Silvertel

Ag112 Evaluation Board User Manual

Rev 1.0 – June 2010

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3　Introduction

This manual is a guide to using the "EVALAg1x2" (Rev 1R or higher) evaluation board with our Ag112 Lithium Ion (Li-ion) battery charger module. The EVALAg1x2 evaluation board can be powered by a bench power supply with a range of 9V to 36V and can be used to charge a single or multiple Li-ion cells.

4　Board Description

4.1　Input

The input power is supplied to the board through connector J12 (see Figure 1), this is a standard 2.5mm DC10 connector. The centre pin of the connector is positive and the outer is negative. The input current can be measure by removing LK1 and connecting an ammeter across these pin.

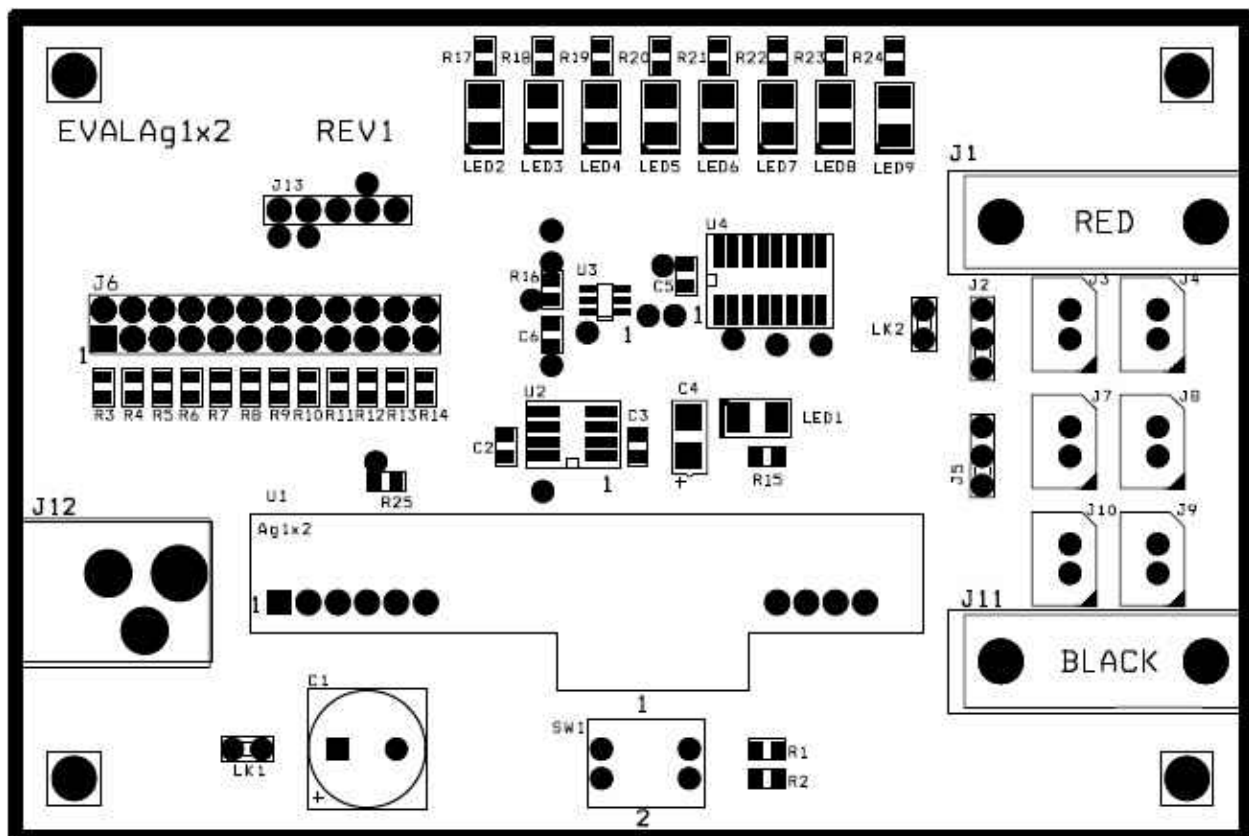LED1 will be illuminated when the input supply is ON.

Figure 1: Board Layout

4.2 Output

The output connections to the Li-ion batteries are made through J3, J4, J7, J8, J9 and J10 (see Figure 2). This allows the board to be setup in different configurations, to be used with the single cell (Ag112-1S), dual cell (Ag112-2S) or triple cell (Ag112-3S) variants, Table 1 shows the output configuration.
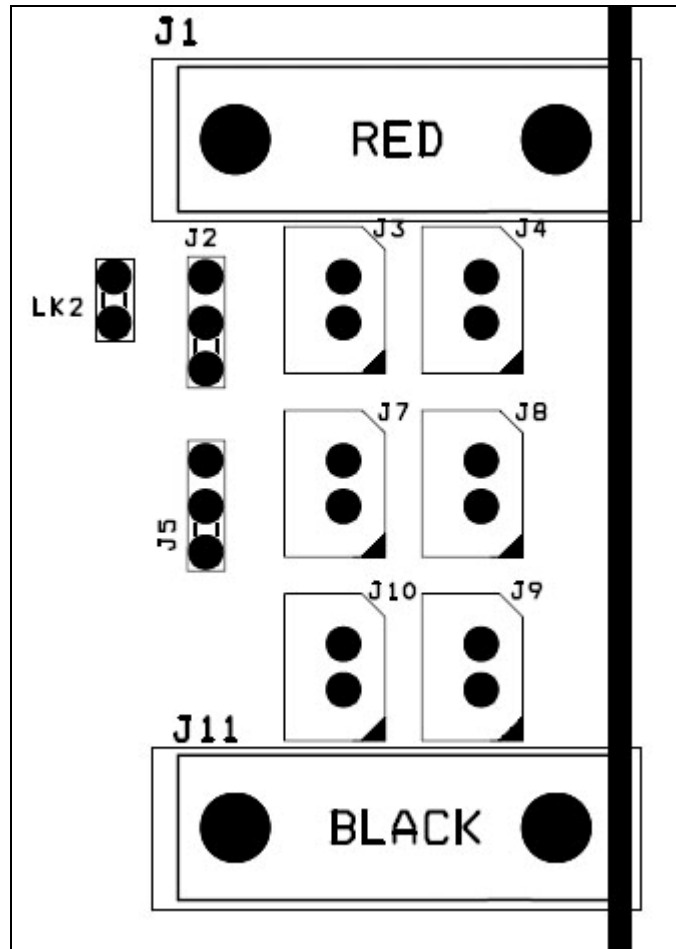

Figure 2: Output Connections

Module Variant	Output Connectors	Link Position	
		J2	J5
Ag112-1S	J9 (and/or J10)	Lower	Lower
Ag112-2S	J8 & J9 (and/or J7 & J10)	Lower	Upper
Ag112-3S	J4, J8 & J9 (and/or J3, J7 & J10)	Upper	Upper

Table 1: Output Configuration

4.3 Capacity Selection

The EVALAg1x2 evaluation board can set the Ag112 capacity by setting the corresponding jumper link on J6 (see Figure 3 and Table 2).
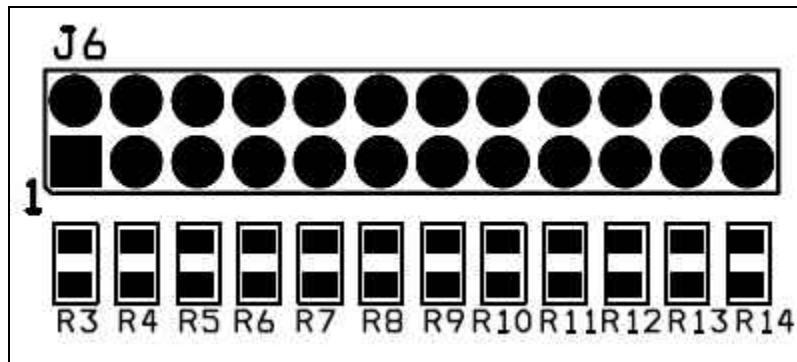

Figure 3: Capacity selection link

Charge Profile No.	J6 Resistor Selection	R_{CS} Resistance (Ohms ±1%)	Voltage per cell (V)	Upper Charge Current (mA)	Cutoff Current (mA)
1	R3	2K	4.2	300	15
2	R4	3K	4.2	600	30
3	R5	3K9	4.2	900	45
4	R6	5K1	4.2	1200	60
5	R7	6K8	4.2	1500	75
6	R8	9K1	4.1	300	15
7	R9	12K	4.1	600	30
8	R10	15K	4.1	900	45
9	R11	20K	4.1	1200	60
10	R12	27K	4.1	1500	75

Table 2: Output Connections

Note: to prevent damaging the battery it is important that the correct value of RCS is set. If the selector link is not fitted, then the Ag112 will default to Charge Profile 1.

4.4 Simulated Thermal Protection

SW1 can be used to demonstrate the Ag112 thermal protection when an appropriate thermistor is fitted. With both switch positions open, the Ag112 will default to a 25ºC ambient condition.

When switch No. 1 is closed R1 (3K9) this will simulate a battery temperature just above 0ºC and the Ag112 will continue to charge the battery.

When switch No. 2 is closed (33K) this will simulate a battery temperature higher than 50ºC and the Ag112 will stop charging and report an over temperature error (LED 5 will illuminate). When switch No.2 is opened the Ag112 will resume charging the battery.

When both switches are closed this will simulate a battery temperature higher than 50ºC, again the Ag112 will stop charging and report an over temperature error. Opening both switches will return the Ag112 to its normal charge mode.

4.5 Status Output

The Ag112 status output pin is connected to a PIC10F200 µ-controller as detailed in the application note "AN112-1". The EVALAg1x2 board used a 3-8 decoder IC (74HC138) to drive LEDs (2 to 9) displaying the status of the Ag112 (see Figure 4).

1. When the Ag112 is charging the battery, LED3 will be illuminated.

2. When the Ag112 has charged the battery, LED4 will be illuminated.

3. When the Ag112 detects that the battery has been disconnected, LED2 will be illuminated.

4. When the Ag112 detects an out of range temperature error, LED5 will be illuminated.

5. When the Ag112 detects an over current condition, LED6 will be illuminated.

6. When the Ag112 encounters a timeout error, LED7 will be illuminated.
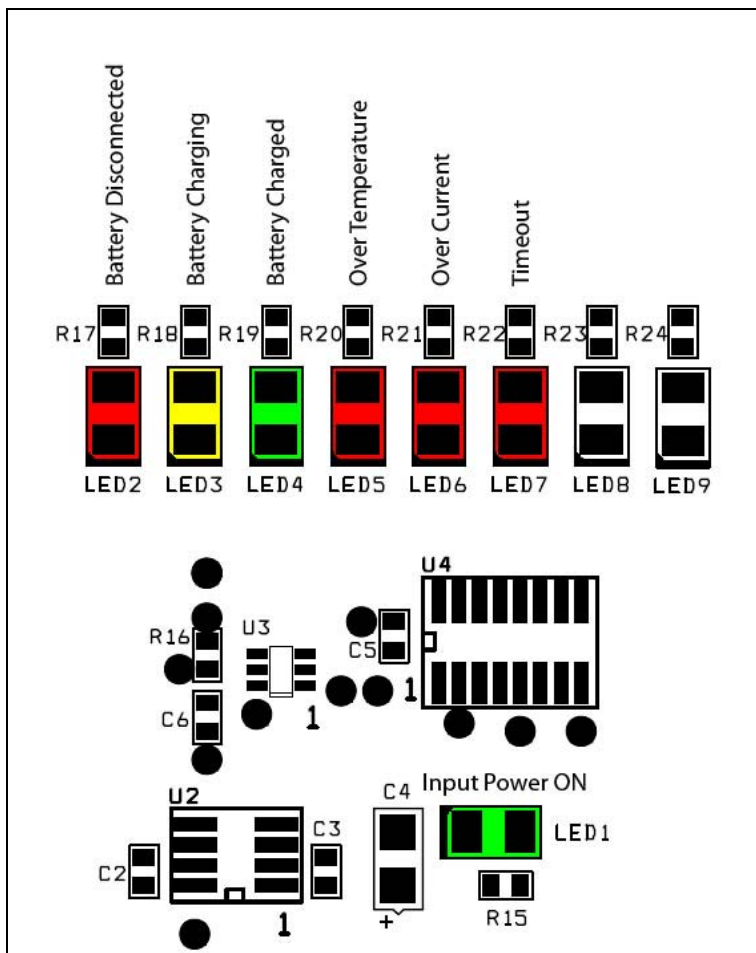
Figure 4: Ag112 Status Output

5 Using the Board

Figure 5 shows an example set-up using the Ag112 to charge a 3.7V 2200mAh Li-ion battery. For a 4.2V 1500mAh change (mode 10) the J6 link is set to the R12 position.
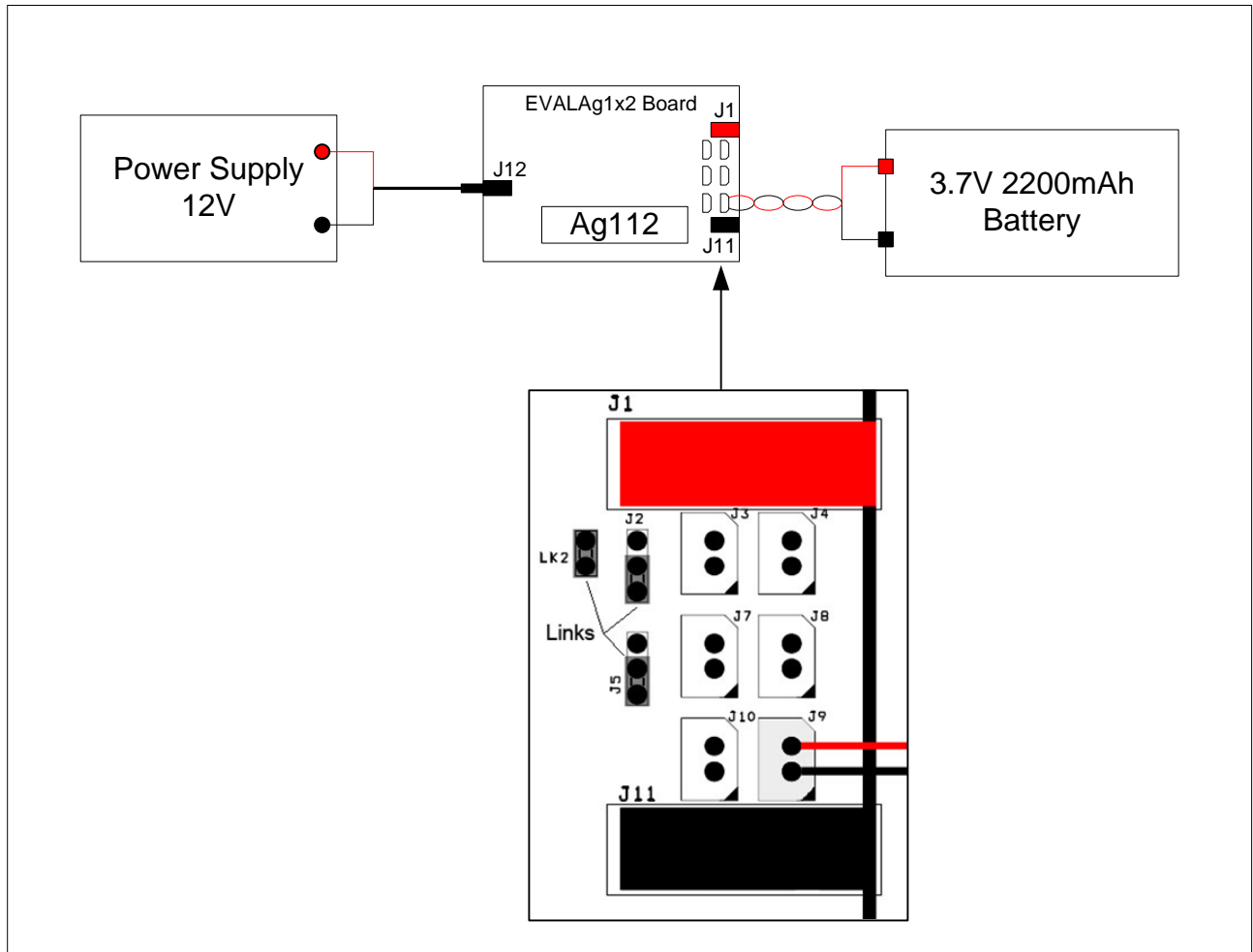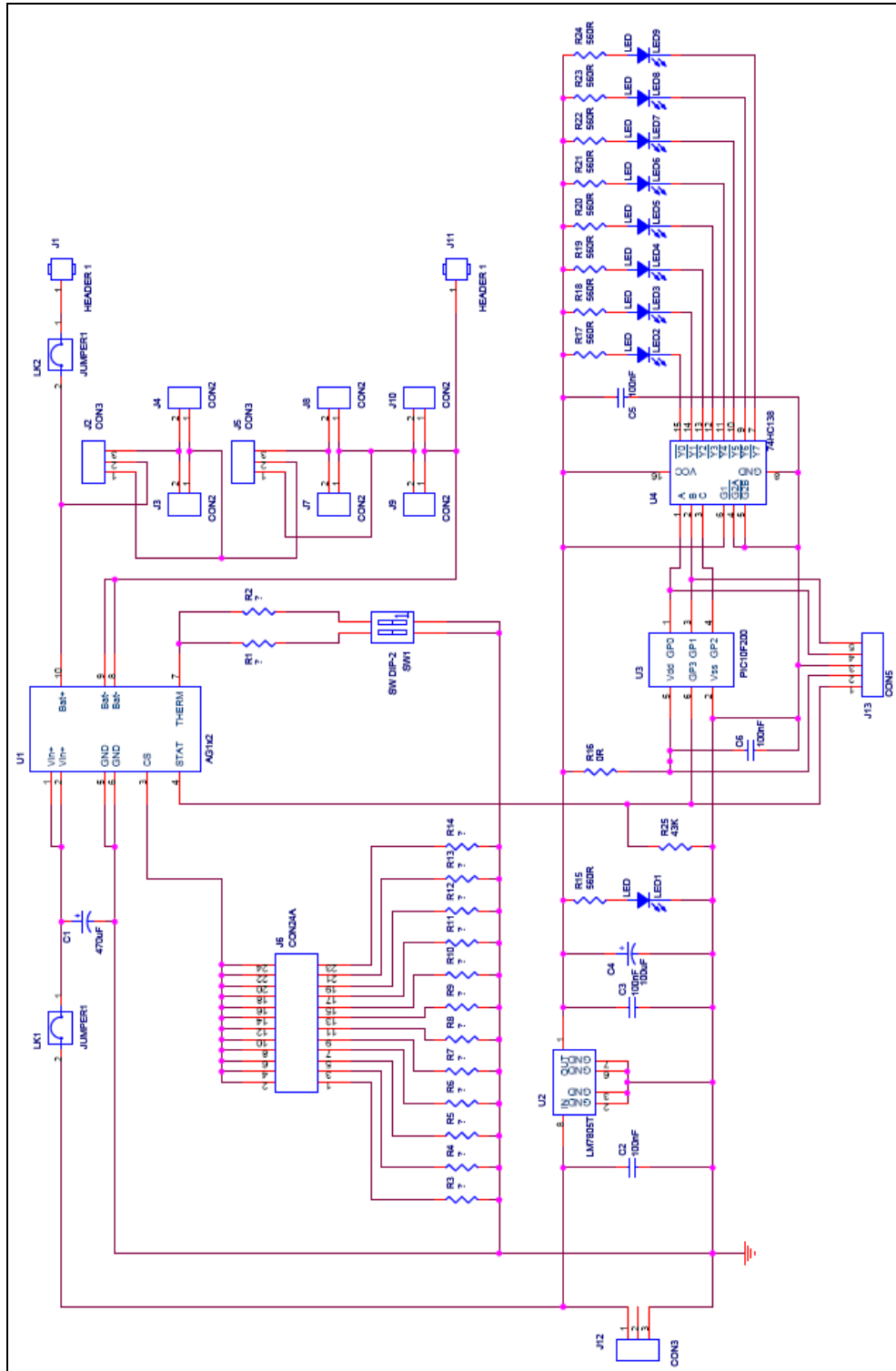

Figure 5: Example set-up

6 EVALAg1x2 Evaluation Board Schematic

Figure 6: EVALAg1x2 1R Schematic