SD-81837-01

SHEET INDEX

CONTENTS	SHEET NO.	ISSUE NO. 1	2	3	4	5	6	7	8	9	10	SHEET NO.
SHEET INDEX SUPPORTING INFORMATION	A1	1	2	3	4	5	6	7	8	9	10	A1
FS1 REMOTE TEST VOLTAGE SUPPLY CIRCUIT	B1	1	2	3	4	5	6	7	8	9	10	B1
	B2	1	2	2	2	2	6	6	8	9	9	B2
APP FIG. 1	C1	1	2	3	4	4	4	4	8	8	8	C1
CIRCUIT NOTES EQUIPMENT NOTES INFORMATION NOTES	D1	1	1	3	3	5	5	5	8	8	8	D1
CAD 1	G1	1	1	3	4	5	6	6	8	8	8	G1
CPS1 CPS2	J1	1	1	1	1	1	1	7	8	9	9	J1
CPS3 CPS4	J2	1	1	1	1	1	1	1	8	9	10	J2
CPS5 CPS6	J3	1	2	2	2	2	2	2	8	9	9	J3
CPS7	J4	1	1	1	1	1	1	1	8	9	9	J4

SUPPORTING INFORMATION

CATEGORY	NO.
EQUIPMENT DRAWINGS	J87300A-( ) ED-82175-( ) ED-82176-( ) ED-82177-( ) ED-82178-( ) ED-82179-( ) ED-82190-( ) ED-82191-( )
EQPT DESIGN REQT	J87300
MAINTENANCE SPEC	167-785-301

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.

DWG ISSUE	CD ISSUE	DATE ISSUED	DRAWN	APPD
1	1	3-18-66	RAW FJB	RAC DHS FC
2A	2A	6-20-66	PB RWL	AK DHS FC
3D	2A APP 1D	8-31-67	LCS GWJ	RAC DHS FC
4A	2A APP 2A	6-16-67	HD FC	JWT DHS FC
5D	2A APP 3D	5-24-68	WF FC	AAM DHS FC
6D	3D	12-31-68	BRM FJB	AAM DHS FC
7B	3D APP 1B	7-26-71	SK CSS	JWT RD MAT
8D	3D APP 2D	11-7-71	SK CSS	JWT RDH DAB
9D	3D APP 3D	10-11-72	SMC MSS	WJS WJS WJS
10B	3D APP 4B	7-25-73	SK SCC	DF DHS DAB

ISSUE 10B

SD- 81837-01 IM99

POWER SYSTEMS

REMOTE TEST VOLTAGE SUPPLY CIRCUIT J87300

AT&TCO STANDARD

SD-81837-01-A1

BELL TELEPHONE LABORATORIES INCORPORATED

SIZE 6S

10 SHEETS

PRINTED IN U.S.A.

SD-81837-01-A1

SD-81837-01

SHEET INDEX

CONTENTS	SHEET NO.	ISSUE NO. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	SHEET NO.
SHEET INDEX SUPPORTING INFORMATION	A1	*	2	3	4	5	6	7	8	9	10																																									A1
FS1 REMOTE TEST VOLTAGE SUPPLY CIRCUIT	B1	1	2	3	4	5	6	7	8	9	10																																								B1
	B2	1	2	2	2	2	6	6	8	9	9																																								B2
APP FIG. 1	C1	1	2	3	4	4	4	4	8	8	8																																								C1
CIRCUIT NOTES EQUIPMENT NOTES INFORMATION NOTES	D1	1	1	3	3	5	5	5	8	8	8																																								D1
CAD 1	G1	1	1	3	4	5	6	6	8	8	8																																							G1
CPS1 CPS2	J1	1	1	1	1	1	1	7	8	9	9																																								J1
CPS3 CPS4	J2	1	1	1	1	1	1	1	8	9	10																																								J2
CPS5 CPS6	J3	1	2	2	2	2	2	2	8	9	9																																								J3
CPS7	J4	1	1	1	1	1	1	1	8	9	9																																								J4

SUPPORTING INFORMATION

CATEGORY	NO.
EQUIPMENT DRAWINGS	J37300A-( ) ED-92175-( ) ED-92176-( ) ED-92177-( ) ED-92178-( ) ED-92179-( ) ED-92180-( ) ED-92181-( )
EQPT DESIGN REQT	J37300
MAINTENANCE SPEC	167-795-301

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.

DWG ISSUE	CD ISSUE	DATE ISSUED	DRAWN	APPD
1	1	3-18-66	RJW RJB	RAC DHS FC
2A	2A	6-20-66	PB RWL	AK DHS FC
3D	2A APP 1D	9-30-67	LLS GBJ	RAC DHS FC
4A	2A APP 2A	6-16-67	JMD FC	JWT BHS FC
5D	2A APP 3D	5-24-68	WF FC	AABC DHS FC
6D	3D	12-31-68	BRM RJB	AAM DHS FC
7B	3D APP 1B	7-16-71	SK CSS	LGHT RD GBJT
8D	3D APP 2D	11-7-71	SK CSS	LGHT RDH DHS
9D	3D APP 3D	10-11-72	DMC CSS	MJDS WB.J. GBJ.
10B	3D APP 4B	7-25-73	SK JCC	BF DHS RDH

ISSUE 10B

SD- 81837-01 1999

POWER SYSTEMS

REMOTE TEST VOLTAGE SUPPLY CIRCUIT J37300

(2)

AT&TCO STANDARD

SD-81837-01-A1

BELL TELEPHONE LABORATORIES INCORPORATED

SIZE 65

10 SHEETS

SD-81837-01-A1

PART OF FS1
REMOTE TEST VOLTAGE SUPPLY CIRCUIT

+GRD

TO FRAME FUSE PANEL

-48

CP1 REGULATOR DRIVER

C1 40↑

R1 511

Q1

C1 25

CR1

R2 1 MEG

R3 31G

CR3

CR2

R4 1 MEG 100

CP3 SWITCH

R1 316

C1 .1

CR1

Q1

R2 8.25K

CP3 SWITCH

T1

CP4 200V & 20V RECTIFIERS

CR1 CR2 CR3 CR4

R1 100K

C1 1

CR5

C2 1

R2 715 590

K1

DS1 LV ALM

+200 +20 TO CONNECTING CIRCUIT

TO CONNECTING CIRCUIT SEE NOTE 104

-48

2G3

2B2

CP5 +116V & -116V RECTIFIERS

CR1 CR2 CR3 CR4

R1 46.4K C1 1

R2 46.4K C2 1

+116 -116 TO CONNECTING CIRCUIT

CP2 ERROR DETECTOR

CR1

RV1

RV2

R1 3.83K

Q1

R2 +116 VOLTS ADJ 2.5K

R2 7.87K

R3 11.5K

R4 10.5K

SD-81837-01-81

DRAWING ISSUE

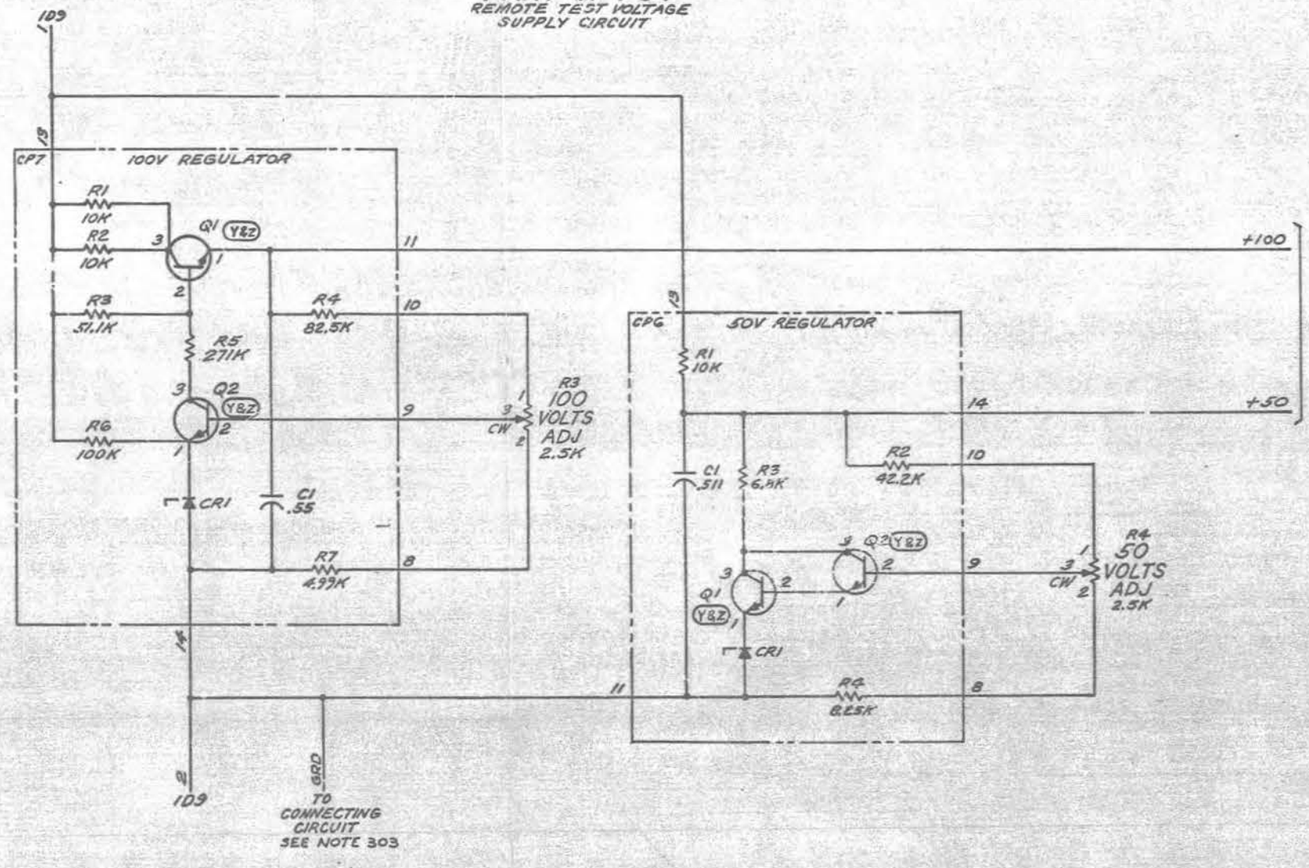
1	BHC	
	RDS	
	FC	
2A	PG	
	AM	
	FC	
3D	LL	
	KSH	
	FC	
4A	JAP	
	FC	
	FC	
5D		
6D		
7B		

ISSUE 10B

REMOTE TEST VOLTAGE SUPPLY CIRCUIT ② SD-81837-01-81

BELL TELEPHONE LABORATORIES INCORPORATED 6S

PART OF FS I
REMOTE TEST VOLTAGE SUPPLY CIRCUIT



DRAWING ISSUE
1
2A
6D

ISSUE 9D

REMOTE TEST VOLTAGE SUPPLY CIRCUIT (2)	SD-81837-01-B2
BELL TELEPHONE LABORATORIES INCORPORATED	6S

SD-81837-01-B2

APP FIG.1

CIRCUIT PACK

EQPT LOC															
DESIG		CP1		CP2		CP3		CP4		CP5		CP6		CP7	
CODE		ED-82175-( )G1		ED-82176-( )G1		ED-82177-( )G1		ED-82178-( )G1		ED-82179-( )G1		ED-82180-( )G1		ED-82181-( )G1	
OPTION															
ELEM IDENT		TERM		TERM		TERM		TERM		TERM		TERM		TERM	
TERM		DESIG	FS LOC	DESIG	FS LOC	DESIG	FS LOC	DESIG	FS LOC	DESIG	FS LOC	DESIG	FS LOC	DESIG	FS LOC
14					1F4				1B7		1E6		2D6		2F3
13			1D0		1G4				1C7				2D5		2C2
12			1D0				1C4		1C5						
11			1C2		1G2		1D2		1C5		1D6		2F5		2D4
10			1D1		1G4		1B4		1B5		1D5		2E6		2D4
9					1G4				1B5		1E5		2E6		2D4
8			1D1		1F4				1C6		1D5		2F6		2E4
7									1B7						
6															
5															
4									1B7						
3									1B7						
2									1B7						
1															

CAPACITOR

DESIG	LOC	CODE
C1	1B0	KS-16390,L8,40

LAMP

DESIG	LOC	CODE
DS1	1C8	2Y

POTENTIOMETER

DESIG	LOC	CODE
R2	1G4	KS-16752,L10
R3	2D4	KS-16752,L10
R4	2E7	KS-16752,L10

TRANSFORMER

DESIG	LOC	CODE
T1	1B4	2151A

TRANSISTOR

DESIG	LOC	CODE
Q1	1D3	KS-19938,L1

DRAWING ISSUE

1	8/64 GW FC	WH
2A	7/65 AM FC	WH
3D	12/67 GW FC	WH
4A	4/68 FC FC	WH

ISSUE 8 KY

REMOTE TEST VOLTAGE SUPPLY CIRCUIT

SD-81837-01-CI

BELL TELEPHONE LABORATORIES INCORPORATED

SD-81837-01-CI

CIRCUIT NOTES:

101.

DESIG	FUSE AMP	POTENTIAL	ONE PER
	.75	-48v	CIRCUIT

BATTERY SYMBOL	VOLTAGE RANGE
-48	42.5-52.5

102.

FEATURE OR OPTION	PROVIDE		
	APP FIG.	AF? OR WIR	QUANTITY
REMOTE TEST VOLTAGE SUPPLY CKT	1		1

103.

REQUIRED APP FIG., WIRING AND APPARATUS CHGS							
CHANGED ON ISS	IF JOB RECORDS DO NOT SPECIFY	TYPE OPTIC. mod P.NO.	SEE NOTE	USE IN CIRCUIT			
				STD	ARM	MD	

104. LEADS 1 AND 2 PROVIDE A LOOP CLOSURE IN THE EVENT OF LOW OUTPUT VOLTAGE AND MAY BE USED ON A JOB BASIS TO PROVIDE A LOW VOLTAGE ALARM IF REQUIRED.

105. THE SIZE OF THE INPUT BATTERY AND GROUND LEADS SHALL BE CHOSEN TO PROVIDE A DROP OF 1 VOLT OR LESS BETWEEN THE FUSE AND THE INPUT TERMINALS WHEN THE INPUT CURRENT IS .650 AMPERES.

EQUIPMENT NOTES:

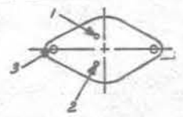
201. ALL WIRES SHALL BE 20 GAUGE SOLID PER KS-19194 UNLESS OTHERWISE SPECIFIED.

202. LEAD DESIGNATED AT SHALL BE CONNECTED AFTER TESTING.

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. THE TERMINAL NUMBER ASSIGNMENT OF KS-19938,L1 TRANSISTOR IS:



303. THE JUMPER BETWEEN TERMINALS 31 AND 51 ON TS1 MAY BE REMOVED TO ISOLATE THE +116V, -116V, +100V, AND +50V OUTPUTS FROM INPUT GROUND.

DRAWING ISSUE	
1	WH
3D	WH
5D	
78	KY

ISSUE 8 KY

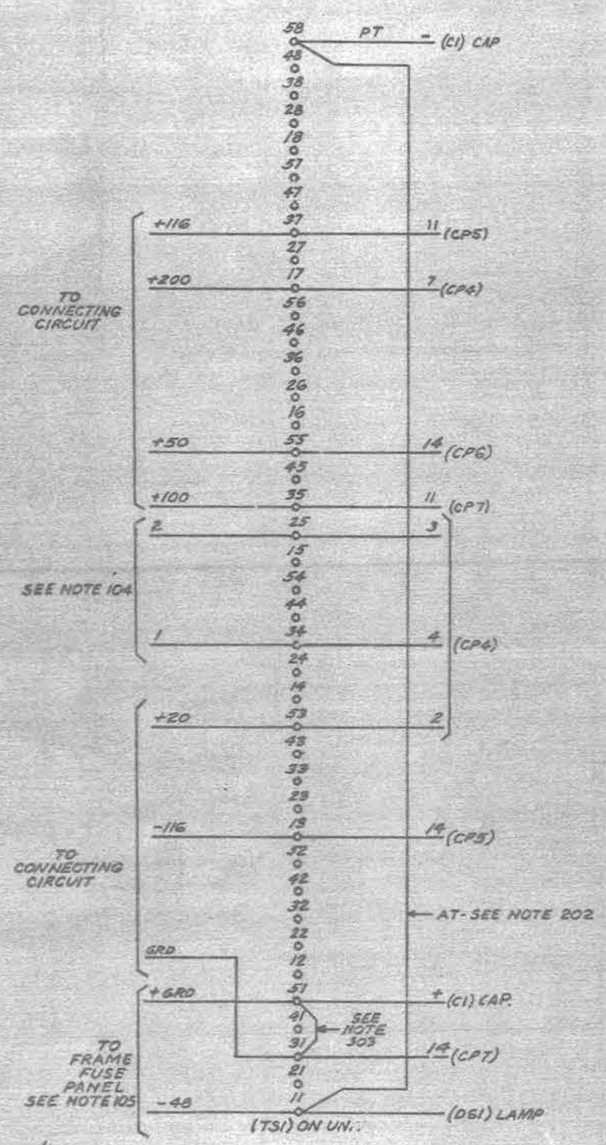
REMOTE TEST VOLTAGE SUPPLY CIRCUIT (2)

SD-81837-01-DI

BELL TELEPHONE LABORATORIES INCORPORATED

SD-81837-01-DI

CAD 1
(FOR APP FIG 1)



DRAWING ISSUE		
1		WH
7D		WH
4A		A
5D		
6D		

ISSUE 8 KY

REMOTE TEST VOLTAGE SUPPLY CIRCUIT (2)

BELL TELEPHONE LABORATORIES INCORPORATED

SD-81837-01-GI

SD-81837-01-GI

CPS1
REGULATOR DRIVER

COMPONENT LIST

CAPACITOR

DESIG	CODE
C1	KS-16390,L1,25

DIODE

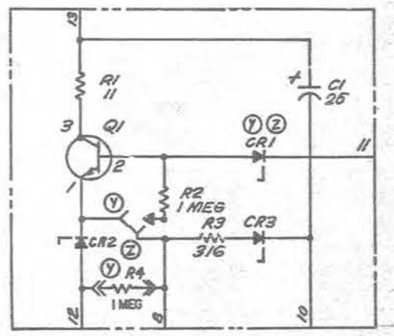
DESIG	CODE
CR1	446L (Z), 446T (Y)
CR2	426AK
CR3	426R

RESISTORS

DESIG	CODE
R1	147A,511
R2	145A,1 MEG
R3	146A,316
R4	145A,1 MEG (Y)

TRANSISTOR

DESIG	CODE
Q1	KS-19742,L1



RECORD OF CHANGES

DWG ISS	PREV FURN	STD	A&M	MFR DISC	SEE NOTE
7B	Z	Y		Z	

CIRCUIT DESCRIPTION

(CP1) IS A REGULATOR DRIVER WITH A NOMINAL 48 VOLT DC INPUT ACROSS TERMINALS 8 AND 13. A DC FEEDBACK CURRENT SIGNAL FLOWING INTO TERMINAL 11 CONTROLS AN OUTPUT CURRENT SIGNAL FROM TERMINAL 12.

THE FEEDBACK CURRENT ENTERING TERMINAL 11 DRIVES THE BASE OF (Q1). THE RESULTING EMITTER CURRENT FLOWS OUT THROUGH TERMINAL 12 AND THE COLLECTOR CURRENT FLOWS IN THROUGH TERMINAL 13. THE REGULATED VOLTAGE APPEARS ACROSS TERMINALS 10 AND 13. BREAKDOWN DIODE (CR1) SERVES AS A VOLTAGE DROPPING ELEMENT IN THE PATH FROM TERMINAL 11 TO THE BASE OF (Q1) AND REDUCES THE REQUIRED VOLTAGE RATING OF THE TRANSISTOR DELIVERING CURRENT TO TERMINAL 11.

RESISTOR (R1) LIMITS THE COLLECTOR CURRENT OF (Q1) AND IN CONJUNCTION WITH BREAKDOWN DIODE (CR2) PREVENTS THE COLLECTOR-EMITTER VOLTAGE RATING OF (Q1) FROM BEING EXCEEDED. RESISTOR (R2) PROVIDES A PATH FOR LEAKAGE CURRENT ENTERING TERMINAL 11.

RESISTOR (R3) AND BREAKDOWN DIODE (CR3) FORM A STARTING NETWORK FOR THE EXTERNAL LOAD CONNECTED BETWEEN TERMINALS 10 AND 13.

CAPACITOR (C1) HELPS TO STABILIZE THE FEEDBACK LOOP AND PROVIDES A LOW IMPEDANCE CURRENT SOURCE ACROSS TERMINALS 10 AND 13.

CPS2
ERROR DETECTOR

COMPONENT LIST

DIODE

DESIG	CODE
CR1	446B

RESISTOR

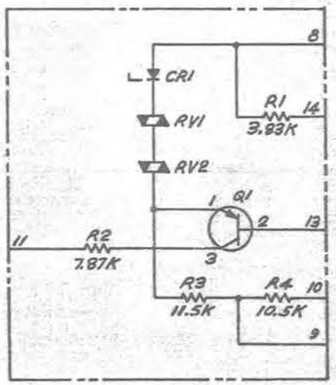
DESIG	CODE
R1	106A,3.83K
R2	146A,7.87K
R3	145A,11.5K
R4	106A,10.5K

TRANSISTOR

DESIG	CODE
Q1	KS-19619,L1

VARISTOR

DESIG	CODE
RV1	100A
RV2	100A



CIRCUIT DESCRIPTION

(CP2) COMPARES A PORTION OF THE VOLTAGE APPEARING ACROSS TERMINALS 8 AND 9 WITH A REFERENCE VOLTAGE, AND PRODUCES A SUITABLE FEEDBACK CURRENT SIGNAL FROM TERMINAL 11.

RESISTORS (R1) AND (R4) ARE PART OF A VOLTAGE DIVIDER NETWORK WHICH REDUCES THE VOLTAGE ACROSS TERMINALS 8 AND 9. THE REDUCED VOLTAGE IS COMPARED WITH THE CONSTANT VOLTAGE PRODUCED BY REFERENCE DIODE (CR1) IN SERIES WITH TEMPERATURE COMPENSATING VARISTORS (RV1) AND (RV2). TRANSISTOR (Q1) IS AN ERROR DETECTOR AMPLIFIER WHOSE COLLECTOR CURRENT VARIES INVERSELY WITH THE MAGNITUDE OF THE VOLTAGE APPEARING AT TERMINAL 13. THE COLLECTOR CURRENT OF (Q1) LEAVES (CP2) AT TERMINAL 11.

RESISTOR (R2) LIMITS THE COLLECTOR CURRENT OF (Q1) AND HELPS TO PREVENT THE COLLECTOR-EMITTER VOLTAGE RATING OF (Q1) FROM BEING EXCEEDED. RESISTOR (R3) PROVIDES THE BIAS CURRENT TO (CR1), (RV1) AND (RV2).

MANUFACTURING REFERENCES

CATEGORY		NO.
CIRCUIT PACK CODE AND ASSEMBLY DRAWING		
CPS 1		ED-82175( )G1
CPS 2		ED-82176( )G1
CONNECTOR ON FRAME		
CPS 1	J1	912 TYPE
CPS 2	J2	912 TYPE

SYMBOL

CPS SHOWN IN DETAIL IN FS1.

NOTES

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

DRAWING ISSUE

1	WB 4/18/75 FC	WB
7B		KY

ISSUE 9D KY

REMOTE TEST VOLTAGE SUPPLY CIRCUIT ② SD-81837-01-J1

BELL TELEPHONE LABORATORIES INCORPORATED 6S

SD-81837-01-J1

CPS3
SWITCH

COMPONENT LIST

CAPACITOR

DESIG	CODE
C1	594C..1

DIODE

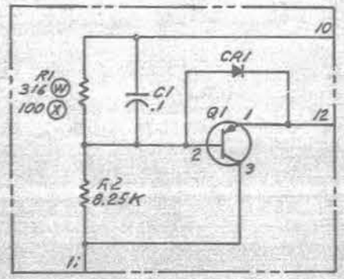
DESIG	CODE
CR1	446F

RESISTOR

DESIG	CODE
R1	KS-20810,L1A,316 (W) 145A,100 (X)
R2	145A,8.25K

TRANSISTOR

DESIG	CODE
Q1	KS-19507,L3



CIRCUIT DESCRIPTION

(CP3) IS A VOLTAGE-OPERATED SWITCH. A LOW OR HIGH RESISTANCE PATH MAY EXIST BETWEEN TERMINALS 11 AND 12, DEPENDING ON THE POLARITY OF THE 10 VOLT PEAK TO PEAK SIGNAL APPLIED BETWEEN TERMINALS 10 AND 12. A SIGNAL WITH A POSITIVE POLARITY AT TERMINAL 12 WILL TURN ON TRANSISTOR(Q1)WHICH WILL FORM A LOW-RESISTANCE PATH FROM TERMINAL 11 TO 12. A SIGNAL WITH A NEGATIVE POLARITY AT TERMINAL 12 (WITH RESPECT TO TERMINAL 10) WILL TURN OFF TRANSISTOR(Q1)AND EFFECTIVELY OPEN THE PATH FROM TERMINAL 11 TO TERMINAL 12

RESISTOR(R2)FORMS A PATH TO PROVIDE STARTING CURRENT WHEN VOLTAGES ARE FIRST APPLIED TO(CP3). RESISTOR(R1)SERVES TO LIMIT THE BASE CURRENT TO(Q1) DURING NORMAL OPERATION. CAPACITOR(C1)SERVES AS A "SPEED-UP" CAPACITOR TO QUICKLY SATURATE AND CUT OFF(Q1). WHEN TERMINAL 12 IS NEGATIVE, DIODE(CR1)PROVIDES A PATH FOR CURRENT TO FLOW FROM FEEDBACK TERMINALS 10 AND 12 AND LIMITS THE MAGNITUDE OF REVERSE BASE EMITTER VOLTAGE USED TO CUT OFF(Q1).

CPS4
200V AND 20V RECTIFIERS

COMPONENT LIST

RELAY

DESIG	K1	
CODE	MA3	
OPTION		
X	CONT ARR	LOC
4	M	
3	B	187
2	B	197
1	M	
COIL	X	1C7

RELAY NOT ADJUSTABLE. REPLACE WHEN THERE IS MALFUNCTION.

CAPACITOR

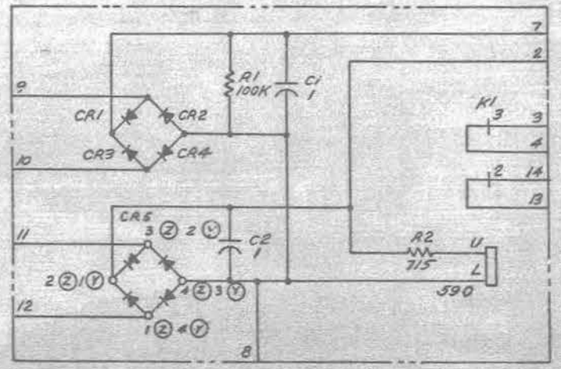
DESIG	CODE
C1	542D
C2	542D

DIODE

DESIG	CODE
CR1	446F
CR2	446F
CR3	446F
CR4	446F
CR5	460A (Z), 460M (Y)

RESISTOR

DESIG	CODE
R1	146A,100K
R2	145A,715



CIRCUIT DESCRIPTION

(CP4) PROVIDES RECTIFICATION AND FILTERING FOR 200 VOLT AND 20 VOLT SQUARE WAVE VOLTAGES. A RELAY CONNECTED ACROSS THE 20 VOLT SUPPLY PROVIDES CONTACTS WHICH PLACE SHORT CIRCUITS ACROSS TWO PAIRS OF TERMINALS (3 & 4 AND 13 & 14) WHEN THE RELAY IS DE-ENERGIZED.

THE VOLTAGE APPEARING ACROSS TERMINALS 9 AND 10 IS A SQUARE WAVE OF APPROXIMATELY 400 VOLTS PEAK TO PEAK. THIS VOLTAGE IS FULL WAVE RECTIFIED BY DIODES(CR1), (CR2), (CR3) AND (CR4) TO PRODUCE 200 VOLTS DC. RESISTOR(R1) AND CAPACITOR(C1) ACT AS A FILTER TO REDUCE THE RIPPLE OF THE VOLTAGE AT TERMINALS 7 AND 8.

THE VOLTAGE APPEARING ACROSS TERMINALS 11 AND 12 IS A SQUARE WAVE OF APPROXIMATELY 40 VOLTS PEAK TO PEAK. THIS VOLTAGE IS FULL WAVE RECTIFIED BY PACKAGED DIODE BRIDGE(CR5)TO PRODUCE 20 VOLTS DC. CAPACITOR(C2)AND RESISTOR(R2)IN SERIES WITH THE COIL RESISTANCE OF RELAY(K1) ACT AS A FILTER TO REDUCE THE RIPPLE OF THE VOLTAGE BETWEEN TERMINALS 2 AND 8.

RELAY(K1) IS NORMALLY OPERATED AND CONTACTS 2 AND 3 ARE THEREBY NORMALLY OPEN. WHEN THE VOLTAGE ACROSS TERMINALS 11 AND 12 APPROACHES ZERO, CONTACTS 2 AND 3 CLOSE.

MANUFACTURING REFERENCES

CATEGORY	NO.
CIRCUIT PACK CODE AND ASSEMBLY DRAWING	
CPS 3	ED-82177( )G1
CPS 4	ED-82179( )G1
CONNECTOR ON FRAME	
CPS 3 J3,J4	912 TYPE
CPS 4 J5	912 TYPE

SYMBOL

CPS SHOWN IN DETAIL IN FS1.

NOTES

1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS;
   CAPACITANCE VALUES ARE IN MICROFARAD.
   VALUES PRECEDED BY THE SYMBOL +(PLUS) OR -(MINUS) ARE IN VOLTS.

RECORD OF CHANGES

DWG ISS	PREV FURN	STD	A & M	MFR DISC	SEE NOTE
9D	Z	Y	Z		
10B	X	W		X	

DRAWING ISSUE

1	MAN. FEB. FC

ISSUE 10B KY

REMOTE TEST VOLTAGE SUPPLY CIRCUIT (2) SD-81837-01-J2

BELL TELEPHONE LABORATORIES INCORPORATED

SIZE 6S

SD-81837-01-J2

CPS5
+116V & -116V RECTIFIERS

COMPONENT LIST

CAPACITOR

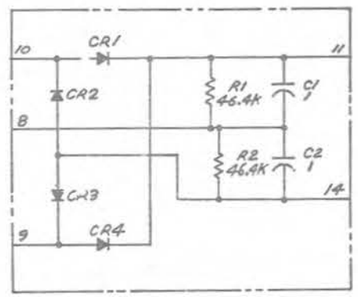
DESIG	CODE
C1	542D
C2	542D

DIODE

DESIG	CODE
CR1	446K
CR2	446K
CR3	446K
CR4	446K

RESISTOR

DESIG	CODE
R1	145A,46.4K
R2	145A,46.4K



CIRCUIT DESCRIPTION

(CP5) CONTAINS THE RECTIFYING AND FILTERING ELEMENTS NECESSARY TO CONVERT A SQUARE-WAVE VOLTAGE OUTPUT OF A TRANSISTOR-CORE INVERTER INTO PLUS AND MINUS 116 VOLT OUTPUT.

THE INPUT VOLTAGE ACROSS TERMINALS 9 AND 10 IS A SQUARE-WAVE OF APPROXIMATELY 464 VOLTS PEAK TO PEAK WITH A CENTER TAP AT TERMINAL 8. DIODES (CR1) AND (CR4) PROVIDE FULL WAVE RECTIFICATION TO PRODUCE +116 VOLTS FROM TERMINAL 11 TO THE CENTER TAP. OUTPUT FILTERING IS PROVIDED BY RESISTOR (R1) AND CAPACITOR (C1). DIODES (CR2) AND (CR3) PROVIDE FULL WAVE RECTIFICATION TO PRODUCE -116 VOLTS FROM TERMINAL 14 TO THE CENTER TAP WITH FILTERING PROVIDED BY RESISTOR (R2) AND CAPACITOR (C2).

CPS6
50V REGULATOR

COMPONENT LIST

CAPACITOR

DESIG	CODE
C1	596C,.511

DIODE

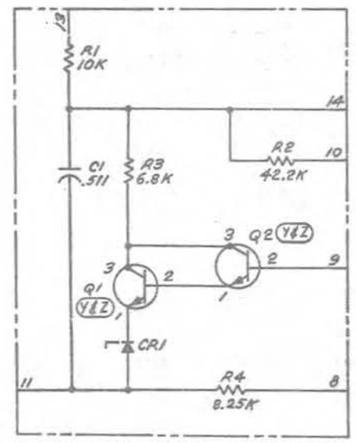
DESIG	CODE
CR1	446T

RESISTOR

DESIG	CODE
R1	147A,10K
R2	107A,42.2K
R3	145A,6.81K
R4	106A,8.25K

TRANSISTOR

DESIG	CODE
Q1	16F (Z)66F(Y)
Q2	16F (Z)66F(Y)



CIRCUIT DESCRIPTION

(CP6) PROVIDES A REGULATED 50 VOLT OUTPUT BETWEEN TERMINALS 11 AND 14 FROM A 116 VOLT DC INPUT BETWEEN TERMINALS 11 AND 13 BY MEANS OF A CLOSED-LOOP SHUNT REGULATOR.

RESISTORS (R2) AND (R4) ARE PART OF A VOLTAGE DIVIDER NETWORK WHICH REDUCES THE OUTPUT VOLTAGE. THE REDUCED VOLTAGE IS COMPARED WITH THE CONSTANT VOLTAGE PRODUCED BY REFERENCE DIODE (CR1). TRANSISTORS (Q1) AND (Q2) FORM A "DARLINGTON CONNECTED" ERROR DETECTOR AND AMPLIFIER.

RESISTOR (R3) PREVENTS THE VOLTAGE RATINGS OF (Q1) AND (Q2) FROM BEING EXCEEDED. THE VOLTAGE DROP ACROSS RESISTOR (R1) KEEPS THE OUTPUT VOLTAGE WITHIN ITS REGULATION LIMITS AND ACTS AS A CURRENT LIMITER IN THE EVENT OF A SHORT CIRCUIT ON THE OUTPUT. CAPACITOR (C1) SERVES AS AN OUTPUT VOLTAGE FILTER.

ASSUME THE OUTPUT VOLTAGE INCREASES. A PORTION OF THIS INCREASE APPEARS AT THE BASE OF (Q2) AND INCREASES ITS DRIVE. THE RESULTING INCREASED EMITTER CURRENT OF (Q2) DRIVES THE BASE OF (Q1), THUS INCREASING ITS COLLECTOR CURRENT AND THE VOLTAGE DROP ACROSS (R1). THE INCREASED DROP ACROSS (R1) RETURNS THE OUTPUT VOLTAGE TO ITS NOMINAL VALUE.

MANUFACTURING REFERENCES

CATEGORY	NO.
CIRCUIT PACK CODE AND ASSEMBLY DRAWING	
CPS 5	ED-82179( )G1
CPS 6	ED-82180( )G1
CONNECTOR ON FRAME	
CPS 5 J6	912 TYPE
CPS 6 J7	912 TYPE

SYMBOL

CPS SHOWN IN DETAIL IN FS1.

NOTES:

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

RECORD OF CHANGES

DWG ISS	PREV FURN	STD	A & M	MFR DISC	SEE NOTE
8D	Z	Y	Z		

DRAWING ISSUE

1	PA PE RC
2A	PE MN FC

ISSUE 9D KY

REMOTE TEST VOLTAGE SUPPLY CIRCUIT (2)

SD-81837-01-J3

BELL TELEPHONE LABORATORIES INCORPORATED

SIZE 6S

SD-81837-01-J3

PRINTED IN U.S.A.

CPS7
100V REGULATOR

COMPONENT LIST

CAPACITOR

DESIG	CODE
C1	542M

DIODE

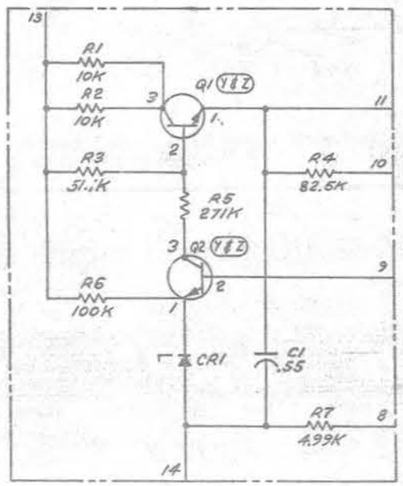
DESIG	CODE
CR1	446B

RESISTOR

DESIG	CODE
R1	147A,10K
R2	147A,10K
R3	145A,51.1K
R4	107A,82.5K
R5	145A,271K
R6	145A,100K
R7	106A,4.99K

TRANSISTOR

DESIG	CODE
Q1	16F(Z)66F(Y)
Q2	16F(Z)66F(Y)



MANUFACTURING REFERENCES

CATEGORY	NO.
CIRCUIT PACK CODE AND ASSEMBLY DRAWING CPS 7	ED-82181 ( ) 01
CONNECTOR ON FRAME CPS 7 J8	912 TYPE

SYMBOL

CPS SHOWN IN DETAIL IN FS1.

NOTES:

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

CIRCUIT DESCRIPTION

(CP7) PROVIDES A REGULATED 100 VOLT OUTPUT BETWEEN TERMINALS 11 AND 14 FROM A 116 VOLT DC INPUT AT TERMINALS 13 AND 14 BY MEANS OF A CLOSED-LOOP SERIES REGULATOR.

RESISTORS (R4) AND (R7) ARE PART OF A VOLTAGE DIVIDER NETWORK WHICH REDUCES THE OUTPUT VOLTAGE. THE REDUCED VOLTAGE IS COMPARED WITH THE CONSTANT VOLTAGE PRODUCED BY REFERENCE DIODE (CR1). TRANSISTOR (Q2) IS AN ERROR DETECTOR AMPLIFIER WHICH DRIVES TRANSISTOR (Q1) TO MAINTAIN A CONSTANT OUTPUT VOLTAGE. RESISTOR (R6) PROVIDES BIAS CURRENT TO (CR1). RESISTORS (R1) AND (R2) SERVE TO LIMIT THE MAXIMUM CURRENT IN THE EVENT OF A SHORT CIRCUIT AT THE OUTPUT TERMINALS. RESISTOR (R3) PROVIDES THE PATH FOR DRIVE CURRENT TO (Q1), RESISTOR (R5) PREVENTS THE COLLECTOR-EMITTER VOLTAGE RATING OF (Q2) FROM BEING EXCEEDED. CAPACITOR (C1) SERVES AS AN OUTPUT VOLTAGE FILTER.

ASSUME THE OUTPUT VOLTAGE INCREASES. A PORTION OF THIS VOLTAGE APPEARS AT THE BASE OF (Q2), INCREASING ITS DRIVE. THE RESULTING INCREASED COLLECTOR CURRENT OF (Q2) REDUCES THE DRIVE TO (Q1). THE COLLECTOR-EMITTER VOLTAGE OF (Q1) INCREASES AND THE OUTPUT VOLTAGE RETURNS TO ITS NOMINAL VALUE.

RECORD OF CHANGES

DWG ISS	PREV FURN	STD	A&M	MFR DISC	SEE NOTE
8D	Z	Y	Z		

DRAWING ISSUE

1	Rdsn 9/19 PC

ISSUE 9D

REMOTE TEST VOLTAGE SUPPLY CIRCUIT (2) SD-81837-01-J4

BELL TELEPHONE LABORATORIES INCORPORATED 6S

SD-81837-01-J4