



INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE ALS AND DLS POWER SUPPLIES

CAUTION

Before putting carrier equipment into service, it is recommended that the user of this equipment become acquainted with the information in these instructions. This supply module should not be removed or inserted while the cabinet is energized with dc quantities. Failure to observe this precaution can result in undesired operation or component damage.

Some components used on this module are sensitive to and can be damaged by the discharge of static electricity. Electro-static discharge precautions should be observed when handling modules or individual components.

APPLICATION

The ALS and DLS power supply modules isolate the relay system logic and sensing circuits from the station battery. The ALS module provides a source of plus and minus 15 Vdc needed by the operational amplifier and digital logic circuits, while the DLS module provides the additional +15 Vdc capacity for driving large amounts of digital logic circuits and for extra trip outputs.

CONSTRUCTION

The ALS and DLS modules are self-contained power supplies with isolated outputs. The supplies consists of an inverter, rectifier assembly or assemblies, and feed-back regulator that is sam-

pled on the main +15V supply for both the ALS and DLS modules. The -15V supply on the ALS is a shunt regulated supply.

All the circuitry for both supplies are housed in modules approximately 4.875" x 10" x 2" and have 2" panels on which are mounted power ON-OFF switches, fuses, LED indicators, test jacks, and output adjusters. Except for the connectors, the modules are completely enclosed in aluminum cases which serve both as heat sinks and RFI noise shields. Each supply requires 2 module spaces in the standard 3 rack unit chassis and is designed to fit in any position in the chassis.

RATINGS

DC Input

Nominal

48V.....	38 to 66 volts d.c. @ 2.6 Amps
125V.....	80 to 145 volts d.c. @ 1.4 Amps
250V.....	170 to 290 volts d.c. @ 0.6 Amps

DC Output

ALS Supply.....	+15 volts @ 3 Amps Max. -15 volts @ 1 Amp Max.
DLS Supply.....	+15 volts @ 4 Amps Max.

Regulation on the +15 volt supplies is ± 150 mV. Regulation on the -15 volt supplies is ± 450 mV.

NOTE: All ratings are at rated loads.

All possible contingencies which may arise during installation, operation, or maintenance, and all details and variations of this equipment do not purport to be covered by these instructions. If further information is desired by purchaser regarding his particular installation, operation or maintenance of his equipment, the local Westinghouse Electric Corporation representative should be contacted.

OPERATION

Referring to the Block Diagram Figure 1, the secondary side is to the right while the primary side is to the left. Rated DC input voltages are applied to terminals 33 for battery positive and 35 for battery negative which goes through the switch and fuses. During operation, any noise generated by the power supply or noise on the battery supply lines is attenuated by the common and differential mode noise rejection circuits. An energy storage capacitor is used to limit the effect of transitory input voltage fluctuations. The input voltage is also sensed for protection against overvoltage. The DC input light emitting diode is illuminated to indicate presence of the input voltage.

The switching signal from the control logic is applied to the pulse width modulator driver which in turn switches the primary of the transformer. The resulting secondary waveform is rectified and filtered at a sufficient voltage level that will sustain secondary circuit operation. The voltage level detection circuit disables the start up oscillator through an optical isolator and also enables the pulse width modulator circuit to produce a 27.5 kilohertz switching signal. This signal from the pulse width modulator is coupled by a second optical isolator to the primary control logic which is then applied to the pulse width modulator driver and the transformer primary is switched.

The switching frequency is always 27.5 kilohertz. However the "ON" time of the primary, which is the width of the pulse, is a function of the output voltage under load conditions. Power fold back protection operates whenever the output load demand is greater than the power supply rating. The overload condition is constantly sensed by the power fold back memory and allows normal operation once the overload condition is removed. The pulse width applied to the driver through the control logic during overload conditions is less than the pulse width under normal loads, which insures the safe operation of switching components.

DESCRIPTION

Referring to schematic drawing Figure 2A (ALS supply), the balun transformer T1 acts to

suppress any noise that is of the same phase on both leads from the battery, or from the switching supply back through the leads. D1 protects against accidental battery polarity reversal or transient battery reversal while C7, L1, and C2 suppress differential mode noise. Resistor R1 limits the inrush current to the supply and C1 stores energy to allow uninterrupted operation even when the dc input voltage experiences transients.

Z1, R9, R10, C9 and Q5 form an overvoltage shutdown circuit to limit the stress on components when subjected to prolonged overvoltage. Whenever the input voltage is too great, Z1 conducts turning on Q5, which blocks the signal at the gate of Q4 (the main switching device) through IC1, Q2, and Q3.

When the input DC voltage is applied, light emitting diode D2 is turned on. Z1, Q1, and associated circuitry will keep the startup oscillator disabled until a positive 15 volts is obtained at test point one. Once the 15 volts is there, the startup oscillator is enabled and a 25 kilohertz switching signal is applied to the control circuit IC1 pin 2. This signal is applied by IC1 to transistors Q2 and Q3, providing a low impedance source and sink to drive the gate of the mosfet Q4. Components C6, R6, and D3 form a circuit to allow core recovery of the T2 transformer. Zener diodes Z3 and Z7 prevent excessive voltage from appearing at the drain of the mosfet Q4 while R8 and C8 suppress transient ringing. Resistor R7 functions as a current sensor. When an overcurrent condition occurs at a level which is determined by the adjustment of P1, Q6 is biased on, SETTING flip flop IC2. This causes the mosfet to turn off immediately. The flip flop will remain in this state until the arrival of the next switching pulse from the pulse width modulator IC5. The arrival of this switching pulse will reset the flip flop and allowing the mosfet to conduct. If the overcurrent condition still exists the flip flop will be set again. As a result the mosfet will be switched on and off until the overcurrent condition is removed.

The conduction time of the mosfet is inversely proportional to the overcurrent magnitude. That is, the more severe the overcurrent the shorter the mosfet conduction time. This characterizes a unique feature known as power fold back in the power supply design.

Components D6, R22, C13, R23 and D7 along with a transformer winding form a circuit which provides auxiliary power to the primary side circuitry after startup. The secondary voltage is rectified by the fast recovery diodes - D9 and D10 for the negative supply and D11 and D12 for the positive supply. Filter circuits L2, C16, and L3, C19 produce the final supply voltages. During initial power up, the voltage rises on the secondary and charges capacitors C21 and C22 through D13. When this voltage rises above 10 volts, zener diode Z8 conducts turning on transistors Q7 and Q8. Q7 turns on optical isolator IC4, which disables the startup oscillator and at the same time enables the pulse width modulator IC5 to produce a switching signal at test point 9. This signal is adjusted to 27.5 kilohertz by potentiometer P2.

The positive output voltage level, which is also controlled by IC5, is adjusted to 15 volts by potentiometer P3, referred to as "OUTPUT ADJUST" on the front panel of the module. The negative 15 volts tracks the positive voltage by comparing both voltage levels in one section of operational amplifier IC6, which biases shunt regulator Q11 in order to regulate the negative 15 volt output.

The switching signal at TP9, is coupled to the primary through optical isolator IC3. The output of the optical isolator is applied to the control circuit and then to the gate drive of the mosfet.

The output voltage of the power supply is monitored for over and undervoltage. The under and overvoltage is sensed by two sections of integrated OP-AMP circuit IC6. When an unfavorable voltage level exists, pins 1 or 7 of IC6 will go low removing the base drive from Q10 thereby causing output LED D21 to turn off and alarm relay RR1 to drop out. In addition, bias is applied to transistor Q9 to drop the normal 10 volt PSME signal to a low of less than 4 volts. The PSME signal is used to control logic circuits elsewhere in the relay system.

The DLS power supply provides additional isolated +15 volt capacity for powering large numbers of digital logic circuits and for extra trip outputs. The internal schematic for the DLS is shown in Figure 2B. It does not include circuits

for the generation of -15 volts. Otherwise, the construction and circuitry is identical to that for the ALS power supply. Deleted are the shunt regulator Q11 and the tracking voltage comparator IC6. In addition, the two secondary windings of T2 are paralleled to achieve the 60 watt power capability for the +15 volt output.

ACCEPTANCE CHECK

Equipment Required:

- (a) Digital Voltmeter (DVM)
- (b) 5 ohm and 15 ohm loads for ALS supply and 3.75 ohm load for DLS supply. All loads should be rated 100 watts.

1. Input Voltage Range Check

- A. Apply rated voltage to terminals of supply.
- B. Turn on the power supply switch.
- C. The DC INPUT light should come on.
- D. Raise the input voltage to the voltage value from the table below and the DC OUTPUT light should go out:

1349D85A01, A04, A07	85V
1349D85A02, A05, A08	200V
1349D85A03, A06, A09	350V

- E. Lower the input voltage to the value from the table below and the DC OUTPUT light should remain on.

1349D85A01, A04, A07	38V
1349D85A02, A05, A08	80V
1349D85A03, A06, A09	170V

2. Output Voltage Checks

- A. Apply rated nominal voltage to the input terminals of the supply.
- B. Turn on the power supply switch.

- C. Measure the open circuit voltage at terminals 21 (+) and 31 (com) with a digital voltmeter. The voltage should be +15 VDC. "OUTPUT ADJUST" potentiometer (P3) can be used to adjust the output to +15 VDC. The -15 VDC output on the ALS supply should track the +15 volt output within $\pm .10$ volts.
- D. Next load the outputs of the supplies per the following table.

ALS Supplies

+15 volt output – 5 ohms, 100 watts – 3 Amps
 -15 volt output – 15 ohms, 100 watts – 1 Amp

DLS Supplies

+15 volt output – 3.75 ohms, 100 watts – 4 Amps

The output voltages should not change from their adjusted open circuit values by more than 0.150 volts. No alarms should occur and the DC output LED should remain lit as the load is changed from full to no load.

REPAIR CALIBRATION

NOTE: If the power supply is determined to be misoperating, it is recommended that the supply be sent back to the factory for repair. However, if repairs must be made in the field, the following test and calibration procedure should be used.

Equipment Required:

- Oscillator (Dual trace).
- Frequency Counter.
- Digital voltmeter.
- Separately adjustable +15 VDC and -15 VDC power supplies.
- 0-350 VDC power supply.
- Loads specified for the Acceptance Check.

- This portion should be done on a test bench and should be done only if it is suspected that the supply is misoperating.

Remove the cover and open at least two leads to the MOSFET Q4 (the left hand transistor when the case is open and the connector is to the right). Refer to internal schematics Figs. 2A and 2B.

- Connect the DVM between TP1 and common. Apply rated nominal input voltage to terms. 33 and 35. The DVM should measure +15 volts at TP1.
- The waveform at TP3, monitored on an oscilloscope, should be a square wave pulse train with an approximately 40% duty cycle on the positive portion at a frequency of 25000 to 26000 Hz (Fig. A). The waveform at TP2 is the inverse of that at TP3.

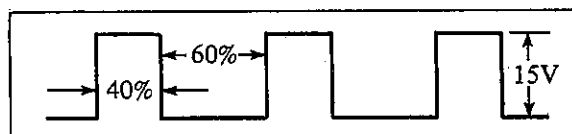


Fig. A

- Next, monitor TP3 with an oscilloscope. Jumper TP4 to TP3 and the waveform at TP3 will change to a positive duty cycle of less than 10% (Fig. B). Remove jumper and the waveform will return to the normal 40% duty cycle.

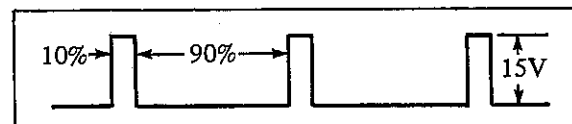


Fig. B

- Raise the input voltage to the value from the table below and the waveforms at TP2 and TP3 should disappear.

1584C88A01, A04, A07 – 85V
 1584C88A02, A05, A08 – 200V
 1584C88A03, A06, A09 – 350V

- Next, lower the input DC voltage till 9 VDC is measured at TP1 with a digital voltmeter. The startup oscillator is disabled and the waveform at TP2 will disappear.
- Turn off the input power supply.

8. For ALS (± 15 VDC) Power Supplies

- (a) With external adjustable +15 VDC and -15 VDC power supplies, apply + and - 14.5 VDC to the output terminals of the ALS supply. Use a DVM for measurement. The LED (D21) will be turned on.
- (b) Monitor TP9 with a frequency counter and adjust the frequency with potentiometer (P2) to 27.5 KHz $\pm .01$ KHz. Lower the positive voltage from +14.5 VDC to +7 VDC and the waveform at TP9 will be disabled. Bring the voltage back to +14.5 VDC.
- (c) Monitor output terminal 11 to common with a DVM. The voltage should be 13.8 VDC (± 1 VDC).
- (d) Monitor output terminal 13 to common. The voltage should be 9 VDC or greater. Increase the +14.5 VDC to +16.4 VDC. The voltage at terminal 13 will drop to 1 VDC or less and LED (D21) will turn off. Lower the +14.5 VDC to 13.4 VDC and terminal 13 will drop to 1 VDC or less and LED (D21) will turn off. Return the positive voltage to +14.5 VDC and follow the same procedure for the -14.5 VDC.

9. For DLS (+15 VDC) Power Supplies

Follow the same procedure as that in 8 (a), (b), (c), and (d) except references to -15 VDC do not apply.

10. Apply rated voltage to the input terminals while maintaining the ± 14.5 VDC for ALS

supplies and +14.5 VDC for DLS supplies at the output terminals. With an oscilloscope monitor TP11. The signal at TP11 (Fig. C) will be 27.5 KHz waveform generated by IC5 and isolated from the secondary by IC3. IC4 will shut down the startup oscillator creating a +15 VDC level at TP2.

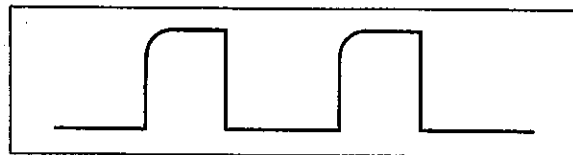


Fig. C

11. Monitor TP3 for the 27.5 KHz waveform (Fig. D).

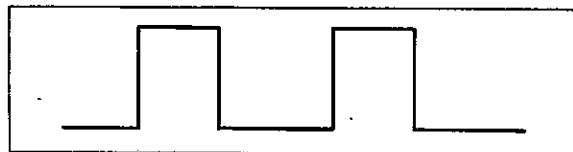
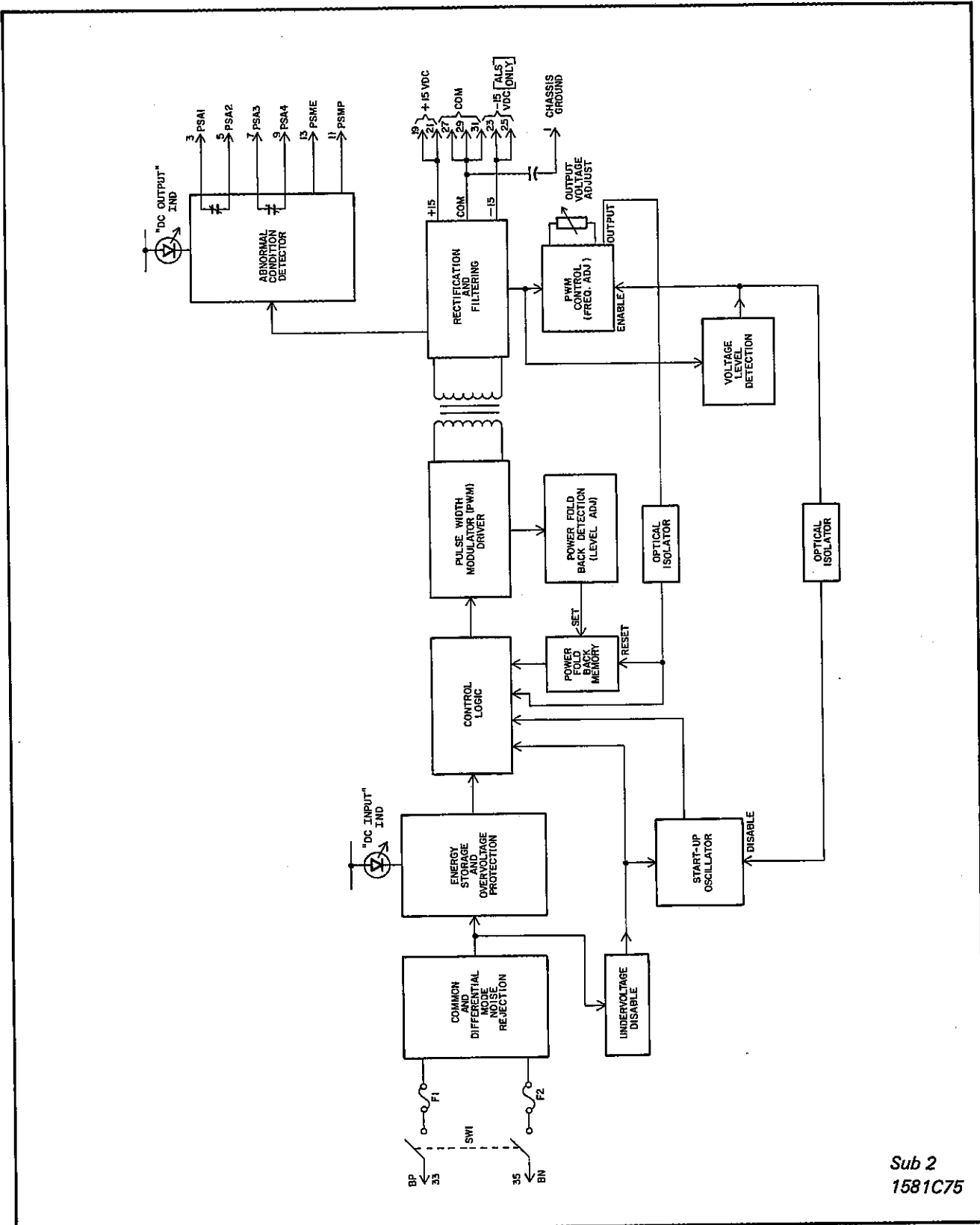


Fig. D

12. Remove all external voltage supplies and re-connect the proper leads to Q4.
13. Replace cover and then perform the Acceptance Check.

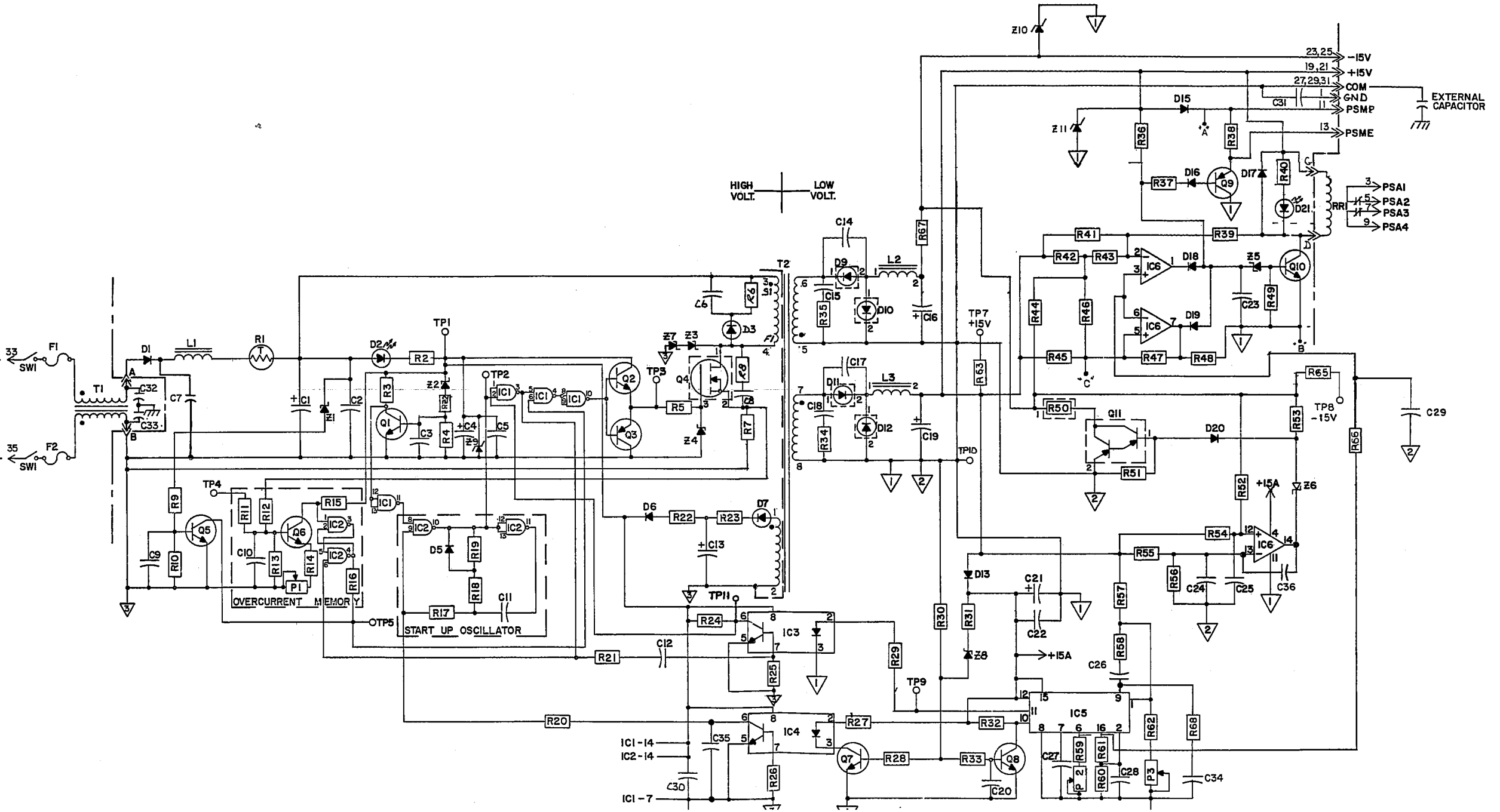
RENEWAL PARTS

Repair work can be done most satisfactorily at the factory. However, interchangeable parts can be furnished to the customers who are equipped for doing repair work. When ordering parts, always give the complete nameplate data and appropriate Westinghouse Style Number.



Sub 2
1581C75

Fig. 1. ALS/DLS Block Diagram



ALS POWER SUPPLY

STYLE NO. 1349D85A01 (48 VDC) 1349D85A07*
 STYLE NO. 1349D85A02 (125 VDC) 1349D85A08*
 STYLE NO. 1349D85A03 (250 VDC) 1349D85A09*

COMPONENT	STYLE NO.	PART NAME	DESCRIPTION
A01 A02 A03			
C001	C001	3529A07H01	CAPACITOR 210 MFD OR 220 MFD 250V 2-5/8
C002	C002	3529A07H06	CAPACITOR 95 MFD 400V 20%
C003	C003	3529A07H02	CAPACITOR 980 MFD 100V 20%
C004	C004	184A663H14	CAPACITOR .1 MFD +/-5% 500V
C005	C005	184A663H14	CAPACITOR .01 MFD 100V +/-20% CER
C006	C006	184A663H14	CAPACITOR 5 MFD +/-75 -10% 25V
C007	C007	184A663H14	CAPACITOR .1 MFD 100V +/-20% CER
C008	C008	876A09H17	CAPACITOR .47 MFD +/-5% 200V MYLAR
C009	C009	184A663H14	CAPACITOR .1 MFD +/-5% 500V
C010	C010	762A680H02	CAPACITOR 1000 PF 1KV +/- CER
C011	C011	879A911H10	CAPACITOR 470 PF 1KV +/-10% CER
C012	C012	762A680H05	CAPACITOR 1500PF +/-10% 1KV CER
C013	C013	762A680H05	CAPACITOR 470PF 1KV CER +/-10%
C014	C014	762A680H05	CAPACITOR 270 PF 500V +/-2% MICA
C015	C015	762A680H05	CAPACITOR 100 MFD +/-10% -10% 50V EL
C016	C016	762A680H05	CAPACITOR 1000 PF 1KV +/-10% CER
C017	C017	762A680H05	CAPACITOR 1500 PF 1KV +/-10% CER
C018	C018	762A680H05	CAPACITOR 590 MFD 25V EL
C019	C019	762A680H05	CAPACITOR .05UF +/-20% 100V
C020	C020	3512A08H02	CAPACITOR .22 MFD 100V
C021	C021	880A363H12	CAPACITOR 150 MFD 5% 35V
C022	C022	762A680H14	CAPACITOR .1 MFD 100V +/-20% CER
C023	C023	184A663H01	CAPACITOR .01 MFD 100V +/-20% CER
C024	C024	762A680H02	CAPACITOR 1000 PF 1KV +/- 10% CER
C025	C025	762A680H02	CAPACITOR 1000 PF 1KV +/- 10% CER
C026	C026	188A669H14	CAPACITOR .027 MFD +/-10%
C027	C027	353A468H03	CAPACITOR .01 MFD 200V +/-5% MET-POL
C028	C028	184A663H01	CAPACITOR .01 MFD 100V +/-20% CER
C029	C029	762A680H02	CAPACITOR 1000 PF 1KV +/- 10% CER
C030	C030	762A680H14	CAPACITOR .1 MFD 100V +/-20% CER
C031	C031	353A468H03	CAPACITOR .001MFD 20% 3000V CERAMIC
C032	C032	353A468H03	CAPACITOR .001 MFD 3000V 20%
C033	C033	353A468H03	CAPACITOR .001 MFD 3000V 20%
C034	C034	762A757H12	CAPACITOR 270 PF 500V +/-2% MICA
C035	C035	763A209H07	CAPACITOR 20 PF 500V 5%
C036	C036	3509A34H02	CAPACITOR .01 MFD 50V 20%
D001	D001	188A342H21	DIODE 1N5406 600 PIV 3A
D002	D002	3529A30H01	RECTIFIER 150V PIV 6A FAST RECOVERY
D003	D003	3508A22H01	DIODE-LED RED LED (EDGE MOUNT)
D004	D004	353A28H01	DIODE 600V PIV 3A EPOXY MR85
D005	D005	836A928H06	DIODE 1N4148 100V
D006	D006	837A692H03	DIODE 1N645A 225V .2 AMP
D007	D007	837A692H03	DIODE 1N645A 225V .2 AMP
D008	D008	353A29H02	DIODE 1N3881
D009	D009	353A29H02	DIODE 1N3881
D010	D010	353A29H02	DIODE 1N3881
D011	D011	353A29H02	DIODE 1N3881
D012	D012	353A29H02	DIODE 1N3881
D013	D013	837A692H03	DIODE 1N645A 225V .2 AMP
D014	D014	837A692H03	DIODE 1N645A 225V .2 AMP
D015	D015	837A692H03	DIODE 1N645A 225V .2 AMP
D016	D016	837A692H03	DIODE 1N645A 225V .2 AMP
D017	D017	837A692H03	DIODE 1N645A 225V .2 AMP
D018	D018	837A692H03	DIODE 1N645A 225V .2 AMP
D019	D019	837A692H03	DIODE 1N645A 225V .2 AMP
D020	D020	837A692H03	DIODE 1N645A 225V .2 AMP
D021	D021	3508A22H02	DIODE-LED YELLOW LED (EDGE MOUNT)
IC001	IC001	3527A09H02	INT CKT MC14011BAL QUAD-2 INPUT NAND
IC002	IC002	3527A09H02	INT CKT MC14011BAL QUAD-2 INPUT NAND
IC003	IC003	3534A93H01	INT CKT 6N136 OPTO-COUPLER
IC004	IC004	3534A93H01	INT CKT 6N136 OPTO-COUPLER
IC005	IC005	3534A92H01	INT CKT SG 1524 PULSE WIDTH MODULE
IC006	IC006	3510A61H01	INT CKT LM 224 QUAD COMPARATOR
L001	L001	3516A94H01	CHOKES 68 UH 5A
L002	L002	3535A63G01	CHOKES 1.28 MH
L003	L003	3535A63G02	CHOKES 1.28 MH
P001	P001	3523A42H03	POTENTIOMETER VAR. 1K OHM 10T (TOP ADJ.)
P002	P002	3502A17H07	POTENTIOMETER 2 K 25T POT (TOP ADJUST)
P003	P003	3529A31H01	POTENTIOMETER 500 OHM 1T POT (SIDE ADJ.)
Q001	Q001	762A672H15	TRANSISTOR 2N2222A, NPN
Q002	Q002	762A672H15	TRANSISTOR 2N2222A, NPN
Q003	Q003	762A672H17	TRANSISTOR 2N2907A, PNP
Q004	Q004	3529A20H02	TRANSISTOR 2N2907A, PNP
Q005	Q005	3529A20H01	TRANSISTOR 2N2907A, PNP
Q006	Q006	762A672H15	TRANSISTOR 2N2222A, NPN
Q007	Q007	762A672H15	TRANSISTOR 2N2222A, NPN
Q008	Q008	762A672H15	TRANSISTOR 2N2222A, NPN
Q009	Q009	762A672H17	TRANSISTOR 2N2907A, PNP
Q010	Q010	762A672H15	TRANSISTOR 2N2222A, NPN
Q011	Q011	3529A21H01	TRANSISTOR 2N2222A, NPN
R001	R001	182A879H02	RESISTOR 10 OHM 4A
R002	R002	187A642H63	RESISTOR 33K 5% 2W
R003	R003	187A642H55	RESISTOR 15K 5% 2W C.C.
R004	R004	3529A27H01	RESISTOR 2 K 5% 2W M.F.
R005	R005	629A531H60	RESISTOR 100K 2% 1/2W M.G.
R006	R006	862A374H47	RESISTOR 10K 2% .50W M.G.
R007	R007	3529A22H02	RESISTOR 30.1 OHM 1% 1W
R008	R008	3529A29H03	RESISTOR 500 OHM 1% 10W
R009	R009	3529A29H01	RESISTOR .4 OHM 5W
R010	R010	3529A29H02	RESISTOR .1 OHM 5W
R011	R011	863A174H30	RESISTOR .2 OHM 5W
R012	R012	863A174H01	RESISTOR 250 OHM 1% 5W MIN, WIRE WOUND
R013	R013	863A175H01	RESISTOR 2 K 2% .50W M.G.
R014	R014	863A174H18	RESISTOR 10K 1% .25W
R015	R015	863A175H97	RESISTOR 2 K 1% .25W
R016	R016	863A175H30	RESISTOR 1 K 1% .25W
R017	R017	863A175H30	RESISTOR 10K 1% .25W
R018	R018	863A175H69	RESISTOR 1.5K 1% .25W
R019	R019	863A175H47	RESISTOR 100 K 1% .25W
R020	R020	836A175H30	RESISTOR 20K 1% .25W
R021	R021	863A174H01	RESISTOR 20K 1% .25W
R022	R022	629A531H36	RESISTOR 1.5K 2% .50W M.G.
R023	R023	862A374H01	RESISTOR 10 OHM 1% 1W
R024	R024	863A175H01	RESISTOR 10K 1% .25W
R025	R025	848A822H27	RESISTOR 750K 1% .25W M.F.
R026	R026	848A822H27	RESISTOR 750K 1% .25W M.F.
R027	R027	848A819H48	RESISTOR 1 K 1% .50W M.F.
R028	R028	863A173H18	RESISTOR 150 OHM 1% .25W
R029	R029	863A174H30	RESISTOR 2 K 1% .25W
R030	R030	629A531H27	RESISTOR 620 OHM 2% .50W M.F.
R031	R031	863A174H01	RESISTOR 1 K 1% .25W
R032	R032	863A175H30	RESISTOR 750 OHM 1% .25W
R033	R033	863A174H30	RESISTOR 20K 1% .252W
R034	R034	848A818H51	RESISTOR 2 K 1% .25W
R035	R035	848A818H51	RESISTOR 100 OHM 1% .25W M.F.
R036	R036	863A174H01	RESISTOR 1 K 1% .25W
R037	R037	848A819H19	RESISTOR 499.0 1% .25W
R038	R038	863A173H81	RESISTOR 681 OHM 1% .25W
R039	R039	836A909H40	RESISTOR 1.5M 5% .25W C.C.
R040	R040	863A174H43	RESISTOR 2.74K 1% .25W
R041	R041	863A175H62	RESISTOR 43.2K 1% .25W
R042	R042	763A126H55	RESISTOR 470 OHM 1% 3W W.W.
R043	R043	863A175H30	RESISTOR 20K 1% .252W
R044	R044	763A126H55	RESISTOR 470 OHM 1% 3W W.W.
R045	R045	863A175H58	RESISTOR 39.2K 1% .25W
R046	R046	863A175H34	RESISTOR 22.1K 1% .25W
R047	R047	836A909H40	RESISTOR 1.5M 5% .25W C.C.
R048	R048	863A174H01	RESISTOR 1 K 1% .25W
R049	R049	863A175H01	RESISTOR 10K 1% .25W
R050	R050	3529A22H01	RESISTOR 25 OHM 1% 10W
R051	R051	863A173H85	RESISTOR 750 OHM 1% .25W
R052	R052	353A473H03	RESISTOR 20K 1% .25W M.F.
R053	R053	863A174H30	RESISTOR 2 K 1% .25W
R054	R054	353A473H02	RESISTOR 10K OHM 1% .25W M.F.
R055	R055	353A473H03	RESISTOR 20K 1% .25W M.F.
R056	R056	353A473H02	RESISTOR 10K OHM 1% .25W M.F.
R057	R057	863A175H18	RESISTOR 15K 1% .25W
R058	R058	863A175H50	RESISTOR 32.4K 1% .25W
R059	R059	863A174H01	RESISTOR 1 K 1% .25W
R060	R060	863A174H69	RESISTOR 5.11K 1% .25W
R061	R061	863A174H69	RESISTOR 5.11K 1% .25W
R062	R062	863A174H43	RESISTOR 2.74K 1% .25W
R063	R063	863A174H01	RESISTOR 1 K 1% .25W
R064	R064	863A174H01	RESISTOR 1 K 1% .25W
R065	R065	863A175H01	RESISTOR 10K 1% .25W
R066	R066	3529A29H02	RESISTOR .2 OHM 5W
R067	R067	353A398H69	RESISTOR 511 OHM 25W 1%
R068	R068	863A175H01	RESISTOR 10K 1% .25W
RR1	RR1	3529A08H01	REED RELAY
T001	T001	3535A73H01	TRANSFORMER RENCO 1361-2-270
T002	T002	1586C64G04	TRANSF. COIL
T003	T003	1586C64G06	TRANSF. COIL
Z001	Z001	187A936H17	ZENER DIODE 1N3050B 180V 1W
Z002	Z002	837A693H18	ZENER DIODE UZ5234 340V 10%
Z003	Z003	849A487H05	ZENER DIODE 1N4761A 75V 1W
Z004	Z004	186A979H10	ZENER DIODE 1N960B (9.1V)
Z005	Z005	878A619H01	ZENER DIODE UZ 1N5388A 200V 10%
Z006	Z006	878A619H01	ZENER DIODE UZ5234 340V 10%
Z007	Z007	187A936H13	ZENER DIODE 1N3049B 160V 1W
Z008	Z008	836A288H05	ZENER DIODE 1N966B 16V .50W
Z009	Z009	837A398H12	ZENER DIODE 1N959B (8.2V) .5W
Z010	Z010	837A398H12	DIODE 1N959B ZENER 8.2V .50W
Z011	Z011	837A693H17	ZENER DIODE UZ5240 400V 10%
Z012	Z012	837A398H12	ZENER DIODE 1N959B (8.2V) .5W
Z013	Z013	862A288H04	ZENER DIODE 1N532B 15V 5W
Z014	Z014	862A288H11	ZENER DIODE 1N534B 17V 5W
Z015	Z015	862A288H11	ZENER DIODE 1N534B 17V 5W

* SAME AS A01, A02, A03 EXCEPT R67 IS
 0.502 OHMS, 3W, RESISTOR

Fig. 2B. ALS Power Supply Parts List

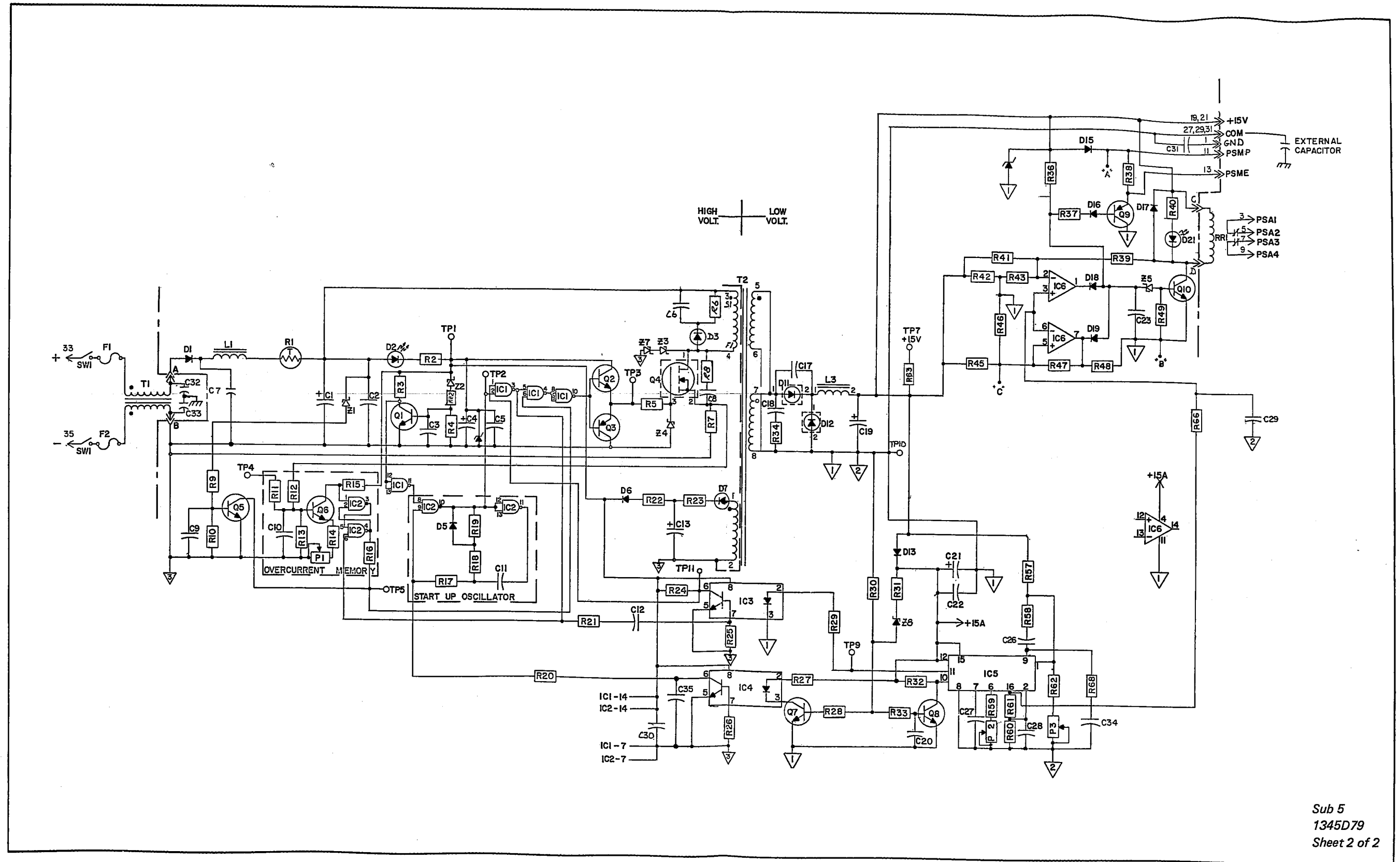


Fig. 3A. Internal Schematic DLS

Sub 5
1345D79
Sheet 2 of 2

DLS POWER SUPPLY

STYLE NO. 1349D85A04 (48 VDC)
STYLE NO. 1349D85A05 (125 VDC)
STYLE NO. 1349D85A06 (250 VDC)

COMPONENT			STYLE NO.	PART NAME	DESCRIPTION																	
A04	A05	A06				IC001	IC001	IC001	3527A09H02	INT	CKT	MC14011BAL	QUAD-2	INPUT	NAND		R028	R028	R028	863A173H18	RESISTOR	150 OHM 1% .25W
						IC002	IC002	IC002	3527A09H02	INT	CKT	MC14011BAL	QUAD-2	INPUT	NAND		R028	R028	R028	863A174H30	RESISTOR	2 K 1% .25W
						IC003	IC003	IC003	3534A93H01	INT	CKT	6N136	OPTP-COUPLER				R029	R029	R029	629A531H27	RESISTOR	620 OHM 2% .50W M.F.
						IC004	IC004	IC004	3534A93H01	INT	CKT	6N136	OPTP-COUPLER				R030	R030	R030	863A174H01	RESISTOR	1 K 1% .25W
						IC005	IC005	IC005	3534A92H01	INT	CKT	SC 1524	PULSE WIDTH MODULE				R031	R031	R031	863A173H85	RESISTOR	750 OHM 1% .25W
						IC006	IC006	IC006	3510A61H01	INT	CKT	LM 224	QUAD COMPARATOR				R032	R032	R032	863A175H30	RESISTOR	20K 1% .252W
																	R033	R033	R033	863A174H30	RESISTOR	2 K 1% .25W
						L001	L001	L001	3516A94H01	CHOKE		68 UH 5A					R034	R034	R034	848A818H51	RESISTOR	100 OHM 1% .25W M.F.
						L003	L003	L003	3535A63G02	CHOKE		1.28 MH					R036	R036	R036	863A174H01	RESISTOR	1 K 1% .25W
																	R037	R037	R037	848A819H19	RESISTOR	499.0 1% .25W
						P001	P001	P001	3523A42H03	POTENTIOM'TR		VAR. 1K OHM 10T (TOP ADJ.)					R038	R038	R038	863A173H81	RESISTOR	681 OHM 1% .25W
						P002	P002	P002	3502A17H07	POTENTIOM'TR		2 K 25T POT (TOP ADJUST)					R039	R039	R039	836A909H40	RESISTOR	1.5M 5% .25W C.C.
						P003	P003	P003	3529A31H01	POTENTIOM'TR		500 OHM 1T POT (SIDE ADJ.)					R040	R040	R040	863A174H43	RESISTOR	2.74K 1% .25W
																	R041	R041	R041	863A175H62	RESISTOR	43.2K 1% .25W
						Q001	Q001	Q001	762A672H15	TRANSISTOR		2N2222A, NPN					R042	R042	R042	763A126H55	RESISTOR	470 OHM 1% 3W W.W.
						Q002	Q002	Q002	762A672H15	TRANSISTOR		2N2222A, NPN					R043	R043	R043	863A175H30	RESISTOR	20K 1% .252W
						Q003	Q003	Q003	762A672H17	TRANSISTOR		2N2907A, PNP					R045	R045	R045	863A175H58	RESISTOR	39.2K 1% .25W
																	R046	R046	R046	863A175H34	RESISTOR	22.1K 1% .25W
						Q004			3529A2H0H2	TRANSISTOR		WTFM360					R047	R047	R047	836A909H40	RESISTOR	1.5M 5% .25W C.C.
									3529A19H01	TRANSISTOR		IRF342					R048	R048	R048	863A174H01	RESISTOR	1 K 1% .25W
						Q005	Q005	Q005	762A672H15	TRANSISTOR		2N2222A, NPN					R049	R049	R049	863A175H01	RESISTOR	10K 1% .25W
						Q006	Q006	Q006	762A672H15	TRANSISTOR		2N2222A, NPN					R057	R057	R057	863A175H18	RESISTOR	15K 1% .25W
						Q007	Q007	Q007	762A672H15	TRANSISTOR		2N2222A, NPN					R058	R058	R058	863A175H50	RESISTOR	32.4K 1% .25W
						Q008	Q008	Q008	762A672H15	TRANSISTOR		2N2222A, NPN					R059	R059	R059	863A174H01	RESISTOR	1 K 1% .25W
						Q009	Q009	Q009	762A672H17	TRANSISTOR		2N2907A, PNP					R060	R060	R060	863A174H69	RESISTOR	5.11K 1% .25W
						Q010	Q010	Q010	762A672H15	TRANSISTOR		2N2222A, NPN					R061	R061	R061	863A174H69	RESISTOR	5.11K 1% .25W
																	R062	R062	R062	863A174H43	RESISTOR	2.74K 1% .25W
																	R063	R063	R063	863A174H01	RESISTOR	1 K 1% .25W
																	R066	R066	R066	863A175H01	RESISTOR	10K 1% .25W
																	R068	R068	R068	3535A39H69	RESISTOR	511 OHM .25W 1%
																	R022	R022	R022	863A175H01	RESISTOR	10K 1% .25W
						R002			187A642H63	RESISTOR		15K 5% 2W C.C.										
									187A642H55	RESISTOR		100K 2% 1/2W M.G.										
									3529A27H01	RESISTOR		10K 2% .50W M.G.										
						R003	R003	R003	629A531H80	RESISTOR		500 OHM 1% 1W										
						R004	R004	R004	629A531H56	RESISTOR		.4 OHM 5W										
						R005	R005	R005	862A374H47	RESISTOR		1 OHM 5W										
						R006	R006	R006	3529A22H02	RESISTOR		.2 OHM 5W										
									3529A29H03	RESISTOR		2 OHM 5W										
						R007			3529A29H01	RESISTOR		250 OHM 1% 5W MIN, WIRE WOUND										
						R008	R008	R008	3529A28H01	RESISTOR		2 K 2% .50W M.G.										
						R009	R009	R009	629A531H39	RESISTOR		10K 1% .25W										
						R010	R010	R010	863A175H01	RESISTOR		2 K 1% .25W										
						R011	R011	R011	863A174H30	RESISTOR		1 K 1% .25W										
						R012	R012	R012	863A174H01	RESISTOR		1 K 1% .25W										
						R013	R013	R013	863A175H01	RESISTOR		10K 1% .25W										
						R014	R014	R014	863A174H18	RESISTOR		1.5K 1% .25W										
						R015	R015	R015	863A175H97	RESISTOR		100 K 1% .25W										
						R016	R016	R016	863A175H30	RESISTOR		20K 1% .252W										
						R017	R017	R017	863A175H30	RESISTOR		20K 1% .252W										
						R018	R018	R018	863A175H69	RESISTOR		51.1K 1% .25W										
						R019	R019	R019	863A175H47	RESISTOR		30.1K 1% .25W										
						R020	R020	R020	836A175H30	RESISTOR		20K 1% .25W										
						R021	R021	R021	863A174H01	RESISTOR		1 K 1% .25W										
						R022	R022	R022	629A531H36	RESISTOR		1.5K 2% .50W M.G.										
						R023	R023	R023	862A374H01	RESISTOR		10 OHM 1% 1W.										
						R024	R024	R024	863A175H01	RESISTOR		10K 1% .25W										
						R025	R025	R025	848A822H27	RESISTOR		750K 1% .25W M.F.										
						R026	R026	R026	848A822H27	RESISTOR		750K 1% .25W M.F.										
						R027	R027	R027	848A819H48	RESISTOR		1 K 1% .50W M.F.										

Fig. 3B DLS Power Supply Parts List

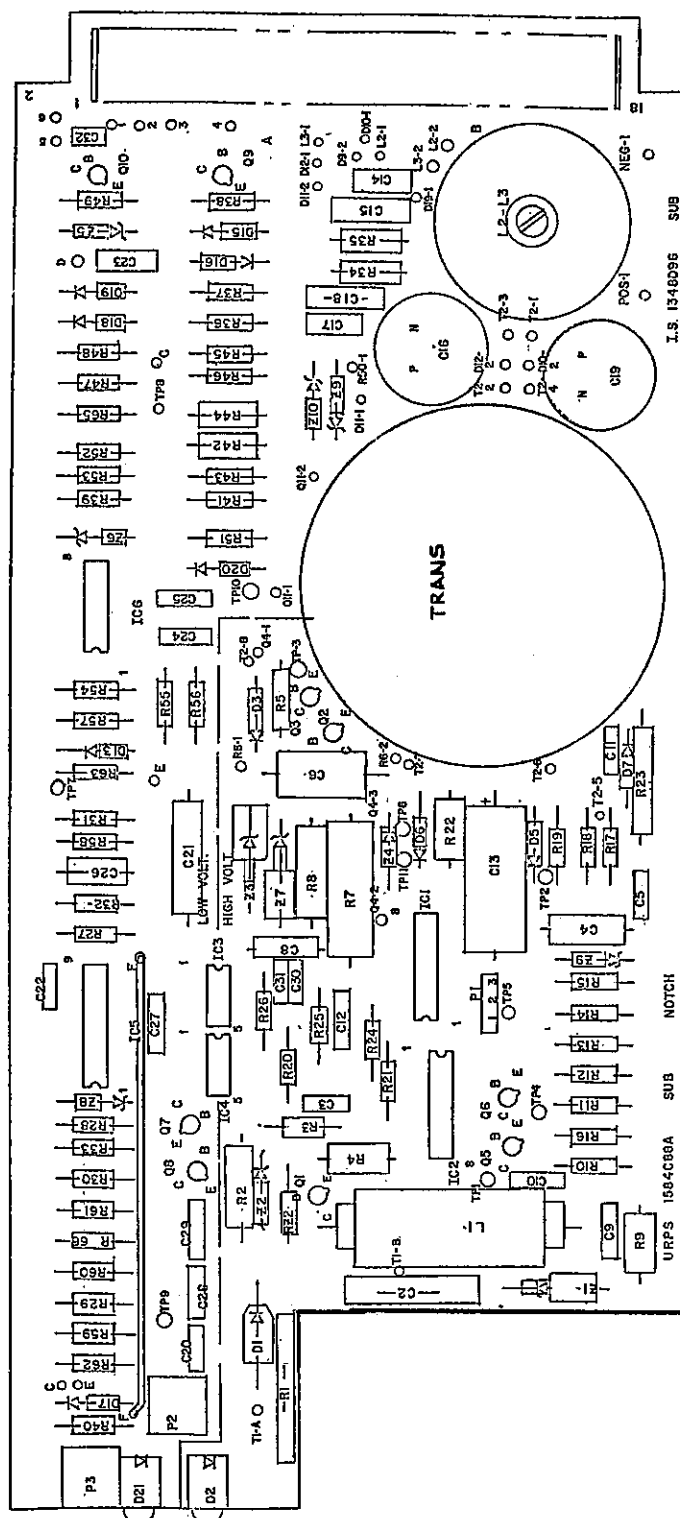


Fig. 4. Component Location

Sub 1
1488B42

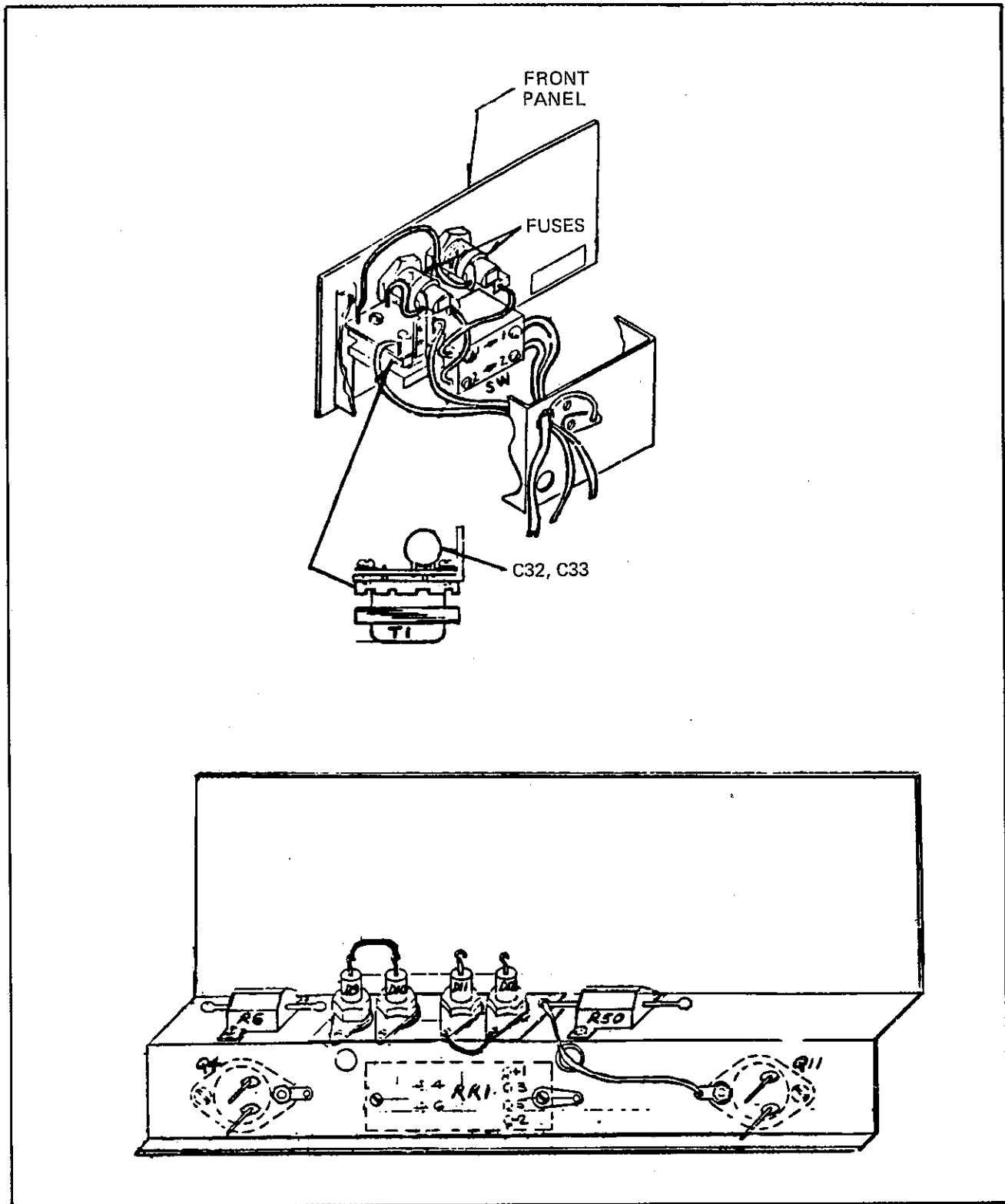


Fig. 5. Location of Components off the PC Board



INSTALLATION • OPERATION • MAINTENANCE
INSTRUCTIONS

TYPE ALS AND DLS POWER SUPPLIES

This addendum reflects changes to the electrical parts lists on pages 9 and 10 for ALS and pages 13 and 14 for DLS Power Supply. Changes are identified by (*).

ADDENDUM TO IL 41-830.11

EFFECTIVE OCTOBER 1986

All possible contingencies which may arise during installation, operation, or maintenance, and all details and variations of this equipment do not purport to be covered by these instructions. If further information is desired by purchaser regarding his particular installation, operation or maintenance of his equipment, the local Westinghouse Electric Corporation representative should be contacted.

WESTINGHOUSE ELECTRIC CORPORATION
RELAY AND TELECOMMUNICATIONS DIVISION

CORAL SPRINGS, FL 33065

Printed in U.S.A.

ALS POWER SUPPLY

STYLE NO. 1349D85A(48 VDC) 1349D85A07*
 STYLE NO. 1349D85A(125 VDC) 1349D85A08*
 STYLE NO. 1349D85A(250 VDC) 1349D85A09*

COMPONENT			STYLE NO.	PART NAME	DESCRIPTION
A01	A02	A03			
	C001		3529A07H01	CAPACITOR	210 MFD OR 220 MFD 250V 2-5/8
		C001	3529A07H06	CAPACITOR	95 MFD 400V 20%
C001	C001	C001	3529A07H02	CAPACITOR	980 MFD 100V 20%
C002	C002	C002	184A663H14	CAPACITOR	.1 MFD +/-5% 500V
C003	C003	C003	184A663H01	CAPACITOR	.01 MFD 100V +20% CER
C004	C004	C004	186A341H07	CAPACITOR	5 MFD +75 -10% 25V
C005	C005	C005	762A680H14	CAPACITOR	.1 MFD 100V +/-20% CER
C006	C006	C006	876A09H17	CAPACITOR	.47 MFD +/-5% 200V MYLAR
C007	C007	C007	184A663H14	CAPACITOR	.1 MFD +/-5% 500V
C008	C008	C008	762A680H02	CAPACITOR	1000 PF 1KV +/- CER
C009	C009	C009	879A911H10	CAPACITOR	470 PF 1KV +/-10% CER
	C010		762A757H11	CAPACITOR	200PF 1KV +/-10% CER
			880A397H08	CAPACITOR	1200PF +/-10% 1KV CER
		C010	879A911H10	CAPACITOR	470PF 1KV CER +/-10%
C011	C011	C011	762A757H12	CAPACITOR	270 PF 500V +/-2% MICA
C012	C012	C012	763A209H25	CAPACITOR	5 PF 500V +/-10% MICA
C013	C013	C013	3535A92H01	CAPACITOR	100 MFD +100 -10% 50V EL
C014	C014	C014	762A680H02	CAPACITOR	1000 PF 1KV +/-10% CER
C015	C015	C015	762A680H05	CAPACITOR	1500 PF 1KV +/-10% CER
C016	C016	C016	3529A32H01	CAPACITOR	590 MFD 25V EL
C017	C017	C017	762A680H02	CAPACITOR	1000 PF 1KV +/-10% CER
C018	C018	C018	762A680H05	CAPACITOR	1500 PF 1KV +/-10% CER
C019	C019	C019	3529A32H01	CAPACITOR	590 MFD 25V EL
	C020	C020	3512A08H02	CAPACITOR	.22 MFD 100V
C020			184A663H02	CAPACITOR	.05UF +/-20% 100V
C021	C021	C021	880A363H12	CAPACITOR	150 MFD 5% 35V
C022	C022	C022	762A680H14	CAPACITOR	.1 MFD 100V +/-20% CER
C023	C023	C023	184A663H01	CAPACITOR	.01 MFD 100V +20% CER
C024	C024	C024	762A680H02	CAPACITOR	1000 PF 1KV +/- 10% CER
C025	C025	C025	762A680H02	CAPACITOR	1000 PF 1KV +/- 10% CER
C026	C026	C026	188A669H14	CAPACITOR	.027 MFD +/-10%
C027	C027	C027	3534A68H03	CAPACITOR	.01 MFD 200V +/-5% MET-POL
C028	C028	C028	184A663H01	CAPACITOR	.01 MFD 100V +20% CER
C029	C029	C029	762A680H02	CAPACITOR	1000 PF 1KV +/- 10% CER
C030	C030	C030	762A680H14	CAPACITOR	.1 MFD 100V +/-20% CER
C031	C031	C031	3536A32H01	CAPACITOR	.001MF 20% 3000V CERAMIC
C032	C032	C032	3536A32H01	CAPACITOR	.001 MFD 3000V 20%
C033	C033	C033	3536A32H01	CAPACITOR	.001 MFD 3000V 20%
C034	C034	C034	762A757H12	CAPACITOR	270 PF 500V +/-2% MICA
C035	C035	C035	763A209H07	CAPACITOR	20 PF 500V 5%
C036	C036	C036	3509A34H02	CAPACITOR	.01 MFD 50V 20%
	D001	D001	188A342H21	DIODE	1N5406 600 PIV 3A
D001			3529A30H01	RECTIFIER	150V PIV 6A FAST RECOVERY
D002	D002	D002	3508A22H01	DIODE-LED	RED LED (EDGE MOUNT)
D003	D003	D003	3535A28H01	DIODE	600V PIV 3A EPOXY MR85
D005	D005	D005	836A928H06	DIODE	1N4148 100V
D006	D006	D006	837A692H03	DIODE	1N645A 225V .2 AMP
D007	D007	D007	837A692H03	DIODE	1N645A 225V .2 AMP
D009	D009	D009	3535A29H02	DIODE	1N3881
D010	D010	D010	3535A29H02	DIODE	1N3881
D011	D011	D011	3535A29H02	DIODE	1N3881
D012	D012	D012	3535A29H02	DIODE	1N3881
D013	D013	D013	837A692H03	DIODE	1N645A 225V .2 AMP
D015	D015	D015	837A692H03	DIODE	1N645A 225V .2 AMP
D016	D016	D016	837A692H03	DIODE	1N645A 225V .2 AMP
D017	D017	D017	837A692H03	DIODE	1N645A 225V .2 AMP
D018	D018	D018	837A692H03	DIODE	1N645A 225V .2 AMP
D019	D019	D019	837A692H03	DIODE	1N645A 225V .2 AMP
D020	D020	D020	837A692H03	DIODE	1N645A 225V .2 AMP
D021	D021	D021	3508A22H02	DIODE-LED	YELLOW LED (EDGE MOUNT)
IC001	IC001	IC001	3527A09H02	INT CKT	MC14011BAL QUAD-2 INPUT NAND
IC002	IC002	IC002	3527A09H02	INT CKT	MC14011BAL QUAD-2 INPUT NAND
IC003	IC003	IC003	3534A93H01	INT CKT	6N136 OPTP-COUPLER
IC004	IC004	IC004	3534A93H01	INT CKT	6N136 OPTP-COUPLER
IC005	IC005	IC005	3534A92H01	INT CKT	SG 1524 PULSE WIDTH MODULE
IC006	IC006	IC006	3510A61H01	INT CKT	LM 224 QUAD COMPARATOR
L001	L001	L001	3516A94H01	CHOKE	68 UH 5A
L002	L002	L002	3535A63G01	CHOKE	1.28 MH
L003	L003	L003	3535A63G02	CHOKE	1.28 MH
P001	P001	P001	3523A42H03	POTENTM'TR	VAR. 1K OHM 10T (TOP ADJ.)
P002	P002	P002	3502A17H07	POTENTM'TR	2 K 25T POT (TOP ADJUST)
P003	P003	P003	3529A31H01	POTENTM'TR	500 OHM 1T POT (SIDE ADJ.)
Q001	Q001	Q001	762A672H15	TRANSISTOR	2N2222A, NPN
Q002	Q002	Q002	762A672H15	TRANSISTOR	2N2222A, NPN
Q003	Q003	Q003	762A672H17	TRANSISTOR	2N2907A, PNP
	Q004		3529A19H01	TRANSISTOR	IRF342
Q004			3529A20H02	TRANSISTOR	MTM3N60
	Q004		3529H20H01	TRANSISTOR	IRF242
Q005	Q005	Q005	762A672H15	TRANSISTOR	2N2222A, NPN
Q006	Q006	Q006	762A672H15	TRANSISTOR	2N2222A, NPN
Q007	Q007	Q007	762A672H15	TRANSISTOR	2N2222A, NPN
Q008	Q008	Q008	762A672H15	TRANSISTOR	2N2222A, NPN
Q009	Q009	Q009	762A672H17	TRANSISTOR	2N2907A, PNP
Q010	Q010	Q010	762A672H15	TRANSISTOR	2N2222A, NPN
Q011	Q011	Q011	3529A21H01	TRANSISTOR	PMD13K80

R001	R001	R001	182A879H02	THERMISTOR	10 OHM 4A
	R002	R002	3529A27H01	RESISTOR	2 K 5% 2W MIN. WIRE WOUND
	R002		187A642H55	RESISTOR	15K 5% 2W C.C.
R002			187A642H63	RESISTOR	33K 5% 2W
R003	R003	R003	629A531H80	RESISTOR	100K 2% 1/2W M.G.
R004	R004	R004	629A531H56	RESISTOR	10K 2% .50W M.G.
R005	R005	R005	862A374H47	RESISTOR	30.1 OHM 1% 1W
R006	R006	R006	3529A22H02	RESISTOR	500 OHM 1% 10W
		R007	3529A29H02	RESISTOR	.2 OHM 5W
R007			3529A29H01	RESISTOR	.1 OHM 5W
	R007		3529A29H03	RESISTOR	.4 OHM 5W
R008	R008	R008	3529A28H01	RESISTOR	250 OHM 1% 5W MIN, WIRE WOUND
R009	R009	R009	629A531H39	RESISTOR	2 K 2% .50W M.G.
R010	R010	R010	863A175H01	RESISTOR	10K 1% .25W
R011	R011	R011	863A174H30	RESISTOR	2 K 1% .25W
R012	R012	R012	863A174H01	RESISTOR	1 K 1% .25W
R013	R013	R013	863A175H01	RESISTOR	10K 1% .25W
R014	R014	R014	863A174H18	RESISTOR	1.5K 1% .25W
R015	R015	R015	863A175H97	RESISTOR	100 K 1% .25W
R016	R016	R016	863A175H30	RESISTOR	20K 1% .252W
R017	R017	R017	863A175H30	RESISTOR	20K 1% .252W
R018	R018	R018	863A175H69	RESISTOR	51.1K 1% .25W
R019	R019	R019	863A175H47	RESISTOR	30.1K 1% .25W
R020	R020	R020	863A175H30	RESISTOR	2 K 1% .25W
R021	R021	R021	863A174H01	RESISTOR	1 K 1% .25W
R022	R022	R022	629A531H36	RESISTOR	1.5K 2% .50W M.G.
R023	R023	R023	862A374H01	RESISTOR	10 OHM 1% 1W
R024	R024	R024	863A175H01	RESISTOR	10K 1% .25W
R025	R025	R025	848A822H27	RESISTOR	750K 1% .25W M.F.
R026	R026	R026	848A822H27	RESISTOR	750K 1% .25W M.F.
R027	R027	R027	848A819H48	RESISTOR	1 K 1% .50W M.F.
	R028	R028	863A174H30	RESISTOR	2 K 1% .25W
R028			863A173H18	RESISTOR	150 OHM 1% .25W
R029	R029	R029	629A531H27	RESISTOR	620 OHM 2% .50W M.F.
R030	R030	R030	863A174H01	RESISTOR	1 K 1% .25W
	R031	R031	863A173H85	RESISTOR	750 OHM 1% .25W
R032	R032	R032	863A175H30	RESISTOR	20K 1% .252W
R033	R033	R033	863A174H30	RESISTOR	2 K 1% .25W
R034	R034	R034	848A818H51	RESISTOR	100 OHM 1% .25W M.F.
R035	R035	R035	848A818H51	RESISTOR	100 OHM 1% .25W M.F.
R036	R036	R036	863A174H01	RESISTOR	1 K 1% .25W
R037	R037	R037	848A819H19	RESISTOR	499.0 1% .25W
R038	R038	R038	863A173H81	RESISTOR	681 OHM 1% .25W
R039	R039	R039	836A909H40	RESISTOR	1.5M 5% .25W C.C.
R040	R040	R040	863A174H43	RESISTOR	2.74K 1% .25W
R041	R041	R041	863A175H62	RESISTOR	43.2K 1% .25W
R042	R042	R042	763A126H55	RESISTOR	470 OHM 1% 3W W.W.
R043	R043	R043	863A175H30	RESISTOR	20K 1% .252W
R044	R044	R044	763A126H55	RESISTOR	470 OHM 1% 3W W.W.
R045	R045	R045	863A175H58	RESISTOR	39.2K 1% .25W
R046	R046	R046	863A175H34	RESISTOR	22.1K 1% .25W
R047	R047	R047	836A909H40	RESISTOR	1.5M 5% .25W C.C.
R048	R048	R048	863A174H01	RESISTOR	1 K 1% .25W
R049	R049	R049	863A175H01	RESISTOR	10K 1% .25W
R050	R050	R050	3529A22H01	RESISTOR	25 OHM 1% 10W
R051	R051	R051	863A173H85	RESISTOR	750 OHM 1% .25W
R052	R052	R052	3534A73H03	RESISTOR	20K 1% .25W M.F.
R053	R053	R053	863A174H30	RESISTOR	2 K 1% .25W
R054	R054	R054	3534A73H02	RESISTOR	10K OHM 1% .25W M.F.
R055	R055	R055	3534A73H03	RESISTOR	20K 1% .25W M.F.
R056	R056	R056	3534A73H02	RESISTOR	10K OHM 1% .25W M.F.
R057	R057	R057	863A175H18	RESISTOR	15K 1% .25W
R058	R058	R058	863A175H50	RESISTOR	32.4K 1% .25W
R059	R059	R059	863A174H01	RESISTOR	1 K 1% .25W
R060	R060	R060	863A174H69	RESISTOR	5.11K 1% .25W
R061	R061	R061	863A174H69	RESISTOR	5.11K 1% .25W
R062	R062	R062	863A174H43	RESISTOR	2.74K 1% .25W
R063	R063	R063	863A174H01	RESISTOR	1 K 1% .25W
R065	R065	R065	863A174H01	RESISTOR	1 K 1% .25W
R066	R066	R066	863A175H01	RESISTOR	10K 1% .25W
R067	R067	R067	3529A29H02	RESISTOR	.2 OHM 5W
R068	R068	R068	3535A39H69	RESISTOR	511 OHM .25W 1%
R0Z2	R0Z2		863A175H01	RESISTOR	10K 1% .25W
RR1	RR1	RR1	3529A08H01	REED RELAY	
T001	T001	T001	3535A73H01	TRANSFORMER	RENCO 1361-2-270
T002	T002		1586C64G05	TRANSF. COIL	
		T002	1586C64G06	TRANSF. COIL	
		T002	1586C64G04	TRANSF. COIL	
	Z001		837A693H18	ZENER DIODE	UZ5234 340V 10%
Z001	Z001		187A936H17	ZENER DIODE	1N3050B 180V 1W
			849A487H05	ZENER DIODE	1N4761A 75V 1W
Z002	Z002	Z002	186A797H10	ZENER DIODE	1N960B (9.1V)
		Z003	878A619H01	ZENER DIODE	UZ 1N5388A 200V 10%
	Z003		878A619H01	ZENER DIODE	UZ5234 340V 10%
Z003			187A936H13	ZENER DIODE	1N3049B 160V 1W
Z004	Z004	Z004	836A288H05	ZENER DIODE	1N966B 16V .50W
Z005	Z005	Z005	837A398H12	ZENER DIODE	1N959B (8.2V) .5W
Z006	Z006	Z006	837A398H12	DIODE	1N959B ZENER 8.2V .50W
		Z007	837A693H17	ZENER DIODE	UZ5240 400V 10%
Z008	Z008	Z008	837A398H12	ZENER DIODE	1N959B (8.2V) .5W
Z009	Z009	Z009	862A288H04	ZENER DIODE	1N5352B 15V 5W
Z010	Z010	Z010	862A288H11	ZENER DIODE	1N5354B 17V 5W
Z011	Z011	Z011	862A288H11	ZENER DIODE	1N5354B 17V 5W

DLS POWER SUPPLY

STYLE NO. 1349D85A04 (48 VDC)
 STYLE NO. 1349D85A05 (125 VDC)
 STYLE NO. 1349D85A06 (250 VDC)

COMPONENT	STYLE NO.	PART NAME	DESCRIPTION
A04 A05 A06			
	C001	3529A07H01	CAPACITOR 220 MFD OR 220 MFD 250V 2-5/8
		3529A07H06	CAPACITOR 95 MFD 400V 20%
C001	C001	3529A07H02	CAPACITOR 980 MFD 100V 20%
C002	C002	184A663H14	CAPACITOR .1 MFD +/-5% 500V
C003	C003	184A663H01	CAPACITOR .01 MFD 100V +20% CER
C004	C004	186A341H07	CAPACITOR 5 MFD +75 -10% 25V
C005	C005	762A680H14	CAPACITOR .1 MFD 100V +/-20% CER
C006	C006	876A09H17	CAPACITOR .47 MFD +/-5% 200V MYLAR
C007	C007	184A663H14	CAPACITOR .1 MFD +/-5% 500V
C008	C008	762A680H02	CAPACITOR 1000 PF 1KV +/- CER
C009	C009	879A911H10	CAPACITOR 470 PF 1KV +/-10% CER
C010		880A397H08	CAPACITOR 1200PF +/-10% 1KV CER
	C10	762A757H11	CAPACITOR 200PF 1KV +/-10% CER
		879A911H10	CAPACITOR 470PF 1KV CER +/-10%
C011	C011	762A757H12	CAPACITOR 270 PF 500V +/-2% MICA
C012	C012	763A209H25	CAPACITOR 5 PF 500V +/-10% MICA
C013	C013	3535A92H01	CAPACITOR 100 MFD +100 -10% 50V EL
C017	C017	762A680H02	CAPACITOR 1000 PF 1KV +/-10% CER
C018	C018	762A680H05	CAPACITOR 1500 PF 1KV +/-10% CER
C019	C019	3529A32H01	CAPACITOR 590 MFD 25V EL
C020		184A663H02	CAPACITOR .05UF +/-20% 100V
	C020	3512A08H02	CAPACITOR .22 MFD 100V
C021	C021	880A363H12	CAPACITOR 150 MFD 5% 35V
C022	C022	762A680H14	CAPACITOR .1 MFD 100V +/-20% CER
C023	C023	184A663H01	CAPACITOR .01 MFD 100V +20% CER
C026	C026	188A669H14	CAPACITOR .027 MFD +/-10%
C027	C027	3534A68H03	CAPACITOR .01 MFD 200V +/-5% MET-POL
C028	C028	184A663H01	CAPACITOR .01 MFD 100V +20% CER
C029	C029	762A680H02	CAPACITOR 1000 PF 1KV +/- 10% CER
C030	C030	762A680H14	CAPACITOR .1 MFD 100V +/-20% CER
C031	C031	3536A32H01	CAPACITOR .001MF 20% 3000V CERAMIC
C032	C032	3536A32H01	CAPACITOR .001 MFD 3000V 20%
C033	C033	3536A32H01	CAPACITOR .001 MFD 3000V 20%
C034	C034	762A757H12	CAPACITOR 270 PF 500V +/-2% MICA
C035	C035	763A209H07	CAPACITOR 20 PF 500V 5%
	D001	188A342H21	DIODE 1N5406 600 PIV 3A
D001		3529A30H01	RECTIFIER 150V PIV 6A FAST RECOVERY
D002	D002	3508A22H01	DIODE-LED RED LED (EDGE MOUNT)
D003	D003	3535A28H01	DIODE 600V PIV 3A EPOXY MR85
D005	D005	836A928H06	DIODE 1N4148 100V
D006	D006	837A692H03	DIODE 1N645A 225V .2 AMP
D007	D007	837A692H03	DIODE 1N645A 225V .2 AMP
D011	D011	3535A29H02	DIODE 1N3881
D012	D012	3535A29H02	DIODE 1N3881
D013	D013	837A692H03	DIODE 1N645A 225V .2 AMP
D015	D015	837A692H03	DIODE 1N645A 225V .2 AMP
D016	D016	837A692H03	DIODE 1N645A 225V .2 AMP
D017	D017	837A692H03	DIODE 1N645A 225V .2 AMP
D018	D018	837A692H03	DIODE 1N645A 225V .2 AMP
D019	D019	837A692H03	DIODE 1N645A 225V .2 AMP
D021	D021	3508A22H02	DIODE-LED YELLOW LED (EDGE MOUNT)
IC001	IC001	3527A09H02	INT CKT MC14011BAL QUAD-2 INPUT NAND
IC002	IC002	3527A09H02	INT CKT MC14011BAL QUAD-2 INPUT NAND
IC003	IC003	3534A93H01	INT CKT 6N136 OPTP-COUPLER
IC004	IC004	3534A93H01	INT CKT 6N136 OPTP-COUPLER
IC005	IC005	3534A92H01	INT CKT SG 1524 PULSE WIDTH MODULE
IC006	IC006	3510A61H01	INT CKT LM 224 QUAD COMPARATOR
L001	L001	3516A94H01	CHOKE 68 UH 5A
L003	L003	3535A63G02	CHOKE 1.28 MH
P001	P001	3523A42H03	POTENTM'TR VAR. 1K OHM 10T (TOP ADJ.)
P002	P002	3502A17H07	POTENTM'TR 2 K 25T POT (TOP ADJUST)
P003	P003	3529A31H01	POTENTM'TR 500 OHM 1T POT (SIDE ADJ.)
Q001	Q001	762A672H15	TRANSISTOR 2N2222A, NPN
Q002	Q002	762A672H15	TRANSISTOR 2N2222A, NPN
Q003	Q003	762A672H17	TRANSISTOR 2N2907A, PNP
	Q004	3529A20H02	TRANSISTOR MTM3N60
		3529H20H01	TRANSISTOR IRF242
	Q004	3529A19H01	TRANSISTOR IRF342
Q005	Q005	762A672H15	TRANSISTOR 2N2222A, NPN
Q006	Q006	762A672H15	TRANSISTOR 2N2222A, NPN
Q007	Q007	762A672H15	TRANSISTOR 2N2222A, NPN
Q008	Q008	762A672H15	TRANSISTOR 2N2222A, NPN
Q009	Q009	762A672H17	TRANSISTOR 2N2907A, PNP
Q010	Q010	762A672H15	TRANSISTOR 2N2222A, NPN
	R001	182A879H02	THERMISTOR 10 OHM 4A
		187A642H63	RESISTOR 33K 5% 2W
	R002	187A642H55	RESISTOR 15K 5% 2W C.C.
R002		3529A27H01	RESISTOR 2 K 5% 2W MIN. WIRE WOUND
R003	R003	629A531H80	RESISTOR 100K 2% 1/2W M.G.

R004	R004	R004	629A531H56	RESISTOR	10K 2% .50W M.G.
R005	R005	R005	862A374H47	RESISTOR	30.1 OHM 1% 1W
R006	R006	R006	3529A22H02	RESISTOR	500 OHM 1% 10W
		R007	3529A29H03	RESISTOR	.4 OHM 5W
R007			3529A29H01	RESISTOR	.1 OHM 5W
	R007		3529A29H02	RESISTOR	.2 OHM 5W
R008	R008	R008	3529A28H01	RESISTOR	250 OHM 1% 5W MIN, WIRE WOUND
R009	R009	R009	629A531H39	RESISTOR	2 K 2% .50W M.G.
R010	R010	R010	863A175H01	RESISTOR	10K 1% .25W
R011	R011	R011	863A174H30	RESISTOR	2 K 1% .25W
R012	R012	R012	863A174H01	RESISTOR	1 K 1% .25W
R013	R013	R013	863A175H01	RESISTOR	10K 1% .25W
R014	R014	R014	863A174H18	RESISTOR	1.5K 1% .25W
R015	R015	R015	863A175H97	RESISTOR	100 K 1% .25W
R016	R016	R016	863A175H30	RESISTOR	20K 1% .252W
R017	R017	R017	863A175H30	RESISTOR	20K 1% .252W
R018	R018	R018	863A175H69	RESISTOR	51.1K 1% .25W
R019	R019	R019	863A175H47	RESISTOR	30.1K 1% .25W
R020	R020	R020	836A175H30	RESISTOR	20K 1% .25W
R021	R021	R021	863A174H01	RESISTOR	1 K 1% .25W
R022	R022	R022	629A531H36	RESISTOR	1.5K 2% .50W M.G.
R023	R023	R023	862A374H01	RESISTOR	10 OHM 1% 1W
R024	R024	R024	863A175H01	RESISTOR	10K 1% .25W
R025	R025	R025	848A822H27	RESISTOR	750K 1% .25W M.F.
R026	R026	R026	848A822H27	RESISTOR	750K 1% .25W M.F.
R027	R027	R027	848A819H48	RESISTOR	1 K 1% .50W M.F.
	R028	R028	863A173H18	RESISTOR	150 OHM 1% .25W
R028			863A174H30	RESISTOR	2 K 1% .25W
R029	R029	R029	629A531H27	RESISTOR	620 OHM 2% .50W M.F.
R030	R030	R030	863A174H01	RESISTOR	1 K 1% .25W
R031	R031	R031	863A173H85	RESISTOR	750 OHM 1% .25W
R032	R032	R032	863A175H30	RESISTOR	20K 1% .252W
R033	R033	R033	863A174H30	RESISTOR	2 K 1% .25W
R034	R034	R034	848A818H51	RESISTOR	100 OHM 1% .25W M.F.
R036	R036	R036	863A174H01	RESISTOR	1 K 1% .25W
R037	R037	R037	848A819H19	RESISTOR	499.0 1% .25W
R038	R038	R038	863A173H81	RESISTOR	681 OHM 1% .25W
R039	R039	R039	836A909H40	RESISTOR	1.5M 5% .25W C.C.
R040	R040	R040	863A174H43	RESISTOR	2.74K 1% .25W
R041	R041	R041	863A175H62	RESISTOR	43.2K 1% .25W
R042	R042	R042	763A126H55	RESISTOR	470 OHM 1% 3W W.W.
R043	R043	R043	863A175H30	RESISTOR	20K 1% .252W
R045	R045	R045	863A175H58	RESISTOR	39.2K 1% .25W
R046	R046	R046	863A175H34	RESISTOR	22.1K 1% .25W
R047	R047	R047	836A909H40	RESISTOR	1.5M 5% .25W C.C.
R048	R048	R048	863A174H01	RESISTOR	1 K 1% .25W
R049	R049	R049	863A175H01	RESISTOR	10K 1% .25W
R057	R057	R057	863A175H18	RESISTOR	15K 1% .25W
R058	R058	R058	863A175H50	RESISTOR	32.4K 1% .25W
R059	R059	R059	863A174H01	RESISTOR	1 K 1% .25W
R060	R060	R060	863A174H69	RESISTOR	5.11K 1% .25W
R061	R061	R061	863A174H69	RESISTOR	5.11K 1% .25W
R062	R062	R062	863A174H43	RESISTOR	2.74K 1% .25W
R063	R063	R063	863A174H01	RESISTOR	1 K 1% .25W
R066	R066	R066	863A175H01	RESISTOR	10K 1% .25W
R068	R068	R068	3535A39H69	RESISTOR	511 OHM .25W 1%
R022	R022	R022	863A175H01	RESISTOR	10K 1% .25W
RR1	RR1	RR1	3529A08H01	REED RELAY	
T001	T001	T001	3535A73H01	TRANSFORMER	RENCO 1361-2-270
T002			1586C64G04	TRANSF. COIL	
		T002	1586C64G06	TRANSF. COIL	
			1586C64G05	TRANSF. COIL	
	T002		187A936H17	ZENER DIODE	1N3050B 180V 1W
	Z001		837A693H18	ZENER DIODE	UZ5234 340V 10%
Z001		Z001	849A487H05	ZENER DIODE	IN4761A 75V 1W
Z002	Z002	Z002	186A797H10	ZENER DIODE	1N960B (9.1V)
		Z003	878A619H01	ZENER DIODE	UZ 1N5388A 200V 10%
	Z003		878A619H01	ZENER DIODE	UZ5234 340V 10%
Z003			187A936H13	ZENER DIODE	IN3049B 160V 1W
Z004	Z004	Z004	836A288H05	ZENER DIODE	1N966B 16V .50W
Z005	Z005	Z005	837A398H12	ZENER DIODE	1N959B (8.2V) .5W
		Z007	837A693H17	ZENER DIODE	UZ5240 400V 10%
Z008	Z008	Z008	837A398H12	ZENER DIODE	1N959B (8.2V) .5W
Z009	Z009	Z009	862A288H04	ZENER DIODE	1N5352B 15V 5W
Z011	Z011	Z011	862A288H11	ZENER DIODE	1N5354B 17V 5W