SET/7000

SYSTEM POWER SUPPLY

THEORY OF OPERATION

The system power supply provides DC power fro all of the circuit modules in the system and system supervision circuits. The functional diagram for this module is shown in Figure VII. The module requires a power source of 120VAC, single phase, 60 Hz. An internal transformer steps down the 120VAC line input to 30VAC. An AC power failure relay (PF) and a power-on lamp are connected to the transformer secondary. The lamp is on and the relay is energized when AC power is on. The transformer also feeds a DC power supply. The negative of the DC supply is connected to pin 12 on the mother board, and the positive output is connected to the contacts of the power failure relay and a normally-closed system reset switch to pin 4. If AC power should fail, the PF relay is de-energized automatically connecting battery power to the positive output line.

If the modules in a fire alarm system require less than 0.5 amp from the system power supply, the signal power output terminal may be used to supply some of the system DC signal devices.

A ground detection circuit in the module monitors the system ground (chassis ground). If either the positive or negative side of the system DC output becomes shorted to the chassis, the ground detection circuit turns on a warning lamp and sends a trouble signal to the system trouble supervisory circuit which is also part of this module.

The trouble supervision circuit accepts a number of inputs from the system to generate a warning signal. A card supervision circuit monitors the modules that are plugged into the mother board. The bus lines at pins 1 and 2 alternate from module to module. At the end of each mother board the last pin (1 or 2) is tied to the negative output line (pin 12). Under normal conditions, the card supervision inputs to the system power supply are at the negative reference. If any card is removed from the rack, the circuit is open and the trouble supervision circuit detects the fault. Another input to the trouble circuit is from pin 10. Any trouble output signals generated by other modules in the system are received by the system power supply on this bus. A trouble input is shown on the diagram via the terminal board from the battery charger module. Finally, a trouble input is generated if AC power is lost.

When an input signal is received by the trouble supervision circuit, the trouble relay is energized. The relay contact connects the system DC, through the SILENCE/NORMAL switch, to the module trouble lamp and the system trouble buzzer. The panel mounted SILENCE/NORMAL switch is used to silence the alarm buzzer after a trouble signal has been received. The trouble light remains on until the fault is corrected. After the fault is corrected, the trouble lamp will go off and the buzzer turns on indicating that the switch must be returned to the NORMAL position.

One set of contacts of the PF relay is connected to pin 11 of the mother board (PROGRAM NEGATIVE SILENCE) and the trouble circuit. By connecting pin 11 to negative, the trouble signal generated by the loss of AC power is canceled.

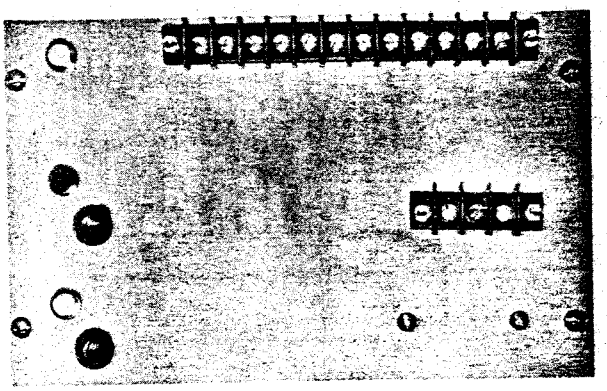
PRODUCT DATA
SFA-3-1

STANDARD ELECTRIC TIME CORP. DIVISION OF JOHNSON SERVICE COMPANY
89 LOGAN STREET • SPRINGFIELD, MASSACHUSETTS 01101

SYSTEM POWER SUPPLY

FUNCTION

This module is the basic power supply providing supervisory and operating current to other modules. The unit is also equipped with a system ground detection circuit with supervised ground alarm light, system reset switch, trouble buzzer, trouble indicator light and silencing switch with terminals for remote trouble signal connection. Other features included are power-on light, power failure relay and a supervisory circuit which causes the trouble buzzer to sound when any of the system modules are removed from the mounting rack. Terminals are provided to connect an external trouble signal.



SFA-3-1

SPECIFICATIONS

CATALOG NUMBER.....SFA-3-1

INPUT POWER.....120VAC, 60Hz., 1 Amp.

OPTIONAL STANDBY....Battery, 24VDC Lead Acid or Nickel Cadmium

NOTE....When battery is omitted a SFA-3-10 double supervisory module is required. Input power is 120/240 3-wire 60Hz.

MAXIMUM DC LOAD.....3.5 Amps., 24VDC

CURRENT DEMAND.....Supervisory 0.008 Amps. Trouble 0.145 Amps.

DIMENSIONS.....9½" W. x 6" H. x 4" D.

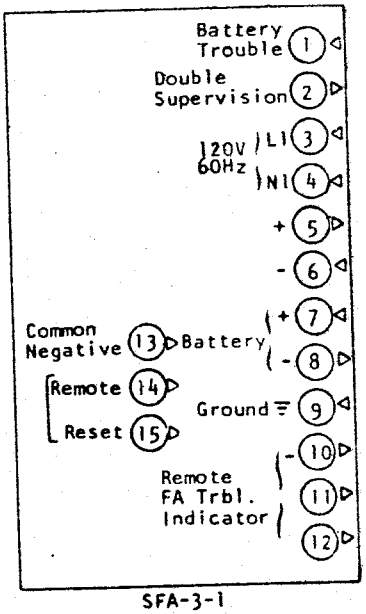
FINISH.....Beige

CONSTRUCTION....Plug-in, printed circuit card assembly, face panel No. 18MSG steel.

INSTALLATION.....Factory rack mounted

MODULE WEIGHT.....7 LBS.

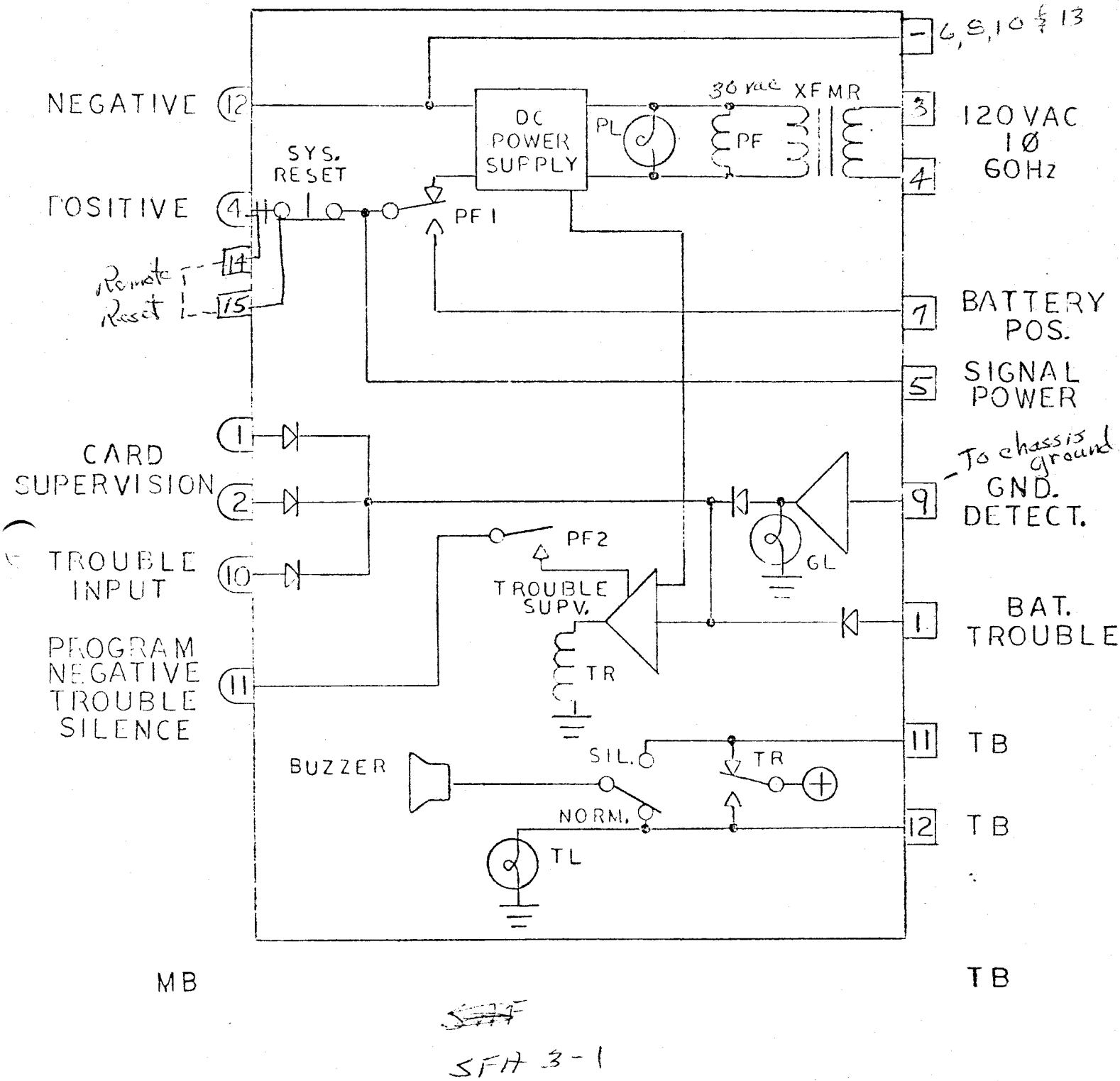
LISTING....Underwriters' Laboratories, Inc.



SFA-3-1

☐ Mother Board Buss

☐ Front Terminals



SFH 3-1

FIGURE VII

SYSTEM POWER SUPPLY

CATALOG NO. SFA-3-1
FACTORY NO. 210761

SYSTEM POWER SUPPLY

FIELD SERVICE TEST PROCEDURE

The objective of this test is to verify that the System Power Supply is functioning properly. After the power supply has been tested (and replaced if necessary), it may be used as the power supply and trouble detection circuit for testing most of the circuit modules in the system.

Test Equipment Required:

Multimeter
DC Ammeter 0-5ADC
Test Leads (Jumpers)

Test Procedure:

1. Turn off AC power to the module and unplug module from the equipment rack.

2. Remove the external wiring connected to terminal strip numbers 1, 2, 5, 7, 11 and 12.

3. Check the continuity between terminal number 5 and the following: terminal numbers 1, 7, 15, 11 and printed circuit card connector contact No. 4. Reading on meter should be zero ohms.

4. Check the continuity between terminal number 13 and the following: terminal numbers 6, 8, 10 and printed circuit card connector contact No. 12. Reading on meter should be zero ohms.

5. The wiring connected to the terminal strip should be: 120VAC input to numbers 3 and 4; Negative Reference for DC voltage to numbers 6, 8, 10, 13; Equipment Rack (safety ground) to number 9; Remote Reset or jumper between numbers 14 and 15. Place a jumper between pins 1 and 2 on the mother board, and the negative bus (pin 12).

Test Procedure (Cont.)

6. Turn on the AC power and measure the voltage across terminals 3 and 4. Voltage should be between 102 (min.) and 132 (max.) VAC, 60 Hz. Module pilot light should be on. The trouble buzzer should be off with the switch set for normal operation. Both the trouble light and the ground light should be off. If the ground light is on, check the connection from terminal number 9 to the equipment rack safety ground.

7. Measure the DC system voltage at the following points with respect to the negative reference. (All DC voltage levels shall be given with respect to negative; terminals 6, 8, 10, 13 or P.C. card connector contact No. 12). Terminal numbers 2, 5, 15, 11 and printed circuit connector No. 4. Voltage should be 26VDC $\pm$4V.

8. Turn on buzzer switch. Buzzer should sound, but trouble light should remain off. Return switch to normal position.

9. Using a test lead, connect terminal number 5 (DC output) to P.C. card connector contact No. 9 (lamp test). The The trouble light, ground light and trouble buzzer should be on. Remove the test lead from contact No. 9 and place it on contact No. 10. The trouble light and buzzer should be on. Measure the DC voltage at terminal 1; reading should be less than 1 volt. Remove the test lead from contact No. 10 and terminal 5. Remove the jumper from contact Nos. 1 and 2. The trouble light and buzzer should be on. Place a jumper between P.C. card connector contact Nos. 11 and 12. This should not silence the buzzer or turn off the lamp. Remove jumper, and turn off the AC power.

10. If the power supply module has not performed satisfactorily in the previous tests, it should be replaced. Before mounting the power supply in the equipment rack, check the continuity between pins 1 and 12 and 2 and 12 on the mother board. If all of the other circuit modules are in place on the unit, the reading should be zero ohms. If it is an open circuit or a very high reading, a fault exists in the equipment rack wiring of this circuit, or on a printed circuit card in one of the modules.

Test Procedure (Cont.)

11. Mount the power supply in the rack and connect the external wiring to the terminal strip. Turn on the AC power. If the trouble lamp/buzzer goes on, measure the voltage at terminal 1. A reading of more than 7VDC indicates trouble in the battery charger module. Reset the battery charger. If the voltage at terminal 1 remains high, the battery charger module must be tested. If the voltage at terminal 1 drops to 1VDC or less, but the trouble light/buzzer remains on, the trouble supervisory line (P.C. card connector contact No. 10) is high. Any modules with trouble lamps on should be checked for abnormal conditions.

12. A DC ammeter may be connected between terminals 14 and 15 of the power supply (remove external wiring) in order to monitor the current and the voltage output while performing a lamp test. No abnormal variation should occur in either reading. (Refer to system specifications). Check any lamps in the system which do not light, and if lamps are good, test the circuit modules for faults.

13. If the system is programmed to silence the trouble light and buzzer when AC power fails, perform the following test. The battery should be connected to terminal 7 (Pos.) and terminal 8 (Neg.). The voltage across these terminals should be within the limits acceptable for the type of battery used. Turn off the AC power. The full value of the battery voltage should appear at terminals 1 and 15. The trouble light and buzzer should remain off.

OUTPUTS → / INPUT ↓	[1]	[2]	[5]	[11]	[12]	[15]	BUZ.	TR	G.L.
NORMAL	1	22^m	22^m	22^m	1	22^m	Off	Off	Off
LAMP TEST	1	22^m	22^m	1	22^m	22^m	On	On	On
BATT. TROUBLE	22^m	22^m	22^m	1	22^m	22^m	On	On	Off
OPEN GND. CKT.	1	22^m	22^m	1	22^m	22	On	On	On
+28VDC ON TROUBLE SUPER.	1	22^m	22^m	1	22^m	22^m	On	On	Off
CARD SUPER. OPEN	1	22^m	22^m	1	22^m	22^m	On	On	Off
AC POWER OFF	22^m	1	22^m	1	22^m	22^m	On	On	Off
AC OFF/SILENCE	22^m	1	22^m	22^m	1	22^m	Off	Off	Off

CHART 3-1

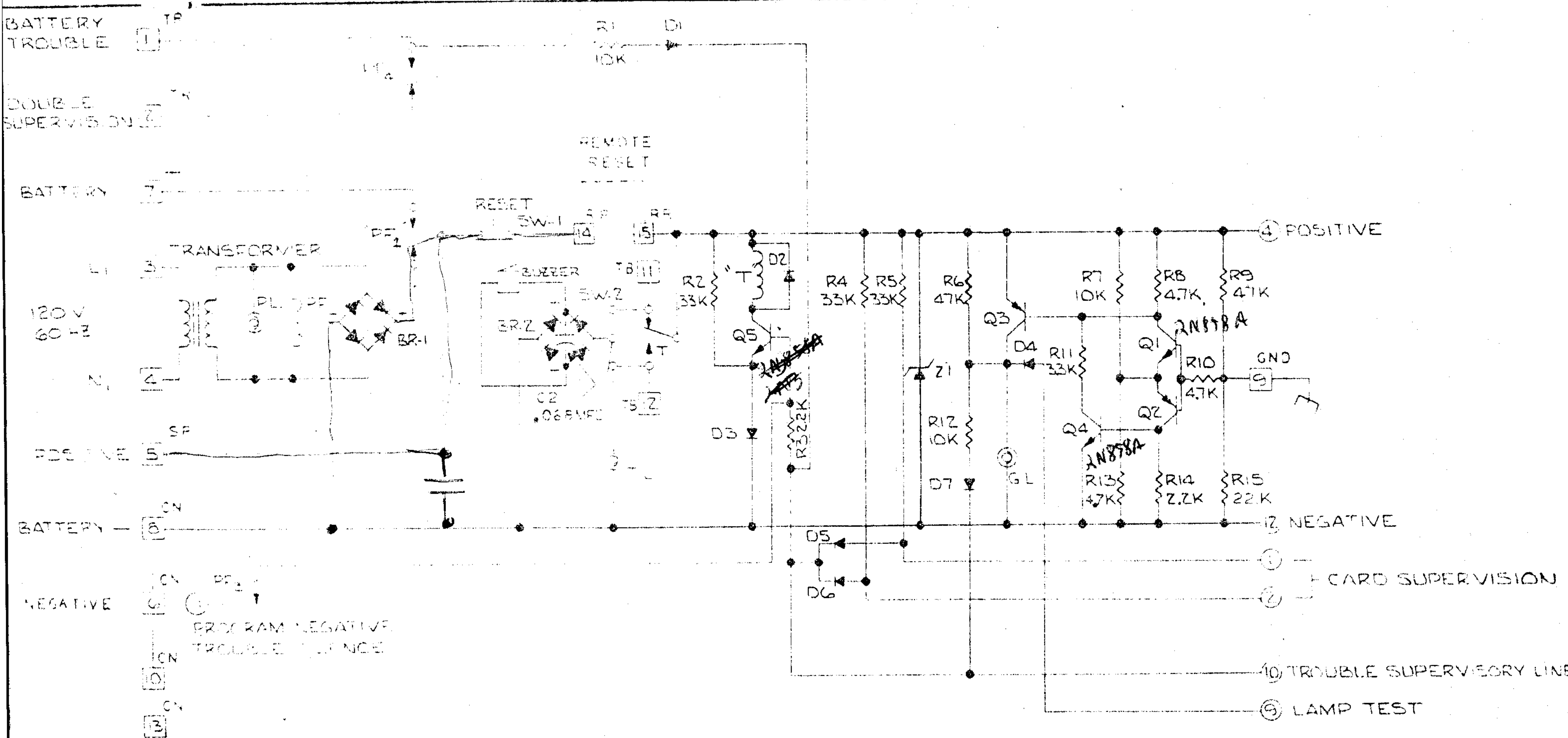
SYSTEM POWER SUPPLY

[3] - [4] AC Input 120V (Nom.)

(12) Common Neg. refference. Mother bd. or Terminal strip conn.

[ ] - TERMINAL STRIP CONNECTOR

m - Indicates minimum reading, all others are maximum



NOTE:
CIRCUIT SHOWN WITH POWER ON AND RELAY "PF" ENERGIZED.

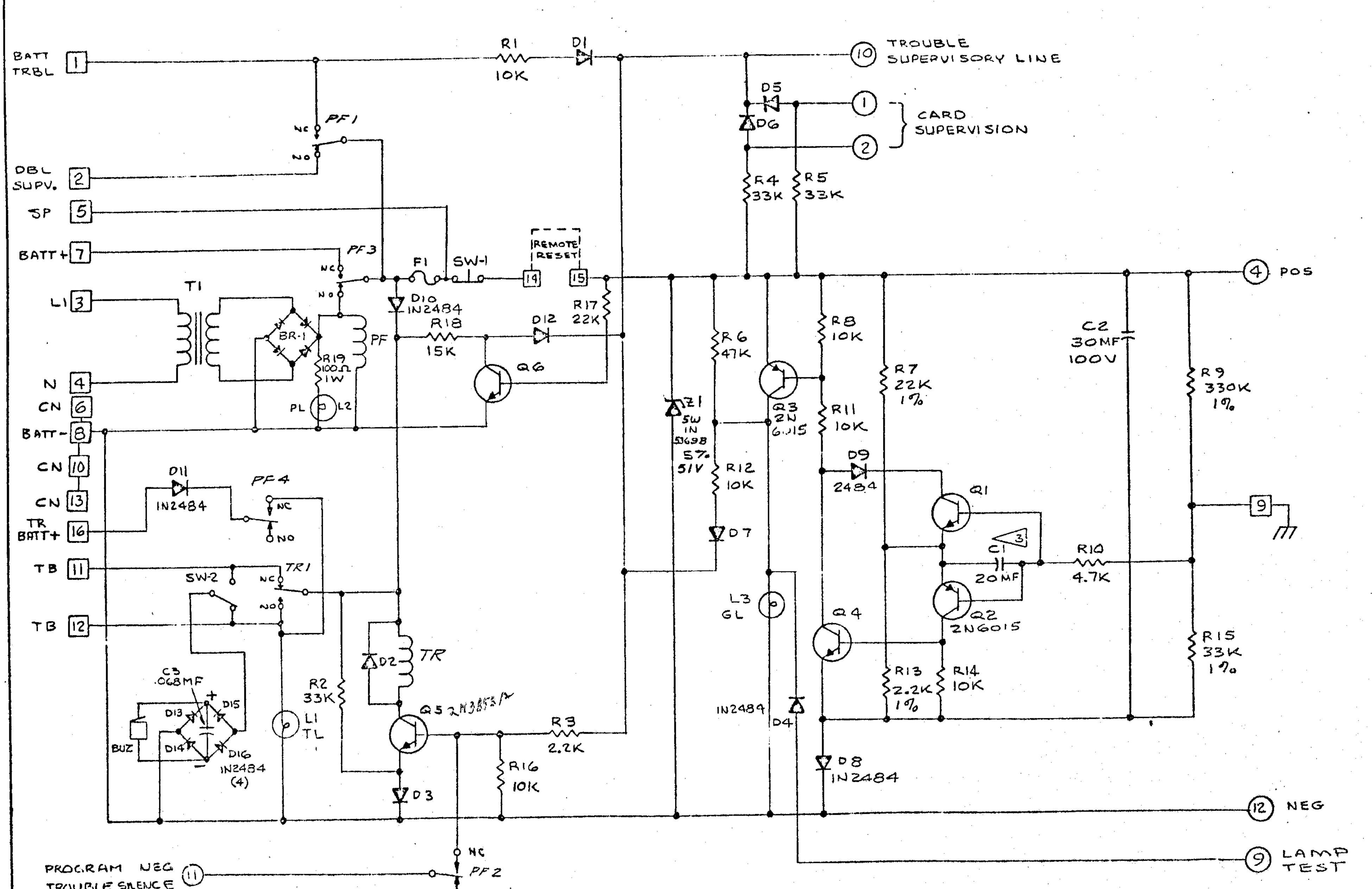
☐ DESIGNATES INSTALLATION WIRING TERMINALS.
◯ DESIGNATES PRINTED CIRCUIT CONNECTORS

Q5 2N3858A

"T" WAS 11FP550W-BSL, REMOVE C

STANDARD ELECTRIC TIME — SPRINGFIELD MASS 01101

SYSTEM POWER SUPPLY



PROGRAM NEG TROUBLE SILENCE (11)

3 — C1: 18 TO 24 MFD, 35V

CIRCUIT SHOWN WITH POWER ON AND RELAY "PF" ENERGIZED & "TR" DE-ENERGIZED UNLESS OTHERWISE SPECIFIED; ALL RESISTORS ½W 10%, ALL DIODES 1N4448, TRANSISTORS 2N3858

□ DESIGNATES INSTALLATION WIRING TERMINAL

○ DESIGNATES PRINTED CIRCUIT CONNECTORS

SFA-3-1

ED	SYM	EN	REVISION	BY	DATE
7			Z1 WAS 1N4757A		

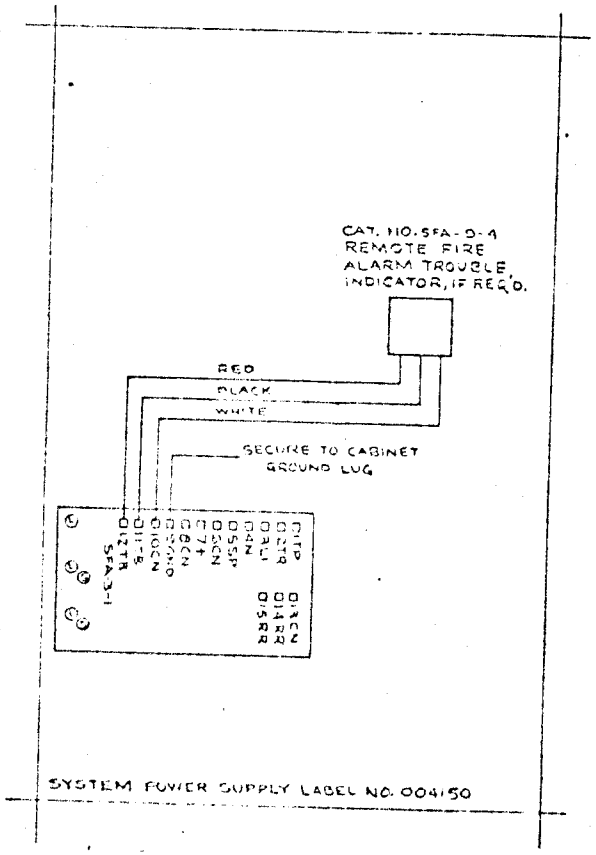
STANDARD ELECTRIC TIME — SPRINGFIELD, MASS. 01101

SYSTEM POWER SUPPLY

DATE 1-25-74

DRAWN LW — CHECKED RJC

21076I-2C ED 7



SFA-3-1-RH

ED	SYM	EN	REVISION	BY	DATE

STANDARD ELECTRIC TIME — SPRINGFIELD MASS U.S.A.

MATERIAL	FINISH
BLANK	RED

DRAWN	TRACED	CHECKED	APPD

SYSTEM POWER SUPPLY R.H.

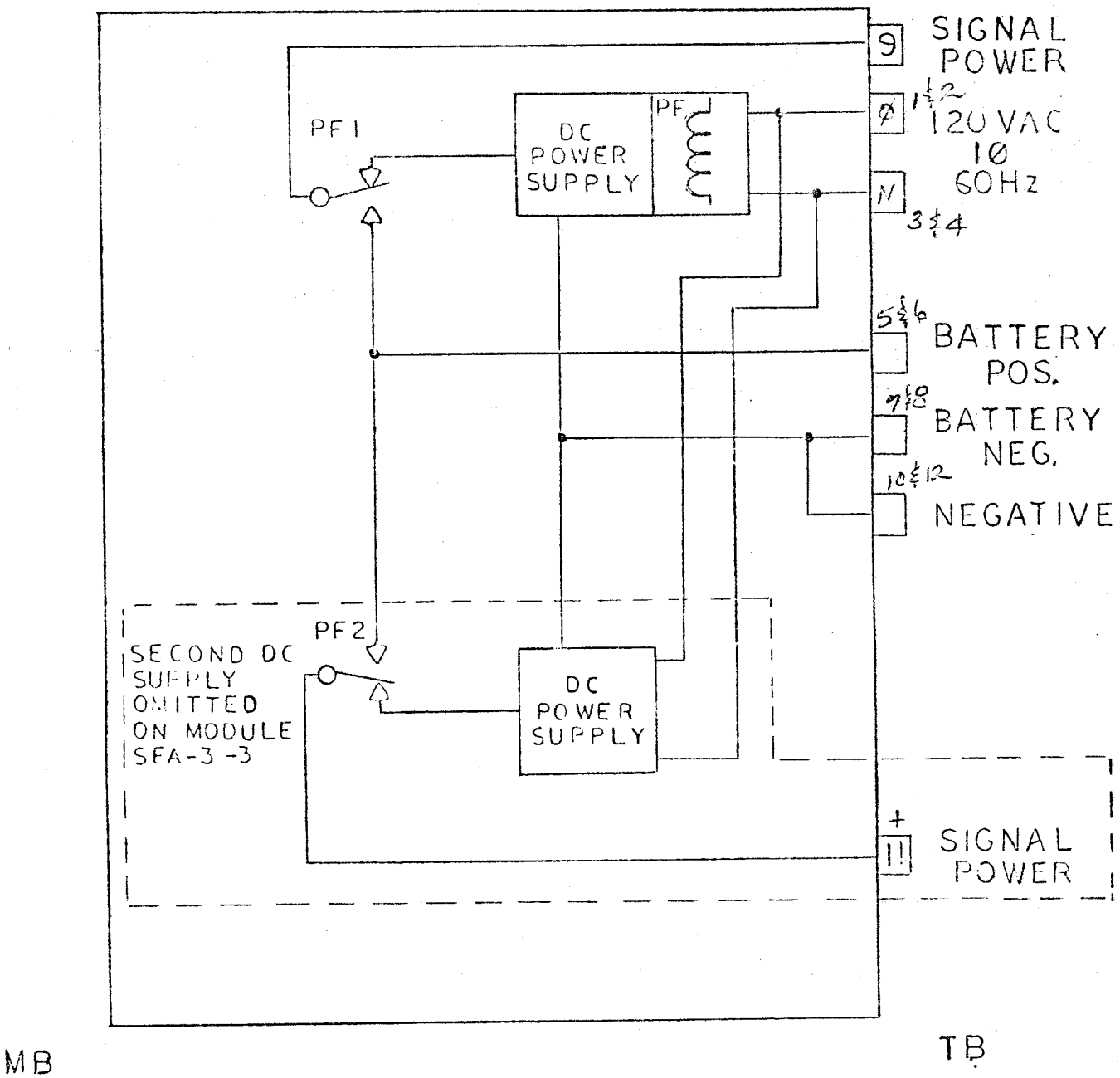
004150 B

SET/7000

SIGNAL POWER SUPPLY

THEORY OF OPERATION

Two signal power modules are available for SET/7000 systems. The SFA-3-2 is a dual output module, as shown in Figure VIII, and module SFA-3-3 is a single output module. The input to these modules is 120VAC single phase, 60 Hz. A power failure relay is used to automatically switch from the DC power supply to the battery when the AC power fails. The PF relay is energized when AC power is applied to the input terminals. The negative of the DC power supplies, battery input and output terminals are all common.



SFA 3-2

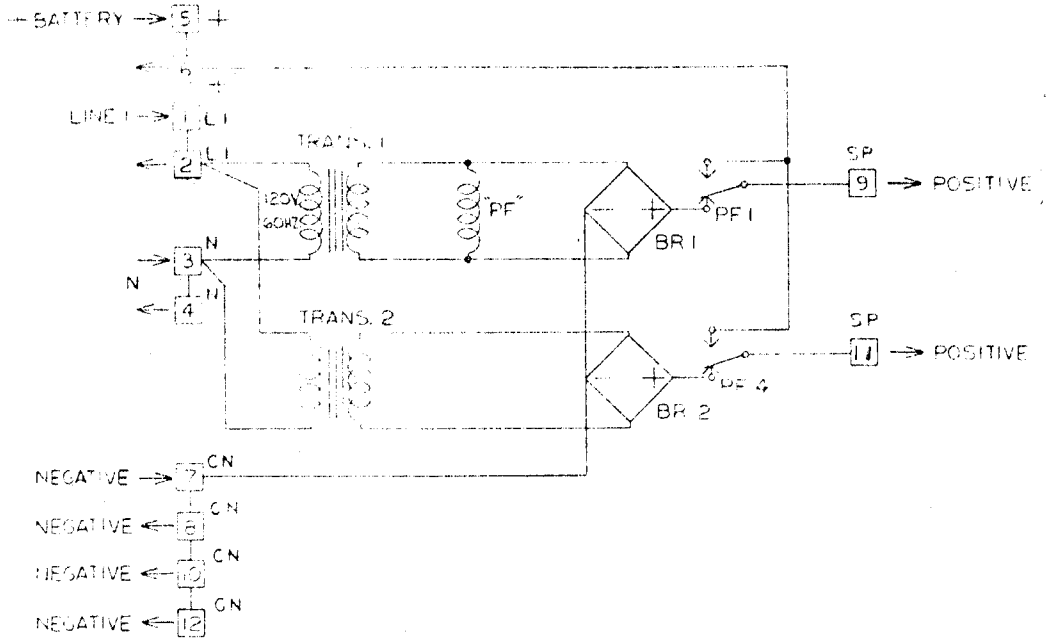
Max current 3 amp's per ckt.

FIGURE VIII

SIGNAL POWER SUPPLY

SFA-3-2 (DUAL CK'T)

SFA-3-3 (SINGLE CK'T)



NOTE

CIRCUIT SHOWN WITH POWER ON AND RELAY "PF" IS ENERGIZED.

□ DESIGNATES INSTALLATION WIRING TERMINALS.

ED	SYM	EN	REVISION	BY	DATE
			REMOVE C1 .47MFD	RJK	6-2372

STANDARD ELECTRIC TIME — SPRINGFIELD MASS 01101

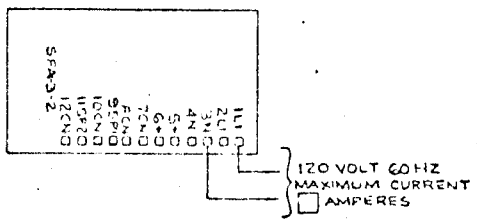
SIGNAL POWER 2 CKT SUPPLY

MATERIAL ~ FINISH ~ CAT NO SEA-3-2 P.O.

BLANK 004-083 REQ. DATE 5-8-[illegible] SCALE ~

DRAWN TRACED CHECKED APPROV.

210762-2 C ED 2



SIGNAL POWER SUPPLY LABEL No. 004151

SFA-3-2-RH

ED	SYM	EN	REVISION	BY	DATE

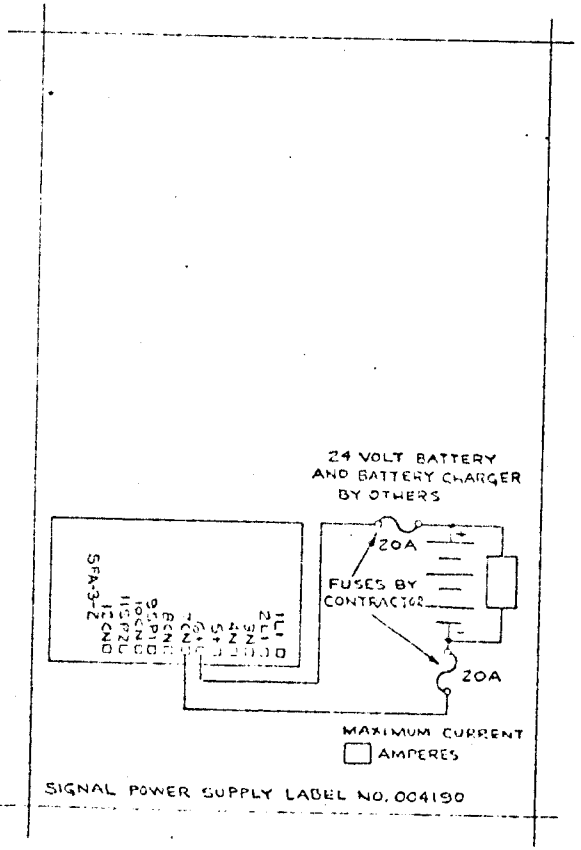
STANDARD ELECTRIC TIME — SPRINGFIELD, MASS. U.S.A.

SIGNAL POWER SUPPLY

MATERIAL | FINISH | SCALE FULL

DRAWN | TRACED | CHECKED

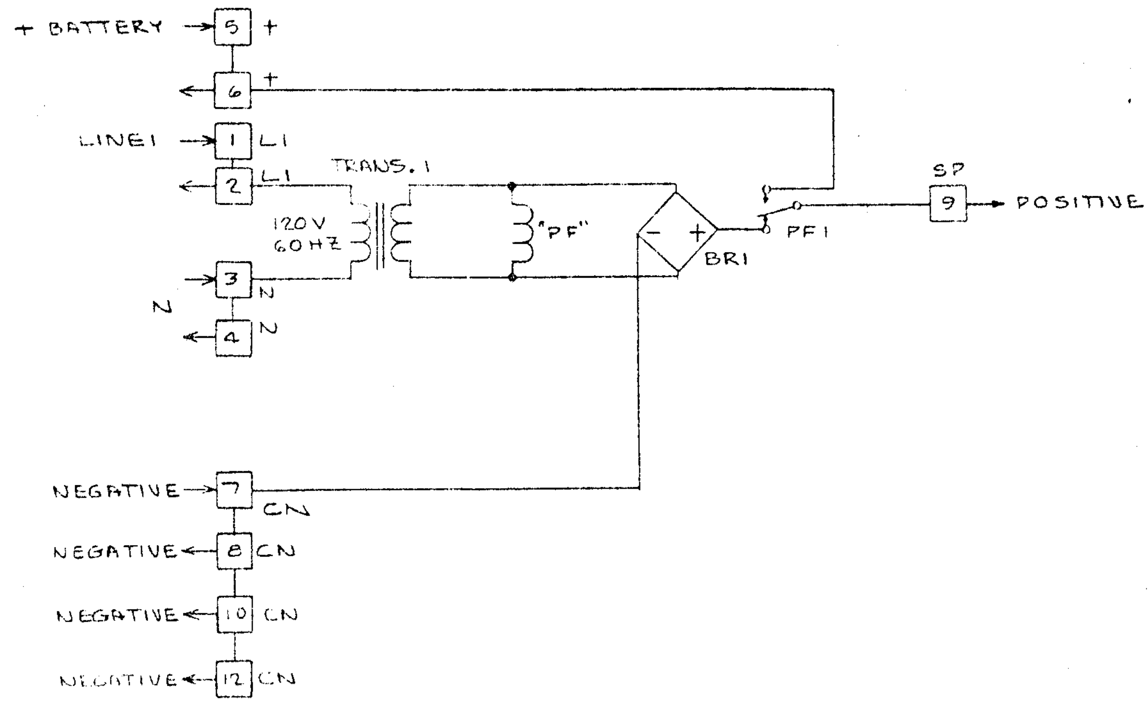
004151 B



SPA-3-2-RH

STANDARD ELECTRIC TIME CO. SPRINGFIELD MASS. 01101

SIGNAL POWER SUPPLY



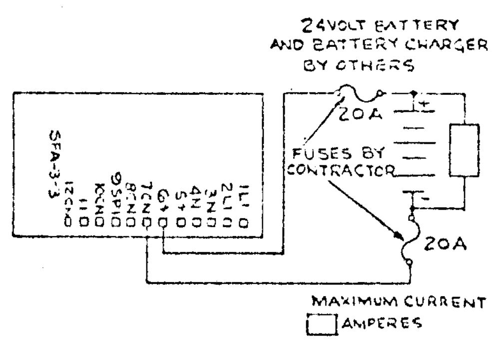
NOTES:
CIRCUIT SHOWN WITH POWER ON, AND RELAY "PF" IS ENERGIZED
☐ DESIGNATES INSTALLATION WIRING TERMINALS

ED	SYM	EN	REVISION	BY	DATE
			DELETE C1 .47 MFD	RSK	6-26-72

STANDARD ELECTRIC TIME — SPRINGFIELD MASS. 01101

SIGNAL POWER SUPPLY 1 CIRCUIT

MATERIAL | FINISH
BLANK 004-083 | REQ
CAT NO SFA-3-3
DATE 5-8-73
SCALE ——
DRAWN OCB | TRACED | CHECKED | APPROV
210841-2C NO 2



SIGNAL POWER SUPPLY LABEL NO.009669

SFA-3-3-RH

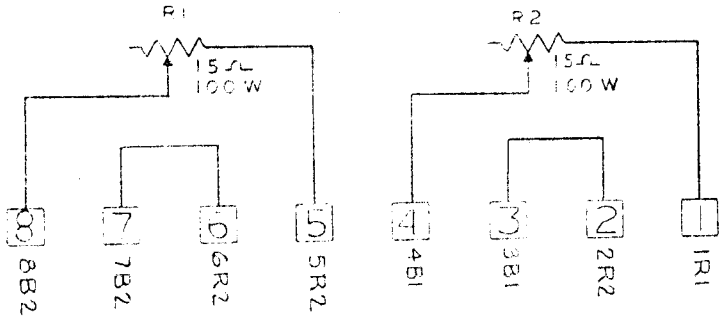
ED	SYM	EN	REVISION	BY	DATE

STANDARD ELECTRIC TIME, SPRINGFIELD MASS.

SIGNAL POWER SUPPLY R.H.

SCALE FULL

004669 R.H.



NOTE

□ DESIGNATES INSTALLATION WIRING TERMINALS

ALL WIRING U/L LABELED NO. 14 AWG STRANDED 1/32 INSULATION THERMOPLASTIC RATED 105°C

ED	SYM	EN	REVISION	BY	DATE
				R.S.K	

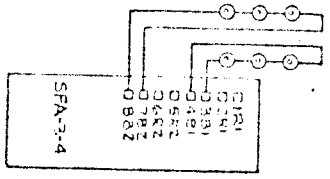
STANDARD ELECTRIC TIME
SPRINGFIELD MASS. 01101

RESISTOR MODULE

CAT. NO. SFA-3-9

210964-2-C ED

NOTE:
SIGNAL CIRCUITS ARE SUPERVISED. BELLS ARE SINGLE STROKE RATED 4 VOLTS D-C 1.5 AMPERES EACH. NOT MORE THAN 6 BELLS IN EACH SERIES CIRCUIT.
TO ADJUST FOR LESS THAN 6 BELLS IN A SERIES CIRCUIT, REMOVE COVER PLATE AND SLIDE RESISTOR BAND UNTIL CIRCUIT DRAWS 1.5 AMPERES. REPLACE COVER PLATE.



LOCATE THIS MODULE IN UPPER MOST PORTION OF RACK ASSEMBLY

RESISTOR LABEL NO. 004186

SFA-3-4-RH

ED	SYM	EN	REVISION	BY	DATE

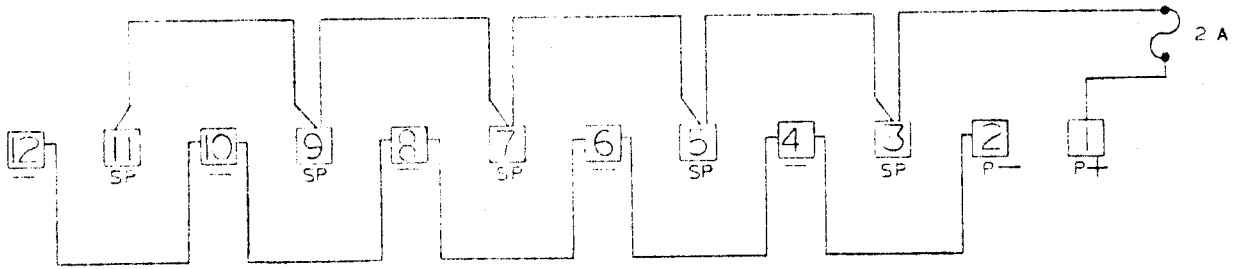
STANDARD ELECTRIC TIME — SPRINGFIELD MASS. 01101

MATERIAL | FINISH

DRAWN | TRACED | CHECKED

RESISTOR MODULE R.H

004186 R



NOTE

□ DESIGNATES INSTALLATION WIRING TERMINALS

ALL WIRING U/L LABELED NO. 16 AWG SOLID 1/32 INSULATION THERMOPLASTIC RATED 90°C

ED	SYM	EN	REVISION	BY	DATE

STANDARD ELECTRIC TIME — SPRINGFIELD MASS. 01101

POWER MODULE

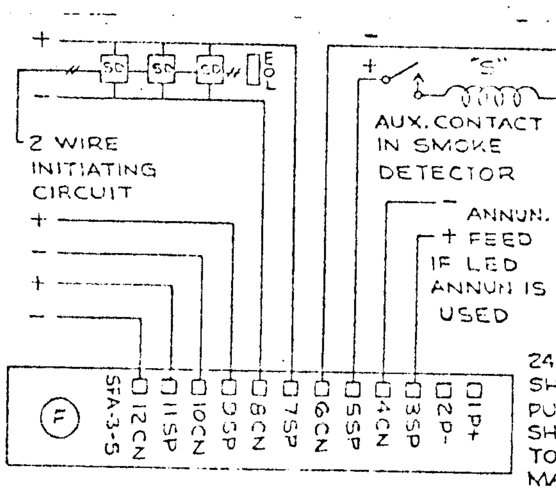
MATERIAL — FINISH — REQ

BLANK

DRAWN: RSP — TRACED — CHECKED — APPROV

CAT. NO. SFA-2-S — DATE — SCALE

2109-5-2-C



POWER MODULE LABEL NO. 00441G

SUPPLEMENTARY FUNCTI... BY OTHERS - SUCH AS FAN SHUTDOWN. FOR CON- TACT RATING SEE LABEL IN SUPPLEMENTARY CON- TROL RELAY. FOR AUX. CONTACT RATING SEE LABEL IN SMOKE DETECTOR.

NOTE:
TYP. USE OF THIS MODULE ... TO CONFORM TO CODE REQUIREMENTS WHERE SMOKE DETECTORS REQUIRE 24 V.D.C. FEED, ONE POWER MODULE SHOULD BE DEDICATED FOR THAT PURPOSE. A SECOND POWER MODULE SHOULD BE USED TO SUPPLY POWER TO SUPPLEMENTARY DEVICES. MAXIMUM TOTAL CURRENT FROM THIS MODULE IS 2 AMPERES.

SFA-3-5-RH

ED	SYM	EN	REVISION	BY	DATE

STANDARD ELECTRIC TIME — SPRINGFIELD MASS. 01101

POWER MODULE R.H.

MATERIAL	FINISH		
BLANK	REQ		SCALE
DRAWN	TRACED	CHECKED	APPR.

004416 B

SET/7000

BATTERY CHARGERS

THEORY OF OPERATION

The automatic battery charger, module SFA-3-6, is the most complex of the battery charger units. The functional diagram for this unit is shown in Figure IX. A DC power supply with current limiting (I limit)requires an input of 120VAC, single phase, 60 Hz. The output is monitored by a front panel mounted ammeter and voltmeter. When power is initially turned on, the target drop (TD) remains red, and the TP output is high. Activating the momentary contact reset switch energizes the K relay and TD. The relay is locked on by its contact, and TD shows white, indicating normal conditions.

Activating the reset switch initially turns on the low level control circuit and the output switch so that the battery will charge. When the battery reaches the voltage set by P1, the high level control circuit activates a timer circuit. The timer holds the output switch on for approximately one hour and charges the battery above its nominal capacity. P2 and the low level control circuit turn on the output switch when the battery voltage drops to a preset value. If the low level control fails to turn on and the voltage continues to drop to a preset level determined by P3, the trouble switch opens. This de-energizes the K relay, causes the target drop to show red, and places a high level on the TP output.

An adjustable power resistor in the module allows the unit to supply a nominal trickle charge current of approximately 0.5 milliamps to the battery. A circuit breaker in the output line protects the battery from a short circuit in the load lines.

The circuit breaker, one hour timer and P3/trouble switch are omitted on the basic battery charger module.

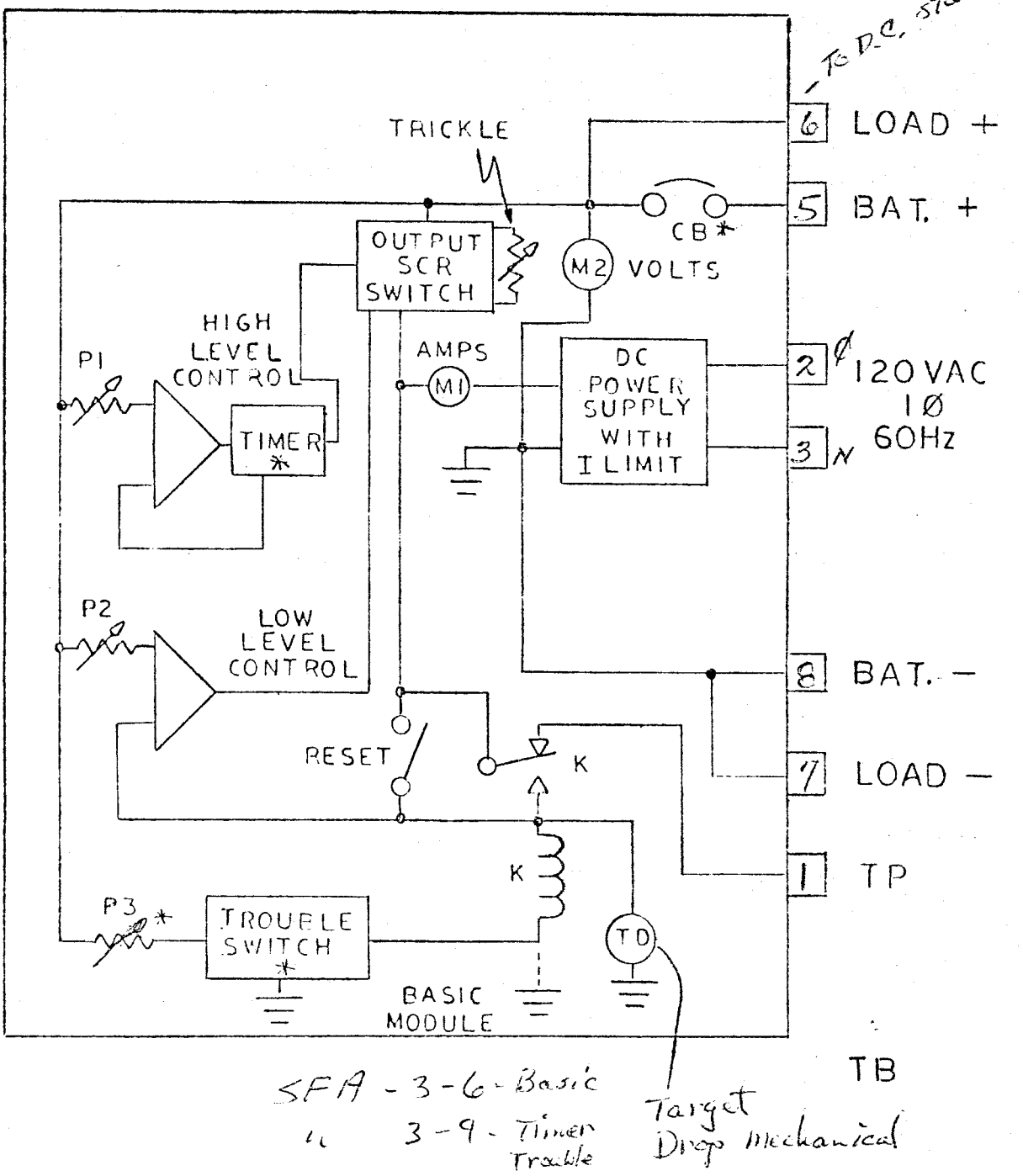
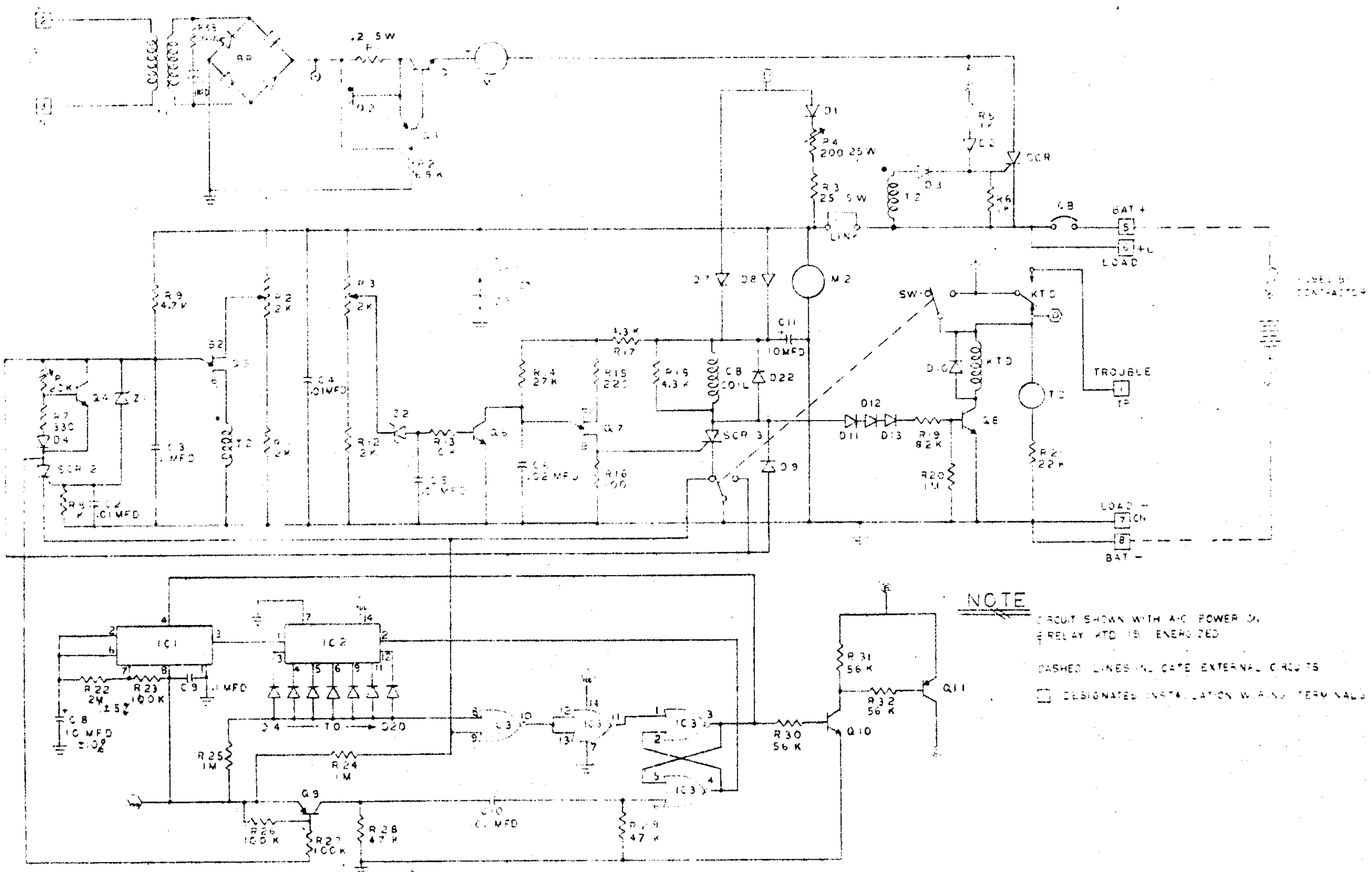


FIGURE IX

AUTOMATIC BATTERY CHARGER



NOTE

CIRCUIT SHOWN WITH A/C POWER ON & RELAY KTD IS ENERGIZED

DASHED LINES INDICATE EXTERNAL CIRCUITS

☐ DESIGNATED INSTALLATION WIRING TERMINALS

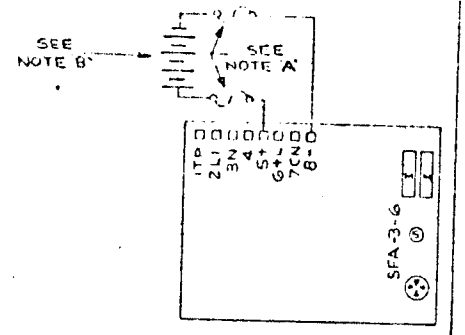
ED	SYM	EN	REVISION	BY	DATE
	A		REVISED ... REVISED NOMENCLATURE		

STANDARD ELECTRIC TIME CO. SPRINGFIELD MASS.

BATTERY CHARGER

D. 2

BATTERY CHARGER LABEL NO.004153



NOTE 'A':
FUSES ARE BY CONTRACTOR,
FUSE AT ☐ AMPERES.

NOTE 'B':
BATTERY IS 24 VOLTS ☐ A/H
AT ☐ HOUR RATE.

NOTE 'C':
MAXIMUM CHARGE RATE TO BATTERY
☐.☐ AMPERES.
BATTERY IS MAINTAINED ON TRICKLE
RATE TO HOLD BATTERY AT:
NICKLE CADMIUM BATTERY AT 28 VOLTS
LEAD ACID BATTERY AT 25.9 VOLTS

SFA-3-6

ED	SYM	EN	REVISION	BY	DATE

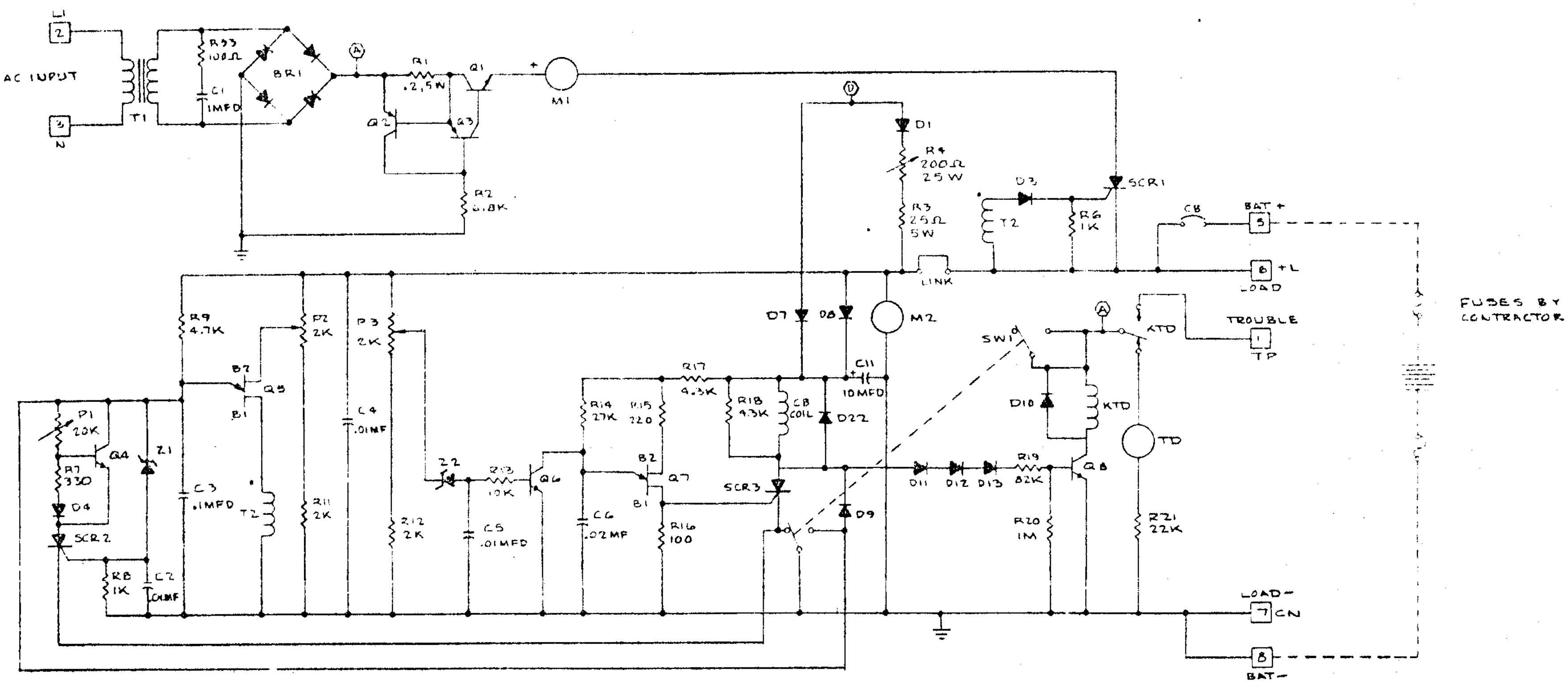
STANDARD ELECTRIC TIME
SPRINGFIELD MASS. 01101

BATTERY CHARGER

MATERIAL	FINISH	CAT NO	S O
BLANK	REQ	DATE	SCALE FULL

DRAWN	TRACED	CHECKED	APPROV
J.F.			

004153 R1



NOTES:
CIRCUIT SHOWN WITH AC POWER ON
AND RELAY KTD IS ENERGIZED
☐ INDICATES INSTALLATION WIRING
TERMINALS
DASH LINES INDICATE EXTERNAL CIRCUITS.

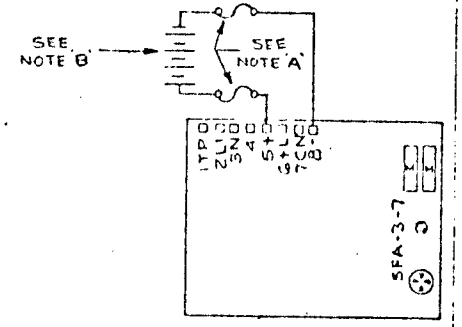
ED	SYM	EN	REVISION	BY	DATE
2			ADDED R33 & C1 / REVISED NAMENCLATURE & CIRCUIT		

STANDARD ELECTRIC TIME

BATTERY CHARGER W/O TIMER

210984 2D-2

BATTERY CHARGER LABEL NO. 004678



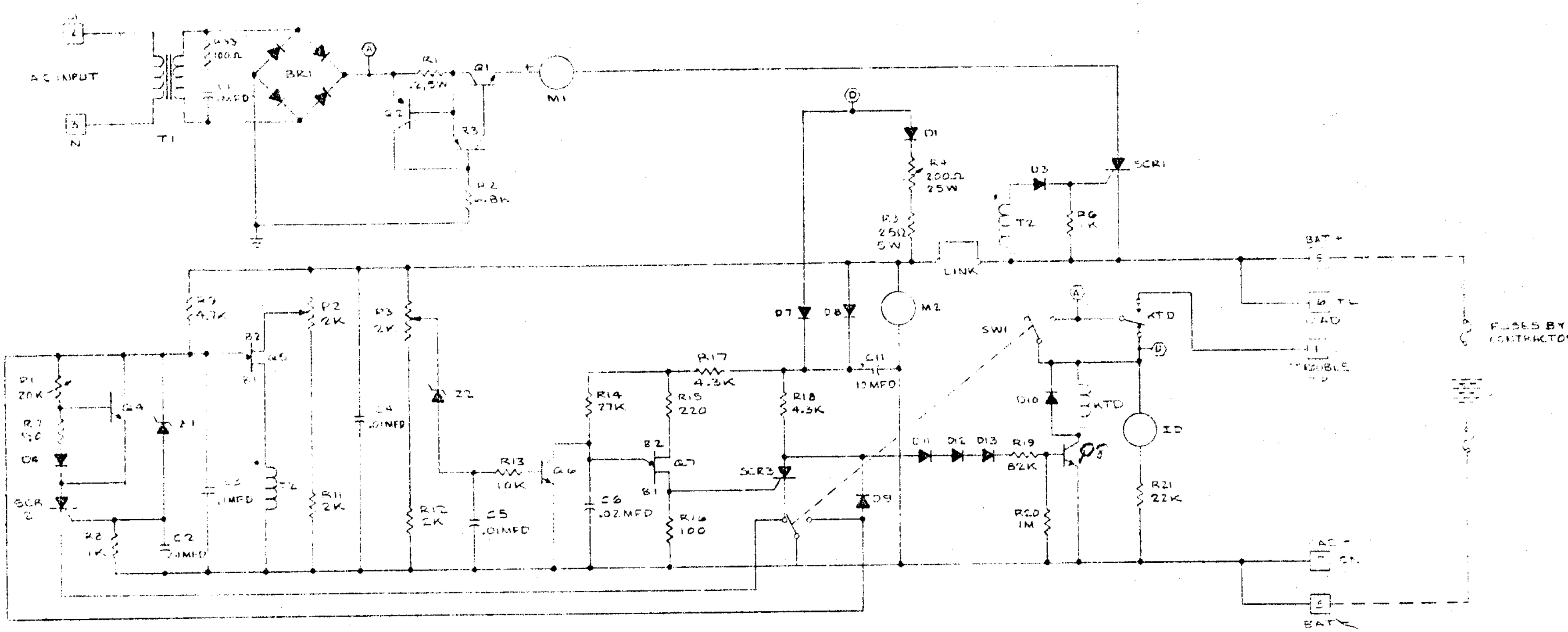
NOTE 'A':
FUSES ARE BY CONTRACTOR.
FUSE AT ☐ AMPERES.

NOTE 'B':
BATTERY IS 24 VOLTS ☐ A/H
AT ☐ HOUR RATE.

NOTE 'C':
MAXIMUM CHARGE RATE TO BATTERY IS ☐ AMPERES.
BATTERY IS MAINTAINED ON TRICKLE RATE TO HOLD BATTERY AT:
NICKLE CADMIUM BATTERY AT 28 VOLTS
LEAD ACID BATTERY AT 25.9 VOLTS

SFA-3-7

STANDARD ELECTRIC TIME	SPRINGFIELD MASS. 01101	BATTERY CHARGER			
MATERIAL	FINISH		CAT. NO	S. O.	
BLANK		REQ	DATE	SCALE FULL	
DRAWN	TRACED	CHECKED	APPROV	004678 D	



NOTES:
CIRCUIT SHOWN WITH A-C POWER ON AND RELAY KTD IS ENERGIZED
□ DESIGNATES INSTALLATION WIRING TERMINALS.
DASH LINES INDICATE EXTERNAL CIRCUITS.

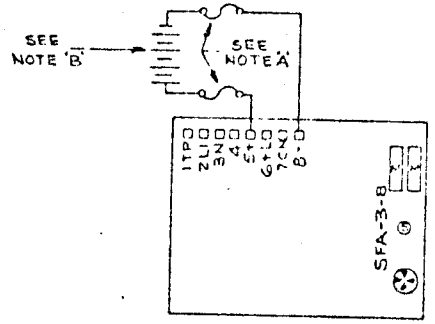
2	ADDED ... REVISED NOMENCLATURE ...		
ED SYM EN	REVISION	BY	DATE

STANDARD ELECTRIC TIME — SPRINGFIELD MASS

BATTERY CHARGER W/ TIMER & DISC.

210985-2D-2

BATTERY CHARGER LABEL NO. 004679



NOTE 'A':
FUSES ARE BY CONTRACTOR.
FUSE AT ☐ AMPERES.

NOTE 'B':
BATTERY IS 24 VOLTS ☐ A/H
AT ☐ HOUR RATE.

NOTE 'C':
MAXIMUM CHARGE RATE TO BATTERY IS 2.5 AMPERES.
BATTERY IS MAINTAINED ON TRICKLE RATE TO HOLD BATTERY AT:
NICKLE CADMIUM BATTERY AT 28 VOLTS
LEAD ACID BATTERY AT 25.9 VOLTS

SFA-3-8

ED	SYM	EN	REVISION	BY	DATE

STANDARD ELECTRIC TIME
SPRINGFIELD MASS. 01101

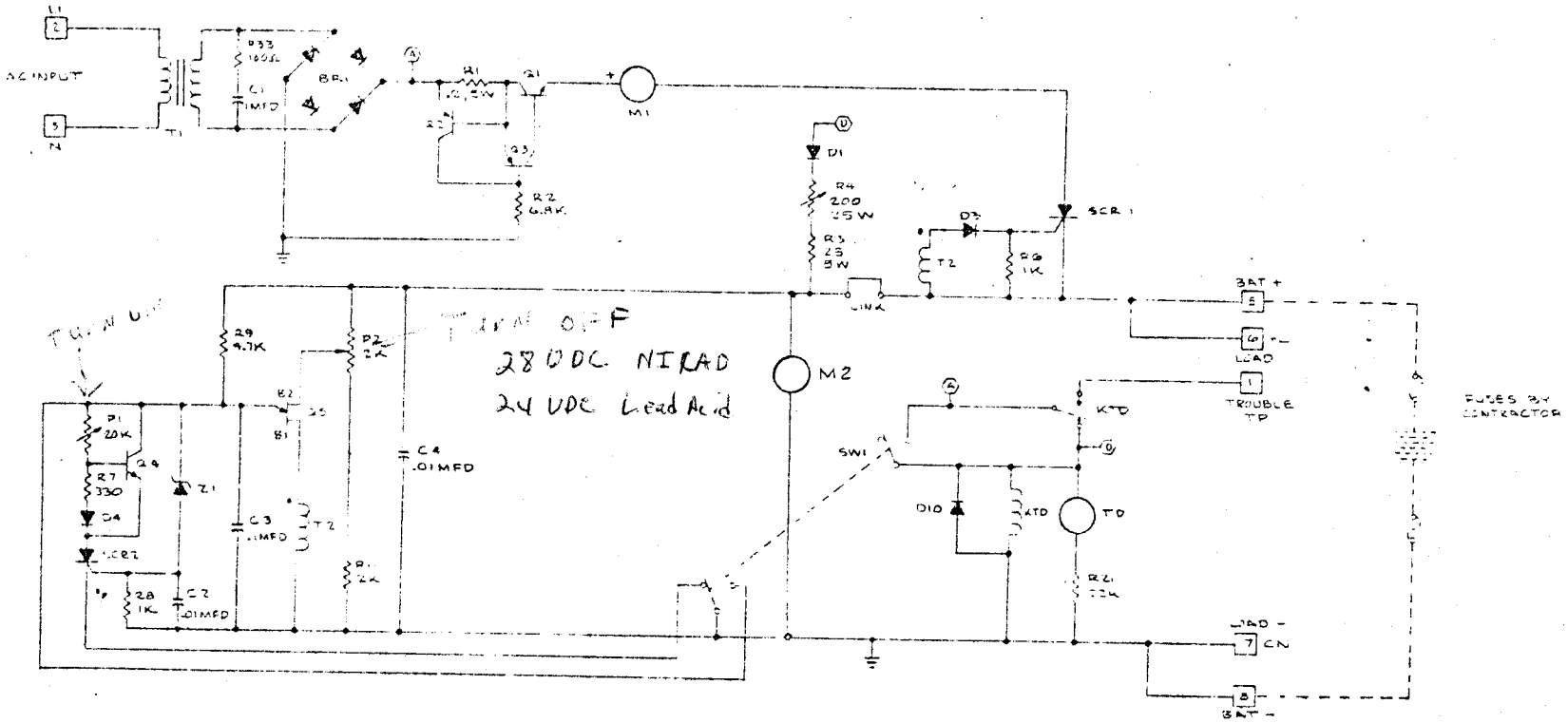
MATERIAL | FINISH
BLANK

DRAWN | TRACED | CHECKED

BATTERY CHARGER

NO | SIZE
SCALE FULL

004679 B



NOTES:

CIRCUIT SHOWN WITH A-C POWER ON AND RELAY KTD IS ENERGIZED.

☐ DESIGNATES INSTALLATION WIRING TERMINALS

DASH LINES INDICATE EXTERNAL CIRCUITS.

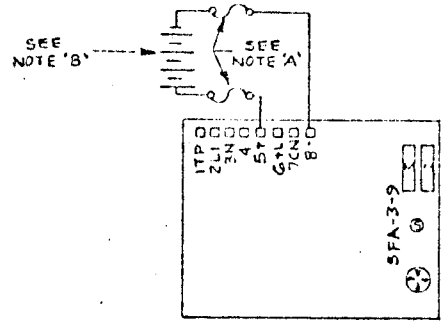
REVISION	BY	DATE
ADDED M2		

STANDARD ELECTRIC TIME SPRINGFIELD, VERMONT

BATTERY CHARGER

1-966-20-5

BATTERY CHARGER LABEL NO.004680



NOTE 'A':
FUSES ARE BY CONTRACTOR.
FUSE AT ☐ AMPERES.

NOTE 'B':
BATTERY IS 24 VOLTS ☐ A/H
AT ☐ HOUR RATE.

NOTE 'C':
MAXIMUM CHARGE RATE TO BATTERY IS 2.5 AMPERES.
BATTERY IS MAINTAINED ON TRICKLE RATE TO HOLD BATTERY AT:
NICKLE CADMIUM BATTERY AT 28 VOLTS
LEAD ACID BATTERY AT 25.9 VOLTS

SFA-3-9

ED	SYM	EN	REVISION	BY	DATE

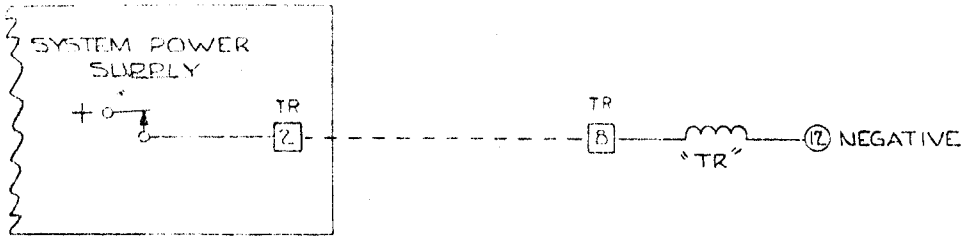
STANDARD ELECTRIC TIME — SPRINGFIELD MASS. U.S.A.

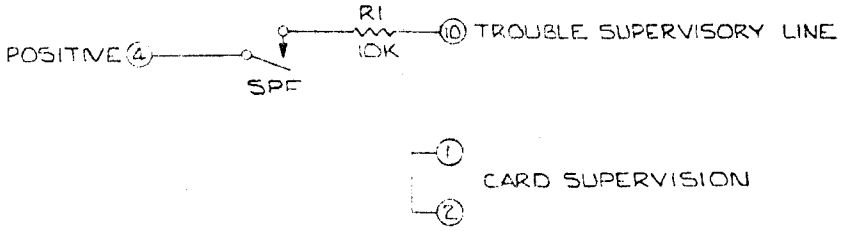
BATTERY CHARGER

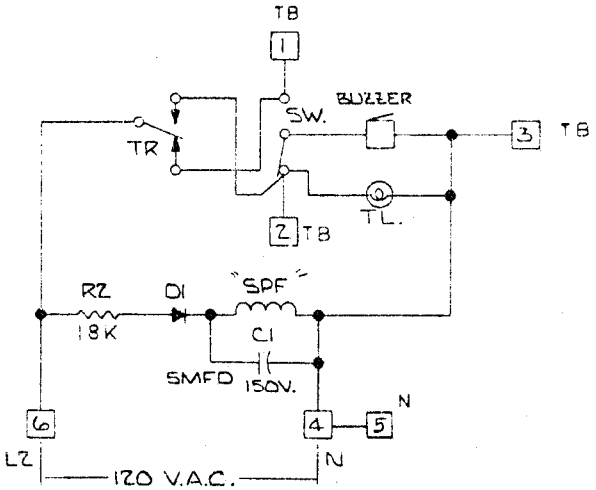
MATERIAL	FINISH	CAT. NO	S.O.
BLANK		DATE	SPACE FILLER

DRAWN | TRACED | CHECKED | APPD.

004680 B.







NOTE:
CIRCUIT SHOWN WITH POWER ON AND RELAYS "SPF" & "TR" ARE ENERGIZED.

□ DESIGNATES INSTALLATION WIRING TERMINAL.

○ DESIGNATES PRINTED CIRCUIT CONNECTORS

DASHED LINES INDICATE EXTERNAL CIRCUITS.

ED	SYM	EN	REVISION	BY	DATE
			SPF WAS 11FP6000W BSL		
			R2 WAS 22 K "TR" WAS 11FP550W BSL	RK	6-15-72

STANDARD ELECTRIC TIME — SPRINGFIELD MASS. 01101

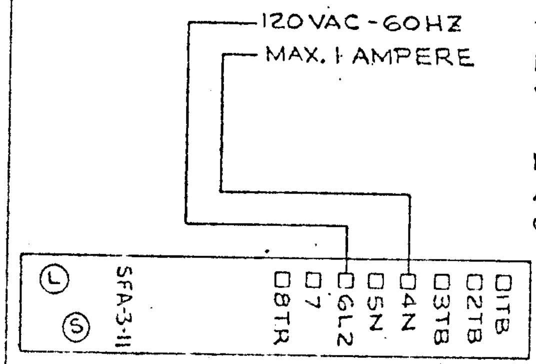
DOUBLE SUPERVISION

MATERIAL — FINISH — CAT. NO SEA-3-10 — E.O.

BLANK 209-085 — REQ — DATE 5-31-72 — SCALE

DRAWN	TRACED	CHECKED	APPROV
B.R.C.			

210764-2-C ED 2



NOTE:
120 VOLT LINE IS TO BE FROM A LEG OF A SINGLE PHASE THREE WIRE OR LEG OF A MULTI-PHASE THREE OR FOUR WIRE LIGHT AND POWER CIRCUIT NOT OTHERWISE USED FOR POWER IN THE FIRE ALARM SYSTEM, AND THE CONTINUOUS UNFUSED NEUTRAL LEG OF THIS SYSTEM.

DOUBLE SUPERVISION LABEL NO. 004182

SFA-3-10-RH

ED	SYM	EN	REVISION	BY	DATE

STANDARD ELECTRIC TIME — SPRINGFIELD MASS. 01101

DOUBLE SUPERVISION MODULE R.H.

MATERIAL	FINISH	CAT. NO	S.O.
BLANK	REQ		SCALE TWICE
DRAWN J. G.	TRACED	CHECKED	APPROV.

004182 B

SET/7000

SWITCHING REGULATOR MODULE FOR SMOKE DETECTORS

THEORY OF OPERATION

The switching regulator accepts the standard system DC input from pin 4 of the mother board and produces a well regulated DC output on pin 3 for the smoke detectors and associated control modules. (Figure X).

The major part of the regulator consists of the power switching circuit and energy storage devices. Under normal conditions the current output is small, and the circuit switches at a slow rate to store energy in the module inductors and capacitors. As the load increases, the circuit operates at a faster rate to maintain a constant output voltage.

The voltage sensing circuit, which consists of a resistor network at the output, is selected to give an output voltage between 19 and 22VDC. Small variations in output voltage (typically millivolts) are connected to the input of an error amplifier which controls the switching network. If the output voltage begins to drop, the error amplifier causes the switching circuit to supply more current to the output to maintain a constant output voltage. If the output voltage begins to increase, the error amplifier causes the switching circuit to supply less load current and maintains a constant output voltage.

An electronic protection circuit has been included in the module. The current limit circuit allows the output voltage to remain constant for loads up to 3.0 amps. If the load increases above this value, the output voltage decreases rapidly, and power dissipation within the module is limited to a safe value.

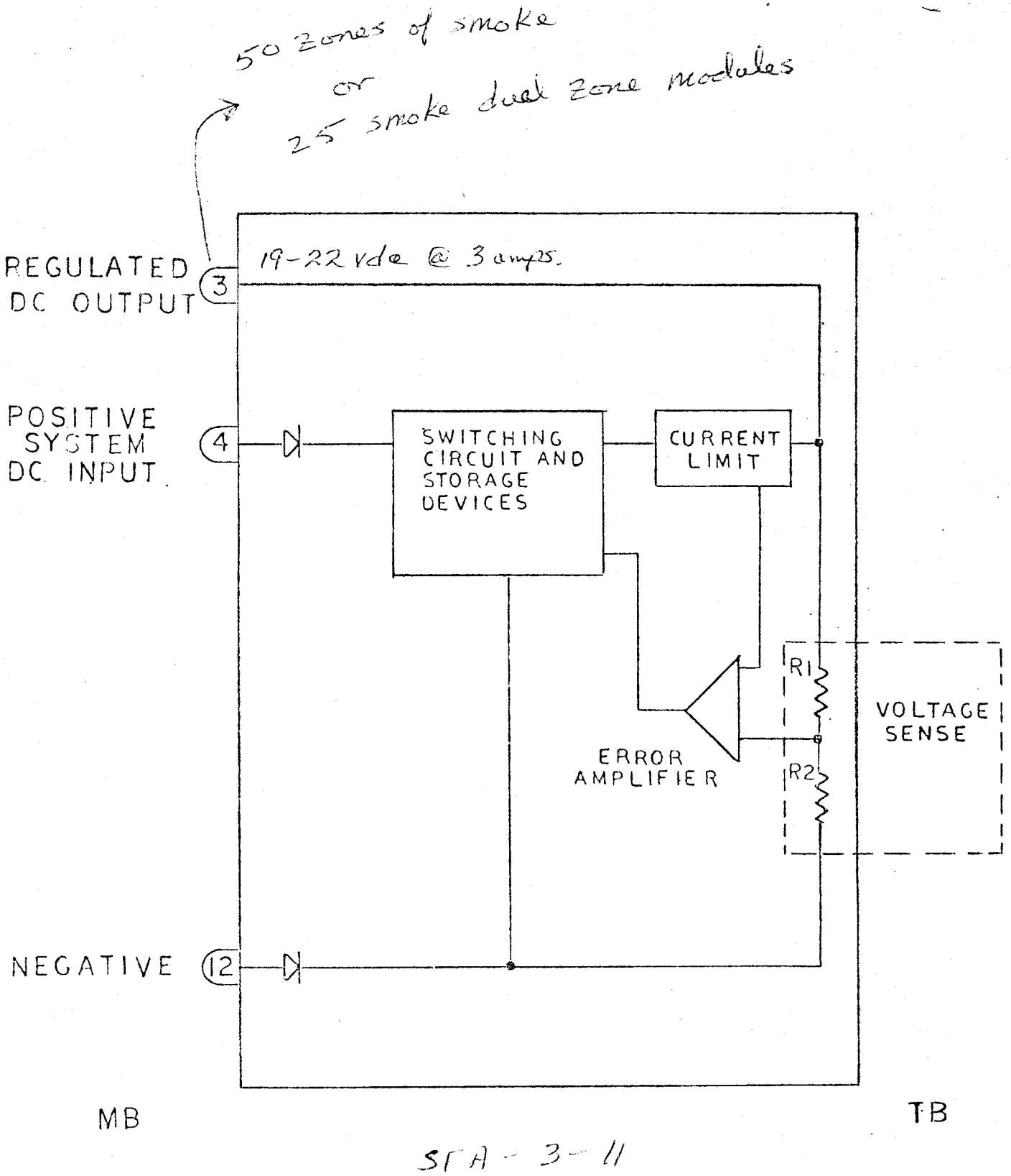
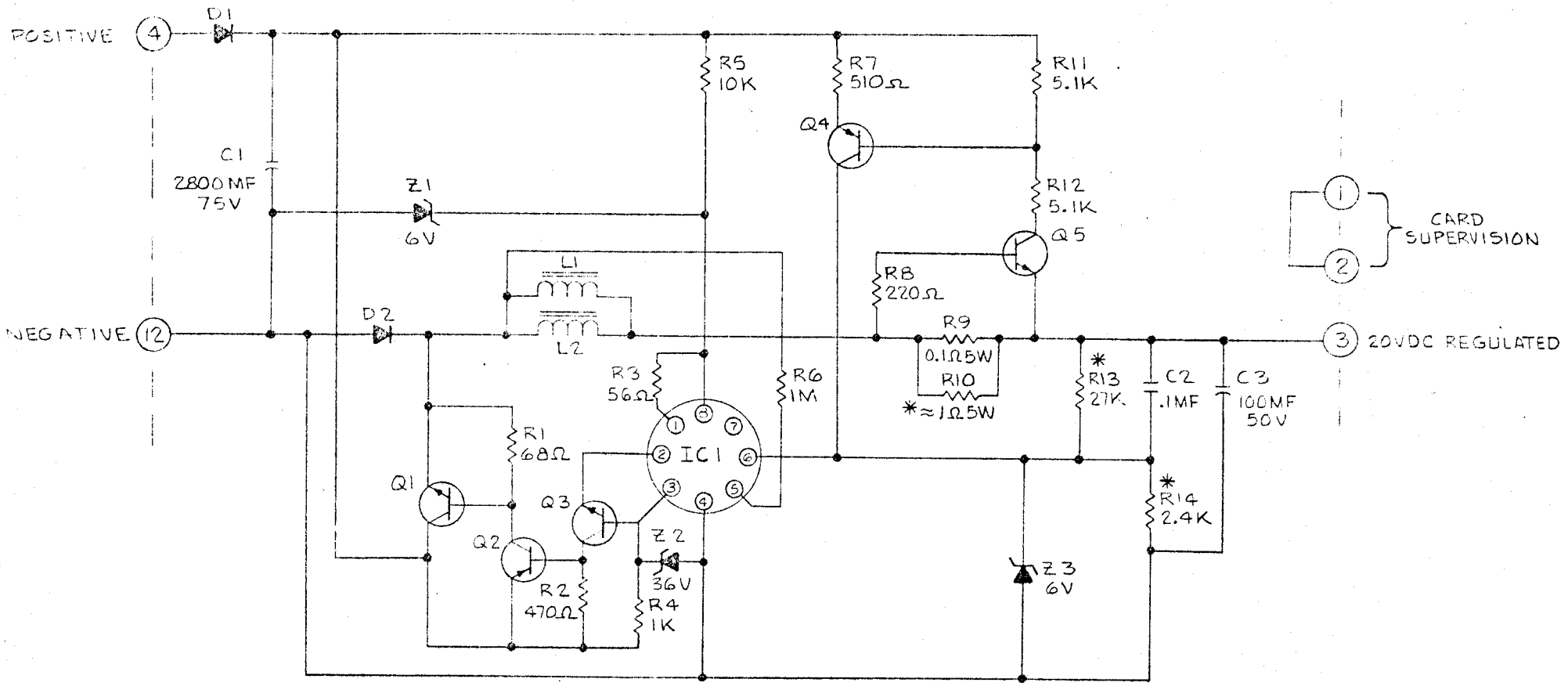


FIGURE X

SWITCHING REGULATOR
FOR SMOKE DETECTORS



* 5WATT RESISTOR IN PARALLEL WITH 0.1Ω RESISTOR SELECTED TO LIMIT OUTPUT CURRENT BETWEEN 3 & 3.2 AMPS

* R13 & R14 ARE MEAN VALUES. ADJUST TO OBTAIN OUTPUT VOLTAGE BETWEEN 19 & 22 VOLTS.

ED	SYM	EN	REVISION	BY	DATE

STANDARD ELECTRIC TIME — SPRINGFIELD MASS. 01101

SCHEMATIC-
SWITCHING REGULATOR
FOR SMOKE DETECTOR

MATERIAL | FINISH | CAT NO SFA-311

BLANK 024-430 REV | DATE 9-11-72

DRAWN LW | TRACED | CHECKED | APPROV

211468-2C REV