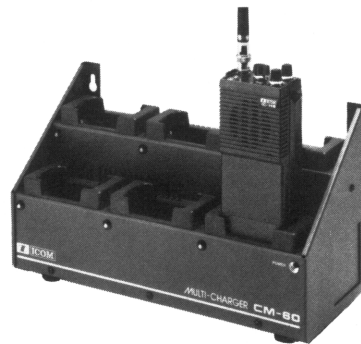


CM-60

MULTI-CHARGER

INSTRUCTION MANUAL



Thank you for your purchase of the new, highly reliable Multi-Charger, the CM-60 by ICOM. Please read this Instruction Manual carefully to insure that you understand the charger's functions thoroughly, and can get the best performance from it. It is designed for use with the Battery Packs for the various ICOM handheld transceivers. Namely, battery packs, IC-CM2, CM3, CM5, CM7 and CM8. For charging of installed batteries in the IC-CM4, please refer to the chapter titled Charging Operations.

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BEFORE USE

This charger is for all Nickel-Cadmium Battery Packs used with ICOM's handhelds, IC-CM2, CM3, CM5, CM7, CM8 and the IC-CM4 only if Nickel-Cadmium cells are installed. These slide-in packs can be charged separately, or while attached to the set.

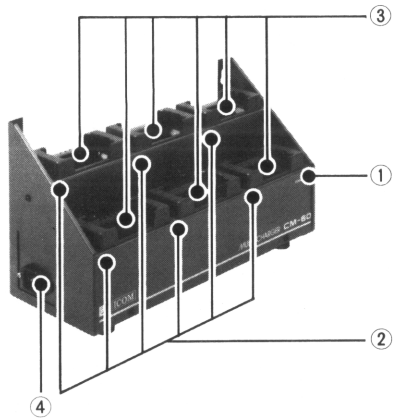
CAUTION:

Do not attempt to charge the IC-CM4 with other than Nickel-Cadmium cells installed, to do so could cause serious injury. For charging the IC-CM4, please refer to Charging Operations.

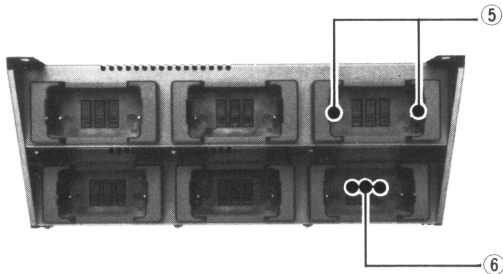
I. INTRODUCTION

- I-1. This multi-charger has six slots to charge six battery packs simultaneously, even if they are different models.
- I-2. All the battery packs for the handhelds have terminals on the base for charging of the same size, type, and construction. This charger, therefore, will operate with any of them.
- I-3. The charger is so designed that it is unnecessary to change settings or switches for semi-rapid charge (3 hours, IC-CM8: 6 hours) or normal charge (15 hours) packs. The charge rate is determined by the design of the packs.
- I-4. For battery capacities of 7.2V to 13.2V the CM-60 will charge automatically, using the proper current, governed by microswitches of each slot.
- I-5. Each slot has a full-charge detect circuit to avoid over-charge. When the pack inserted to a slot, reaches full charge condition, the charge current is reduced to 1/20 - 1/30 of normal current for trickle charging.
- I-6. The charging lamp of each slot lights to indicate it is functioning. When the battery pack is fully charged, the lamp will reduce its intensity to indicate the slot is in the trickle charging. The lamp will not light when any pack is inserted incorrectly.

II. DESCRIPTION OF CONTROLS AND CONNECTIONS



1. Power Lamp
Indicates power is on.
2. Charge lamp
Indicates charging is underway, reduces its intensity when charging of pack is completed.
3. Insertion slot for a battery pack.
4. AC Power Socket
For connection of the supplied AC power cable.
5. Charging Terminal
Correspond to the terminals on the bottom of the battery packs.



6. Microswitches
Since the current and capacity for each battery pack is different, these microswitches select the proper factors for each one.

III. CHARGING OPERATIONS

III-1. CHARGING PERIOD AND PACKS ACCEPTED BY THE CM-60

Listed below are the charging period and specifications for various packs.

Type	Model	Charge Period (Approx.)	Voltage	Internal Cells	Height of the pack (mm)	Replaceable Batteries
Rapid	IC-CM2	3H	7.2V	N-425AR x 6	39	No
Rapid	IC-CM5	3H	10.8V	N-425AR x 9	60	No
Rapid	IC-CM7	3H	13.2V	N-450AR x 11	80	No
Rapid	IC-CM8	6H	8.4V	N-800AR x 7	80	No
Normal	IC-CM3	15H	8.4V	N-250AA x 7	39	No
Normal	IC-CM4*	15H	7.2V	AA type 450mAH x 6	49	Yes

* When AA type 450mAH Nickel-Cadmium batteries are installed.

DO NOT ATTEMPT TO CHARGE REGULAR ZINC OR ALKALINE BATTERIES!

Operation of the charger is quite simple, but it is very important that you understand the battery packs that are suitable, please carefully consult the table above prior to charging any battery pack.

III-2. WHEN TO CHARGE

Nickel-Cadmium battery packs offer stable and accurate voltages, but due to their characteristics, just prior to being exhausted there is a sudden voltage drop. When sudden voltage drop occurs, it is important to stop using the batteries and recharge them. If charging is not done the battery life is shortened, and it is possible that polarity will be reversed.

Stop using the battery pack when the handheld's transmit LED flickers or does not light when transmitting, or if the battery condition indicator is displayed. When it is obvious that the transceiver is not receiving power from the pack, STOP to use the transceiver, and recharge the battery pack. This is also true when the transceiver's reception is weak, or if the normal rushing noise is low.

Newly purchased battery packs and those that have not been recharged for two months, or longer, should be charged. New battery packs are shipped from the factory without charging.

III-3. CHARGING PERIOD

The necessary time for full charge is 3 hours for the rapid-charge packs (IC-CM8: 6 hours) and approximately 15 hours for the normal-charge packs.

Rapid-charge packs are charged at the charge current of 135mA. The charge lamp will reduce its intensity when these packs reach full charge.

Normal-charge packs are charged at 25mA for the IC-CM3 and 45mA for the IC-CM4 (with Nickel-Cadmium batteries installed). A 15 hour charge is recommended to insure that all the batteries in the pack are evenly charged, an unbalanced charge will shorten battery life.

III-4. AMBIENT TEMPERATURE RANGES

Normal-Charge Packs: $0^{\circ} \sim +45^{\circ}\text{C}$.

Rapid-Charge Packs: $+10^{\circ} \sim +40^{\circ}\text{C}$.

As can be seen from the above, charging is possible over a wide temperature range. Keeping within those limits will insure 100% charge and it is recommended that you keep within the limits. The rapid-charge packs have an internal sensor that will stop the charge if out of the these limitations.

III-5. PRECAUTIONS

It is possible to charge the packs while they are attached to the transceiver, but be sure that the set's power switch is turned off.

When charging the packs alone, be sure that the terminals on the top are not shorted, use the insulator strip provided to prevent this.

Penlite (AA type) Nickel-Cadmium batteries for IC-CM4, which will appear as a white crystal-like substance oozing from them at their ends. This will cause poor connection. Burnishing the springs and clips inside the IC-CM4 occasionally is important.

DO NOT ATTEMPT TO CHARGE OTHER THAN NICKEL-CADMIUM CELLS IN THE CM-60! READ THE MANUFACTURER'S INSTRUCTIONS AND THE CHAPTER OF THIS MANUAL ON CHARGING OPERATIONS CAREFULLY!

Nickel-Cadmium batteries can be normally recharged about 300 times. It is not possible to replace the cells in the IC-CM2, CM3, CM5, CM7 and CM8. All these battery packs are offered for sale separately.

Battery packs are not charged before shipping, charge before using.

Before installing Penlite Nickel-Cadmium cells in the IC-CM4 check with the dealer to find if they have been pre-charged.

While charging the CM-60 may cause interference to adjacent radio equipment, locate the charger well away from such equipment.

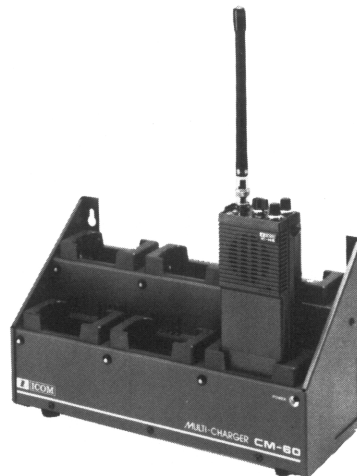
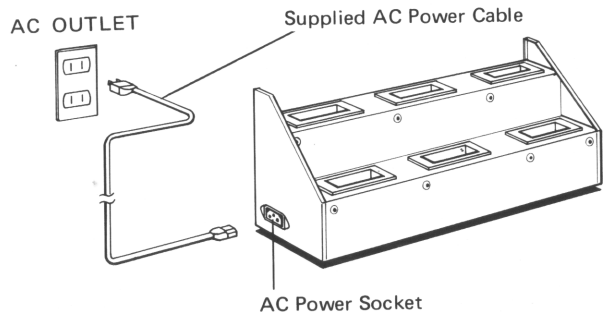
The optional IC-DM1 cannot be used in conjunction with the CM-60 for charging, it can be inserted and used as a stand for the ICOM handhelds.

III-6. CHARGING PROCEDURES

Connect the supplied power cable to the AC power socket of the CM-60, then the power plug, the other end of the AC power cable to a wall outlet. The CM-60 is ON and the power lamp will light.

Set a battery pack into a slot of the charger with the model label to your right, the Charging Lamp will illuminate when the pack is properly inserted.

As noted before the entire handheld can be inserted, be sure that the transceiver's power switch is off. Do not attempt to operate the set while it is in the charger.



III-7. POWER/CHARGING LAMPS

The power lamp will light when the power cable is connected to a wall outlet, but the charging lamp will not be lighted under the following circumstances:

The battery pack is inserted incorrectly.

The springs and terminals of the IC-CM4 are fouled with battery leakage, or the cutouts in the base of the pack are not clear.

Charging of a pack is completed (the charging lamp lights with reduced intensity).

When the intensity of the charging lamp is reduced, charging of the pack is completed and the slot is in trickle charging condition. So the pack is ready for use.

IV. SPECIFICATIONS

Charging slot: 6

(Each slot can be used independently.)

Charging currents:

IC-CM2, CM5 and CM7 135mA for 3 hours

IC-CM8 135mA for 6 hours

IC-CM3 25mA for 15 hours

IC-CM4 45mA for 15 hours (applies only to Nickel-Cadmium batteries installed)

Temperature Limitations: IC-CM2, CM5, CM7 and CM8 +10°C ~ +40°C.

IC-CM3 and IC-CM4 0°C ~ +45°C.

The IC-CM2, CM5, CM7 and CM8 have built-in temperature sensors to prevent overcharge.

Power Requirement: 117V or 240V AC, 50/60Hz, or 220V AC 50Hz



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