

SHEET INDEX

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DWG ISSUE	CD ISSUE	DATE ISSUED	DRAWN	APPR
/	/	6-3-63	YNC	WJM
			PBF	DHC
			ARM	

SHEET INDEX NOTES

1. WHEN CHANGES ARE MADE IN THIS DRAWING, ONLY THOSE SHEETS AFFECTED WILL BE REISSUED.
2. THIS SHEET INDEX WILL BE REISSUED AND BROUGHT UP TO DATE EACH TIME ANY SHEET OF THE DRAWING IS REISSUED, OR A NEW SHEET IS ADDED.
3. THE ISSUE NUMBER ASSIGNED TO A CHANGED OR NEW SHEET WILL BE THE SAME ISSUE NUMBER AS THAT OF THE SHEET INDEX.
4. SHEETS THAT ARE NOT CHANGED WILL RETAIN THEIR EXISTING ISSUE NUMBER.
5. THE LAST ISSUE NUMBER OF THE SHEET INDEX IS RECOGNIZED AS THE LATEST ISSUE NUMBER OF THE DRAWING AS A WHOLE.

SUPPORTING INFORMATION

CATEGORY	NO.

SD- 69454-01	AT&TCO STANDARD
STATION SYSTEMS	
KEY AND TELEPHONE CIRCUIT	
ARRANGED FOR TOUCH-TONE CALLING ON 2- AND 4-WIRE LINES	
1616-TYPE TELEPHONE SETS	
②	SD-69454-01-A1
BELL TELEPHONE LABORATORIES INCORPORATED	13 SHEETS PRINTED IN U.S.A.

②

35

CIRCUIT NOTES:

101.	DESIG	AMP	POTENTIAL FUSED	ONE PER

102.	FEATURE OR OPTION	PROVIDE		QUANTITY
		FIG.	APP OR WRG	
	PLUG TERMINATION OF D120C CORD OF 1616-TYPE TEL SET	1		ONE PER KEY TEL SET
	TOUCH TONE DIAL CKT	2		
	DC BUZZER	3		
	TEL SET CKT FOR 1616-TYPE TEL SET ARRANGED FOR HANDSET OR HEAD TEL SET OPERATION OR FOR HANDSET OR SPEAKERPHONE OPERATION	4		
	599B KEY	5		
	KEY AND TRANSMITTER UNIT FOR SPEAKERPHONE SYS NO. 3A	6		
	FIRST KEY UNIT OF 1616-TYPE TEL SETS	7		
	SUPPLEMENTARY KEY UNIT OF 1616-TYPE TEL SETS	8	SEE NOTE 301	
	OPERATOR HEADSET	9	AS REQD	
	WITH CONTROL UNIT 55A, SEE NOTE 105		Z	

103.

NETWORK VALUES			
NO.	NETWORK	RESISTANCE IN OHMS	CAPACITANCE IN UF
	CODE		

CIRCUIT NOTES: (CONTINUED)

104.								RECORD OF FIGURES, WIRING, AND APPARATUS CHANGES			
CHANGED ON ISS.	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USE IN CIRCUIT							
				STD	A&M	MD					

105. SETS SHALL BE FURNISHED WITH INDICATED LEADS SPADE TIPPED, TAPED AND STORED. FOR THE FOLLOWING CONDITIONS LEADS SHALL BE TERMINATED AS SPECIFIED BELOW:

SPEAKERPHONE: (MODIFIED 55A CONTROL UNIT)

INTERNAL LEAD CONNECTIONS		
LEAD DESIGNATIONS	3RD KEY POSITION	1616-TYPE CALL DIRECTORS
	667 TRANSMITTER LEADS	
T1	Y-BL	3 OF (TB2)
R1	BL-Y	6 OF (TB1)
LK	Y-O	4 OF (TB1)
AG	O-Y	1 OF (TB1)
A1	O-V	2 OF (TB1)

WITH THE 667B TRANSMITTER THE LEADS TO THE TURN KEY ARE AVAILABLE.

FOR SPEAKERPHONE SYSTEM NO. 3A, THE LOUDSPEAKER LEADS SHALL BE BROUGHT FROM THE CONTROL UNIT VIA LEADS EXTERNAL TO THE TELEPHONE SET CORD. THE MAXIMUM ALLOWABLE CONDUCTOR LENGTH BETWEEN THE CONTROL UNIT AND THE TELEPHONE SET IS 100 FEET FOR SPEAKERPHONE SYSTEM NO. 3A.

AN EXTERNAL TRANSMITTER CANNOT BE USED WITH THE 1616 TELEPHONE SET.

STATION SYSTEMS
KEY AND TELEPHONE CIRCUIT

2

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CIRCUIT NOTES: (CONTINUED)

- 106. ALL KEY POSITIONS ARE ARRANGED IN THE SHOP AS PICKUP POSITIONS. TO CONVERT A KEY POSITION FROM PICKUP (LOCKING) TO SIGNALING (NONLOCKING) REMOVE THE SCREW DETAIL P-10E837 FROM THE PLUNGER AT THE KEY POSITION TO BE CONVERTED. MAKE THE NECESSARY CONNECTION CHANGES AS SHOWN IN TABLE C. TO CONVERT A KEY POSITION FROM NONLOCKING TO LOCKING, INSERT SCREW DETAIL P-10E837 IN PLUNGER.
- 107. WHEN USING THE ARRANGEMENT FOR A COMMON SIGNALING KEY FOR SEVERAL PRIVATE OR INTERCOMMUNICATING LINES AS PROVIDED FOR IN TABLE C, THE 6TH KEY OF ANY SUPPLEMENTARY KEY UNIT IS CONVERTED TO NONLOCKING AND IS USED AS THE SIGNALING KEY. THE SIGNALING IS DIRECTED TO THE S OR S1 LEAD OF THE LINES TO BE SIGNALLED. THE AUTOMATIC CUTOFF FEATURE OF KEY TELEPHONE SYSTEM NO. 1A1 CANNOT BE USED ON A LINE CONNECTED TO THE COMMON SIGNALING KEY.
- 108. WHEN MORE THAN 5 PRIVATE AND INTERCOMMUNICATING LINES WITH COMMON SIGNAL KEY ARE REQUIRED PER TELEPHONE SET, THE C TERMINALS OF THE KEY UNITS OF THE LINES USING COMMON SIGNALING ARE STRAPPED TOGETHER.
- 109. THE RINGER OR BUZZER MAY BE CONNECTED WITHOUT CAPACITOR FOR PRIVATE LINE, COMMON, OR INTERCOM LINE SIGNALS AS REQUIRED. WHEN POWER FAILURE FEATURE IS PROVIDED A CAPACITOR IS REQUIRED.
- 110. WHEN A KEY AND TRANSMITTER UNIT (FIG. 6) IS USED IT SHALL BE PLACED IN THE 3RD KEY POSITION OF THE 18-BUTTON SET OR THE 5TH KEY POSITION OF THE 30-BUTTON SET IN PLACE OF THE APPARATUS BLANK OR KEY UNIT OCCUPYING THAT POSITION.
- 111. WHEN SIGNALING KEYS ARE TO BE PROVIDED ON ANY SUPPLEMENTAL KEY UNIT OF A 1616-TYPE TELEPHONE SET, THE SPADE TIPPED LEADS ASSOCIATED WITH PICKUP KEYS TO BE USED AS SIGNALING KEYS SHALL BE CONNECTED TO THE C TERMINAL ON (T8VT). THESE C TERMINALS SHALL BE STRAPPED TO THE SG TERMINAL OF TERMINAL STRIP (T8VT).
- 112. THE 599B KEY SHALL BE LOCATED IN THE FIRST KEY POSITION REPLACING EITHER THE 599A OR THE 598A KEY UNIT.

EQUIPMENT NOTES:

- 201. A D120C CORD CONSISTS OF AN 8-FOOT LENGTH OF 120-STRANDED 27-GAUGE CONDUCTORS JACKETED AND GROUPED INTO BLUE-WHITE, ORANGE-WHITE AND GREEN-WHITE SERVINGS OF 40 CONDUCTORS EACH. THE CORD IS PROVIDED WITH 3 PLUGS ON THE END TOWARD THE CABLE AND 3 PLUGS AND TERMINAL STRIPS MOUNTED ON A KEY FRAME INSIDE THE SET.
- 202. THE KS-8109 BUZZER SHALL BE MOUNTED ON THE RELAY BRACKET USING TWO NYLON SCREWS AND TWO FIBER WASHERS TO INSULATE THE BUZZER FROM THE BRACKET. THE NYLON SCREWS AND FIBER WASHERS ARE FURNISHED IN THE SET.

DRAWING
ISSUE

/ TNC
DHC
ARM

STATION SYSTEMS
KEY AND TELEPHONE CIRCUIT

2

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INFORMATION NOTES:

- 301. THE 18-BUTTON KEY TELEPHONE SET SHALL BE PROVIDED WITH A TELEPHONE SET CIRCUIT AND ANY KEY ARRANGEMENT AS SHOWN IN TABLE 4.
- 302. RINGER CONNECTIONS MAY BE MADE BY CONNECTING THE CABLE LEADS ASSOCIATED WITH R OR R1 AND B OR B1 LEADS AT THE EQUIPMENT AS DESIRED OR REQUIRED.
- 303. WHEN A 598A KEY IS ADDED, THE T, R, AND A LEADS CONNECT AS FOLLOWS:

LEAD DESIG	FROM				TO				COLOR			
	TB1	TB11	TB111	TB1V	TB1T	TB11T	TB1V	TBV	TBT	TB1T	TB11T	TB1V
R	1				R				BL-V			
		1				R				BL-V		
			1				R				BL-V	
T	PIN 45 OF ASSOC CONN				T							V-BL
A	PIN 46 OF ASSOC CONN				A-H							G-V
						A-H						
							A-H					

- 304. BR-V LEAD SHALL BE CONNECTED TO TERMINAL 27 OF THE THIRD PLUG INSIDE THE 1616-TYPE SETS. THE SPADE TIPPED END SHALL BE TAPED AND STORED.
- 305. RINGER VOLUME CONTROL IS LOCATED ALONG THE BASE AT THE LEFT FRONT OF SETS. THE RINGER IS MANUALLY SHUT OFF WHEN THE CONTROL ARM IS MOVED TO THE EXTREME LEFT POSITION. THE LOUDEST POSITION IS THE FARTHEST RIGHT POSITION.
- 306. BUZZER LEADS BZ AND BZ1 MAY BE CONNECTED AT THE EQUIPMENT TO PROVIDE THE REQUIRED TYPE OF BUZZER OPERATION.
- 307. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS,
CAPACITANCE VALUES ARE IN MICROFARADS.

FIG. 101
TOP VIEW 599A KEY

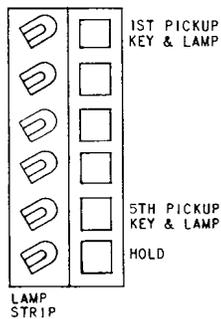


FIG. 102
TOP VIEW 598A KEY

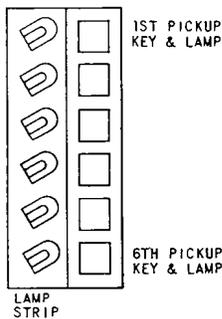
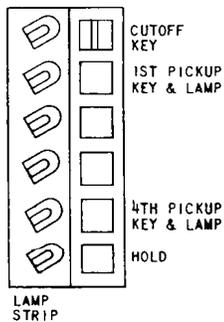


FIG. 103
TOP VIEW 599B KEY



FIGURES AND OPTIONS ON THIS DWG	
CKT. FIG.	APP OR WIRING
1	Z
2	
3	
4	
5	
6	
7	
8	
9	

STATION SYSTEMS KEY AND TELEPHONE CIRCUIT		<div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">2</div>	SD-69454-01-B3
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TABLE A
CODE IDENTIFICATION FOR 18-BUTTON KEY TEL SET

BASE & 1ST SUFFIX	2ND SUFFIX	LEFT KEY POSITION	NO. 2 KEY POSITION	NO. 3 KEY POSITION
1616A	2	599A	598A	598A
	7	599B		
	11	599A		
	13	599B		667B

TABLE B OF FIG. 7 AND 8

PICKUP-SIGNALING CONVERSION OF KEY UNIT
 CONVERT KEYS FROM LOCKING TO NONLOCKING OR VICE VERSA
 (SEE NOTES 106, 107, 108, AND 111) AND CHANGE SET LEADS AS FOLLOWS

NO. OF PICKUP KEYS	NO. OF SIG KEYS CONVERTED FROM PICKUP KEYS			NO. OF PRIVATE AND INTERCOM LINES WITH COM SIG KEYS (PER KEY UNIT)	KEY LEADS & TERMS OF KEY UNIT OR UNITS INVOLVED						
	599A	599B	598A SUPL KEY		O-W	S-W	G-R	BL-BK	BR-BK	Y-O SUPL KEY ONLY	O-Y SUPL KEY ONLY
					-	-	-	-	A-H	A-H	A-H
5	-	-	1	-	A-H	A-H	A-H	A-H	A-H	C	G
4	1	-	2	-	A-H	A-H	A-H	A-H	C	C	G
3	2	1	3	-	A-H	A-H	A-H	C	C	C	G
2	3	2	4	-	A-H	A-H	C	C	C	C	G
1	4	3	5	-	A-H	C	C	C	C	C	G
-	-	-	6	-	C	C	C	C	C	C	G
5	-	-	1	2	A-H	A-H	A-H	C	C	C	SG
5	-	-	1	3	A-H	A-H	C	C	C	C	SG
5	-	-	1	4	A-H	C	C	C	C	C	SG
5	-	-	1	5	C	C	C	C	C	C	SG

STATION SYSTEMS KEY AND TELEPHONE CIRCUIT		2	SD-69454-01-B4
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FIG. 1
PLUG TERMINATION OF
D120C CORD
SEE NOTE 105

DRAWING
ISSUE
/ TND
DHC
ARM

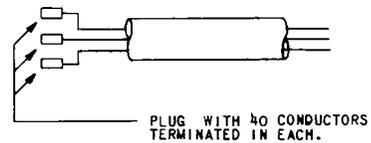
D120C CORD COLOR	PLUG TERM.	LEAD DESIGNATION		
		PLUG 1 BLUE-WHITE SERVING	PLUG 2 ORANGE-WHITE SERVING	PLUG 3 GREEN-WHITE SERVING
BL-W	1	R	R	R
W-BL	26	T	T	T
O-W	2	A1		
W-O	27	A, S ₂ OR S1	A, S ₂ OR S1	A, S ₂ OR S1
G-W	3	L	L	L OR † R1
W-G	28	LG	LG	LG OR † T1
BR-W	4	R	R	R
W-BR	29	T	T	T
S-W	5			
W-S	30	A, S ₂ OR S1	A, S ₂ OR S1	A, S ₂ OR S1
BL-R	6	L	L	L OR † P1
R-BL	31	LG	LG	LG
O-R	7	R	R	R
R-O	32	T	T	T
G-R	8			
R-G	33	A, S ₂ OR S1	A, S ₂ OR S1	A, S ₂ OR S1
BR-R	9	L	L	L
R-BR	34	LG	LG	LG
S-R	10	R	R	R
R-S	35	T	T	T
BL-BK	11			
BK-BL	36	A, S ₂ OR S1	A, S ₂ OR S1	A, S ₂ OR S1
O-BK	12	L	L	L OR † S
BK-O	37	LG	LG	LG OR † AG
G-BK	13	R OR ER	R	R
BK-G	38	T OR ET	T	T
BR-BK	14			
BK-BR	39	A, S ₂ OR S1	A, S ₂ OR S1	A, S ₂ OR S1
S-BK	15	L	L	L OR † M1
BK-S	40	LG	LG	LG OR † M2
BL-Y	16	R	R	R
Y-BL	41	T	T	T
O-Y	17	FW		
Y-O	42		A, S ₂ OR S1	A, S ₂ OR S1, † A1
G-Y	18	SP	L	L OR † F1
Y-G	43	P3	LG	LG
BR-Y	19	SG	PB	RR
Y-BR	44	† CS	SPARE	RT
S-Y	20	R OR R1	BZ	SPARE
Y-S	45	B OR B1	BZ1	SPARE
	21	VACANT	VACANT	VACANT
	46			
	22			
	47			
	23			
	48			
	24			
	49			
	25			
	50			

† SPEAKERPHONE SYSTEM NO. 3A

FIG. 104
PLUG
NUMBERING SCHEME



FIG. 105
D120C CORD



STATION SYSTEMS
KEY AND TELEPHONE CIRCUIT

2

SD-69454-01-C1

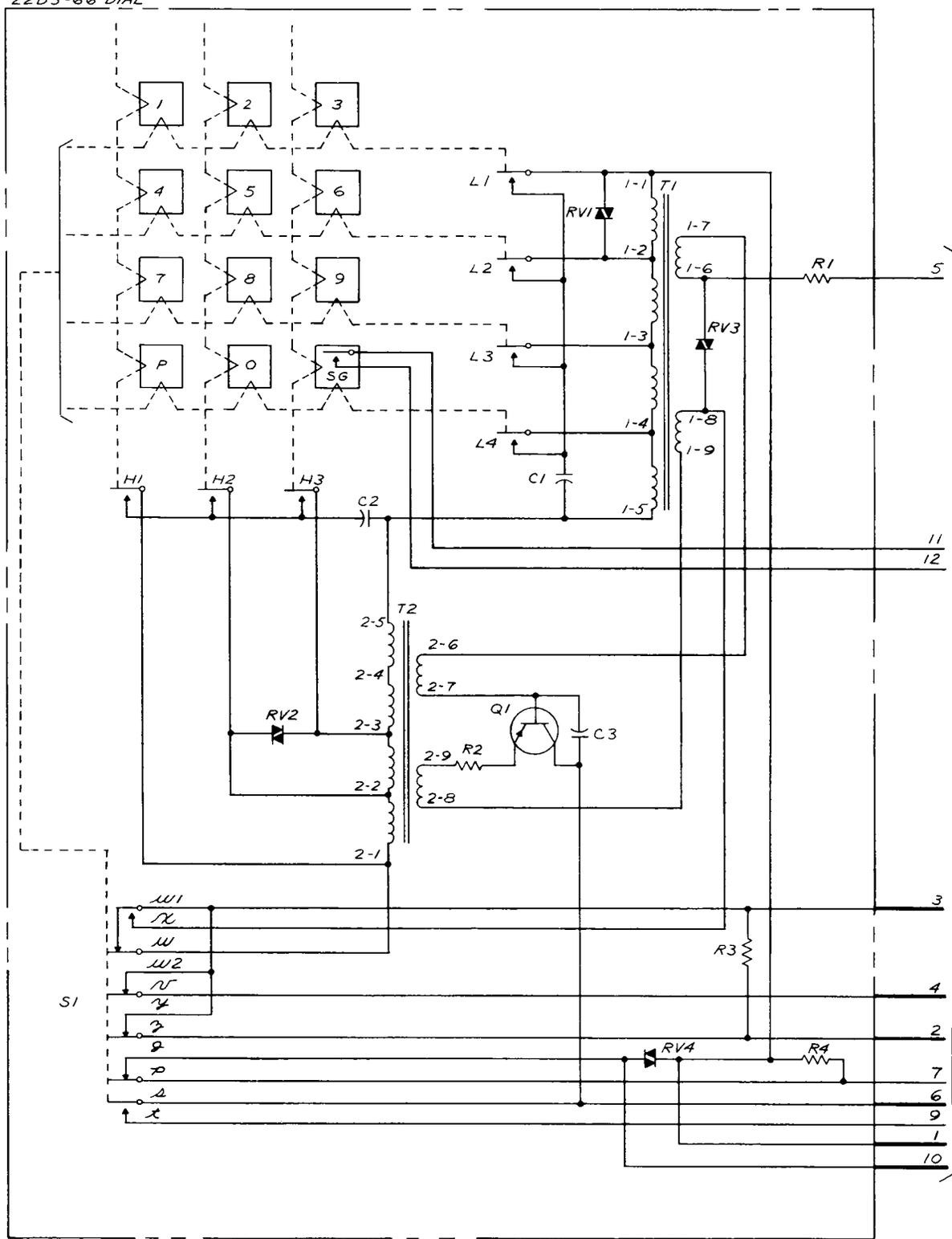
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FIG. 2
TOUCH-TONE DIAL CKT
1616 SET

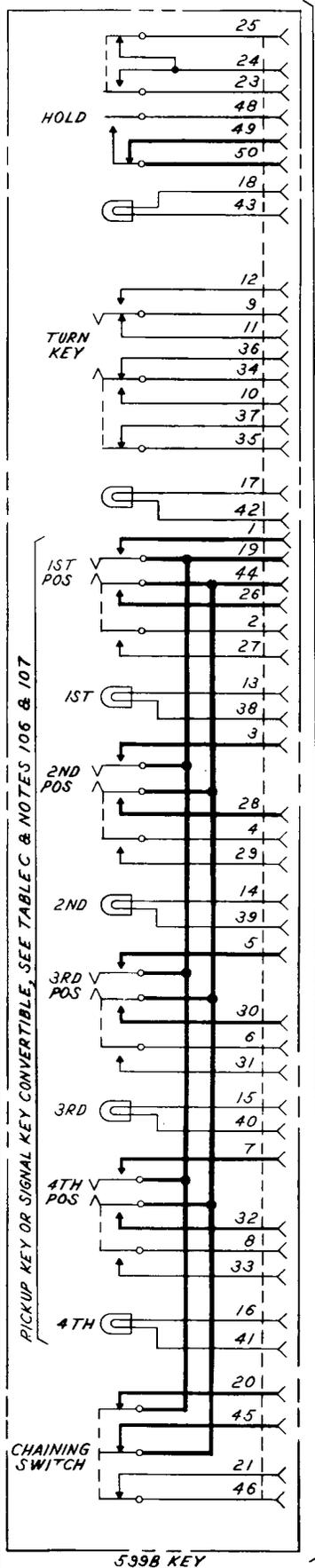
22B3-66 DIAL



TO
FIG. 4

STATION SYSTEMS KEY AND TELEPHONE CIRCUIT		②	SD-69454-01-C2
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FIG. 5
5398 KEY
SEE NOTE 112 & FIG. 103



THE FOLLOWING TABLE LISTS THE SERVICE FEATURES AND LEADS UTILIZED TO PROVIDE THESE SERVICES IN THE 1616-TYPE TELEPHONE SETS.

SEE NOTE 112

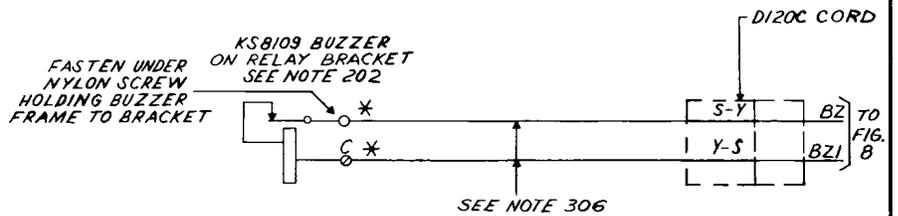
FEATURE (599B KEY)	5TH AND 6TH PICKUP KEY LEADS						SPADE TIPPED LEADS IN SET				
	R 5TH G-BK	T 5TH BK-G	A 5TH BK-BR	R 6TH BL-Y	T 6TH Y-BL	A 6TH Y-O	BL-Y	Y-BL	O-Y	Y-O	BR-BK
CUTOFF STA ON 1A1 SYS	TO EQUIP.			TO EXT STA			TAPE AND STORE		G TBI	TAPE AND STORE	
CUTOFF STA ON 4-WIRE LINE (AUX RELAY RECD)	TO EQUIP. GRD	TO EQUIP. AUX REL				TAPE AND STORE	TAPE AND STORE		G TBI	G TBI	
CUTOFF EXT RING. OR BUZ	TO EQUIP.			TO EXT RING. OR BUZ		TAPE AND STORE					
CUTOFF BELL IN SET	TO EQUIP.			*	*	1 TB2 †	A NET. †	TAPE AND STORE			
CUTOFF BUZ IN SET	TO EQUIP.			*	*	D A CAP.	C C C	TAPE AND STORE			
MONITORING	TO MON EQUIP.					R TBI	T TBI				

† TAPE AND STORE THE S-Y AND Y-S LEADS FROM A OF NETWORK AND 1 OF TB2.

* THE BL-Y AND Y-BL LEADS SHOULD BE TAPED AND STORED AT THE EQUIPMENT WHEN THE SPADE TIPPED LEADS ARE USED IN THE SET.

TO FIG. 7 IN PLACE OF 599A KEY SHOWN THEREON

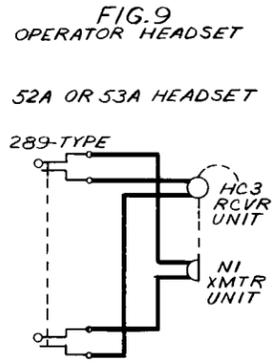
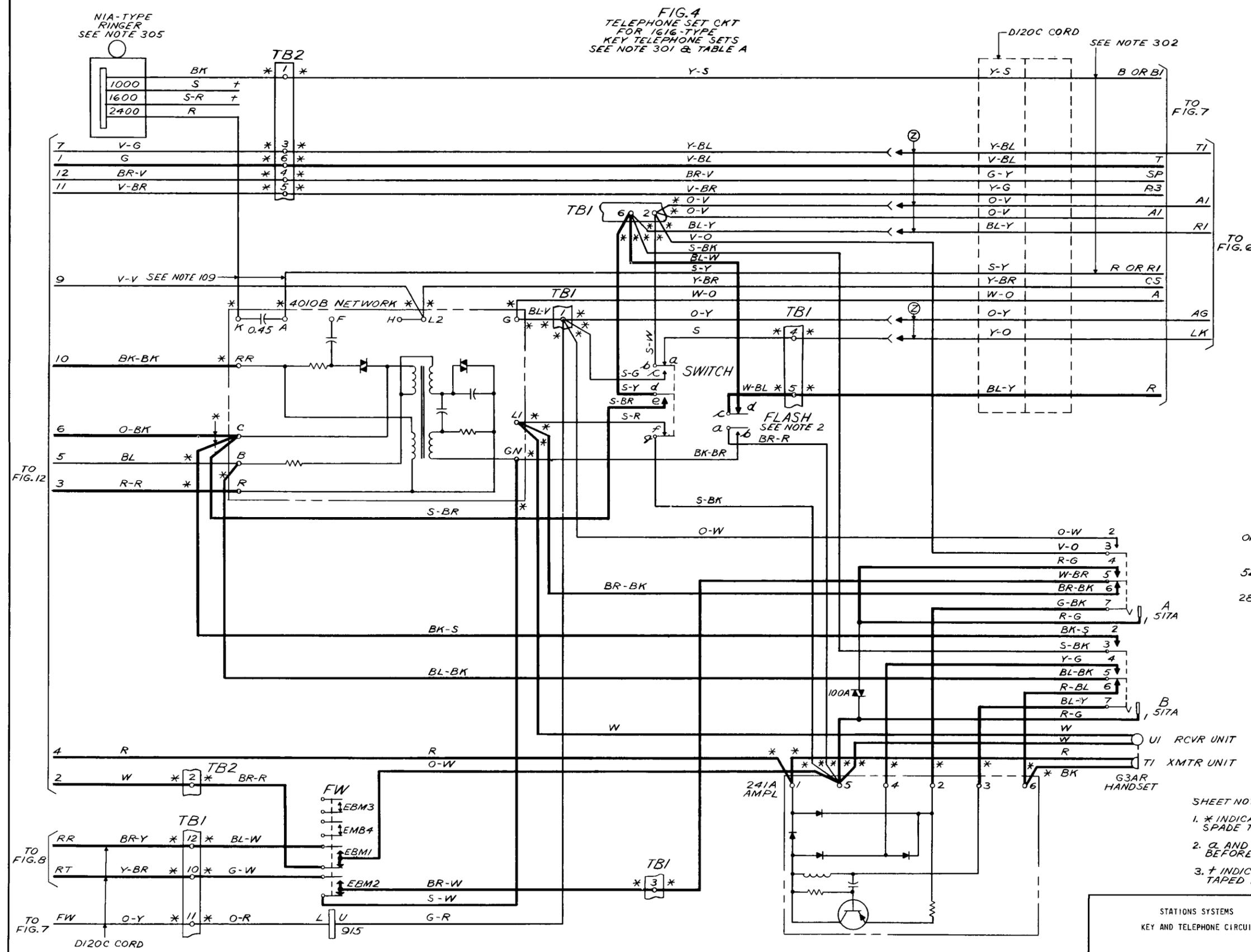
FIG. 3
DC BUZZER CKT



* INDICATES LEADS ARE SPADE TIPPED

STATION SYSTEMS KEY AND TELEPHONE CIRCUIT		SD-69454-01-C3
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DRAWING
ISSUE
/ 177K
DNC
ARM

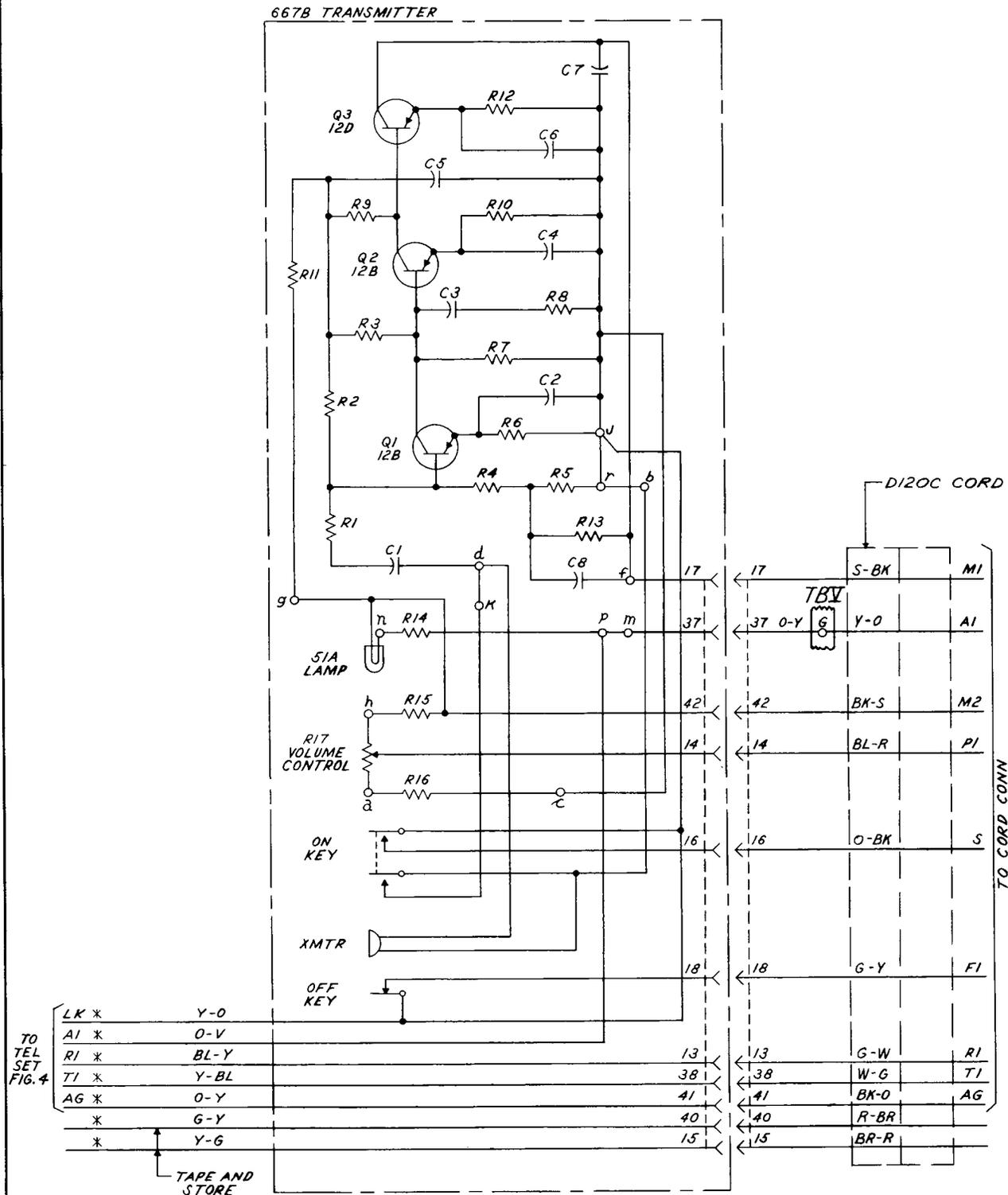


SHEET NOTES:

1. * INDICATES LEADS ARE SPADE TIPPED.
2. a AND b SHOULD MAKE BEFORE c AND d BREAK.
3. † INDICATES LEADS ARE TAPED AND STORED.

STATIONS SYSTEMS KEY AND TELEPHONE CIRCUIT	②	SD-69454-01-C4
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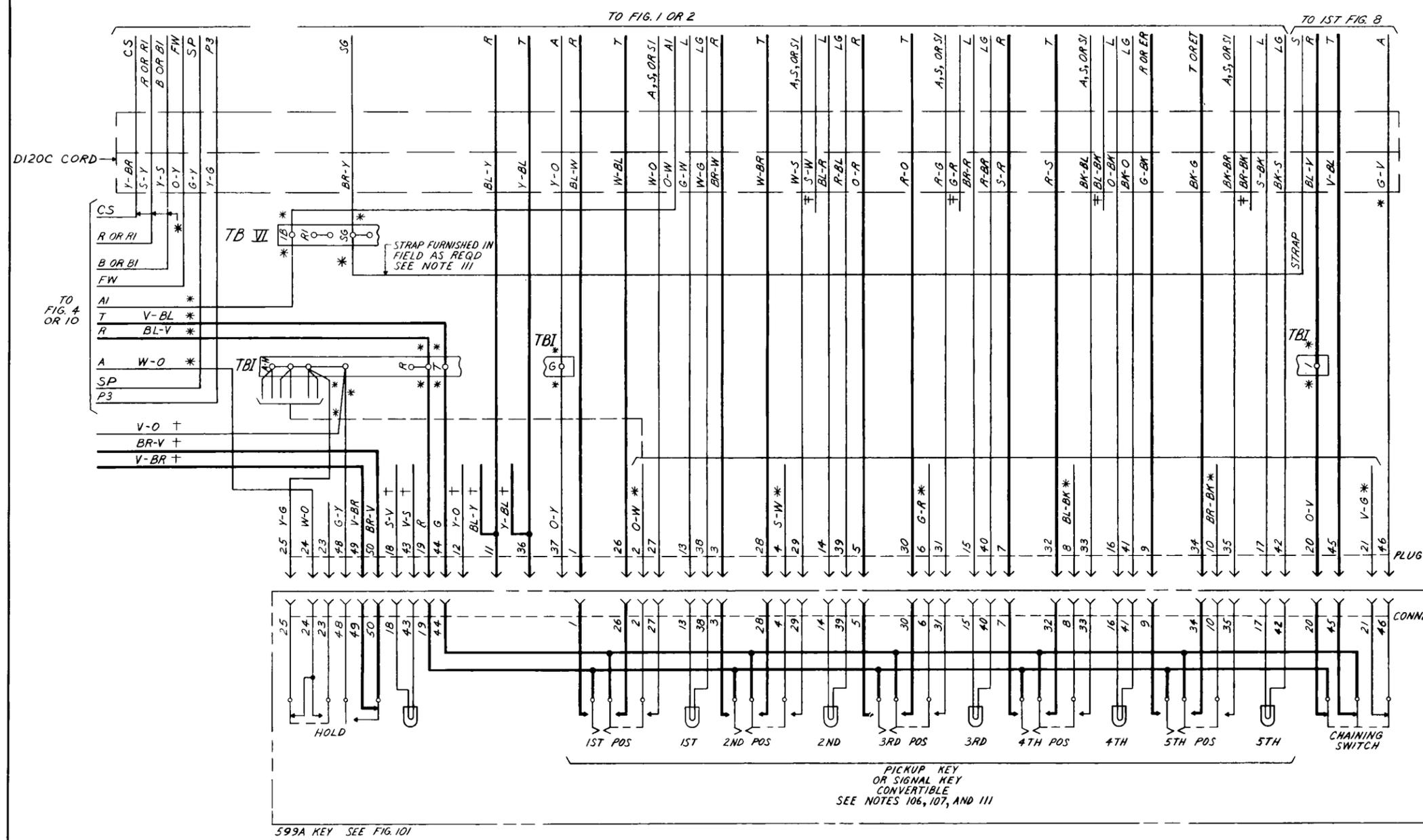
FIG. 6
KEY AND TRANSMITTER CIRCUIT
FOR SPEAKERPHONE MODULE
SEE NOTES 105 & 110



- NOTES:
- * INDICATES LEADS ARE SPADE TIPPED AND OF SUFFICIENT LENGTH TO REACH NETWORK OR TERMINALS WHEN SPEAKERPHONE MODULE IS IN 3RD KEY POSITION OF A 1616-TYPE TEL SET.
 - SCRIPT LETTER DESIGNATIONS ARE A PART OF PRINTED CIRCUIT BOARD.

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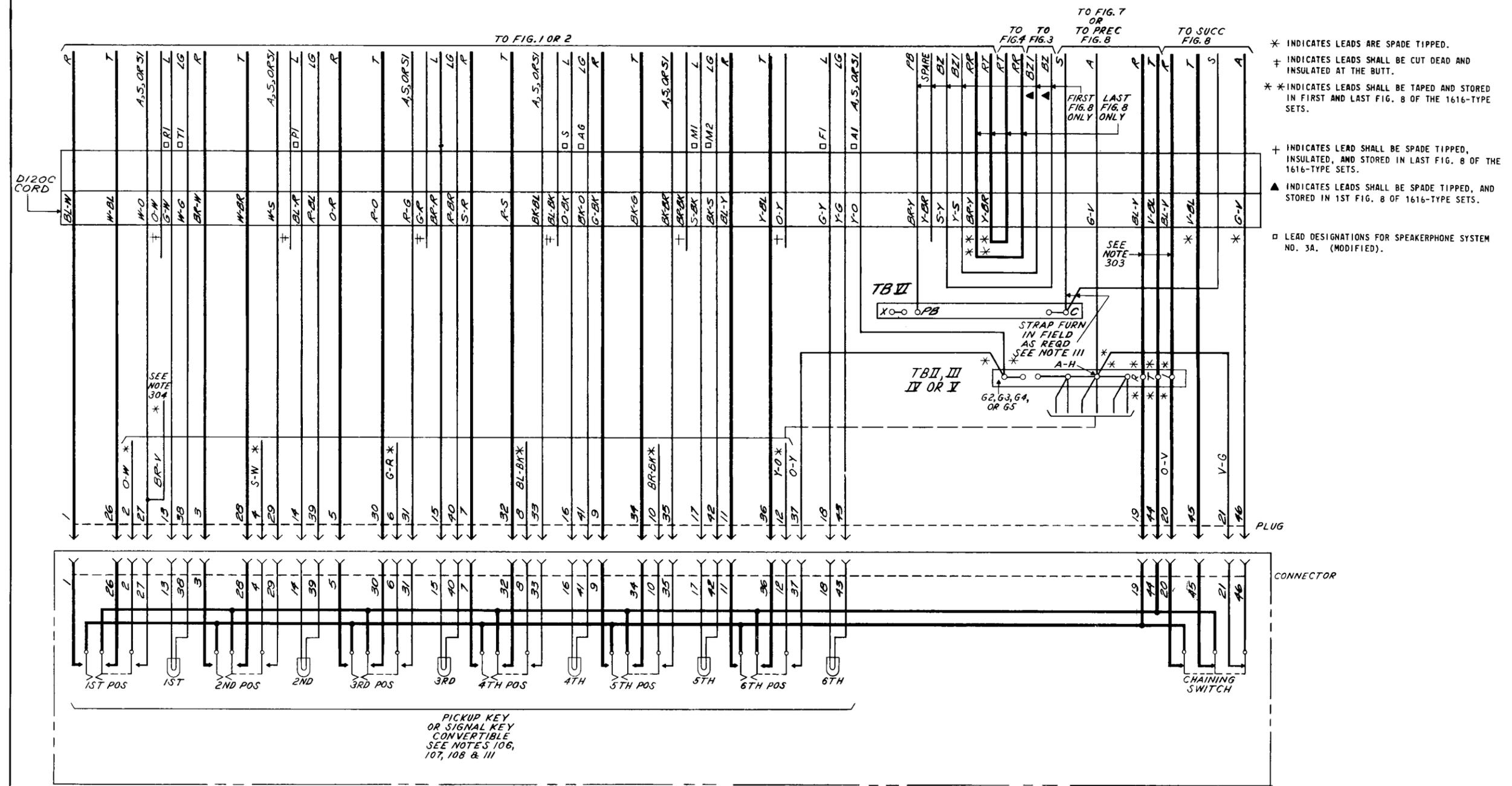
FIG. 7
FIRST KEY UNIT OF
1616-TYPE TELEPHONE SET
SEE NOTE 110



* INDICATES LEADS ARE SPADE TIPPED.
† INDICATES LEADS SHALL BE SPADE TIPPED AND STORED.
‡ INDICATES LEADS SHALL BE CUT DEAD AND INSULATED AT THE BUTT.

FIG. 8
 SUPPLEMENTARY KEY UNIT
 SECOND OR LAST KEY UNIT OF THE 1616-TYPE KEY TELEPHONE SET

DRAWING
 ISSUE
 1
 DMC
 DMC
 ARM



- * INDICATES LEADS ARE SPADE TIPPED.
- + INDICATES LEADS SHALL BE CUT DEAD AND INSULATED AT THE BUTT.
- * * INDICATES LEADS SHALL BE TAPED AND STORED IN FIRST AND LAST FIG. 8 OF THE 1616-TYPE SETS.
- + INDICATES LEAD SHALL BE SPADE TIPPED, INSULATED, AND STORED IN LAST FIG. 8 OF THE 1616-TYPE SETS.
- ▲ INDICATES LEADS SHALL BE SPADE TIPPED, AND STORED IN 1ST FIG. 8 OF 1616-TYPE SETS.
- LEAD DESIGNATIONS FOR SPEAKERPHONE SYSTEM NO. 3A. (MODIFIED).

598A KEY SEE FIG. 102

PICKUP KEY
 OR SIGNAL KEY
 CONVERTIBLE
 SEE NOTES 106,
 107, 108 & 111

STATION SYSTEMS
 KEY AND TELEPHONE CIRCUIT

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