

**PRELIMINARY
INSTRUCTION MANUAL
FOR
RADIO SET AS-3**

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FOR
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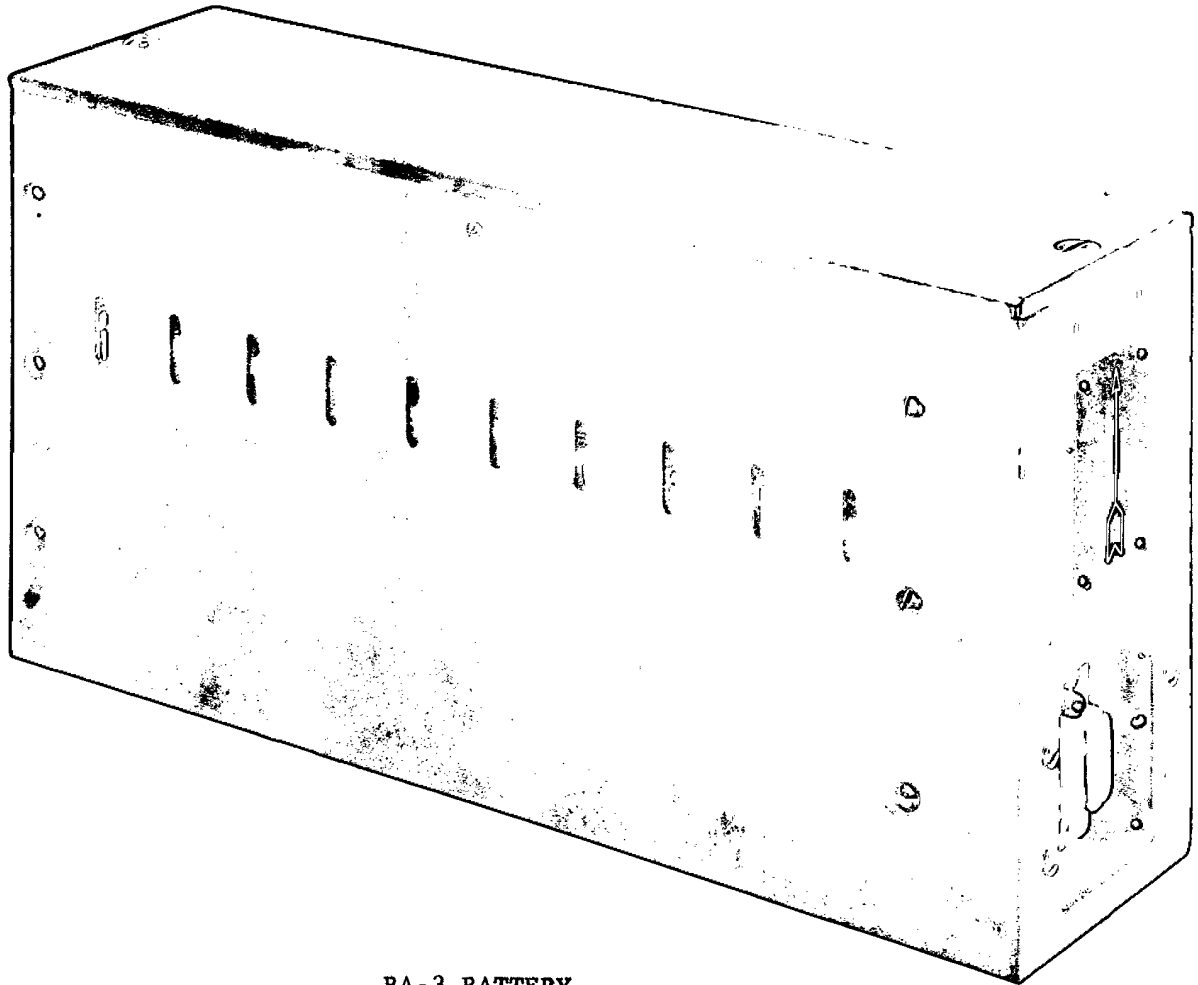
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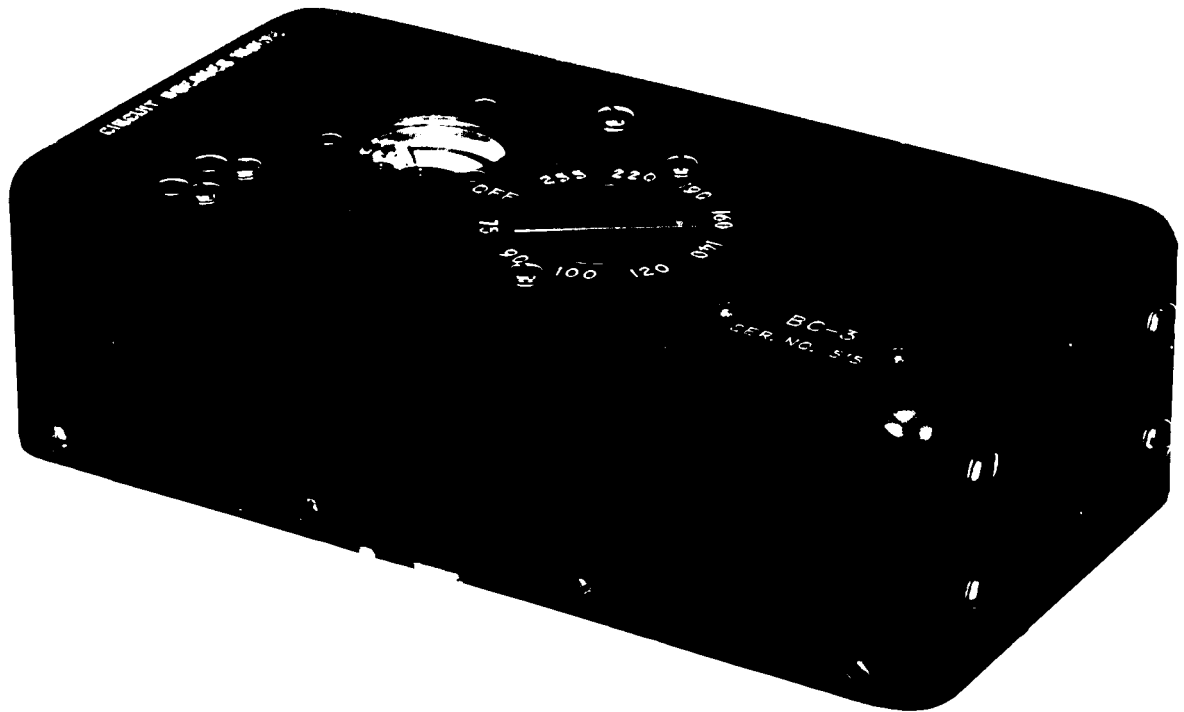
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BA-3 BATTERY

Figure 1-1. Radio Set AS-3, Less Receiver and Printer
(Sheet 1 of 4)



BC-3 BATTERY CHARGER

Figure 1-1. Radio Set AS-3, Less Receiver and Printer

(Sheet 2 of 4)



CA 3 CARTRIDGE

Figure 1-1. Radio Set AS-3, Less Receiver and Printer

(Sheet 3 of 4)



AC-3 POWER SUPPLY

Figure 1-1. Radio Set AS-3, Less Receiver and Printer

(Sheet 4 of 4)

SECTION I

GENERAL INFORMATION

1-1. SCOPE.

This manual contains operating and maintenance instructions for the AT-3 Transmitter, AC-3 Power Supply, BA-3 Battery, BC-3 Battery Charger, CO-3 Coder, and CA-3 Cartridge (Figure 1-1). These units when combined with a receiver (RR/D-11 or equivalent) and a printer (TP-3 or equivalent), not covered herein, comprise Radio Set AS-3.

1-2. PURPOSE.

Radio Set AS-3 is a miniature, automatic radio set for c-w transmission and reception of radio messages. Transmission may be manual using a telegraph key, or it may be automatic using a tape cartridge for transmission at the rate of 300 words per minute.

1-3. DESCRIPTION.

AT-3 Transmitter. The AT-3 Transmitter is housed in a black-anodized aluminum case. All operating controls, except the built-in telegraph key, are accessible through cutouts in the cover; the built-in key is attached to a hinged panel on the front surface. A bracket assembly is provided for mounting the CA-3 Cartridge for transmission of taped messages. Keyed connectors on the back and each side of the transmitter provide for connection to a power supply, a receiver, and a printer.

The transmitter operates in the frequency range of 3 to 30 megacycles and is crystal-controlled.

AC-3 Power Supply. The AC-3 Power Supply is housed in a black-anodized aluminum case. This unit furnishes power to the AT-3 Transmitter (and the associated receiver and printer) from a 70- to 270-volt, 50- to 400-cycle, a-c power source. A line-selector switch and meter are flush with the top surface. A hinged panel in the cover provides access to a compartment containing the line cord. The AC-3 Power Supply can also be used to charge the BA-3 Battery.

BC-3 Battery Charger. The BC-3 Battery Charger is used to charge the BA-3 Battery from a 70- to 270-volt, 50- to 400-cycle, a-c power source. The unit is housed in a black-anodized aluminum case. A line-selector switch and meter are flush with the top surface. A connector at one end mates with the BA-3 Battery and a hinged panel at the other end provides access to a compartment containing the line cord and a circuit breaker.

CA-3 Cartridge. The CA-3 Cartridge is used to store information for automatic transmission.

CO-3 Coder. The CO-3 Coder is used to place information on the tape in the CA-3 Cartridge by means of three keys located on the front of the coder.

cord to the power source. Rotate the line-selector switch clockwise until the pointer of the AC-3 meter is in the green segment at the center of the scale.

Note

If the line-selector switch is set below the line voltage, the protective circuit breaker within the AC-3 will open and the red button will pop up. Select the next higher position of the switch (counterclockwise rotation) and push the red button down to reset the circuit breaker.

Use of BA-3 Battery. With AT-3 function switch in REC. + STANDBY or TRANSMIT position, depress BATTERY button (white button) on the AT-3 Transmitter. If the pointer of the adjacent meter is in green segment of "B" scale, the battery is useable. If meter indication is in red segment of "B" scale, charge the battery as described in Section IV.

2-4. TRANSMITTER TUNING.

Select a suitable CR-18/U Crystal in the 3- to 10-mc range for the desired transmitting frequency and insert it in the crystal socket on the front of the AT-3. (The crystal frequency is doubled or tripled as required.) Tune the transmitter as follows:

Step 1. Set oscillator coil wiper wheel to approximate frequency by rotating thumbwheel ① to position wiper wheel under the scale above the coil.

Step 2. Set function switch to TRANSMIT position.

Step 3. Open KEY door and depress the key.

Note

Do not hold key down for long periods with power-amplifier tank out of resonance. Depress key only while actually tuning.

Step 4. Adjust oscillator by rotating thumbwheel (1) for maximum meter indication on 'A' scale of meter adjacent to oscillator coil.

Step 5. Rotate antenna switch (3) fully clockwise (position 11).

Step 6. Rotate meter-adjust control fully from left to right. If TUNE TO MAX meter deflects to right-hand stop, back off on the meter-adjust control until TUNE TO MAX meter reads about three-fourths of full deflection.

Step 7. Rotate thumbwheel (2) until a dip is indicated on the meter adjacent to the oscillator coil. If TUNE TO MAX meter deflects full scale during this step, rotate meter-adjust control to the left until TUNE TO MAX meter reads about one-third of full deflection.

Step 8. Rotate antenna switch (3) one position counter-clockwise and adjust with thumbwheel (2) for maximum indication on TUNE TO MAX meter.

Step 9. Repeat Step 8 until position of antenna switch (3) is determined for which deflection of the TUNE TO MAX meter is maximum.

Step 10. Check results of Step 9 by tuning with thumbwheel (2) for antenna switch positions adjacent to the one thought to be best.

Step 11. Set antenna switch (3) to position selected and adjust thumbwheel (2) for maximum deflection of TUNE TO MAX meter.

Step 12. Touch up adjustment with thumbwheel (1) for maximum deflection of TUNE TO MAX meter.

The transmitter is now tuned for maximum output power and is ready to operate.

2-5. PREPARATION OF CARTRIDGE.

The CO-3 Coder is used to prepare the CA-3 Cartridge for transmission (refer to paragraph 3-3 for procedure for erasing a previous message from the tape in the CA-3 Cartridge). Insert the cartridge into the coder as follows:

Step 1. Lift the hinged panel in the top surface of the coder.

Step 2. Fold back the cover of the cartridge and engage the lip at the lower left corner of the cartridge with the cartridge-holding bracket of the coder.

Step 3. Press down on the right side of the cartridge until the spring catch engages the coder bracket (see Figure 2-3).

Use the coder keys to inscribe the message on the cartridge tape in standard dots and dashes. Depress the SPACE key once between characters and twice between words for proper spacing.

To remove the cartridge from the coder, depress the spring catch at the lower right corner of the cartridge and lift the cartridge out. The tape will rewind automatically and will be ready for transmission upon insertion in the transmitter.

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Figure 2-3. CA-3 Cartridge with CO-3 Coder

SECTION III

OPERATION

3-1. GENERAL.

Figures 3-1 and 3-2 identify the operating controls of the AT-3 Transmitter and the AC-3 Power Supply. The function switch of the transmitter must be set for the desired mode of operation: REC. ONLY, REC. + STANDBY, or TRANSMIT.

3-2. RECEIVE MODE.

To receive messages on the receiver associated with the AT-3 Transmitter, set the function switch on the transmitter to REC. ONLY or REC. + STANDBY. The REC. + STANDBY position applies power to the transmitter filaments and is used if the operator expects to be transmitting messages within the next few minutes.

3-3. TRANSMIT MODE.

Transmission may be of three types: manual, automatic transmission of identification signal, or automatic transmission of information in the CA-3 Cartridge. For each type of transmission, the transmitter must first be tuned as specified in Section II. If a BA-3 Battery is used, check it as specified in paragraph 2-3 before transmitting.

Manual Transmission: Set the function switch of the transmitter to TRANSMIT. Open the KEY door and use the built-in key to send the desired message.

Note

An external key can be connected to the EXT. KEY connectors and used instead of the built-in key.

Automatic Identification. Set the function switch to TRANSMIT.

Push the yellow button marked IDY and hold it down for a few seconds at a time.

Automatic Message Transmission. Insert the CA-3 Cartridge into the cartridge holder of the transmitter as follows:

Step 1. Lift the hinged panel above the function switch.

Step 2. Fold back the cover of the cartridge and engage the lip on the lower left corner of the cartridge.

Step 3. Press down on the right side of the cartridge until the spring catch engages (see Figure 3-3).

To transmit the prepared message, set the function switch to TRANSMIT and press down on the blue button marked MSG. Hold the button down until the transmission has been completed.

Note

The MSG button should be released when the transmitter stops transmitting or when the cartridge wheels stop turning.

Remove the cartridge by depressing the spring catch at the lower right corner and lifting the cartridge out. The tape will re-wind automatically and will be ready to transmit again upon re-insertion in the transmitter.

To erase the message on the cartridge tape, insert the cartridge in the same manner as for transmission. Depress plunger shaft below ERASE arrow on the cartridge holder. Push the plunger shaft down until the drive motor starts and hold it down until the cartridge wheels stop turning. Upon removal from the transmitter, the cartridge is ready for insertion in the CO-3 Coder. (Refer to paragraph 2-5 for preparation of the cartridge.)

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Figure 3-1. AT-3 Transmitter, Operating Controls

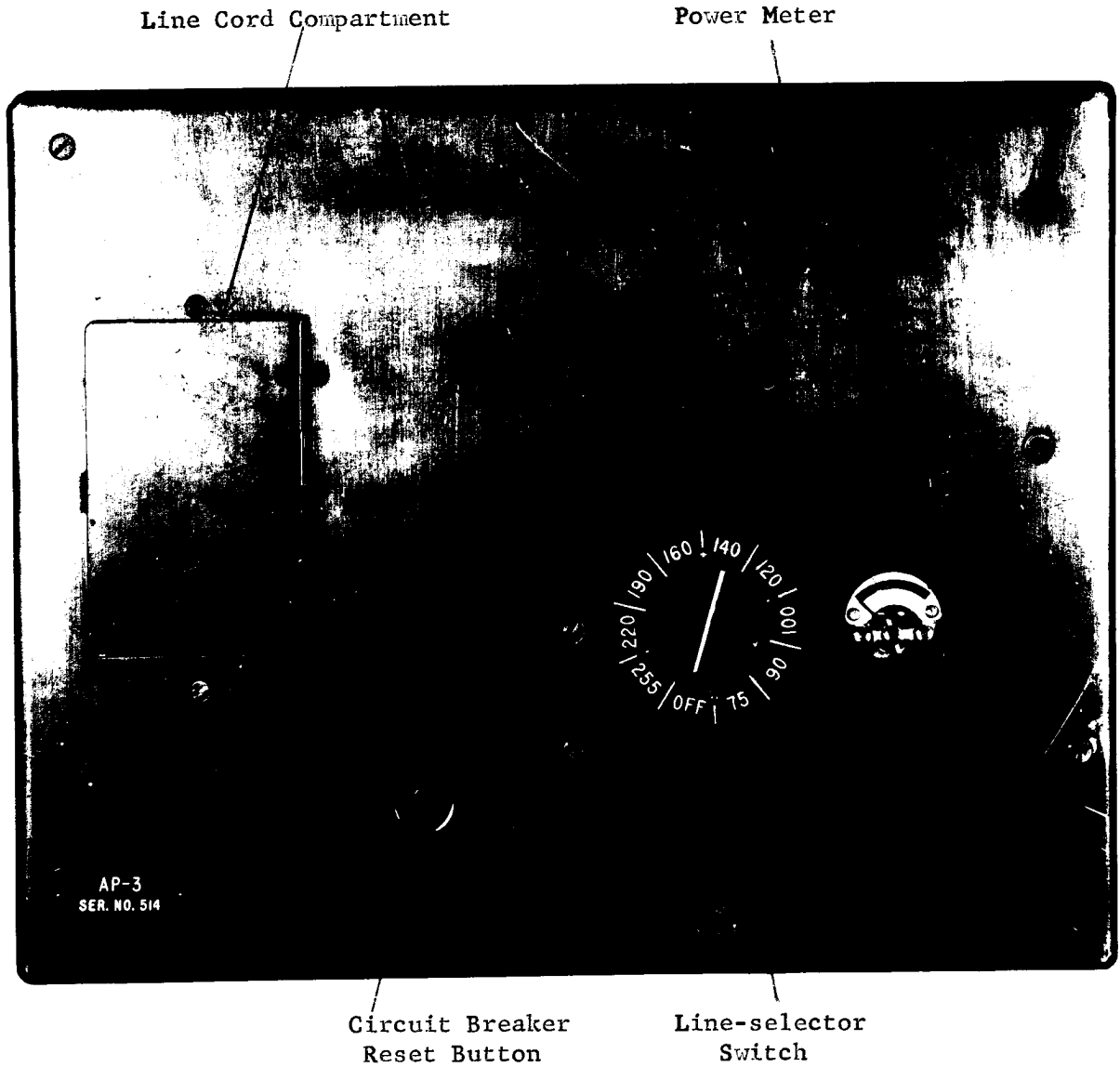


Figure 3-2. AC-3 Power Supply, Operating Controls

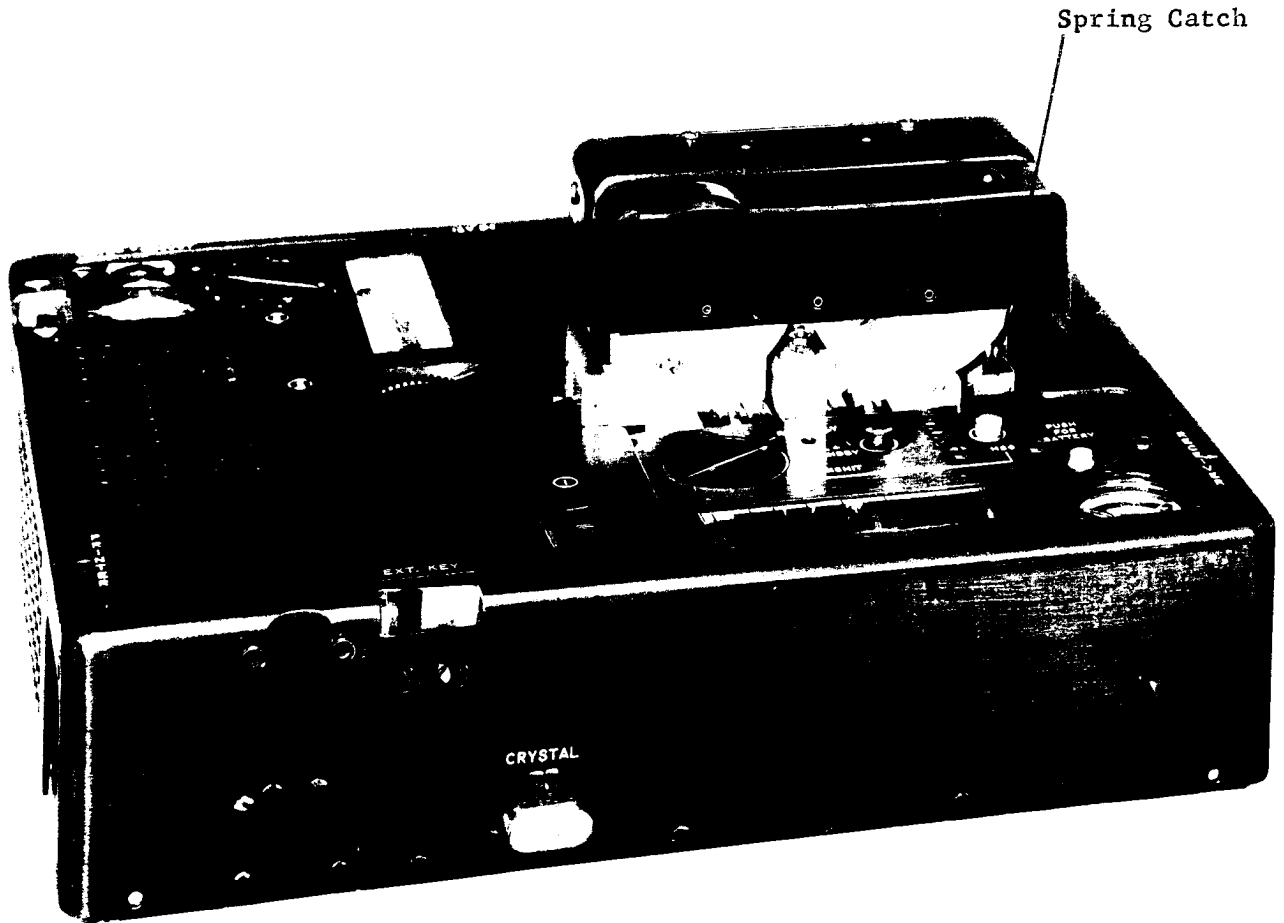


Figure 3-3. CA-3 Cartridge with AT-3 Transmitter

SECTION IV
MAINTENANCE

4-1. GENERAL.

Schematic diagrams of the AT-3 Transmitter, the AC-3 Power Supply, the BC-3 Battery Charger, and the BA-3 Battery are shown in Figures 4-2 through 4-5. The CO-3 Coder and the CA-3 Cartridge are mechanical devices. In case of faulty operation of the transmitter, power supply, or battery charger, remove the bottom plate or the cover of the unit and inspect for loose connections and for evidence of overheating. If visual inspection does not disclose the trouble, disconnect all diodes and transistors in the unit, and make continuity and resistance checks. If a transistor or diode is suspected of being defective, substitute a new one and recheck the performance of the unit.

Note

When soldering or unsoldering a diode or transistor lead, grip the lead with pliers between the solder joint and the diode or transistor. The pliers form a heat sink that prevents excessive heat from damaging the diode or transistor.

4-2. BATTERY MAINTENANCE.

General The cells of the BA-3 Battery contain only a small amount of electrolyte, a solution of potassium hydroxide (KOH) having a normal specific gravity of 1.300 at 70° F. The specific gravity does not change appreciably between charge and discharge. The electrolyte level should be checked only after the battery has been charged. Add water as required to bring the electrolyte level to the red line, but not above it. Whenever water is added, thoroughly wash and rinse the vent plugs with

water before replacing.

Note

When charging at high rates, gassing will cause the electrolyte to rise above the red line. Do not remove this apparently excess electrolyte. The level will drop back when the battery stands on open circuit.

A non-corrosive, harmless deposit of potassium carbonate (white crystals) may appear on the cell tops. Brush or wash it off periodically.

Precautionary Notes. The following precautions should be observed to avoid damage to the battery or harm to personnel.

1. KEEP OPEN FLAMES OR SPARKS AWAY FROM THE BATTERY - PARTICULARLY WHEN IT IS BEING CHARGED.
2. DO NOT SPILL THE ELECTROLYTE ON CLOTHES OR SKIN. IN CASE OF ACCIDENT, WASH WITH VINEGAR OR SATURATED BORIC ACID SOLUTION AND RINSE FREELY WITH WATER.
3. Sulfuric acid, as used in lead-acid batteries, will cause permanent damage to the BA-3 Battery. Do not add sulfuric acid to the cells, and do not use any tools (such as hydrometers or funnels) that have been used previously with lead-acid batteries.
4. Do not discharge the battery beyond its rated capacity. Follow the instructions contained in paragraphs 2-3 and 3-3 to determine useability of the battery.
5. DO NOT CHARGE THE BATTERY CELLS WHEN REMOVED FROM BATTERY CASE.

Use of AC-3 for Battery Charging. With the line-selector switch in the OFF position, plug the battery into the power supply and connect the line cord of the AC-3 to the a-c power source. (Refer to paragraph 2-3.) Figure 3-2 shows the operating controls of the AC-3. Rotate the line-selector switch clockwise until the pointer of the AC-3 meter is in the green segment of the scale. The battery will be fully charged in approximately one hour. If the initial charging rate is too high, as indicated by excessive gassing of the battery cells, select the next higher position (counterclockwise) of the line-selector switch for about 10 minutes.

Use of BC-3 For Battery Charging. Figure 4-1 shows the operating controls of the BC-3 Battery Charger. To charge a BA-3 battery, proceed as follows:

Step 1. With the line-selector switch in the OFF position, plug the battery into the BC-3 and connect the BC-3 line cord to the a-c power source.

Note

The circuit breaker in the line-cord compartment must be on (handle down) for operation of the battery charger.

Step 2. Rotate the line-selector switch clockwise until the meter indication is in the green segment of the scale.

Step 3. Allow the battery to charge for several hours (overnight, if possible).

Note

If the line-selector switch is set below the line voltage, the protective circuit breaker within the BC-3 will open. Select the next higher position of the switch (counterclockwise rotation) and reset the circuit breaker.

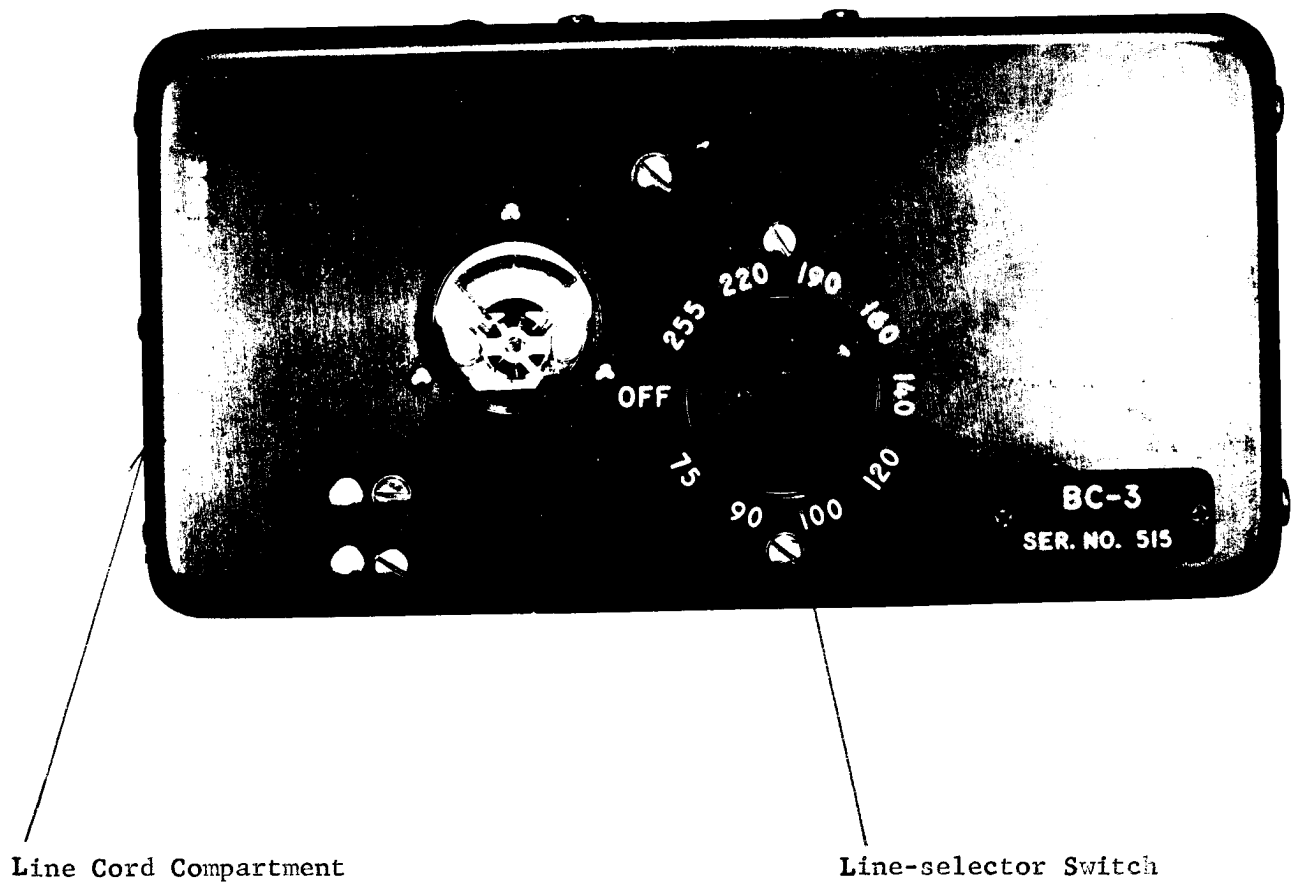
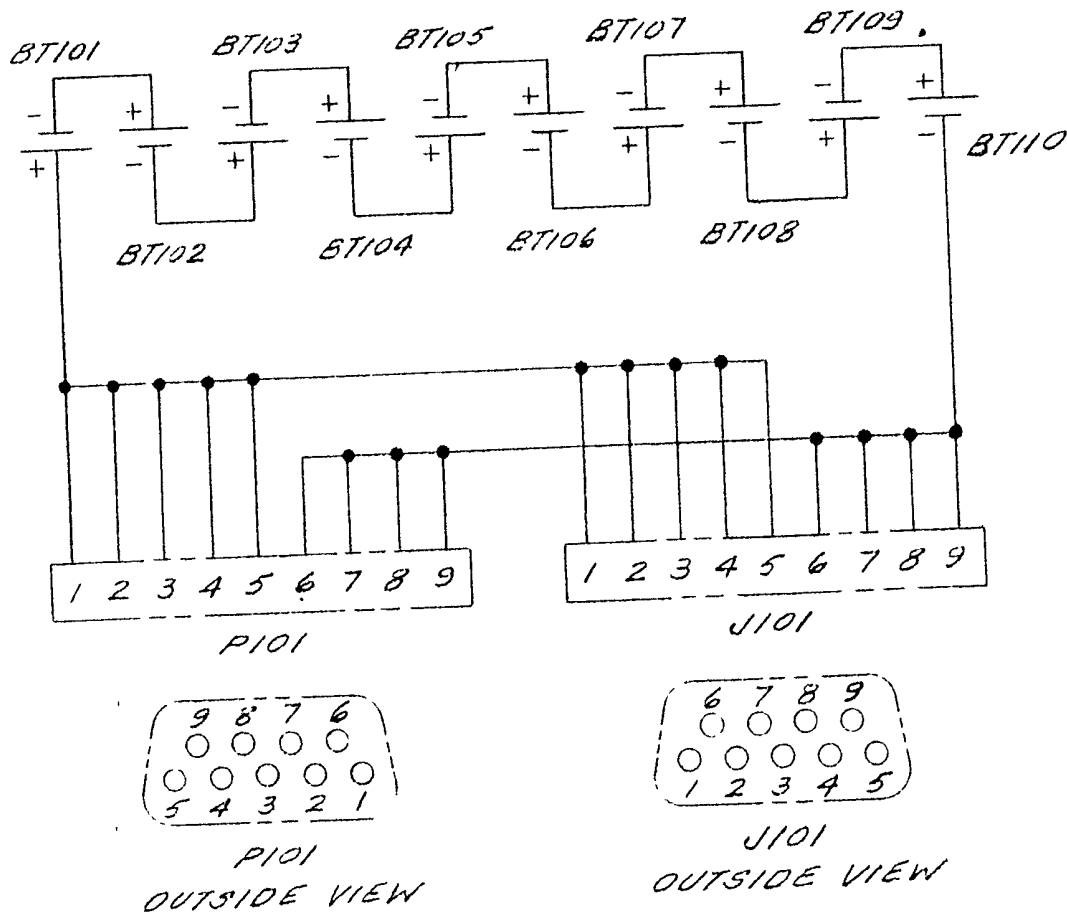


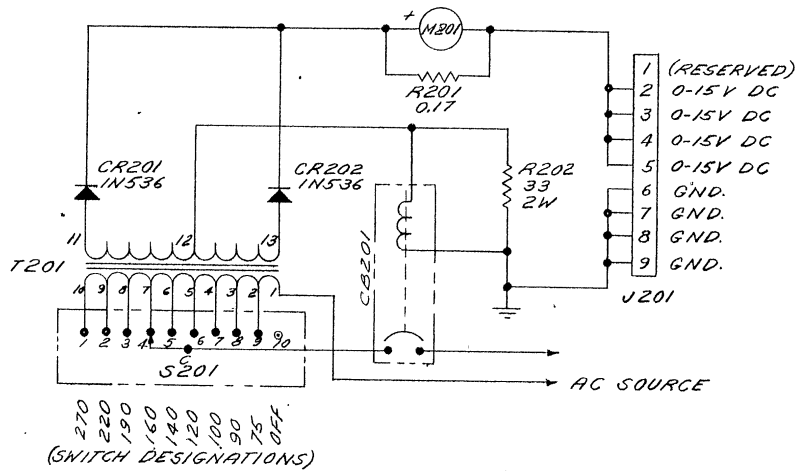
Figure 4-1. BC-3 Battery Charger, Operating Controls



NOTES:

1. FOR ASSEMBLY SEE DRAWING #22660.
2. FOR WIRING DIAGRAM SEE DRAWING #22661.

Figure 4-5. BA-3 Battery, Schematic Diagram

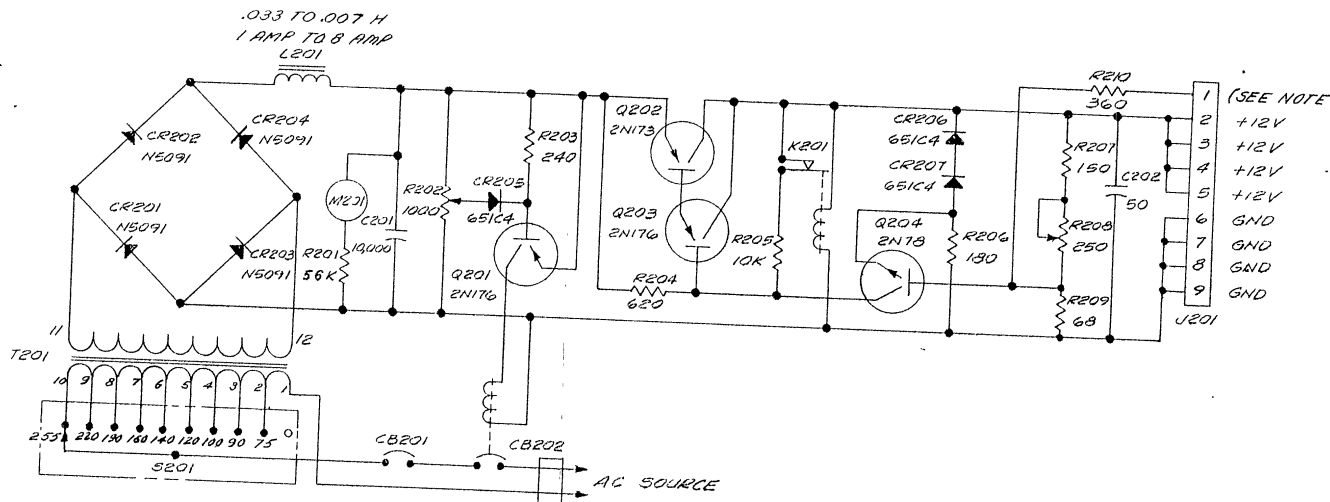


- NOTES:
1. FOR ASSEMBLY SEE DRAWING NO. EAP 58122-1
 2. FOR WIRING DIAGRAM SEE DRAWING NO. EAP 581217-1
 3. RESISTANCE VALUES ARE IN OHMS.
 4. CAPACITANCE VALUES ARE IN MICROFARADS (UF).

RECORD OF HIGHEST SYMBOL NUMBERS	
CB	201
CR	202
J	201
M	201
R	202
S	201
T	201

STAT

Figure 4-4. BC-3 Battery Charger, Schematic Diagram



- NOTES:
1. FOR ASSEMBLY SEE DRAWING NO. KHM
 2. FOR WIRING DIAGRAM SEE DRAWING NO. KHM
 3. RESISTANCE VALUES ARE IN OHMS, MULTIPLIER K=1000.
 4. CAPACITANCE VALUES ARE IN MICROFARADS (UF).
 5. FOR USE AS BATTERY CHARGER CONNECT TERMINALS 1 AND 2 OF J201.

RECORD OF HIGHEST SYMBOL NUMBERS	
CATEGORY	NUMBER
C	202
CB	202
CR	207
J	201
K	201
M	201
P	201
R	201
S	201
T	201
Q	204

