



Note: Although this unit is specified for the P200 radio, it also applies to the HT600, MT1000, MTX800, and MTX900 radios. The internal circuitry is identical to the NTN4633 charger that is specified for the HT600. The batteries are identical except for the color of the cases.

1. INTRODUCTION

The NTN5538B (117 V ac) and NTN5539B (220 V ac) Single-Unit Rapid-Charge Battery Chargers are accessory items for charging rechargeable nickel-cadmium batteries. The chargers are approved for use with the following standard-charge and rapid-charge batteries:

Battery Number	Capacity	Charge Type
NTN5531A	Medium	Rapid
NTN5521A, NTN5545A	High	Rapid

2. SPECIFICATIONS

Input Power	117 V ac, 220 V ac, 240 V ac; 50/60 Hz
Size	7.72 × 5.12 × 3.14 in. (193 × 128 × 78.5mm)
Weight	2.43 Lbs. (1.1 kg.)
Rapid Charge Rate	Approximately 1 hour
Operating Temperature Range	0°C to 50°C
Rapid-Charge Temperature Window	8°C to 41° C

3. DESCRIPTION

These single-unit rapid chargers are current sensing, voltage sensing, current regulating devices which provide two different charger rates; a one-hour rate and a 16-hour rate. A rapid-charge nickel-cadmium battery is charged initially at a one-hour charge rate, after which the charging rate is automatically reduced to the 16-hour rate. A standard-charge nickel-cadmium battery is charged only at the 16-hour rate. Either of the batteries (rapid or standard) can be left in the charger indefinitely without any resultant harm.

The NTN5538B Charger operates from a 117 V ac, 60 Hz power source and the NTN5539B Charger operates from a 220 V ac, 50 Hz power source. Two light-emitting diode (LED) indicators display charging conditions and battery fault indications, such as open or shorted battery cells.

4. SAFETY INSTRUCTIONS

This manual contains important safety and operating instructions. Before using battery charger, read all instructions and cautionary markings on (1) battery charger, (2) battery, and (3) radio using battery.

WARNING

- To reduce risk of injury, charge only Motorola nickel-cadmium type rechargeable batteries listed. Other types of batteries may burst, causing personal injury and damage.
- Do not expose charger to rain or snow.
- Use of an attachment not recommended or sold by Motorola may result in a risk of fire, electric shock, or injury to persons.
- To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.
- Make sure cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
- An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in a risk of fire and electric shock. If extension cord must be used, make sure:
 1. That pins on plug of extension cord are same number, size, and shape as those on plug on charger:
 2. That extension cord is properly wired and in good electrical condition; and

WARNING, (Cont'd.)

3. The cord size is 18AWG for lengths up to 100 ft., and 16AWG for lengths up to 150 ft.

- Do not operate charger with damaged cord or plug — replace them immediately.
 - Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified serviceman.
 - Do not disassemble charger; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
 - To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
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5. OPERATION

Normal battery operation is eight hours of use followed by approximately one hour of rapid charge. Place the charger in operation as follows:

- a. Visually check the battery and charger charging contacts for dirt, grease or other material which may prevent good conduction, and clean if necessary.
- b. Connect the charger to the appropriate ac power source. Both LED's will light momentarily.
- c. Insert the battery, with or without radio, into the charger pocket. When the battery contacts mate with the charger's charging contacts, charging begins. If the battery is within the proper temperature range (+ 8 to + 41°C), the red (CHARGING) LED will light to indicate that the battery is rapid-charging.

NOTE

To insure proper charging, make certain that the battery is pushed fully into the charger pocket.

- d. Allow sufficient time for the battery to fully charge (approximately one hour). When rapid-charging is complete, trickle-charging begins. The red (CHARGING) LED will turn off and the green (charge COMPLETE) LED will turn on.

At this time, the battery has reached approximately 90% full charge and can be used. If the battery is left in

the charger, it will reach 100% full charge after approximately two hours of trickle-charging. The battery can be removed from the charger and used or remain in the charger indefinitely.

If a battery which is outside the + 8 to + 41°C temperature range is inserted into the charger, it will be trickle-charged. The green LED will light if the battery temperature is above 41°C, or the red LED will light if the battery temperature is below 8°C. Once the battery moves inside the temperature window, the charger automatically switches to the rapid-charge rate and charging continues as described in the steps above.

6. CIRCUIT DESCRIPTION

(Refer to the Schematic Diagram)

a. General

Operating voltage (B+) is developed from a step-down transformer (T1) with a fused primary, driving a conventional full-wave bridge rectifier (CR1-CR4). The B+ (approximately 30 V dc) output is applied to a number of transistor stages and to a precision 12-volt regulator circuit (U4). The regulated 12 V dc (A) is applied to various transistor stages and to most of the logic circuits. A reduced B+ voltage (approximately 27 V dc) is applied to the Vcc input at U1 pin 4.

Charging current for the battery is provided by a constant-current source. The charging current is controlled by a current regulator with negative feedback. The current regulator is comprised of transistor circuits (Q1-Q6), a differential amplifier (U1C), and a single-input amplifier (U1D). Under normal charging conditions, transistors Q2 and Q6 are turned on, R10 is effectively shorted (rapid charge condition). For a momentary increase in charging current, the voltage across R14 will increase. The input to U1C pin 10 increases, which produces an increased output at U1C pin 8. The higher potential at U1C pin 8 is fed through CR8, R21, and R22 to U1D pin 13. This higher input at pin 13 reduces the output at U1D pin 14, which is passed through R15, CR7, and VR2 to reduce the drive of Q3, then Q1. The reduced drive of Q1 results in a reduction of charging current, returning back to normal.

Diodes CR5, CR6, transistor Q4, and resistor R73 provide for a constant current input of transistor Q2, ensuring Q2 to be turned on, independent of battery terminal voltage and charge rate. Together with Q5, this constant current source can be switched off for trickle-charging, by switching off Q5, consequently Q4, and Q2. With Q2 turned off, resistor R10 is added in the charging path.

Rapid-charge charging current for a high-capacity rapid-charge battery is approximately 800 mA. Trickle-charge current for the same battery is approximately 72 mA. The following chart lists the two different capacity

batteries and the battery's respective RC, rapid charging current, and trickle charging current.

Battery Capacity	RC	Charging Current	
		Rapid	Trickle
Medium	5.6k	500 mA	50 mA
High	3.3k	800 mA	72 mA

b. Maximum Current Limiter

The maximum current limiter is a protective circuit for the charger. If the charge rate exceeds a predetermined threshold, set by resistors R30 and R31, the output at U2A pin 1 goes high. This high turns on Q7, which turns off Q6. With Q6 turned off, the charging rate is no longer a function of RC, but a function of resistor R23. The charging current is limited to approximately 850 mA.

c. Battery Sense Detect

With no battery in the charger, the voltage at U1B pin 6 is approximately 9.6 V, which holds the output at U1B pin 7 low. When battery is placed in the charger, via the conduction of transistor Q6, the voltage at U1B pin 6 drops to approximately 2.2 V (during normal charging) or lower (if either the dynamic voltage clamp circuit or the open cell detect circuit is activated). The voltage drop at pin 6 of U1B, results in a high output at U1B pin 7, which turns on transistor Q8 and the red CHARGING LED, CR18.

d. Temperature Window and Bistable Multivibrator

Comparators U2C and U2D sense the RT line and set the cold and hot sides of the temperature window respectively. The cold side temperature is 8 degrees C. The hot side temperature is 41 degrees C. In a normal rapid-charge condition, a voltage level which represents the battery's temperature is felt at U2C pin 10 and U2D pin 9. As the battery charges and the battery's temperature rises, the voltage at U2D pin 9 decreases. At 41 degrees C, the low level input at U2D pin 9 reaches a point that triggers the output at U2D pin 14 to go low. The low output of U2D is applied through CR12, CR13, and R13 to the base of Q5 and the following sequence occurs. Transistor Q5 turns off, Q4 turns off, Q2 turns off, resistor R10 is placed in the charging circuit, and the battery trickle charges. The low output at U2D is also applied through coupling capacitor C15 to U3A pin 7, which triggers the output of U3A at pin 1 to switch from high to low. This low output at U3A pin 1 is applied to the LED display circuitry via Q8, turning off the red (CHARGING) LED, and via Q10/Q9, turning on the green (charge COMPLETE) LED. When the battery's temperature cools down below 41 degrees C, the outputs of U2D and U3A are latched low via a feedback through diode CR14. This feedback latching prevents a fully charged battery from being rapid-charged again.

When a battery outside the cold temperature window is placed in the charger, the battery sense detect circuit, via U1B, turns on the red (CHARGING) LED. The temperature window circuit, via an increased voltage level at U2C pin 10, triggers a low from U2C pin 13 to initiate trickle charging. The output of U2C is isolated from the output of U2D by diode CR13. Thus, the green LED remains off and the red LED remains on. When the battery's temperature rises and enters the temperature window, the output at U2C goes high, Q5, Q4 and Q2 turn on, and the battery begins rapid charging.

e. Oscillator

The oscillator circuit turns the green and red LEDs on and off (flashing) to indicate that a problem (shorted or open cells or shorted contacts) is detected with the battery or battery contacts. Whenever the potential at the cathode is lower than the anode of diode CR26 (a low from U2B pin 2 or a low from U3D pin 14), the oscillator becomes activated. The oscillator output at U3B pin 2 flips back and forth (high to low), and is sent to the LED display circuit. On the low cycle, both transistors (Q8 and Q9) are turned off and both LEDs are turned off. On the high cycle, both transistors are turned on and both LEDs are turned on. If a problem occurs during the charge complete cycle, only the green LED will flash.

f. Battery Open Circuit (O/C) Detect

During normal charging conditions (good battery) or when a battery is not in the charger, the voltage at the cathode of CR16 is somewhat higher than the anode voltage. The output of U2B at pin 2 is high. When an open-circuited battery is detected (RC present but no charging current), the low impedance path of RC (compared to R53) causes the voltage at the anode to drop to a very low level. This low-level input (2.2 V to 1.2 V) at U2B pin 5 flips the output (U2B pin 2) high to low. The U2B low is passed to the LED display circuit, turning on the green LED (CR21). The U2B low is also passed to the oscillator circuit, which triggers both LEDs to flash.

g. Shorted Cells and Short Circuit Detect

This circuit detects shorted battery cells and shorted contacts by monitoring the battery's terminal voltage (BATT B+). Low battery voltage at U3D pin 8 triggers the comparator (for rapid-charge battery or standard-charge battery) to produce a low output at U3D pin 14. A low from the comparator keys the oscillator to flash the LEDs and to trickle-charge the battery.

h. Dynamic Voltage Clamp

During normal charging conditions, a low voltage level at U1A pin 2 holds the output at U1A pin 1 high. As the battery voltage (BATT B+) increases, the input voltage level at U1A pin 2 increases. If the BATT B+ voltage

increases to a predetermined threshold level (approximately 15.5 volts), the higher potential at U1A pin 2 triggers the output at U1A pin 1 low. This low output from U1A pin 1 overrides the output at U1D pin 14, and reduces the base drive current of transistor Q3, hence that of Q1. This negative feedback action to reduce the charging current results in maintaining a constant battery terminal voltage (15.5 volts). This circuit prevents overvoltage conditions that could damage the radios' electronics if the radio is attached to the battery when charging.

7. MAINTENANCE

a. Fuse

The fuse (F1) in the primary circuit of transformer T1 is the only user serviceable part in the charger. If necessary, replace this fuse with one the same size and rating as marked, or refer to the electrical parts list for the proper electrical specifications. After replacing the fuse, if the charger still fails to operate properly, contact a local Motorola Service Shop (MSS) for repairs.

b. Radio Contacts

If the red CHARGING LED does not turn on when a battery is inserted into the pocket, check the contacts of the radio for dirt, grease, or other foreign material. Clean the contacts if necessary.

c. DC Voltage Measurements Charts

In the following charts,

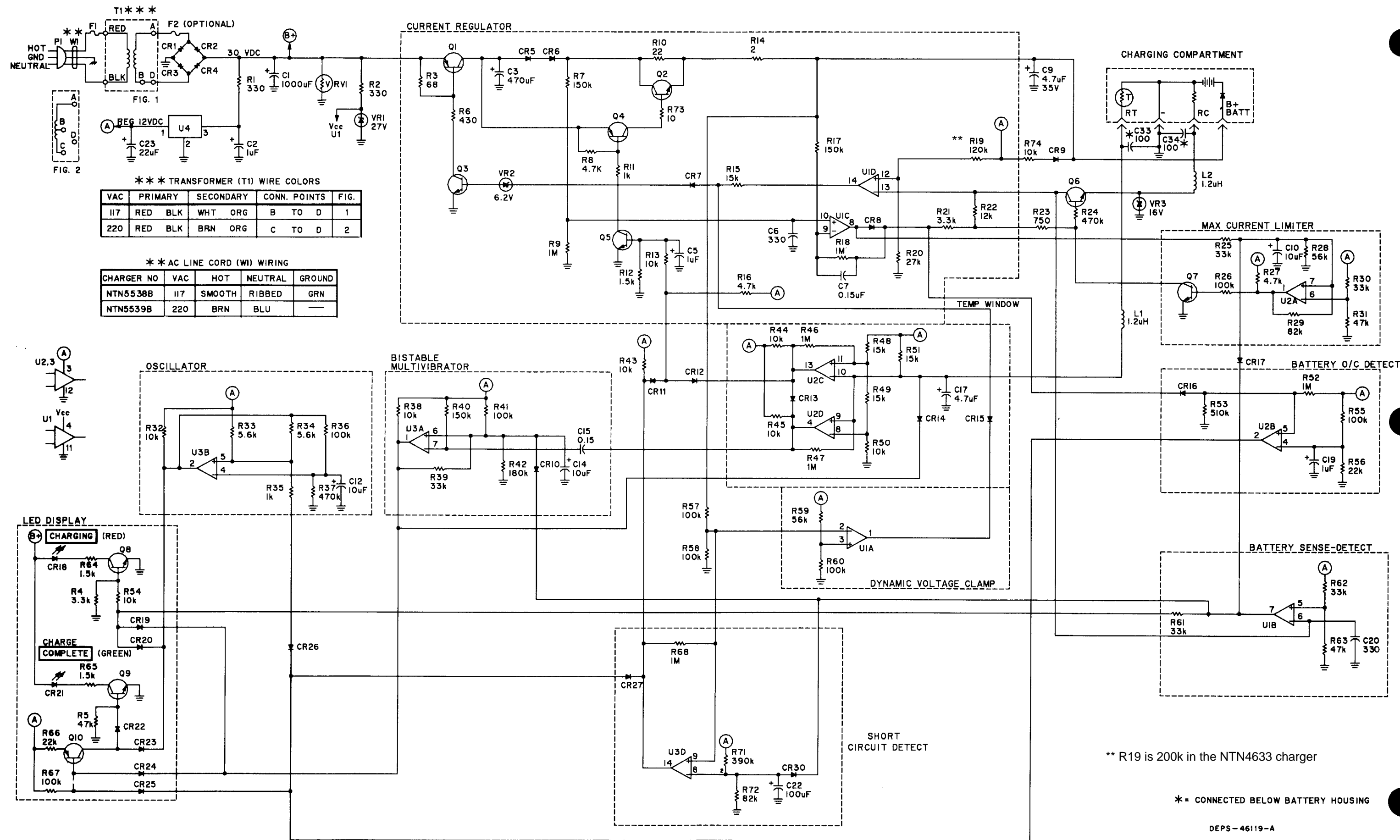
- Measurements were taken with a FLUKE 8010A Digital Multimeter at 25°C room temperature.
- All voltage readings are dc and referenced to charger ground
- DC voltages designated with an "*" will vary with the temperature of the battery.

DC VOLTAGE
MEASUREMENT CHARTS

			Q1			Q2		Q3	Q4	Q5	Q6			Q7	Q8		Q9		Q10		VR1
Battery and Condition	B+ Batt	Chrg. Cur. mA	E	B	C	B	E	B	B	B	B	C	E	B	C	B	C	B	B	C	
No Battery	10.76	—	28.2	28.2	1.9	1.89	10.76	0.00	1.92	0.08	9.28	9.69	9.25	0.06	26.8	0.03	26.6	0.00	11.73	0.53	11.84
Rapid Charge 500 mAh	12.85	563.5	22.3	21.6	15.79	14.87	14.07	0.62	14.80	0.70	2.70	2.18	2.10	0.06	0.09	0.71	20.7	0.00	11.74	0.02	11.85
Complete Charge 500 mAh	12.84	51.14	26.8	26.2	15.55	3.99	12.94	0.60	15.55	0.17	2.70	2.18	2.10	0.07	25.4	0.15	0.08	0.71	0.60	1.25	11.85
Rapid Charge 900 mAh	12.86	805.5	20.8	20.00	16.40	15.44	14.62	0.63	15.39	0.71	0.05	2.18	0.05	0.65	0.10	0.71	19.10	0.00	11.74	0.02	11.86
Complete Charge 900 mAh	12.83	72.51	26.5	25.8	16.09	9.03	12.99	0.60	16.09	0.17	0.05	2.18	0.00	0.63	25.1	0.15	0.08	0.72	0.60	1.25	11.85

	U1													U2												U3													
Battery and Condition	B+	1	2	3	5	6	7	8	9	10	12	13	14	1	2	4	5	6	7	8	9	10*	11	13	14	1	2	4	5	6	7	8	9	10	11	13	14		
No Battery	26.8	25.5	5.66	7.61	6.97	9.64	.061	0.00	10.60	9.23	2.17	9.68	0.00	0.06	11.52	2.14	3.93	6.88	0.00	2.91	11.83	11.83	7.32	0.08	11.83	11.83	11.73	9.61	11.49	1.11	11.80	1.10	5.66	0	5.67	11.77	11.77		
Rapid Charge 500 mAh	21.5	20.2	6.67	7.61	6.97	2.18	20.1	8.56	12.09	12.36	2.17	2.18	7.30	0.06	11.54	2.14	3.93	6.88	4.34	2.96	6.89	6.89	7.44	11.80	11.79	11.84	11.74	9.63	11.79	7.63	11.81	2.18	6.67	0	6.67	11.79	11.79		
Complete Charge 500 mAh	25.9	24.6	6.65	7.61	6.98	2.18	24.5	8.69	12.07	12.23	2.17	2.18	6.88	0.07	11.48	2.14	3.93	6.89	4.41	2.92	0.62	0.62	7.33	0.75	0.11	0.06	11.74	9.63	11.79	7.64	2.23	2.18	6.65	0	6.65	11.79	11.79		
Rapid Charge 900 mAh	19.10	17.79	6.69	7.61	6.98	2.18	17.71	12.12	12.57	12.75	2.17	2.18	7.49	11.19	11.55	2.14	3.93	6.89	8.40	2.95	6.90	6.90	7.44	11.80	11.79	11.85	11.74	9.63	11.79	7.64	11.82	2.18	6.69	0	6.69	11.79	11.79		
Complete Charge 900 mAh	24.8	23.6	6.65	7.61	6.98	2.18	23.5	12.13	12.51	12.67	2.17	2.18	7.01	11.19	11.48	2.14	3.93	6.89	8.40	2.92	0.62	0.62	7.33	0.75	0.11	0.06	11.74	9.63	11.79	7.63	2.23	2.18	6.65	0	6.65	11.79	11.79		

SCHEMATIC DIAGRAM

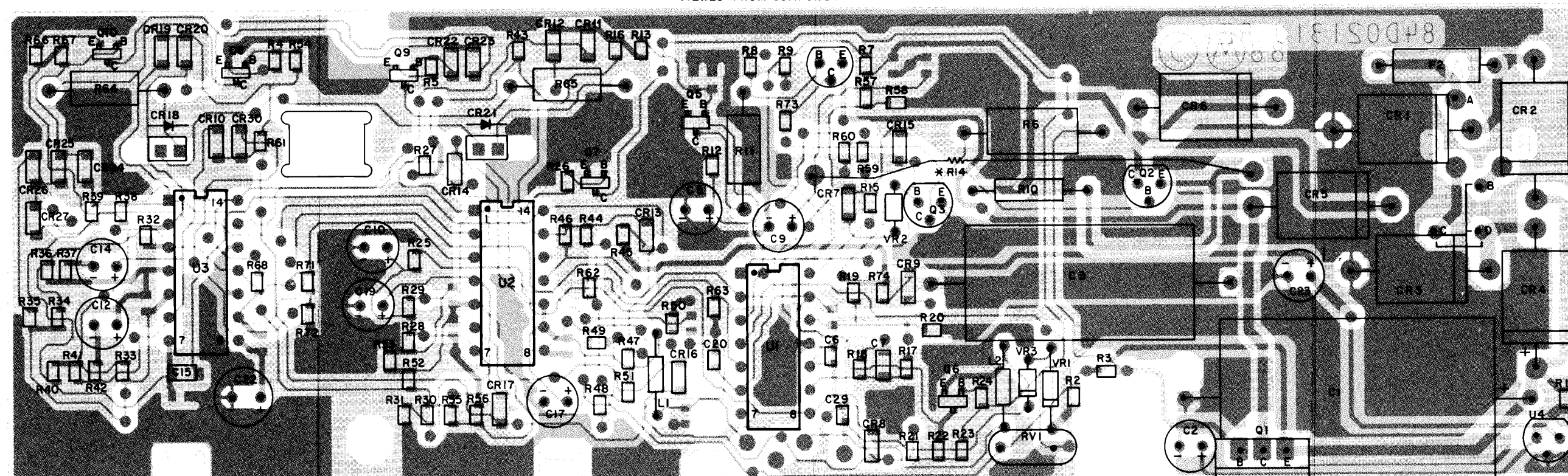


** R19 is 200k in the NTN4633 charger

* = CONNECTED BELOW BATTERY HOUSING

CIRCUIT BOARD DETAIL AND PARTS LIST

VIEWS FROM COMPONENT SIDE



* MOUNTED ON BACK OF BOARD

CS - CEPS - 46116-A
SS - CEPS - 46117-A
OL - CEPS - 46118-A

parts list

Electrical Parts List

NTN5538B (117 V ac) Single-Unit Charger (Rapid)

NTN5539B (220 V ac) Single-Unit Charger (Rapid)

PL-11093-A

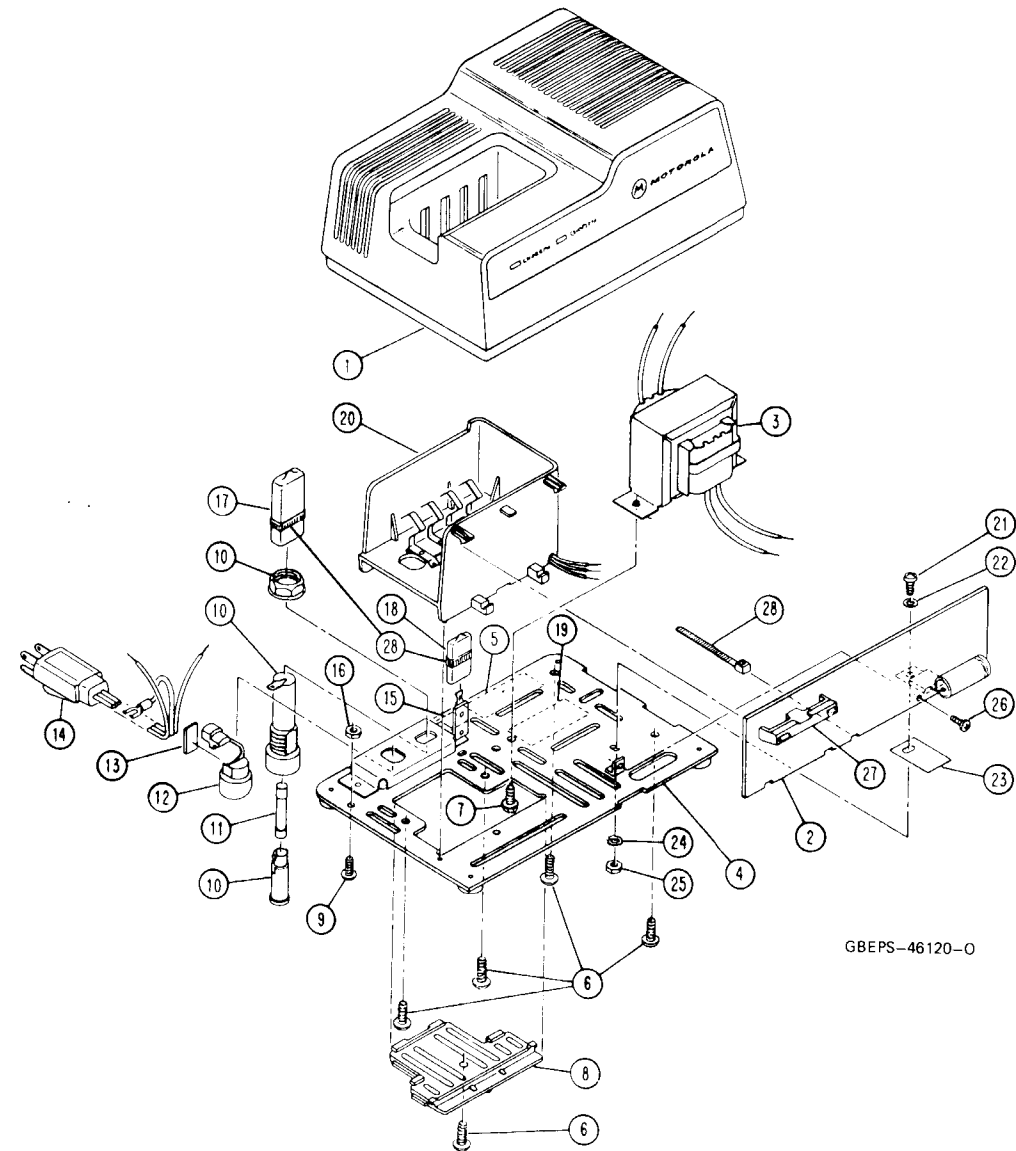
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF $\pm 5\%$, 50 V: unless stated
C1	2360563A01	1000 uF
C2	2360561M09	1 uF
C3	2360561N02	470 uF; 35 V
C5	2360561M09	1 uF
C6	2160520C13	330
C7	2160521H39	0.1 uF + 80-20%; 25 V
C9	2360561M15	4.7 uF; 35 V
C10	2360561M19	10 uF; 35 V
C12	2360561M19	10 uF; 35 V
C14	2360561M19	10 uF; 35 V
C15	2160521H39	0.1 uF + 80-20%; 25 V
C17	2360561M15	4.7 uF; 35 V
C19	2360561M09	1 uF
C20	2160520C13	330
C22	2360561M44	100 uF; 16 V
C23	2360561M23	22 uF; 16 V
C33, 34	2105455G12	100; 63 V
		diode: (see note)
CR1 thru 6	4805746G16	silicon
CR7 thru 17	4805494Q14	silicon
CR18	4805729G08	LED, red
CR19, 20	4805494Q04	silicon
CR21	4805729G09	LED, green
CR22 thru 27	4805494Q04	silicon
CR30	4805746G13	silicon
		fuse:
F1	6500892099	3/4 amp; 125 V (NTN5538B)
	or 6505384M02	1/4 amp; 250 V (NTN5539B)
F2	6505214E07	3-amp (optional)
		choke, rf:
L1, 1	2482723H01	1.2 uH
		plug, ac:
P1	----	connector, part of W1
		transistor: (see note)
Q1	4805708G09	PNP
Q2	4805474G43	NPN
Q3	4805474G42	NPN
Q4	4805474G41	PNP
Q5 thru 9	4805128M62	NPN
Q10	4805128M67	PNP
		resistor, fixed: ohms $\pm 5\%$; 1/8 W: unless stated
R1, 2	0660076A37	330
R3	0660076A21	68
R4	0660076A61	3.3k
R5	0660076A89	47k
R6	1760471A01	430; 2 W
R7	0660076F05	150k $\pm 1\%$
R8	0660076A65	4.7k
R9	0660076F25	1 Meg $\pm 1\%$
R10	0660076N01	22 $\pm 2\%$; 1 W
R11	0660076L49	1k; 3/4 W
R12	0660076A53	1.5k
R13	0660076A73	10k
R14	1805226Q01	2; 7 W; wire-wound
R15	0660076A77	15k
R16	0660076A65	4.7k
R17	0660076F05	150k $\pm 1\%$
R18	0660076F25	1 Meg $\pm 1\%$
R19	0660076F03	120k $\pm 1\%$
R20	0660076E83	27k $\pm 1\%$
R21	0660076E61	3.3k
R22	0660076E75	12k $\pm 1\%$
R23	0660076E46	750 $\pm 1\%$
R24	0660076R17	470k $\pm 10\%$
R25	0660076A85	33k
R26	0660076B01	100k
R27	0660076A65	4.7k
R28	0660076A91	56k
R29	0660076A95	82k
R30	0660076A85	33k
R31	0660076A89	47k
R32	0660076A73	10k
R33, 34	0660076A67	5.6k
R35	0660076A49	1k
R36	0660076B01	100k
R37	0600076R17	470k $\pm 1\%$
R38	0600076A73	10k
R39	0660076A85	33k
R40	0660076B05	150k
R41	0660076B01	100k
R42	0660076B07	180k

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R43, 44, 45	0660076A73	10k
R46, 47	0660076B25	1 Meg
R48, 49	0660076E77	15k $\pm 1\%$
R50	0660076E73	10k
R51	0660076E77	15k $\pm 1\%$
R52	0660076B25	1 Meg
R53	0660076B18	510k
R54	0660076A73	10k
R55	0660076B01	100k
R56	0660076A81	22k
R57, 58	0660076F01	100k $\pm 1\%$
R59	0660076E91	56k $\pm 1\%$
R60	0660076F01	100k $\pm 1\%$
R61, 62	0660076A85	33k
R63	0660076A89	47k
R64, 65	0660075L53	1.5k; 3/4 W
R66	0660076A81	22k
R67	0660076B01	100k
R68	0660076B25	1 Meg
R71	0660076B15	390k
R72	0660076E95	82k $\pm 1\%$
R73	0660076A01	10
R74	0660076A73	10k
		varistor: (see note)
RV1	0605220M01	35 V
		transformer, power
T1	2505178Q01 or 2505491R01	for (NTN5538B) for (NTN5539B)
		circuit module: (see note)
U1	5184320A80	quad operational amplifier
U2, 3	5184320A51	quad comparator
U4	5105469E49	voltage regulator, 12 V
		Zener diode:
VR1	4883461E12	27 V
VR2	4805249R04	6.2 V
VR3	4805249R14	16 V
		cable assembly:
W1	0105957M12 or 3005526R01	3-conductor, includes ac cord, plug P1, and red crimp lug (NTN5538B) 2-conductor, includes ac cord and plug P1 (NTN5539B)

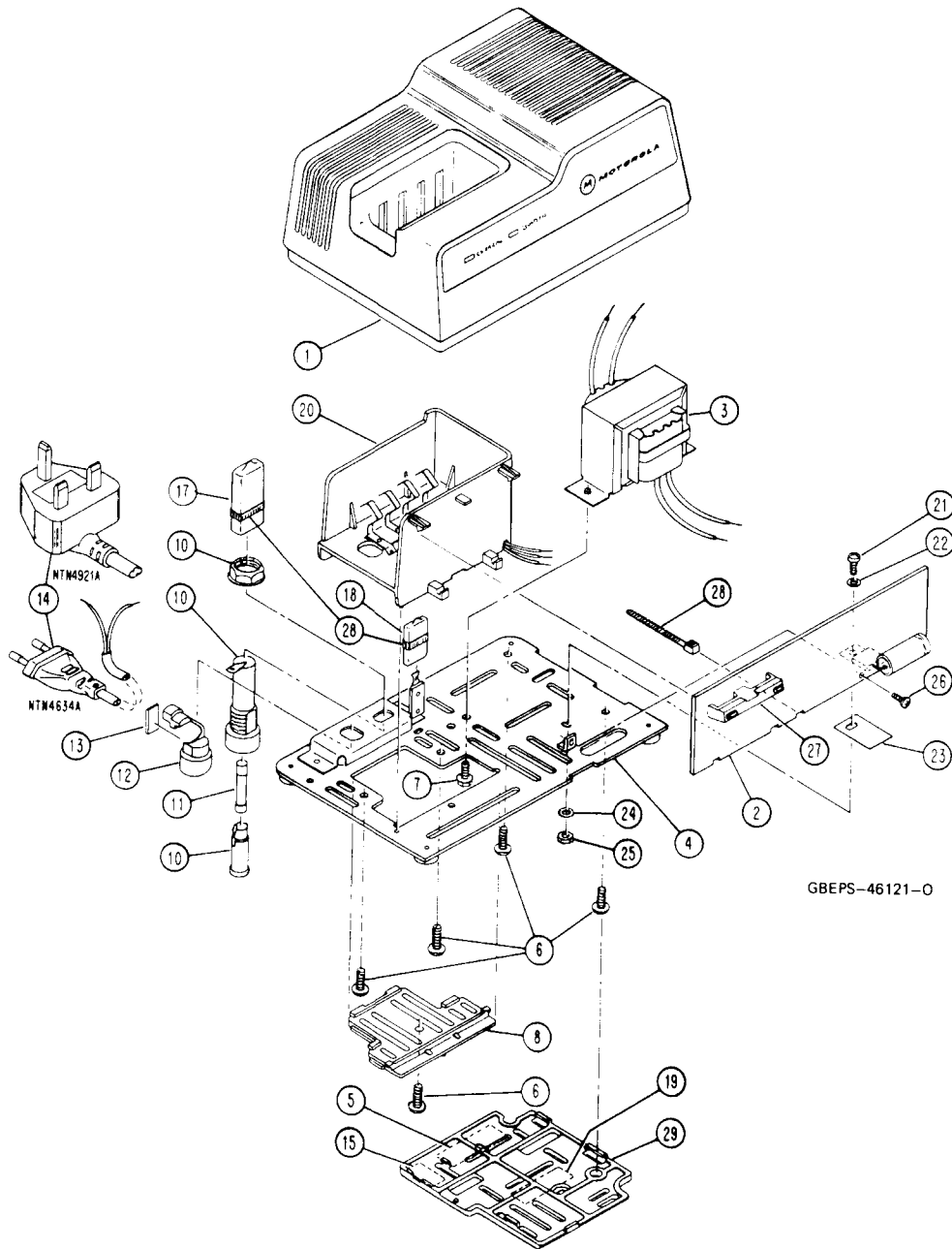
note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

EXPLODED VIEWS
AND PARTS LISTS

NTN5538B



NTN5539B



parts list

Exploded View Parts List
NTN5538B (117 V ac)
Single-Unit Charger (Rapid) PL-11094-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
1	0105952Q64	ASSEMBLY, top housing; includes: Housing, Escutcheon, Thermal Partition, and Fastener Clip
2	0105957M06	ASSEMBLY, circuit board
3	See Note	TRANSFORMER (T1)
4	0105957M16	ASSEMBLY, base plate; includes: Brackets, Single Lug Terminal Strip, Base Plate, and 4 Rubber Bumpers
5	5405228Q01	LABEL, caution
6	0300138574	SCREW, phillips hd.; 8-32 x 3/8" (5 req'd)
7	0300131632	SCREW, tapping; slotted hd.; 8-32 x 3/8" (2 req'd)
8	1305130Q01	GRILL, base
9	0300138035	SCREW, phillips hd.; 6-32 x 3/8"
10	0905724C02	RECEPTACLE, fuse holder
11	See Note	FUSE (F1)
12	4205723C01	RETAINER, cable
13	4305233D01	SPACER
14	See Note	ASSEMBLY, cable (P1, W1)
15	5405229Q01	LABEL, fuse
16	0200007005	NUT, hex; 6-32 x 1/4" x 3/32"
17	3805637M02	CAP GUARD, fuse holder
18	3805637M01	CAP GUARD, terminal
19	5405230Q01	LABEL, info
20	0105957M07	ASSEMBLY, partition; includes: Thermal Partition, Charging Contacts, Fastener Clip, and Capacitors C33, C34
21	0300120938	SCREW, phillips hd.; 4-40 x 5/16"
22	-----	BUSHING, nylon (part of Q1, see note)
23	-----	INSULATOR, mica (part of Q1, see note)
24	0400007667	LOCKWASHER, #4 external tooth
25	0200120486	NUT, hex; 4-40 x 1/4 x 3/32"
26	0300120938	SCREW, phillips hd.; 4-40 x 5/16"
27	0705567P01	HOLDER, LED
28	4210217A26	TIE WRAP

note: Refer to Electrical Parts List for part number and description.

Exploded View Parts List
NTN5539B (220 V ac) Single-Unit Charger (Rapid) PL-11095-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
1	0105952Q64	ASSEMBLY, top housing; includes: Housing, Escutcheon, Thermal Partition, and Fastener Clip
2	0105957M06	ASSEMBLY, circuit board
3	See Note	TRANSFORMER (T1)
4	0105957M14	ASSEMBLY, base plate; includes: Brackets, Single Lug Terminal Strip, Base Plate, and 4 Rubber Bumpers
5	5405228Q01	LABEL, caution
6	0300138574	SCREW, phillips hd.; 8-32 x 3/8" (5 req'd)
7	0300131632	SCREW, tapping; slotted hd.; 8-32 x 3/8" (2 req'd)
8	1305130Q01	GRILL, base
9	-----	NOT USED
10	0905490R01	RECEPTACLE, fuse holder
11	See Note	FUSE (F1)
12	4205723C01	RETAINER, Cable
13	4305233D01	SPACER
14	See Note	ASSEMBLY, cable (P1, W1)
15	5405229Q03	LABEL, fuse
16	-----	NOT USED
17	3805637M02	CAP GUARD, fuse holder
18	3805637M01	CAP GUARD, terminal
19	5405230Q01	LABEL, info
20	0105957M07	ASSEMBLY, partition; includes: Thermal Partition, Charging Contacts, Fastener Clip, and Capacitors C33, C34
21	0300120938	SCREW, phillips Hd.; 4-40 x 5/16"
22	-----	BUSHING, nylon (part of Q1, See Note)
23	-----	INSULATOR, mica (part of Q1, See Note)
24	0400007667	LOCKWASHER, #4 external tooth
25	0200120486	NUT, hex; 4-40 x 1/4 x 3/32"
26	0300120619	SCREW, phillips Hd.; 4-40 x 5/16"
27	0705567P01	HOLDER, LED
28	4210217A26	TIE WRAP
29	1305412R01	GRILL, thermal

note: Refer to Electrical Parts List for part number and description.