POWER SYSTEMS
POWER SUPPLY CIRCUIT
FOR 756A PBX
WITH BATTERY RESERVE
J86464

CHANGES

D. Description of Changes

D.1 Figs. 1,3,4,5,6,7,8 were rated Mfr Disc. and Fig. 2 A&M Only, as a result of 756A PBX being rated Mfr Disc.

D.2 Circuit Note 103 changed to include information per D.1.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 2426-COR

WE DEPT 81450-SDL-JK

CIRCUIT DESCRIPTION

CD-81326-02
ISSUE 2D
APPENDIX 2D
DWG ISSUE 7D

POWER SYSTEMS
POWER SUPPLY CIRCUIT
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WITH BATTERY RESERVE
J86464

CHANGES

B. Changes in Apparatus

B.1	Removed	Replaced By
	J87225A, DC to DC converter FS1, App Fig. 7	KS-19157,L2 DC to DC converter FS1, App Fig. 7
	J87230B, DC to DC converter FS1, App Fig. 8	J87807A, L2&L4 DC to DC converter FS1, App Fig. 8

D. Description of Changes

D.1 On sheet 2, FS1, DC to DC REG CONV J87225A SD-81572-01, "OR KS-19157,L2" added. J87255A DC to DC converter is rated Mfr Disc. and KS-19157,L2 DC to DC converter AT&TCo. Standard.

D.2 On sheet 2, FS1, CONV CKT +48 J87230B SD-81590-02, "OR J86807A, L2&L4 SD-81571-01" added. J87230B is rated Mfr Disc. and J86807A AT&TCO. Standard.

D.3 Circuit note 103 changed to include information on D.1 and D.2.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 2433-DHS
DEPT 81450-SDL-RB

POWER SYSTEMS
POWER SUPPLY CIRCUIT
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J86464

CHANGES

A. Changed and Added Functions

A.1 Added battery reserve arrangement (App Fig. 7) to supply +10V for DSS and busy lamps.

A.2 Added battery reserve arrangement (App Fig. 8) to supply +48V for direct station selection.

B. Changes in Apparatus

Added

App Fig. 7

App Fig. 8

D. Description of Changes

D.1 In FS1 added App Fig. 7 and 8

D.2 In FS1 designated wiring option "T".

D.3 Changed circuit notes 102 and 103 to include information on D.1 and D.2.

D.4 Added App Fig. 7 and 8 to sheet 4.

F. Changes in Description of Operation

In SECTION II:

F.1 Change 1.02 to read "Positive 48V dc is provided from the output of the J87230B, dc to dc converter."

F.2 Change 1.04 to read "Positive 10V dc is provided from the output of the J87225A, dc to dc converter."

F.3 Change 1.08 to read "---- is covered by fuses F1 through F10."

In SECTION III:

F.4 Change 1.01 to read " AC Input
105 to 129 volts, 60 Hz ±2%"

F.5 Change 1.02 (b) to read

"(b) +48 40 52.6 0 to 1.5
Noise max, 56 dBrn C-Message
Bridge Conn."

F.6 Add the following to 1.02

"(c) +10 9 11 0 to 3

Noise max, 150 millivolts, peak to peak."

F.7 Delete 1.03.

F.8 Change 3.01 (c) to read "Provide 10 volts dc for lamps in sets."

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 4257-RRG
WECo DEPT 8143-JRP-ET

POWER SYSTEMS
POWER SUPPLY CIRCUIT
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J86464

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 To provide power supplies for 756A PBX systems with battery reserve.

SECTION II - DETAILED DESCRIPTION

1. INPUT AND OUTPUT VOLTAGES

1.01 105 to 129 volts commercial ac power is supplied from a nearby outlet through the plug, cord and line switch to the input distribution point, TS1, to provide power for the J87211A rectifier which furnishes negative 48V dc power to float the batteries.

1.02 Positive 48-volt dc is provided from the output of the T1 transformer rectified with a 426A diode, CR1, and filtered with C1 and C2 capacitors, 2000 microfarads, to reduce output noise.

1.03 An applique, "X" option, is provided to add 0 to 96 volts output having a low ripple content.

1.04 10 volts 60 Hz is obtained from a tap on the secondary winding of the T1 transformer. To maintain the outputs of the T1 transformer within working limits, the input winding is equipped with taps for normal 111-, 117-, or 123-volt service.

1.05 Ringing is supplied by the J86464H transistorized ringing generator which has the audible ringing tone superimposed on the 20 hertz output.

1.06 Low tone is supplied by the J86464G transistorized tone generator which provides an output of 600 Hz modulated at 120 Hz. The LT1 output is approximately 2 volts and is interrupted at 60 IPM & 120 IPM to provide busy tones.

1.07 TOUCH-TONE® dial tone is provided by the 404C tone generator. The TT1 output is approximately 1.75 volts for dial tone.

1.08 Distribution fusing for this circuit and connecting circuits is covered by fuses F1 through F7.

2. INTERRUPTER AND 60 HERTZ INVERTER

2.01 A small 10-volt ac motor in the interrupter (INT) drives a series of cams through a gear arrangement. The rotating cams open and close contacts to provide various timing pulses as shown in Table A.

2.02 The 10 volts ac for the interrupter motor is provided by the 60 hertz ac inverter, the output of which is coupled by the T2 transformer to the interrupter motor. A typical half-cycle of operation occurs as follows:

(a) Assume Q1 transistor has just switched on. At this instant the difference between the supply voltage and the voltage drop across R2 (100Ω) appears across winding (5-8) of T2 transformer. The shape of the voltage across winding (5-8) of T2 transformer is rectangular because C3 capacitor provides a low impedance source of voltage for the inverter circuit. The collector current of Q1 transistor will increase exponentially with time as a consequence of the applied rectangular voltage and the primary inductance of T2 transformer.

(b) Because of transformer action, a voltage is induced in winding (9-12) of T2 transformer. This induced voltage is of such a polarity and magnitude as to provide a forward-bias voltage across feedback network R1, R4, R5B, that maintains Q1 transistor saturated. Because Q1 transistor is saturated, feedback network R2, R3, R5A has very little voltage across it. This voltage is insufficient to turn Q2 transistor on. As a result, the collector current of Q2 transistor is minimum during this part of the cycle.

(c) Switching action begins when the increasing collector current of Q1 reaches a value equal to its base current times the transistor current gain, beta. At this time Q1 transistor comes out of saturation and its collector to emitter voltage increases rapidly. The voltage across feedback network R2, R3, R5A increases. This increase in voltage causes Q2 transistor to turn on. Because Q2 transistor is now saturated, feedback network R1, R4, R5B has very little voltage across it. As a result, Q1 transistor is held off.

(d) The ganged potentiometers, R5A and R5B, provide a means to adjust the frequency and compensate for manufacturing variation of inductance in both the transformer and the motor. Diodes CR1 and CR2 insure that the maximum voltage across any transistor cannot exceed twice the voltage across C3 by providing a return path for the lagging current caused by the inductance of the motor load. That is, the voltage across either half of the transformer primary winding is restricted to be not greater than the voltage across C3.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 AC Input

105 to 129 volts, 60 Hz

1.02 DC Output

	Volts	Min.	Max.	Amp
(a)	-48	45	52.6	0 to 11

Noise max. 39 dBrn C-Message Bridge Connection

(b)	+48	40	60	0.1

Noise max. 52 dBrn C-Message Bridge Connection

1.03 AC Output

Volts	Min.	Max.	Amp
±10, 60 Hz	8	11	2.1

1.04 Ringing Output

20 hertz, 65 to 90 volts

1.05 Busy Tone Output

LT1 2.0 volts

1.06 TOUCH-TONE Dial Tone Output

TT1 1.75 Volts

2. FUNCTIONAL DESIGNATIONS

None

3. FUNCTIONS

3.01 This power supply circuit is designed to perform the following functions:

(a) To provide negative 48 volts dc for relay and talking power.

(b) Provide positive 48 volts dc for direct station selection.

(c) Provide 10 volts ac for lamps in sets.

(d) Provide low tone for busy tone.

(e) Provide TOUCH-TONE dial tone.

(f) Provide audible ringing tone of 460 Hz modulated at 40 Hz superimposed on the 20 hertz output.

(g) Provide machine ringing.

(h) Provide signalling interruptions, battery operated 60 hertz inverter to power the interrupter.

(i) Provide negative 96 volts dc for operation of the "Make Busy and Busy Display" test feature.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a key sheet the information thereon is to be followed.

4.02 This circuit will function with the following PBX system circuits.

(a) Alarm, Transfer and Test Circuit - SD-66796-01

(b) 756 PBX CAD - SD-65746-01

(c) Two-way Trunk Circuits to Central Office - SD-65752-01

(d) Dial Pulse Register Circuit - SD-65742-01.

(e) -96 Volt DC Applique Circuit - SD-81920-01

SECTION IV - REASON FOR REISSUE

B. Changes in Apparatus

B.1 Removed

KS-15886,L141D Battery. APP Fig. 6

D. Description of Changes

D.1 The KS-15886,L141D lead-calcium batteries were expected to have a life time of double that of the KS-5361 lead-antimony batteries. However, recent studies indicate that their normal life is identical.

Since the KS-15886 batteries cost more than KS-5361 cells with no important advantages, the use of them has been rated "Mfr Disc."