

Battery upgrade



	2x	Stock batter	Upgrade battery
Model		EREMIT 606090	HXJNLDC 7565121
Size		90mm / 60mm / 6mm	122mm / 65mm / 7.5 mm
Chemistry		Lithium-Polymer	Lithium-Polymer
Capacity		14.8Wh (4Ah)	30.34Wh (8.2Ah)
Nominal voltage		3.7V	3.7V
Discharge max continuous		2A	5A

	2x	Stock batter	Upgrade battery
Charging limit voltage		4.25V	4.2V
Mass		74g	136g

- **Connector:** JST-PH 2.0mm (not included in upgraded battery) (see [this](#) and [this](#))
 - **Datasheet:** [ePH.pdf](#)
 - **Max current:** 2 A
- Both batteries have protection ICs

Charging chip - MP2650

- Datasheet: [MP2650GV.pdf](#)
- 4V to 21V Operating Input Voltage (V_{IN}) Range
- Up to 5A Configurable Input Current (I_{IN}) Limit (Up to 45W Total Power)
- Up to 5A Configurable Charge Current (I_{CHARGE})
- Configurable Battery Charge Voltage Regulation (V_{BATT_REG}) Up to 4.5V/Cell
- Up to 5V/3A USB On-The-Go (OTG)

Monitoring chip - MAX17320G20+

- Datasheet: [max17320.pdf](#)
- Battery Health + Programmable Safety/Protection
 - Overvoltage (Temperature Dependent)
 - Overcharge/Overdischarge/Short-Circuit Current
 - Over/Undertemperature
 - Undervoltage + SmartEmpty
 - Battery Internal Self-Discharge Detection
 - Ideal Diode Discharge During Charge Fault
 - Charging Prescriptions (JEITA)
 - Prequal Charge Control with CHG FET
- ModelGauge m5 EZ Algorithm
 - Percent, Capacity, Time-to-Empty/Full, Age
 - Cycle+™ Age Forecast
- Precision Measurement Without Calibration
 - Current, Voltage, Power, Time, Cycles
 - Die Temperature, 4 Thermistors $\pm 1^\circ\text{C}$
- Cell Balancing with Internal FETs

- SHA-256 Authentication
 - Nonvolatile Memory for Stand-Alone Operation
 - History Logging, User Data (84 Bytes)

Firmware

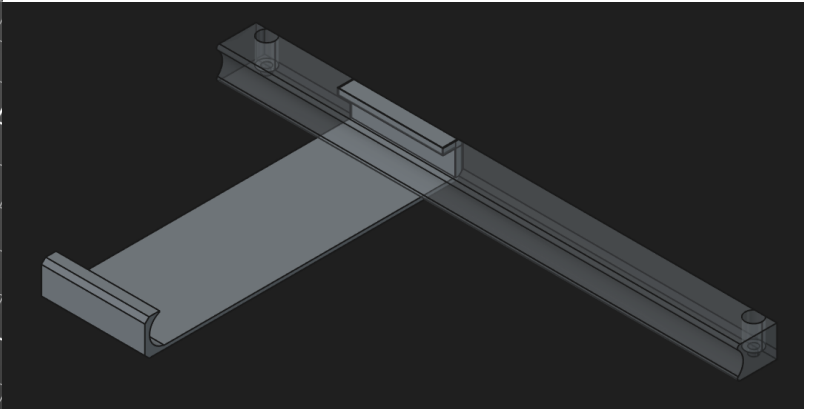
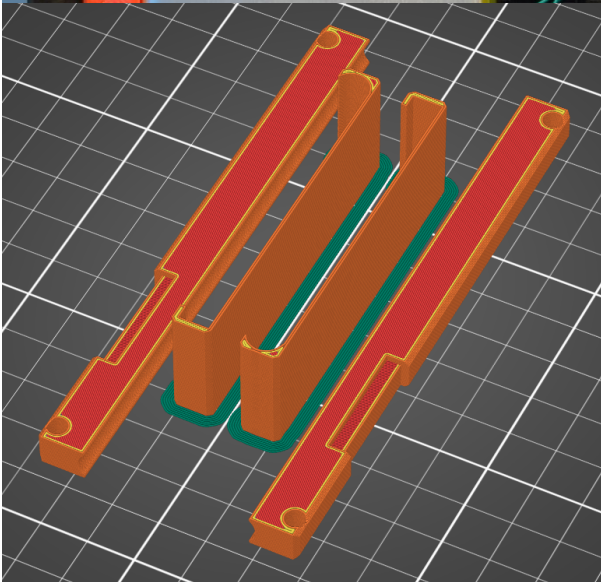
pocket-reform-sysctl-fw/src/sysctl.c void charger_init()

```
// 2A max charge current, assumes 4000mAh cells.  
mps_reg_limits.charge_current = 1<<5 | 1<<3;  
// set all current limits to 500mA (should always be safe)  
int current_limit = 1<<3 | 1<<1;  
mps_reg_limits.input_i_limit1 = current_limit;  
mps_write_buf(MPS_REGSTART_LIMITS, sizeof(mps_reg_limits.all_regs),  
mps_reg_limits.all_regs);  
mps_read_buf(MPS_REGSTART_LIMITS, sizeof(mps_reg_limits.all_regs), mps_reg_limits.all_regs);  
mps_write_byte(0x0F, current_limit); // Input Limit 2
```

- Charging current limit is 2A by default hard-coded in the firmware.
- Upgraded batter can go up to 5A and charger chip can also go up to 5A but PH connectors only do 2 A max so can't increase charging current.

Upgrade battery holding brackets

- FreeCAD: [bat_holder.FCStd](#)
- STL:
 - [mnt_bat_holder.stl](#)
 - [mnt_bat_clip.stl](#)



Revision #23

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