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MOTOROLA

AC/DC INTEGRAL BATTERY CHARGER AND CABLE KITS

MODEL CHART

MODEL NO.	DESCRIPTION	APPLICATION
NLN6531A	AC/DC Integral Battery Charger	Charging batteries in P43DDN Series "Handie-Talkie" Radios
NKN6112A	Cable Kit	117 or 234 V ac, 50-400 Hz source
NKN6108A	Cable Kit	6 V dc source
NKN6109A	Cable Kit	12 V dc source

1. DESCRIPTION

This charger with the appropriate cable is used for charging nickel-cadmium batteries used with the P43DDN Series "Handie-Talkie" Radios. It is housed in a rectangular plastic sleeve which is constructed to fit between the radio portion of the two-way radio and the battery housing. Connections to each portion are automatically made when the three-section unit is clamped together.

2. INSTALLATION AND OPERATION

a. Unclamp and separate the radio unit from the nickel-cadmium battery housing of the radio.

b. Place the charger unit on top of the battery housing so that the miniature nine-pin connectors mate.

c. Place the radio on top of the charger unit so that the nine-pin connector of the radio mates with the nine-pin connector on top of the charger.

d. Clamp the units together.

CAUTION

This charger is to be used only for the Model NPN1006A Nickel-Cadmium Battery Power Supply containing the Model NLN6408A Battery Kit.

e. Connect the Model NKN6108A, the Model NKN6109A or the Model NKN6112A Cable Kit into the receptacle in the recessed compartment under the spring cover on the charger and to the appropriate external power source.

NOTE

The Model NKN6112A Cable Kit is wired and fused for use with a 117 V ac source. For other usage, refer to Schematic Diagram 63D81113A05.

f. Place the CHARGE-TRICKLE switch in the CHARGE position. The amber indicator lamp will light. The switch and jewel are located in a recessed compartment and are externally accessible.

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CAUTION

When the ambient temperature is below 32°F or above 113°F, use the TRICKLE position only.

3. CURRENT DRAIN

The following table shows the drain from an external 6 or 12 volt dc source when connected to the battery charger.

DC SUPPLY VOLTAGE	MAX. INPUT CURRENT (Amperes)	
	CHARGE	TRICKLE
6	1.26	0.5
12	0.7	0.35

4. DUTY CYCLES

For maximum service life from the nickel-cadmium battery, charge rates should be balanced with the radio usage. For light duty cycles, operate the charger in the TRICKLE position continuously. For heavy duty cycles, operate the charger in the CHARGE position. It may be necessary to operate in the CHARGE position during the day and leave the unit on TRICKLE overnight if the duty cycle is extremely high. In the event that the unit must be left to charge for over 16 hours, the charger should be operated in the TRICKLE position.

5. THEORY OF OPERATION

a. 6 or 12 Volt DC Source
(Refer to Schematic Diagram 63D81113A05)

Voltage is supplied to the charger through in-line fuses. The oscillator circuit, composed of transistors Q1, Q2 and transformer T1, provides an ac voltage to rectifiers CR2 and CR3. The pulsating dc output of CR2 and CR3 is filtered by C5. Output current regulation is provided by transistor Q3, diode CR4, and associated resistors. Transistor Q4 and diode CR5 comprise a voltage regulator circuit.

The network, comprised of L1, L2, C8 and C9, prevents oscillator "hash" from entering the receiver or transmitter when both the oscillator and the radio are "on". A capacitance-inductance filter network is also provided to prevent "hash" generated within the transistor inverter stages from entering the battery line of the vehicle.

Lamp DS1 is illuminated by a portion of the charging current passing through it when the switch is in the CHARGE position; the lamp will not light when the switch is in the TRICKLE position. The polarity protection diode CR1 will cause one of the fuses to blow if the charger is connected with improper polarity.

b. 117 or 234 Volt AC Source

Voltage is applied through a fused plug to a primary of transformer T2. The secondary of T2 supplies an ac voltage to diodes CR6 and CR7. This voltage is rectified by CR6 and CR7 and filtered by C6 and C7. Diode CR8 isolates C6 and C7 from voltage spikes when using a 6 or 12 V dc source.

6. MAINTENANCE

a. Pilot Light Replacement

Unscrew the amber jewel with the fingers. Remove the miniature flange lamp from the jewel and replace with a #338, 2.7 volt, .062 ampere bulb. Replace jewel in unit.

b. Fuse Replacement

The Models NKN6108A and NKN6109A Cable Kits employ in-line fuseholders. These cylindrical fuseholders may be opened by pushing the ends together slightly and twisting them to the left. The Model NKN6112A Cable Kit has a fuse plug. The fuses employed are of the slow-blow type, 1/4"x 1-1/4". The values are as follows:

6 V dc external source: 1.25 A
12 V dc external source: 0.75 A
117 V ac external source; 1.6 A
234 V ac external source: 0.8 A

c. Access to Chassis

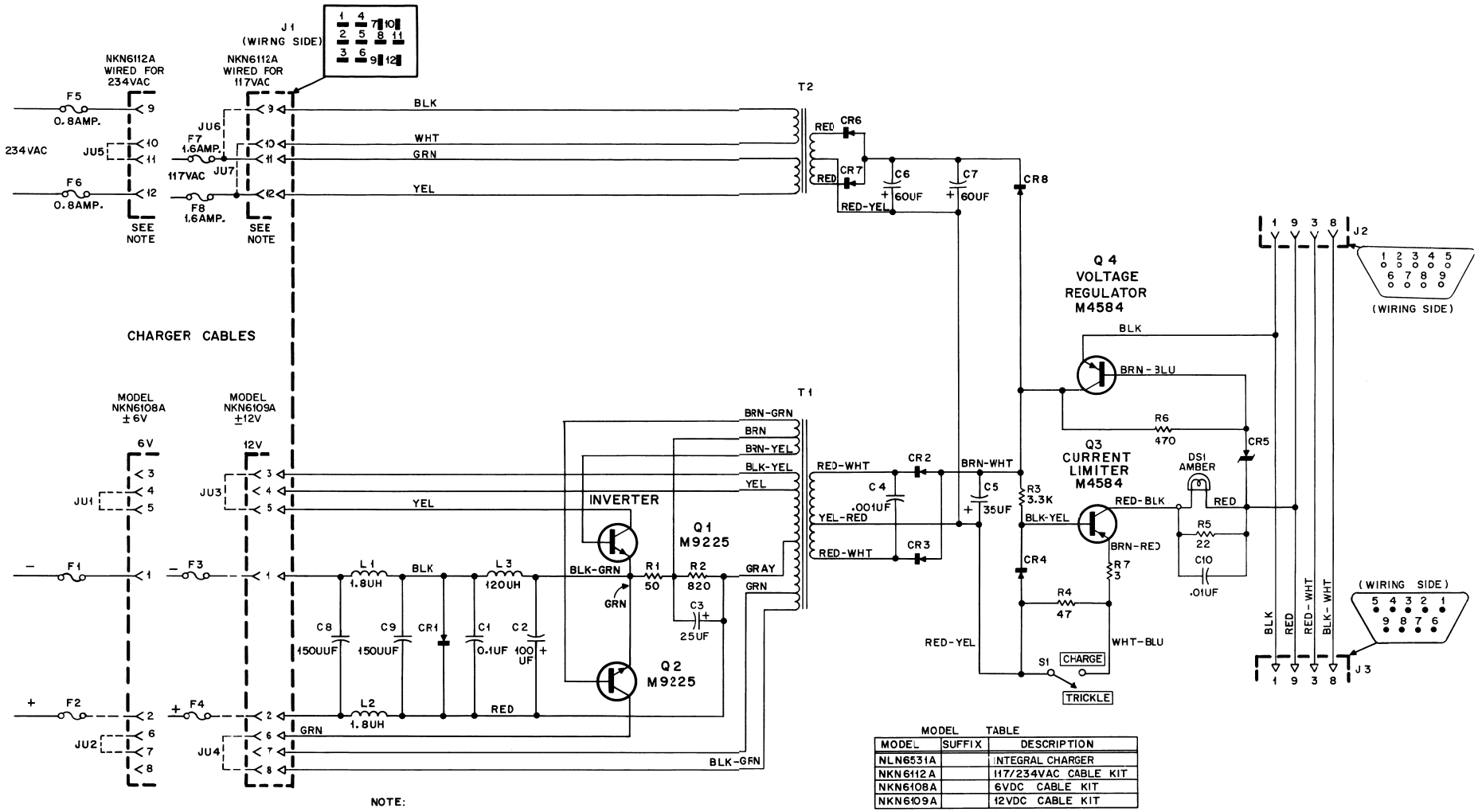
Access to all components and to the printed circuit board is obtained when the charger is unclamped and removed from the radio unit and the battery housing.

d. To Measure Charging Current

Connect a 0-200 milliammeter between pins 1 and 9 of J2 or J3. It is suggested that the female connector J3 be selected. In this case, use meter leads with alligator clips which grip short lengths of bare wire of approximately the same gauge as the mating plug pins. With a voltage input of 6 V dc (NKN6108A Cable), 12 V dc (NKN6109A Cable) or 117 or 234 V ac (NKN6112A Cable), the output of the charger should be approximately 150 mA in the CHARGE position and 10 mA in the TRICKLE position.

7. DATA INCLUDED

Schematic Diagram and Parts List	63D81113A05



MODEL	SUFFIX	DESCRIPTION
NLN6531A		INTEGRAL CHARGER
NKN6112A		117/234VAC CABLE KIT
NKN6108A		6VDC CABLE KIT
NKN6109A		12VDC CABLE KIT

MODEL TABLE

NOTE:
MODEL NKN6112A 117/234VAC CABLE KIT IS FURNISHED WITH 1.6AMP. FUSES AND JUMPERS JU6 AND JU7 CONNECTED AS SHOWN FOR 117VAC OPERATION. FOR 234VAC OPERATION, REPLACE 1.6AMP FUSES WITH 0.8AMP FUSES AND DISCONNECT JUMPERS JU6 AND JU7, AND CONNECT JUMPER JU5 AS SHOWN.

63D81113A05-02

PREVIOUS REVISION AND PARTS LIST
SHOWN ON BACK OF THIS DIAGRAM

AC/DC Integral Battery Charger
and Cable Kits
Schematic Diagram
Motorola No. 63D81113A05-02
7/12/72 - TPP

REVISIONS

DIAG. ISSUE	BOARD AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
01			DESCRIPTION WAS SLEEVE CHARGER	MODEL TABLE
02	NLN6531A	CR2, 3, 6, 7, 8 R4	WAS 48C82466H04 WAS 6S129233 47 ±10%, 1/4 W	

PARTS LIST

NLN6531A AC/DC Integral Battery Charger EPD-16152-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		CAPACITOR, fixed; uf; ±10%; 100 v unl stated
C1	8C82317B01	0.1
C2	23D82601A09	100 uf +150-10%; 25 v
C3	23D82601A01	25 uf +150-10%; 25 v
C4	21D82187B20	1000 uuf
C5	23D82601A13	35 +100-10%
C6, 7	23D82601A29	60 +150-10%; 50 v
C8, 9	21D82877B05	150 uuf; 75 v; N750
C10	21K861443	.01 +100-20%; 75 v
		SEMICONDUCTOR DEVICE, diode: (SEE NOTE)
CR1	48C82525G01	silicon
CR2, 3, 6, 7, 8	48C82466H13	silicon
CR4	48C82392B11	silicon
CR5	48D82256C39	silicon; zener type
		LAMP, incandescent:
DS1	65A82671G01	type No. 338
		CONNECTOR, receptacle:
J1	1V80763A71	male; 12 contact (sealed)
J2	9C82847E01	female; 9 contact
J3	28C82846E01	male; 9 contact
		COIL, RF: choke;
L1, 2	24A824968	1.8 uh
L3	24A848627	120 uh
		TRANSISTOR: (SEE NOTE)
Q1, 2	48R869225	N-P-N; type M9225
Q3, 4	48R131584	N-P-N; type M4584
		RESISTOR, fixed: ±10%; 1 w
R1	17C82291B15	50 ±5%; 3 w
R2	6S5701	820
R3	6S5718	3.3K
R4	6S124A17 or 6S131274	47 ±5%; 1/4 w
R5	6S6406	22; 1/2 w
R6	6S2010	470; 2 w
R7	17C82036G14	3 ±5%; 2 w
		SWITCH: toggle
S1	40A482097	spst
		TRANSFORMER: power
T1	1V80767A19	transistor-controlled
T2	25C83590D01	105-125 v ac and 210-250 v ac; pri: No. 1: BLK, YEL; res. 233 ohms ±10% pri. No. 2: GRN, YEL; res. 233 ohms ±10% sec: RED, RED w/RED-YEL tap; res. 32 ohms ±10%
		LAMPHOLDER:
XDS1	9B82684G04	single cont; incl. LENS, YEL
		SOCKET, transistor:
XQ1, 2	9C83662A01	female; 2 cont.
XQ3, 4	9D82673A01	female; 2 cont.

NOTE:

Replacement diodes and transistors must be ordered by Motorola part number only for optimum performance.