

BASIC 43 RO TELEPRINTER

430910 SELECTIVE CALLING MODIFICATION KIT

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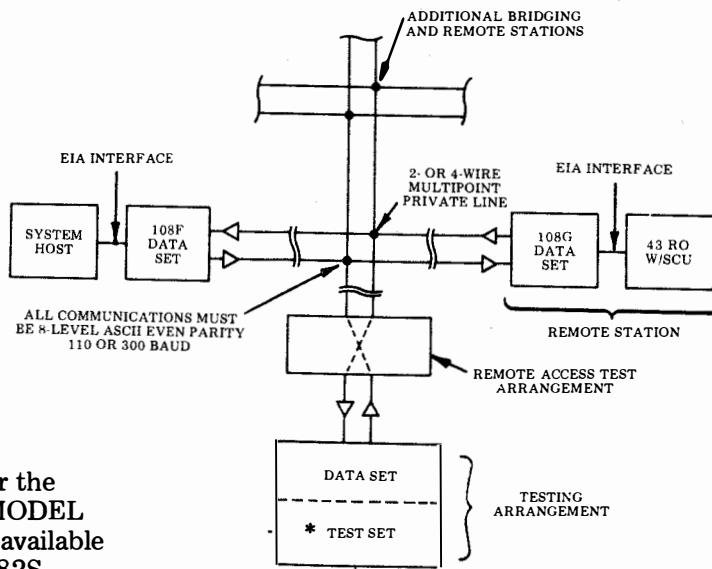
1. GENERAL

1.01 The Model 43 teleprinter selective calling feature provides Model 43 basic teleprinter receive-only operation in systems that use specific control characters and two-character sequences to select and transmit data to one or more stations on multipoint private lines.

1.02 This specification is being reissued to include a new 410718 (single board) circuit card which is furnished instead of the old 430916 (double board) circuit card assembly. Both versions are fully described in this specification.

1.03 A block diagram of a typical selective calling system, including access for remote testing, is shown in Fig. 1. Specific line protocol for the Model 43 teleprinter selective calling feature is described under System Operation in 2.

1.04 The selective calling feature is applicable to the Model 43 basic RO sprocket or friction feed teleprinters with TTL interface.



*Testing procedures for the DIGITECH PACER MODEL 103 or equivalent are available from Teletype in 50982S. (See paragraph 4.01.)

Fig. 1—Selective Calling System Block Diagram

1.05 The feature is available either as a field modification kit that can be added inside the Model 43 teleprinter, or it can be provided by a service center in a tested station arrangement with call directing, answer-back codes, and options already installed.

2. DETAILED DESCRIPTION

System Operation

2.01 Data communication in the Selective Calling System for which the Model 43 teleprinter selective calling feature was developed is based on the following line protocol using the Bell System data sets indicated.

2.02 When the system is active on-line, originating carrier from the 108F data set at the system host location is normally detected at the 108G data set associated with each remote RO station. With power ON to the station data set, the EIA control leads, Data Set Ready (CC), Carrier Detect (CF), and Clear to Send (CB)† are on. This enables the Selective Calling Unit (SCU) in the terminal to accept control characters and two character Call Directing Codes (CDCs). See Fig. 2 for Control Selection and Data Flow and 2.05 for control characters.

† 108G Data Set Option "W" must be enabled to connect CB and CF together under control of Carrier Detect.

2.03 Answering Carrier from a single remote station is normally present only when a positive or negative answer-back (AB) response is generated by a station when its CDC is recognized. This carrier is under control of EIA Request to Send lead (CA) Option D in the 108G data set.

2.04 The EIA send and receive data and signal ground leads (BA), (BB), and (AB) are used by the data set, data terminal ready (CD) is connected on the new 410718 circuit card only. See Fig. 7 for interface connections.

2.05 The following ASCII control characters are sent by the system to control operation as follows:

EOT — Used to place all stations in an unselected mode. Prepares station to recognize a CDC thereby placing it in a selected mode.

STX — Used to place a station that is in a selected or interrupt mode into the receive mode. If station is in unselected mode, STX places the station in a passive mode to blind it to CDCs in text.

ETX — Used to place a terminal already in the receive mode into an interrupt mode so that a CDC can be used to verify that previous message was received properly.

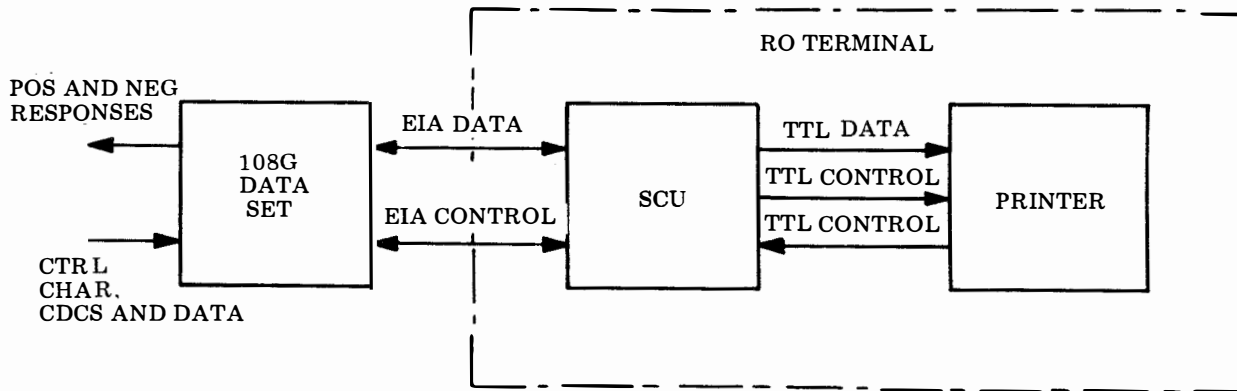


Fig. 2—Control, Selection and Data Flow at Remote Station

2.06 See Fig. 3 for selective calling modes.

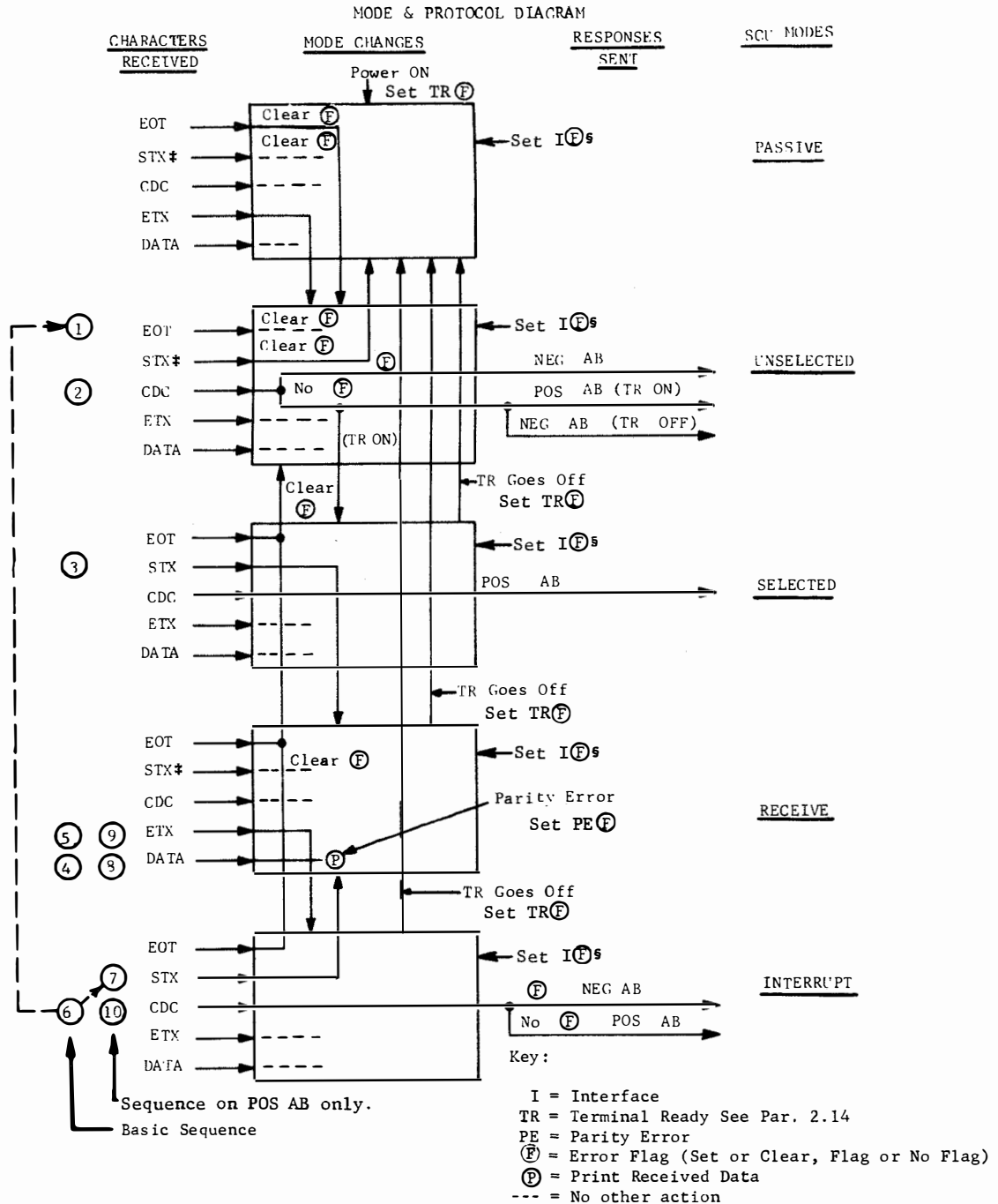


Fig. 3—Selective Calling Modes

‡ Old 430916 circuit card — STX clears PE and TR flag. (Does not have I flag.)

New 410718 circuit card — STX clears PE flag only. (Does not clear TR or I flag.)

§ New 410718 circuit card only — I flag will be set if Clear to Send, Data Set Ready or Carrier Detect goes off.

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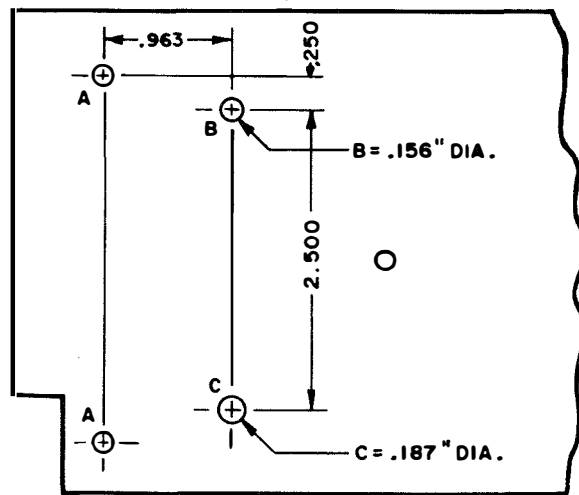
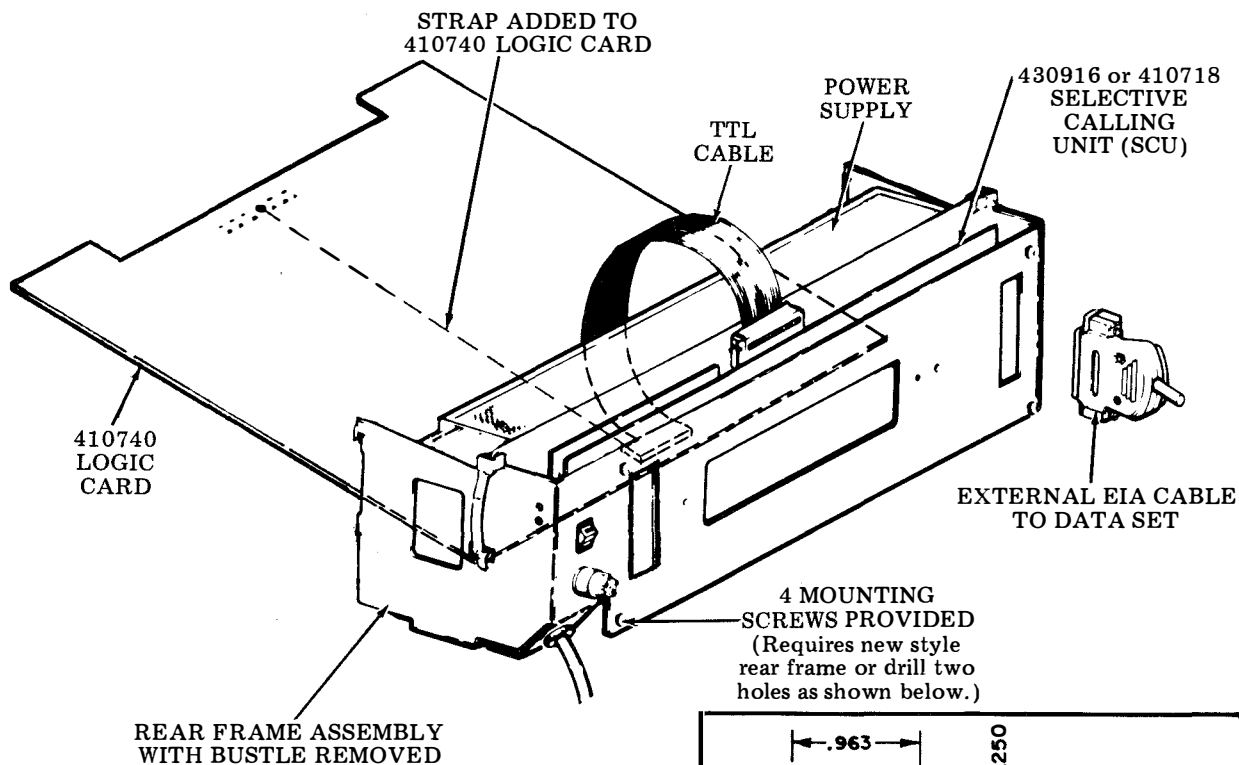
Kit Material and Installation in Teleprinter

2.07 The 430910 Selective Calling Modification Kit consists of a 430916 or 410718 Selective Calling Unit (SCU) Assembly, a 26-gauge wire strap, 30-gauge wire straps, mounting hardware, and a field specification 50962S.

2.08 The modification kit is located inside the rear frame of the basic Model 43 friction or sprocket feed RO teleprinter in the space otherwise occupied by a terminal interface unit

and utilizes the same mounting holes and 25 pin EIA connector access opening at the left rear of the bustle. See Fig. 4.

2.09 Installation consists of disassembly-reassembly of the bustle cover, rear frame assembly, and logic card according to the standard procedures in Manual 369 or 391. The rear frame should be checked for the presence of two holes (location B and C — Fig. 4) that match the mounting holes in the 430916 or 410718 selective calling unit assembly. Drill holes, if necessary, with rear frame removed from set and power supply removed from the rear frame.



A = Existing Holes

Fig. 4—Location of SCU

2.10 The wire strap (cut to 15" length) is soldered between two points as shown on the bottom of the 410740 circuit card (P301-20 and J107-14) and the card is re-installed. (See Fig. 5.)

2.11 Options should be enabled on the SCU (See page 8) and the SCU mounted as shown in Fig. 4. Connection to data set is

via a shielded EIA cable furnished separately. The 3, 7, 12, 25, and 50 foot cables are available from Teletype Corporation.

3 foot length	430569
7 foot length	408065
12 foot length	408066
25 foot length	408067
50 foot length	408068

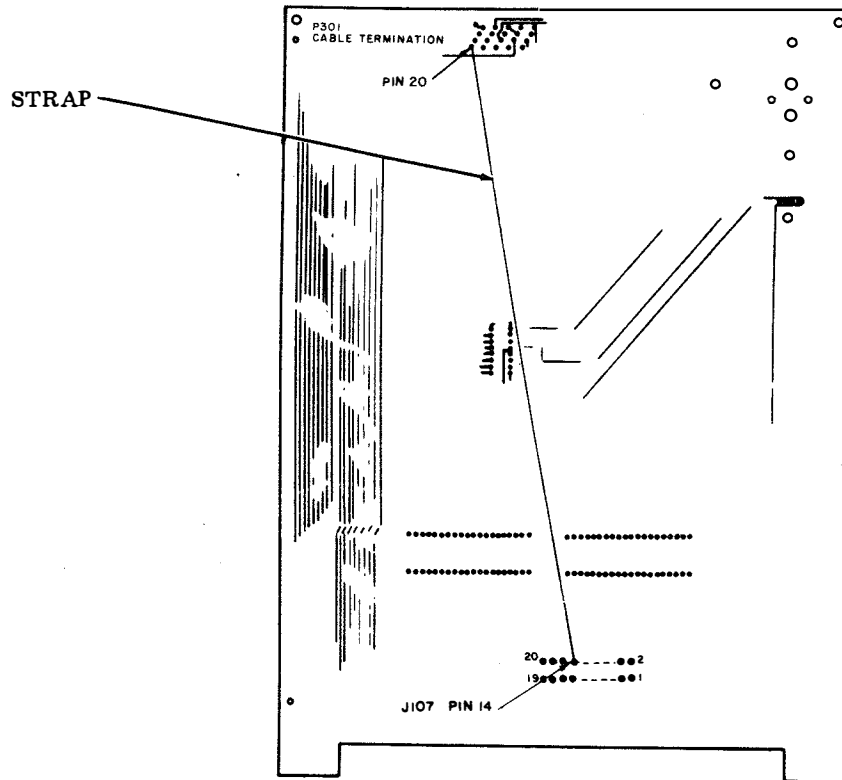


Fig. 5—Logic Card Strap
(Bottom side of early design 410740 circuit card.)

2.12 The selective calling unit circuit card connects electrically to the TTL logic card cable P301 as shown on the teleprinter block diagram (Fig. 6).

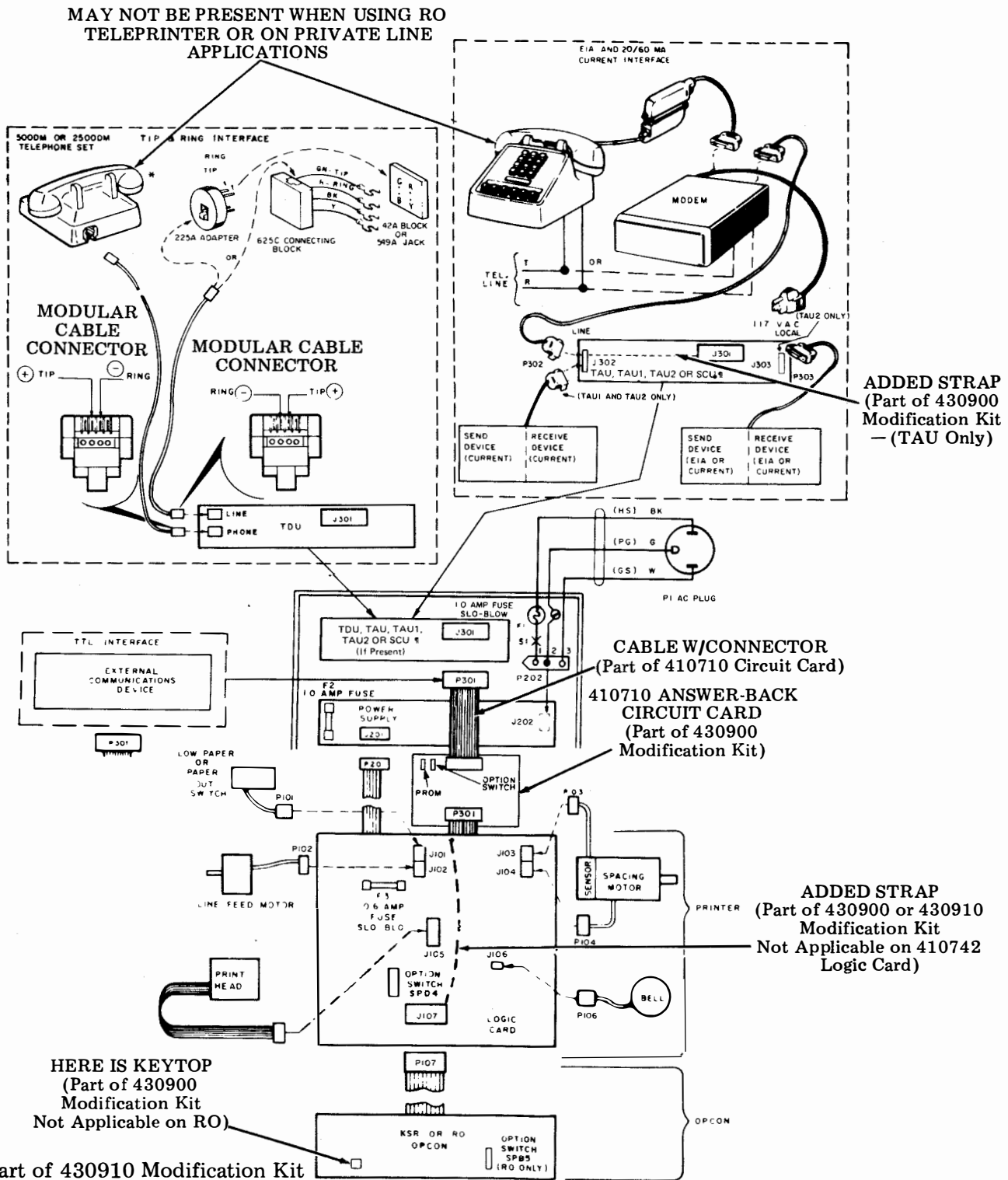


Fig. 6—Basic Teleprinter Block Diagram

Terminal Operation

2.13 The terminal with the selective calling feature operates as previously described for the Model 43 basic RO teleprinter on private line applications, except that the data mode will be terminated by opening the cover. Messages are printed without operator action whenever the station is ready under control of system selective calling procedures.

2.14 The following is a description of internal lead status between the 43 teleprinter and the SCU. An understanding of these conditions is necessary to fully define the selective calling modes shown in Fig. 3. (See Fig. 7.)

- (a) DR on = 0 V on TTL Pin 15.
 DR off = +5 V on TTL Pin 15.
 DR turns off momentarily on a received EOT. Otherwise, DR is on and carrier is being received.
- (b) TR on = 0 V on both TTL Pins 5 and 20.
 TR off = +5 V on either TTL pin 5 or 20.
 TR is on whenever TERM READY or DATA key on 43 teleprinter are lit. The alarm key may also be lit on "low paper" or "paper out" with less than eight received line feeds.

(c) TR turns off when:

- Cover is opened.
- RESET key is depressed.
- PRINTER TEST is depressed.
- After paper out and 8LF received (on sprocket feed).
- DR turns off (only under conditions in (e) below).

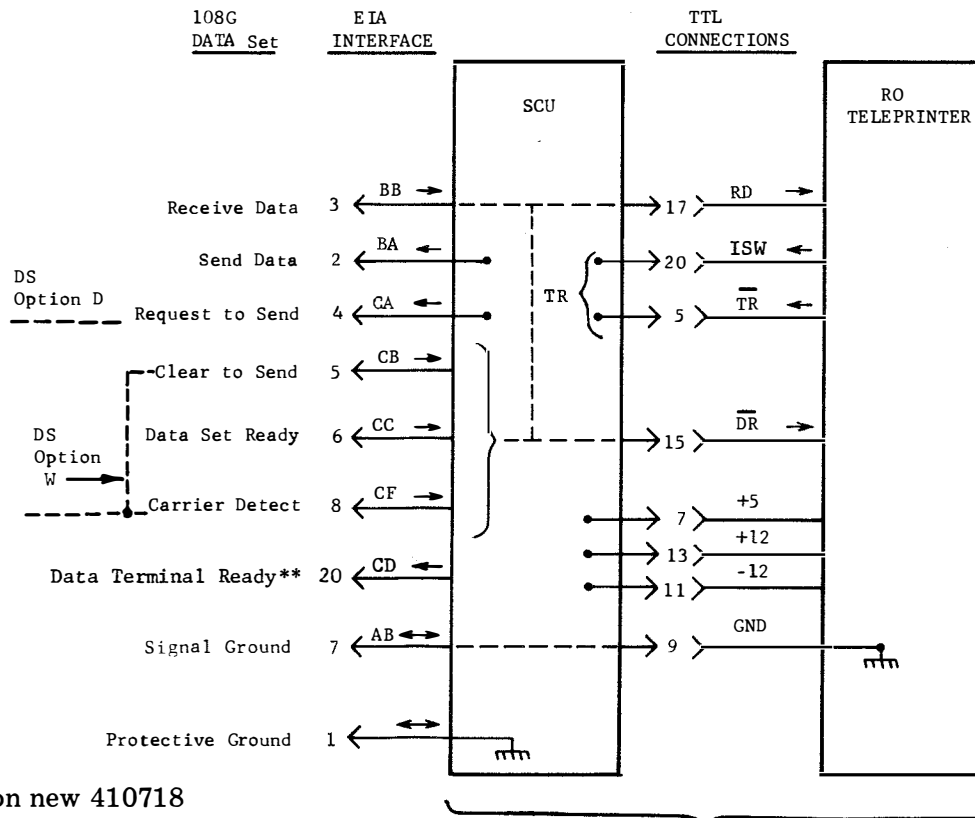
(d) After an alarm condition is cleared it may be necessary to depress RESET key to turn TR on; ie, turn off ALARM indicator. This occurs after PRINTER TEST key is released or paper replaced.

(e) Although TR does not turn off due to some alarm conditions, it will not turn on with these conditions present once TR is turned off for another reason.

These conditions are:

- Low Paper (FF).
- Paper out, but less than 8 LF (SF).

2.15 The interface connections between the logic card and data set are shown in Fig. 7.



**Present on new 410718 circuit card only (always on.)

SELECTIVE CALLING RO TERMINAL
 Fig. 7—SCU Interface Connections

Data Set and Terminal Options

2.16 Options for both the station data set 108G and teleprinter can be enabled by field crafts personnel or can be ordered already coded. Instructions for installing these options are provided in manuals for the data set and this specification.

2.17 Data set options should normally be as factory furnished, as specified on the service order, or as determined by installation requirements. However, when used with the selective calling feature, options D and W must be enabled. Option L is recommended, but not required (separate grounds).

2.18 Options for the teleprinter and selective calling feature are numbered with alpha suffixes. Selection for existing options and the new options are as listed in 2.20. The methods for enabling these options are shown under Coding CDCs and Coding ABs, Fig. 8, 9 and 10.

2.19 Options 431 through 437 apply as described for RO except that 433b (not turn off Terminal Ready on EOT) should always be selected. (434 does not apply on RO, and Options 438 through 444 apply only to answer-back modification kit.)

2.20 The following are new options for the Selective Calling feature:

- 445. Individual Call Directing Code (CDC)
 - a. Uncoded††
 - b. Two ASCII characters (must specify) See Note.
- 446. Group Call Directing Code (CDC)
 - a. Uncoded††
 - b. Two ASCII characters (same for all in group)
- 447. Broadcast Call Directing Code (CDC)
 - a. Uncoded††
 - b. Two ASCII characters (same for all in system)
- 448. Individual Answer-Back (AB) See Note 1
 - a. Uncoded††

- b. Two ASCII characters (must code)
- c. Second AB character sent:††
Programmed character (positive reply)
Delete (negative reply)
- d. Second AB character sent (new circuit card only): See Note 2
ACK (positive reply)
NAK (negative reply)

- 449. Answer-Back (448b) to Group CDC
 - a. No††
 - b. Yes (specify for only one terminal in each group)
- 450. Answer-Back (448b) to Broadcast CDC
 - a. No††
 - b. Yes (specify for only one terminal in system)
- 451. SCU Speed Control (must match Option 436)
 - a. 30 Characters/Sec††
 - b. 10 Characters/Sec

††Factory furnished state of option.

Note 1: Any ASCII characters for CDC or AB can be chosen with the following exceptions:

- EOT, ETX, or STX should not be used as CDCs.
- Any character used by the system host (usually DEL) to separate CDCs for multiple polling should not be used as a CDC.
- DEL should not be used as the second AB character.
- Other system restraints.

Note 2: If Option 448d is used, second AB character, if coded will be overridden.

Coding of CDCs

2.21 Four wiring fields are provided on the SCU circuit card to program the CDCs in accordance with Options 445b, 446b, and 447b, by use of 30 gauge insulated and stripped wire wrap straps. Two straps are required for each character and a wire wrap tool is required. (430544 wire wrap tool is available from Teletype Corporation.)

2.22 Above MLC7 (old 430916 circuit card) and below MLA5 (new 410718 circuit card) are the six wire-wrap pins for coding the row field. The abbreviations are as follows:

FIR — First Individual Row	}	Individual CDC s
SIR — Second Individual Row		
FGR — First Group Row	}	Group CDC s
SGR — Second Group Row		
FBR — First Broadcast Row	}	Broadcast CDC s
SBR — Second Broadcast Row		

The row field must be connected to the 16 ASCII row field terminals below MLC6 and MLC7 (old 430916 circuit card) and above MLC5 and MLC6 (new circuit card) marked RWO-RW15.

2.23 Above MLB7 (old 430916 circuit card) and below MLA4 (new 410718 circuit card) are the six wire-wrap pins for coding the column field. The abbreviations are as follows:

FIC — First Individual Column	}	Individual CDC s
SIC — Second Individual Column		
FGC — First Group Column	}	Group CDC s
SGC — Second Group Column		
FBC — First Broadcast Column	}	Broadcast CDC s
SBC — Second Broadcast Column		

The column field must be connected to the 8 ASCII column field terminals below RPB6 (old circuit card) and above, MLC4 (new circuit card) marked C0-C7 (old circuit card) and CL0-CL7 (new circuit card).

2.24 The following is an example of coding six CDCs. If the six CDCs are AA XY BB, the twelve straps would be wired as shown. All terminals in the CDC field must be connected. If a group or broadcast CDC is not specified, the group or broadcast CDC should be coded the same as for the individual CDC. (See Fig. 9.)

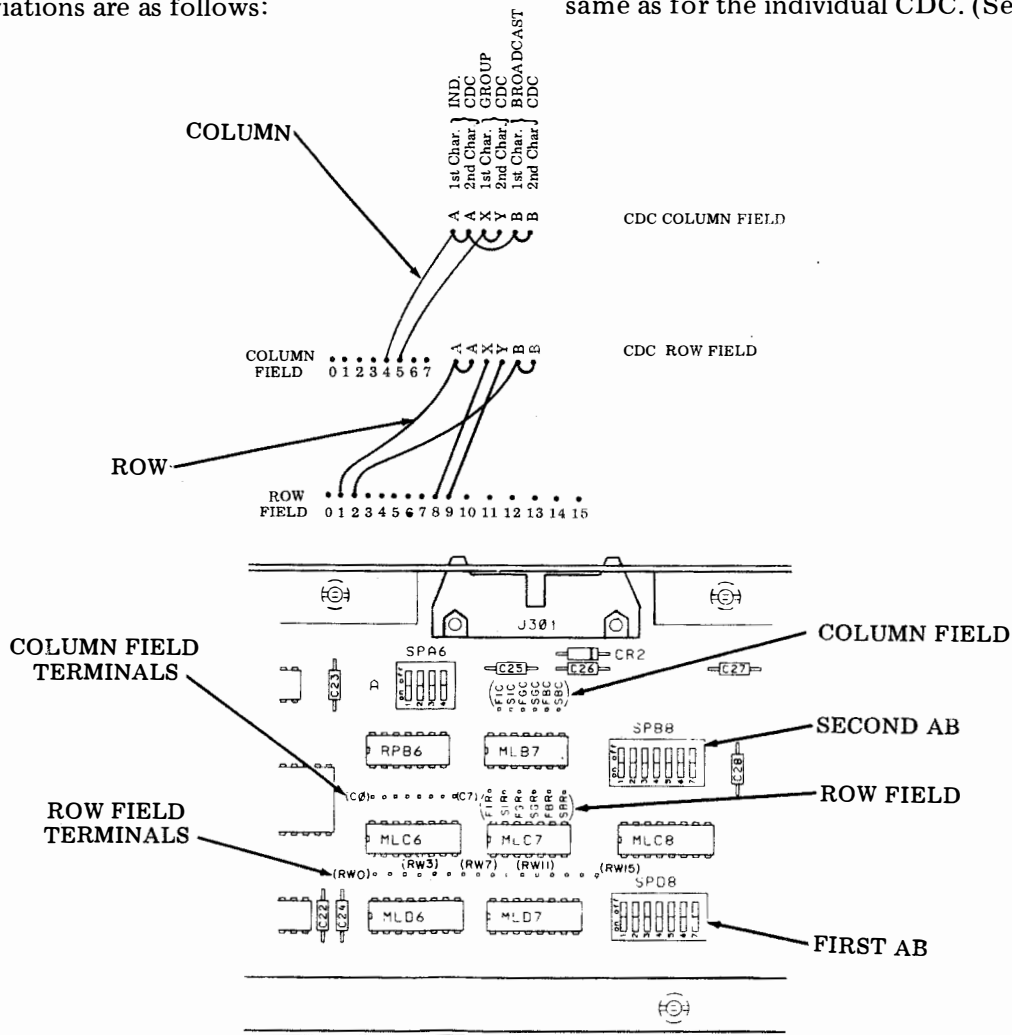


Fig. 8—CDC Row and Column Terminal Locations (Old 430916 Circuit Card) and CDC Coding Example

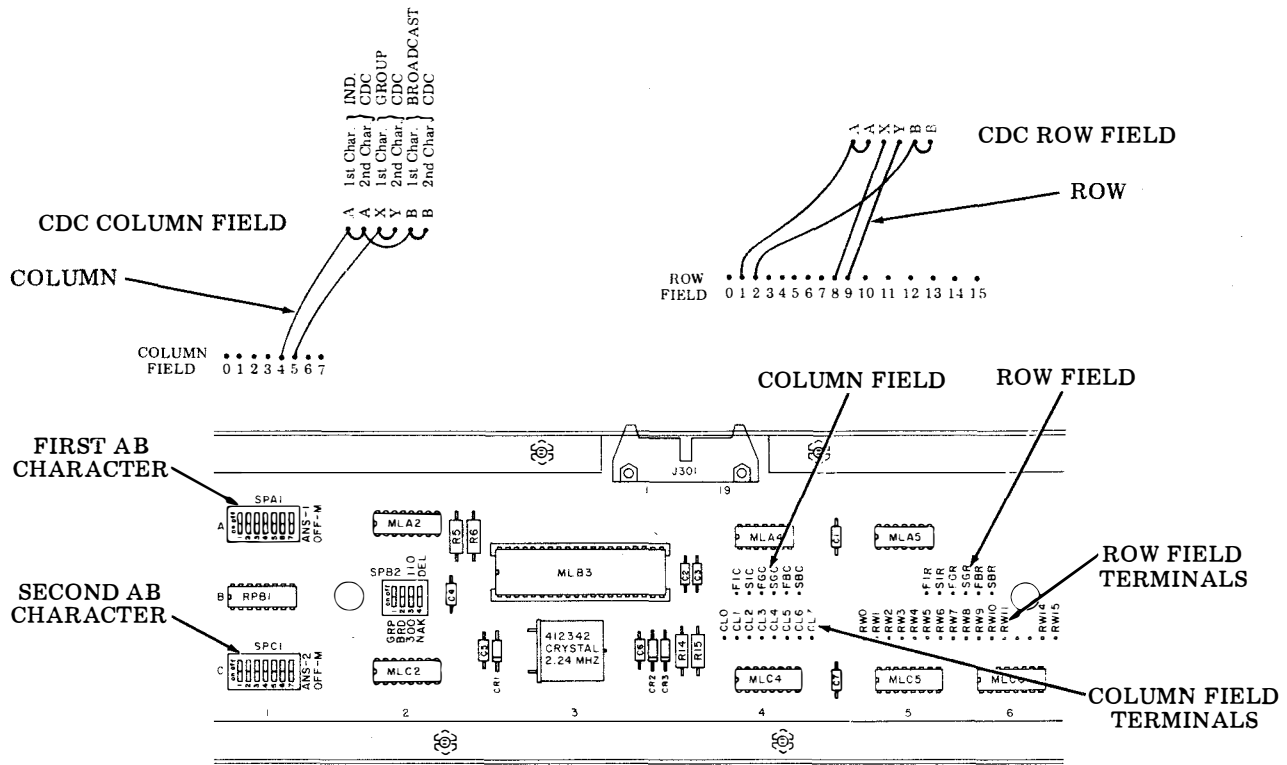


Fig. 9—CDC Row and Column Terminal Locations (New 410718 Circuit Card) and CDC Coding Example

2.25 Where more than two characters use the same row or column, straps must be connected within the CDC field. Only two wire wraps per pin can be used. Complete the worksheet shown below and use as a reference when wiring the CDC fields. (Fill in the characters and draw in the wire straps.)

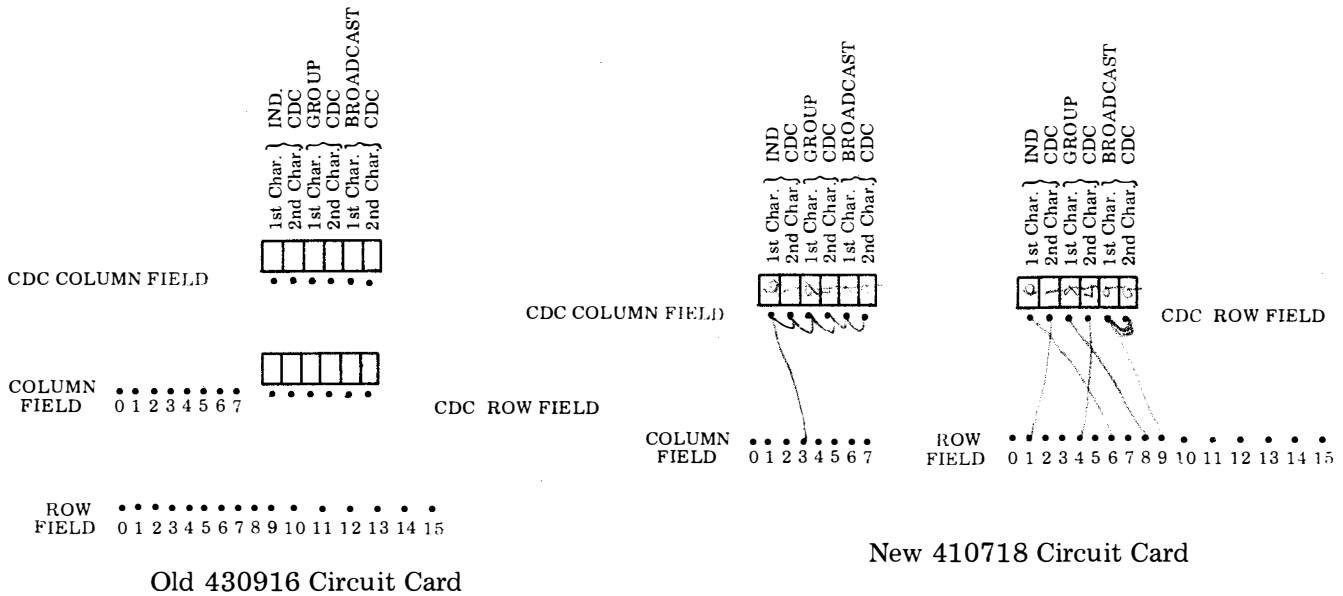


Fig. 10—Worksheet

ROW \ COLUMN	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	▀	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	\$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	^	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
10	LF	SUB	*	:	J	Z	j	z
11	VT	ESC	+	;	K	[	k	{
12	FF	FS	,	<	L	\	l	|
13	CR	GS	-	=	M	]	m	}
14	SO	RS	.	>	N	^	n	~
15	SI	US	/	?	O	_	o	DEL

Row and Column to Character Conversion

Char.	Col	Row	Char.	Col	Row	Char.	Col	Row	Char.	Col	Row	Char.	Col	Row	Char.	Col	Row	Char.	Col	Row			
NULL	0	0	DLE	1	0	SP	2	0	0	3	0	@	4	0	P	5	0	▀	6	0	p	7	0
SOH	0	1	DC1	1	1	!	2	1	1	3	1	A	4	1	Q	5	1	a	6	1	q	7	1
STX	0	2	DC2	1	2	"	2	2	2	3	2	B	4	2	R	5	2	b	6	2	r	7	2
ETX	0	3	DC3	1	3	#	2	3	3	3	3	C	4	3	S	5	3	c	6	3	s	7	3
EOT	0	4	DC4	1	4	\$	2	4	4	3	4	D	4	4	T	5	4	d	6	4	t	7	4
ENQ	0	5	NAK	1	5	%	2	5	5	3	5	E	4	5	U	5	5	e	6	5	u	7	5
ACK	0	6	SYN	1	6	&	2	6	6	3	6	F	4	6	V	5	6	f	6	6	v	7	6
BEL	0	7	ETB	1	7	/	2	7	7	3	7	G	4	7	W	5	7	g	6	7	w	7	7
BS	0	8	CAN	1	8	(	2	8	8	3	8	H	4	8	X	5	8	h	6	8	x	7	8
HT	0	9	EM	1	9	)	2	9	9	3	9	I	4	9	Y	5	9	i	6	9	y	7	9
LF	0	10	SUB	1	10	*	2	10	:	3	10	J	4	10	Z	5	10	j	6	10	z	7	10
VT	0	11	ESC	1	11	+	2	11	;	3	11	K	4	11	[	5	11	k	6	11	{	7	11
FF	0	12	FS	1	12	,	2	12	<	3	12	L	4	12	\	5	12	l	6	12	|	7	12
CR	0	13	GS	1	13	-	2	13	=	3	13	M	4	13	]	5	13	m	6	13	}	7	13
SO	0	14	RS	1	14	.	2	14	>	3	14	N	4	14	^	5	14	n	6	14	~	7	14
SI	0	15	US	1	15	/	2	15	?	3	15	O	4	15	_	5	15	o	6	15	DEL	7	15

DO NOT USE FOR CDC.

Character to Row and Column Conversion

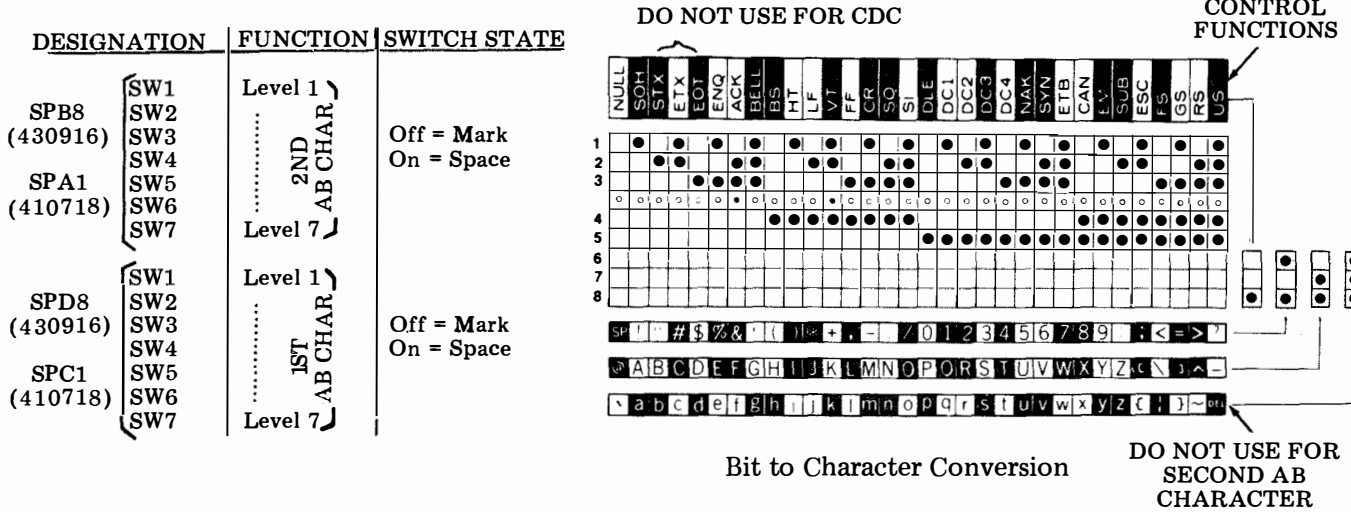
Fig. 11—Conversion Charts

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Coding ABs and Speed

2.26 Two dual in-line switchpacks are provided with seven switches each to code the first and second answer-back characters (Option 448b). Switches are turned off corresponding to the marking bits of the ASCII characters selected. The

8th bit is internally set to provide even parity only. Switchpack SPD8 (old circuit card) and SPA1 (new circuit card) is for the first answer-back character and SPB8 (old circuit card) and SPC1 (new circuit card) is for the second answer-back character. The switches are factory furnished in the ON position. (Refer to Fig. 8 and 8A).



Character	Bits Marking	Character	Bits Marking	Character	Bits Marking	Character	Bits Marking
@	7	\	6,7	SP	6	NULL	NONE
A	1,7	a	1,6,7	!	1,6	SOH	1
B	2,7	b	2,6,7	:"	2,6	STX	2
C	1,2,7	c	1,2,6,7	#	1,2,6	ETX	1,2
D	3,7	d	3,6,7	\$	3,6	EOT	3
E	1,3,7	e	1,3,6,7	%	1,3,6	ENQ	1,3
F	2,3,7	f	2,3,6,7	&	2,3,6	ACK	2,3
G	1,2,3,7	g	1,2,3,6,7	'	1,2,3,6	BELL	1,2,3
H	4,7	h	4,6,7	(	4,6	BS	4
I	1,4,7	i	1,4,6,7	)	1,4,6	HT	1,4
J	2,4,7	j	2,4,6,7	*	2,4,6	LF	2,4
K	1,2,4,7	k	1,2,4,6,7	+	1,2,4,6	VT	1,2,4
L	3,4,7	l	3,4,6,7	,	3,4,6	FF	3,4
M	1,3,4,7	m	1,3,4,6,7	-	1,3,4,6	CR	1,3,4
N	2,3,4,7	n	2,3,4,6,7	.	2,3,4,6	SO	2,3,4
O	1,2,3,4,7	o	1,2,3,4,6,7	/	1,2,3,4,6	SI	1,2,3,4
P	5,7	p	5,6,7	0	5,6	DLE	5
Q	1,5,7	q	1,5,6,7	1	1,5,6	DC1	1,5
R	2,5,7	r	2,5,6,7	2	2,5,6	DC2	2,5
S	1,2,5,7	s	1,2,5,6,7	3	1,2,5,6	DC3	1,2,5
T	3,5,7	t	3,5,6,7	4	3,5,6	DC4	3,5
U	1,3,5,7	u	1,3,5,6,7	5	1,3,5,6	NAK	1,3,5
V	2,3,5,7	v	2,3,5,6,7	6	2,3,5,6	SYN	2,3,5
W	1,2,3,5,7	w	1,2,3,5,6,7	7	1,2,3,5,6	ETB	1,2,3,5
X	4,5,7	x	4,5,6,7	8	4,5,6	CAN	4,5
Y	1,4,5,7	y	1,4,5,6,7	9	1,4,5,6	EM	1,4,5
Z	2,4,5,7	z	2,4,5,6,7	:	2,4,5,6	SUB	2,4,5
[	1,2,4,5,7	{	1,2,4,5,6,7	;	1,2,4,5,6	ESC	1,2,4,5
\	3,4,5,7	|	3,4,5,6,7	<	3,4,5,6	FS	3,4,5
]	1,3,4,5,7	}	1,3,4,5,6,7	=	1,3,4,5,6	GS	1,3,4,5
^	2,3,4,5,7	~	2,3,4,5,6,7	>	2,3,4,5,6	RS	2,3,4,5
_	1,2,3,4,5,7	DEL	1,2,3,4,5,6,7	?	1,2,3,4,5,6	US	1,2,3,4,5

DO NOT USE FOR SECOND AB CHARACTER

Character to Bit Conversion

Fig. 12—AB Coding and Bits

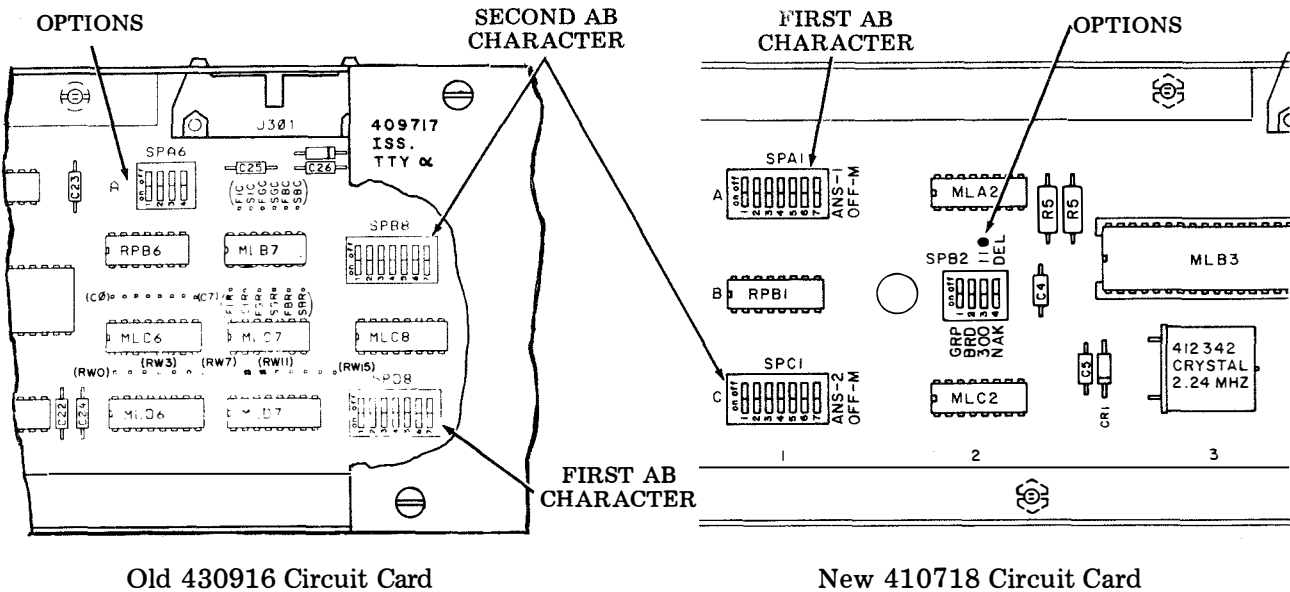


Fig. 13—Switch Identification

2.27 One switchpack SPA6 (old circuit card) and SPB2 (new circuit card) is provided with four switches to set Options 448, 449, 450, and 451.

		Old 430916 Circuit Card	New 410718 Circuit Card	
448.	Individual Answer-Back	SPD8 and SPB8	SPA1 and SPC1	
a.	Uncoded	All ON-Space	All ON-Space	##
b.	Two ASCII Characters	Coded	Coded	##
c.	Second AB Character Sent: Programmed Character (Positive Reply) Delete (Negative Reply)		SPB2 — — — ○	##
d.	Second AB Character Sent (Late Design Only): ¶¶ ACK (Positive Reply) NAK (Negative Reply)		SPB2 — — — ●	
449. Answer-Back to Group CDC		430916 SPA6	410718 SPB2	
		1 2 3 4	1 2 3 4	
a.	No	○ — — —	○ — — —	##
b.	Yes	● — — —	● — — —	
450. Answer-Back Broadcast CDC		430916 SPA6	410718 SPB2	
		1 2 3 4	1 2 3 4	
a.	No	— ○ — —	— ○ — —	##
b.	Yes	— ● — —	— ● — —	
451. SCU Speed Control		430916 SPA6	410718 SPB2	
		1 2 3 4	1 2 3 4	
a.	30 Characters/Sec	— — ● ●	— — ● —	##
b.	10 Characters/Sec	— — ○ ○	— — ○ —	

- Indicates toggle or slide position to ON.
- Indicates toggle or slide position to OFF.
- Position of switch does not affect option.
- ## Factory furnished state of option.
- ## Must code answer-back characters.
- ¶¶ Second AB character if coded, will be overridden.

3. KIT MATERIAL AND ORDERING

3.01 The 430910 modification kit consists of the following parts:

Qty	Part No.	Description
1	31530RM	Wire, Insulated 15" (26 Ga)
4	341798	Screw w/Lockwasher 6-32 x 9/16"
18	430542	Strap, Wire 3-1/2" (30 Ga)
1	430916	Old Assembly, Station or Control Unit
1	410718	New Assembly, Station Control Unit
1	50962S	Specification

4.03 No routine servicing is required. In the event of operational trouble with the selective calling kit, replace the 430916 or 410718 selective calling unit assembly.

4. SUPPLEMENTAL SUPPORT INFORMATION

A. Testing

4.01 An installation checkout of the 43 teleprinter w/TTL interface should be performed, using existing documentation before installing the SCU into the teleprinter. An installation checkout of the teleprinter w/SCU may be performed under direction of a testing station, with access to the private line or through the switched network or within the system itself to make sure the station is operable. Teleprinters without access to a testing station must be associated with locally developed testing arrangements to perform actual on-line tests.

B. Tools

4.02 The selective calling modification kit can be readily installed by field service personnel. No special tools other than a small soldering

iron for adding a strap to the logic card and a 430544 tool (or 30 gauge equivalent) for wrapping and unwrapping wires to the CDC wiring field are required. The 430544 tool may also be used for stripping wires.

C. Servicing

4.03 No routine servicing is required. In the event of operational trouble with the selective calling kit, replace the 430916 or 410718 selective calling unit assembly.

D. Training

4.04 Service personnel should be properly trained on the basic Model 43 teleprinter before attempting installation of the selective calling kit since dismantling of the terminal is involved. No special training for installing, testing, or servicing the kit is required.

E. Documentation

4.05 The basic Model 43 teleprinter service manual is available and provides information required for disassembly, standard options, and test procedures for the terminal. Later issues of all applicable service and how to operate manuals will include the selective calling feature.

F. Disposition

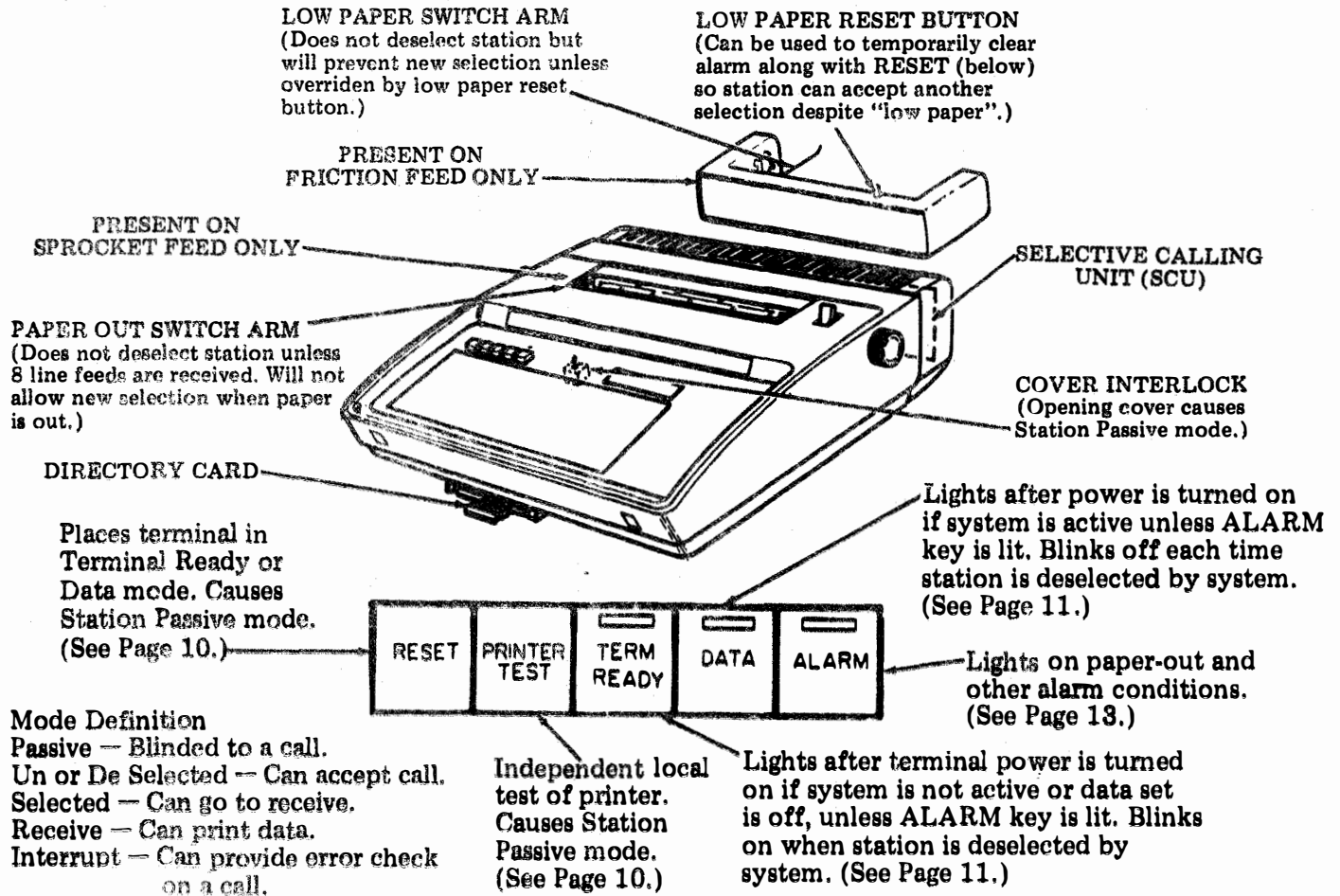
4.06 Fill out the directory card label and insert the cutouts on Page 13 into the How to Operate Manual and on the underside of the directory card. (Refer to 5.01 and 6.01.) If the modification kit is installed and tested by a service center, place the 50962S specification and the How to Operate Manual into the documentation envelope and place the envelope into the shipping container when the teleprinter is repacked for shipment; otherwise retain this specification for future use.

5. ADDENDUM TO HOW TO OPERATE MANUAL

5.01 Cut out on dashed line and insert in the How to Operate Manual 372 associated with this teleprinter. Place over existing operational controls and status indicators page.

Selective Calling Unit Terminal Controls and Indicators

- Use and function of the operational control and status indicators should be reviewed before the RO teleprinter is operated. Station can only receive data in the Receive mode. The Receive mode is under control of the system when the TERM READY or DATA keys are lit and ALARM is not lit.



6. DIRECTORY CARD LABEL

6.01 Fill out the new directory card label and cut out on solid line. Place over existing service record on bottom side of directory card.

