



FX-1 FLEXOWRITER TROUBLESHOOTING NOTES

PBC 4112

Packard Bell



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INTRODUCTION

This publication contains information concerning the common troubles which may be encountered during the installation, operation, checkout and maintenance of the FX-1 Flexowriter supplied with the PB250 Computer manufactured by Packard Bell Computer Corporation, Los Angeles, California. Adjustment procedures for the correction of these troubles and certain customer performed adjustments are also included in this manual.

The information provided herein is for the use of technical personnel engaged in computer operation and maintenance functions. It is assumed that such personnel are familiar with basic computer technology or have completed a training program conducted by Packard Bell Computer Corporation.



FX-1 FLEXOWRITER

TROUBLESHOOTING NOTES

A. GENERAL

Refer to Figure 1 and Figure 2 as necessary during the performance of the following troubleshooting and adjustment procedures. A short glossary of terms and detailed Flexowriter specifications are provided for reference in the appendix of this manual. Refer to Volume 2 of PBC1002, PB250 Technical Manual for general information relating to the Flexowriter.

B. FLEXOWRITER TROUBLES

Common Flexowriter troubles are listed in Table 1. Refer to Figure 1 for location of specified component contacts.

Table 1. (Sheet 1 of 4)

COMMON FLEXOWRITER TROUBLES

On-Line	Trouble	Cause	Remarks
Input	Incorrect Flexowriter loading from reader	Faulty SR (X) Contact Adjustment Defective buffer gates Bad $Rf\overline{Tf}$	See reader contact adjustment, paragraph C-8.



Table 1. (Sheet 2 of 4)

COMMON FLEXOWRITER TROUBLES

On-Line	Trouble	Cause	Remarks
Input	Incorrect Flexo-writer loading from reader	Faulty mechanical adjustments	See selector slide contact adjustment paragraph C-9.
		Reader dirty	
	Incorrect Flexo-writer loading from key board	Faulty SS contact adjustment	
		Defective buffer gates	
		Bad $\overline{RfTf}$ signal	
	Computer hangs in TES line 35) ₈	Open leads; $\textcircled{Bp}$ contacts not "making"	
Output	Computer hangs in TES line 36) ₈	Open leads; SRC or SSC contacts not "making"	Combining translator magnet pulses
	Computer hang in TES line 37) ₈	$\textcircled{Tb}$ contacts hung up or shorted	
	Incorrect Flexo-writer type-out	Defective transistor in TD-100	
		Defective type gates	
		Defective Flexo-writer letter or number cam	



Table 1. (Sheet 3 of 4)

COMMON FLEXOWRITER TROUBLES

On-Line	Trouble	Cause	Remarks
Output	Incorrect Flexo- writer type-out	Translator hook not over key lever stud	Combining translator magnet pulses
		Type bar binding in guide	
		Translator dirty and slow	
		Shorted or open arc suppressor circuit	
		Memory line 05 out of adjustment	
		Translator clutch out of adjustment	See translator magnets and clutch adjustment paragraph C-10.
	Flexowriter misses first charactor on Type-Out (after carriage return)	(Tb) signal fails to stay true	See (Tb) adjustment, paragraph C-1
Output		Key lock bail remain closed	CRT-1 contacts 1 and 2 fail to close before (Tb) signal CRT-2 con- tacts 4 and 5 open


Table 1. (Sheet 4 of 4)
COMMON FLEXOWRITER TROUBLES

On-Line	Trouble	Cause	Remarks
Output	On type-out of sector using OUP, Flexowriter carriage return causes storage of WOC command into line when BREAK-POINT is depressed	CRT-1, Contacts 1 and 2 not closed long enough	See SCRT-1 adjustment, paragraph C-7
	Flexowriter punches code holes when tape feed is depressed	Defective TD-100	
		Shorted arc suppressor circuit	
		Faulty mechanical adjustment of punch	
	Flexowriter punches incorrectly	Shorted arc suppressor circuit	
		Caulty mechanical adjustment of punch	
		C Register delay too short	
		Selector slide stack or selector contact shorted	
	Malfunction of Flexowriter during normal "off-line" operations		Disconnect computer and insert shorting plug JL-2
			Type and punch test tape consisting of each character, number and function - Read tape with punch on

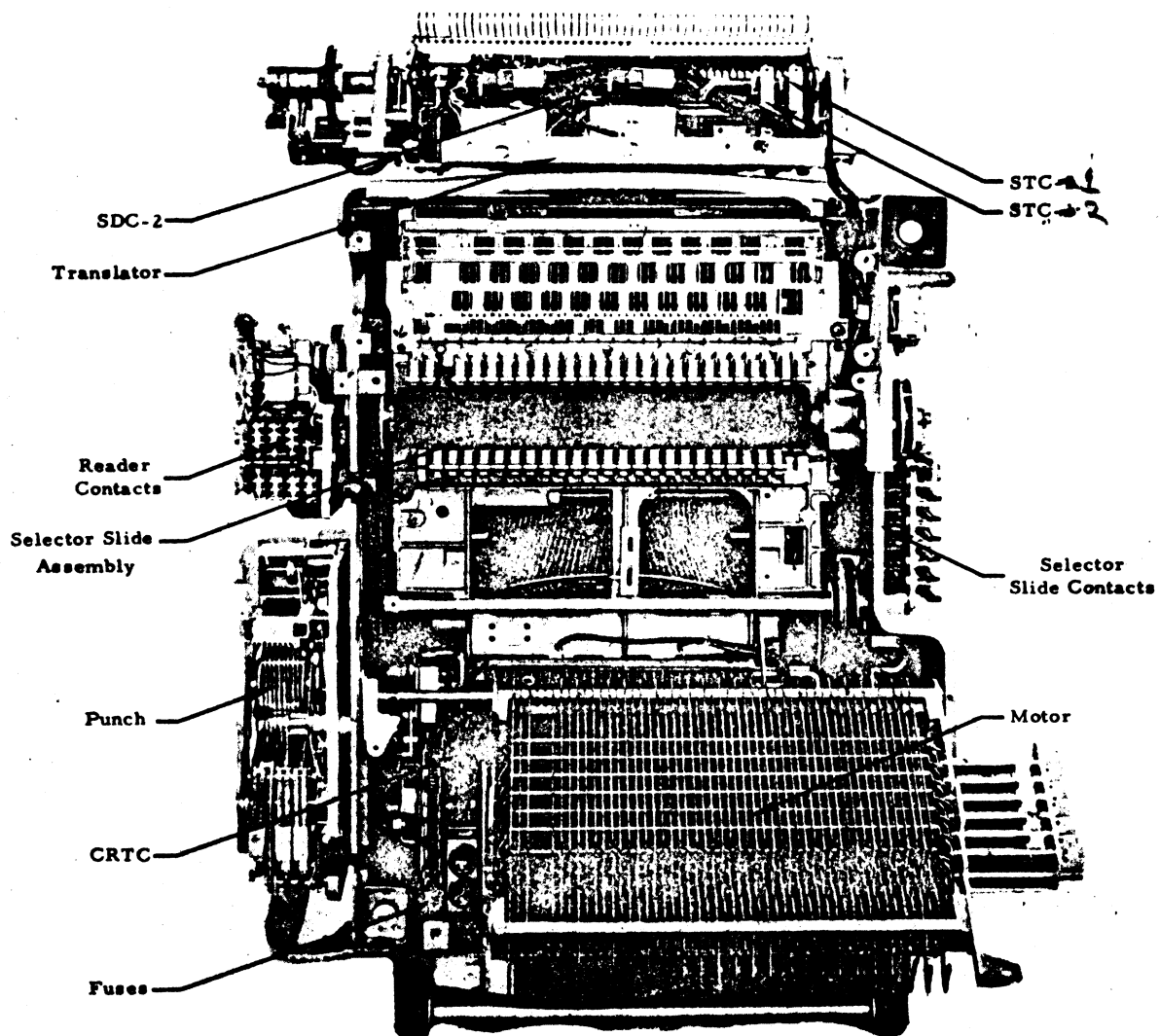


Figure 1. FX-1 Flexowriter (Bottom View)



C. FLEXOWRITER ADJUSTMENTS

The following tools are required to perform the typewriter busy Tb signal adjustments: (1) oscilloscope, (2) ohmmeter, (3) timing dial, (4) screwdrivers (Philips and regular), (5) spring hook, (6) bristol wrenches (assorted sizes).

C-1. INPUT (Tb) SIGNAL ADJUSTMENTS

If the input typewriter busy signal ((Tb) , Figure 3) is observed coming "false" before completion of the type cycle or carriage return and tab, perform the following adjustments:

- a. Disconnect the Flexowriter input/output cables and attach ohmmeter between pins 32 and 33 of plug JL-1.
- b. Turn Flexowriter off and remove reader cover.
- c. To test the normal typeout (Tb) signal, generated by contacts 2 and 3 of STC-2, release translator clutch and cycle Flexowriter by pulling motor belt. If ohmmeter does not show continuity throughout the translator cycle, remove translator and inspect the STC-2 contacts. Make certain that contacts are "making" from approximately 15 degrees to 320 degrees by attaching timing dial to translator clutch and observing ohmmeter. Check contact operator for smooth cam action. If cam action is not smooth it can cause the contacts to bounce at high speed. Contacts 2 and 3 of STC-2 are the cam operated contacts located nearest the clutch on the translator clutch shaft.

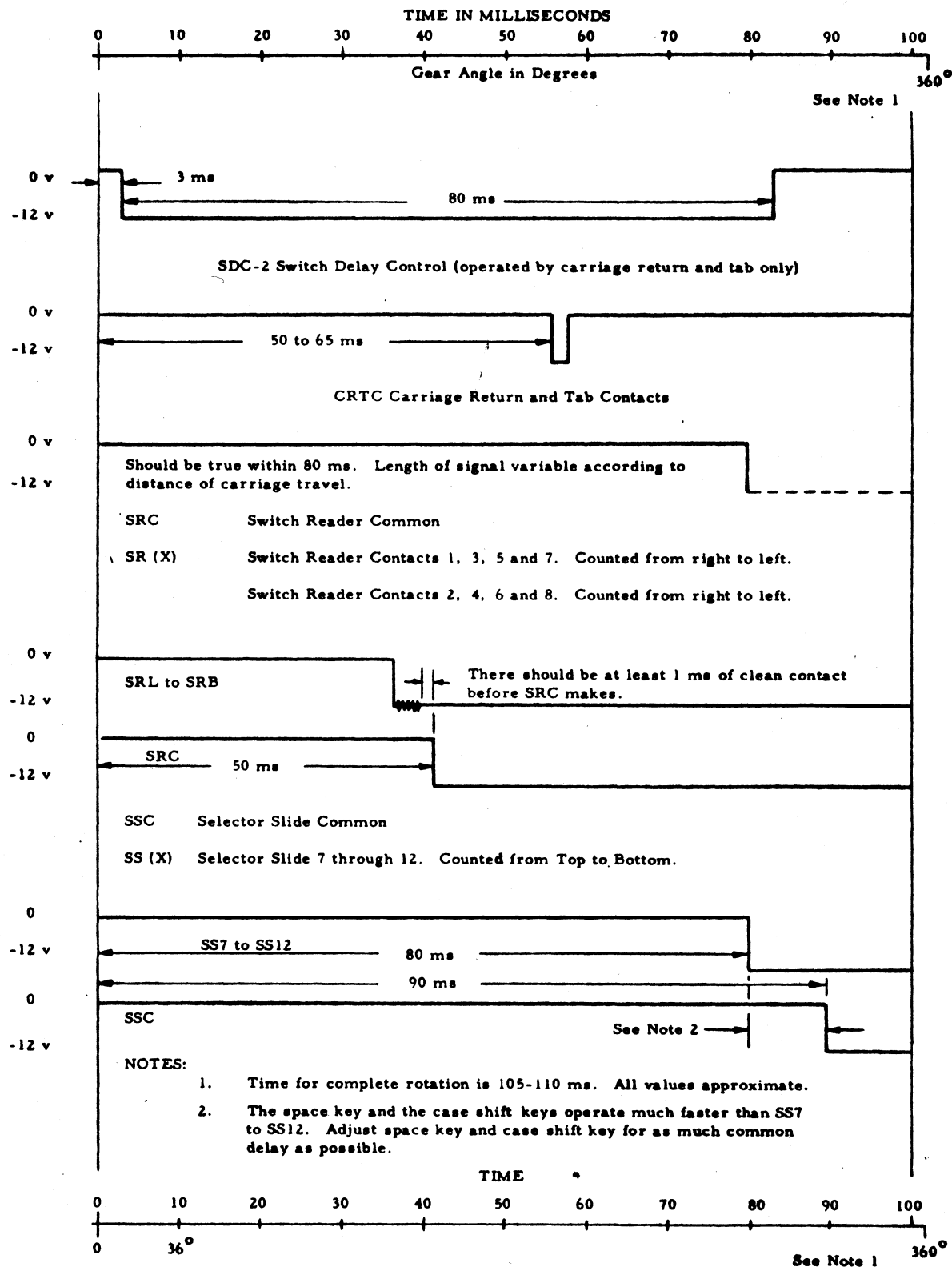


Figure 3. Signal Wave Forms



C-2. CARRIAGE RETURN (Tb) SIGNAL ADJUSTMENTS

To check the operating sequence of all carriage return (Tb) contacts, remove the POWER ON 2-AMP fuse, trip translator magnets 2, 3, 4, 6, and clutch. Attach the ohmmeter across pins 32 and 33 of plug JL-1 and cycle Flexowriter. (Tb) signal should remain true the length of carriage return as shown in Figure 4.

Typeout failure on carriage return, can be caused by the faulty adjustment of the following five contacts which are listed in order of operation.

- 1) STC-2, contacts 1 and 2
- 2) SDC-2, contacts 4 and 5
- 3) SDC-1, contacts 2 and 3
- 4) RDC, contacts 5 and 6
- 5) SCRT-2, contacts 4 and 5
- 6) SCRT-1, contacts 1 and 2

C-3. STC-2 CONTACT ADJUSTMENT

Refer to paragraph C-1 for adjustment of the STC-2 contacts.

C-4. SDC-2 AND SDC-1 CONTACT ADJUSTMENTS

SDC-2, contacts 4 and 5 provide a momentary (Tb) signal to the computer while SDC-1, contacts 2 and 3 pick up relay delay control (RDC). These contacts are operated by the carriage return and tab keys as long as the key is pulled down by the translator. The contacts are located in the center of the translator shaft. Remove the translator and translator cover



(Tb) signal during CR or tab

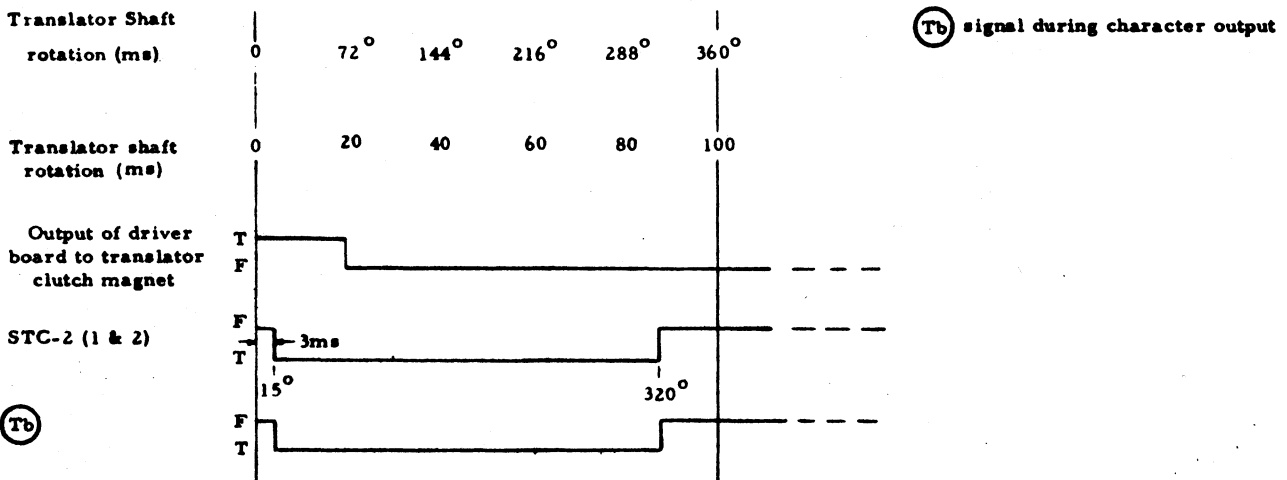
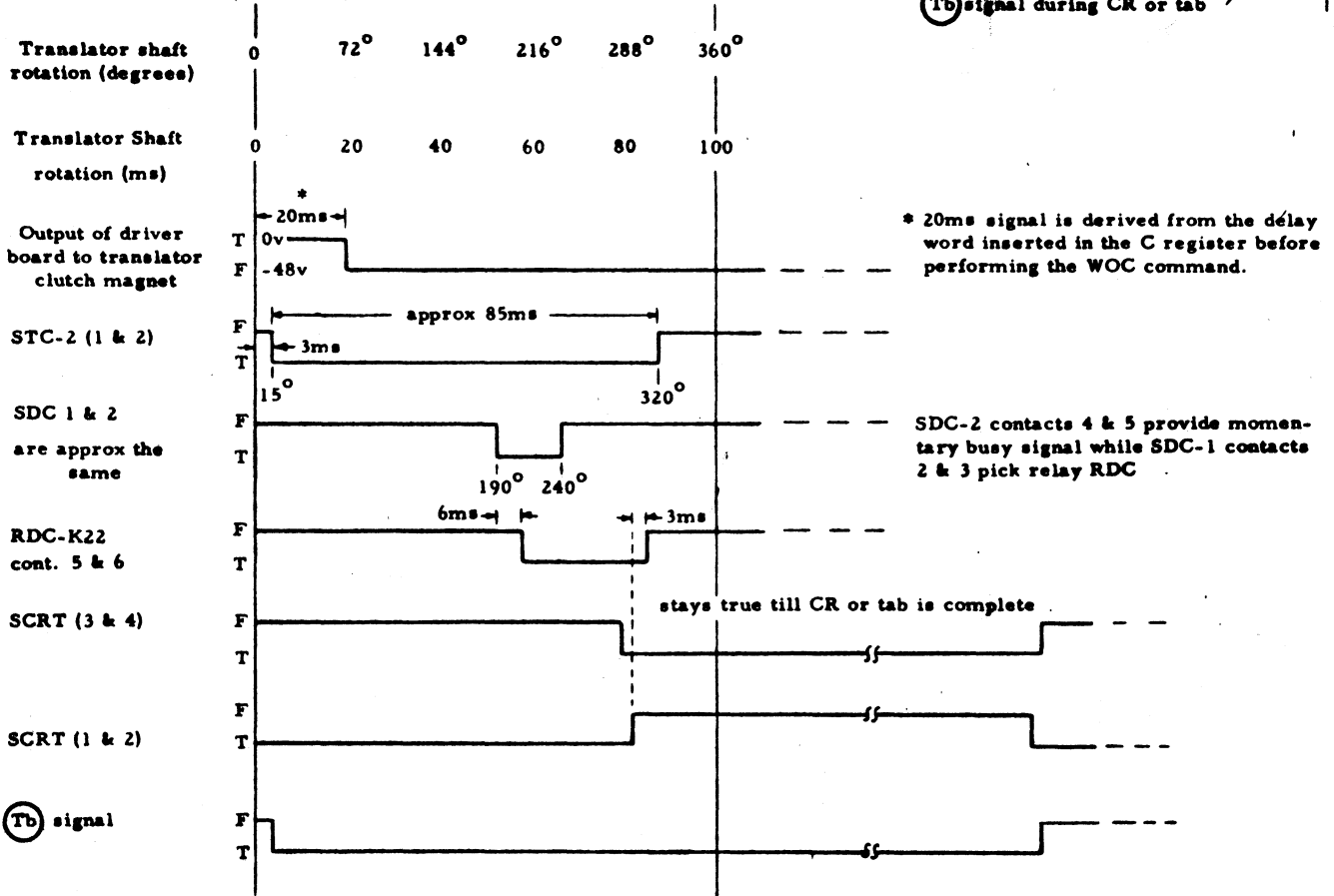


Figure 4. Contact Wave Forms and Location Chart

and adjust SDC-1 contacts 2 and 3 to "make" at the same time as contacts 4 and 5, with a gap of approximately 0.015 inch.

C-5. RDC CONTACT ADJUSTMENT

RDC, contacts 4 and 5 of K22, provides the (Tb) signal to the computer until the SCRT contacts are operated. To adjust RDC contacts 4 and 5 remove Flexowriter relay cover and locate relay K22. Check contact for dirt, proper "make" (approx. 0.005 wipe on contacts) broken or shorts, etc.

C-6. SCRT-2 CONTACT ADJUSTMENT

SCRT-2, contacts 4 and 5, which supply the (Tb) signal to the computer for the length of carriage travel are located to the left of the rectifier. To adjust, remove punch cover, tilt Flexowriter up and remove bottom cover plate. Remove punch, working through punch entrance, adjust contacts to 0.010 inch gap.

C-7. SCRT-1 CONTACT ADJUSTMENT

SCRT-1, contacts 1 and 2 are located and accessible the same as SCRT-2 (see paragraph C-6). Their purpose is to open the internal dc power line in the Flexowriter and drop out RDC at the same time the keylock magnet is de-energized, allowing the keylock bail to block typing during carriage return or tab. These must be adjusted to make before SCRT-2, contacts 4 and 5 "break" or "break" after 4 and 5 "make".

C-8. READER CONTACT ADJUSTMENTS

The computer input contacts of the Flexowriter reader are the middle set of contacts in each stack. The contact stacks are counted with the machine

tilted on back as follows: SCR, SR1, SR3, SR5, SR7 from right to left on bottom. On top from right to left: SRT, SR2, SR/, SR6, SR8. The reader contacts must be adjusted in relation to the reader common. The gap setting of the common from C contact should be 0.040 and 0.005. The reader contacts SR-1SR8 gap should be approximately 0.020. The best check of these contacts is the Bootstrap Program RPT and LAI with no tape in reader and blank tape in reader.

C-9. SELECTOR SLIDE CONTACT ADJUSTMENT

The computer input contacts of the selector slides are the inside set of the selector slide contacts, with a gap setting of approximately 0.015 inch with selector slides in position. The selector slide common with a gap of 0.040 - 0.005 inch is the outside, first set of contacts toward the front of the Flexowriter. With the Flexowriter tilted back, the contacts are counted as follows: Outside top to bottom, SSC, SS1, SS2, SS4, SS5, SS6; inside top to bottom, SS7, SS8, SS9, SS10, SS11, SS12.

C-10. TRANSLATOR MAGNETS AND CLUTCH OUTPUT SIGNAL ADJUSTMENT

The output signal from the computer to the Flexowriter translator magnets is direct. The common return, however, is controlled by the form C contacts of RRP-2 (K8, contacts 1, 2, and 3). During off-line operation, RR picks and transfers 2 to 3, breaking computer common return. Check that contacts are clean, have no shorts, and that they transfer properly when the relay is picked.



C-11. PUNCH MAGNETS AND CLUTCH OUTPUT SIGNAL ADJUSTMENT

Adjustment for the punch magnets and clutch are the same as for the translator magnets and clutch, described in paragraph C-10 except that the form C contacts of RPB-2 (K8, contacts 1, 2, and 3) control the computer common return.

RPC K13?

C-12. TYPE LIGHT ADJUSTMENT

The indicator light is connected directly to a voltage source. If the indicator light is not illuminated check for loose or damaged bulb.



APPENDIX A
FX-1 FLEXOWRITER SPECIFICATIONS

SPECIFICATION

The following information is abstracted from Packard Bell Computer Corporation Specification 678-1A2137, which describes a Flexowriter Recorder, Reproducer, Receiver, Transmitter, manufactured by Commercial Controls Corporation, a subsidiary of Friden Calculating Machine Company Incorporated, for use with the PB250 Computer.

- 1) Basic Model FL with 12 inch carriage, standard 6 lines per inch friction feed platen. Paint finish to Packard Bell Computer Corporation Specification 678-1A2139.
- 2) Control Voltage: 48 volts dc
- 3) Standard alignment
- 4) Elite Gothic Inverted type style for alphabetic characters (slugs 1083518 through 1083543), plus special type slugs listed in Table A-1.

Table A-1. (Sheet 1 of 2)

SPECIAL TYPE SLUGS AND CODING

Position	Upper Case	Lower Case	Slug No. or Panel Switch
3	✓	2	1081209
7	=	3	1087659
11	[	4	1084705
15	]	5	1081902

Table A-1. (Sheet 2 of 2)

SPECIAL TYPE SLUGS AND CODING

Position	Upper Case	Lower Case	Slug No. or Panel Switch
19	Ω	ϕ	1085692
23	&	7	1081900
27	*	8	1084681
31	(	9	1081877
35	)	0	1081849
39	π	1	1087777
43	?	+	1081491
38	:	;	1088982
42	"	'	1088979
41	—	-	1085585
36		.	1088980
32		,	1088981
40	/	\$	1081550

- 5) The code sequence for the tape shall be as indicated in Figure A-1.

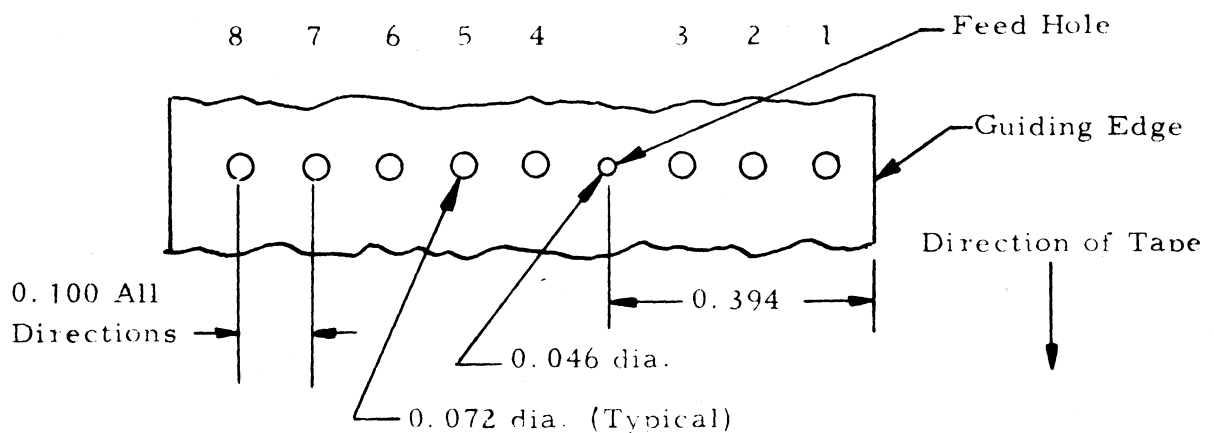


Figure A-1. Tape Code Sequence

- 6) The code for each character shall be as indicated in Table A-2.

Table A-2. (Sheet 1 of 3)

CODE CHART

Position	Character	Tape Code	Selector Code	Translator Code
R	Upper Case	2-4-5-6	(C) -2-4-5-6	↑ Same as Tape Code ↓
S	Tab	2-3-4-5-6	(C) -2-3-4-5-6	
T	Space Bar	5	(C) -5	
U	_____	_____		
1	Q	4-5	(C) -4-5	
2	A	1-6	(C) -1-6	
3	✓over 2	2	(C) -2	
4	Z	1-4-6	(C) -1-4-6	
5	W	2-3-6	(C) -2-3-6	
6	S	2-5-6	(C) -2-5-6	
7	= over 3	1-2-5	(C) -1-2-5	
8	X	1-2-3-5-6	(C) -1-2-3-5-6	
9	E	1-3-5-6	(C) -1-3-5-6	
10	D	3-6	(C) -3-6	
11	[over 4	3	(C) -3	
12	C	1-2-5-6	(C) -1-2-5-6	
13	R	1-4	(C) -1-4	
14	F	2-3-5-6	(C) -2-3-5-6	
15	]over 5	1-3-5	(C) -1-3-5	
16	V	1-3-6	(C) -1-3-6	
17	T	1-2-6	(C) -1-2-6	
18	G	1-2-3-6	(C) -1-2-3-6	

A-5

Table A-2. (Sheet 2 of 3)
CODE CHART

Position	Character	Tape Code	Selector Code	Translator Code
19	Ω over 6	2-3-5	(C) -2-3-5	↑ Same as Tape Code ↓
20	B	2-6	(C) -2-6	
21	V	4-5-6	(C) -4-5-6	
22	H	4-6	(C) -4-6	
23	& over 7	1-2-3	(C) -1-2-3	
24	N	1-3	(C) -1-3	
25	U	3-5-6	(C) -3-5-6	
26	J	1-5	(C) -1-5	
27	* over 8	4	(C) -4	
28	M	3-5	(C) -3-5	
29	I	1-4-5-6	(C) -1-4-5-6	
30	K	2-5	(C) -2-5	
31	(over 9	1-4-5	(C) -1-4-5	
32	, over ,	1-2-4-5-6	(C) -1-2-4-5-6	
33	O	2-3	(C) -2-3	
34	L	1-2	(C) -1-2	
35	) over 0	6	(C) -6	
36	. over .	1-2-4-6	(C) -1-2-4-6	
37	P	1-2-3-5	(C) -1-2-3-5	
38	: over 3	5-6	(C) -5-6	
39	π over 1	1	(C) -1	
40	/ over \$	1-5-6	(C) -1-5-6	
41	- over -	1-2-3-4-5	(C) -1-2-3-4-5	
42	" over '	1-2-4-5	(C) -1-2-4-5	
43	? over +	2-3-4-5	(C) -2-3-4-5	



Table A-2. (Sheet 3 of 3)

CODE CHART

Position	Character	Tape Code	Selector Code	Translator Code
V	Carr. Ret.	-	-	↑ Same as Tape Code ↓
W	Uncoded	-	-	
Z	Lower Case	3-4-5-6	Ⓒ -3-4-5-6	

- 7) Switches S1 through S10 are on the Flexowriter keyboard (see Figure A-2). Table A-3 lists functions of switches.
- 8) All wiring shall be in accordance with Packard Bell Computer Corporation schematic 350-1J2051, arc suppression and line filter to be supplied as shown. Contacts shall be suppressed in accordance with Computer Controls Corporation drawing No. 1292-300. Relays and solenoids shall have arc suppression circuits as listed in Table A-4.
- 9) Feedback circuit must be closed when the Flexowriter is not conditioned to print.
- 10) Units are supplied with grey 6 foot power cord, terminated with Royal Electric Co. No. PA3 3-pin plug, or equivalent.
- 11) SSC and SRC shall be form C contacts.
- 12) The timing of SSC shall be related to SS1 through SS12, so that SS1 through SS12 close before SSC closes, and SSC opens before SS1 through SS12 open, with 0.040 inch gap adjustment of SSC, contacts 3 and 4.
- 13) The timing of SRC shall be related to SR1 through SR8 so that



SR1 through SR8 close before SRC closes, and SRC opens before SR1 through SR8 open, with 0.045 ± 0.005 inch gap adjustment of SRC (form C, made side) and 0.022 inch gap adjustment of SR1 through SR8.

- 14) STC-2 contacts shall be adjusted to make 13° , break 320° . SCRT-2 contacts 4 and 5 shall be adjusted to 0.010 inch gap.
- 15) Connections from Flexowriter components to pins of JL-1 connector shall be as listed in Table A-5. JL-1 shall be Cannon KOA 2-21L-50SN Position N.
- 16) Connections from Flexowriter components to pins of JL-2 connector shall be as listed in Table A-6. JL-2 shall be Cannon KOA 2-21L-50SN Position Y.

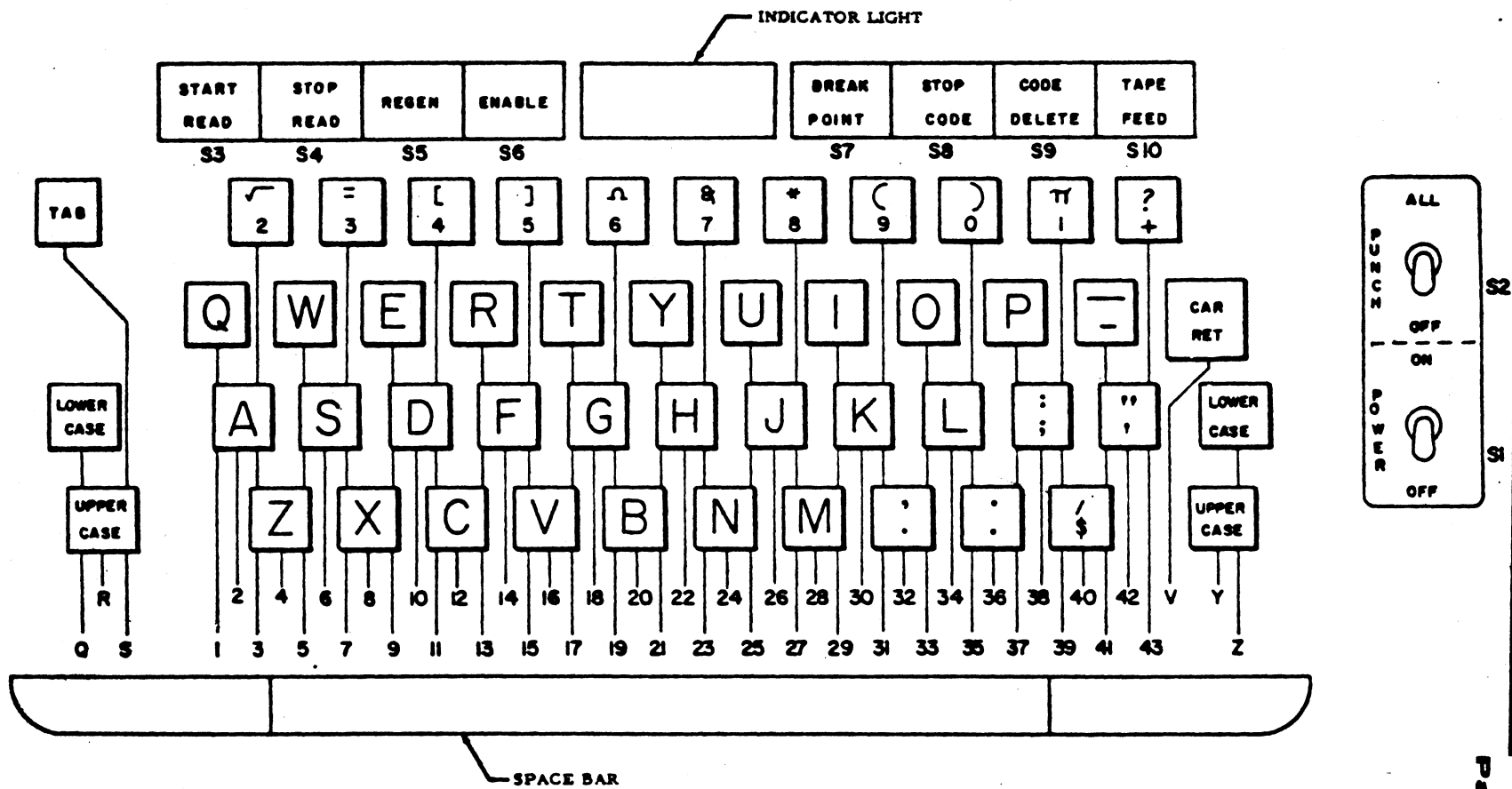


Figure A-2. Flexowriter Keyboard



Table A-3. (Sheet 1 of 2)

KEYBOARD CONTROLS

Reference Designation	Marking	Function
S1	POWER	In ON position, Flexowriter motor is on. In OFF position, Flexowriter motor is off.
S2	PUNCH	In ALL position, punches tape for all characters. In OFF position, prevents operation of tape punch.
S3	START READ	When depressed, puts tape reader in operation for off-line typing from prepared tapes.
S4	STOP READ	Manually depressed to stop tape reader during off-line typing.
S5	REGEN	When depressed while PUNCH switch is in ALL position, causes automatic duplication of tapes read by tape reader.
S6	ENABLE	When depressed, interrupts computation and conditions use of other keys and switches on Flexowriter.



Table A-3. (Sheet 2 of 2)

KEYBOARD CONTROLS

Reference Designation	Marking	Function
S7	BREAKPOINT	When depressed, sends a signal to the PB250 Computer which may be tested by the TES command and with ENABLE switch will clear parity flip-flop, as indicated by illumination of PARITY light.
S8	STOP CODE	When depressed with PUNCH switch in ALL position, punches code in tape. When tape is read, this code will automatically stop the tape reader.
S9	CODE DELETE	When depressed, punches 1-2-3-4-5-6 code in tape. If PUNCH switch is in ALL position, and both TAPE FEED switch and CODE DELETE switch are depressed, a series of delete codes are punched.
S10	TAPE FEED	When depressed with PUNCH switch in ALL position, causes tape to be fed through tape punch.

Table A-4RELAY AND SOLENOID ARC SUPPRESSION CIRCUITS

Name	Arc Suppression Circuit
RAR (K2) RPE (K3)	Friden 1048362 Back-to-Back Rectifier
RSC (K4) RCD (K5)	Friden 1056642 R-C
RRP (contacts 1 and 2 of K8 and K9) RNP (contacts 1 and 2 of K10 and K11) RPC (contacts 1 and 2 of K12 and K13) RDC (K22) RRC (K23) LKL	Friden 1056642 R-C on each coil of double wound relays
LR LPC LTC LT1 through LT6 LT1 through LT8	Shall be suppressed in accordance with Packard Bell Computer Corporation schematic 350-1J2051
Start relay, contacts 1 and 2 Start relay, contacts 1 and 4 SPL-1, contacts 1 and 2 SRC, contacts 1 and 2	Friden 1056642 R-C


Table A-5
JL-1 PIN CONNECTIONS

Pin No.	Flexowriter Connections	Pin No.	Flexowriter Connections
1	SR1 Out	26	SPL-2 In
2	SR2 Out	27	SPL-2 Normally Closed
3	SR3 Out	28	SPT-2 In
4	SR4 Out	29	SPT-2 Out
5	SR5 Out	30	RPE In
6	SR6 Out	31	RPE Out
7	SR7 Out	32	STC-2 Interlock In
8	SR8 Out	33	STC-2 Interlock Out
9	SR1 through SR8 In	34	ENABLE Normally Open
10	SRC Normally Open	35	ENABLE In
11	SRC In	36	ENABLE Normally Closed
12	SRC Normally Closed	37	BREAKPOINT Normally Open
13	STC-1 Normally Open	38	BREAKPOINT In
14	STC-1 In	39	BREAKPOINT Normally Closed
15	STC-1 Normally Closed	40	Not Used
16	SS7 through SS12 In	41	
17	SS7 Out	42	
18	SS8 Out	43	
19	SS9 Out	44	
20	SS10 Out	45	
21	SS11 Out	46	
22	SS12 Out	47	Not Used
23	SSC In	48	Positive of Internal Supply
24	SSC Out	49	Not Used
25	SPL-2 Normally Open	50	Frame Ground of Machine



Table A-6

JL-2 PIN CONNECTIONS

Pin No.	Flexowriter Connection	Pin No.	Flexowriter Connection
1	LP1 In positive	26	LKL Negative
2	LP2 In positive	27	Negative of internal supply
3	LP3 In positive	28	LR Positive
4	LP4 In positive	29	Not Used
5	LP5 In positive	30	
6	LP6 In positive	31	
7	LP7 In positive	32	
8	LP8 In positive	33	
9	LPC In positive	34	
10	LP's Common negative return	35	
11	LT1 In	36	
12	LT2 In	37	
13	LT3 In	38	
14	LT4 In	39	
15	LT5 In	40	
16	LT6 In	41	
17	Not Used	42	
18	Not Used	43	
19	LTC In	44	
20	LT's Common return	45	
21	RPC In	46	
22	Indicator Light in positive	47	Not Used
23	Indicator Light in negative	48	Positive of internal supply
24	Internal LKL Control	49	Not Used
25	LKL In positive	50	Frame ground of machine



APPENDIX B

GLOSSARY



GLOSSARY

Bootstrap Program

Gives PB250 Computer enough intelligence to accept higher order programs.

(Bp)

BREAKPOINT switch

CRTC

Carriage Return and Tab Controls

LAI

Load A from Input Buffer

Off-Line

Operation under control of operator

On-Line

Operation under control of PB250 Computer

OUP

Octal Utility Package

RDC

Relay, Delay Control

Rf

Flip-flop forming one-half of combined input control

RRP

Relay, Read Power

RPT

Read Paper Tape

RPC

Relay, Punch Control

SCRT

Switch Carriage Return and Tab

SDC

Switch Delay Control

SPL

Switch Punch Latch

SR(X) or (Rx)

Switch Reader (Contacts)

SRC, (B5), (B6), (Rc), or (Rc)

Switch Reader Common

GLOSSARY (Continued)

SRT	Switch Reader Tape
SS(X) or (Tx)	Selector Slide (Contacts)
SSC	Selector Slide Common
STC	Switch Translator Cam
(Tb)	Typewriter busy signal
TES	Transfer on External Control
Tf	Flip-flop forming one-half of combined input control
WOC	Write Output Character command



APPENDIX C

This appendix comprises lubrication procedures for FX-1 Flexowriters.

LUBRICATION PROCEDURES

1. SCOPE

This publication comprises special abridged instructions for cleaning and lubricating components of Flexowriters which are subjected to greatest amount of mechanical usage. The instructions contained herein do not obviate the necessity to periodically check and lubricate other components. It is recommended that all components which require Friden No. 9 grease be checked simultaneously as these instructions are carried out.

2. SPECIAL TOOLS OR EQUIPMENT

The following special tools or equipment will be required to perform the lubrication instructions contained herein:

- a) Friden grease gun
- b) Cleaning brush
- c) Grease cloth
- d) Compressed-air gun or dust cloths

3. LUBRICANTS REQUIRED

The following lubricants will be required to perform the lubrication instructions contained herein:

- a) Friden No. 9 grease (or equivalent)
- b) Friden No. 1 oil (or equivalent)
- c) Friden No. 2 bearing oil (or equivalent)



4. PROCEDURE

a. Disassembly

To expedite and facilitate subsequent cleaning and lubricating, the Flexowriter should be disassembled into the following five basic subassemblies:

- 1) Power drive mechanism (writing machine)
- 2) Code selector
- 3) Tape punch
- 4) Tape reader
- 5) Code translator

b. Cleaning

Each subassembly should be cleaned by removing any accumulation of dust. If available, use a compressed-air gun; otherwise use a clean dust cloth.

c. Lubrication

Refer to Table C-1 and Figures C-1 through C-6.

d. Reassembly

Upon completion of cleaning and lubricating, reassembly the subassemblies into a complete Flexowriter. Perform an operational check to ascertain that the Flexowriter is operating properly.

Table C-1 (Sheet 1 of 4)

LUBRICATION CHART

Subassembly	Figure	Part	Index No.	Lubricant	Instructions
Power Drive Mechanisms Note: An asterisk following an index number indicates two or more identical parts.	C-1	Bushing (see note)	B7*	No. 2 Oil	Apply moderate amount every 6 months or every 1000 operational hours.
		Bushing	D6	No. 2 Oil	Same as above
		Bushing	D7	No. 2 Oil	Same as above
		Bushing	D9	No. 2 Oil	Same as above
		Felt Pad	B8*	No. 2 Oil	Saturate every 6 months or every 1000 operational hours.
		Drive chain	C	No. 9 Grease	Apply a light coat of grease every 6 months or every 1000 operational hours.
Code Selector	C-2	Stud, pivot	A3*	No. 9 Grease	Same as above

Table C-1 (Sheet 2 of 4)

LUBRICATION CHART

Subassembly	Figure	Part	Index No.	Lubricant	Instructions
Code Selector (continued)	C-2	Shaft, lower assembly	B1*	No. 9 Grease	Same as above
		Shaft, upper assembly	B5*	No. 9 Grease	Same as above
		Shaft,	C4	No. 2 Oil	Apply a light coat of oil every 6 months or every 1000 operational hours.
Tape Punch (clutch)	C-3	Zerk fitting	K10	No. 9 Grease	Fill fitting until new grease can be seen; every 6 months or every 1000 operational hours.
Tape Punch (proper)	C-3	Bearing	K6*	No. 2 Oil	Apply moderate amount of oil every 6 months or every 1000 operational hours.
		Bearing	R6*	No. 2 Oil	Same as above

Table C-1 (Sheet 3 of 4)

LUBRICATION CHART

Subassembly	Figure	Part	Index No.	Lubricant	Instructions
Tape Reader <i>Reader</i>	C-4	Bearing	F7	No. 2 Oil	Apply a light amount of oil every 6 months or every 1000 operational hours.
		Bearing	F3	No. 2 Oil	Same as above
		Bearing	C5	No. 2 Oil	Same as above
		Bearing	R6	No. 2 Oil	Same as above
		Shaft	E	No. 2 Oil	Same as above
		Pins, Reader	C*	No. 2 Oil	Same as above
		Shaft	F6	No. 9 Grease	Apply very light coat of grease every 6 months or every 1000 operational hours.
		All Springs		No. 9 Grease	Apply very light coat of grease to the ends of all springs every 6 months or every 1000 operational hours.

Table C-1 (Sheet 4 of 4)

LUBRICATION CHART

Subassembly	Figure	Part	Index No.	Lubricant	Instructions
Code Translator (Permutation Assembly)	C-5	Guide, Bar, Permutation	A1*	No. 2 Oil	Apply moderate amount of oil every 6 months or every 1000 operational hours.
		Activators	A7*	No. 2 Oil	Same as above
Code Translator (Frame Assembly)	C-6	Bearing	D4*	No. 2 Oil	Same as above
		Bearing	G2*	No. 2 Oil	Same as above
		Bearing	K1	No. 2 Oil	Same as above
		Shaft	C3	No. 9 Grease	Apply light coat of grease every 6 months or 1000 oper- ational hours.
		Shaft	E2	No. 9 Grease	Same as above
Code Translator (Clutch)	C-6	Zerk Fitting		No. 9 Grease	Fill fitting until new grease can be seen; every 6 months or every 1000 operational hours.

Note: A star symbol located near an index number indicates that the component is referred to in Table C-1.

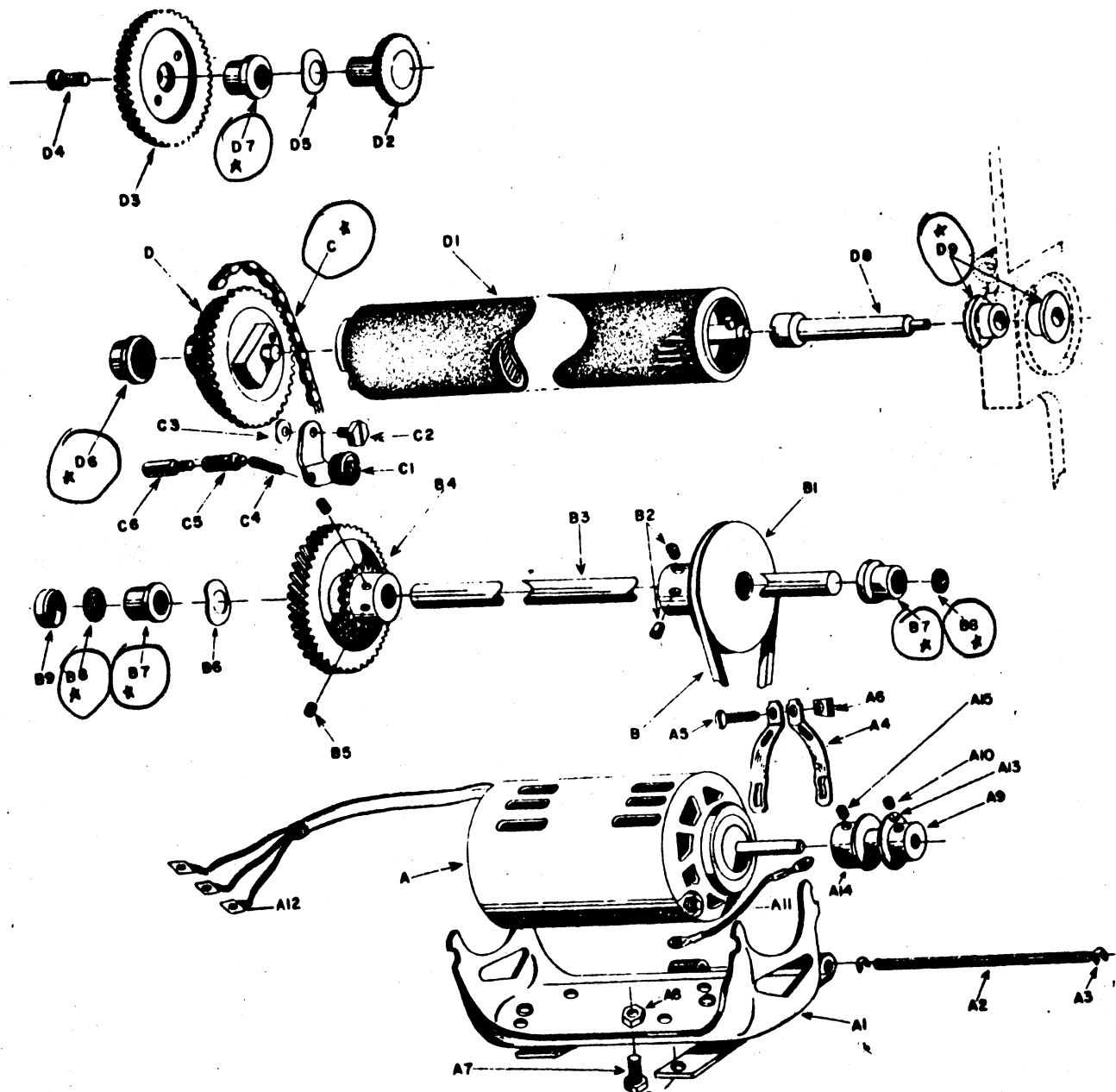


Figure C-1. Power Drive Mechanism

Note: A star symbol located near an index number indicates that the component is referred to in Table C-1.

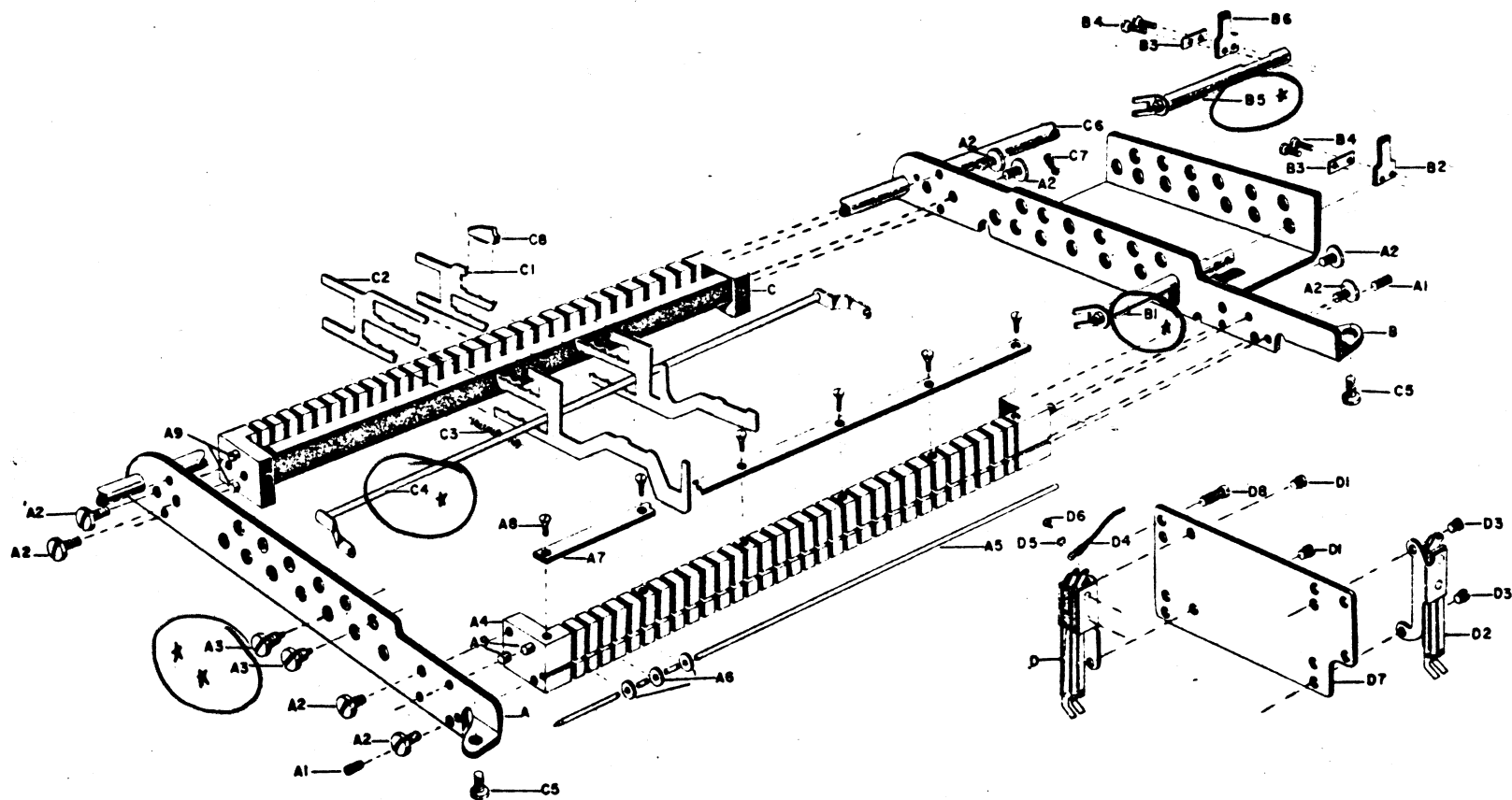


Figure C-2. Code Selector

Note:

A star symbol located near an index number indicates that the component is referred to in Table C-1.

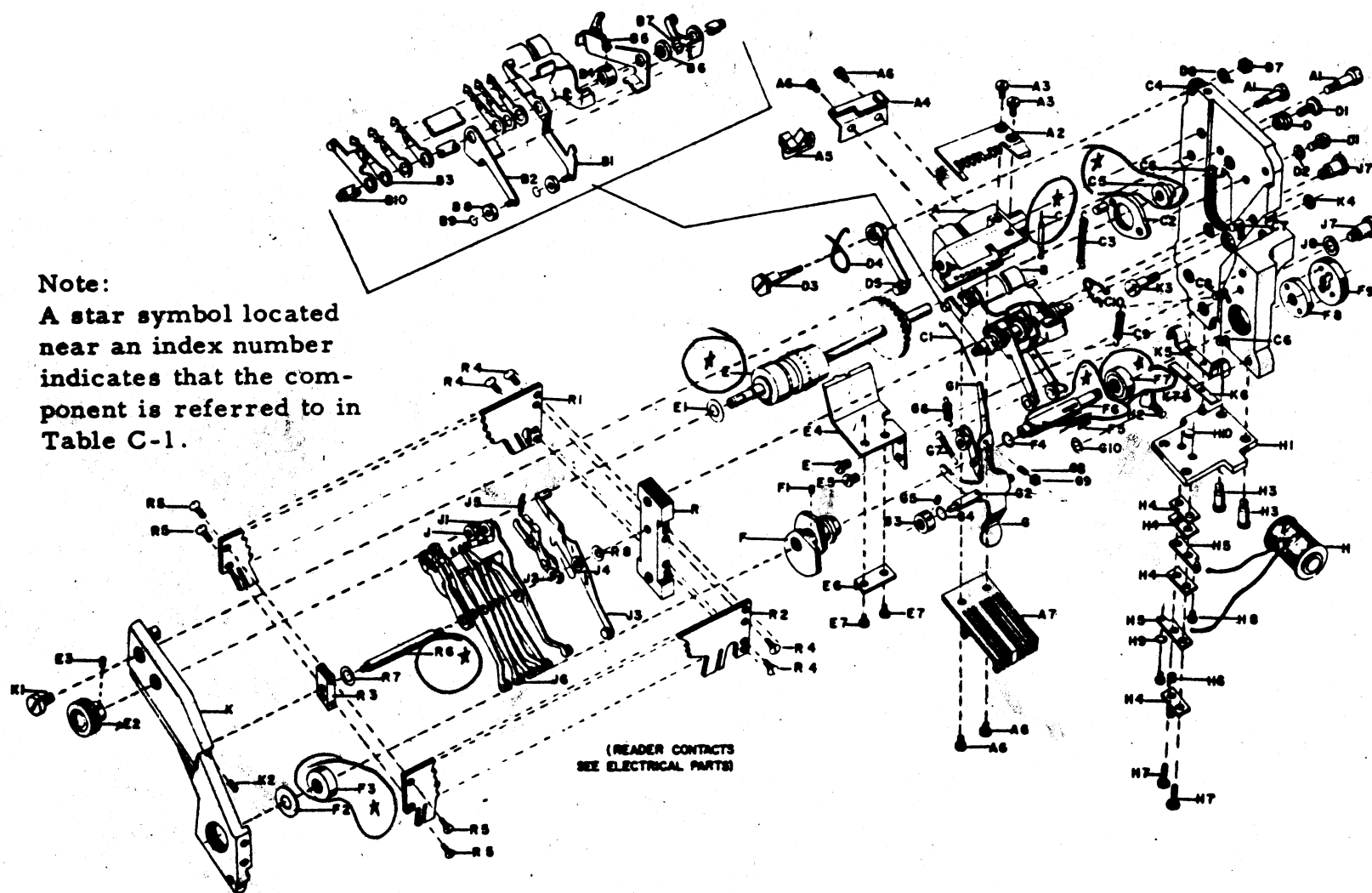


Figure C-4. Tape Reader

Note: A star symbol located near an index number indicates that the component is referred to in Table C-1.

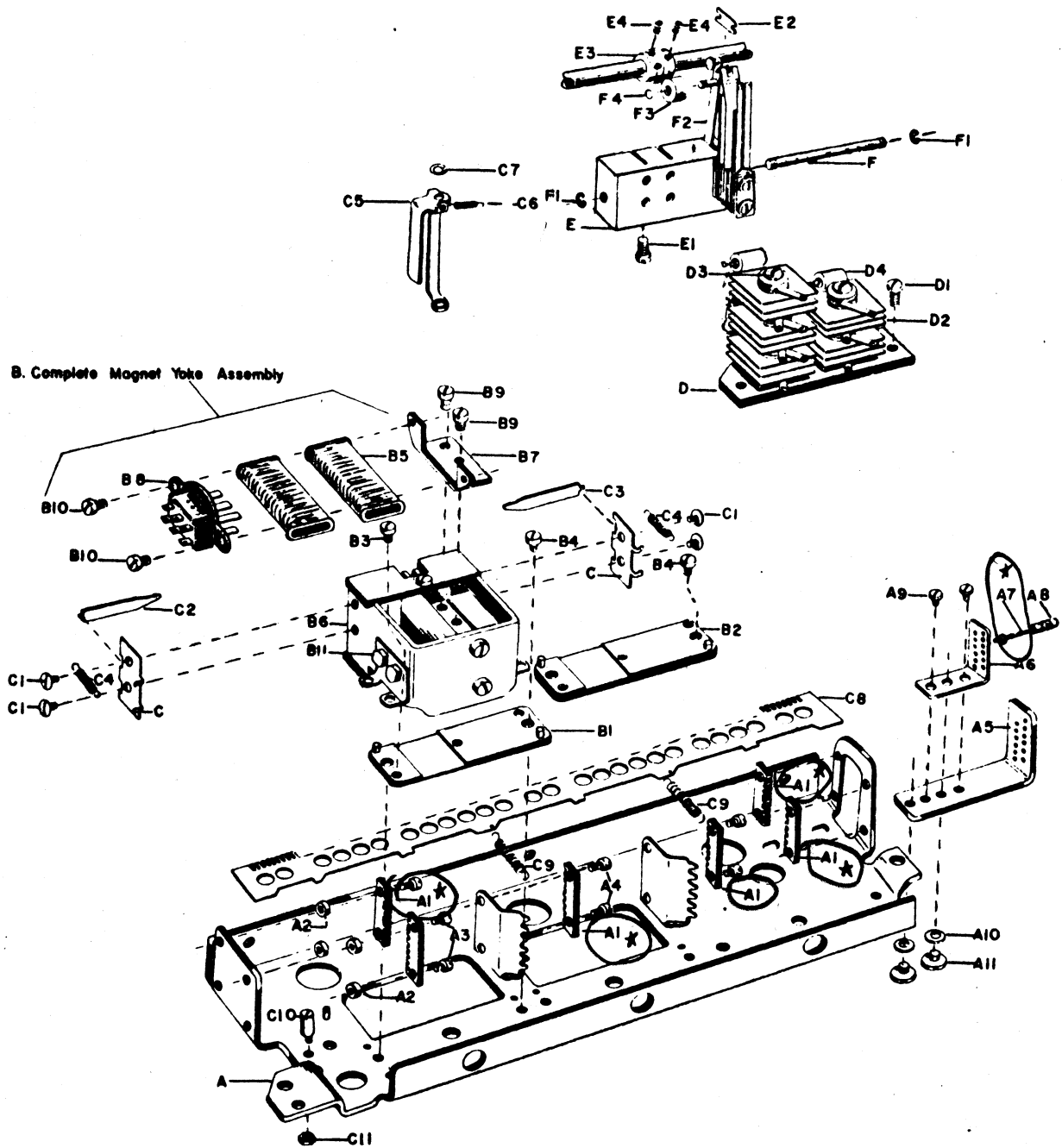


Figure C-5. Code Translator, Permutation Assembly

Note: A star symbol located near an index number indicates that the component is referred to in Table C-1.

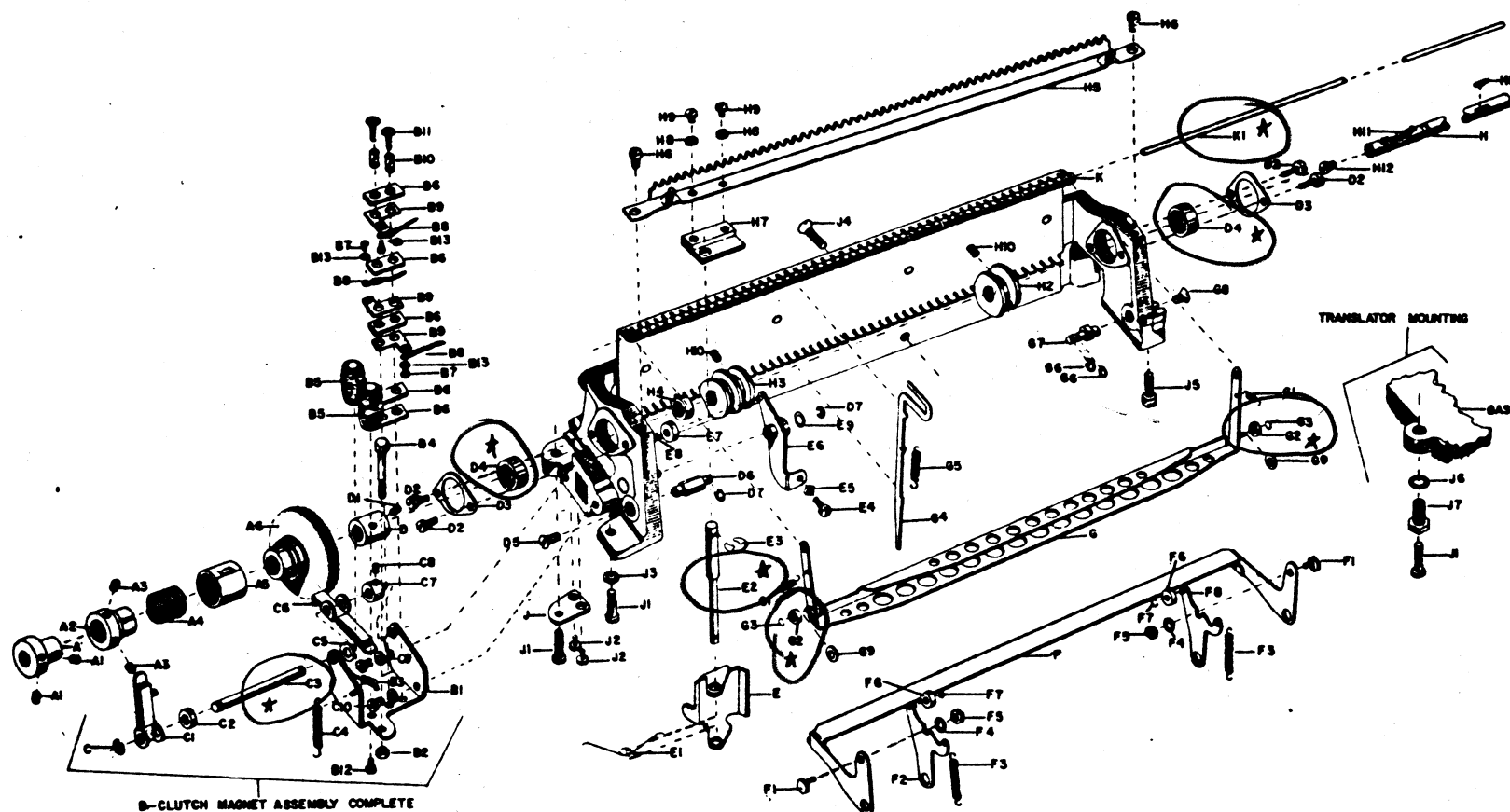


Figure C-6. Code Translator, Frame Assembly

31793

PRINTED BY THE STANDARD REGISTER CO.

Friden

COMMERCIAL CONTROLS CORPORATION

SUBSIDIARY *

97 HUMBOLDT ST.

ROCHESTER 2, N. Y.

PAGE OF PAGES

HOME OFFICE USE ONLY	BUILD SCHEDULED	10 - March	4 - July	37790/37799	37816/37819	2	2
		8 - April	4 - Aug	MACHINE 37800/37807	37820/37823	CODE	
		4 - May	4 - Sept	SERIAL NO. 37808/37811	37824/37827		
		4 - June		37812/37815			

- Reference Specifications - Dwg. #1A6120A.
- Code chart attached, 6 channel - 8 channel punch & reader.
- Arc suppression and line filter to customer specifications.
- No identifying name plates to appear on front surface.
- Timing of all contacts to customers specifications.
STC-1 adjustable
STC-2 adjustable - set to ~~max~~ make at 13° ~~break~~ at 320°
- Special power cord, grey with right angle plug - 1296-210.
- Control switches.
S1 - Power - On/Off
S2 - Punch - All/Off
S3 - Start Read
S4 - Stop Read
S5 - Regen - manual non print, terminating on stop code 1,2,4 or Stop Read switch.
S6 - Enable - locking switch, C contact wired to connector
S7 - ~~BREAK~~ Point - locking switch, C contact wired to connector
S8 - Stop Code, coded 1,2,4
S9 - Code Delete, coded 1,2,3,4,5,6
S10 - Tape Feed - coded Blank (feed hole)

Dual depression of S9 & S10 will punch continuous Delete code.
- Additional one inch service loop to leads from JL-1 and JL-2.
- The timing of SSC shall be related to SS1 thru SS12 so that SS1 thru SS12 close before SSC closes, and SSC opens before SS1 thru SS12 open, with .040 gap adjustment of SSC, 3 & 4.

MACHINE SPECIFICATIONS

Form No. 886R

COLOR "PC"

DATE RELEASED 1-29-63 ORDER NO. 52989 SERIAL NO. 37790-37827
(38)

FINAL ASSEM. NO. 1053600 CHG:

SEE MOD SHEET
SF

PLATEN ASSEM. 2004026 STD SECTORS _____ REPLACES _____
ALIGNING INFO. STANDARD

RELAY ASSEM. 1292-302 (11-7-61) REPLACES 1044013
FIELD SWITCH ASSEM. NONE
SCHEMATIC WIRING DIAGRAM 1292-300 (REV 2) REPLACES 1041000
(4-17-61)

CARRIAGE ASSEM. 2004146 (REPL 2004119) CHG:
1046087-1-CONT ASSEM (REPL 1045662)

POWER FRAME ASSEM. 1053430 CHG: (SF)
OMIT THE FOLLOWING:
1053434 -1- CAM (POS W)
1053515 -1- KEY LEVER (POS W)
1053521 -1- B/C (POS W)

SET OF TYPE 1277-132

SET OF BELL CRANKS 1056790 CHG: 156-39H-40H-41J-43A

BASE ASSEM. 1044759 CHG:

SEE MOD SHEET

SELECTOR CONTACT ASSEM. 1047134 (REPL 1053737) CHG:

SEE BASE MOD SHEET

MAIN CABLE ASSEM. 1292-301 (7-2-62) REPLACES 1044012

READER ASSEM. R-1434 (PC) (1056851) (REPL 1053000) * SERIAL NO. _____

PUNCH ASSEM. HP-1103 (PC) (1044294) (REPL 1058156) * SERIAL NO. _____

SELECTOR ASSEM. S-4536 (1053422) (REPL 1053365) * SERIAL NO. _____

TRANSLATOR ASSEM. T-3391 (1053300) * SERIAL NO. _____

AUXILIARY UNITS
(CHECK W/FLEXO) NONE

* SEE MOD SHEET

SPECIAL FEATURES 1055172-OPER CHAR IN PLACE OF COLOR SHIFT:
R/E
90 → 48 V

FINAL ASSEM. MOD. SHEET

SPEC. 37790-37827

(38 MACHS)

FINAL ASSEM. SAME AS 1053600 EXCEPT-
1055605-1- SPOOL OF TAPE (1") (REPL. 1054726) ($\frac{7}{8}$)
1055937-1- CLUTCH COVER (REPL. 1053720)
1042118-1- FRONT COVER PLATE ASSEM. (REPL. 1042106)
1044817-1- DUST COVER (REPL. 1044813)
2000855-1- TOP COVER (REPL. 1043629)
2000779 -1- MTC BRKT (ADD)
1041896 -2- SPACER (ADD)

ADD THE FOLLOWING

2000453 -1- CLAMP
1043385-1- PLUG BUTTON
148033-1- BULB
1276-963-1- LINE FILTER ASSEM.
1056642-1- SUPPRESSOR (CONNECT ACROSS SSC)
1044592-1- MATING CONNECTOR (JL.1.)
1044634-1- MATING CONNECTOR (JL.2.)
JUMPER JL2 AS FOLLOWS:
21-22, 24-25, 23-26, 26-27.
2003188 -1- SWITCH NAMEPLATE (ENGRAVE AS SHOWN)
1091817 -1- SCREW

OMIT THE FOLLOWING

1054189-1- LINK (B.S.)
1055870-1- COVER (B.S.)
1048656-1- POWER CORD
6319001-1- MEDALLION
6319003-1- MACHINE NAMESTRIP

NOTE: DO NOT STRIP PAINT FROM AROUND SCREW HOLES

SEE PAINT SHEET

EQUIP W/SF 2000790-90V TO 48V

SEE NOTES #1 & #2 ON SCHEMATIC

PAINT SHEET

SPEC. # 37790-37827

PAINT THE FOLLOWING PARTS & ASSEMBLIES PER PAINT SPEC. #

(38)

CUSTOMER: PACKARD BELL

COLOR CODE 'PC' #678-1A 2139 CHG.

ASSEMBLY		PAINT
2000855	TOP COVER	2000855
1055937	CLUTCH COVER	1055937
1042118	FRONT COVER	1055249
1053723	REAR COVER	1053723
1054489	FRONT PAPER GUIDE (RH)	1047872
	FRONT PAPER GUIDE (LH)	
1054978	PAPER TABLE	1054978
1021026	DRUM PAPER SUPPLY	1021028
1053730	SUPPLY ROLL	1053731
1053857	CARR END COVER (RH)	1053857
1055914	CARR END COVER (LH)	1055914
1053726	FRONT RAIL DUST COVER	1053726
1058116	PUNCH COVER (UPPER)	1058116
1058125	PUNCH COVER (LOWER)	1058125
1057920	PUNCH CASTING (OUTER)	1057920
1055217	READER COVER (UPPER)	1055217
1056779	READER COVER (LOWER)	1056779
1045101	BASE ASSEMBLY	1045101
	FILLER PLATE	
	CARR END BRACES	
	DOUBLE READER COVER	
	EXT. RELAY COVER	
	COVER PUNCH OPENING	
	COVER READER OPENING	
	CARBON RIBBON MAGAZINE	
	COVER CARBON RIBBON SUPPLY	
	CARBON RIBBON SPOOL (LH)	
	CARBON RIBBON SPOOL (RH)	
1043385	PLUG BUTTON	1043385
1053017	COVER READER	1053017
1053002	READER CASTING OUTER	1053002
	AUXILIARY BOX COVER	
	AUXILIARY BOX BASE	
	AUXILIARY BOX BOTTOM PLATE	
1276-963	LINE FILTER ASSEM.	1053892

ABOVE LIST OF PARTS DESIGNATED
BY A PART NUMBER ARE THE ONLY
ONES REQUIRING PAINT. ALL OTHERS
DO NOT APPLY TO THIS SPEC.

BASE ASSEM. MOD. SHEET

SPEC. 37790-37827

(38 MACH'S)

BASE ASSEM, SAME AS 1044759 EXCEPT-

1045101 BASE ASSEM. B/M (REPL, 1043980)

1053891-1- MOTOR START RELAY (REPL, 1054753)

1044490-1- WINCH, BR'KT, (FRONT) (REPL, 1044694)

1043332-1- WINCH, BR'KT (REAR) (REPL, 1044695)

1045424-1- NAMEPLATE (REPL, 1045425)

1055949-1- SWITCH (S.2) (ADD'T)

1056642-3- SUPPRESSOR (ADD'T) MOUNT AS FOLLOWS

1- ACROSS KEYLOCK MAGNET

1- ACROSS MOTOR START SWITCH (TERM. 4 & 1)

1- ACROSS MOTOR START SWITCH (TERM. 1 & 2)

NOTE POLARITY

OMIT: 1053733-1- CONTACT (B.S.)

1047134 SELECTOR CONT. ASSEM.
JUMPER AS FOLLOWS.

SS1 (M)- 2(M)- 3(M)- 4(M)- 5(M)- 6(M).

SS7 (M)- 8(M)- 9(M)- 10(M)- 11(M)- 12(M).

EQUIP W/SF 2000790- 90V TO 48V

READER SPECIFICATIONDATE 1-29-63 ORDER NO. _____ SPEC. NO. R-1434 PCCOLOR P.C. SERIAL NO. _____SOLD
TOUSED
WITHSPEC,37790/37827P.O. _____ QTY 38 BUILD SCHEDULE _____

MODEL _____

SAME AS 1056851 EXCEPT: (SEE BELOW)NO. OF BITS 8 VOLTAGE 48 FEED STD.FRAME ASSEMBLY 1056931 EXCEPT: (SEE BELOW)MAGNET YOKE ASSEM 2000320 REPL 2000318

PINWHEEL ASSEM _____ REPL _____

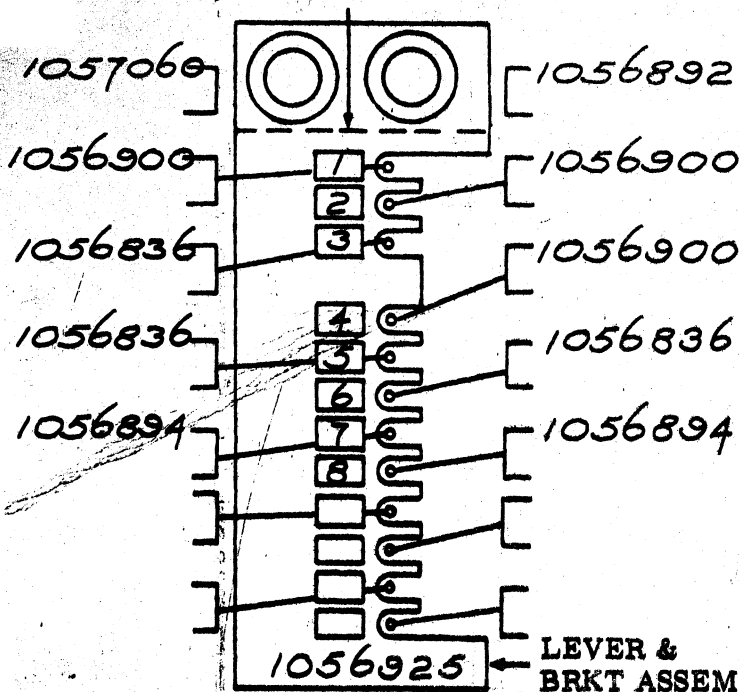
PAPER SUPPORT _____ REPL _____

CONTACT ASSEM W/CABLE ASSEM _____ EXCEPT:

SCHEMATIC WIRING DIAGRAM _____ REPL _____

CABLE ASSEM & WIRING DIAG. 1292-303 (3-17-60) REPL 1041204

CONTACT LEVER & BRKT ASSEM _____ EXCEPT: (SEE BELOW)

CONTACT ARRANGEMENT
GUIDE EDGEFINAL ASSEM. MODIFICATIONSADD

1276-289 - SUPPRESSION ASSEM.
(6-5-62) NOTE POLARITY
186636 - 1 - SCREW
1046586 - 1 - SUPPRESSOR
MT. ACROSS CLUTCH
2000453 - 1 - CLAMP

FRAME ASSEM MODIFICATIONSADDREMOVE

NOTE: USE 2000311 TIE BR'KT.

CONTACT LVR & BRKT ASSEM MODIF.ADDREMOVE

1056836 - 1	1056892 - 2
1056894 - 1	1056893 - 2
1057060 - 1	1056893 - 1
1056900 - 2	

REMARKS: SRC ADJUSTEDTO CLOSE AFTER SR1 THRUSR8.1295-904 - CONT. ADJ. CHART (4-17-61) (ADD'T)

TAPE PUNCH SPECIFICATIONS

ORDER NO. _____

DATE: 1-29-63

QTY: 38

MODEL

SAME AS 1044294 RECEIPT:

NO. OF BITS 8

VOLTAGE 48

WIRING DIAGRAM 1294-492 (4-17-61)

CABLE ASSEMBLY 1294-493 (12-3-61)

CLUTCH MAGNET YOKE ASSEMBLY 1058174

CODE MAGNET YOKE ASSEMBLY 1044232

ADVANCED FEED

DRIVE ARM & LEVER ASSEMBLY

CODE ASSEMBLY

GUIDE & DIE BLOCK ASSEMBLY 2001327 STD.

TAPE TABLE (CENTER FEED)

PIN WHEEL ASSEM. (ADVANCED FEED)

CONTACT ASSEMBLY 1041243 CHG*

CASTING ASSEMBLY

SPEC NO. HP-1103 PC

SERIAL NO. _____

SOLD
TO

USED SPEC.

WITH 37790 -
37827

(REPLACES 1044557)

(REPLACES 1044538)

(REPLACES 1058175)

(REPLACES 1044237)

CENTER FEED

(REPLACES _____)

(REPLACES _____)

(REPLACES _____)

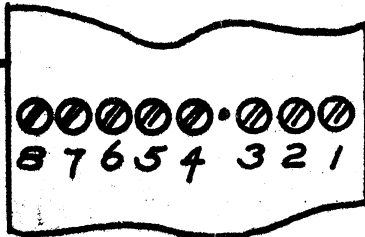
(REPLACES _____)

(REPLACES _____)

(REPLACES 1044559)

(REPLACES _____)

ONE SEQUENCE



DIRECTION OF TAPE

MISC. PARTS REQ.

ADD

QTY.	PART NO.	DESCRIPTION
1	2001322	BAIL ASSEM.
1	1276-330	SUPPR. ASSEM. (4-26-61)
1	1276-620	CHIP CHUTE
1	1090559	SCREW
1	1056642	SUPPRESSOR MT. ACROSS CLUTCH
* 1	2003112	CONTACT (SPT)

NOTE POLARITY

REMOVE

QTY.	PART NO.	DESCRIPTION
1	2001321	
1	1040631	
1	1042145	

CODE SELECTOR SPECIFICATION SHEET

SHEET 1 OF 2

SPEC. S-4536

ORDER NO. _____

SERIAL NO. _____

QTY. 38

DATE: 1-29-63

MACH. NO. 37790-37827

SELECTOR ASSEMBLY SAME AS 1053422 EXCEPT:

☐ STANDARD CODING _____

☒ SPECIAL - SEE CODE SHEET

(KEYBOARD _____)

(KEYBOARD _____ W/EXCEPTIONS)

SEE NOTE ON SCHEMATIC FOR CONT. ADJ.

CODE SHEET

38 MACHINES

Form No. 883R

USED WITH SPEC. #37790-37827

SHEET 2 OF 2

POS.	CHAR.	TAPE CODE	SLIDE NO.	SELECTOR	TRANSLATOR
R	U.C	2-4-5-6		C-2-4-5-6-8-10-11-12	
S	TAB	2-3-4-5-6		C-2-3-4-5-6-8-9-10-11-12	
T	SPACE	5		C-5-11	
			OMIT		
U			OMIT		
1	Q	4-5		C-4-5-10-11	
2	A	1-6		C-1-6-7-12	
3	2	2		C-2-8	
4	Z	1-4-6		C-1-4-6-7-10-12	
5	W	2-3-6		C-2-3-6-8-9-12	
6	S	2-5-6		C-2-5-6-8-11-12	
7	3	1-2-5		C-1-2-5-7-8-11	
8	X	1-2-3-5-6		C-1-2-3-5-6-7-8-9-11-12	
9	E	1-3-5-6		C-1-3-5-6-7-9-11-12	
10	D	3-6		C-3-6-9-12	
11	4	3		C-3-9	
12	C	1-2-5-6		C-1-2-5-6-7-8-11-12	
13	R	1-4		C-1-4-7-10	
14	F	2-3-5-6		C-2-3-5-6-8-9-11-12	
15	5	1-3-5		C-1-3-5-7-9-11	
16	V	1-3-6		C-1-3-6-7-9-12	
17	T	1-2-6		C-1-2-6-7-8-12	
18	G	1-2-3-6		C-1-2-3-6-7-8-9-12	
19	6	2-3-5		C-2-3-5-8-9-11	
20	B	2-6		C-2-6-8-12	SAME AS TAPE CODE
21	Y	4-5-6		C-4-5-6-10-11-12	
22	H	4-6		C-4-6-10-12	
23	7	1-2-3		C-1-2-3-7-8-9	
24	N	1-3		C-1-3-7-9	
25	U	3-5-6		C-3-5-6-9-11-12	
26	J	1-5		C-1-5-7-11	
27	8	4		C-4-10	
28	M	3-5		C-3-5-9-11	
29	I	1-4-5-6		C-1-4-5-6-7-10-11-12	
30	K	2-5		C-2-5-8-11	
31	9	1-4-5		C-1-4-5-7-10-11	
32	'	1-2-4-5-6		C-1-2-4-5-6-7-8-10-11-12	
33	O	2-3		C-2-3-8-9	
34	L	1-2		C-1-2-7-8	
35	O	6		C-6-12	
36	•	1-2-4-6		C-1-2-4-6-7-8-10-12	
37	P	1-2-3-5		C-1-2-3-5-7-8-9-11	
38	:	5-6		C-5-6-11-12	
39	1	1		C-1-7	
40	\$	1-5-6		C-1-5-6-7-11-12	
41	-	1-2-3-4-5		C-1-2-3-4-5-7-8-9-10-11	
42	°	1-2-4-5		C-1-2-4-5-7-8-10-11	
43	+	2-3-4-5		C-2-3-4-5-8-9-10-11	
V	C.R	2-3-4-6		C-2-3-4-6-8-9-10-12	
W			1043252	DUMMY	
Z	L.C.	3-4-5-6		C-3-4-5-6-9-10-11-12	
FRONT PANEL	S-8	1-2-4			
	S-9	1-2-3-4-5-6			
	S-10	FEED HOLE			

CODE TRANSLATOR SPECIFICATIONSSPEC. NO. T-3391

ORDER NO. _____

SERIAL NO. _____

QTY. 38

DATE: 1-29-63

USED

SPEC.#	37790 -
WITH	37827

VOLTAGE 48V

TRANSLATOR FINAL ASSEMBLY SAME AS 1053300 EXCEPT:

ADD THE FOLLOWING PARTS:

1294-491 TRANS. WIRING DIA. (4-17-61)
1048287 -1- RESISTOR
186 -2- SCREW
1091111 -2- WASHER
1275-770 -1- BAIL CONTACT ASSEM.
1278-065 -2- SPACER
6003024 -2- NUT
1276-252 -1- SUPPRESSION ASSEM. (6-5-62)
186636 -2- SCREW
1047624 -2- SCREW
1054149 -2- OPERATOR
1047848 -1- CLUTCH MAG. ASSEM. (REPL. 1047850) EXCEPT--
1276-055 -1- MAG. YOKE ASSEM. (REPL. 1047590)
1276-253 -1- SEEKER SPRING SUPPORT (REPL. 1020786)
1275-664 -1- PLUG BRACKET (REPL. 1043796) (JT-1) (MT. IN JT-1 POS.)
1045201 -1- TIMING CONT. BLOCK A. (ADD)
OMIT: 1043796 -1- PLUG BRACKET FROM JT-2 POS.
1040503 -2- SCREW (ADD)

STC-1 TO BE ADJ. BY CUSTOMER. STC-2 TO OPERATE AT 13° & RESTORE AT 320°

FRAME UNIT ASSEMBLY SAME AS 1047422 EXCEPT: (T-77)

ADD THE FOLLOWING PARTS:

2000707 -1- BAIL STOP
1053341 -4- CAM
165556 -8- SCREW
6001006 -2- SPRING
1043886 -1- BAIL ASSEM.
1047593 -1- CLAMP
1043965 -2- SEEKER (REPL. 1020158) POS. S & V

PERM. UNIT ASSEM SAME AS 1047413 (T-77) EXCEPT:

1044685 -1- MAGNET ASSEM. (REPL. 1043945)
1044606 -1- MAGNET ASSEM. (REPL. 1043946)

SEE SHEET #2 FOR PERM. BAR CODING

CODE TRANSLATOR SPECIFICATIONS

PERMUTATION BARS TO BE CODED AS FOLLOWS

REMOVE ALL PROJECTIONS AS LISTED BELOW

T- 3391

USE SET OF PERMUTATION UNIT BARS SPECIAL EXCEPT (SEE BELOW)

PERMUTATION BAR NO. 1 MAKE FROM BLANK #1040730

1	3	5	11	14	15	18	19	21	24	26	28	29	31	34	36	37	40	42	44	46	47	49	51	53	56
58	59	62	63	65	68	69	72	74	75	78	79	82	84	85	88	90	92	94	95	97	103				

PERMUTATION BAR NO. 2 MAKE FROM BLANK #1040730

2	4	5	11	13	16	17	20	22	24	26	27	29	31	34	35	38	39	41	44	46	48	50	51	53	56
57	59	61	63	65	67	70	71	74	76	78	79	82	84	85	87	89	92	94	96	98	103				

PERMUTATION BAR NO. 3 MAKE FROM BLANK #1040730

1	4	5	11	13	15	17	20	21	23	26	28	30	32	33	35	38	40	42	43	46	48	49	51	53	56
58	60	61	63	66	67	69	71	73	76	77	79	81	84	85	87	89	92	93	96	98	104				

PERMUTATION BAR NO. 4 MAKE FROM BLANK #1040730

2	4	5	12	13	15	18	19	21	23	25	27	29	31	33	36	37	39	41	43	45	47	49	52	54	55
57	59	61	64	65	68	69	72	74	75	77	79	82	83	85	87	89	92	94	96	98	104				

PERMUTATION BAR NO. 5 MAKE FROM BLANK #1040731

2	4	6	12	13	15	17	19	22	24	26	28	29	31	34	35	38	40	41	43	45	48	49	52	53	55
57	60	62	63	66	68	70	72	74	75	77	79	81	84	86	87	90	92	94	96	97	104				

PERMUTATION BAR NO. 6 MAKE FROM BLANK #1040731

2	4	5	11	14	15	18	20	22	23	26	28	30	31	34	35	38	39	42	44	46	47	50	52	54	55
57	60	61	63	65	68	69	71	74	75	77	80	82	83	86	87	90	91	93	95	98	104				

PERMUTATION BAR NO. 7 MAKE FROM BLANK #1040731

PERMUTATION BAR NO. 8 MAKE FROM BLANK #1040731

BARS #9-10-11 & 12

MAKE FROM BLANK #1040732

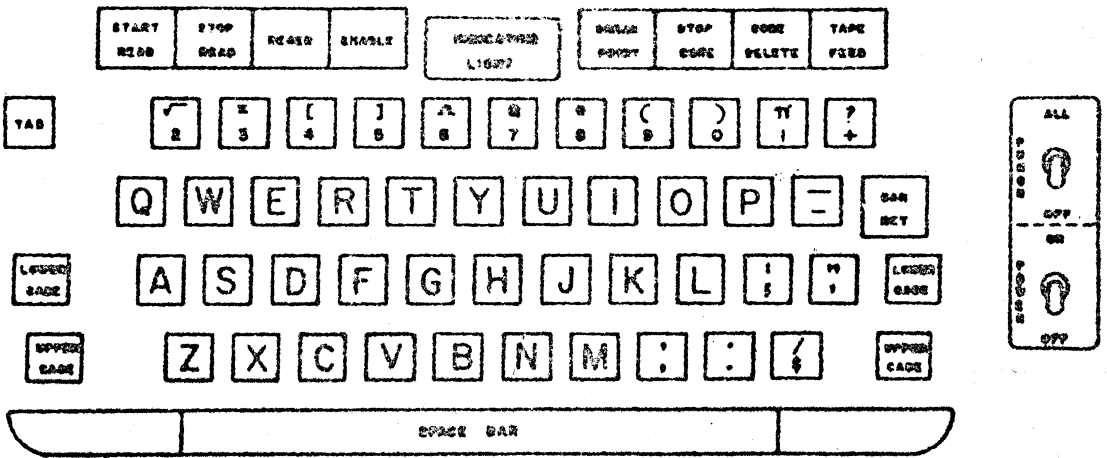


Figure 4-1. Flexowriter Keyboard

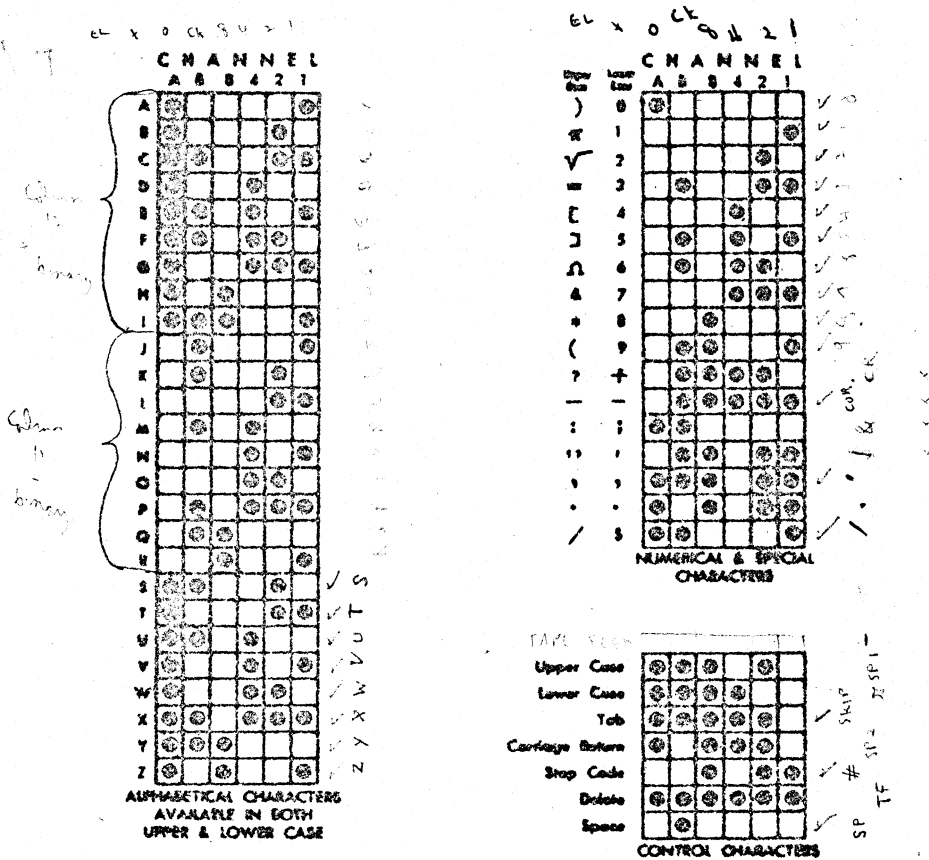


Figure 4-2. Flexowriter Code