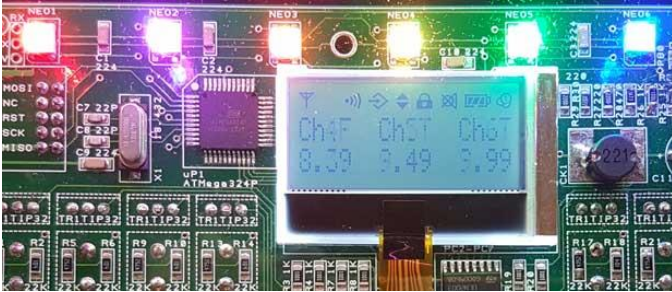


# SC1 V1.4 Crystallite System Smart 6 Channel Charger

The SC1 replaces the original 6 channel charger. See end of document for expected performance figures. Please see the earlier instructions pdf for information on Revisions up to V1.3.

## Description



The SC1 will charge up to 6 Crystallite packs at a time. NeoPixel LEDs are used to indicate the charging status of each channel. The battery voltages are displayed in sequence, on the backlit LCD display, along with Charge Times, the status and the average current draw for that channel. Please note that the image here is from the initial SC1 production (Rev 0).

The significance of the LED colours are as follows >

### Nothing

- Nothing is connected to that channel of the charger. The charging time indication is reset. The LCD display indicates 'OFF'.

### Red

- SC1 has detected a battery voltage of less than 0.5 volts and therefore a short-circuit situation. If a battery is completely flat, this warning colour may appear for just a few seconds until the battery reaches its usual 'discharged' voltage. In such cases an exclamation mark appears next to the channel number (0.00V!). SC1 checks continually until the fault is removed.

### Orange

- Indicates that the battery voltage is currently less than 7.5 volts and the charge rate is set to 50% of the maximum so that the battery voltage can be raised to a level suitable for a higher charge rate. The 'orange' period usually lasts only a short time.

### Mauve

- Indicates that the SC1 is in Fast Charge mode with the charging at the maximum possible, given the temperature constraints of the SC1. This rate of charge continues until the battery voltage has risen to the preset Trigger Threshold. If battery packs are urgently required, two hours more charging will render them suitable for use.

### Green

- When the battery has charged as described above (see Trickle Charge Threshold below) SC1 will then put the channel into Trickle Charge Mode. The battery may stay connected in this way indefinitely without risking damage. **Note:** a discharged battery that charges for a very short fast charge period and goes directly to Trickle Charge Mode may be faulty

### Blue

- Indicates that the battery pack voltage has risen over that expected. This might simply happen, depending on the ambient temperature but it might then be possible that SC1 has detected a high-resistance or open-circuit battery. The timer continues to increment if the battery voltage has risen high enough. **Note:** A battery that has been in Trickle Charge Mode for many hours may then indicate Blue – the battery should not then necessarily be viewed as faulty.

## Charging Timers

When packs are plugged into the charger, a timer is started for each pack. The elapsed (charging) time is displayed at the right of the LCD. When a pack is charged and goes into Trickle Charge mode, the timer will continue to increment, so it is possible to see how long was spent charging the pack – this may be useful in determining the Trickle Charge Threshold. Unplugging a pack from the charge zeroes the time display.

## Setting the Trickle Charge Threshold

When SC1 powers up, it first shows the Firmware Revision info, then the LED display intensity, followed by the Trickle Charge setting.

The default value for trickle charging is 8.40 volts. Depending on the conditions where the batteries are being used, such as temperature, it may be necessary to change this default setting. To do so, you will need to access the SYSTEM push switch through a small hole in the front panel, just above the DC connector. You can do this with the tip of a biro.

Press the button and the Trickle Charge voltage will be displayed and then the message *Hold to increase setting*. If you release the button then *Operation Cancelled* will be displayed, otherwise the display will increment in 0.01 volts steps. If the setting reaches 8.80 volts then the next step will revert the trickle charge voltage to 8.40 volts.

If you have previously increased the Trickle Charge voltage and repeat the operation, this time the setting will *decrease* until the minimum of 8.40 volts is reached, when the setting will roll over to 8.80 volts.

## Setting the LED brightness

The LEDs can be dimmed by pressing and holding the SYSTEM button as you power up or reset. The routine switches through four levels of brightness, repeating, once a second. Releasing the SYSTEM button saves the changes. So now, at startup, the LEDs test themselves at full brilliance, then the current setting is loaded and briefly displayed.

## The fan and mounting the SC1

The SC1 is fitted with a cooling fan that will be switched on if at least one channel is in Fast Charge Mode. There are four rubber spacers on the back of the SC1 to allow air flow from the fan.

When screwing the SC1 to a surface, it will probably be better if the fixing screws are tightened just far enough to secure the unit in place – tightening the screws all the way home will do no harm, but will distort the fixing plates.

The SC1 requires a 15 volt 4.2A power supply (PSU)

## Technical Specification

### SC1 Charger

Charging Mode	Mean Charge Current - mA
Fast Maximum Charge Rate	440 - 480
Medium Charge	290 - 340
Trickle Charge	58

### Crystallite Pack Consumption

Operating Condition	Consumption/Duration
Standby Mode	58mA
Game Play (no vest)	68-77mA
Game Play (inc vest)	106-115mA
Game Play Per shot	108mAS
Battery Life (Standby)	32 hours
Battery Life (Game Play)	12 hours

- mAS (milli-amp-seconds) – amount of battery capacity used for one shot
- Performance to be expected from a 2500mAH battery pack
- Calculations assume 5 minutes vesting and de-vesting time and no time between games



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