

G. POWER SUPPLIES

GENERAL DESCRIPTION:

The Swan Universal Power Supply systems are designed to provide all necessary voltages required by Swan Transceiver models 240, 250, 300-C, 350, and 400. The model 117-X basic A.C. supply is designed for an input of 117 volts at 50 or 60 cycles. The model 230-X is identical except that it operates with either 117 or 230 volts. For fixed station use, the 117-X or 230-X is installed in a cabinet which matches the Swan transceivers. This cabinet also contains a speaker, phone jack, and indicator light. The complete combination is designated as model 117-XC or 230-XC. The A.C. line cord plugs into the back of the supply. In the 230-XC, provision for changing from 117 to 230 volts input is made by simply changing line cords. Wiring changes are taken care of in the line cord plug.

12 VOLT OPERATION:

A D.C. Module attaches to the back of the A.C. supply and converts it for 12 volts D.C. input. the model 14-X D.C. Module is for negative ground systems, the most common type. (For positive ground systems, the model 14-XP D.C. module is available.) The combined units are designated as model 14-117 or 14-230 depending on which A.C. supply is used. The positive ground models are designated as model 14P-117 or 14P-230.

With the versatility of this power supply design, a number of advantages become apparent. The D.C. supply may be operated from an A.C. line by detaching the D.C. module, making a simple wiring change, and plugging in an A.C. cord. (See instructions under "Mobile Installation.")

The matching A.C. supply, model 117-XC or 230-XC, may be converted easily to 12 volts input by attaching the 14-X D.C. module to the back. This provides for portable or emergency operation from a 12 volt battery. There may also be times when it will be desirable to operate temporarily in an automobile, such as during a vacation trip, field day, or emergencies. The 117-XC can be set on the floor or front seat, and with the 14-X attached it becomes a 12-volt power supply, complete with speaker.

SPECIFICATIONS:

Power Rating: 200 watts average, 500 watts peak.
Input:

Model 117-X: 117 volts nominal, 50-60 cycles
Model 230-X: 230 volts or 117 volts, 50-60 cycles.
Model 14-X: 13 volts D.C. nominal, 40 amps peak.

Output:

800 volts at 200 ma. average, 600 ma. peak.
275 volts at 150 ma. continuous.
110 volts negative bias, at 100 ma.
12 volts D.C. at 200 ma., relay supply.
12.6 volts A.C. at 5.5 amps. (with A.C. input only)

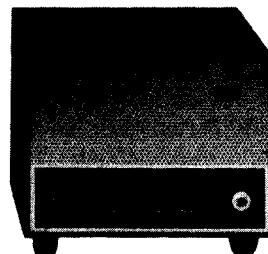


Fig. 6. MODEL 117-XC
AC POWER SUPPLY WITH SPEAKER

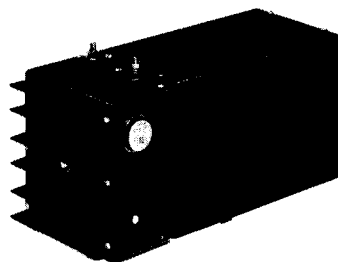


Fig. 7 MODEL 14-117
DC POWER SUPPLY

Battery Drain with Swan Transceiver

Rec: 3.5 amps. Trans: 16 amps average, 40 amps peak (not including filament drain of transceiver).

DESIGN:

Both the A.C. and D.C. sections are conservatively designed for long, reliable service with a minimum failure rate. At the same time, they are designed for easy access and servicing for those times when it is required. Any component can be readily checked out and replaced in a matter of moments. The D.C. module and A.C. supply can be detached quickly from one another and tested individually, thus isolating the source of trouble.

The A.C. supply is quite conventional, using a silicon rectifier bridge for the medium voltage, and another for high voltage. The 117-X has a single primary winding for 117 volt input, while the 230-X has a pair of primary windings which connect in parallel for 117 volts, and in series for 230 volts. The switching is taken care of in the A.C. line cord plug.

The D.C. module uses two power transistors for switching in a flip-flop oscillator circuit. A large portion of the cost in this unit is in the transistors where no compromise has been made. They are rated at 60 amperes, with a 45 volt rating. A diode spike clipping circuit provides additional protection against one of the common sources of transistor failure.

**MOBILE INSTALLATIONS
READ CAREFULLY**

The 12 volt electrical system in an automobile will sometimes generate high voltage transients. This can be caused by the starter motor, the alternator or generator, or loose wiring, and can represent a serious hazard to the transistors in your DC power supply. By selecting the best transistors available for the application, your Swan supply is capable of absorbing a good deal of abuse, but there is a limit to what even the best transistors can take and for this reason we strongly urge that you read the following notes completely, and follow them carefully.

- (1) Clean and tighten the battery terminals and clamps.
- (2) Tighten battery cables where they attach to the starter solenoid and engine block.
- (3) Inspect battery cables for corrosion or wear. Replace them if they look questionable.
- (4) Check battery condition frequently. If the cells do not hold a similar charge or water level, replace the battery.
- (5) Check alternator, (or generator), and regulator connections for tightness. Also, primary ignition wiring, horn wiring, lights, etc.
- (6) Check the charging voltage from the alternator. Often the regulator is misadjusted, and the voltage setting may be excessive. It should not read more than 14.5 volts at normal engine speeds.

POWER SUPPLY INSTALLATION:

- (A) Connect the primary leads from the power supply directly to the battery terminals. Mount the ceramic fuse block with 50 amp. fuse in series with the positive lead. (With positive ground systems, the fuse goes in the negative lead). If possible, drill and tap a hole in the battery post itself for a contact stud. The more intimately the supply is connected to the battery, the less chance there is for voltage transients to reach it. Solder lugs are provided for the ends of the various leads.
- (B) The filament line comes prewired to the Jones plug, and has an in-line 9 amp. fuse. Connect this line to the ignition switch accessory terminal, as recommended in the schematic, Fig. 8. In most cars the 12 volts at this terminal is switched off while twisting the ignition key to start the engine. Thus, the relay in the power supply will also be turned off, and the transistors will not be subjected to the sharp transients put out by the starter motor. **NOTE:** The car radio is normally connected to the accessory terminal for the same reason. It may be more convenient to locate the 12 volt line going to the car radio, and splice into it with the transceiver filament line. Look for

SWAN MODEL 14-X D.C. MODULE

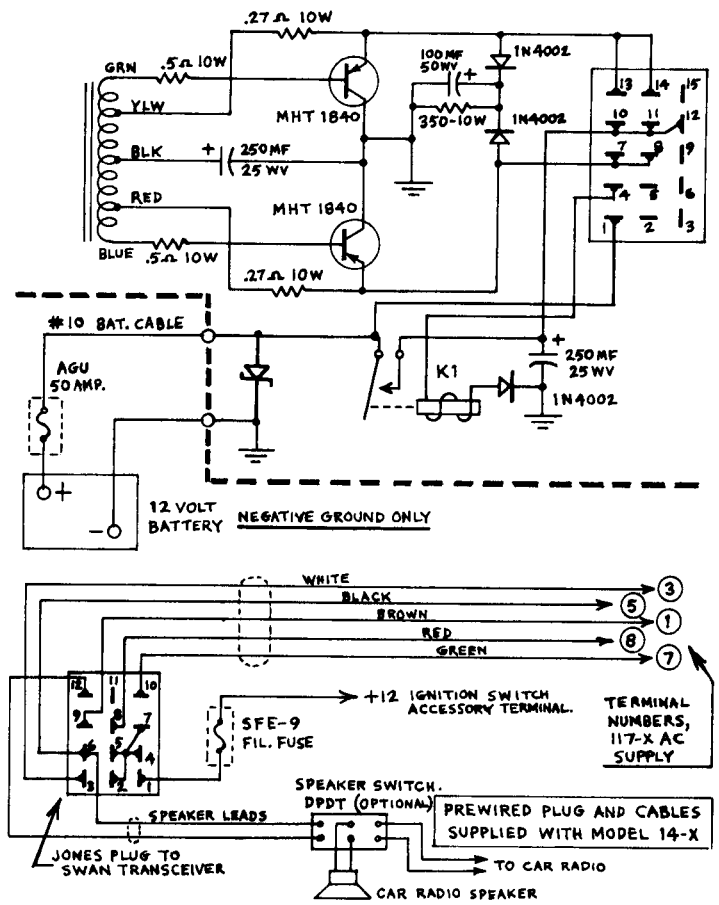


FIG. 8 MODEL 14-X D.C. MODULE

the car radio fuse, and connect to this circuit on the "hot side".

POWER SUPPLY PROTECTION—A Zener diode is installed in the Swan 14-X DC module for added protection. It is an 18 volt Zener which connects across the input terminals of the power supply. It conducts only when the input exceeds 18 volts, thus has no effect on normal operation. Transient voltage pulses which go beyond the 18 volt level will be absorbed by the diode, thus preventing them from reaching the transistors. This protection will be effective so long as the diode is operative. If transients reach a high enough level, or a long enough duration, the diode will eventually fail, and literally burn out. After this, the transistors are on their own, and will most likely fail for the same reason. (See Warranty Policy)

SPEAKER CONNECTIONS: Speaker leads coming from the Jones plug go to an under dash speaker, or to a speaker selector switch which may be installed as illustrated. Another arrangement which works well is to install a rear seat speaker for the car radio, and then connect the front speaker only to the transceiver.

SWAN MODEL 117-X (230-X) A.C. POWER SUPPLY

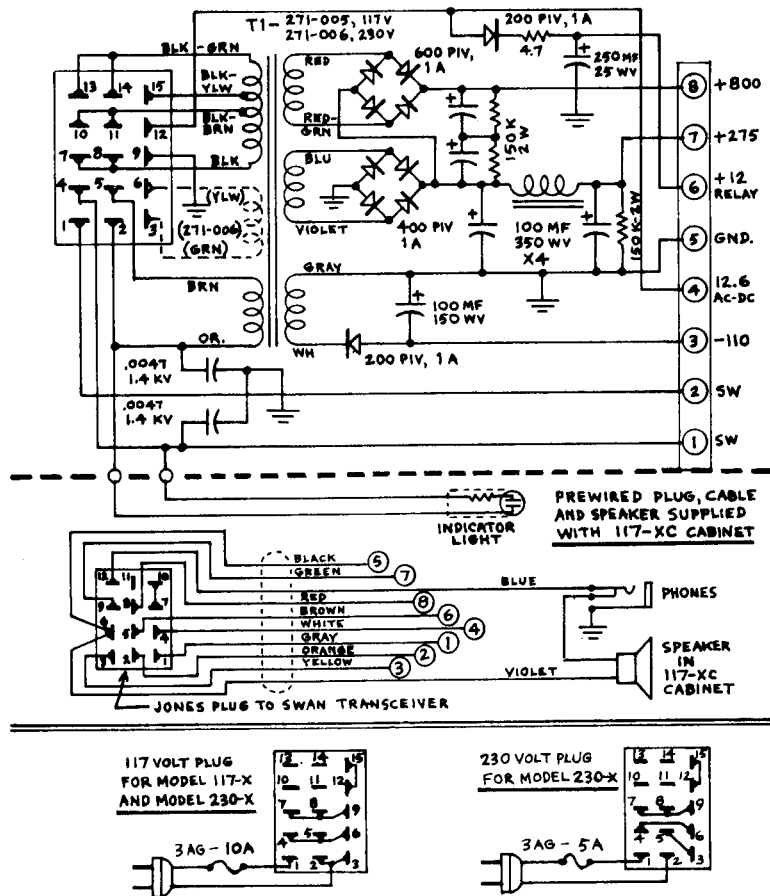


FIG. 9 MODEL 117-X (230-X) POWER SUPPLY

A.C. OPERATION: The 12 volt power supply may be operated from an A.C. line by two methods.

- (A) Detach the D.C. Module, and plug in an A.C. line cord in place of it. Before applying power, disconnect the brown cable wire going to terminal (1) of the A.C. supply and connect a jumper from terminal (1) to (2). Temporarily tape the brown wire to keep it from shorting to ground, since it will be carrying 12 volts D.C. Now the power supply will operate when the A.C. line is plugged in, although the transceiver filaments will still be operating on the battery. This arrangement will be useful primarily for checking out the A.C. portion of the supply when trouble shooting.
- (B) To operate the transceiver entirely on the A.C. line, it will be necessary to do the following: Disconnect the 5 wire cable going from the transceiver to the A.C. portion of the supply. Replace it temporarily with a 10 wire cable and hook-up as illustrated in the schematic diagram Fig. 9. This is the same cable and speaker hook-up used in the matching cabinet, 117-XC. Using the D.C. supply in this manner will prove useful for portable or

emergency operation from the car when A.C. power is available.

If frequent A.C. as well as D.C. operation with the mobile supply is contemplated, both the 5 wire and 10 wire cables may be connected simultaneously to the supply. Thus, when operating on D.C., the 5 wire cable is plugged into the transceiver, and on A.C. operation the 10 wire cable is used.

MATCHING CABINET:

Ordinarily the A.C. supply will be purchased complete in a matching cabinet as either model 117-XC or 230-XC. However, in some cases an owner may have purchased a 117-X or 230-X basic supply only, perhaps in a D.C. supply combination, and he may wish later on to mount it in a matching cabinet. For this purpose the cabinet with speaker and cables is available separately. The basic A.C. supply mounts inside with three screws, and the pre-wired cable connects as shown in the schematic. Connections to the phone jack and speaker have already been made. Two leads from the indicator light must be run through the grommet and soldered to the terminals provided at the bottom of the

supply. Refer to the schematic for clarification. The A.C. line cord is also provided with the matching cabinet kit. These line cords are available separately also, and come normally wired and stamped for 117 volts. 230 volt line cords are also available on special order, or the 117 volt line cord may easily be wired for 230 volts by referring to the schematic. Note that the 230 volt line cord will work only with the 230-X basic A.C. supply. The 117 volt line cord will work with either the 117-X or 230-X.

POWER SUPPLY

WARRANTY POLICY—The normal guarantee on your Swan power supply is for a period of 90 days from date of purchase, and covers all components, material and workmanship. In the case of transistor failure, however, the warranty on them will be void if inspection proves that high transient voltages from the automobile were responsible. We will do all in our power to be fair and just in this determination. The warranty card must be filled out and mailed to the factory within 10 days from date of purchase. Do not ship a unit to the factory for servicing without prior authorization. Check with your dealer first, as he may be in a position to handle the service work more quickly. This warranty is void if the equipment has been misused or damaged.

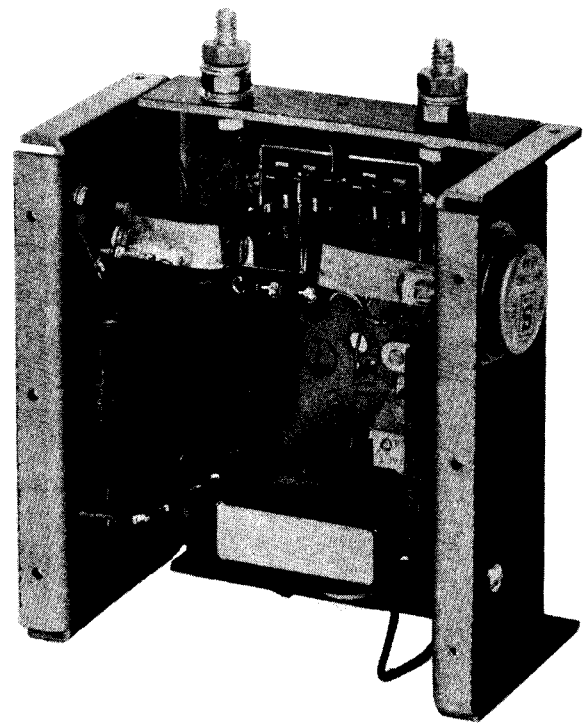


FIG. 10 MODEL 14-X, D.C. MODULE
INTERNAL VIEW

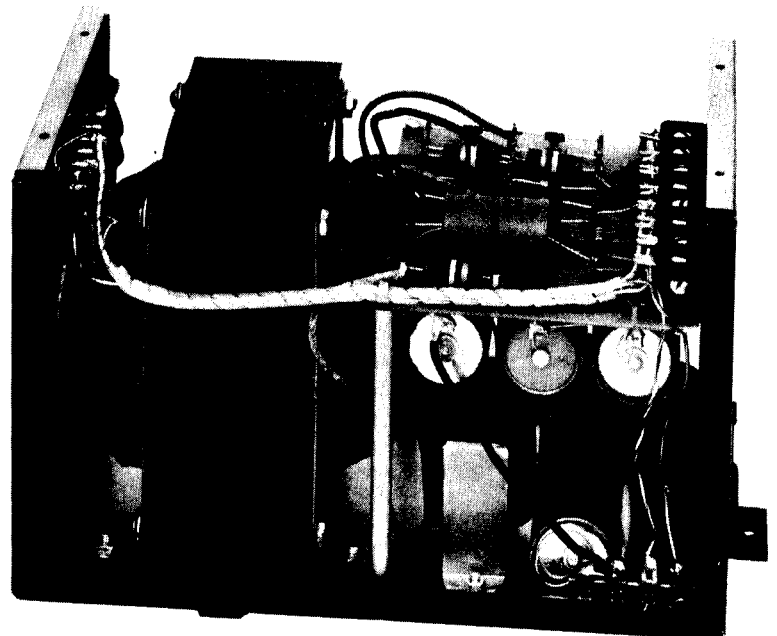


FIG. 11 MODEL 117-X BASIC AC POWER SUPPLY
INTERNAL VIEW

IV POWER SUPPLIES

GENERAL

Recommended power supplies for the Swan 400 are the Model 117B ac supply, and the Model 512 dc power supply. Model 117AC power supplies may be used, providing the modifications shown in Part I, on Page 8, are made. Model 117B power supplies are provided with a power cable with Jones plug attached for plugging into the transceiver. Model 512 power supplies are manufactured with a pre-wired cable to which must be connected a Jones plug after installation of the cable through the firewall of the automobile.

MODEL 117B POWER SUPPLY

Model 117B power supply is an all solid state bridge-type power supply, with the medium voltage supply provided through the center tap of the high-voltage transformer. All components of the unit are capable of handling maximum power requirements of the transceiver under all normal operating conditions. All switching for the power supply is performed in the transceiver. See Figure 8, Schematic Diagram

MODEL 512 DC POWER SUPPLY

The Model 512 power supply is a transistorized dc-to-dc converter designed for use in systems with negative grounds only. It supplies all power requirements for mobile operation of the transceiver. The Model 512 employs an entirely new design concept to provide the highest efficiency possible in mobile use. See Figure 9 for a schematic diagram of the unit.

INSTALLATION

The Model 512 may be mounted in any convenient location within the automobile. The engine compartment, near the battery, is an excellent location, since lead length will be minimized. Make all of the connections shown in Figures 10 and 11. Hardware is provided for complete installation of the supply. The power supply should be mounted with star washers on all mounting bolts to break through the anodized finish to provide a good ground. The charging rate of the generator or alternator should not exceed 13.5 to 14.0 volts.

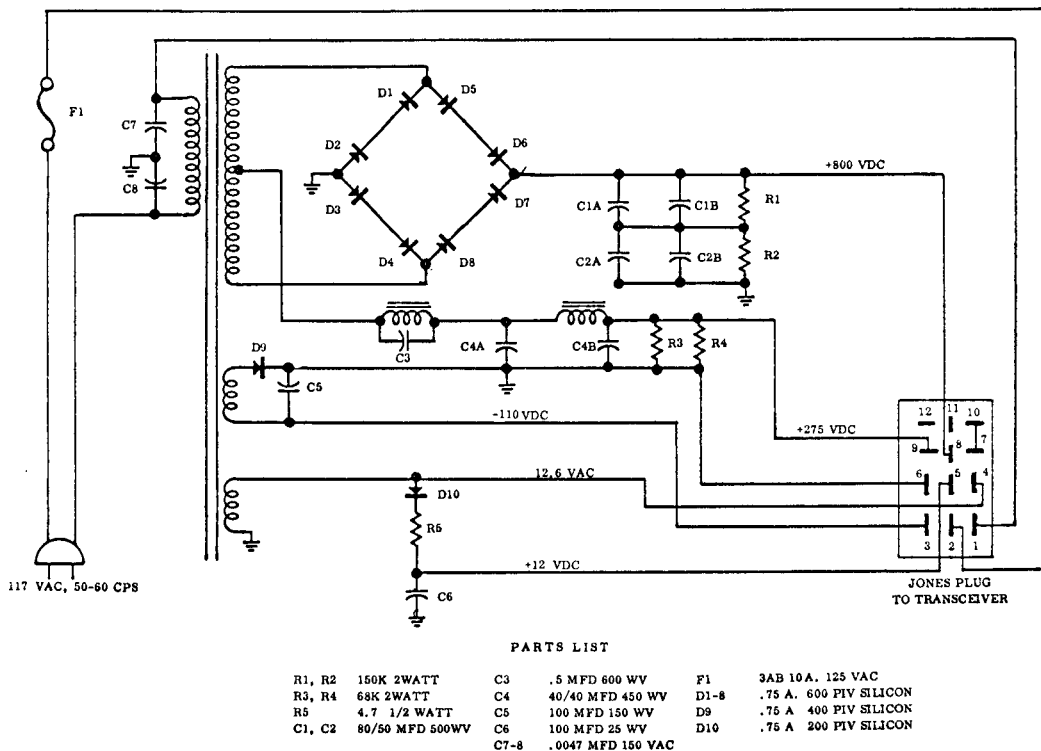


FIGURE 8 SCHEMATIC DIAGRAM, MODEL 117B AC POWER SUPPLY

IV POWER SUPPLIES

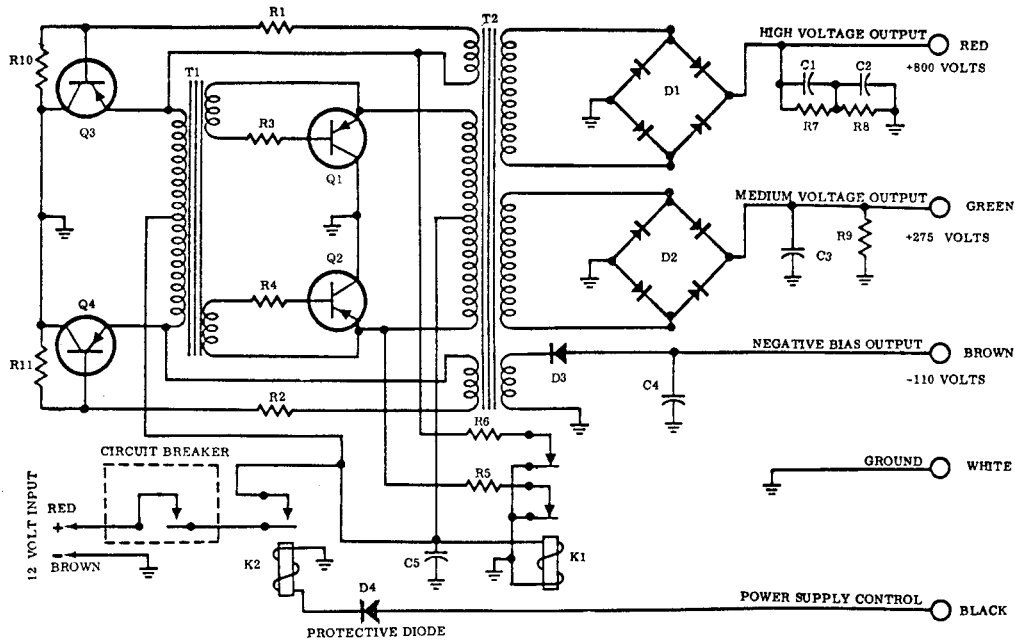


FIGURE 9 SCHEMATIC DIAGRAM, MODEL 512 DC POWER SUPPLY

PARTS LIST

Part No.	Description	Part No.	Description
R1, R2	270 ohms, 1/2 Watt, Carbon	Q1, Q2	Swan Part No. LS605S
R3, R4	0.24 ohm, 4 Watt Wirewound	Q3, Q4	Swan Part No. LS605B
R5	0.50 ohm, 5 Watt, Wirewound	D1	Swan Part No. DB1K5ADI
R6	5.6 ohm, 2 Watt, Wirewound	D2, D3	Diodes, Swan Part No. D-6K-5ADI
R7, R8, R9	100K ohms, 2 Watt, Carbon	D4	Swan Part No. D-1K-5ADI
R10, R11	3.3K ohms, 1/2 Watt, Carbon	T1	Swan Part No. 4041-1
C1, C2	20 MFD, 500 Volts, Electrolytic	T2	Swan Part No. 50012STI
C3	40 MFD, 450 Volts, Electrolytic	K1	Swan Part No. GR11D
C4	50 MFD, 150 Volts, Electrolytic	K2	Swan Part No. MAGW88DX-2
C5	2000 MFD, 15 Volts, Electrolytic	CB	Circuit Breaker, Swan Part No. L1303

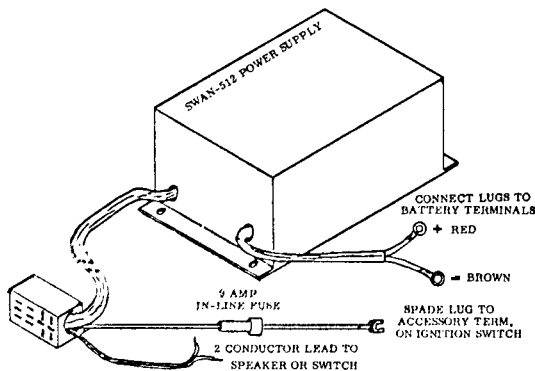


FIGURE 10 CABLING DIAGRAM

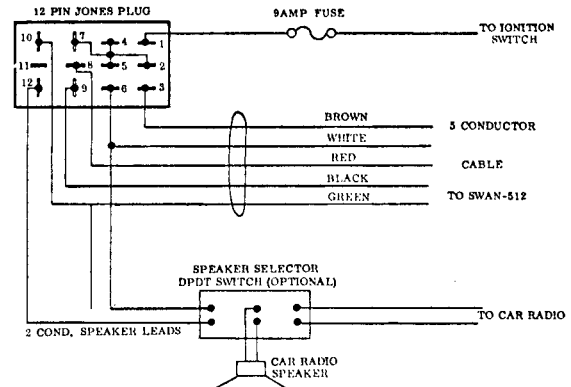


FIGURE 11 JONES PLUG WIRING DIAGRAM