

POCKETLADER V3

05/12



evoJet

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Preface

Please read these instructions completely and attentively, before using the unit. This will help you to exploit all the functions of your new POCKETLADER battery charger. The warnings and safety notes are particularly important. With the powerful POCKETLADER, most battery types used for Modellbau, such as nickel metal hydride (NiMH), nickel cadmium (NiCd), lead acid (Pb) and most types of lithium batteries (Lion, LiPo, LiFe [A123]) can be charged and discharged in the range of 1 V to 21 V and 50 mA to 5 Amps. The Orbit extension is a powerful Balancer / Equalizer for all lithium-batteries with full supervisory function and single cell voltage display.

Due to a new technical concept, all functions of the battery charger are managed by a fully digital control system (DDCS). Furthermore, the technical innovations of the POCKETLADER also include a step-up/step-down converter, which can charge up to 65 Watts and up to 5 Amps. This principle not only assures an extremely low power dissipation, but also a reduction of the operating current to a minimum with small numbers of cells (high efficiency).

The POCKETLADER can be upgraded to support all common and future battery types and charging methods by means of a simple software flash-update. The latest control software (firmware) can be downloaded at any time via the Internet from the evoJet website (<http://evojet.de>) and saved in the flash memory of your POCKETLADER. Thus your POCKETLADER is optimally prepared for today's and tomorrow's applications. Its ultra-compact dimensions and robust design make the POCKETLADER a constant companion for both indoor and outdoor R/C adventures. We wish you a lot of fun and always a good flight or drive!

Yours Orbit / evoJet -Team

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Warning and Safety Notes

In order to guarantee a safe operation of your POCKETLADER, please always observe the safety notes on this page. The manufacturer takes no responsibility for damage caused by improper use. The POCKETLADER charger is designed to be powered by a 12 V DC car battery. Dont connect it to any AC power source.

- This product is not designed for use by children under the age of 14. This is not a toy.
- The housing of the charger serves as a heat-sink. Operate the device in a place where the heated air around the housing can be dissipated.
- If the charger, or the battery gets very hot, immediately interrupt the power supply. A moderate warming of the charger (up to approx. 45 °C / 110 °F) is normal at high-power operation.
- The charger and the battery to be charged should be set up on a heat-resistant, non-inflammable and non-conductive surface for use. Never place the charger directly on a car seat, carpet or similar. Keep all inflammable and volatile materials well away from the charging area. Provide a good ventilation. Defective batteries can explode or burn !
- The charge output sockets and connecting leads may not be modified and may not be interconnected in any way. There is a danger of short-circuit between the charge outputs and the cars body when the charger is connected to the car battery. The charging leads and connecting leads may not be coiled up when the charger is in use. Avoid any short-circuiting the charging output or your model battery with the car body. For this reason the charger must never be placed directly on the cars body.
- Always observe the charging current and voltage limits recommended by the battery supplier. Excessive currents or voltages can damage or explode the battery.
- Do not charge or discharge batteries unattended. Especially lithium batteries have a high risk of fire or explosion. Only one battery may be connected to the unit for charging at a time.
- The following types of battery **may not** be connected to the charger:

X NiCd / NiMh batteries with more than 12 cells, Lithium batteries with more than 5 cells, or lead-acid batteries with a nominal voltage of more than 12V.

X Batteries which require a different charging method than for NiCd, NiMh, Lithium or lead-acid types.

POCKETLADER V3 (COMBO) - Instructions 3.1

- X** Faulty or damaged cells or batteries.
- X** Batteries consisting of parallel-wired cells, or cells of different types or consisting of old and new cells mixed, or cells of different makes.
- X** Non-rechargeable batteries(drycells). Caution: explosion hazard !
- X** Batteries which are not expressly recommended by the manufacturer to be suitable for the currents which the charger unit delivers during the charging.
- X** Batteries which are already fully charged or hot, or only partially discharged.
- X** Batteries or packs fitted with an integrated charge circuit or charge supervisory circuit.
- X** Batteries installed in a device, or which are electrically connected to other devices.
- To avoid short-circuits between the banana plugs fitted at the chargeleads, always connect the charge leads to the charger first, and then to the battery to be charged. Reverse the sequence when disconnecting the battery.
- Before any charging doublecheck the proper qualification of the selected charging program for your battery.
- Have you setup the correct charge or discharge current? Have you set the important cut-off voltage when charging NiMh / NiCd batteries? Are all connections correct? Avoid any intermittent contacts.
- Always be careful! A battery could explode or burn, if the charger does have a fault or if the user chooses the wrong charging program and settings.
- Do not operate the device in a wet environment (for example, do not place it on wet grass).
- Do not open the housing. In case of defects of the device, please contact the manufacturer directly.
- Do not clean the device with aggressive detergents, but with a soft, dry or barely damp cloth.

Technical Specifications

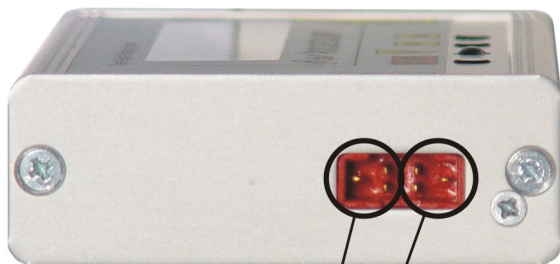
Power supply:	8 V - 15 V DC car battery 12V
Operating current:	typical 54 mA - max. 5 A
Stand-by current (OFF):	< 100 μ A
Output (reverse polarity protected):	1 V - 21,5 V / 50 mA - 5 A Corresponding to: 1 - 12 (14) NiCd/NiMh cells or 1s - 5s lithium or 2 - 16 V lead battery
Charging power:	10 - 65 W (adjustable)
Discharging:	50 mA - 3 A, max. 7 W
COMBO-Balancer 5S:	up to 1 Ampere equalization in the range 3,4V – 4,23V
LCD display:	2 x 16 characters, backlighted
SIO interface:	Connector for PC measurement curves, flash software updates (via Orbit Microlog software) and extensions such as the Orbit LiPo-Checker for individual cell balancing [Art. no. 0605]
Dimensions (L x W x D):	110 x 69 x 24 mm 4.3" x 2.7" x 0.9"
Weight:	200 g / 0.44 lb

Connections LADER [0640]

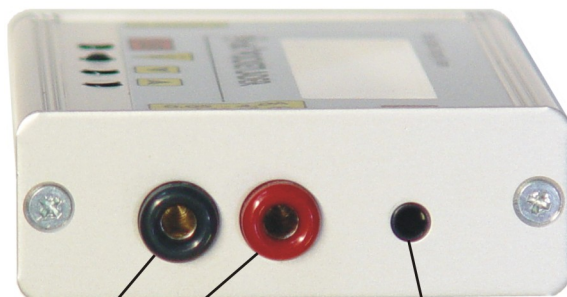
On the left side of the housing, you will find the connector for the power supply (stabilized DC power adapter or battery).

On the right side are the plug sockets for the connection of the battery to be charged as well as the SIO interface for data exchange with a PC (e.g. for recording charging curves or for firmware updates).

POCKETLADER V3 (COMBO) - Instructions 3.1



Input + - MPX/MG6
8V - 15V DC max.5A



- + 4mm 3.5mm stereo
output-battery SIO-interface
1V - 21.5V DC

Connections COMBO [0645]

On the right side are the plug sockets for the connection of the lithium battery adapter, see below. This is a 10-pin diagnosis for up to 5S (nominal 18,5V) batteries. There are 2-pins per S-cell available (+) and (-) which are totally floating. This means, it is absolutely equal in which order the cells are being connected, as long as (+) and (-) are not confused.

POCKETLADER V3 (COMBO) - Instructions 3.1

Many ready to use diagnosis-adapters are available for all common used LiPo batteries: (see <http://evojet.de>)

Example: [0645G5] COMBO Adapter G5 – Graupner/robbe/Kokam 5S



Use always the right adapter-type for your battery.

For a 3S-battery a 3S-adapter, for a 4S-battery a 4S-adapter and so on.

2S-batteries can be plugged in with 3S/4S/5S-adapter –

where it doesn't matter to plug it in right or left-justified.

Single-cell Voltages

An internal data-connection supplies the **Pocketlader-COMBO** with the voltage information of the single cells in a battery pack. They can easily be toggled with the **SET** key during charging and appears in the LCD instead of the time display. The cell-voltages display will also automatic rotate slow.

A longer press on the **SET** key will return to the time-display.

Blue LED-flasher

Five blue LED's indicate the functional status of the COMBO balancer:

Connect the lithium-battery: Checkup the diagnosis adapter and connectors. Comparing to the S-cells of the battery, the LED's are flashing fast for about 10 seconds.

Balancing/Draining:

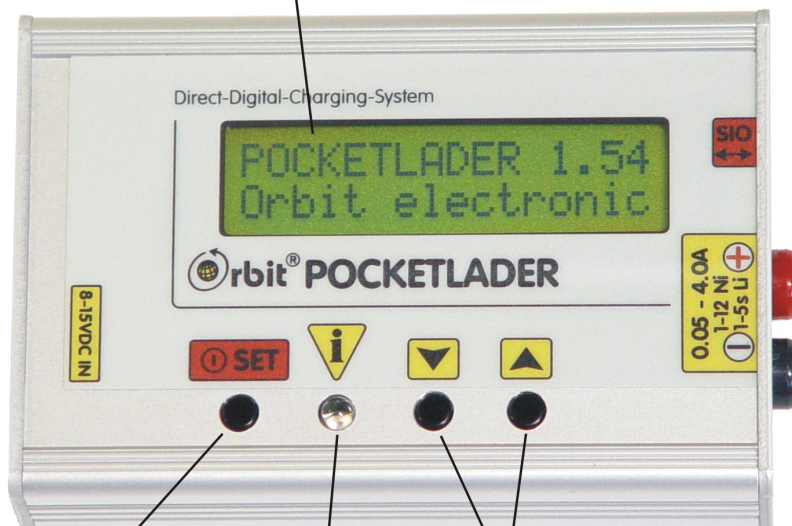
When a LED lit-on, the compared battery cell will be balanced / drained and the battery pack will become more equalized. A simple short flashing of a LED indicates attention due to increasing cells voltages when charging. An LED off condition means actual no more action required.

Controls

All keys and displays for controlling the device are located on the upper side of the housing.

POCKETLADER V3 (COMBO) - Instructions 3.1

LC-Display with backlight



Ⓜ ON-OFF

SETup button

Info-LED

up-down

button

More information about using the keys and the meaning of the displays can be found in the following sections.

Turning On and Off and Setup

- The Pocketlader powers-on automatically, when the power supply (stabilized DC power adapter with 8 V - 15 V or a sufficiently dimensioned battery) is applied. See **Setup 17:POWERUP-ON** must be YES. If set to NO, you have to press the **SET** key for more than 2 seconds for manually turning the charger on.
- By keeping the **SET** key pressed for **4 seconds** when turning the device on, the charger switches into **Setup** mode. In this mode, you can modify the basic configuration settings of your POCKETLADER. For more information, see the section **Setup Mode** starting on page 27.

The **Setup** mode can also be entered from each charging mode by a double-click on the **SET** key. But only if there is no battery connected.

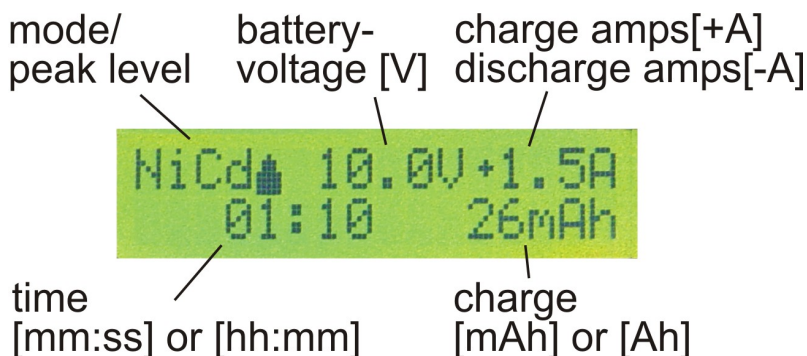
- To turn the charger **off**, press the **SET** key again and keep it pressed until the device switches off.

Charging and Discharging

First select the charging program (mode) suitable for your battery type by using the **Up/Down** keys. The program is shown in the upper left corner of the display.

1. NiCd and NiMh (NiXx) Batteries

These battery types are charged with a selectable constant current. The charging process is terminated either by delta peak detection (\blacktriangle -cut-off when the battery is full) or by charging current drop-down (NiXx). The display shows the following information:



For each battery type (NiMh and NiCd), two different delta peak switch-off values can be selected, symbolized by the size of the triangle icon (delta) after the program name. The NiXx mode uses CC/CV (constant current/constant voltage), see also SETUP 6: NiXx-mode.

POCKETLADER V3 (COMBO) - Instructions 3.1

Program	Delta peak	per cell
NiMh ▲	-0.30 %	≈ -4.5 mV
NiMh+ ▲	-0.50 %	≈ -7.5 mV
NiCd ▲	-0.70 %	≈ -10.5 mV
NiCd+ ▲	-1.30 %	≈ -19.5 mV
NiXx	CC/CV Voltage 61:NiXx-CV/MAX.	

To achieve an optimal charging result and temperature behavior, we recommend the higher delta peak values (programs **NiMh+** and **NiCd+**) for charging currents up to 1.5 C* and the smaller values (**NiMh** and **NiCd**) for currents above 1.5 C*.

Charging current preselection

To select the charging or discharging current, first hit the **SET** key and then the **Up/Down** keys to switch between the available values.

- For **charging**, select a **positive** current value (+0.05 A to +4.0 A).
- For **discharging**, select a **negative** current value (-0.05 A to -3.0 A).

POCKETLADER V3 (COMBO) - Instructions 3.1

Program	Recommended charging current
NiMh ▲	1.5 C to 2 C*
NiMh+ ▲	0.5 C to 1.5 C*
NiCd ▲	1.5 C to 4 C*
NiCd+ ▲	0.5 C to 1.5 C*
NiXx (format mode)	NiMh: 0.1 C to 0.5 C* NiCd: 0.1 C to 1.0C*

Caution: Please use always the charging currents and voltage limits recommended by the battery supplier !

Limiter preselection

To limit a charge or discharge in [mAh], press the **SET** key for longer 1 second (tick) and then the **Up/Down** keys to switch between the available values [mAh]

Range: 50mAh – 9900mAh

During the charge or discharge process the Limiter will be displayed by a toggling charge mAh, i.e. L=44.5%.

Notice: The switch to another charging mode deactivates the limiter, e.g. no-more mAh limitation active.

Combination mode

A follow-up charge or discharge (combi program) process can be activated by pressing the **SET** key for longer 1 second during the Charging current preselection (tick, tick). Use the **Up/Down** keys to switch between the available combination values.

CHARGE => DISCHARGE

- For **discharging**, select a **negative** current value (-0.05 A to -3.0 A).

DISCHARGE => CHARGE

- For **charging**, select a **positive** current value (+0.05 A to +4.0 A).

Current re-adjustment

To re-adjust the charge or discharging amps during the running charge simply use the **Up/Down** keys to switch between the available values. For the ▲ peak modes in the first 3 minutes only.

Generally, for any possible adjustment during the running charge, the SETUP 18:KEY-LOCK must be set to NO.

POCKETLADER V3 (COMBO) - Instructions 3.1

The following **Setup** parameters are relevant for these programs (see section **Setup Mode** starting on page 27):

11: DISCHARGE-END

12: DISCHARGE (time)

13: NiMhCd-CYCLES

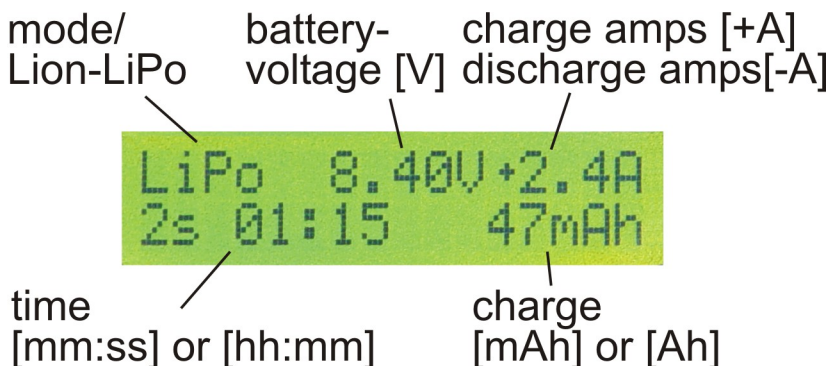
Caution: Please use always the charging currents and voltage limits recommended by the battery supplier !

* *The charging rate C is the battery capacity per hour. Example:
RC2400 \Rightarrow 2400 mAh/h \Rightarrow 0.5 C = 1.2 A; 1 C = 2.4 A etc.*

2. Lithium Ion/Polymer/FerroPhosphate(A123)

These battery types are charged with a manually selected current CC and a constant charging voltage CV. The charging process is terminated automatically when a full battery is detected due to a drop-down of the charging amps (see SETUP: -END).

First select the charging program (mode) suitable for your battery type (**Lion** or **LiPo** or **LiFe** (A123)) by pressing the **Up/Down** keys. The program is shown in the upper left corner of the display.



The series cells of the connected battery (1s to 5s) are detected automatically and shown in the display. In case the number displayed is not correct, use the **Up/Down** keys to select the correct number of series cells. Afterwards, confirm your selection with the **SET** key. The constant charging voltage is set depending on the number of series cells and the SETUP x1:Lxxx-CV/MAX settings.

POCKETLADER V3 (COMBO) - Instructions 3.1

Example:

Program	Charging voltage (1s to 5s)	per cell
LiFe(A123)	3.6 V 7.2 V 10.8 V 14.4 V 18.0 V	*3.60 V
Lion	4.1 V 8.2 V 12.3 V 16.4 V 20.5 V	*4.10 V
LiPo	4.2 V 8.4 V 12.6 V 16.8 V 21.0 V	*4.20 V

Caution: Always make sure that the correct charging voltage for the respective number of series cells is used, as excessive voltage can cause the battery to burn or explode ! For additional supervisory your lithium batteries, we recommend the Orbit LiPo-Checker [0685] or the POCKETLADER-COMBO [0645] units.

When using the Pocketlader-**COMBO** or the external **LiPo-Checker [0685]** connected to the SIO interface, a ✱-symbol (display: LiPo✱) appears during the charge, to indicate the alarm/feedback line is present.

Charging current preselection

To select the charging or discharging current, first hit the **SET** key and then the **Up/Down** keys to switch between the available values.

- For **charging**, select a **positive** current value (+0.05 A to +4.0 A).
- For **discharging**, select a **negative** current value (-0.05 A to -3.0 A).

POCKETLADER V3 (COMBO) - Instructions 3.1

Program	Recommended charging current
LiFe(A123)	0.5 C to 4 C*
Lion	0.5 C to 1 C*
LiPo	0.5 C to 2 C*

Caution: Please use always the charging currents and voltage limits recommended by the battery supplier !

Limiter preselection

To limit a charge or discharge in [mAh], press the **SET** key for longer 1 second (tick) and then the **Up/Down** keys to switch between the available values [mAh].

Range: 50mAh – 9900mAh

During the charge or discharge process the Limiter will be displayed by a toggling charge mAh, i.e. L=44.5%.

Notice: The switch to another charging mode deactivates the limiter, e.g. no-more mAh limitation active.

Combination mode

A follow-up charge or discharge (combi program) process can be activated by pressing the **SET** key for longer 1 second during the Charging current preselection (tick, tick). Use the **Up/Down** keys to switch between the available combination values.

CHARGE => DISCHARGE

- For **discharging**, select a **negative** current value (-0.05 A to -3.0 A).

DISCHARGE => CHARGE

- For **charging**, select a **positive** current value (+0.05 A to +4.0 A).

Current re-adjustment

To re-adjust the charge or discharging amps during the running charge simply use the **Up/Down** keys to switch between the available values. For the ▲ peak modes in the first 3 minutes only.

Generally, for any possible adjustment during the running charge, the SETUP 18:KEY-LOCK must be set to NO.

POCKETLADER V3 (COMBO) - Instructions 3.1

The following **Setup** parameters are relevant for these programs (see section **Setup Mode** starting on page 27):

11: DISCHARGE-END

12: DISCHARGE (time)

X0: LiXy-CV/MIN.

X1: LiXy-CV/MAX.

X2: LiXy-CHARGE (time)

X3: LiXy-INFO

X4: LiXy-END

X5: LiXy-CYCLES

X6: LiXy-FIXED

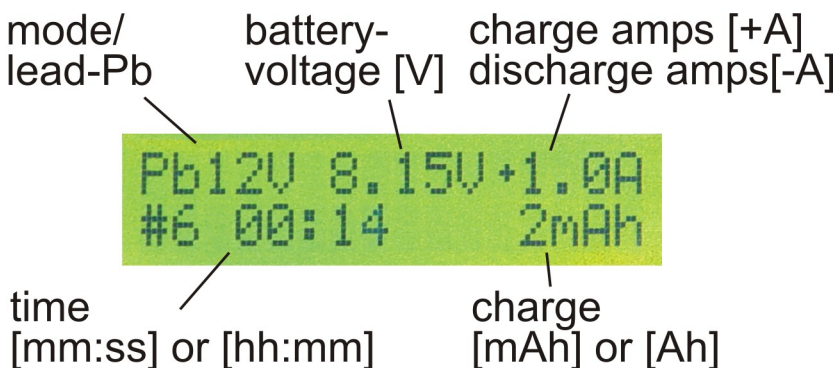
X7: LiXy-RESTART

* *The charging rate C is the battery capacity per hour. Example:
RC2400 \Rightarrow 2400 mAh/h \Rightarrow 0.5 C = 1.2 A; 1 C = 2.4 A etc.*

3. Lead and Lead Acid Batteries (Pb)

These battery types are charged with a manually selected current CC and a constant charging voltage CV. The charging process is terminated automatically when a full battery is detected due to a drop-down of the charging amps (see SETUP:54:Pb-END).

First select the charging program (mode) **Pb** by pressing the **Up/Down** keys. The program is shown in the upper left corner of the display. The display shows the following information:



The series cells of the connected battery (Pb2V to Pb16V) are detected automatically and shown in the display. In case the number/voltage displayed is not correct, use the **Up/Down** keys to select the correct number of cells. Afterwards, confirm your selection with the **SET** key.

POCKETLADER V3 (COMBO) - Instructions 3.1

The constant charging voltage is set as follows, depending on the number of cells and SETUP 51:Pb-CV/MAX.

Program	Charging voltage Pb2V to Pb16V	per cell
Pb	2.45 V 4.9 V 7.35 V 9.8 V 12.25 V 14.7 V 17.15 V 19.6 V	*2.45 V see Setup

Caution: Always make sure that the correct charging voltage for the respective number of series cells is used, because excessive voltage can cause the battery to overheat!

Charging current preselection

To select the charging or discharging current, first press the **SET** key and then the **Up/Down** keys to switch between the available values.

- For **charging**, select a **positive** current value (+0.05 A to +4.0 A).
- For **discharging**, select a **negative** current value (-0.05 A to -3.0 A).

Program	Recommended charging current
Pb	0.1 C to 0.5 C*

Caution: Please use always the charging amperage and voltage limits recommended by the battery manufacturer!

Limiter preselection

To limit a charge or discharge in [mAh], press the **SET** key for longer 1 second (tick) and then the **Up/Down** keys to switch between the available values [mAh].

Range: 50mAh – 9900mAh

During the charge or discharge process the Limiter will be displayed by a toggling charge mAh, i.e. L=44.5%.

Notice: The switch to another charging mode deactivates the limiter, e.g. no-more mAh limitation active.

Combination mode

A follow-up charge or discharge (combi program) process can be activated by pressing the **SET** key for longer 1 second during the Charging current preselection (tick, tick). Use the **Up/Down** keys to switch between the available combination values.

CHARGE => DISCHARGE

- For **discharging**, select a **negative** current value (-0.05 A to -3.0 A).

DISCHARGE => CHARGE

- For **charging**, select a **positive** current value (+0.05 A to +4.0 A).

Current re-adjustment

To re-adjust the charge or discharging amps during the running charge simply use the **Up/Down** keys to switch between the available values. For the **▲** peak modes in the first 3 minutes only.

Generally, for any possible adjustment during the running charge, the SETUP 18:KEY-LOCK must be set to NO.

The following **Setup** parameters are relevant for these programs (see section **Setup Mode** starting on page 27):

- 11:DISCHARGE-END
- 12:DISCHARGE (time)
- 50: Pb-CV/MIN.
- 51: Pb-CV/MAX.
- 52: Pb-CHARGE (time)
- 53: Pb-INFO
- 54: Pb-END
- 55: Pb-CYCLES
- 56: Pb-FIXED
- 57: Pb-RESTART

* *The charging rate C is the battery capacity per hour. Example:
RC2400 ⇒ 2400 mAh/h ⇒ 0.5 C = 1.2 A; 1 C = 2.4 A etc.*

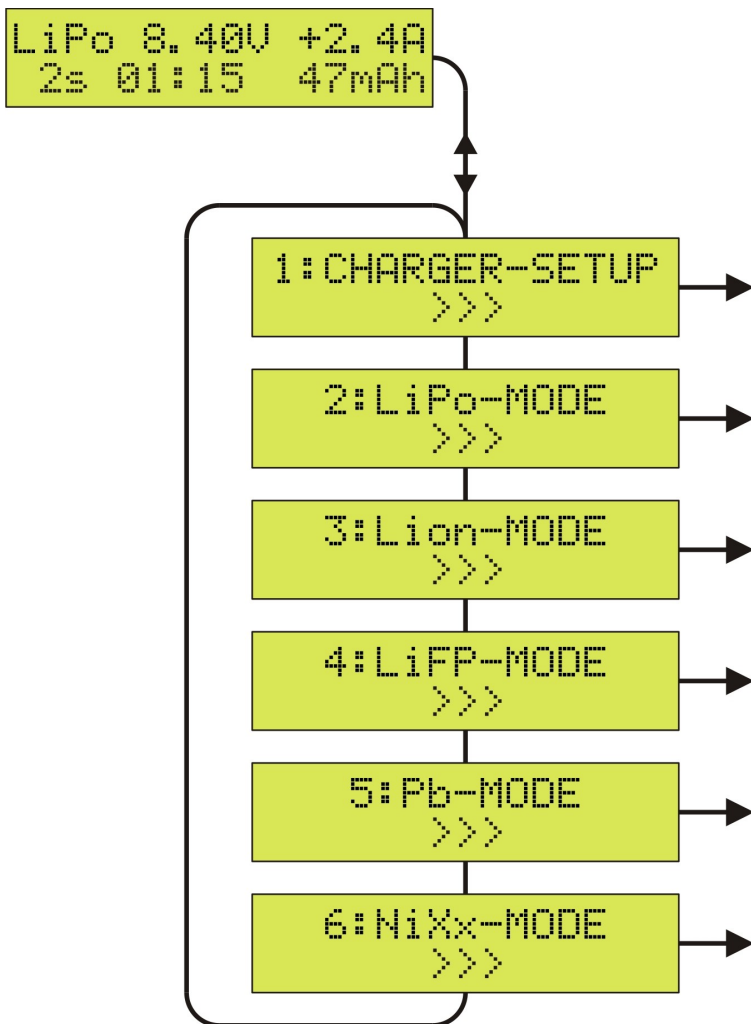
Configuration - Setup Mode

In the **Setup** mode of the POCKETLADER (COMBO), you can modify the basic configuration settings of the charger. To enter the Setup mode double-click the **SET** key while the device is on or keep the **SET** key pressed when switching the unit on. The Setup mode is shown in the display (after about 4 seconds from OFF).

Use the **Up/Down** keys to select the Setup-mode you want to change. Hitting the **SET** key briefly will enter the respective mode structure, a longer press on the SET key will return back (ESC).

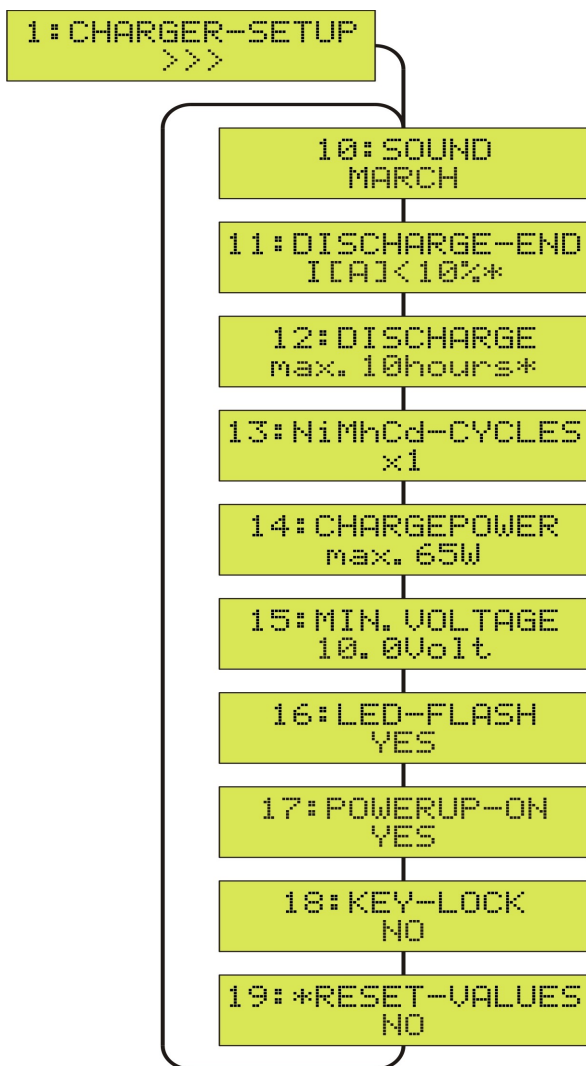
The table on the following page lists all the Setup parameters you can change.

Selectable Setup-Menus



To leave the Setup-modes back to normal operation, keep the **SET** key pressed until the regular charging display appears.

Setup 1: CHARGER



To enter the 1:CHARGER-SETUP menu, hit the SET key and use the Up/Down keys to choose between the available parameter.

POCKETLADER V3 (COMBO) - Instructions 3.1

To change a setting, first hit the **SET** key and then use the **Up/Down** keys to switch between the available values. A '?' indicates the value to be set. To finish the setting and store the new value, hit the **SET** key again.

10: SOUND

This value specifies the 'ready' melody or beeps, which indicate the end of charge or discharge. There are different melodies / settings available.

Standard value: MARCH

11: DISCHARGE-END

Threshold value for cutting-off the discharge.

- 100%, cuts immediately when reaching the min. / discharging voltage.
 - 25%, cuts at min. / discharging voltage when the current / amps are down to 25% of its original value (CC/CV).
- Standard value: 10%

The recommended factory setting is marked by an asterix * -symbol.

12: DISCHARGE

Value for the maximum discharging time in hours.

Standard value: 10 hours

The recommended factory setting is marked by an asterix * -symbol.

13: NiMHcd-CYCLES

Value for the number of combination-cycles, consisting of charge / discharge or discharge / charge procedures.

Standard value: 1-cycle

14: CHARGEPOWER

Value for the maximum charging power – limitation for a small power-supply unit or supplying battery.

→ e.g. wall-plug supply: $12V / 2Amps = 12V \times 2A = 24 \text{ Watt}$

Standard value: 65 Watt

15: MIN. VOLTAGE

Value for the minimum input voltage – warning before deep-discharging the supplying battery or overloading the power-supply unit. Is the input voltage closer than 0.5V to the MIN-VOLTAGE a beep and a warning message appears in the display. The charging cuts when reaching the MIN-VOLTAGE !

Standard value: 10.0V

16: LED-FLASH

Mode selection for the Info-LED about the charging / discharging 'ready'-message.

NO shows a permanent LED-on.

YES does a LED-double-flash.

Standard value: YES

17: POWERUP-ON

Switch-on the POCKETLADER when the power-supply appears.

Standard value: YES – on please !

18: KEY-LOCK

Adjusting the current / amps during charging / discharging with the **Up/Down** keys locked ?

Standard value: NO

POCKETLADER V3 (COMBO) - Instructions 3.1

19: *RESET-VALUES

Reload all setup-values with the recommended factory settings.

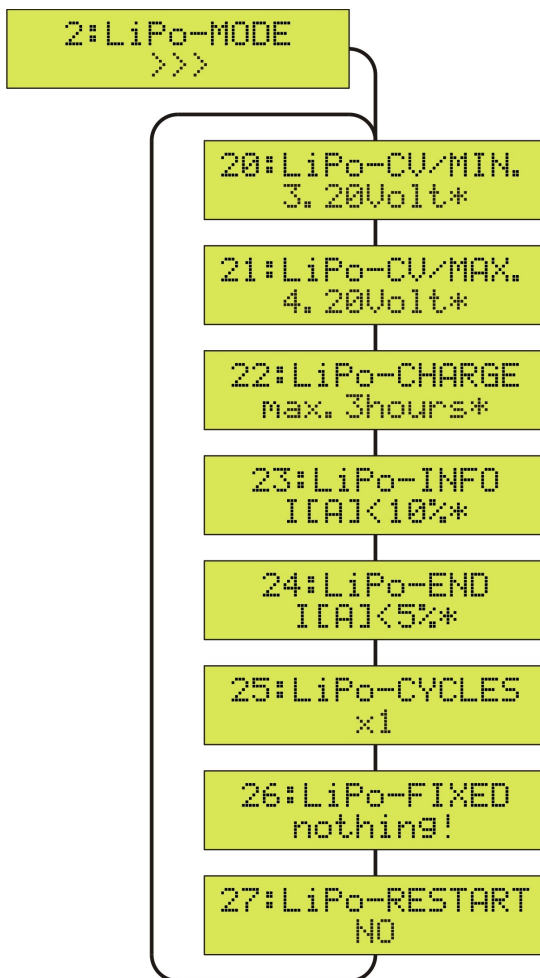
To do this, activate to YES and hit the **SET** key.

Standard value: NO

Caution: Please use always the charging amperage and voltage limits recommended by the battery supplier!

Setup 2: LiPo to Setup 6: NiXx

To change a setting, first hit the **SET** key and then use the **Up/Down** keys to switch between the available values. A '?' indicates the value to be set. To finish the setting and store the new value, hit the **SET** key again.



Representative for Lion-, LiFe(A123)-, Pb- and NiXx- is following shown the setup-values for LiPo-batteries.

20: LiPo-CV/MIN.

Value for the minimum allowed discharging voltage (CV) per cell.
Standard value: 3.20 Volt

The recommended factory setting is marked by an asterix *
symbol.

21: LiPo-CV/MAX.

Value for the maximum allowed charging voltage (CV) per cell.
Standard value: 4.20 Volt

The recommended factory setting is marked by an asterix *
symbol.

22: LiPo-CHARGE

Value for the maximum charging time in hours.

Standard value: 10 hours

The recommended factory setting is marked by an asterix *
symbol.

23: LiPo-INFO

Threshold value for flashing the Info-LED.

- 100%, flashes immediately when reaching the max. / charging voltage.
- 25%, flashes at max. / charging voltage when the current / amps are down to 25% of its original value (CC/ CV). Standard value: 10%

The recommended factory setting is marked by an asterix *
symbol.

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24: LiPo-END

Threshold value for cutting-off the charge.

- 100%, cuts immediately when reaching the max. / charging voltage.
- 15%, cuts at max. / charging voltage when the current / amps are down to 15% of its original value (CC/CV).
Standard value: 5%

The recommended factory setting is marked by an asterix *
symbol.

25: LiPo-CYCLES

Value for the number of combination-cycles, consisting of charge / discharge or discharge / charge procedures.

Standard value: 1-cycle

26: LiPo-FIXED

Setting for a fixed charging mode and battery setting. The charging current / amps setting and chosen S-cells are taken over.

Attention – industrial mode, for just a single battery type !

Standard value: nothing !

27: LiPo-RESTART

Setting for automatic restarting the charge procedure when the battery voltage drops below a given value in percent.

- e.g. 5%, sinks the battery voltage for -5%, the charge restarts again.

Standard value: NO restart

To leave the Setup-modes back to normal operation, keep the **SET** key pressed until the regular charging display appears.

Caution: Please use always the charging amperage and voltage limits recommended by the battery supplier!

The SIO Interface

The SIO connector (**S**erial **I**nput / **O**utput) of your POCKETLADER serves as an interface for data exchange with a PC. For the data transfer, you need a serial SIO cable, which you can order at the evoJet webshop (<http://evojet.de> item no. [0590], SIO2USB PC cable).

Together with the cable, you will receive the Windows application **Orbit Microlog**, which you can use, for example, to record and display the charging curves of your batteries, to identify battery problems and to update the control software (firmware) of your POCKETLADER (see next page). You can always download the latest Microlog version on the order page of the SIO2USB PC cable in our webshop.



The Microlog software in action

Updating the POCKETLADER Firmware

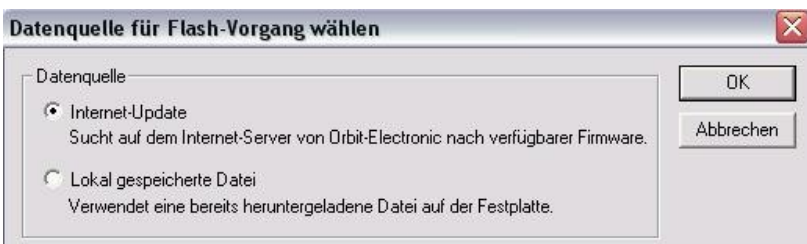
1. Connect the POCKETLADER to the PC using the SIO2USB cable and switch the POCKETLADER on.
2. Launch the Microlog application on the PC and select the menu item *Firmware-Info / Flash-Utility* in the *Options* menu.



3. It is detected by Microlog, and the current firmware version number is displayed.



4. Now select whether the new firmware should be downloaded directly from the Orbit server via the Internet, or you want to load a local firmware file (e.g. from a local disk).



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- The firmware versions available on the server or in the selected local directory are listed. Select the desired version and language, and click on **OK**.



- The new firmware is transferred into the flash memory of the POCKETLADER. This will take about 2 minutes. After that, your POCKETLADER is immediately ready for operation again.



Specifications of the SIO Interface

During operation, the POCKETLADER constantly sends the current operating parameters via the SIO interface according to the following specification:

Plug	3.5 mm stereo jack
Transmission format	9600 bps, 8/n/1
Data output during charging / discharging	#[MC],[seconds],[mV],[±mA]CRLF each second e.g. #N00125,12455,+2500
Charging stop	#C,00000,[mAh],±0000CRLF

"MC" stands for "Mode Code" – depending on the operating mode, one of the following letter codes is sent:

MC	Operating mode
P	Delta peak automatic charging
D	Discharging
R	Reflex charging
F	Forming
N	Normal charging
B	Lead battery charging
L	Lithium

Recommended Charging Currents (Overview)

Battery type	Program	Recommended charging current
Nickel metal hydride	NiMh	1.5 C to 2 C*
	NiMh+	0.5 C to 1.5 C*
Nickel cadmium	NiCd	1.5 C to 4 C*
	NiCd+	0.5 C to 1.5 C*
Lithium ion	Lion	0.5 C to 1 C*
Lithium polymer	LiPo	0.5 C to 2 C*
Lead / lead gel	Pb	0.1 C to 0.5 C*

Caution: Please use always the charging amperage and voltage limits recommended by the battery supplier !

- *The charging rate C is the battery capacity per hour. Example: RC2400 ⇒ 2400 mAh/h ⇒ 0.5 C = 1.2 A; 1 C = 2.4 A etc.*

CE-conformance

evoJet GmbH declares for the car-charger series POCKETLADER and POCKETLADER-COMBO the conformance with the following harmonised EC directives:

EN50081, EN50082, EN55014, EN55022

Langerwehe, 1.2.2012

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Notes: