SD-99303-01

SHEET INDEX

SHEET NO.	CONTENTS
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2	FS 1 CONTROL CKT FS 2 OSCILLATOR CKT FS 3 PULSE GENERATOR CKT
3	APP FIG. 1, 2
4	APP FIG. 3
5	CAD 1

CIRCUIT NOTES:

101.

DESIG	FUSE AMP	POTENTIAL	ONE PER
	1 1/3	-48 SIG *	CKT
		GRD	CKT

BATTERY SYMBOL	VOLTAGE RANGE
-48	42.5 – 52.5V

* SEE NOTE 204

102.

FEATURE OR OPTION		PROVIDE APP FIG.	PROVIDE APP OR WRG	PROVIDE QUANTITY
TONE GENERATOR CKT	FOR OTHER THAN ESS APPLICATIONS	1, 2, 3	Z	1 PER CKT
TONE GENERATOR CKT	FOR ESS APPLICATION (SEE NOTE 105)			
GROUNDED ALARM INDICATION			X	
800-OHM BATTERY ALARM INDICATION			Y	

103.

NETWORK VALUES		
NETWORK NO.	RESISTANCE IN OHMS	CAPACITANCE IN UF

104.

RECORD OF APP FIGURES, WIRING AND APPARATUS CHANGES							
CHANGED ON ISS	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USE IN CIRCUIT STD	USE IN CIRCUIT A&M	USE IN CIRCUIT MD	
7B	V OR W	W	102	V		W	
10B	U	NONE		U			
11B	T	U		T		U	
15B	P	Q		P		Q	
16D			108			U	

105. Z WIRING IS FURNISHED WITH UNIT AS MANUFACTURED. REMOVE Z WIRING FOR ESS APPLICATION (2F6).

CIRCUIT NOTES:(CONT)

106.

CIRCUIT TITLE	SYSTEM	OPTION	LEAD DESIGNATIONS ALM1	ALM2	ALM3	ALM4	ALM5	NOTES
FLOOR ALARM BOARD MISC & AUX ALARM (SD-21205-01)	DCO PANEL	X	AG			G		
MISC ALARMS (SD-20341-01)	DCO PANEL	X	AG			G		
AUDIBLE ALARM CKT (SD-21819-01)	DCO & [illegible] PANEL	X				G		
AISLE PILOT CKT (SD-25087-01)	NO. 1 XBAR	X	F			G	MG	
ALARM CKT (SD-25671-01)	NO. 5 XBAR	Y	MN					
AUDIBLE AND VISUAL ALARM (SD-[illegible]-01)	COM	X	F			G		
PILOT LAMP CKT (SD-[illegible]-01)	NO. 1 SXS	X	AM			C		
TONE [illegible] CONTR. & DIST (SD-[illegible]-01)	ESS			ALM2	ALM3			
MISC ALM CKT (SD-32192-01)	355A SXS	X	AM			C		
PILOT LAMP CKT (SD-[illegible]-01)	350A SXS	X	AM			C		
AUX PSH TRK CKT (SD-99329-01)	COM			ALM2	ALM3			

107. THE CHANGE CLASSIFICATION "B" FOR ISSUE 13 WAS REVISED TO ISSUE 14A, WITHOUT CIRCUIT CHANGES. ALL REFERENCES TO OPTIONS R AND S THAT APPEARED ON ISSUE 13B, ARE REMOVED FROM THE DRAWING.

108. ON ISSUE 12A OPTION U WAS RERATED FROM MANUFACTURE DISCONTINUED TO STANDARD.

EQUIPMENT NOTES:

201. THE 400A TONE GENERATOR REQUIRES 2 X 23 INCHES OF MOUNTING PLATE SPACE.

202. A KS-19221,L1 AMPLIFIER (COVERED BY SD-99725-01) IS INCLUDED AS PART OF THE 400A TONE GENERATOR.

203. TERMINALS 11, 12, 13, 14, 15, 24, 25, 31, 32, AND 34 OF TB1 ARE FOR TEST PURPOSES. SEE FS 1.

204. AN INDIVIDUAL FUSE SHOULD BE PROVIDED FOR THIS CIRCUIT ON A BUS BAR FED BY A BATTERY FEEDER THAT DOES NOT SERVE ANY OTHER CIRCUIT. A GROUND LEAD FOR THE CIRCUIT SHOULD BE CONNECTED TO A RELATIVELY HEAVY GROUND BAR TO PROVIDE A LOW IMPEDANCE RETURN TO BATTERY.

INFORMATION NOTES:

301. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS,
CAPACITANCE VALUES ARE IN MICROFARADS,
VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS) ARE IN VOLTS.

302. REDUCTION IN GENERATOR OUTPUT WITH LOAD RESISTANCE

LOAD RESISTANCE	REDUCTION IN OUTPUT
100 OHMS	1/2 DB
50 OHMS	1 DB
30 OHMS	1-1/2 DB
20 OHMS	2 DB

303. P-42E811 PULSE GENERATORS WHICH INCLUDED P-42E810 SERIES 1 AND SERIES 2 PRINTED WIRING BOARD SHOULD NOT BE USED. THESE BOARDS CONTAIN A DESIGN DEFECT WHICH RESULTS IN MALOPERATION OF THE TONE ALARM CIRCUIT, RELAY (A) SHOULD EITHER BE MODIFIED OR RETURNED TO THE WESTERN ELECTRIC CO. FOR MODIFICATION.

304. PRIOR TO ISSUE 8D THE 400A TONE GENERATOR WAS CODED APPARATUS.

SUPPORTING INFORMATION

CATEGORY	NO.
EQUIPMENT DRAWING	J99327A

OPTION INDEX

APP OR WIRING	LOCATION
Z	2F6
Y	APP FIG. 1
X	2G8
W	2G8
V	APP FIG. 1
U	APP FIG. 1
T	APP FIG. 1
Q	APP FIG. 3
P	APP FIG. 3

1	1	[illegible]
2A	2A	[illegible]
3A	3A	[illegible]
4A	3A APP 2B	[illegible]
5B	3A APP 2B	5-21-[illegible]
6B	3A APP 3B	5-9-[illegible]
7B	3A APP 4B	[illegible]
8C	[illegible]	1-10-67
9D	3A APP 6D	[illegible]
10B	[illegible]	[illegible]
11B	[illegible]	[illegible]
12A	5A	[illegible]
13B	5A APP 1B	[illegible]
14A	[illegible]	[illegible]
15B	[illegible]	[illegible]
16D	[illegible]	[illegible]
17D	5A APP 3D	[illegible]
18D	5A APP 2D	[illegible]
19D	5A APP 7D	5-15-[illegible]

WORKING LIMITS

MAX. LOOP RESISTANCE FOR T AND R LEADS IS 20 OHMS.

ISSUE 19D

SD-99303-01 1N99

COMMON SYSTEMS

400A TONE GENERATOR CIRCUIT

400A TN GEN

AT&TCO STANDARD

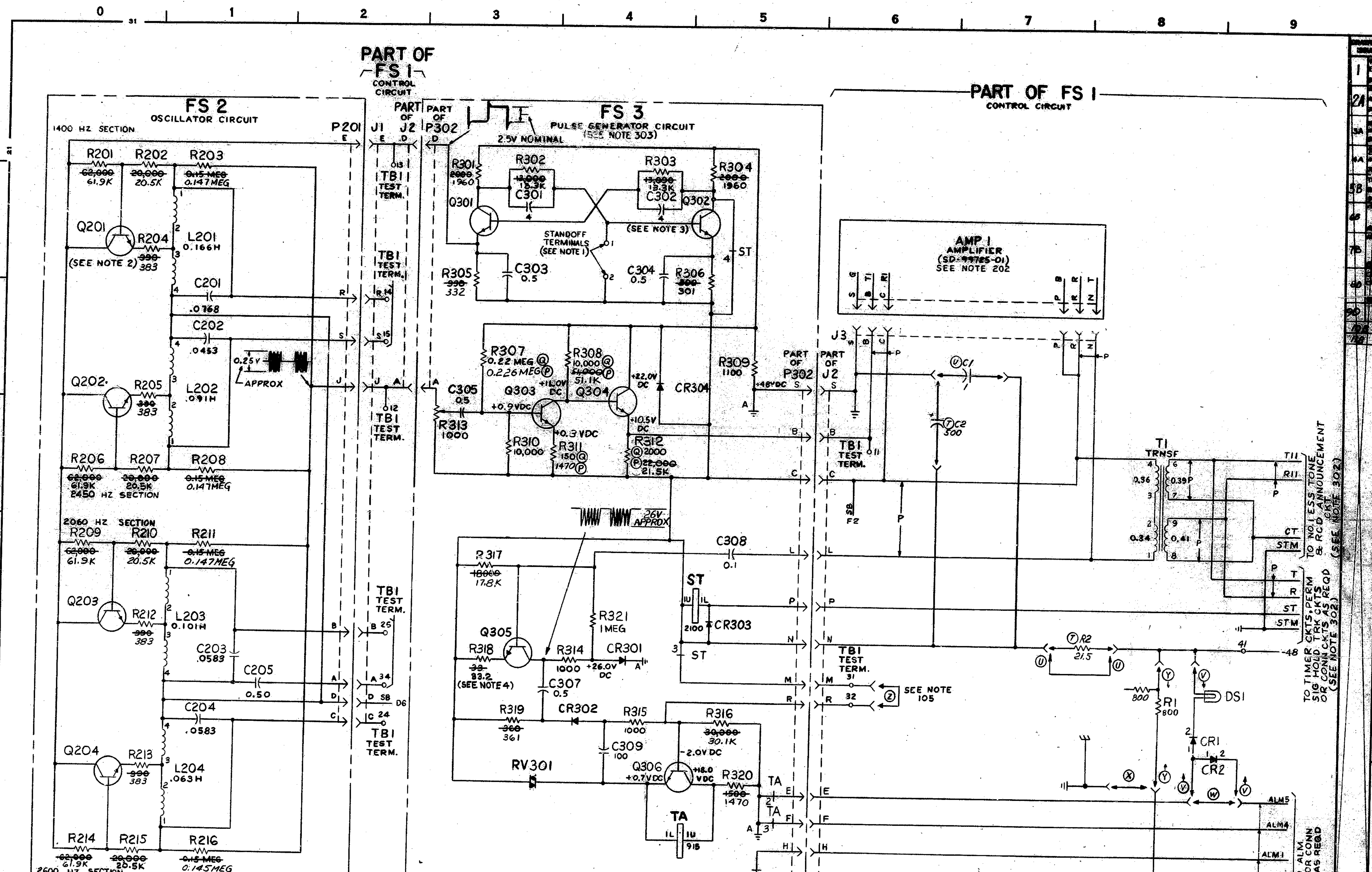
SD-99303-01-1

5 SHEETS

BELL TELEPHONE LABORATORIES INCORPORATED

6S

PRINTED IN U.S.A.



SHEET NOTES:

1. STANDOFF TERMINALS ARE FOR TEST PURPOSES ONLY.
2. VOLTAGES MEASURED AT TRANSISTOR Q201,2,3 AND 4:
   (A) COLLECTOR - PULSATING +1.6V DC PEAK DEFLECTION.
   (B) BASE - PULSATING +0.2V DC PEAK DEFLECTION.
   (C) EMITTER - PULSATING +0.1V DC PEAK DEFLECTION.
3. VOLTAGES MEASURED AT TRANSISTORS Q301,2:
   (A) COLLECTOR - PULSATING +12.0V DC PEAK DEFLECTION.
   (B) BASE - PULSATING +1.0V DC PEAK DEFLECTION.
   (C) EMITTER - PULSATING +1.7V DC PEAK DEFLECTION.

SHEET NOTES: (CONT)

4. VOLTAGES MEASURED AT TRANSISTOR Q305:
   (A) COLLECTOR - PULSATING +7.5V DC PEAK DEFLECTION.
   (B) BASE - PULSATING +0.35V DC PEAK DEFLECTION.
   (C) EMITTER - PULSATING 0.65V DC PEAK DEFLECTION.
5. ALL DC VOLTAGES ARE APPROXIMATE AND TAKEN WITH RESPECT TO -48V DC (TERMINAL 41 OF TB1) USING A DC VTVM WITH 11 MEGOHM INPUT RESISTANCE (MINIMUM).

E-7481 (10-61)

ISSUE 19D

NOTICE
NOT FOR USE OR DISCLOSURE OUTSIDE THE BELL SYSTEM EXCEPT UNDER WRITTEN AGREEMENT

400A TONE GENERATOR CIRCUIT

SD-99303-01-2

BELL TELEPHONE LABORATORIES INCORPORATED

DWG SIZE 6S

PRINTED IN U.S.A.

SD-99303-01-2

APP FIG. 1

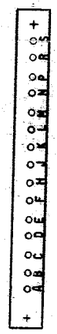
AMPLIFIER

DESIG	LOC	CODE
AMP 1	2B7	KS-19221,L1

CAPACITOR

	DESIG	LOC	CODE
(U)	C1	2C6	542D
(T)	C2	2D6	KS-19658,L37, 500

CONNECTOR



DESIG	J1	J2	J3
CODE	IS-16345,L2 SOCKET	IS-16345,L2 SOCKET	IS-16345,L2 SOCKET
OPTION			
TERM.	LOC	LOC	LOC
S	2C2	2C6	2C6
R	2C2	2F6	2C7
P		2E6	2C7
N		2F6	2C8
M		2F6	
L		2E6	
K		2F6	
J	2C2	2F6	
H		2F6	
F		2F6	
E	2A2	2F6	
D	2F2	2A2	
C	2F2	2D6	2C6
B	2E2	2D6	2C6
A	2F2	2C2	

DIODE

	DESIG	LOC	CODE
(V)	CR1	2F8	~~446F~~,533F
	CR2	2G8	~~446F~~,533F

LAMP

	DESIG	LOC	CODE
(V)	DS1	2F9	91

RESISTOR

	DESIG	LOC	CODE
(V)	R1	2F8	19EW
(T)	R2	2F7	KS-14603,L1A, 21.5

TRANSFORMER

DESIG	LOC	CODE
T1	2D8	2552N

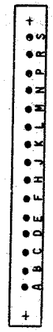
APP FIG. 2

ED-99654-30 OSCILLATOR (PRINTED WIRING BOARD ASSEMBLY) (SEE NOTE 1)

CAPACITOR

DESIG	LOC	CODE
C201	2C1	577D,.0768
C202	2C1	577D,.0453
C203	2F1	577D,.0583
C204	2F1	577D,.0583
C205	2F1	542A

CONNECTOR



DESIG	P201
CODE	IS-16345,L1 PLUG
OPTION	
TERM.	
S	2C2
R	2C2
P	
N	
M	
L	
K	
J	2C2
H	
F	
E	2A2
D	2F2
C	2F2
B	2E2
A	2F2

INDUCTOR

DESIG	LOC	CODE
L201	2B1	1592B, 0.166H
L202	2C1	1592B, .091H
L203	2E1	1592B, 0.101H
L204	2G1	1592B, .063H

RESISTOR

DESIG	LOC	CODE
R201	2A0	~~KS-13490L1,62,000P~~,KS-20810 L1A, 61.9KΩ
R202	2A0	~~KS-13490L1,20,000A~~,KS-20810 L1A, 20.5KΩ
R203	2A1	~~KS-13490L1,0.15 MEG~~,KS-20810 L1A, 0.147MEG
R204	2B0	~~KS-13490L1,390A~~,KS-20810 L1A, 383Ω
R205	2C0	~~KS-13490L1,390A~~,KS-20810 L1A, 383Ω
R206	2D0	~~KS-13490L1,62,000A~~,KS-20810 L1A, 61.9KΩ
R207	2D0	~~KS-13490L1,20,000A~~,KS-20810 L1A, 20.5KΩ
R208	2D1	~~KS-13490L1,0.15 MEG~~,KS-20810 L1A, 0.147MEG
R209	2E0	~~KS-13490L1,62,000A~~,KS-20810 L1A, 61.9KΩ
R210	2E0	~~KS-13490L1,20,000A~~,KS-20810 L1A, 20.5KΩ
R211	2E1	~~KS-13490L1,0.15 MEG~~,KS-20810 L1A, 0.147MEG
R212	2E0	~~KS-13490L1,390A~~,KS-20810 L1A, 383Ω
R213	2G0	~~KS-13490L1,390A~~,KS-20810 L1A, 383Ω
R214	2G0	~~KS-13490L1,62,000A~~,KS-20810 L1A, 61.9KΩ
R215	2G0	~~KS-13490L1,20,000A~~,KS-20810 L1A, 20.5KΩ
R216	2G1	~~KS-13490L1,0.15 MEG~~,KS-20810 L1A, 0.147MEG

TRANSISTOR

DESIG	LOC	CODE
Q201	2B0	~~29A~~,66S
Q202	2C0	
Q203	2E0	
Q204	2G0	

NOTES:

1. PRIOR TO ISSUE 8D THE ED-99654-30 OSCILLATOR WAS THE P-42E817 OSCILLATOR.

ISSUE 19D

400A TONE GENERATOR CIRCUIT

SD-99303-01-3

BELL TELEPHONE LABORATORIES INCORPORATED

SIZE 6S

SD-99303-01-3

APP FIG. 3

ED-99657-31 PULSE GENERATOR (PRINTED WIRING BOARD ASSEMBLY) (SEE NOTE 1 & 2)

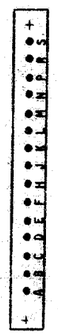
RELAY

DESIG	ST		TA	
CODE	MAGA		MATA	
OPTION				
	CONT ARR	LOC	CONT ARR	LOC
4	BM	2B5	BM	2H5
3	BM	2F4	BM	2G5
2	BM		BM	2E5
1	BM		BM	
COIL		2E5		2G5

CAPACITOR

DESIG	LOC	CODE
C301	2B3	603A
C302	2B4	603A
C303	2B3	
C304	2B4	542A
C305	2C3	
C307	2F4	542A
C308	2E5	535AB
C309	2F4	602B

CONNECTOR



DESIG	P302
CODE	PLUG
OPTION	
TERM	LOC
S	2C5
R	2F5
P	2E5
N	2F5
M	2F5
L	2E5
K	2H5
J	2H5
H	2G5
F	2G5
E	2B5
D	3A3
C	2D5
B	2D5
A	2C3

DIODE

DESIG	LOC	CODE
CR301	2F4	[illegible] 513AF
CR302	2F4	[illegible] 533C
CR303	2E5	[illegible] 533C
CR304	2C4	[illegible] 813AF

POTENTIOMETER

DESIG	LOC	CODE
R313	2D3	[illegible] CHICAGO TELEPHONE SUPPLY CORP. OR EQUIV.

RESISTOR

DESIG	LOC	CODE
R301	2A3	~~KS-13490L1, 20000~~, KS-20810 L1A, 19600
R302	2A3	~~KS-13490L1, 13,0000~~, KS-20810 L1A, 13.3K
R303	2A4	~~KS-13490L1, 13,0000~~, KS-20810 L1A, 13.3K
R304	2A5	~~KS-13490L1, 39000~~, KS-20810 L1A, 19600
R305	2B3	~~KS-13490L1, 350R~~, KS-20810 L1A, 332Ω
R306	2B5	~~KS-13490L1, 300R~~, KS-20810 L1A, 301Ω
Q R307	2C3	KS-13490L1, 0.22 MEG
P R307	2C3	~~237A,OR EQUIV~~, KS-20616 L1A,OR EQUIV, 0.226 MEG
Q R308	2C4	KS-13490L1, 10,0000
P R308	2C4	~~KS-13490L1, 51,0000~~, KS-20810 L1A, 51.1K
R309	2C5	~~KS-13492L1~~, KS-20289 L6C, 11000
Q R310	2D3	KS-13490L1, 10,000Ω
P R310	2D3	~~237A,OR EQUIV~~, KS-20616 L1A, 10,000Ω
Q R311	2D4	KS-13490L1, 1500
P R311	2D4	~~237A,OR EQUIV~~, KS-20616 L1A,OR EQUIV, 1470Ω
Q R312	2D4	~~KS-13490L1~~, KS-20810 L1A, 2,000Ω
P R312	2D4	KS-13490L1, 2,000Ω
R314	2F4	~~KS-13490L1~~, KS-20810 L1A, 1,000Ω
R315	2F4	~~KS-13490L1~~, KS-20810 L1A, 1,000Ω
R316	2F5	~~KS-13490L1, [illegible]~~, KS-20810 L1A, 30.1K
R317	2E3	~~KS-13490L1, 18,0000~~, KS-20810 L1A, 17.8K
R318	2F3	~~KS-13490L1, 330~~, KS-20810 L1A, 33.2Ω
R319	2F3	~~KS-13490L1, 360R~~, KS-20810 L1A, 361Ω
R320	2G5	~~KS-13492L1, 1500A~~, KS-20289 L6C, 1470Ω
R321	2E4	~~KS-13490L1~~, KS-20810 L1A, 1.0MEG

TRANSISTOR

DESIG	LOC	CODE
Q301	2B3	
Q302	2B5	
Q303	2D3	~~2N~~,665
Q304	2C4	
Q305	2E3	
Q306	2G4	

VARISTOR

DESIG	LOC	CODE
RV301	2G3	100A

NOTE:

1. PRIOR TO ISSUE 8D THE ED-99657-30 PULSE GENERATOR WAS THE P-42E811 PULSE GENERATOR.
2. PRIOR TO ISSUE 11B THE ED-99657-31 PULSE GENERATOR WAS THE ED-99657-30 PULSE GENERATOR.

ISSUE 19D

400H TONE GENERATOR CIRCUIT

SD-99303-01-4

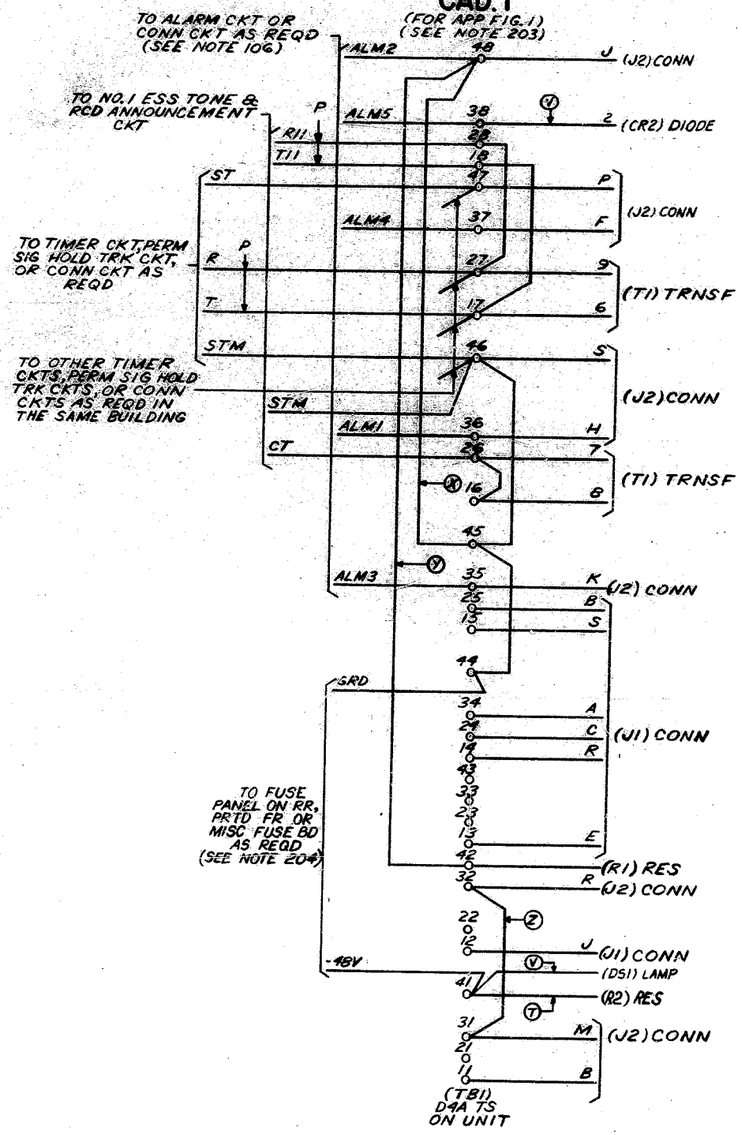
BELL TELEPHONE LABORATORIES INCORPORATED

SIZE 6S

SD-99303-01-4

CAD. I

(FOR APP FIG. 1)
(SEE NOTE 203)



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ISSUE 19D

400A TONE GENERATOR CIRCUIT (2) SD-99303-01-5

BELL TELEPHONE LABORATORIES INCORPORATED 6S

SD-99303-01-5