

FS5
RECORDER CONNECTOR CKT
 (KS-19645, L2 RECORDER CONNECTOR)
MODIFICATION FOR 4-WIRE SERVICE

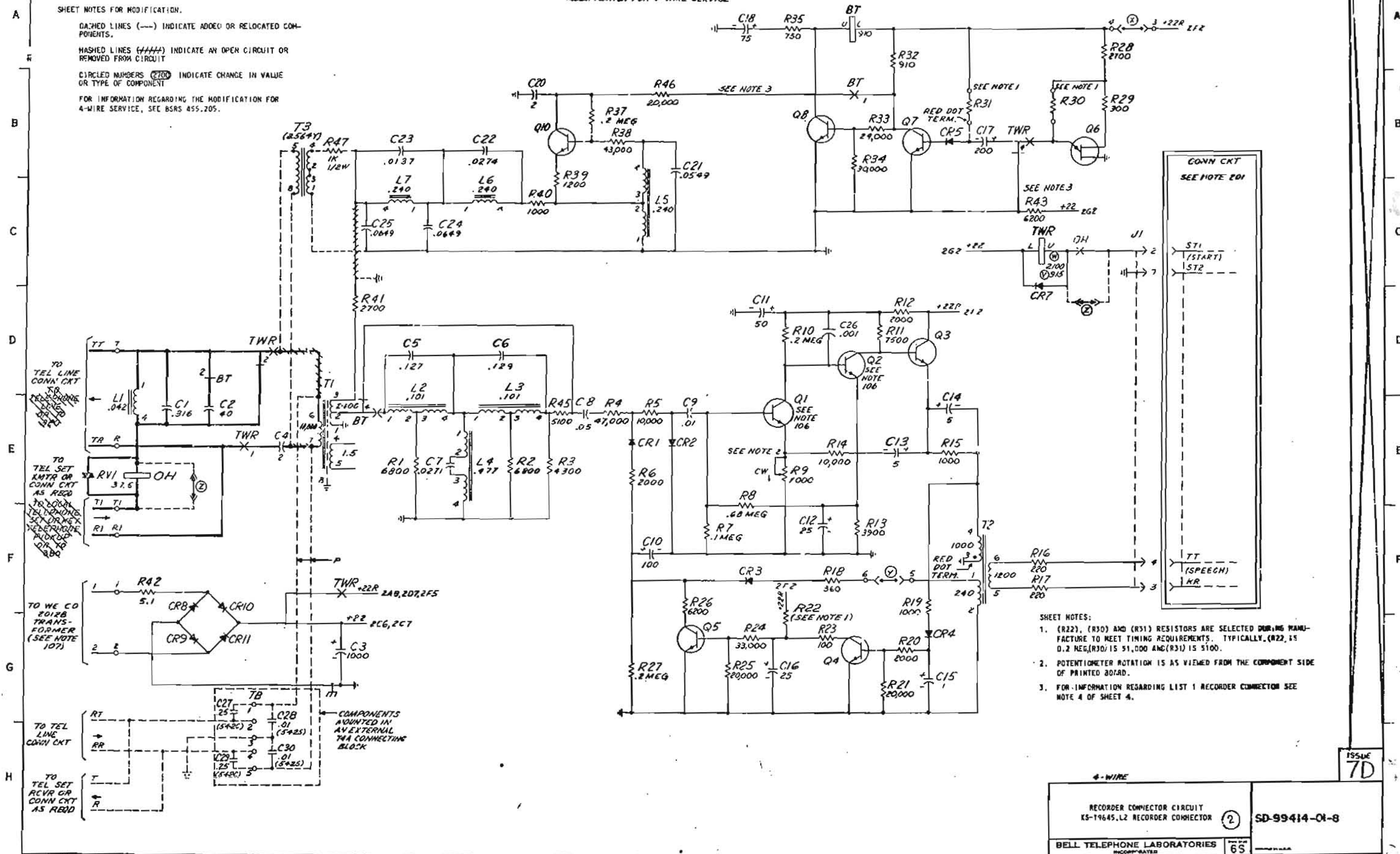
SHEET NOTES FOR MODIFICATION:

DASHED LINES (---) INDICATE ADDED OR RELOCATED COMPONENTS.

HASHED LINES (////) INDICATE AN OPEN CIRCUIT OR REMOVED FROM CIRCUIT

CIRCLED NUMBERS (2700) INDICATE CHANGE IN VALUE OR TYPE OF COMPONENT

FOR INFORMATION REGARDING THE MODIFICATION FOR 4-WIRE SERVICE, SEE BSRS 455.205.



- SHEET NOTES:**
- (R22), (R30) AND (R31) RESISTORS ARE SELECTED DURING MANUFACTURE TO MEET TIMING REQUIREMENTS. TYPICALLY, (R22) IS 0.2 MEG, (R30) IS 51,000 AND (R31) IS 5100.
 - POTENTIOMETER ROTATION IS AS VIEWED FROM THE COMPONENT SIDE OF PRINTED BOARD.
 - FOR INFORMATION REGARDING LIST 1 RECORDER CONNECTOR SEE NOTE 4 OF SHEET 4.

SD-99414-01-8

4-WIRE		ISSUE 7D
RECORDER CONNECTOR CIRCUIT KS-19645, L2 RECORDER CONNECTOR		SD-99414-01-8
BELL TELEPHONE LABORATORIES INCORPORATED		65

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CIRCUIT NOTES:

DESIG	FUSE AMP	POTENTIAL	ONE PER
BATTERY SYMBOL		VOLTAGE RANGE	

FEATURE OR OPTION	PROVIDE		
	APP FIG	APP OR WRG	QUANTITY
KS-19645, L2 RECORDER CONNECTOR	1		1 PER CKT
WARNING BEEP TONE		X	
AUTOMATIC VOLUME CONTROL		Y	
KS-19645, L11 NETWORK	2		1 PER CKT

NETWORK VALUES		
NETWORK NO.	RESISTANCE IN OHMS	CAPACITANCE IN UF

RECORD OF APP FIGURES, WIRING AND APPARATUS CHANGES						
CHANGED OR ISS	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USE IN CIRCUIT		
				STO	A & M	HD
6B		W	107	V		W

CIRCUIT NOTES: (CONT)

- 105. WIRING FOR OPTIONS X AND Y FURNISHED WITH RECORDER CONNECTOR AT TIME OF MANUFACTURE.
- 106. WITH APPROPRIATE CIRCUIT MODIFICATIONS, 16G TRANSISTORS MAY BE USED FOR (Q1) AND (Q2). MODIFICATION INFORMATION IS SPECIFIED IN NOTE 1, SHEET 4.
- 107. FOR INSTALLATIONS INVOLVING A MULTIPLICITY OF RECORDER-CONNECTORS WHERE IT IS DESIRABLE TO USE A COMMON POWER SUPPLY RATHER THAN INDIVIDUAL 2012 B TRANSFORMERS FOR EACH RECORDER-CONNECTOR, IT IS RECOMMENDED THAT ONLY RECORDER-CONNECTORS BEARING DATE OF MANUFACTURE "1-75" OR LATER BE USED. A COMMON POWER UNIT CAPABLE OF PROVIDING EITHER AC OR DC VOLTAGE MAY BE USED. THE VOLTAGE AND CURRENT REQUIREMENTS OF AN INDIVIDUAL RECORDER-CONNECTOR AT TERMINAL 1 AND 2 OF THE RECORDER-CONNECTOR WITH DATE OF MANUFACTURE "1-75" OR LATER IS:

	VOLTAGE ^N		CURRENT REQUIREMENT ^{NX}	
	MIN	MAX	NOMINAL VOLTS	MILLIAMPERES
DC	20	26	22	40
AC (RMS)	16	22	18	40

^NLIMITS APPLY FOR BOTH STANDBY (RELAY TWR RELEASED) AND DURING OPERATION (RELAY TWR OPERATED).

^{NX}CURRENT DRAIN IS FOR THE NOMINAL VOLTAGE INDICATED DURING OPERATION. IN STANDBY CONDITION (RELAY TWR RELEASED) CURRENT DRAIN IS NEGLIGIBLE.

THESE VOLTAGES ARE READILY OBTAINABLE FROM KEY TELEPHONE SYSTEM POWER UNITS, SUCH AS THE 198-2 AND THE 290-1. WHEN USING THE 198-2 FOR EXAMPLE, AT LEAST 30 RECORDER-CONNECTORS MAY BE POWERED FROM THE 20V DC SIG. SUPPLY AND ADDITIONAL 25 RECORDER-CONNECTORS MAY BE POWERED FROM THE 18V AC SIG. SUPPLY.

EQUIPMENT NOTES:

- 201. PLUG, PART OF CABLE FROM CONNECTING CIRCUIT, IS CANNON SK-47-21C-1/2 OR EQUIV.

INFORMATION NOTES:

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

SUPPORTING INFORMATION

CATEGORY	NO.

OPTION INDEX

APP OR WRG	LOCATION
Y	ZFA
X	ZAB
W	ZC7
V	ZC7

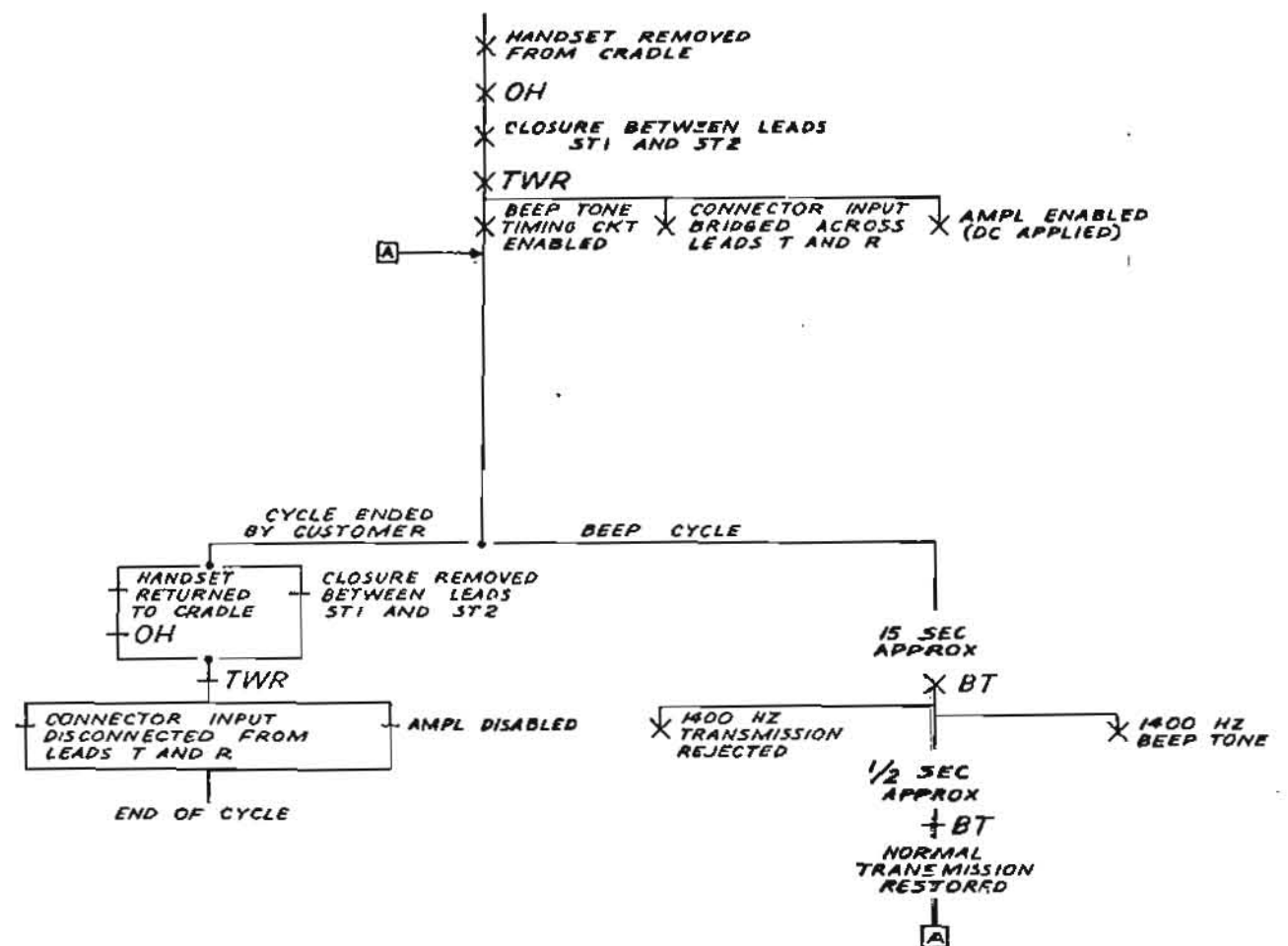
ORIG DESIG	REV	DATE ISSUED	BY	CHKD	APP
1	1	3-25-65	WEN	WEN	WEN
2D	1	APP 1D	3-23-66	WEN	WEN
3D	1	APP 2D	7-20-66	LJC	WEN
4B	2B	9-10-66	WEN	WEN	WEN
5D	3D	3-24-67	WEN	WEN	WEN
6B	3D	APP 1B	5-25-67	WEN	WEN
7D	4D	5-25-67	WEN	WEN	WEN

7D

SD-99414-01	1/49	AT&T STANDARD
COMMON SYSTEMS RECORDER CONNECTOR CIRCUIT KS-19645, L2 RECORDER CONNECTOR		SD-99414-01-1 8 SHEETS
BELL TELEPHONE LABORATORIES INCORPORATED		6S

DRAWING ISSUE
5D
6B

SCI OPERATION



SD-99414-01-5

ISSUE 7D

RECORDER CONNECTOR CIRCUIT KS-19645, L2 RECORDER CONNECTOR	SD-99414-01-5
BELL TELEPHONE LABORATORIES INCORPORATED	6S

APP FIG. 1

APP FIG. 2

RELAY		DESIG		LOC		CODE		TWR	
CC	22	M222						M222	
OPTION		CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC
12									
11									
10									
9									
8									
7									
6									
5									
4	EMB	2E2						EMB	2B7
3	EMB							EMB	2F2
2	EMB	201						EMB	201
1	EMB	206						EMB	2E1
COIL		236							2C7

CAPACITOR		
DESIG	LOC	CODE
C1	2E1	5706H
C2	2E1	SPRAGUE, 1130406C7015G1
C3	2G2	SPRAGUE, 340108H040J54
C4	2E1	542F
C5	202	5770, .127
C6	203	5770, .129
C7	2E3	5770, .0271
C8	2E4	KS-13814, L1
C9	2E4	KS-19708, L1, .01
C10	2F4	400107G0030C4
C11	205	400506G0250F4
C12	2F5	400256G006C84
[2] C13,14	2E6	400505G0258B4
C15	2G6	400105G003854
C16	2G5	400256G006C84
C17	2B7	400277G0120H4
C18	2A5	400756G0250H4
C19	205	400205G0258B4
C20	2B3	400E05G0258B4
C21	2B4	570PK
C22	2B3	570LT
C23	2B2	570HT
[2] C24,25	2C2	570BT
C26	205	KS-19708, L3, .001

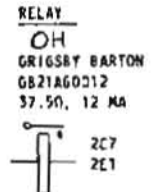
CONNECTOR	
DESIG	J1
CODE	CONHOM ELECTRIC
OPTION	5K-M7/75-325
TERM.	LOC
7	2CB
5	
4	2CB
3	2CB
2	2CB

CAPACITOR		
DESIG	LOC	CODE
C1	3B2	596C .75
C2	3B2	542B .2

TRANSFORMER		
DESIG	LOC	CODE
T1	3A3	2533H

RESISTOR		
DESIG	LOC	CODE
R1	3B1	470
R2	3B2	750
R3	3B3	1.0K

KS-13490, L1
OR
ALLEN BRADLEY
±5% EB OR EQUIV.



DIODE		
DESIG	LOC	CODE
[2] CR1,2	2E4	MOTOROLA, 1N4001 OR ERIE, ED3000B
CR3	2F5	400J
CR4	2G4	MOTOROLA, 1N4001 OR ERIE, ED3000B
CR5	2B6	400J
CR6	2B6	400J
CR7	2C7	
CR8	2F1	
CR9	2G1	MOTOROLA, 1N4001 OR ERIE, ED3000B
CR10	2F1	
CR11	2G1	

INDUCTOR		
DESIG	LOC	CODE
L1	2E0	1592A, .042
L2	202	1592B, .101
L3	203	1592B, .101
L4	2E3	1592B, .477
L5	2C4	1586L, .240
L6	2C3	1592A, .240
L7	2C2	1592A, .240

POTENTIOMETER		
DESIG	LOC	CODE
R9	2E5	B57347B

RESISTOR (SEE NOTES 1 & 2)

DESIG	LOC	CODE
R1	2E2	6800
R2	2E3	4300
R3	2E3	4300
R4	2E4	47,000
R5	2E4	10,000
R6	2E4	2000
R7	2F5	.1 MEG
R8	2E5	.68 MEG
R10	205	.2 MEG
R11	206	7500
R12	206	2000
R13	2F6	3900
R14	2E6	10,000
R15	2E6	1000
[2] R16,17	2F7	220
R18	2F5	360
R19	2F6	1000
R20	206	2000
R21	206	20,000
R22	2F5	.2 MEG
R23	205	100
R24	205	33,000
R25	205	20,000

KS-13490, L1
OR
ALLEN BRADLEY
±5% EB OR EQUIV.

RESISTOR (CONT)

DESIG	LOC	CODE
R16	2F4	6200
R17	204	.2 MEG
R18	2A8	2700
R19	2B8	300
R10	2B7	51,000
R11	2B7	5100
R12	2A6	910
R13	2B6	24,000
R14	2B6	30,000
R15	2A5	750
R16	205	4300
R17	2B4	.2 MEG
R18	2B4	43,000
R19	2C4	1200
R20	2C3	1000
R21	202	2700
R22	2F0	5.1
R23	2C7	6200
R24	2C7	3300
R25	2E3	5100
R26	2B4	20,000

KS-13490, L1
OR
ALLEN BRADLEY
±5% EB OR EQUIV.

TRANSFORMER

DESIG	LOC	CODE
T1	202	2533H
T2	2F7	B-570333

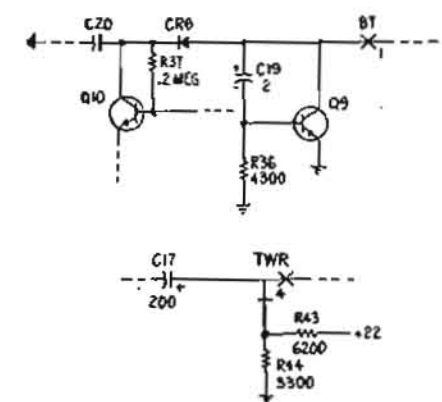
TRANSISTOR (SEE NOTE 1)

DESIG	LOC	CODE
Q1	2E5	
Q2	206	2N3391A
Q3	206	2N3415
Q4	206	2N2923
Q5	205	2N2923
Q6	2B7	2N2646
Q7	2B6	
Q8	2B4	2N2923
Q9	205	
Q10	2B3	

BE, CD, OR T.I. INC OR FAIRCHILD

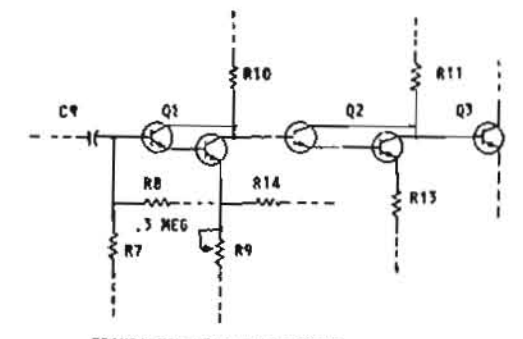
SE4010
SE4001
SE4001

SHEET NOTES: (CONT)
4. THE FOLLOWING CIRCUIT ARRANGEMENTS AND COMPONENTS WERE INCLUDED IN THE LIST 1 RECORDER CONNECTORS.



SHEET NOTES:

- FOR (Q3-5) AND (Q7-10), 16 G TRANSISTORS MAY BE USED INTERCHANGEABLY. FOUR 16 G TRANSISTORS MAY BE USED TO REPLACE BOTH (Q1) AND (Q2), IN THIS CASE (R8) SHALL BE CHANGED TO .3 MEG. SCHEMATIC FOR THIS ARRANGEMENT WILL BE:



- VALUES SHOWN FOR R22, R30 AND R31 MAY DIFFER SINCE THESE RESISTORS ARE SELECTED DURING MANUFACTURE TO MEET ELECTRICAL REQUIREMENTS.
- UNLESS OTHERWISE SPECIFIED "B" NUMBERS REFERRED TO ARE B.T.L. DRAWING NUMBERS: ORDER AS FOLLOWS: "B [NO.] (PART OF KS-19645, L1)."

RECORDER CONNECTOR CIRCUIT
KS-19645, L2 RECORDER CONNECTOR

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INCORPORATED

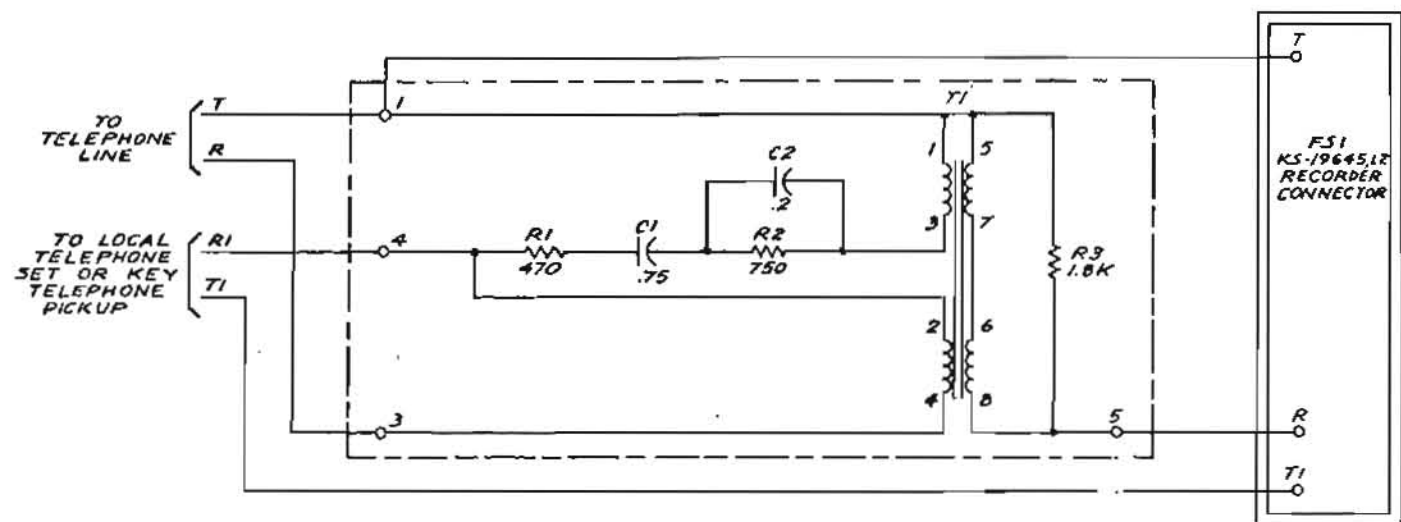
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SD-98414-01-4

ISSUE
7D

FS 2
KS-19645, L11 NETWORK



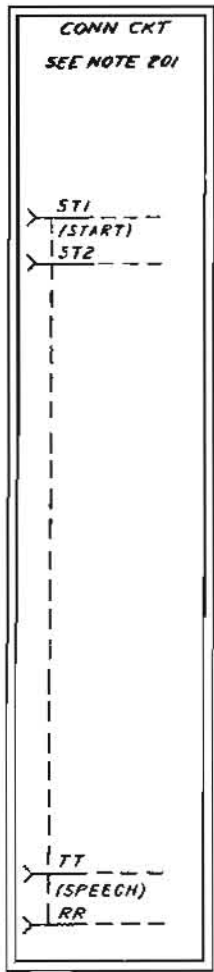
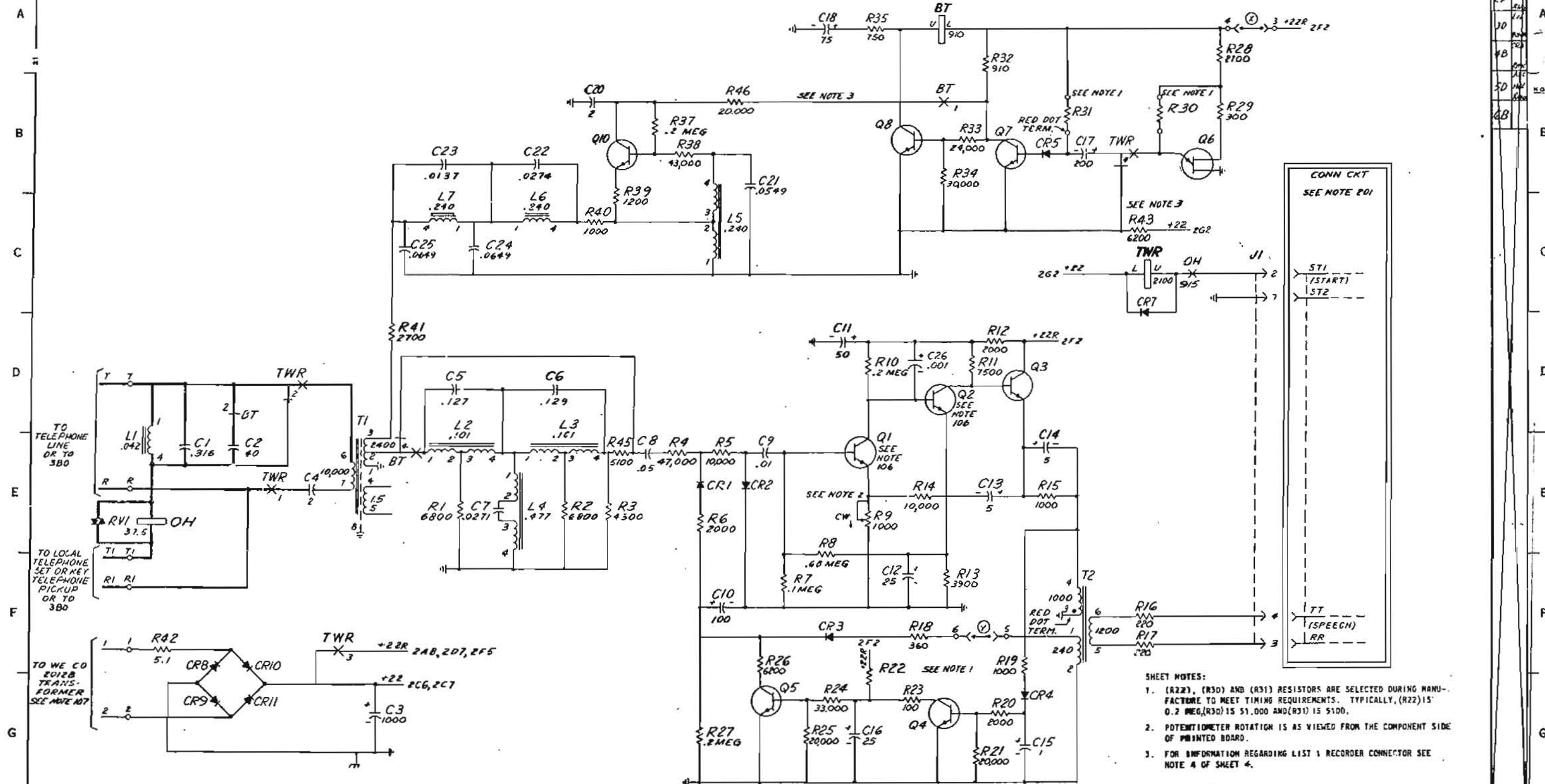
DRAWING
ISSUE
5D
6B

ISSUE
7D

RECORDER CONNECTOR CIRCUIT KS-19645, L2 RECORDER CONNECTOR		SD-99414-01-3
BELL TELEPHONE LABORATORIES INCORPORATED		6S

SD-99414-01-3

FS 1
RECORDER CONNECTOR CKT
(KS-19645, L2 RECORDER CONNECTOR)



- SHEET NOTES:**
- (R22), (R30) AND (R31) RESISTORS ARE SELECTED DURING MANUFACTURE TO MEET TIMING REQUIREMENTS. TYPICALLY, (R22) IS 0.2 MEG, (R30) IS 51,000 AND (R31) IS 5100.
 - POTENTIOMETER ROTATION IS AS VIEWED FROM THE COMPONENT SIDE OF PRINTED BOARD.
 - FOR INFORMATION REGARDING LIST 1 RECORDER CONNECTOR SEE NOTE 4 OF SHEET 4.

SD-99414-01-2

ISSUE
7D

RECORDER CONNECTOR CIRCUIT KS-19645, L2 RECORDER CONNECTOR	②	SD-99414-01-2
BELL TELEPHONE LABORATORIES INCORPORATED	65	PRINTED IN U.S.A.

FS3
RECORDER CONNECTOR CKT
(KS-1964S, L2 RECORDER CONNECTOR)
MODIFICATION FOR CONNECTING ARRANGEMENT
RC1

SHEET NOTES FOR MODIFICATION

DASHED LINES (---) INDICATE ADDED OR RELOCATED COMPONENTS

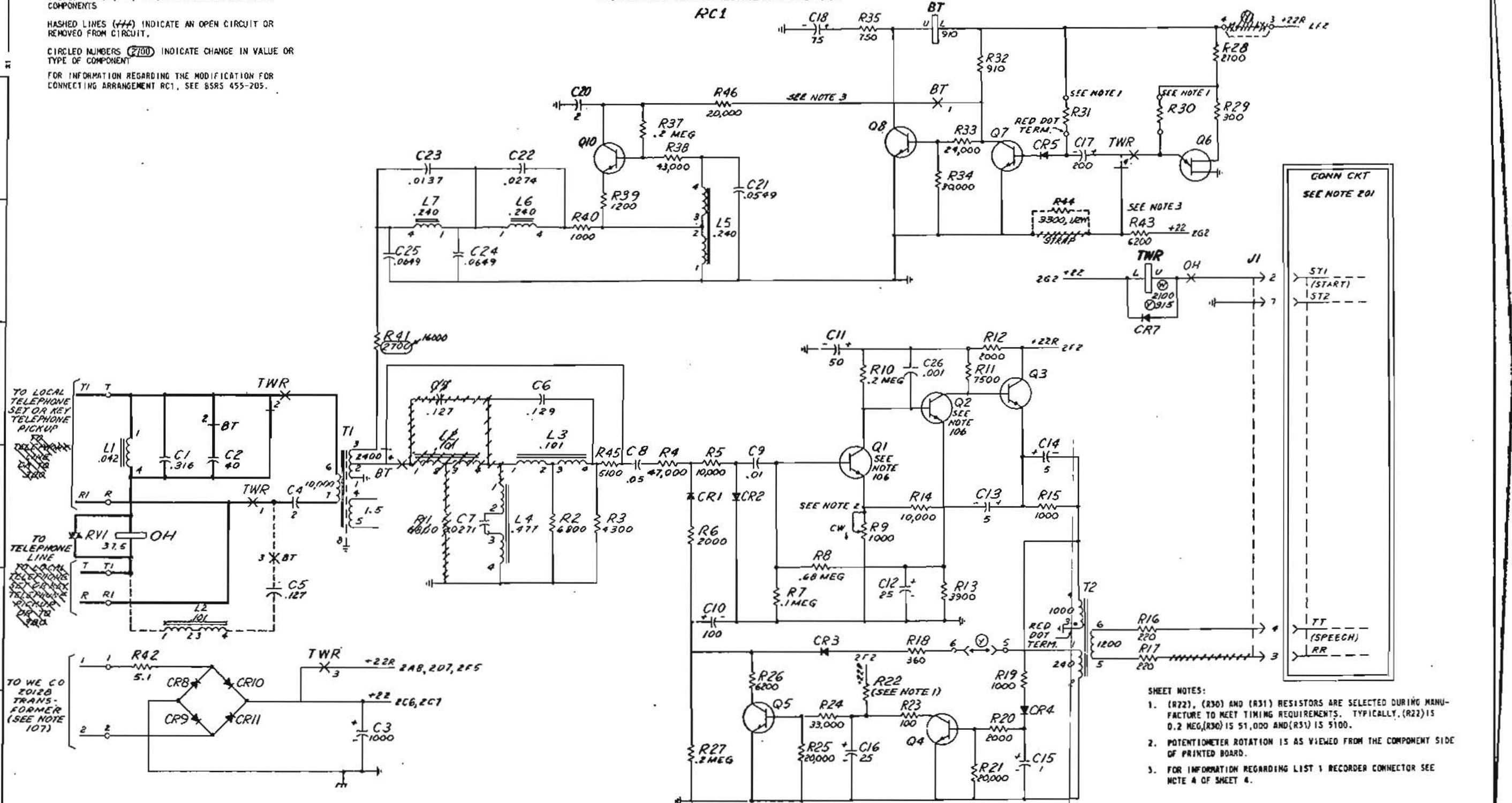
HASHED LINES (---) INDICATE AN OPEN CIRCUIT OR REMOVED FROM CIRCUIT.

CIRCLED NUMBERS (2700) INDICATE CHANGE IN VALUE OR TYPE OF COMPONENT

FOR INFORMATION REGARDING THE MODIFICATION FOR CONNECTING ARRANGEMENT RC1, SEE BSRS 455-205.

A
B
C
D
E
F
G
H

A
B
C
D
E
F
G
H



- SHEET NOTES:**
- (R22), (R30) AND (R31) RESISTORS ARE SELECTED DURING MANUFACTURE TO MEET TIMING REQUIREMENTS. TYPICALLY, (R22) IS 0.2 MEG, (R30) IS 51,000 AND (R31) IS 5100.
 - POTENTIOMETER ROTATION IS AS VIEWED FROM THE COMPONENT SIDE OF PRINTED BOARD.
 - FOR INFORMATION REGARDING LIST 1 RECORDER CONNECTOR SEE NOTE 4 OF SHEET 4.

RC1

RECORDER CONNECTOR CIRCUIT KS-1964S, L2 RECORDER CONNECTOR	(2)	SD-99414-01-6
BELL TELEPHONE LABORATORIES INCORPORATED	65	ISSUE 7D

SD-99414-01-6

CS FOR MODIFICATION

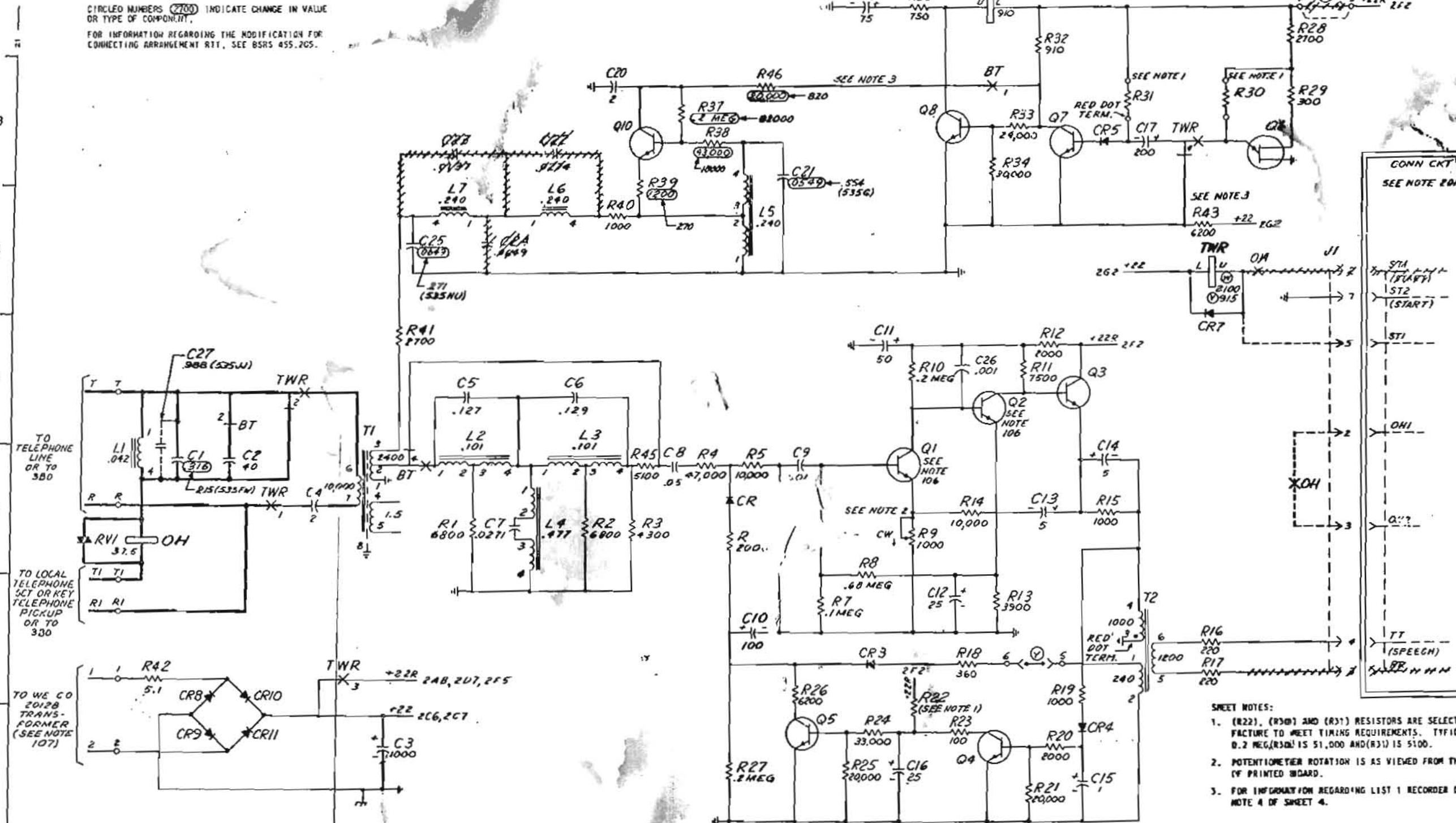
DASHED LINES (---) INDICATE ADDED OR RELOCATED COMPONENTS

HASHED LINES (####) INDICATE AN OPEN CIRCUIT OR REMOVED FROM CIRCUIT.

CIRCLED NUMBERS (200) INDICATE CHANGE IN VALUE OR TYPE OF COMPONENT.

FOR INFORMATION REGARDING THE MODIFICATION FOR CONNECTING ARRANGEMENT RTT, SEE BSRS 455.205.

FS4
RECORDER CONNECTOR
(KS-19645, L2 RECORDER)
MODIFICATION FOR CONNECTING ARRANGEMENT
RTT



SHEET NOTES:

1. (R22), (R30) AND (R31) RESISTORS ARE SELECTED DURING MANUFACTURE TO MEET TIMING REQUIREMENTS. TYPICALLY, (R22) IS 0.2 MEG, (R30) IS 51,000 AND (R31) IS 5100.
2. POTENTIOMETER ROTATION IS AS VIEWED FROM THE COMPONENT SIDE OF PRINTED BOARD.
3. FOR INFORMATION REGARDING LIST 1 RECORDER CONNECTOR SEE NOTE 4 OF SHEET 4.

RTT

RECORDER CONNECTOR CIRCUIT
KS-19645, L2 RECORDER CONNECTOR

2

SD-99414-01-7

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DRAWING ISSUE 70

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ISSUE 70