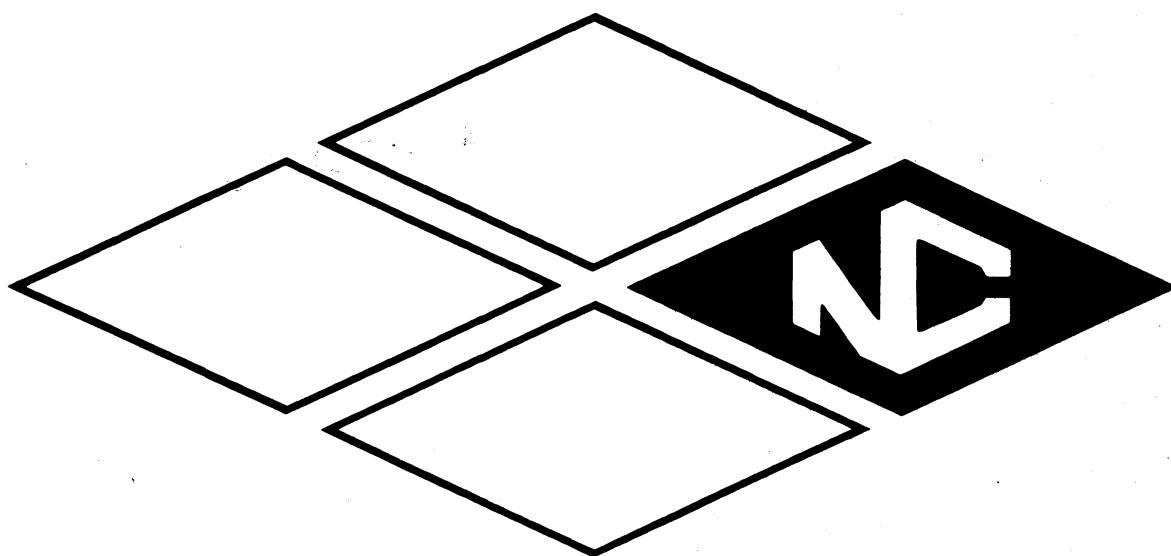


# ACCESSORY POWER SUPPLIES

## *Instruction Manual*

49 6252  
MODEL NCX-A  
MODEL NCX-D



NATIONAL RADIO COMPANY

## NCX-A POWER SUPPLY

The NCX-A Power Supply is a conservatively rated supply capable of providing all necessary power to operate the National NCX-3 transceiver or other similar equipment. The supply is housed in a gray-blue perforated cabinet with a front panel matching the styling of the NCX-3. Included with the supply is a 4" x 6" oval speaker which is mounted behind the front panel. The supply is equipped with a power plug and 3' cable so that it may be connected directly to the NCX-3 transceiver, with no other power or speaker connections required.

Referring to the schematic diagram, 117 VAC is supplied from the line cord through the power supply protection fuse. A pair of switching leads is connected to the NCX-3 through Pins 1 and 2 of the cable and plug. A bridge rectifier using diodes D1, D2, D3 and D4, swinging choke L1 and the filter capacitors C1 and C2 provide 700 volts dc to the final amplifier tubes in the NCX-3. This high-voltage supply is capable of supplying 700 volts at 50 to approximately 300 ma. at better than 2% regulation from minimum to maximum load. In order to provide maximum efficiency in the NCX-A supply, the low-voltage dc is taken from the center tap of the high-voltage winding. The low-voltage dc from the center

tap is filtered by choke L2 and capacitor C3. It is dropped and further filtered by resistor R5 and R6 and a filter capacitor inside the NCX-3 transceiver. This provides 280 volts at 125 ma. at terminal 9 of plug P1. Resistor R8 is a 30,000 ohm bleeder resistor to prevent shock hazard.

The output of the bias winding of T1 is rectified by diodes D5 and D6. This rectified output is filtered by the combination of resistor R7 and capacitor C4 and provides -80 volts at approximately 10 ma. for bias purposes to terminal 3 of the power plug P1.

### NCX-A SUPPLY RATINGS

#### INPUT:

117 V AC  $\pm$  10%, 50-60 cycles/second  
1.4 Amperes, 140 Watts receive  
3.7 Amperes, 365 Watts CW transmit

#### OUTPUT:

High Voltage 700 VDC at 50 to 300 ma.  
Low Voltage 280 VDC at 125 ma.  
Bias Voltage -80 VDC at 10 ma.

#### DIMENSIONS

8½" wide x 6⅛" high x 12" deep on 1½" feet.

#### WEIGHT

24½ pounds

## NCX-D POWER SUPPLY

The NCX-D Power Supply is a transistorized self-oscillating DC to DC converter employing automatic reverse polarity protection and automatic short-circuit protection. The NCX-D supplies 700 vdc, 280 vdc, and -80 vdc voltages from a 12 vdc positive or negative ground power source.

Referring to the schematic diagram, Q1 and Q2 are 2N1518 transistors operating in a self-oscillating circuit to supply 12 VAC power to the primary of the transformer. The power supply oscillator runs at a frequency of 200 cycles per second instead of the usual 400 cycles thus minimizing the annoying whine often associated with this type of power supply. Power is supplied to this transistor-oscillator circuit through contacts of the relay K1. The coil of the relay K1 is supplied with power when +12 v is applied through diode D1 in series with the relay coil. If the supply voltage is reverse connected to the NCX-D, diode D1 will not conduct. Thus, relay K1 cannot close and the power supply is protected against accidental reverse polarity.

The high voltage secondary supplies power to a voltage doubling circuit consisting of diodes D2, D3, D9 and D10 and filter capacitors C2 and C3. This circuit provides 700 vdc at 300 ma. to terminal 8 of the terminal board. Resistor R3 is a bleeder resistor across capacitors C2 and C3.

The low voltage winding of the transformer supplies power to a bridge rectifier consisting of diodes D4, D5, D6 and D7. The output of this bridge rectifier, filtered by the combination of L1 and C4 sup-

plies 280 vdc at 125 ma. to terminal 7 of the terminal board. Power supplied by the bias winding is rectified by diode D8 and filtered by capacitor C5 to supply -80 vdc at approximately 10 ma. to terminal 6 of the power supply terminal board. Terminal board connection 3 is a common lead which provides a ground return for each of the above-mentioned supply voltages.

### INSTALLATION INSTRUCTIONS

The NCX-D power supply is furnished with four 10/32 threaded mounting holes on each of two sides of the power supply. The supply is rated for full power output at a maximum ambient temperature of 140° F. (60° C.). The NCX-D may be mounted in many locations in the automobile, such as in the trunk, under the seat, against the firewall, under the dash or near the battery in the engine compartment. The latter location is quite feasible because of the high temperature rating of the NCX-D unless operation is contemplated in extremely hot climates. If in doubt, obtain a thermometer and measure the temperature rise in the engine compartment after prolonged engine operation. An extremely convenient location for the NCX-D is atop or alongside the steering column, secured by means of radiator clamps around the column and attached to the 10/32 mounting holes in the supply. The supply is approximately 90% efficient at full power output, and the temperature rise on the surface of the heat sinks and case is perfectly normal.

Consideration should be given to the distance of the NCX-D supply from the battery terminals. Table 1 lists various recommended wire sizes which may be used to supply 12 v power to the NCX-D supply. This table also gives the voltage drop-per-foot for both cables when the NCX-D supply is running at full power capacity. The power supply may be located some distance from the transmitter or transceiver since the remote switching leads do not carry full primary dc power to the supply.

Since each installation varies depending upon the automobile, the location of the supply, and the operator's preferences, it is not practical to supply a wired cable to connect the NCX-D supply to its transmitter or transceiver load. Figure 2 shows the connections necessary to supply power to the NCX-D supply, and from the NCX-D supply to the NCX-3 transceiver. A connection from terminal 5 of the supply to pin 4 of the power plug should only be used if the automobile battery has a negative ground. If your automotive system has a positive ground, a lead from pin 4 of the power plug should be run to pin 4 of the NCX-D supply. This is shown in the alternate dotted line connection for positive ground power sources.

## NCX-D

### DIMENSIONS

7<sup>3</sup>/<sub>4</sub>" wide x 4<sup>1</sup>/<sub>4</sub>" high x 5<sup>3</sup>/<sub>8</sub>" deep

### WEIGHT

5 pounds

## NCX-D SUPPLY RATINGS

### INPUT:

12.0 ± volts  
at 5 amperes — receive  
at 28 amperes — CW transmit

### OUTPUT:

High Voltage — 700 vdc at 50 to 300 ma.  
Low Voltage — 280 vdc at 125 ma.  
Bias Voltage — -80 vdc at 10 ma.

## FUSES

A momentary short circuit of the 700 volt output will cause the NCX-D power supply to stop oscillating. No harm will be done to the unit. Normal operation will occur when the short circuit is removed. In addition, the 280 volt output and the -80 volt output circuits are fused by #44 panel lamps. Momentary short circuit of either of these outputs will result in failure of L1 or L2. These lamps may be replaced by removing the top cover of the NCX-D supply. The primary power input of the NCX-D supply is protected by a slow blow primary power fuse, type MDX-40. Do not replace with other than the recommended type.

TABLE 1

WIRE SIZE AWG	VOLTAGE DROP/FOOT (2 CABLES)
4	0.019 V
6	0.030 V
8	0.048 V
10	0.076 V
12	0.121 V

ALL READILY AVAILABLE RESISTORS AND CAPACITORS ARE OMITTED FROM THE FOLLOWING PARTS LIST, BUT ARE COMPLETELY IDENTIFIED ON THE SCHEMATIC.

## PARTS LIST

### NCX-A POWER SUPPLY

DESCRIPTION	PART NUMBER
Plug, Jones, Female	A50828
Strain Relief Bushing	A50892-1
Capacitor, Electrolytic, 40 μfd 450 VDCW	C19458-7
Capacitor, Electrolytic, 40 μfd 150 VDCW Tubular	C19411-3
Capacitor, Electrolytic, 80 μfd 450 VDCW Tubular	C19411-4
Fuse Holder	A50862
Transformer, Power	C50871
Choke, Swinging	B50863
Choke, Filter	B50864
Rectifier, Silicon, 1600 PIV Similar to IN2359	A50876
Rectifier, Silicon, 500 PIV Similar to IN534	A50874
Resistor, 7,500 ohms, 5 w ± 10%	B17436-13
Resistor, 30,000 ohms, 5 w ± 10%	B17436-14
Resistor, 330 ohms, 7 w ± 10%	B17436-9
Line Cord	B22132-6
Cable, 8 — Conductor	B50877
Front Panel, Complete	D50875-2
Speaker, 6" oval	C50882
Cabinet, Complete	D50870-8
Foot, Extension	A50850
Foot, Rubber	A50851

### NCX-D POWER SUPPLY

DESCRIPTION	PART NUMBER
2N1518 Transistor	
Transformer, Transistor Power	B50912
Rectifier, Silicon, 400 PIV Similar to IN1490	
Relay, 12 VDC	A50916
Fuse, 40 Ampere	A50917
Fuse Holder	A50918
Resistor, 1 ohm, 25 watt	A50919
Resistor, 25 ohms ± 10%, 10 watt	B17436-15
Terminal, 12 VDC Red	A50921-1
Terminal, 12 VDC Black	A50921-2
Terminal Strip, Barrier	A50906
Capacitor, Electrolytic, 40 μfd 450 VDC Tubular	B50915-1
Capacitor, Electrolytic, 20 μfd 350 VDC Tubular	B50915-2
Capacitor, Electrolytic, 10 μfd 150 VDC Tubular	B50915-3
Capacitor, Electrolytic, 50 μfd 25 VDC	B50915-4
Heat Sink, Transistor	A50922
Case, NCX-D	B50923
Cover, NCX-D Supply	B50924
Terminal Board, NCX-D Supply	B50925



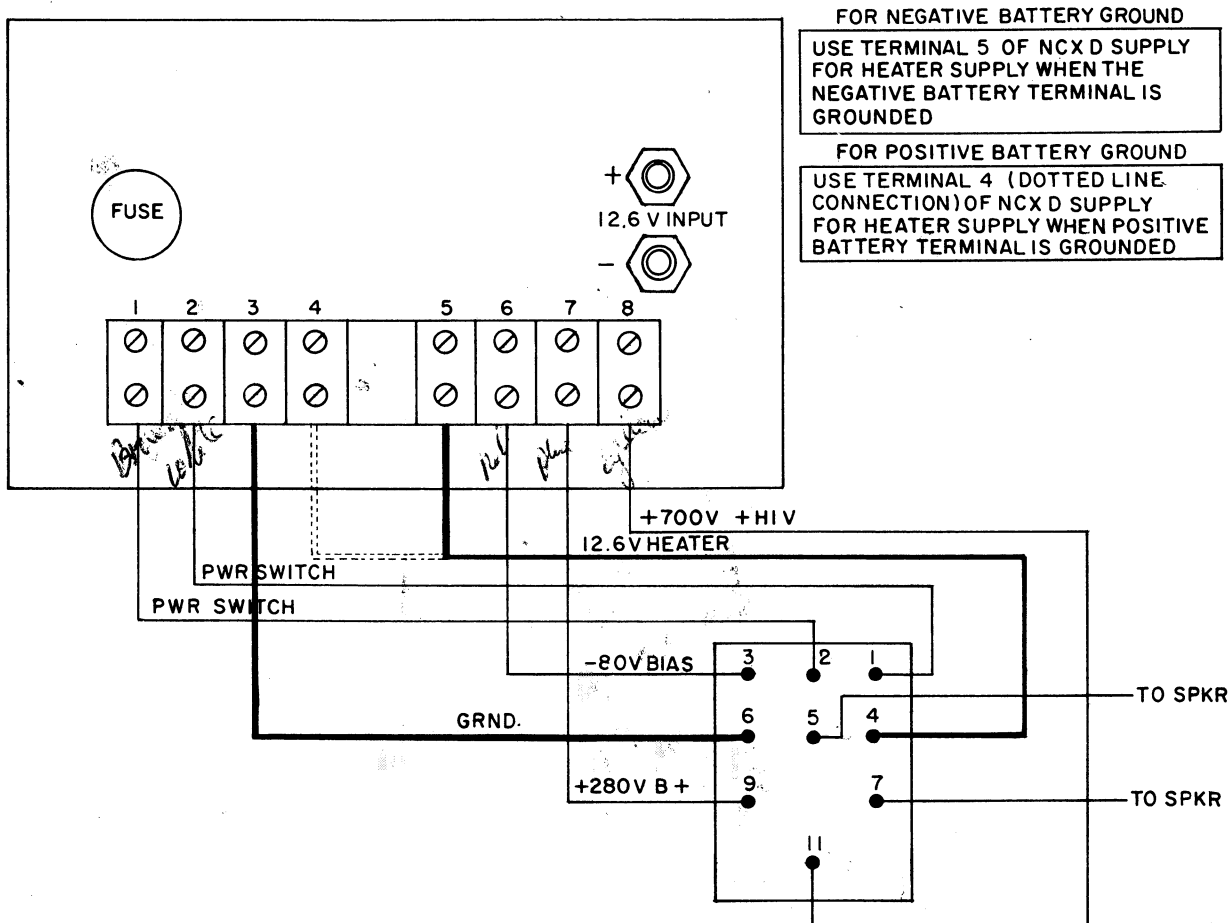


Figure 3. NCX-D Wiring Connections