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OELBBBPWR01

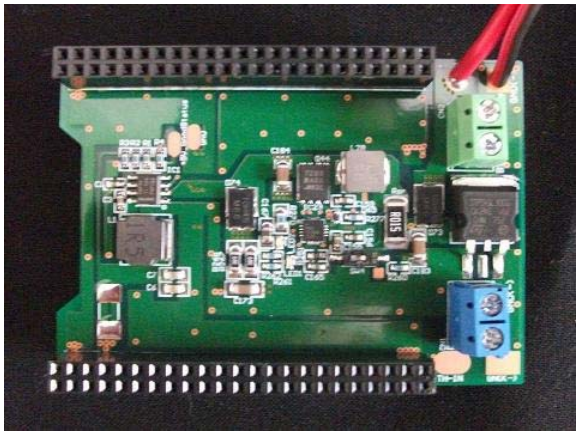
Li-ion Battry Charger Board with Solar Panel for BBB(BeagleBone Black]

GENERAL DESCRIPTION:

The OELBBBPWR01 is Li-ion battery charger board via 20V solar panel docked on BBB(BeagleBone Black).
The OELBBBPWR01 provides +5V/3A output power source into BBB in expansion 46pins connector.
The MPP(MaximumPowerPoint) is set to 17.2V for solar panel. A optinal 10kohm NTC thermister is available as battery heating detection and protection. Default setting for themal protection is available with 10kohm resistor mounted on board as dummy thermister and on/off SW4. If users hope to apply external thermal protection thermister mounted on battery, users have to let SW4 off and connect external 10kohm NTC thermister (103AT) mounted on battery to PAD(TH-IN/GND(-)) with soldering. The battery temperature range is －10degC to +50degC. The battery charging current is limited to 2.76A.
LED1&2 indicate charging status(LED2=on/busy, LED1 =on/completed). The OELBBBPWR01 has Solar/Battery OR output port pads Vout on board. Solar panel may supply power into +5V DCDC converter for BBB and also into OR output port Vout and concurrently can charge power into battery at (>17.2V) region. User also can apply (15VDC to 20VDC) voltage output source instead of solar panel with connecting to solar panel port.

FEATURES:

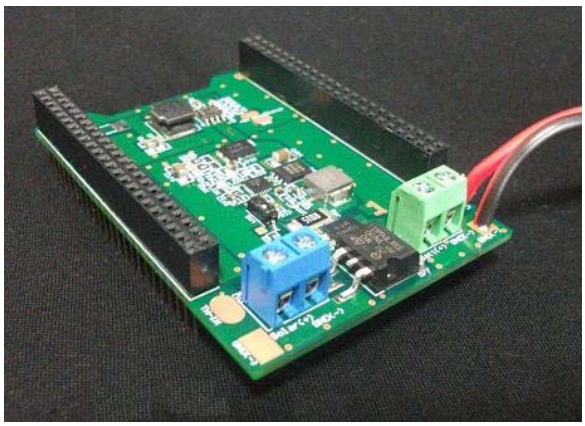
- **Li-ion 12V Battery Charger with 20V Solar Panel for BBB(BeagleBone Black)**
- **+5V Output supplied into BBB via expansion connector**
- **Solar/Battery OR Output Voltage**
- **Also applicable for Pb Battery**
- **MPP(Maximum Power Point) set to 17.6V**
- **Maximum +5V output supply current is 3A**
- **Optinal 10k NTC thermistor for battery is aplicable Charging current is limited to 2.67A**
- **Operating Temperature Range: －10 degC to +50 degC**
- **Battery temperature range is －10 degC to +50 degC with optinal 10k NTC thermister**
- **Charging Battery busy indicator LED**
- **Board style docked on BBB via expansion connector**
- **Board Size ; 54mm × 77mm**
- **Capable of charging mobile phone**



Pic.1 Top view of board OELBBBPWR01

APPLICATIONS:

For use Beaglebone black outside installation with solar panel and battery
IOT applications
Embedded Linux Systems with BBB



Pic.2 Skew view of board OELBBBPWR01

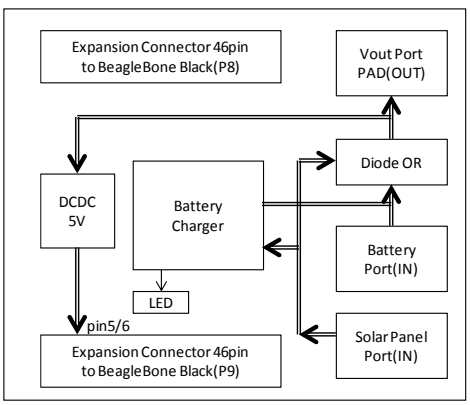


Fig.1 Functional Block Diagram of OELBBBPWR01

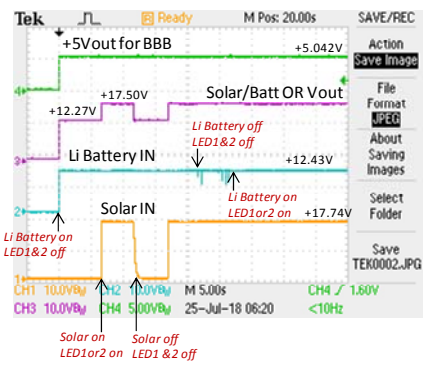


Fig.2 Launching power Waveform

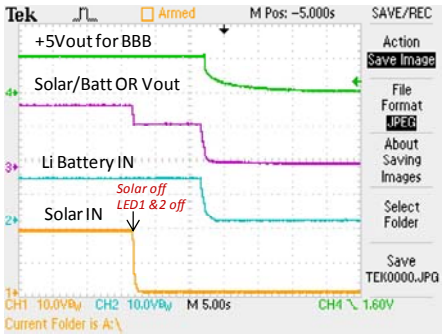


Fig.3 Power-down Waveform

Fig.2 shows the launching power waveform that includes Solar/Battery OR output Vout. The solar port voltage(higher than MPP 17.2V) concurrently supplies power into +5V DC/DC converter for BBB via expansion 46pins connector and also into battery and also into load of OR output port pads Vout.
If no solar panel is connected, the battery supplies power into +5V DC/DC for BBB and into load of OR output Vout on instead.

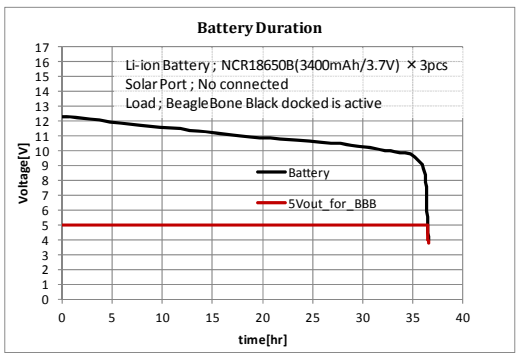


Fig.4 Battery duration test result

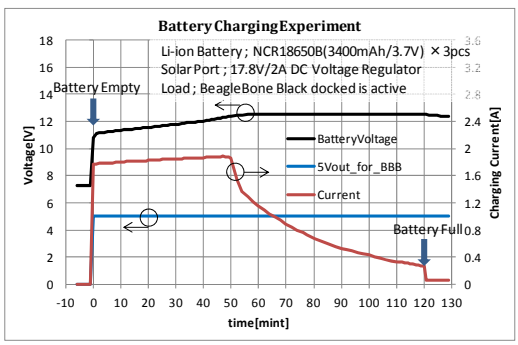
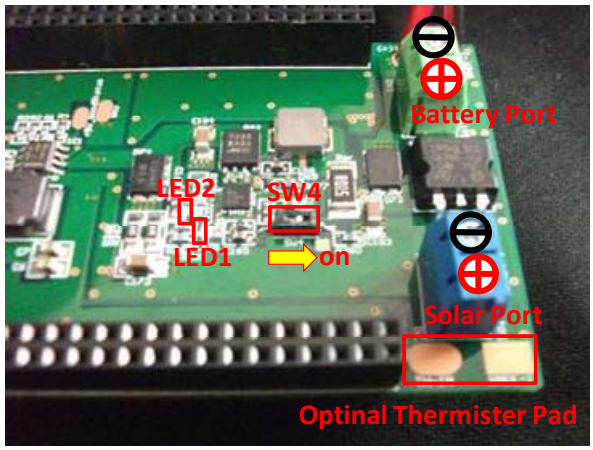


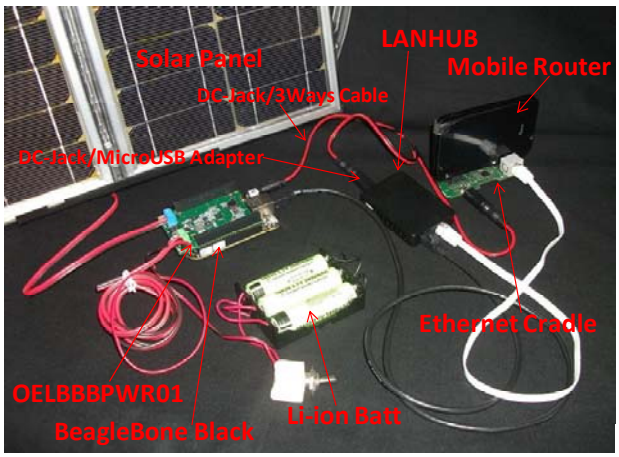
Fig.5 Charging Battery restore time test result

It is shown battery duration test result of OELBBBPWR01 docked to begalebone black in fig.4 and charging battery restore time test result in fig.5. The test is performed by new fully charged Li-ion battery NCR186550B(3400mAh/3.7V) ×series 3pcs with operating BeagleBone Black. Test result indicates a safe volatge range >10V and duration time 35hr and restore time 60mint. The restore time test has been performed after the duration test.



Pic.3 Locations of LED,SW,Terminal block,Pads

Pic.3 shows the locations of LED,SW,optinal thermister pads and terminal block ports.The '+' mark indicates positive pole, the '—' mark indicates negative pole.



Pic.4 Application Examples

Application Examples:
Pic.4 shows application examples that consists of Solar Panel,Li-ion Battery, BeagleBone Black, OELBBBPWR01, Mobile Gateway(Router), Ethernet Cradle, LANHUB. Fig.6 shows the application example test configuration.

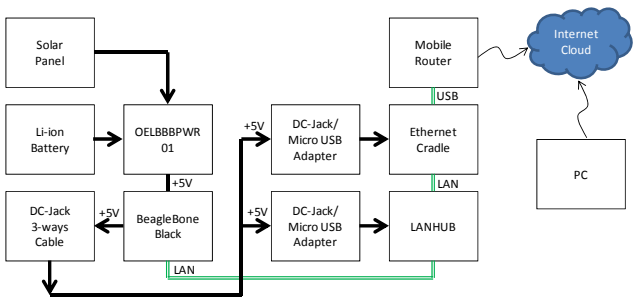


Fig.6 Application Example Test Configuration

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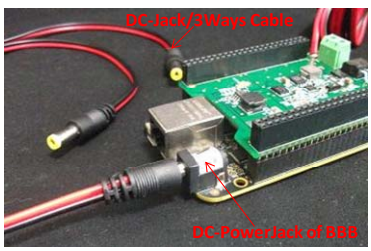
Pic.5 Access screen shot to BBB Web Server through mobile gateway(port 80)

Pic.6 Access screen shot to BBB Cloud9 through mobile gateway(port 3000)

Pic.5 shows access screen shot to BeagleBone Black Web Server through mobile gateway(port 80) at the test.
Pic.6 shows access screen shot to BeagleBone Black Cloud9 through mobile gateway(port 3000) at the test.



Pic.8 How to supply power to LANHUB & MobileRouter

Pic.9 View of DC-Jack/3Ways Cable (Not for sale)

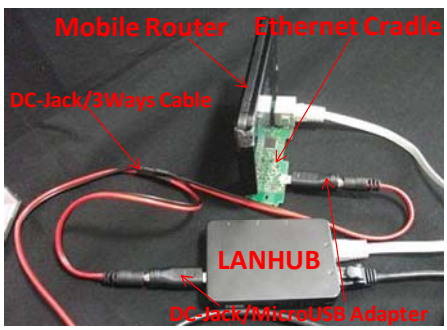
Note ;
DC-Jack/3Ways Cable, DC-Jack/MicroUSB Adapter, Mobile Router, LAN HUB, Ethernet Cradle, LAN Cable, Battery, Solar Panel and BeagleBone Black are **not included** in product.

Note ;
Take caution to avoid reverse connection of power cable to battery and solar panel terminal block port. If you do reverse connection, we never ensure the operating guarantee about our board OLEBBBPWR01 and claim our immunity from exchange.

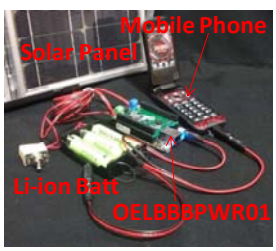
Pic.7 View of OELBBBPWR01 docked to BeagleBone Black

Pic.8,9,10 shows how to supply power to LANHUB and to Mobile Router from DC Power Jack of BBB via DC-Jack/3Ways Cable and DC-Jack/Micro USB Adapter.
The DC Power Jack of BBB is available as outport because of that OELBBBPWR01 is pouring power into it via expansion 46pins connector, though the DC Power Jack is input port intrinsically.

About security ;
The Cloud9 has the Linux console terminal of BeagleBone Black, then no security gateway at mobile router WAN port is very risky and dangerous.
Hence you should set the security rules to mobile router WAN port such as IP packet filtering or port mapping.



Pic.10 View of connecting DC-Jack/3Ways Cable to LANHUB & Mobile Router via DC-Jack/Micro USB Adapter



Pic.11 View of charging Mobile Phone via micro USB

Charging mobile phone;
You can charge mobile phone via micro USB(5V) from OELBBBPWR01& battery/solar panel.