More tips

- The Kokam LiPo-502 charger can also charge Lithium Ion cells and packs.
- FMA's Versatile Adapter, part number 501MC, is a great companion for the charger. It provides Futaba, JR, Airtronics, Deans and Molex connectors, plus 2.1mm and 2.5mm power connectors, enabling you to easily connect your cells and packs to the charger. Be sure to get the 201BCB cable at the same time—it directly connects the Versatile Adapter to the charger.

- To determine the LiPoly pack configuration that will work best in your application, use the LiPo Calc design tool on the FMA Web site, www.fmadirect.com.

LiPo-502 Lithium Polymer Battery Charger specifications

For battery types	Lithium Polymer, Lithium Ion, NiCd and NiMH
Nominal output voltage	User-settable to 3.7, 7.4, 11.1, 14.8 or 18.5 volts (for LiPo and LiIon only)
	Auto: charger detects number of cells in series and sets output voltage (for LiPo, LiIon, NiCd and NiMH)
Output current	User-settable to 0.1A, 0.5A, 1.0A, 1.5A, 2.0A or 2.5A
Maximum output power	50W
Input voltage	11 to 15VDC

Kokam/USA limited warranty for chargers

Kokam/USA warrants this product to be free of manufacturing defects for the term of one year from the date of purchase. Should any defects covered by this warranty occur, the charger shall be repaired or replaced with a unit of equal performance by Kokam/USA or an authorized Kokam/USA service station.

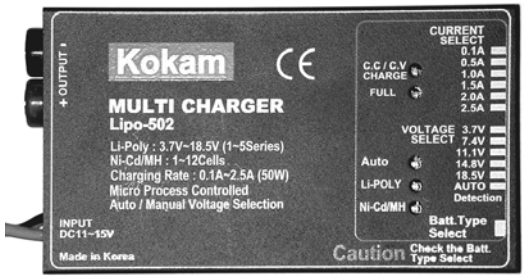
Limits and exclusions

This warranty may be enforced only by the original purchaser, who uses this product in its original condition as purchased, in strict accordance with the product's instructions. Units returned for warranty service to a Kokam/USA service center will be accepted for service when shipped postpaid, with a copy of the original sales receipt or warranty registration form, to the service station designated by Kokam/USA.

This warranty does not apply to:

- Consequential or incidental losses resulting from the use of this product.
- Damage resulting from accident, misuse, abuse, neglect, electrical surges, reversed polarity on connectors, lightning or other acts of God.
- Damage from failure to follow instructions supplied with the product.
- Damage occurring during shipment of the product either to the customer or from the customer for service (claims must be presented to the carrier).
- Damage resulting from repair, adjustment, or any alteration of the product by anyone other than an authorized Kokam/USA technician.
- Installation or removal charges, or damage caused by improper installation or removal.

Call (301) 668-7614 for more information about service and warranty repairs.



LIPO-502 Charger

for

Lithium Polymer and NiCd/NiMH cells and packs

About the charger

The Kokam LIPO-502 charger is designed to charge Lithium Polymer (LiPo) and NiCd/NiMH cells and battery packs. It charges up to 5 LiPo cells connected in series, and up to 12 NiCd/NiMH cells connected in series. Six current settings handle a wide range of cell and pack capacities. Output voltage can be set manually to one of five levels. Alternatively, the charger can automatically set the output voltage after it senses the number of cells connected in series. The charger can be powered by a 12V lead acid or gel cell battery, a DC power supply or any source that can provide 11 to 15VDC.

LiPo cells are best charged using a special sequence: constant current at the beginning of the charge cycle, followed by constant voltage at the end of the charge cycle. In contrast, NiCd/NiMH cells should be charged with constant current, using peak detection to terminate charging. The LIPO-502 charger provides both methods. Two LEDs on the charger's panel show charging status, and a third LED lights when auto voltage detection is activated.

Built-in circuitry prevents damage to the charger if cells, packs or power source are incorrectly connected to the input or output terminals; or if the output terminals are shorted. An internal timer stops operation after 12 hours of continuous charging.

Order Kokam/USA cells and packs through the FMA Direct Web site, www.fmadirect.com (or www.kokamusa.com). LiPo technical and application information is available in the Support section of the FMA Direct Web site.

Precautions

- For best results, use a 1C charge rate* (where C = pack capacity). Charging at a 1C rate takes about 1 hour to reach 90% capacity (for a fully discharged pack). Charge rates greater than 1C may reduce cell capacity.* Extreme charge rates **will** damage cells.
- Provide good ventilation
- Always watch the charger while it is charging. Never leave the charger unsupervised.
- Never charge a LiPo battery with the charger set for NiCd/NiMH. Doing so may cause the lithium battery to explode.
- Allow packs to cool down before charging them.
- Follow all guidelines for charging, discharging, handling and storing LiPo cells.*
- See additional warnings sheet provided with this charger.

*For details, see the *Kokam/USA Lithium Polymer Cell application manual*, AN000001, available in the Support section of the Web site.

Kokam USA a division of FMA Inc.

FMA Direct

Kokam/USA • 5716A Industry Lane • Frederick, MD 21704
Sales: (800) 343-2934 • Technical: (301) 668-7614 • www.kokamusa.com • www.fmadirect.com

Parts list

- Charger
- 5 jumpers
- 2 banana plugs for output cable

Prepare the output cable

If you aren't using the 201BCB cable and 501MC Versatile Adapter (available separately), then make a cable to connect your cell/pack to the charger:

1. Solder the supplied banana plugs to one end of the cable.
2. Solder a connector to match your cell/pack to the other end of the cable (observe polarity!)

Using the charger

You'll need a power source that delivers clean 11–15VDC, such as a12V lead-acid battery/gel cell or a good quality regulated 12VDC power supply. The power source must deliver at least 1.3 times the current applied to the pack. For example, if you are charging at 1.5A, the power source must supply 1.3 x 1.5A = 2A or more. (Many 12V wall plug-in power supplies are unsuitable for powering the charger because they have excessive AC voltage on the DC output. Wall plug-in chargers for lead acid batteries, for example, may cause the charger to malfunction.)

1. Determine pack voltage and capacity.

- LiPo pack voltages are 3.7, 7.4, 11.1, 14.8 or 18.5 volts (for 1s through 5s packs).
- For a series-connected pack, the pack's capacity (mAh or Ah) is the same as the capacity of a single cell.
- For a parallel-connected pack, the pack's capacity (mAh or Ah) is equal to the number of cells times the capacity of a single cell.

2. Set the output current, battery type, and voltage.

a. Place a jumper on the two pins corresponding to the desired output current.

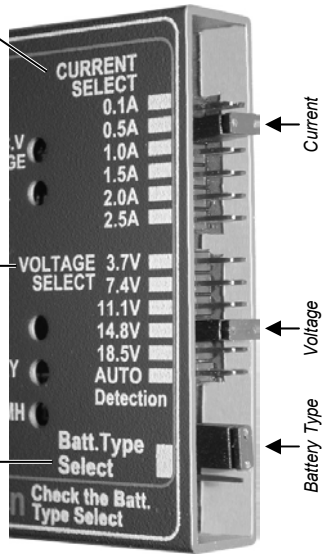
Note: For LiPo batteries, do not set the output current to a value larger than the pack's capacity. Maximum charge rate for Kokam USA cells and packs is 1C, where C is the cell/pack capacity. Charge rates >1C may damage cells.

b. Place a jumper on the Battery Type Select pins corresponding to the battery type you are charging: upper two pins for LiPo or lower two pins for NiCd/NiMH.

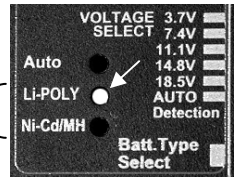
c. For LiPo: Carefully place a jumper on the two pins corresponding to the pack voltage, or place a jumper on the Auto pins. Pack should be discharged (2.5V to 3V per cell) for auto detection to operate correctly.

For NiCd/NiMH: When Battery Type Select is set for NiCd/NiMH, the Voltage Select jumpers have no effect.

Example: *Jumpers on the charger to the right are set for 0.5A output current, 14.8V pack voltage and LiPo.*



3. Connect charger to power source (observe polarity!).



Check the battery type LED to assure you selected the correct type.

Example: *LED (see arrow) in the example to the right shows the charger is set for a LiPo battery.*

When Batt. Type select is set to LiPo and Voltage Select is set to AUTO, the AUTO LED will be on.

4. Connect battery to charger (observe polarity!).

5. Monitor charger.

For LiPo batteries:

If this LED...	Is in this state...	It means that...
C.C. / C.V. Charge	On	Charger is in Constant Current mode
C.C. / C.V. Charge	Blinks	Charger is in Constant Voltage mode
FULL	On	Battery is charged
All	Blinking together	There is an error, which could be: ■ Charger input voltage is <11 volts or >15 volts ■ Poor or no connection between charger and cell/pack ■ Defective cell/pack ■ Pack voltage is greater than charger's maximum output

- If you selected a specific voltage, the charger will compare the selected voltage with the battery voltage for the first minute. If the two voltages are significantly different, all LEDs blink and charging stops.
- If you selected AUTO voltage detect, the charger checks battery voltage at 1/10 the current you set for two minutes before starting to charge.
- If a LiPo pack was discharged below 3.0 volts per cell, all LEDs may blink (indicating a problem). Try charging the pack two or three times in succession.
- A LiPo pack will reach about 90% capacity in one hour, and this may be sufficient for your purposes. It will take an additional two to three hours for the LiPo pack to reach 100% capacity.

6. When charging is complete (FULL LED is on):

a. Disconnect charger from power source.

b. Disconnect pack from charger.

Tip: Continue charging for a while after reaching the "FULL" state. This assures the cell/pack is 100% charged.

Tip: Cell/pack may be left connected indefinitely without harm. When the cell/pack is fully charged, charger output drops to almost 0mA. After 12 hours, charging is automatically stopped.