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Colin Hinson

In the village of Blunham, Bedfordshire.

SHOCKTRAY/FILTER ASSEMBLY
LSTA-101 / PDFA-101
OPERATION and MAINTENANCE
MANUAL



MOTOROLA INC.

Government Electronics Group

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SECTION 1

INTRODUCTION

1.1 GENERAL INFORMATION

This manual describes the operation and maintenance of the LSTA-101 Shocktray/Filter assembly. The assembly's primary function is to power two LST-5/5A/5B/5C transceivers or one transceiver and one AN/CSZ-1/1A voice/data processor and a AM-7175 (200W) power amplifier from 28 Vdc aircraft power. It allows the above mentioned three equipments to be mounted on a single shock isolated platform. The LSTA-101, shown in figure 1-1, consists of a shocktray and a PDFA-101 Filter Assembly. The PDFA-101 provides aircraft power filtering and protection from power line dropouts. A KY-57 may be installed in place of a AN/CSZ-1/1A, by utilizing a KY-57 power adapter, model number LSKY-100. The weight of the LSTA-101 assembly is 12.5 pounds.

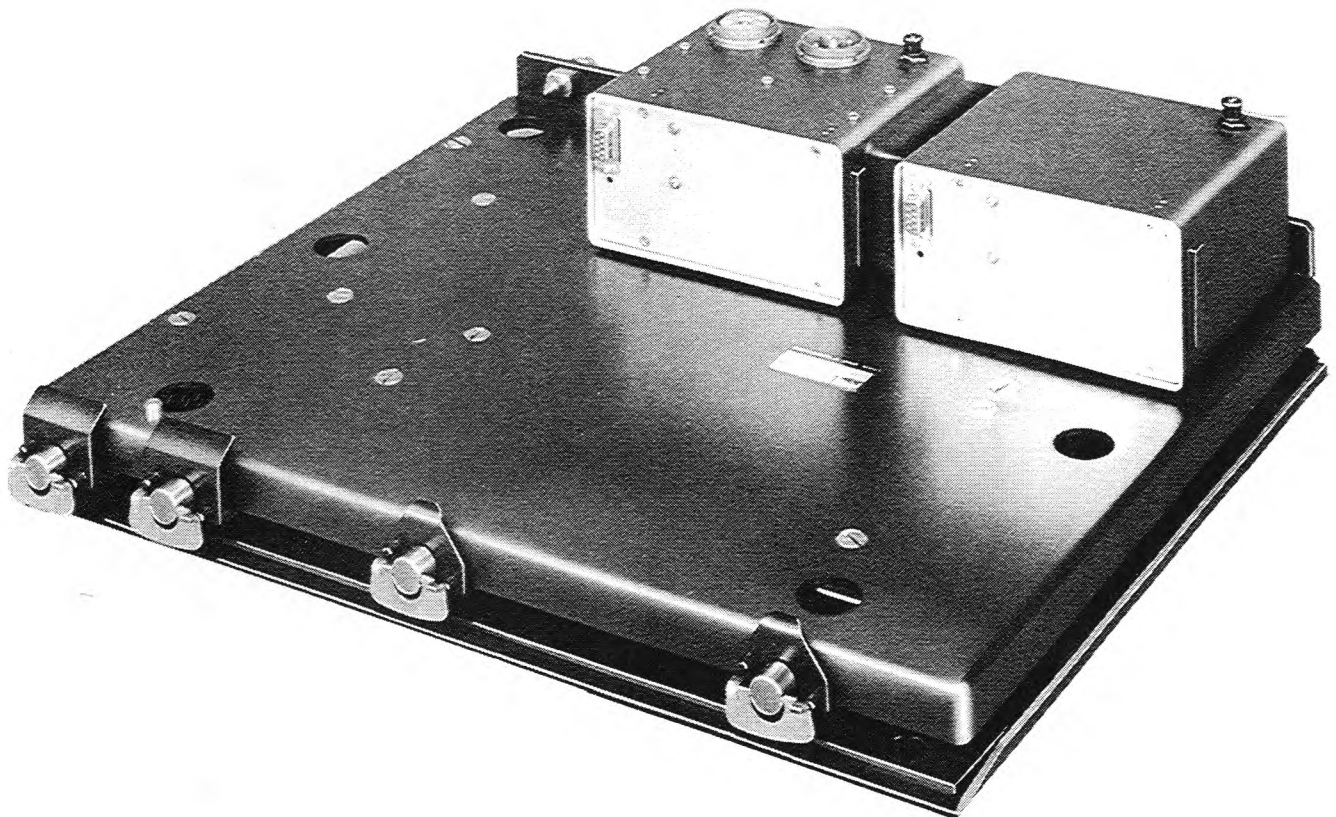


Figure 1-1. LSTA-101 Shocktray/Filter Assembly

1.2 OUTLINE DIMENSIONS AND MOUNTING HOLE LOCATIONS

Figure 1-2 provides the outline dimensions and mounting hole locations.

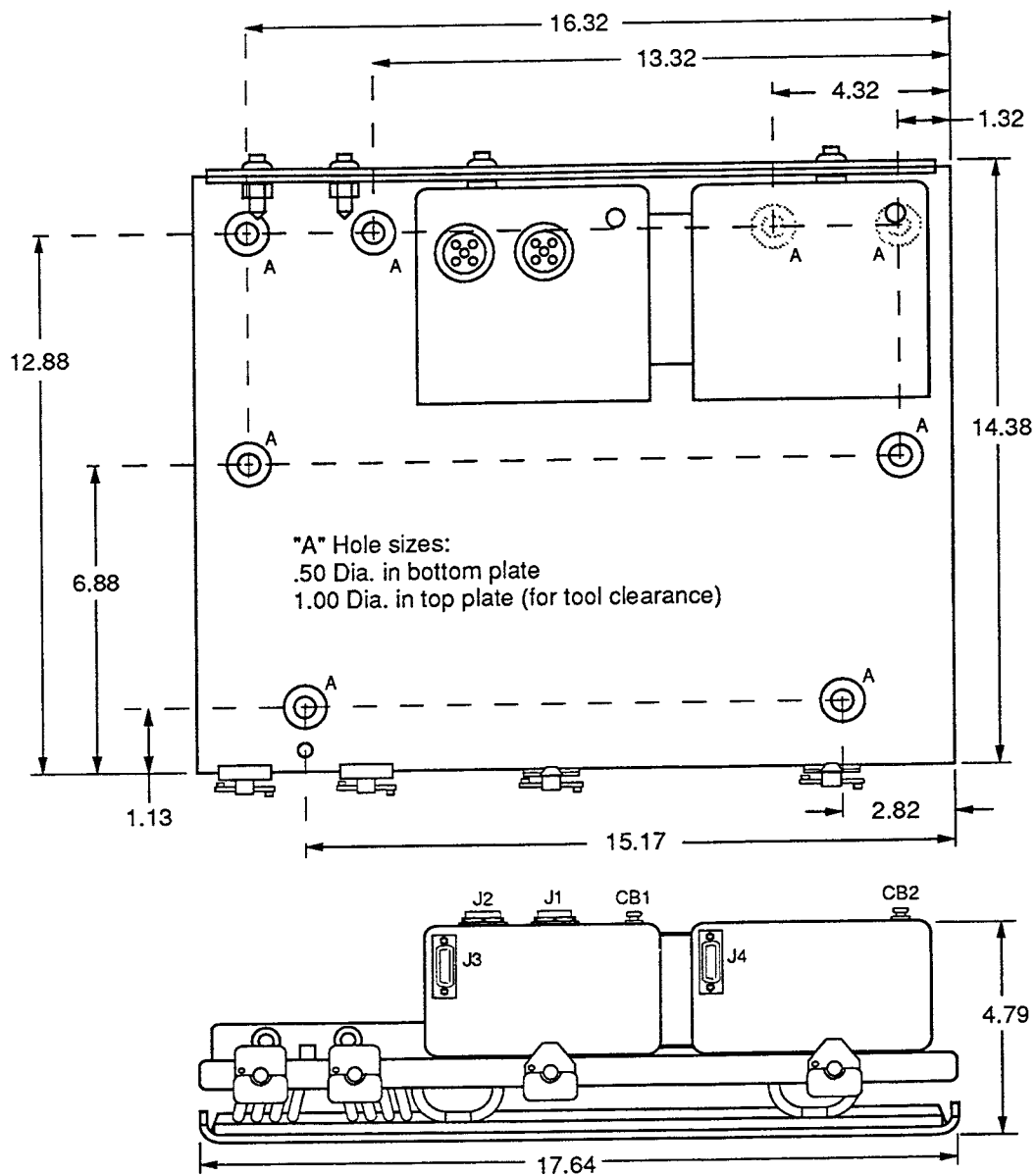


Figure 1-2. LSTA-101 Outline Dimensions

1.3 CONNECTORS AND CIRCUIT BREAKERS

Figure 1-2 also identifies the connectors and circuit breakers of the PDFA-101 Filter assembly and table 1-1 describes the function of those and identifies the mating connectors.

Table 1-1. Connectors and Circuit Breakers

CONNECTOR	FUNCTION	MATING CONNECTOR
J1	28 Vdc input from aircraft	MW10F(M)A15 Pins A & B = +28Vdc. Pins C & D = Return
J2	28 Vdc output to AM7175	MW10M(M)A15 (part of AM7175) Pins A & B = +28Vdc. Pins C & D = Return
J3, J4	28 Vdc output to LST-5x or AN/CSZ-1A	Back panel of LST-5x or AN/CSZ-1A
CIRCUIT BREAKERS	FUNCTION	
CB1, CB2	5 amp. circuit breaker for J3 and J4 outputs	

1.4 APPLICATION

Figure 1-3 shows a typical aircraft application using the LSTA-101, while figure 1-4 is the wiring diagram for that installation.

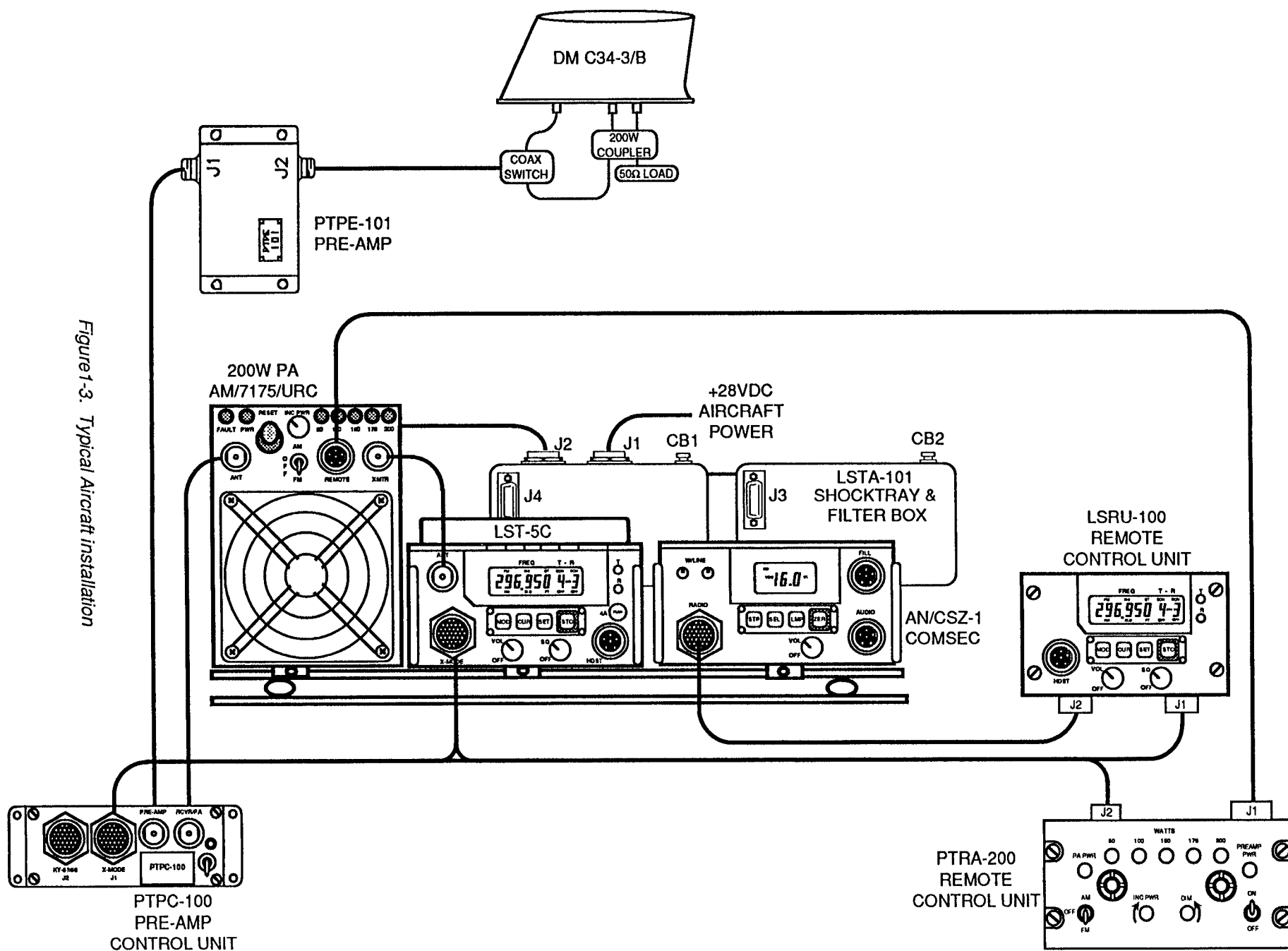
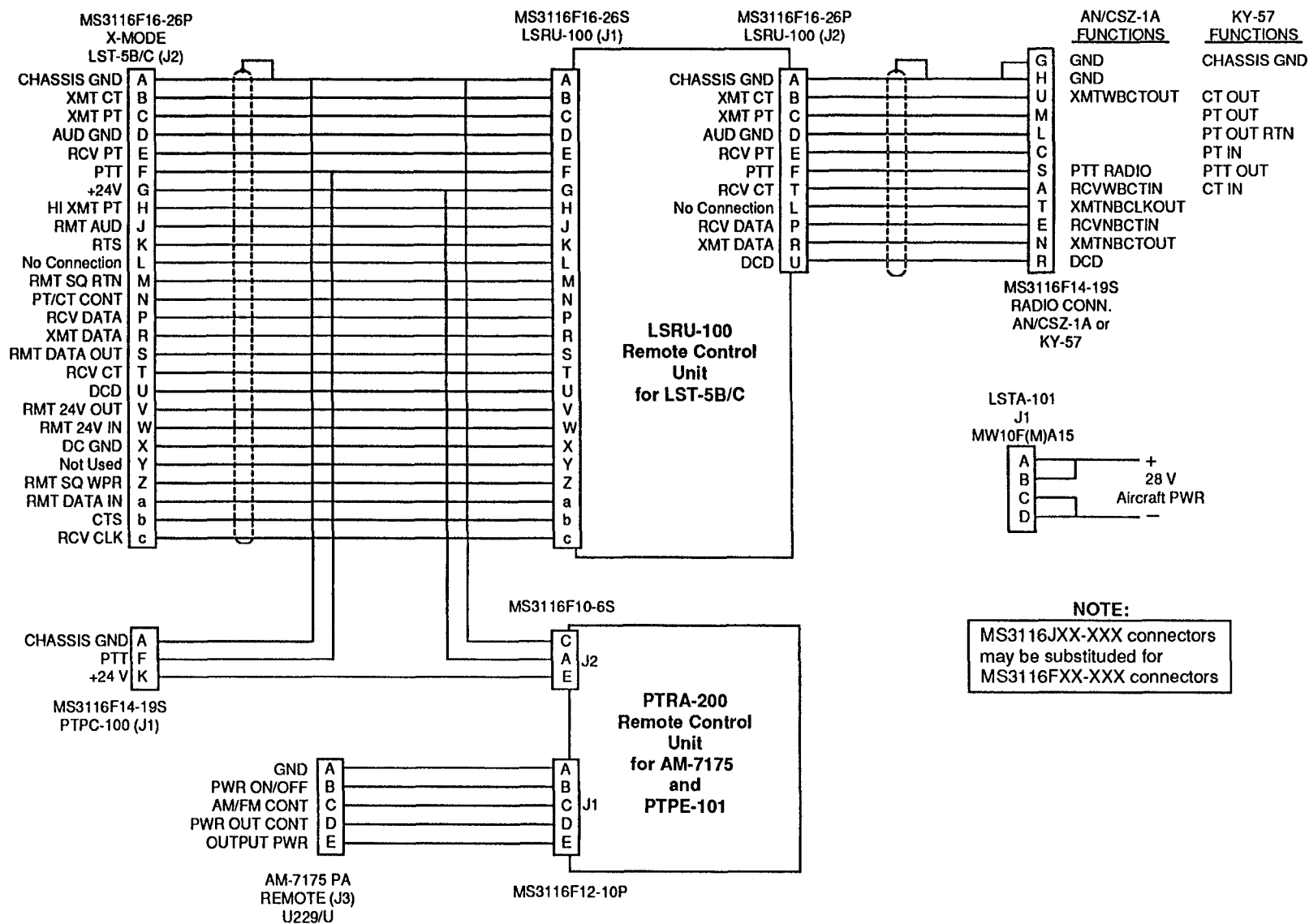


Figure 1-3. Typical Aircraft installation

Figure 1-4. Typical Aircraft Installation Wiring Diagram



SECTION 2

PDFA-101 DESCRIPTION

2.1 FUNCTIONAL DESCRIPTION

The PDFA-101 provides the electrical interface between aircraft power and the radio equipment. It takes the 28 Vdc aircraft power in at J1 and delivers it to three output connectors (J2, J3, and J4). J3 and J4 are used to power any combination of one or two of the LST-5/5A/5B/5C transceivers or AN/CSZ-1/1A voice/data processors while the J2 connector supplies power to an AM-7175/URC 200W power amplifier. Filtering is provided for the J3 and J4 connectors to make the radio system immune to power dropouts of less than 50 msec. duration. Protection against line dropouts lasting more than 50 msec. is provided by a voltage sensing/turn-on delay circuit (A1). This circuit interrupts the power to the J3 and J4 connectors and holds it off until 5 seconds after the power dropout ends. This allows the LST/CSZ equipment to reset its operating parameters after power restoration.

2.2 DETAILED DESCRIPTION

The schematic diagram Figure 2-1 is the reference document for the following description. The aircraft power comes into the PDFA-101 at J1, pin A and B are positive and pin C and D are negative. CR3 provides reverse voltage protection. L13, C1 and C2 constitute the line filter with enough capacity to maintain normal operation of the radio, even in the transmit mode, during a primary power dropout of up to 50 msec. R1 is a bleeder resistor to discharge C1 and C2 at power shutdown. Since the PDFA-101 supplies power for two radios the circuitry is duplicated. The following paragraphs describe the operation of one of the circuits (the upper half on the schematic) but the theory applies to the second circuit as well, since they are identical except for reference designators.

2.2.1 RADIO TURN-ON

The main power for the radio is applied to J3 pins 3 and 7 through relay K1 which must be energized to apply power to the radio. 28 Vdc power is present at J3-1 and is returned to J3 pin 6 when the radio is turned on. This voltage is applied to E2 of the power hold-off timer assembly, passed through R2 where it is clamped to +15 Vdc by zener diode CR2. This +15 Vdc is then used to turn on transistor Q2 after a delay of approximately 5 seconds because of the RC time-constant of R11 and C5. When Q2 turns on, Q3 also turns on, which applies 28 Vdc, through CR5 and E4 to the relay coil, causing it to energize and apply power to the radio at J3 pins 3 and 7 through 5 Amp. circuit breaker CB1.

Operational amplifier U1 is a voltage comparator, whose inverting input (pin 3) is clamped to +10 Vdc by CR2 and the voltage divider R6 and R5. The non-inverting input (pin 2) senses the supply voltage at E2 and is set at about 1/2 the supply voltage by the voltage divider consisting of R1, R4 and R13. As long as the supply voltage keeps pin 2 of U1 higher than Pin 3, the output of U1 (pin 7) will stay high and Q1 stays off. With Q1 off, capacitor C5 stays charged to +15 Vdc, Q2 and Q3 stay on and the relay remains

energized.

2.2.2 RADIO TURN-OFF

If the voltage at E2 drops because of turning the radio off or a primary power drop-out, pin 2 of U1 drops to a lower voltage than pin 3. This causes U1 pin 7 to go low and transistor Q1 turns on. With Q1 on, C5 will immediately discharge, turn Q2 and Q3 off and de-energize the relay, removing power from the radio.

When the primary voltage is restored, U1 pin 2 will again go higher than pin 3, pin 7 goes high and Q1 turns off. This allows C5 to charge up again for about 5 seconds before Q2 and Q3 come on, energize the relay and restore the radio to its previous operating mode.

2.3 MAINTENANCE DOCUMENTS

The following documents are provided for maintenance purposes:

Figure 2-1. PDFA-101 Schematic Diagram. (page 2-3)

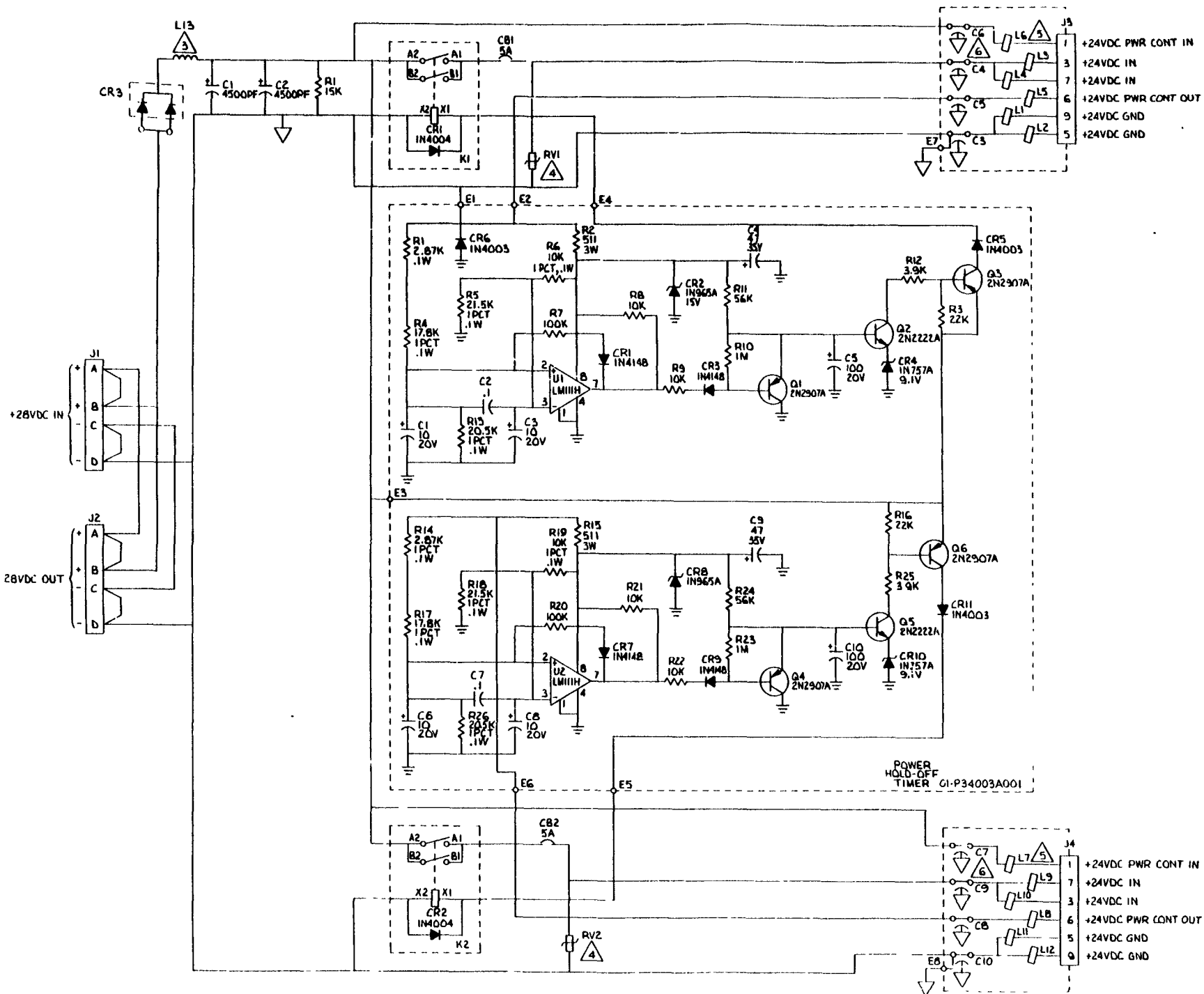
Figure 2-2. PDFA-101 Parts Location Diagram (page 2-4)

Figure 2-3. PDFA-101 Parts List. (page 2-5)

Figure 2-4. A1 Printed Wiring Board Assembly Parts (page 2-6)

Figure 2-5. A1 Printed Wiring Board Assembly Parts List. (page 2-7)

Figure 2-1 PDFA-101 Schematic Diagram





Find No.	Qty.	Part No.	Nomenclature
01-P34007A001 part list revision - H			
A1	1	01-P34003A001	PRINTED WIRING BOARD ASSEMBLY POWER HOLD-OFF TIMER
C1	1	622D452M035AA2A	CAPACITOR
C2	1	622D452M035AA2A	CAPACITOR
C3	1	M15733/61-0008	FILTER
C4	1	M15733/61-0008	FILTER
C5	1	M15733/61-0008	FILTER
C6	1	M15733/61-0008	FILTER
C7	1	M15733/61-0008	FILTER
C8	1	M15733/61-0008	FILTER
C9	1	M15733/61-0008	FILTER
C10	1	M15733/61-0008	FILTER
CB1	1	MS3320-5	CIRCUIT BREAKER
CB2	1	MS3320-5	CIRCUIT BREAKER
CR1	1	1N4004	DIODE
CR2	1	1N4004	DIODE
CR3	1	MBR12060CT	DIODE
J1	1	MW20M(M)A00	CONNECTOR
J2	1	MW20GF(M)A00	CONNECTOR
J3	1	28-P26612A001	CONNECTOR
J4	1	28-P26612A001	CONNECTOR
K1	1	M5757/23-002	RELAY
K2	1	M5757/23-002	RELAY
L13	1	TF4RX04GB	INDUCTOR
R1	1	RCRO7G153JS	RESISTOR, 15K-5%-1/4W
RV1	1	V39ZA6	VARISTOR
RV1	1	V39ZA6	VARISTOR

Figure 2-3. PDF-A-101 Parts List

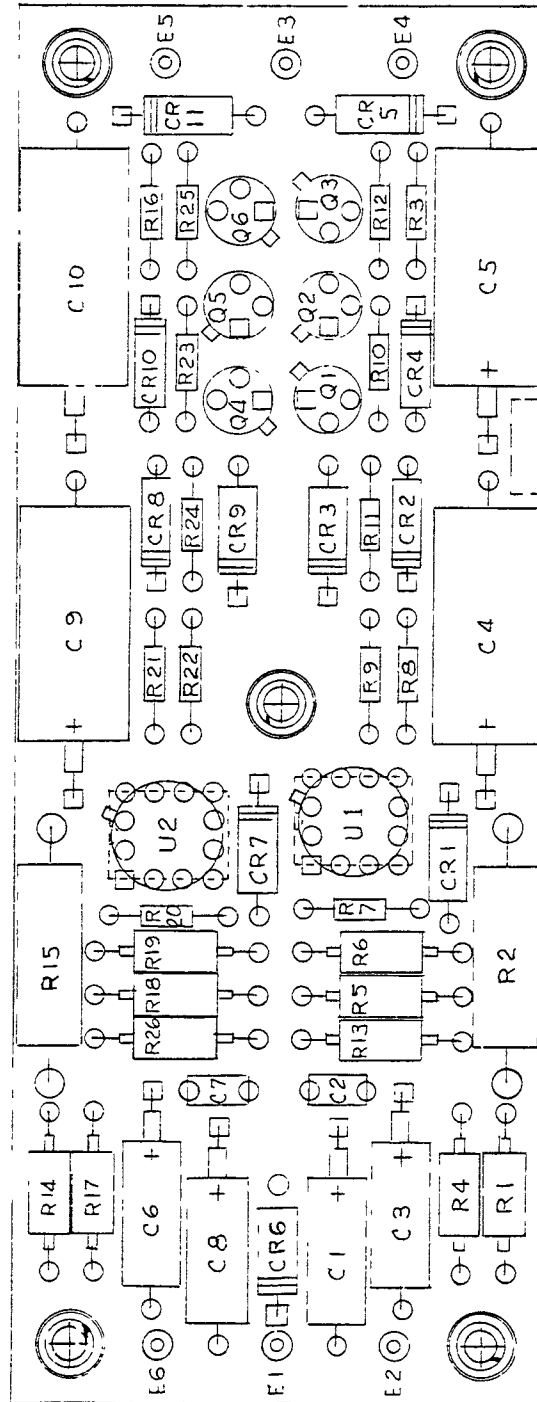


Figure 2-4 A1 Printed Wiring Board Parts Location Diagram

Find No.	Qty.	Part No.	Nomenclature
01-P34003A001 part list revision - A			
C1	1	M39003/01-2286	CAPACITOR, 10UF-10-20
C2	1	M39014/01-1593	CAPACITOR, .1UF-10-50
C3	1	M39003/01-2286	CAPACITOR, 10UF-10-20
C4	1	M39003/01-2312	CAPACITOR, 47UF-10-35
C5	1	M39003/01-2301	CAPACITOR, 100UF-10-20
C6	1	M39003/01-2286	CAPACITOR, 10UF-10-20
C7	1	M39014/01-1593	CAPACITOR, .1UF-10-50
C8	1	M39003/01-2286	CAPACITOR, 10UF-10-20
C9	1	M39003/01-2312	CAPACITOR, 47UF-10-35
C10	1	M39003/01-2301	CAPACITOR, 100UF-10-20
CR1	1	1N4148	DIODE
CR2	1	1N965A	DIODE
CR3	1	1N4148	DIODE
CR4	1	1N757A	DIODE
CR5	1	1N4003	DIODE
CR6	1	1N4003	DIODE
CR7	1	1N4148	DIODE
CR8	1	1N965A	DIODE
CR9	1	1N4148	DIODE
CR10	1	1N757A	DIODE
CR11	1	1N4003	DIODE
Q1	1	2N2907A	TRANSISTOR
Q2	1	2N2222A	TRANSISTOR
Q3	1	2N2907A	TRANSISTOR
Q4	1	2N2907A	TRANSISTOR
Q5	1	2N2222A	TRANSISTOR
Q6	1	2N2907A	TRANSISTOR
R1	1	RNC55H2871FS	RESISTOR, 2870-1-1/10
R2	1	RWR89S5110FR	RESISTOR, 511-1-3
R3	1	RCR05G223JS	RESISTOR, 22K-5-1/8
R4	1	RNC55H1782FS	RESISTOR, 17.8K-1-1/10
R5	1	RNC55H2152FS	RESISTOR, 21.5K-1-1/10
R6	1	RNC55H1002FS	RESISTOR, 10K-1-1/10
R7	1	RCR05G104JS	RESISTOR, 100K-5-1/8

Figure 2-5. A1 Printed Wiring Board Assembly Parts List.

Find No.	Qty.	Part No.	Nomenclature
R8	1	RCR05G103JS	RESISTOR, 10K-5-1/8
R9	1	RCR05G103JS	RESISTOR, 10K-5-1/8
R10	1	RCR05G105JS	RESISTOR, 1M-5-1/8
R11	1	RCR05G563JS	RESISTOR, 56K-5-1/8
R12	1	RCR05G392JS	RESISTOR, 3900-5-1/8
R13	1	RNC55H2052FS	RESISTOR, 20.5K-1-1/10
R14	1	RNC55H2871FS	RESISTOR, 2870-1-1/10
R15	1	RWR89S5110FR	RESISTOR, 511-1-3
R16	1	RCR05G223JS	RESISTOR, 22K-5-1/8
R17	1	RNC55H1782FS	RESISTOR, 17.8K-1-1/10
R18	1	RNC55H2152FS	RESISTOR, 21.5K-1-1/10
R19	1	RNC55H1002FS	RESISTOR, 10K-1-1/10
R20	1	RCR05G104JS	RESISTOR, 100K-5-1/8
R21	1	RCR05G103JS	RESISTOR, 10K-5-1/8
R22	1	RCR05G103JS	RESISTOR, 10K-5-1/8
R23	1	RCR05G105JS	RESISTOR, 1M-5-1/8
R24	1	RCR05G563JS	RESISTOR, 56K-5-1/8
R25	1	RCR05G392JS	RESISTOR, 3900-5-1/8
R26	1	RNC55H2052FS	RESISTOR, 20.5K-1-1/10
U1	1	51-P99967B424	MICROCIRCUIT
U1	1	51-P99967B424	MICROCIRCUIT

Figure 2-5. A1 Printed Wiring Board Assembly Parts List.(Continued)