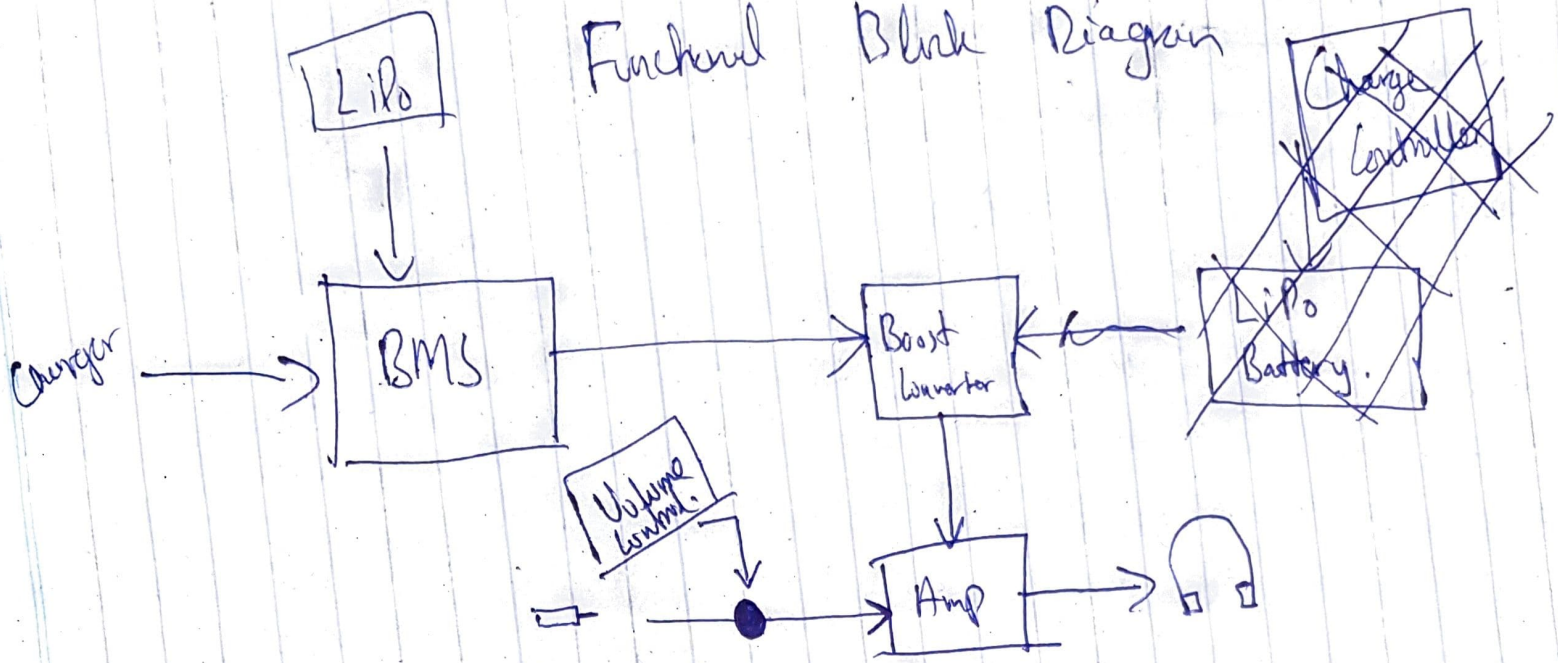
Functional Block Diagram



BMS:

- Short Circuit
- Over Discharge
- Over Charge
- Charging Management.

Boost Converter (TPS6103)

$0.49 = 3.2(x)$

$0.153125 = x$

$\frac{0.49}{3.2} = \frac{R_2}{R_1+R_2}$

390k, 60k.

$0.49 = 3.2\left(\frac{R_2}{R_1+R_2}\right)$

$\frac{0.49}{3.2}(R_1+R_2) = R_2$

$0.153125(R_2) - R_2 = -0.153125 R_1$

$R_2 - 0.153125(R_2) = 0.153125 R_1$, for $R_2 = 100k$

$R_1 = 553k\Omega$

$R_4 = 180k\Omega$

$R_5 = 1.62M\Omega$

$R_6 = 1M\Omega \leftarrow$ Pullup.

$C_{in} = 10\mu F$
$+ 100nF \leftarrow$ Ceramic / Tantalum.

$C_{out} = 220\mu F \leftarrow$ low ESR $< 30m\Omega$
$+$
$2.2\mu F \leftarrow$ low ESR $< 30m\Omega$

$L = 6.8\mu H \leftarrow$ 4A rated. low ESR.

Audio Amplifier (TPA6112A2)

Differential Audio Amplifier Configuration

Gain ← 10

$R_f = 10k$
$R_i = 1k$
} Metal Film Resistors.

$C_i \geq \frac{1}{2\pi(100)(20)}$

$C_i \geq 8.0\,\mu F$ ← Low leakage Tantalum / Ceramic Capacitor.

$C_s = 0.1\,\mu F$ ← Low ESR ceramic
$+ \; 10\,\mu F$ ← Electrolyte Aluminium.

$C_B = 1\,\mu F$ ← Low ESR Ceramic / Tantalum

$C_c = 220\,\mu F$ ← Low ESR Tantalum / Ceramic.

BMS

Refer to Greatsutty Video.

- Charge Controller
- Battery Protection – PMIC

Protection Circuit (FS312F-G)

- Use Typical Application Circuit.

Battery Charger (BQ21040)

- Use Simplified Schematic
- Set R_{ISET} = 675Ω