Maintenance Manual

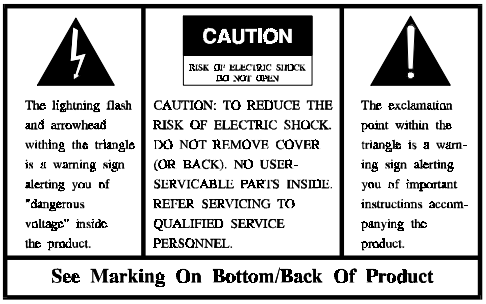
Universal
Multi-Unit Charger
Rapid- BML 161 51/024
Standard- BML 161 51/023

CAUTION

THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID ELECTRIC SHOCK DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING: TO PREVENT FIRE OR ELECTRIC SHOCK HAZARD. DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.

CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.



ERICSSON

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NOTICE!

This manual covers Ericsson and General Electric products manufactured and sold by Ericsson Inc.

NOTICE!

Repairs to this equipment should be made only by an authorized service technician or facility designated by the supplier. Any repairs, alterations or substitution of recommended parts made by the user to this equipment not approved by the manufacturer could void the user's authority to operate the equipment in addition to the manufacturer's warranty.

NOTE: The Universal Chargers BML 161 51/022 & BML 161 51/024 have been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable portection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

IMPORTANT SAFETY INFORMATION

1. **SAVE THIS MANUAL** - It contains important safety and operating instructions for Universal Multi-unit Charger.

2. Before using the battery charger, read all instructions and cautionary markings on (1) the battery charger, (2) the battery, and (3) the product using the battery.

3. **CAUTION** - To reduce the risk of injury, charge only Ericsson battery packs using the proper battery sleeve. Charging any other battery pack or batteries may cause the battery to burst and cause personal injury or damage.

4. Do not expose charger to rain or snow.

5. Do not use auxiliary equipment not recommended or sold by the manufacturer. To do so may result in a risk of fire, electric shock, or injury to persons.

6 To reduce risk of damage to electric plug and cord, pull by the plug rather than the cord when disconnecting the charger.

7. Make sure the cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.

8. An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in a risk of fire and electric shock. If an extension cord must be used, make sure:

   a. That pins on the plug of the extension cord are the same number, size, and shape as those on the charger's plug;

   b. That the extension cord is properly wired and in good condition; and

   c. That the wire size is large enough for the AC ampere rating of the charger as specified in Table 1.

9. Do not operate charger with damaged cord or plug - replace them immediately.

10. Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; return it to a qualified service shop.

11. Do not disassemble the charger; return it to a qualified service shop when service or repair is required. Incorrect reassembly may result in a risk of electrical shock or fire.

12. To reduce risk of electric shock, unplug the charger from the outlet before attempting any maintenance or cleaning.

13. GROUNDING AND AC POWER CORD CONNECTION - To reduce the risk of electrical shock use only a properly grounded outlet. The charger is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. Be sure that the outlet is properly installed and grounded in accordance with all local codes and ordinances.

14. **DANGER** - Never alter the AC cord or plug. If it will not fit in the outlet, have a proper outlet installed by a qualified electrician. Improper connection can result in risk of an electric shock.

15. The Rapid Charger 120 Vac line cord has a grounding plug that looks like the plug illustrated in Figure 1. A temporary adapter, which looks like the adapter illustrated in sketches B and C, may be used to connect this plug to a two-pole receptacle as shown in sketch B if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician.

16. **DANGER** - Before using an adapter as illustrated, be certain that the center screw of the outlet plate is grounded. The green-color rigid ear or lug extending from the adapter must be connected to a properly grounded outlet--make certain it is grounded. If necessary, replace the outlet cover plate screw with a longer screw that will secure adapter ear or lug to outlet plate and make ground connection to grounded outlet.

TABLE 1
RECOMMENDED MINIMUM SIZE FOR
EXTENSION CORDS

LENGTH OF EXTENSION CORD (Ft.)	25	50	100	150
AWG SIZE OF EXTENSION CORD	18	18	18	16

IMPORTANT SAFETY INFORMATION

17. Care should be taken when placing the charger in service to insure proper top and bottom ventilation. A minimum of 1/4" is required between the bottom of the charger and the surface on which it sits.

NOTE

Due to the temperature characteristics of nickel-cadmium batteries, the batteries will not accept a full charge at temperature extremes. For maximum capacity, recharge the battery pack at a room temperature of 65° to 85°F, whenever possible.

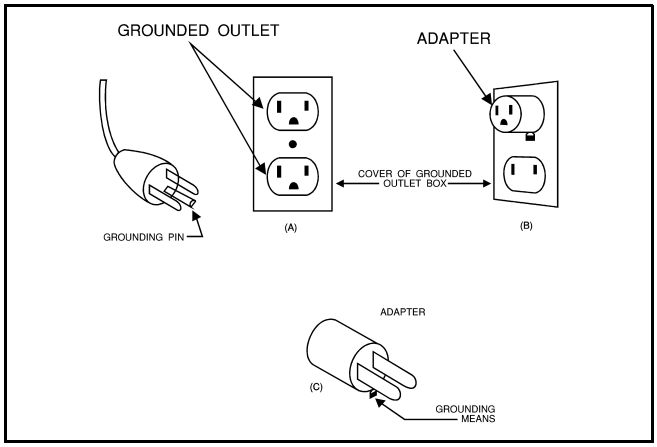


Figure 1 - Grounding Methods

SPECIFICATIONS

VOLTAGE SOURCE	
120 volt switch position	96-144 Vac, 50/60 Hz
220 volt switch position	176-264 Vac, 50/60 Hz
POWER CONSUMPTION	
Rapid Charger	170 watts
Standard Charger	30 watts
FUSE RATING	
Rapid Charger	F1 - 5 Amp 250 volt, fast blow
Standard Charger	F1 - 315 mAmp 250 volt, fast blow F2 - 600 mAmp 250 volt, slow blow
RECHARGE TIME	
Rapid Charger	1 hour
Standard Charger	14 hours
OPERATING TEMPERATURE RANGE	+5° to +45°C (+41° to +113°F)
DIMENSIONS(HxWxD)	
Height	4.6 inches (117 mm)
Width	12.4 inches (315 mm)
Depth	18.2 inches (461 mm)
WEIGHT	
Rapid Charger	15.7 lb. (7.1 kg)
Standard Charger	15.1 lb. (6.8 kg)
AGENCY APPROVAL	
BML 161 51/023 (Charger Base)	UL, CSA, SEMKO
BML 161 51/024 (Charger Base)	UL, CSA, FCC
BML 161 51/043 (120V Cord)	UL, CSA
BML 161 51/044 (220V Cord)	SEMKO

DESCRIPTION

The Universal Multi-unit Charger is designed to charge Ericsson personal radio battery packs. The charger is capable of charging up to six battery packs at one time and is available as a Standard or Rapid Charger.

The use of interchangeable battery sleeves permits charging different battery pack families at the same time (i.e. two M-RK and four M-PD sleeve inserts in the same charger). The sleeves allow charging a battery pack alone or attached to a radio and can be easily installed or removed from the charger.

Each sleeve has spring loaded electrical charging contacts and contains circuitry unique to charging a particular family of battery packs. The sleeve is designed to plug easily into the charger base using guides in the base for self alignment.

Battery Pack sleeves are available for most Ericsson personal radios including M-PA, M-PD, PCS etc. The following listing identifies the sleeve required for each radio.

RADIO TYPE	SLEEVE NUMBER
M-PA, M-PD, MTL, PLS, & TPX	BML 161 51/001
PCS	BML 161 51/002
M-RK	BML 161 51/003
MONOGRAM TRUNKING	BML 161 51/004
PRISM HP	BML 161 51/005

STANDARD CHARGER

The Standard Multi-unit Charger may be powered by either a 120 Vac or 220 Vac 50/60 Hz power source. Ensure the charger's voltage selection switch is set to the proper voltage before applying power. Switching on the Charger's ON/OFF power switch applies input power to the built-in power supply board.

The power supply board (PS-9) rectifies the input power and produces a stable DC voltage to the A1 printed circuit board (PCB). The power supply's output is 15 Vdc and up to 1.14 amps which is supplied to the six A1 charger PCBs.

A constant current is developed through the use of various series resistance combinations. In connection with the sleeve circuitry, the proper selection of series resistors controls the current needed for the particular battery pack being charged. This also includes series resistors selected by the long or short battery pack microswitch. A portion of the current flows through the **CHARGE** LED indicating the battery pack is connected and is being charged.

RAPID CHARGER

The Rapid Multi-unit Charger may also be powered by either a 120 Vac or 220 Vac 50/60 Hz power source. Ensure the charger's voltage selection switch is set to the proper voltage before applying power. Switching on the Charger's ON/OFF power switch applies input power to the built-in power supply board.

The power supply board (PS-8) rectifies the input power to produce a stable DC voltage for the constant current regulator PCBs (CC-8). The power supply's output is 13 Vdc at 10 amps which is supplied to the three constant current regulators.

Each constant current regulator provides a constant current of 1.9 or 1.3 amps for two battery packs via the charge control PCB (CHG-1). This constant current is selected by a control signal from the charge control board.

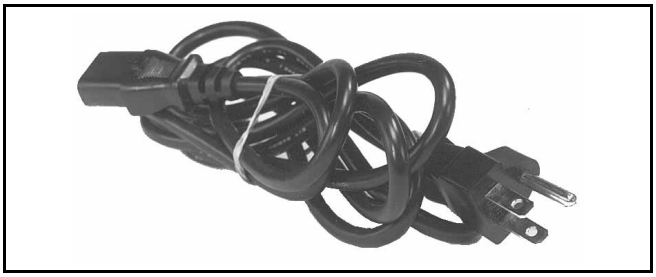
The Rapid Charger is microprocessor controlled and uses switching current regulators to regulate the charge current. Battery voltage and temperature are monitored by the microprocessor which controls the **CHARGE** and **READY** LEDs and the charge enable transistor.

CAUTION

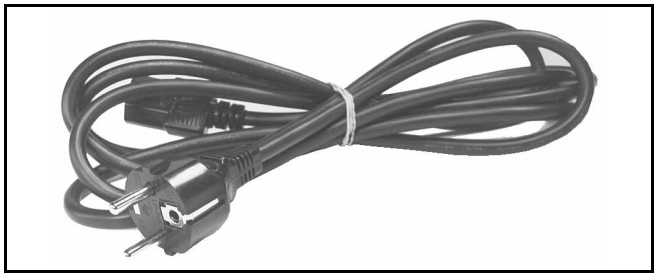
Recharging any battery pack or batteries other than the ones your equipment was designed to charge may result in damage to equipment, leakage, or explosion.

ACCESSORIES AND REPLACEMENT PARTS

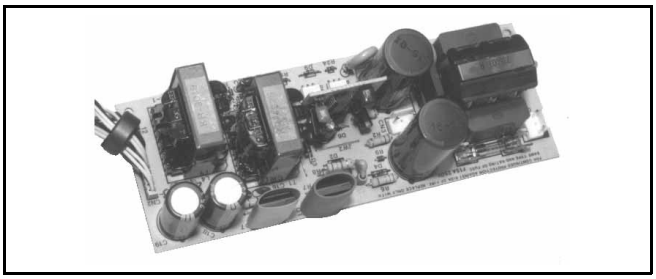
The following accessories are available for the Universal Multi-unit Chargers:



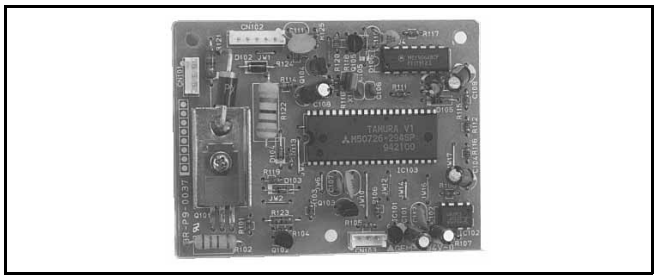
120 Vac Line Cord
BML 161 51/043



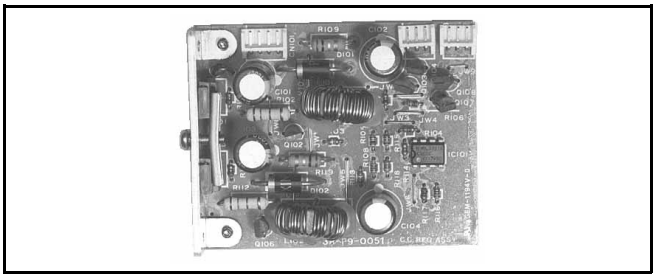
230 Vac Line Cord
BML 161 51/044



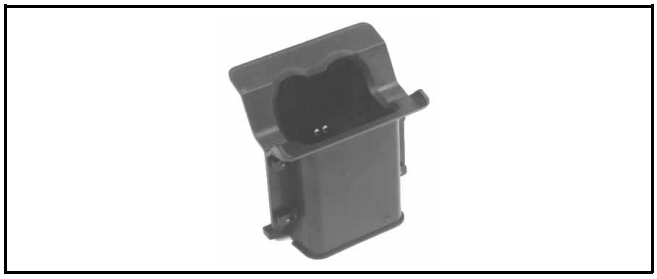
Rapid Charger Power Supply
F29/4R-A9-0091



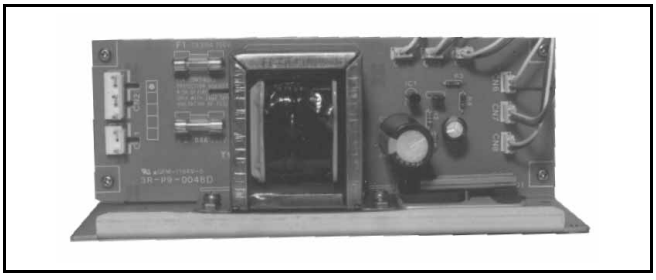
Rapid Charger Control Board
F29/4R-A9-0083



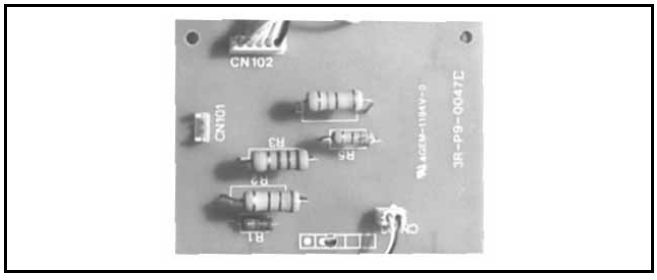
Rapid Chgr Constant Current
F29/4R-A9-0092



Charger Sleeve
(See chart on page 5)



STD Charger Power Supply
F29/4R-A9-0095



STD Charger Control Board
F29/4R-A9-0096

INSTALLATION

The Multi-unit Chargers may be located on a flat surface or mounted on a vertical wall in a convenient location. Ensure either a 120 Vac or 220 Vac 50/60 Hz source is located near the charger. Switch charger's voltage selection switch to the match the source voltage. Plug the power cord into the charger and plug the other end into the outlet. When locating the charger on a flat surface be sure to allow a minimum of 1/4" clearance around the top and bottom covers to provide adequate ventilation.

MOUNTING INSTRUCTIONS

When mounting the Universal Multi-unit charger on a wall be sure the wall is strong enough to support the charger and a full compliment of radios. Also, ensure either 120 Vac or 220 Vac 50/60 Hz power is readily available for the charger.

Hollow walls - It is not recommended that the charger be mounted directly to the wall due to the possible weight (26 lbs max) involved. We suggest you mount the charger on an 18" x 18" plywood panel secured to the wall studs. The following steps describe the process for installing the panels and mounting the charger.

1. Locate the studs, studs are normally 16" apart, measured center-to-center.

2. Position the top of the panel at the desired height and drill a 1/8" pilot hole through the panel into the studs. Secure the plywood panel to the studs using four 2 1/2" long (min) screws.

3. Using the template, locate keyhole slots for the Multi-unit charger mounting screws. Install the four No. 8 x 1 1/2" mounting screws and mounting spacers (provided) . Install charger on mounting spacers by pressing down on the charger allowing the mounting spacers to seat into the charger keyhole slots. The weight of the charger will hold it firmly to the wall.

Solid walls - To install the charger on a brick or concrete wall, first insert four wood dowels or four fiber, plastic, or masonry mounting anchors. Use the following procedure:

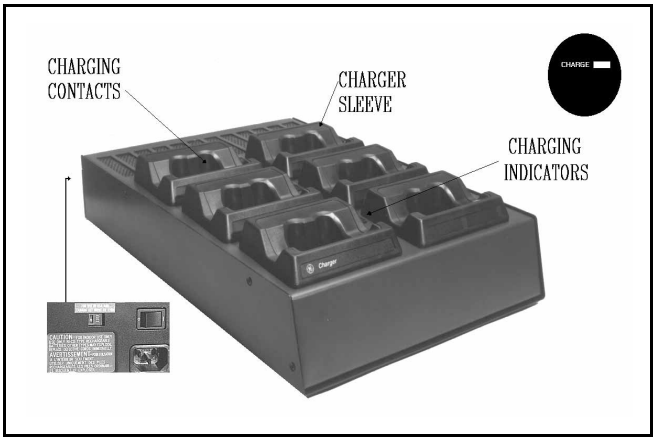
1. Using the mounting template provided, locate and mark the charger keyhole mounting points. Drill holes to match the anchor's diameter and depth using a carbide drill bit. Insert the mounting anchors into the holes.

2. Screw the four No. 8 x 1 1/2" screws and mounting spacers (provided) into the anchors.

3. Install charger on mounting spacers by pressing down on the charger allowing the mounting spacers to seat into the charger keyhole slots. The weight of the charger will hold it firmly to the wall.

INDICATORS

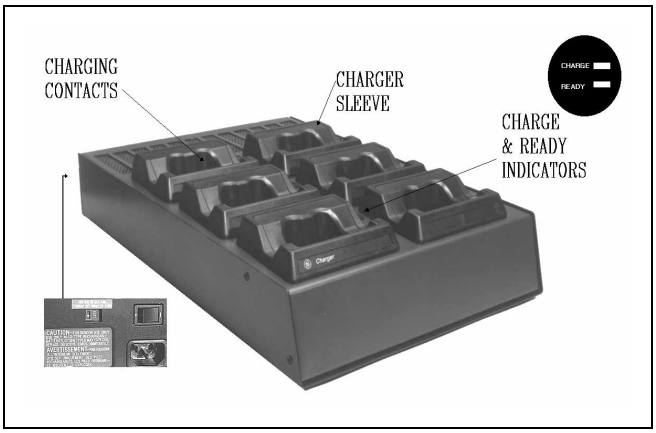
Standard Multi-unit Charger



STANDARD Multi-unit Charger
(Shown with sleeves installed)

CHARGE (RED) **CONTINUOUS**: Indicates battery is charging at the selected charging rate.

Rapid Multi-unit Charger



RAPID Multi-unit Charger
(Shown with sleeves installed)

STAND-BY Both indicators are **OFF**. Battery not installed.

CHARGE (RED) **CONTINUOUS**: Indicates battery is charging at the selected charging rate.

BLINKS SLOWLY: Indicates a BATTERY FAULT condition which is preventing an acceptable rapid charge. This condition may result if the battery is too hot or cold, weak or dead, or defective. If the blinking CHARGE indicator does not turn to a continuous RED after 15 minutes, remove and reinsert the battery.

Weak or Dead Battery - The CHARGE indicator goes to continuous RED after the battery has an acceptable pre-charge (typically less than 10 minutes).

Cold or Hot Battery - The CHARGE indicator stays in a blinking RED condition until the battery temperature reaches acceptable limits and the battery is removed and reinserted to clear the fault condition.

Defective Battery - The CHARGE indicator stays in a blinking RED condition after clearing the fault by removing and reinserting the battery.

READY (GREEN) **CONTINUOUS**: Indicates charging is complete and charger has switched to trickle charge.

PROBLEM (RED/GREEN) **BLINKING FAST**: When both indicators are blinking fast, either the output has a short circuit or an abnormal output condition exists.

WARNING

If both RED and GREEN indicators are blinking fast, immediately unplug the charger and return it for service. If left in this condition, the battery may be severely overcharged causing personal injury or damage.

OPERATION

To Use The Multi-unit Charger

CAUTION

To reduce risk of injury, charge only nickel-cadmium batteries. Other types of batteries may burst causing personal injury or damage.

1. Plug in the charger and turn the charger's ON/OFF switch on.
2. **Turn the radio OFF** and place the radio into the proper charging sleeve with the speaker facing the front of the charger. If only charging a battery pack, insert the battery pack into the charger as indicated on the battery pack. Make sure the ON-OFF switch on the battery pack is in the OFF position (M-RK, MONOGRAM or Prism HP battery packs do not have an ON/OFF switch).
3. STANDARD MULTI-UNIT CHARGER: The CHARGE (red) indicator will light indicating the battery is being charged. To charge the battery to maximum capacity, let the battery pack charge for at least 14 hours.
4. RAPID MULTI-UNIT CHARGER: The CHARGE (red) indicator will light indicating the battery is being charged. (If the RED indicator is blinking slowly - the charger is in the pre-charging mode. This mode results if the battery temperature is either too "hot" or "cold", dead or

defective, or if the battery is excessively discharged. If the battery is excessively discharged, the charger should switch to normal charge within 10 minutes.)

When the READY (green) indicator lights - charging is complete and the charger is in trickle charge mode.

NOTE

Occasionally, when charging a new battery or a battery which has been out of use for a few months, the charger will prematurely switch to the trickle charge before the battery has been fully charged. If this happens, allow the battery to continue trickle charging overnight. Then remove and reinsert the battery and observe that the battery goes through a normal rapid charge before putting it into service.

To Remove A Battery Pack

Simply reach into the cutouts provided in the sides of the charging insert and lift the battery pack out.

DEFINITIONS

Dead Battery	–	Battery pack with low voltage due to long-term self discharge or extreme discharge.
Hot Battery	–	Battery Pack excessively warmed by charging or environmental temperature conditions.
Cold Battery	–	Battery pack excessively cooled by an environmental condition.
Defective Battery	–	Battery pack with one or more of the internal cells shorted.

MAINTENANCE

REMOVAL AND REPLACEMENT INSTRUCTIONS

WARNING

To avoid electrical shock, disconnect the charger from the power source before removing or replacing any component or assembly.

Battery Sleeve

Identify the required battery sleeve. To remove or install the sleeve, perform the following steps:

Removal - Use the following instructions to remove a charger sleeve:

1. Turn the charger upside down. Locate the two recessed holes for the applicable sleeve screws and remove them using a Phillips screwdriver.

2. Turn the charger right side up and remove the sleeve. This can be done by inserting a couple of fingers into the sleeve cavity and gently pull upward while holding the base down.

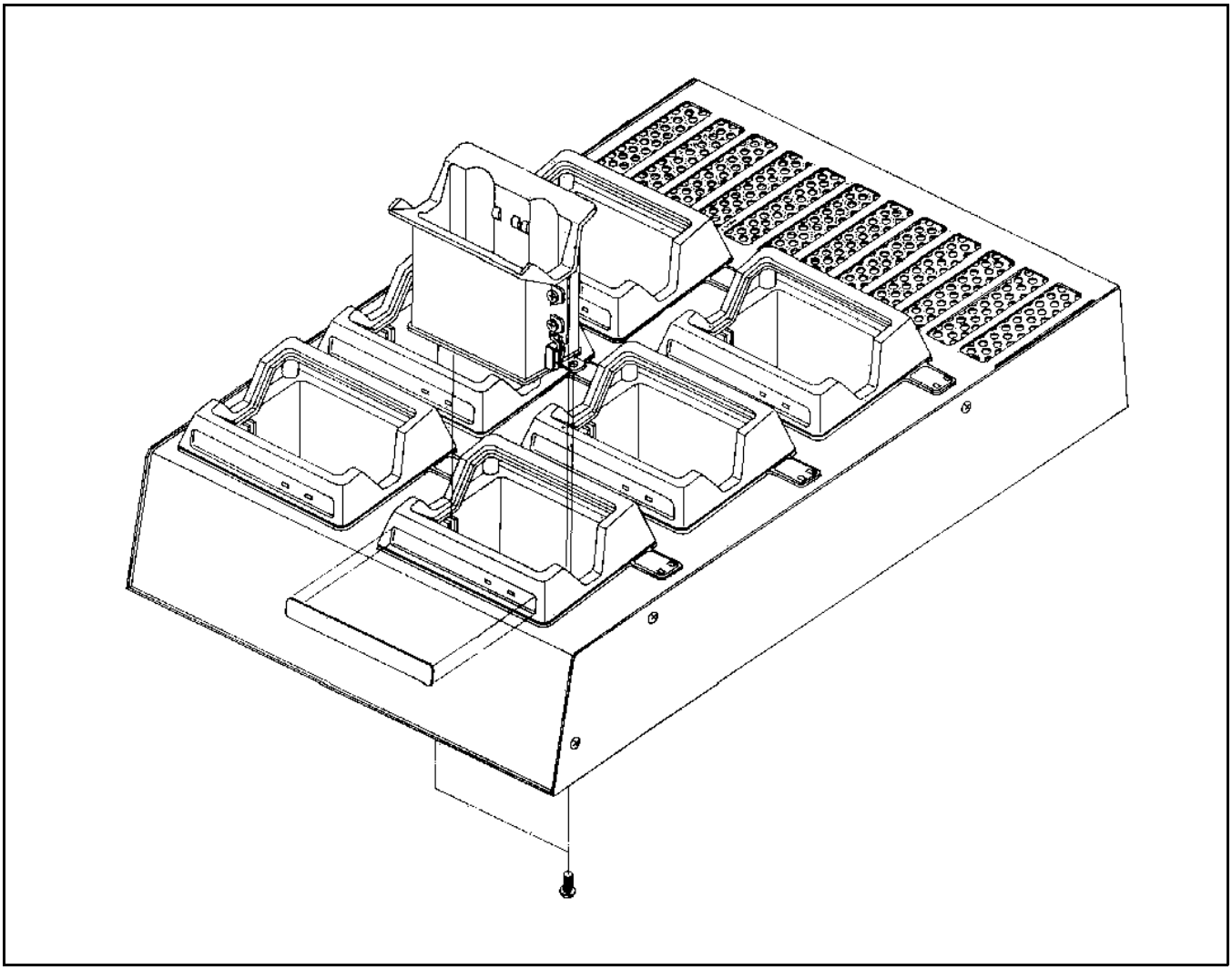
Installation - Use the following instructions to install a charger sleeve:

1. With the sleeve circuit board facing the rear of the charger, tilt the sleeve slightly forward and insert it into the charger base.

2. Align the sleeve's side molding with the grooves in the charger's base. The sleeve will drop into the base until it meets the connector pins.

3. Press down gently but firmly on the top center of the sleeve until it seats fully into the base. The top of the sleeve will be flush with the top of the base. Do not force the sleeve into the base, the base connector pins will slip into the sleeve connector using a minimum amount of pressure.

4. Turn the charger upside down. Secure the sleeve in the charger base by installing the two sleeve screws.



Standard Multi-unit Charger

Case

Disassembly - Use the following procedures to disassemble the Standard Multi-unit Charger: (Refer to Illustrated Parts Breakdown.)

1. Remove front cover assembly screw.
2. Remove eight cover screws (item 11-8). Gently separate the cover assembly (item 9) from the bottom assembly (item 10).
3. Lift the front of the cover assembly up and slide the cover assembly toward the rear (approximately 1/2" to clear retaining tabs). Lift the cover assembly out of the base assembly and turn upside down to the right of the base.
4. All field replaceable parts are now accessible. To remove and replace a subassembly, refer to the applicable removal and replacement instructions.

Reassemble:

5. Install the cover assembly into the base unit by first hooking the rear tabs and sliding the cover forward.
6. Carefully lower the cover assembly onto the base assembly.
7. Reinstall the nine cover screws.

Control Board (A1)

To remove a Control Board (item 2), perform the following steps:

1. Disassemble the charger (see Case disassembly procedure).
2. Disconnect the input power cable (CN101).
3. Disconnect the sleeve interconnect cable (CN102).
4. Disconnect the LED cable (CN103).
5. Remove the two screws (item 11-2) securing the board and remove the Charger Board from the sleeve holder (item 5).

Reinstall:

6. Install Charger Board onto the sleeve holder.
7. Install two screws to secure the board (removed in step 5).
8. Reconnect the LED cable (CN103).
9. Reconnect the sleeve interconnect cable (CN102).
10. Reinstall the input power cable (CN101).
11. Reassemble charger and install battery sleeve.

LED Board (A2)

To remove an LED board (item 7), perform the following steps:

1. Disassemble the charger (see Case disassembly procedure).
2. Disconnect the cable from the charger board (CN201).
3. Remove the retaining screw (item 11-5) securing the board and remove the LED Board from the cover assembly (item 9).

Reinstall:

4. Install the LED Board onto the cover assembly.
5. Install the screw to secure the board (removed in step 3).
6. Reconnect the charger board cable (CN201).

Power Supply

To remove the Power Supply (item 1), perform the following steps:

1. Disassemble the charger (see Case disassembly procedure).
2. Disconnect the AC input power cable (CN1).
3. Disconnect the voltage selector cable (CN2).
4. Disconnect the six DC power cables (CN3-CN8).
5. Remove the four screws (item 11-1) securing the power supply assembly to the bottom assembly (item 10).
6. Lift up the power supply assembly to remove it from the bottom assembly.

Reinstall:

7. Set the power supply assembly into the bottom assembly.
8. Install the four mounting screws (removed in step 5) to secure the assembly.
9. Reconnect the six DC power cables (CN3-CN8). (Note: These cables are interchangeable.)
10. Reconnect the voltage selector cable (CN2).
11. Reconnect the AC input power cable (CN1).
12. Reassemble charger and install battery sleeve.

AC Power Assembly

To replace the AC power assembly (item 3), perform the following steps:

1. Disassemble the charger (see Case disassembly procedure).
2. Remove the Power Supply (see Power Supply removal procedure).
3. Remove the two mounting screws (item 11-7).

4. Remove assembly by lifting up, pulling assembly out of the two tabs.

Reinstall:

5. Reinstall the AC power assembly into the bottom assembly.

6. Install the two mounting screws (removed in step 3) to secure the assembly.

7. Reinstall the power supply and reassemble the charger.

Fuse replacement

To replace the power supply fuses, F1 or F2, perform the following steps:

1. Disassemble the charger (see Case disassembly procedure).

2. Remove the Power Supply (see Power Supply removal procedure).

3. Replace F1 with a 315 mA 250V UL/CSA fuse, or replace F2 with a 600 mA 250V UL/CSA fuse.

4. Reinstall power supply and reassemble charger.

Rapid Charger

Case

Disassembly - Use the following procedures to disassemble the Rapid Multi-unit Charger: (Refer to Illustrated Parts Breakdown.)

1. Remove front cover assembly screw.

2. Remove eight cover screws (item 12-7). Gently separate the cover assembly (item 10) from the bottom assembly (item 11).

3. Lift the front of the cover assembly up and slide the cover assembly toward the rear (approximately 1/2" to clear retaining tabs). Lift the cover assembly out of the base assembly and turn upside down to the right of the base.

4. All field replaceable parts are now accessible. To remove and replace a subassembly, refer to the applicable removal and replacement instructions.

Reassemble:

5. Install the cover assembly into the base unit by first hooking the rear tabs and sliding the cover forward.

6. Carefully lower the cover assembly onto the base assembly.

7. Reinstall the nine cover screws.

Constant Current Regulator Board Assembly

To remove a Constant Current Regulator Board (item 2), perform the following steps:

1. Disassemble the charger (see Case disassembly procedure).

2. Disconnect the input power cable (CN101).

3. Disconnect the Control Board power cables (CN102 and CN103).

4. Remove the two screws (item 12-2) securing the board and remove the constant current regulator board assembly power supply heat sink (item 1-1).

Reinstall:

5. Install constant current regulator board assembly into the power supply heat sink.

6. Install two screws to secure the board (removed in step 4).

7. Reconnect the Control Board power cables (CN102 and CN103). (Note: These cables are interchangeable.)

8. Reconnect the input power cable (CN101).

9. Reassemble charger and install battery sleeve.

Control Board

To remove a Control Board (item 3), perform the following steps:

1. Disassemble the charger (see Case disassembly procedure).

2. Disconnect the input power cable (CN101).

3. Disconnect the sleeve interconnect cable (CN102).

4. Disconnect the LED cable (CN103).

5. Remove the two screws (item 12-8) securing the board and remove the Control Board from the sleeve holder (item 6).

Reinstall:

6. Install Control Board onto the sleeve holder.

7. Install two screws to secure the board (removed in step 5).

8. Reconnect the LED cable (CN103).

9. Reconnect the sleeve interconnect cable (CN102).

10. Reinstall the input power cable (CN101).

11. Reassemble charger and install battery sleeve.

LED Board

To remove an LED board (item 8), perform the following steps:

1. Disassemble the charger (see Case disassembly procedure).

2. Disconnect the cable from the charger board (CN201).

3. Remove the retaining screw (item 12-3) securing the board and remove the LED Board from the cover assembly (item 10).

Reinstall:

4. Install the LED Board onto the cover assembly.

5. Install the screw to secure the board (removed in step 3).

6. Reconnect the charger board cable (CN201).

Power Supply

To remove the Power Supply (item 1), perform the following steps:

1. Disassemble the charger (see Case disassembly procedure).

2. Remove the four screws (item 12-1) securing the power supply assembly to the bottom assembly (item 11). Slide power supply assembly forward to gain access to connectors.

3. Disconnect the AC input power cable (CN1).

4. Disconnect the voltage selector cable (CN2).

5. Lift up the power supply assembly to remove it from the bottom assembly.

Reinstall:

7. Set the power supply assembly into the bottom assembly.

8. Reconnect the voltage selector cable (CN2).

9. Reconnect the AC input power cable (CN1).

10. Install the four mounting screws (removed in step 2) to secure the assembly.

12. Reassemble charger and install battery sleeve.

AC Power Assembly

To replace the AC power assembly (item 4), perform the following steps:

1. Disassemble the charger (see Case disassembly procedure).

2. Remove the Power Supply (see Power Supply removal procedure).

3. Remove the two mounting screws (item 12-3).

4. Remove assembly by lifting up, pulling assembly out of the two tabs.

Reinstall:

5. Reinstall the AC power assembly into the bottom assembly.

6. Install the two mounting screws (removed in step 3) to secure the assembly.

7. Reinstall the power supply and reassemble the charger.

Fuse replacement

To replace the power supply fuse, F1, perform the following steps:

1. Disassemble the charger (see Case disassembly procedure).
2. Remove the Power Supply (see Power Supply removal procedure).
3. Replace F1 with a 5A 250V UL/CSA fuse.
4. Reassemble charger.

TROUBLESHOOTING PROCEDURES

STANDARD MULTI-UNIT CHARGER

The first step in troubleshooting the Standard Multi-unit Charger is to make a careful visual inspection of the unit for obvious signs of overheating components. Also check for loose connections and cracked components. If there is no evidence indicating the location of the failure, continue troubleshooting by making voltage measurements or signal tracing. Functional diagrams are provided to assist in troubleshooting the units.

Quick Checks:

- Check input power and AC plug
- Ensure voltage selector switch is in the correct position
- Ensure power switch is in the ON position
- Check operation using a known good battery pack
- Check battery sleeve charging contacts
- Check inside connections between printed circuit boards
- Check fuses on power supply assembly
- Inspect for cold solder joints, solder bridges, or pattern cuts.

CHECKING PROCEDURES

The following procedures will aid in isolating failures to a field/shop replacable assembly. These procedures do not attempt to isolate failures to the component level.

FAULT CONDITION 1: Charger does not charge. (CHARGE (red) indicator stays off).

1. All six (6) slots are not charging;

   Check power supply output voltage.

   Measure voltage at CN3 between pins 1 and 2. Voltage should be 15 Vdc ±.2 volts. If voltage is incorrect, check fuses F1 and F2 on power supply board. Replace fuses if bad, otherwise, replace power supply.

2. Only one slot is not charging;

   Check charge control board output voltage.

   Measure voltage at CN102 between pins 3 and 5. Voltage should be 15 Vdc ±0.2 volts. If voltage is not present, verify input voltage at CN101 between pins 1 and 2. If no input voltage is present replace the cable between power supply and charge control board, if voltage is present then the charger control board is defective.

FAULT CONDITION 2: Batteries do not charge to full capacity.

1. Long batteries fail to charge to full capacity.

   Check long battery microswitch for proper operation. Replace defective sleeve if necessary.

2. Clean sleeve battery terminals. Replace sleeve if defective.

3. Battery has exceeded it's useful life, replace battery.

RAPID MULTI-UNIT CHARGER

The first step in troubleshooting the Rapid multi-unit charger is to make a careful visual inspection of the unit for obvious signs of overheating components. Also check for loose connections and cracked components. If there is no evidence indicating the location of the failure, continue troubleshooting by making voltage measurements or signal tracing. Functional diagrams are provided to assist in troubleshooting the units.

Quick Checks:

- Check input power and AC plug
- Ensure voltage selector switch is in the correct position
- Ensure power switch is in the ON position
- Check operation using a known good battery pack
- Check battery sleeve charging contacts
- Check inside connections between printed circuit boards
- Check fuses on power supply assembly
- Inspect for cold solder joints, solder bridges, or pattern cuts

CHECKING PROCEDURES

The following procedures will aid in isolating failures to a field/shop replacable assembly. These procedures do not attempt to isolate failures to the component level.

FAULT CONDITION 1: Charger does not charge. (CHARGE (red) indicator stays off).

1. All six (6) slots are not charging;

   Check power supply output voltage.

   Measure voltage at CN2 between pins 1,2 and pins 3,4. Voltage should be 13 Vdc ±0.2 volts. If voltage is incorrect, check fuse F1 on power supply board. Replace fuse if bad, otherwise, replace power supply.

2. Two slots are not charging;

   Check constant current regulator input voltage.

   Measure voltage at CN101 between pins 1,2 and pins 3,4. Voltage should be 13 Vdc ±0.2 volts. If voltage is incorrect, check the interconnecting cable and the constant current regulator. Replace defective assembly as required.

   Check fuse F101 on constant current regulator board.

   If fuse is open, replace constant current regulator board.

3. Only one slot is not charging;

   Check charge control board output voltage.

   Measure voltage at CN102 between pins 4 and 5. Voltage should be between 6.15 Vdc and 10.5 Vdc with battery installed. If voltage exceeds 10.5 volts, either the output printed wiring board ,terminal printed wiring board, or associated interconnecting cable is defective.

   Check voltage at IC103 pin 42 on constant current regulator board.

   Voltage should be 4.5 volts ±5%. If normal voltage is not present, replace constant current regulator board.

FAULT CONDITION 2: Batteries do not charge, CHARGE (red) LED flashes slowly.

1. With a battery installed, check the voltage on the charge control board at CN102 between pins 4 and 5.

   Voltage should be below 6.15 volts. CHARGE LED blinking slowly indicates charger is in the pre-charge mode. In less than 10 minutes, the trickle charge raises the battery voltage above 6.15 volts and the charger switches to the normal rapid charge mode as indicated by a steady CHARGE LED. If charger doesn't switch to rapid charge, the battery is probably defective.

2. With battery installed, charger switches to rapid charge for several seconds, then stops charging and the CHARGE (red) LED starts to blink slowly.

This condition indicates that the battery is either too hot (above 45°C) or too cold (below 0°C). If the condition continues with battery at room temperature, then check for continuity or shorts between the charge control board output and the sleeve contacts. If problem persists, replace the charge control board.

FAULT CONDITION 3: CHARGE (red) LED flashes slowly in standby (no battery installed)

1. Verify charger control board output voltage at CN102 pins 4 and 5 is approximately 5 volts.

   If the voltage is zero volts, there is probably a broken wiring pattern between R122 and D102 on the charger control board.

   If the voltage is 12.6 volts, check IC103 pin 6.

   If the voltage is correct (approximately 5 volts), then the reset circuit is faulty.

   Replace charger control board if found to be defective.

FAULT CONDITION 4: Both CHARGE (red) and READY (green) LEDs flash simultaneously.

1. The probable cause of this fault condition is shorted components Q101 and D101, or defects in Q103 and Q102.

   This failure requires the replacing the charger control board.

FAULT CONDITION 5: Irregular flashing of CHARGE (red) LED after charge sequence has started.

1. This condition results when the voltage sense circuit detects an excessively high battery voltage, normally battery does not exceed 10.5 volts .

   Replace battery with a known good battery. If normal operation results, replace defective battery.

   If the problem persists, replace the charge control board.

FAULT CONDITION 6: Battery overheats due to over charging.

1. Verify voltage on charger control board IC103 pin 5. Voltage should be 2.5 to 4.4 volts.

   If voltage is out of range, replace charger control board.

FAULT CONDITION 7: Charging stops before reaching complete charge and READY (green) LED flashes.

1. This condition results from attempting to charge a battery with a limited capacity and is close to the end of its life cycle.

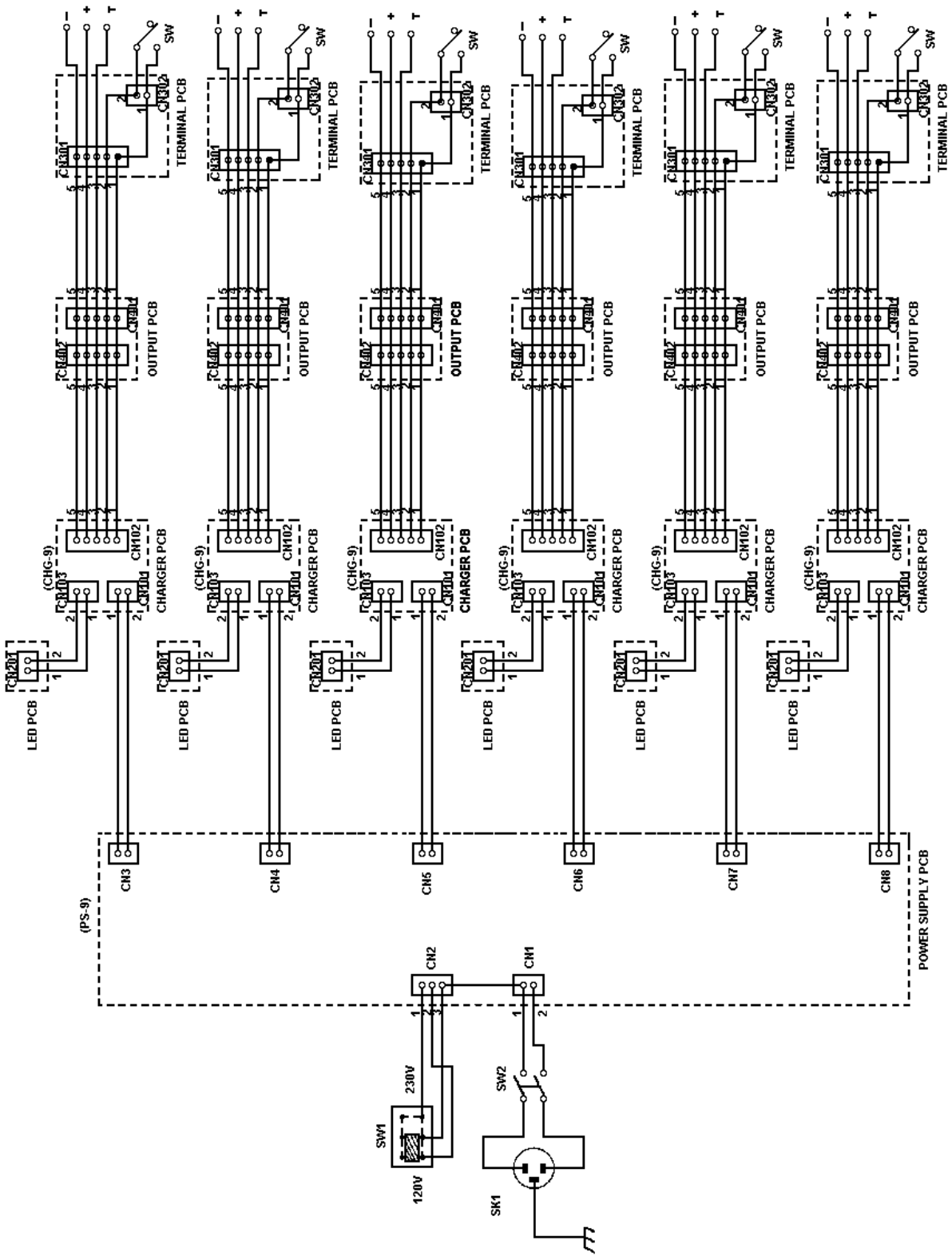
   Verify condition is not present when charging a known good battery. Replace defective battery.

FAULT CONDITION 8: Extended charge time when charging a "long battery", without overheating.

1. When charging a long battery, the battery length microswitch detects the battery length, switching the charger to the correct rate of rapid charge (normal charge current is 1.9 A ±10%).

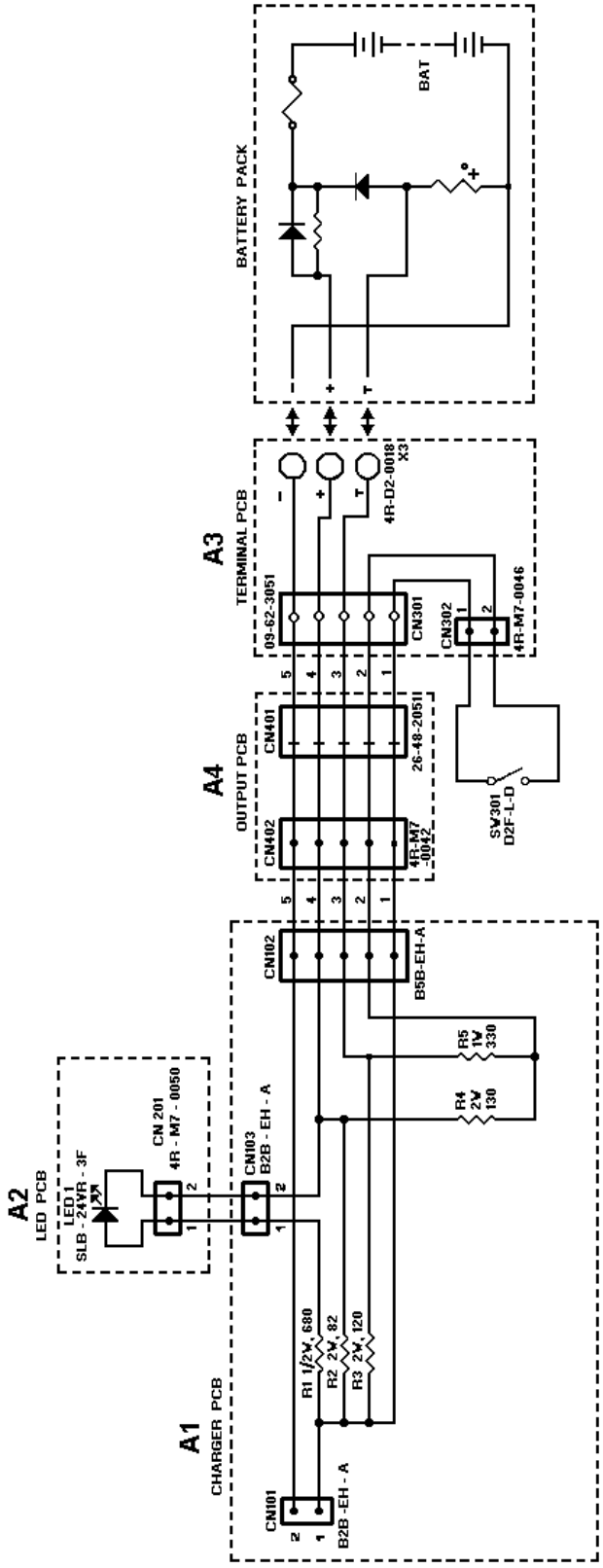
   Check microswitch, replace if found defective.

   Trace current paths back to power supply. Replace defective boards as required.



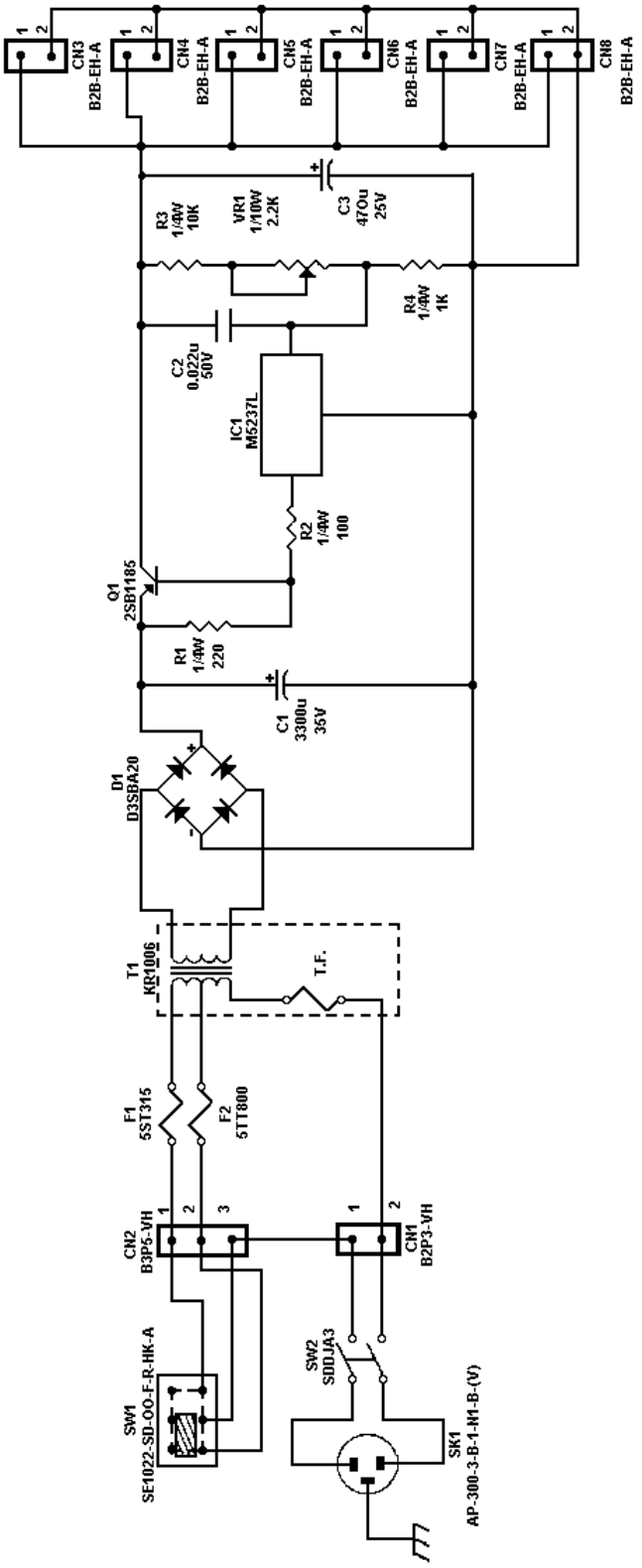
STANDARD MULTI-UNIT CHARGER
BML 161 51/023

(3R-M5-0041)



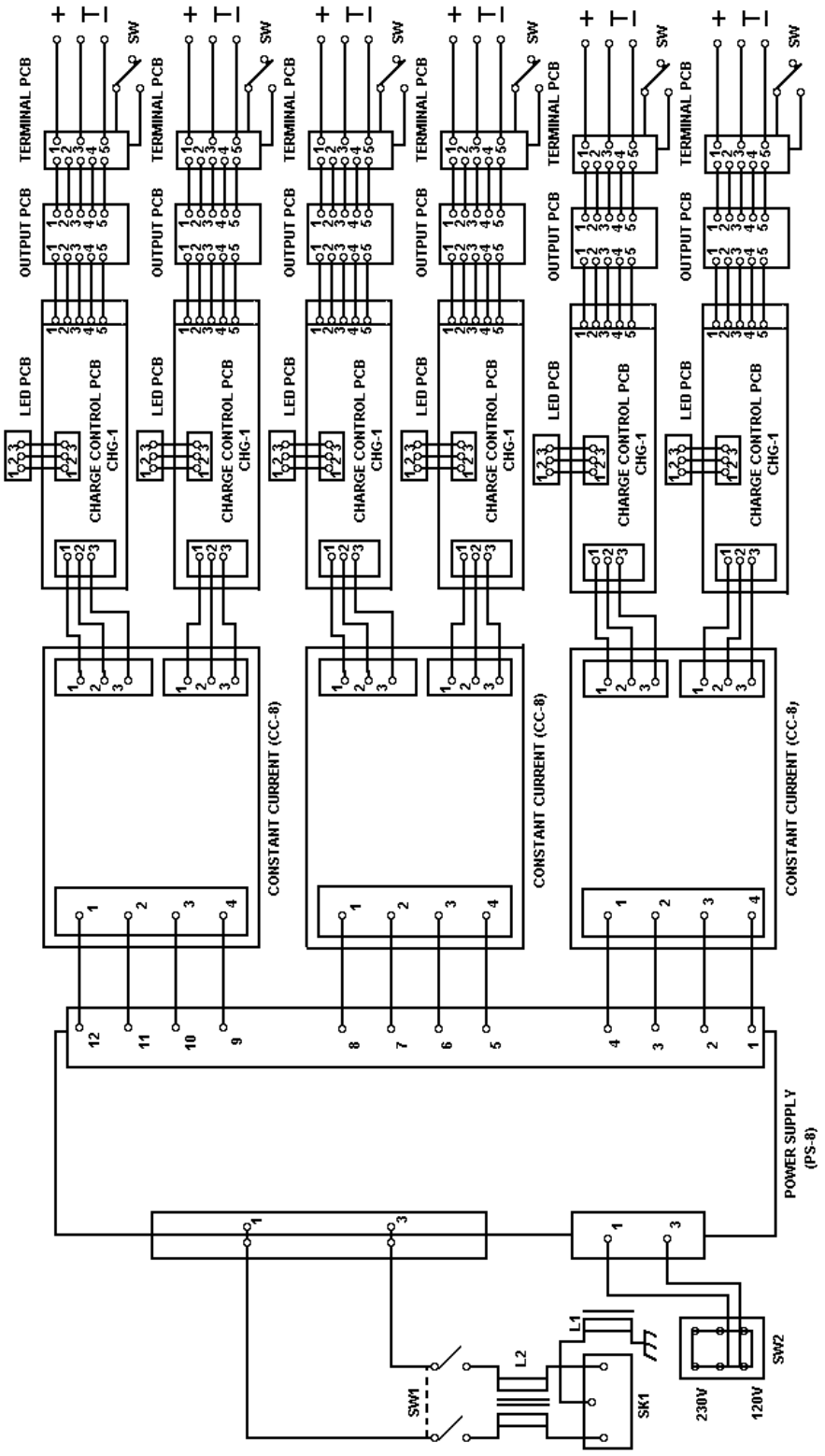
STANDARD MULTI-UNIT CHARGER
BML 161 51/023

(4R-M5-0039A)



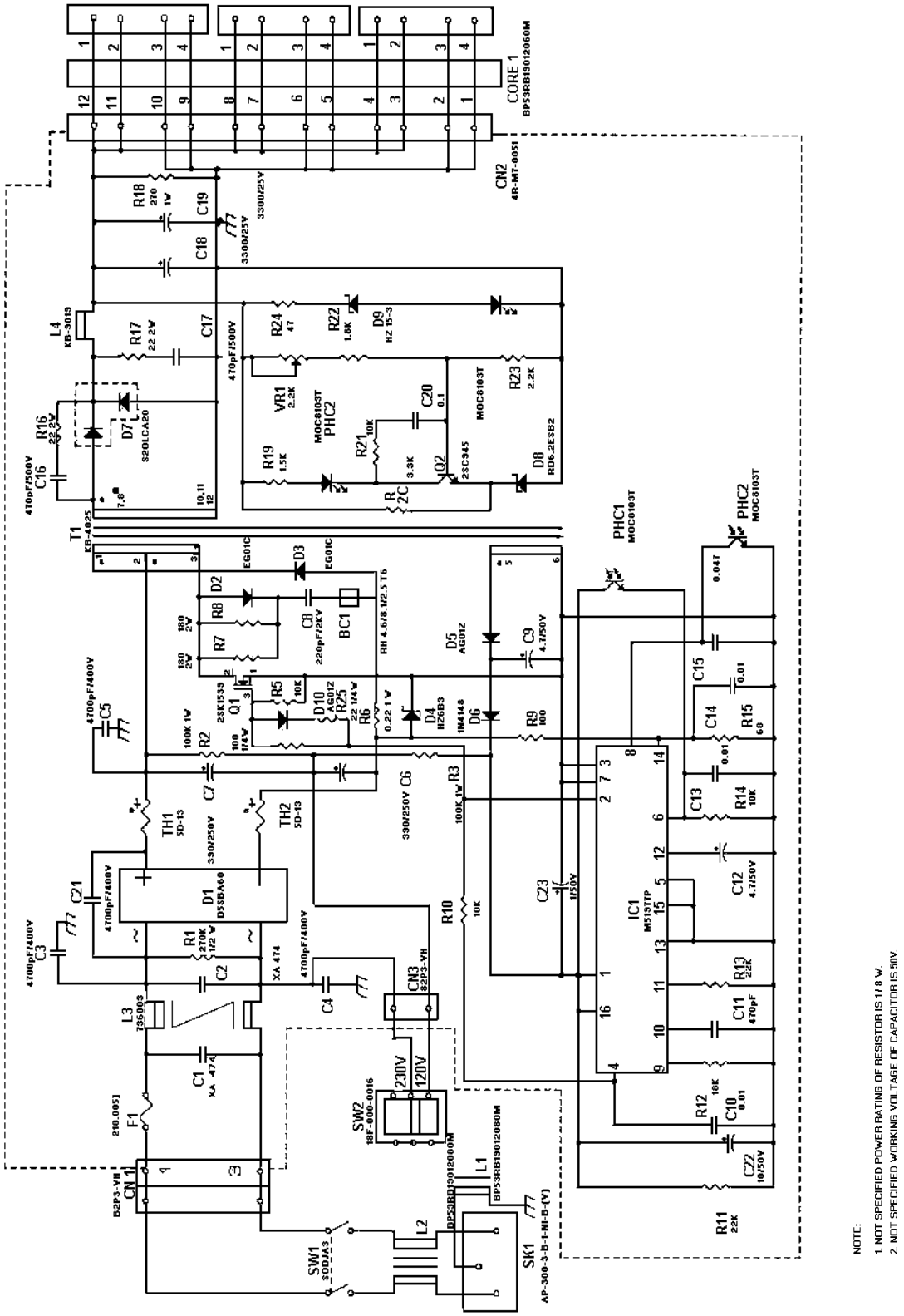
STANDARD MULTI-UNIT CHARGER
POWER SUPPLY - F29/4R-A9-0095

(4R-M5-0030C)



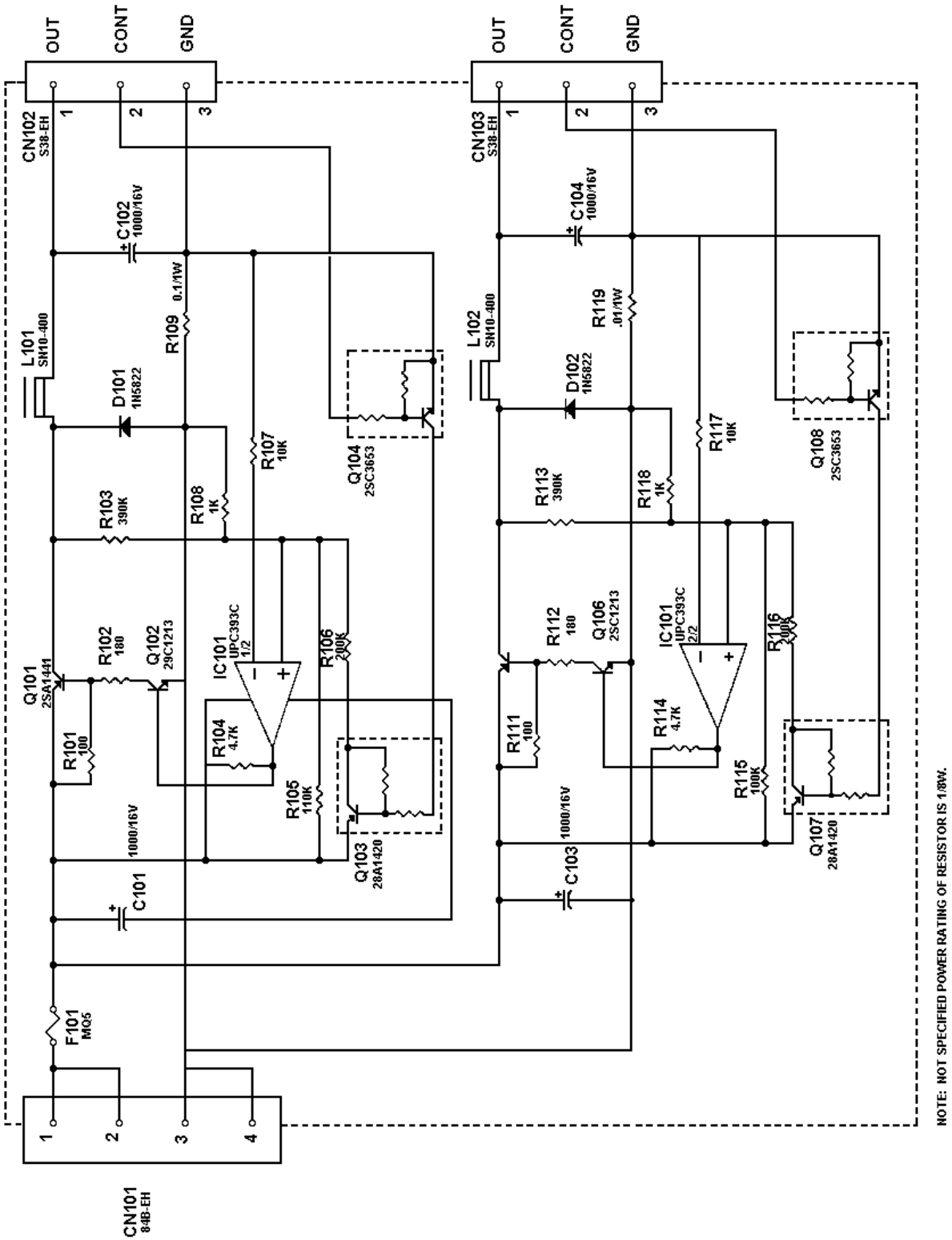
RAPID MULTI-UNIT CHARGER
BML 161 51/024

(3R-M5-0040)



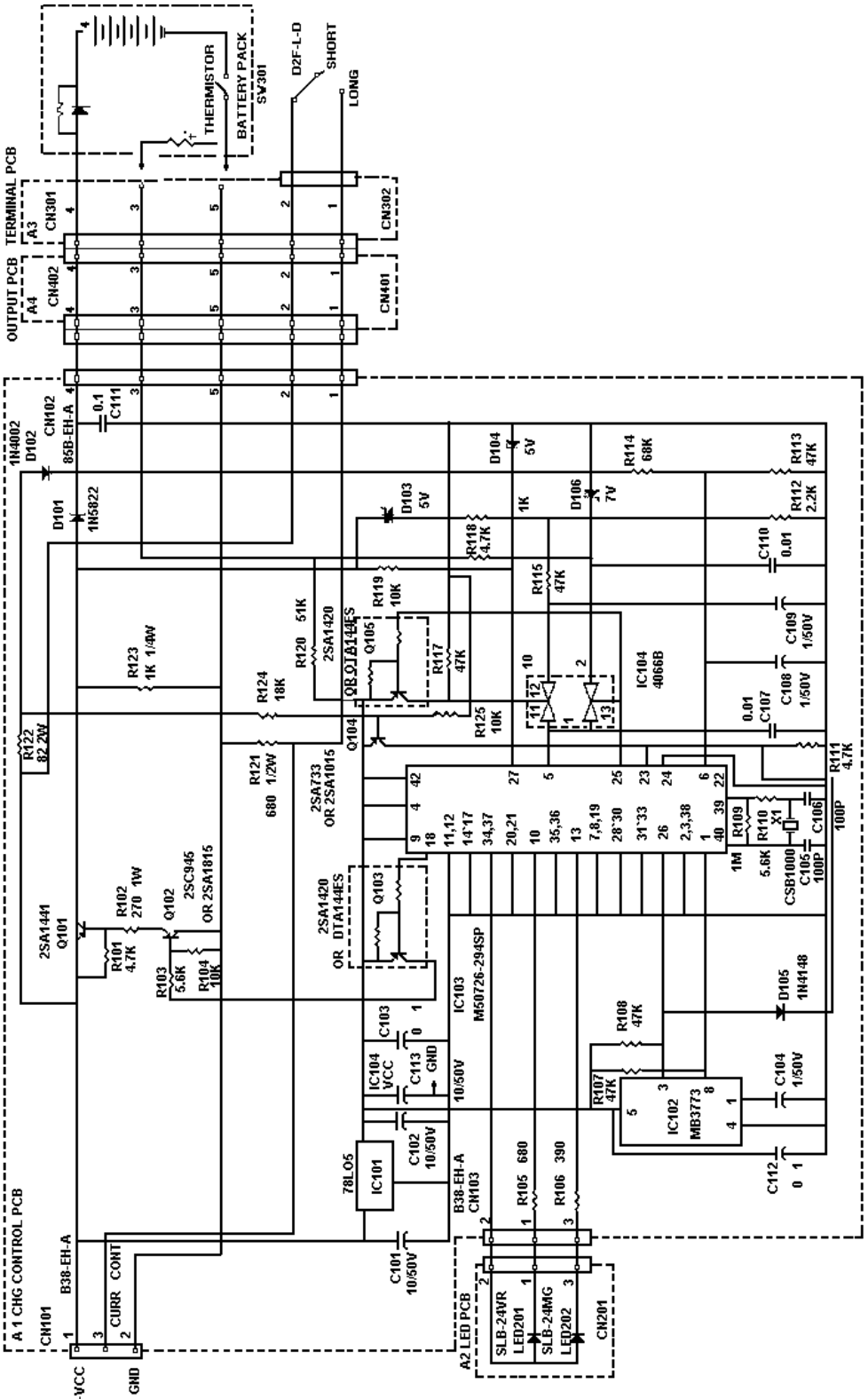
RAPID MULTI-UNIT CHARGER
POWER SUPPLY BOARD (F29/4R-A9-0091)

(3R-M5-0026A)



RAPID MULTI-UNIT CHARGER
CONSTANT CURRENT REGULATOR (F29/4R-A9-0091)

(3R-M5-0037)



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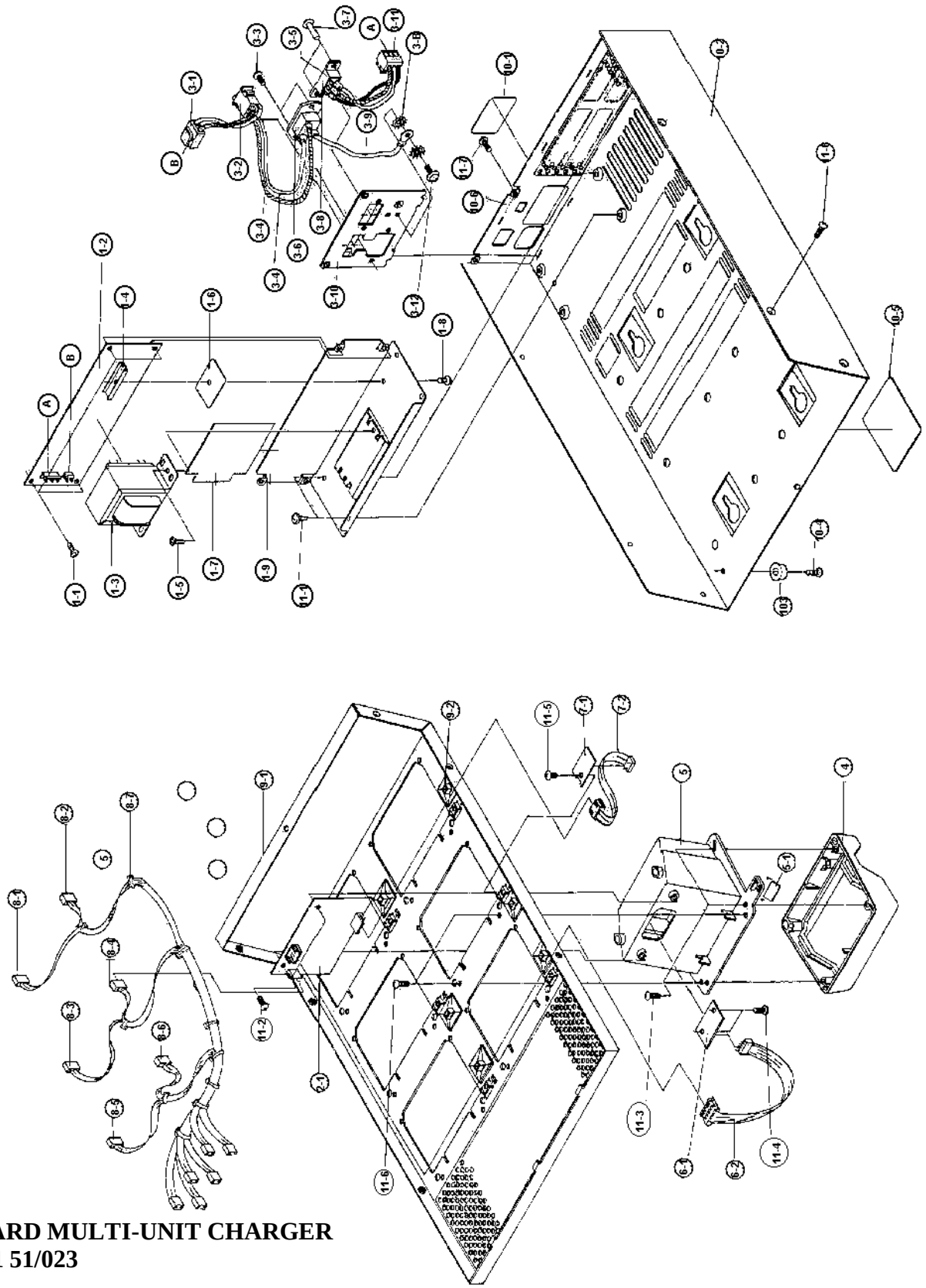
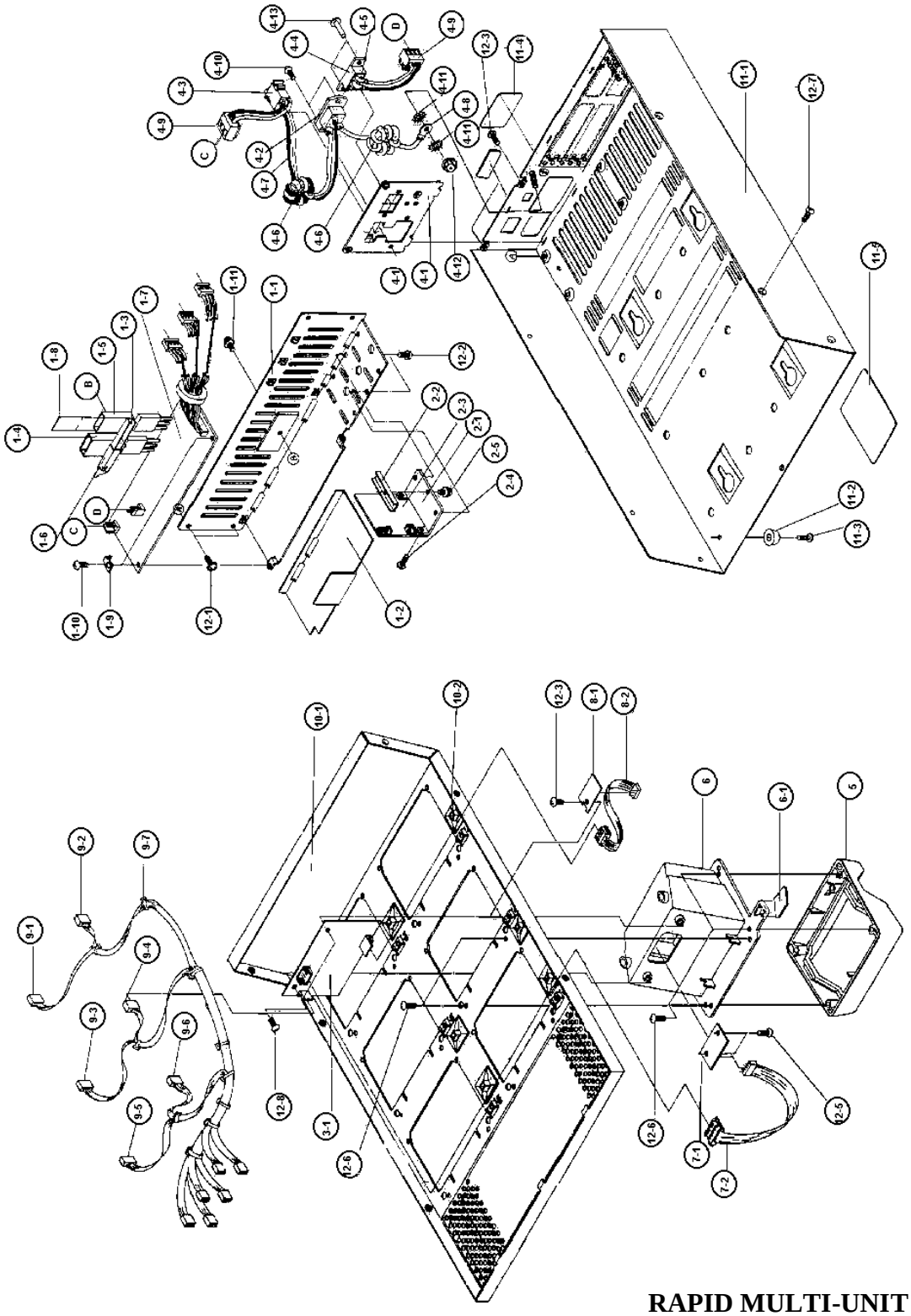
CONTROL BOARD (F29/4R-A9-0083)

(2R-M5-0018A)



STANDARD MULTI-UNIT CHARGER
BML 161 51/023

(2R-K5-0024A)



RAPID MULTI-UNIT CHARGER
BML 161 51/024

(2R-K5-0022A)

UNIVERSAL MULTI-UNIT CHARGER
STANDARD MODEL - BML 161 51/023

ISSUE 2

SYMBOL	PART NUMBER	DESCRIPTION
		NOTE: Prefix all Part Numbers with F29/
1	4R-A9-0095	Power Supply (PS-9).
2	4R-A9-0096	Charger Control Board.
3	4R-A9-0098-02	AC Input Assembly.
4	2R-B1-0097	Top Cabinet Assembly.
5	2R-B1-0117	Sleeve holder.
6	4R-A9-0097-02	Output printed circuit board.
7	4R-A9-0097-03	LED printed circuit board.
8	4R-A9-0093-04	Connector Harness.
9	4R-A9-0097-01	Cover assembly.
10	4R-A9-0098-01	Bottom assembly.
11		Screw kit.
11-1		Screw, self tapping, 3x6 ZC.
11-2		Screw, self tapping, 3x8 ZC.
11-3		Screw, self tapping, 3x8 ZC.
11-4		Screw, self tapping, 3x6 ZC.
11-5		Screw, self tapping, M3x8 ZC.
11-6		Screw, self tapping, 3x8 ZC.
11-7		Screw, self tapping, 3x6 ZC.
11-8		Screw, self tapping, 3x6 BZ.

* COMPONENTS, ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

UNIVERSAL MULTI-UNIT CHARGER
RAPID MODEL - BML 161 51/024

ISSUE 2

SYMBOL	PART NUMBER	DESCRIPTION
		NOTE: Prefix all Part Numbers with F29/
1	4R-A9-0091	Power Supply (PS-8).
2	4R-A9-0092	Constant Current Regulator Assembly.
3	4R-A9-0083	Charge Control printed circuit board assembly.
4	4R-A9-0094-02	AC Input Assembly.
5	2R-B1-0097	Top cabinet.
6	2R-B1-0117	Sleeve Holder.
7	4R-A9-0093-02	Output printed circuit board assembly.
8	4R-A9-0093-03	LED printed circuit board assembly.
9	4R-A9-0093-04	Output connector harness.
10	4R-A9-0093-01	Cover assembly.
11	4R-A9-0094-01	Bottom assembly.
12		Screw kit.
12-1		Screw, self tapping, M3x6 ZC.
12-2		Screw, self tapping, 3x8 ZC.
12-3		Screw, self tapping, M3x6 ZC.
12-4		Screw, self tapping, M3x6 ZC.
12-5		Screw, self tapping, 3x6 ZC.
12-6		Screw, self tapping, 3x8 ZC.
12-7		Screw, self tapping, M3x6 BZ.
12-8		Screw, self tapping, 3x6 ZC.

* COMPONENTS, ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

Ericsson Inc.
Private Radio Systems
Mountain View Road
Lynchburg, Virginia 24502
1-800-528-7711 (Outside USA, 804-528-7711)