

Board Layout

The DS2711/12K board is designed to allow a DS2711 or DS2712 to be configured into any possible charge configuration. The board supports single cell, dual cell series, and dual cell parallel charging of AA or AAA NiMH cells. The board also allows the user to select between on-board regulation of the charge source, on board regulation with a separate DS2711/12 power supply, or external regulation. Figures 1 and 2 show the board layout of jumper and battery socket locations.

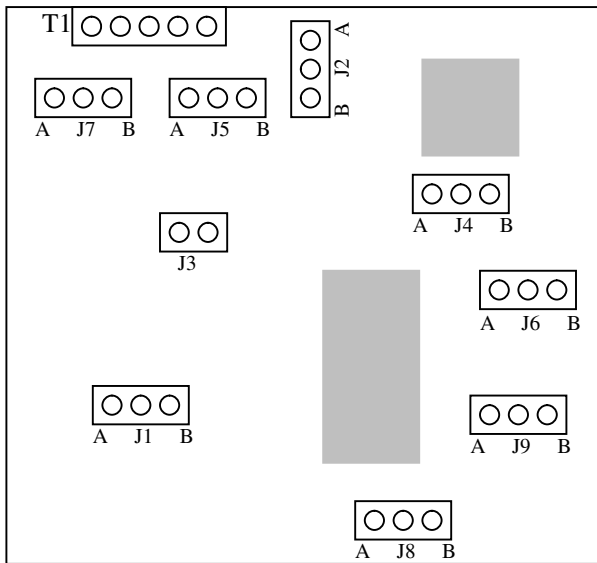


Figure 1. Terminal header and jumper locations on topside of board.

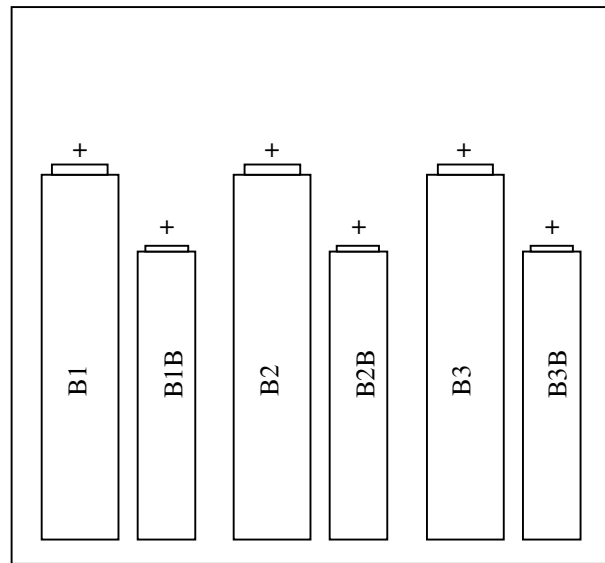


Figure 2. Battery socket locations on bottom side of board.

LED Flash Selection – Jumper J8

The DS2711/12 is capable of three different LED flash configurations. Use jumper J8 to select between the different flash modes for charge, maintenance, and fault as shown in Figure 3. The board must be power cycled after jumper settings are changed for the changes to take effect.

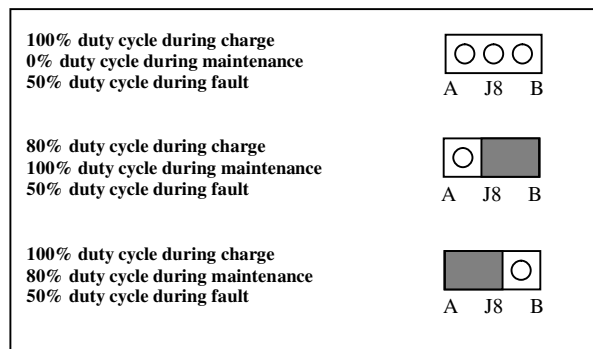


Figure 3. LED Flash Mode Selection

Power Input Selection – Jumpers J2, J3, J5, J7, and connection terminal

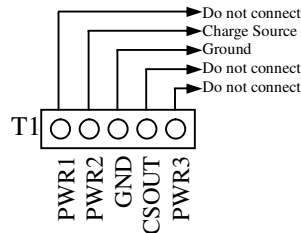
Figure 4 shows the jumper settings and terminal connections for the three different modes of regulation. The board must be power cycled after jumper settings are changed for the changes to take effect.

When using on-board regulation. Connections should be made to PWR2 and GND only. Provide a supply voltage between 4.0 and 5.5V capable of delivering the required charge current to the cells.

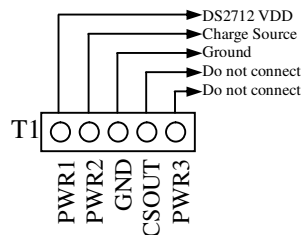
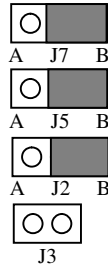
When using on-board regulation with a separate supply for the DS2711/12, connect the DS2711/12 supply voltage between PWR1 and GND, connect the charge source between PWR2 and GND.

When using an externally regulated charge source, connect the DS2711/12 supply voltage between PWR1 and GND and connect the regulated charge source between PWR3 and GND. Leave PWR2 open. The CSOUT terminal will supply a linear feedback voltage that can be used to regulate the supply current.

Use on-board Regulation



Use on-board Regulation with separate supply for the DS2712



Use externally regulated Charge Source

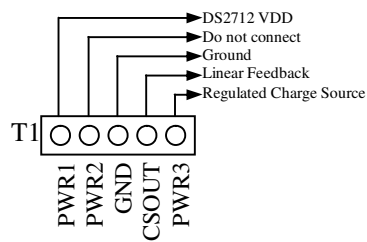
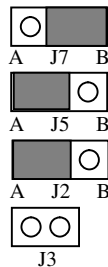


Figure 4. Different modes of supplying a charge source.

Charge Configuration – Jumpers J1, J4, J6, J9, and all battery sockets

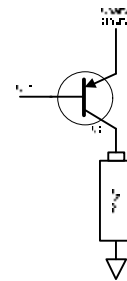
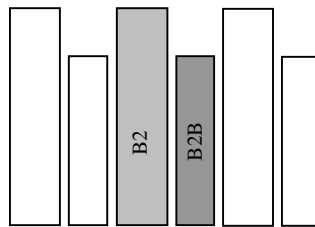
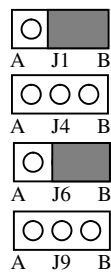
The DS2711/12K board will charge AA or AAA cells in single cell, two cell series, and two cell parallel configurations. Figure 5 shows the jumper settings and cell socket configurations for charging in each mode. Regardless of charging mode, paired AA and AAA cells (B2 and B2B, for example) should never be populated at the same time. The board must be power cycled after jumper settings are changed for the changes to take effect.

To charge in single cell mode set jumpers J1, J4, J6, and J9 according to Figure 5. Populate either socket B2 or B2B only.

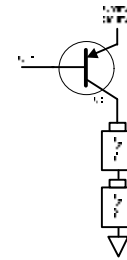
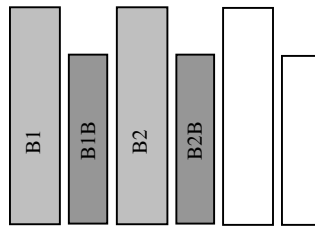
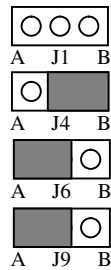
To charge in dual cell series mode set jumpers J1, J4, J6, and J9 according to Figure 5. Populate both sockets B1 and B2 or sockets B1B and B2B. The charge rate is determined by which cell, B2 or B2B, is populated.

To charge in dual cell parallel mode set jumpers J1, J4, J6, and J9 according to Figure 5. Populate cells in any combination of the following: B2 only, B2B only, B3 only, B3B only, B2 and B3, B2 and B3B, B2B and B3, or B2B and B3B.

Single Cell Charging



Dual Cell Series Charging



Dual Cell Parallel Charging

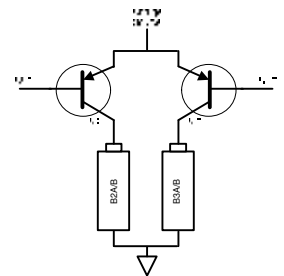
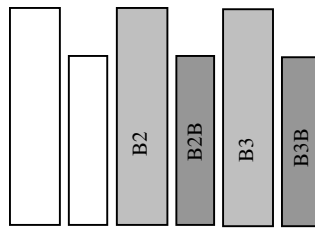
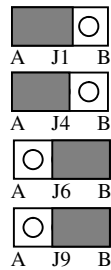


Figure 5. Single, Series, and Parallel Charge Configurations

Charge Rate – Resistors R14 and R15

Resistor R14 sets the charge rate for all AA sockets and the combined resistance of R14+R15 sets the charge rate for all AAA sockets. The formulas are as follows:

$$\text{DS2711 AA Charge Rate (A)} = 0.125 \text{ (V)} / \text{R14}$$

$$\text{DS2711 AAA Charge Rate (A)} = 0.125 \text{ (V)} / (\text{R14} + \text{R15})$$

$$\text{DS2712 AA Charge Rate (A)} = 0.113 \text{ (V)} / \text{R14}$$

$$\text{DS2712 AAA Charge Rate (A)} = 0.113 \text{ (V)} / (\text{R14} + \text{R15})$$

The default values of 0.200 Ohms for R14 and 0.100 Ohms for R15 give set a AA charge rate of .625 amps and a AAA charge rate of .417 amps for the DS2711 or a AA charge rate of .565 amps and a AAA charge rate of .377 amps for the DS2712.

Charge Time – Resistor R21

Resistor R21 sets the time limit for fast charge and top-off charge as follows:

$$\text{Fast Charge Time (minutes)} = 1.5 * \text{R21} / 1000$$

$$\text{Top Off Charge Time (minutes)} = \frac{1}{2} \text{ Fast Charge Time (minutes)}$$

The default value for R21 is 200K Ohms giving a fast charge duration of 5 hours and a top-off charge of 2.5 hours. The minimum allowable value for R21 is 20K Ohms giving a fast charge time of 30 minutes and the maximum allowable value is 360K Ohms giving a fast charge time of 9 hours.

Impedance Test – Resistor R20

Resistor R20 sets the voltage level threshold used to prohibit charging of non-NiMH cells using the following formula:

$$\text{Impedance threshold (m}\Omega\text{)} = (8000 / \text{R20}) * (1 / \text{Charge Rate (A)})$$

The default value for R20 is 68K Ohms, which sets the Impedance threshold at 200mOhms for AA cells and 300mOhms for AAA size cells. The maximum allowable value for R20 is 250K Ohms and the minimum value is 20K ohms. R20 cannot be selected until after the charge rate has been set.

