAY WIRING DIAGRAM 1055314

COMMERCIAL CONTROLS CORP.
FLEXOWRITER RECORDER
REPRODUCER Model FG 40
SCHEMATIC WIRING DIAGRAM

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