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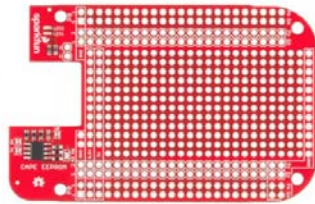
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





BeagleBone Black Proto Cape Hookup Guide

Board Overview



The BeagleBone Black Proto Cape is a great way to prototype or design custom capes for the BeagleBone Black. This cape gives you access to all gpio available on the BeagleBone Black. There are also two red LED's available for user applications. The included EEPROM lets the user prototype cape description files, which are used by the BeagleBoard Foundation to register boards.

Suggested Reading

Before you start, we recommend the following background knowledge:

- How to Solder
- Working with Wire
- Logic Levels

Assembly

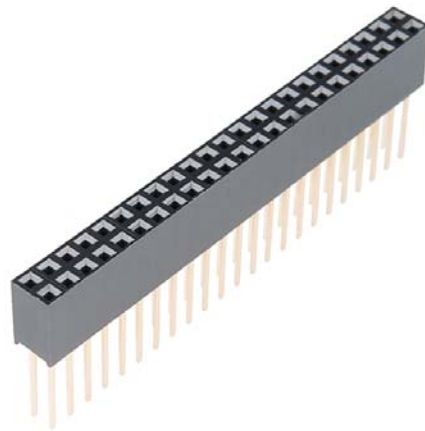
First let's solder some headers to the cape. There are two styles of headers you may choose from.

If you only plan on using one cape, straight headers will do just fine.



Header 2x23 (PRT-12791)

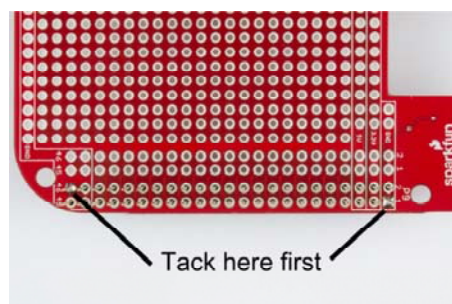
If you plan to use multiple capes, it is necessary to use stackable headers.



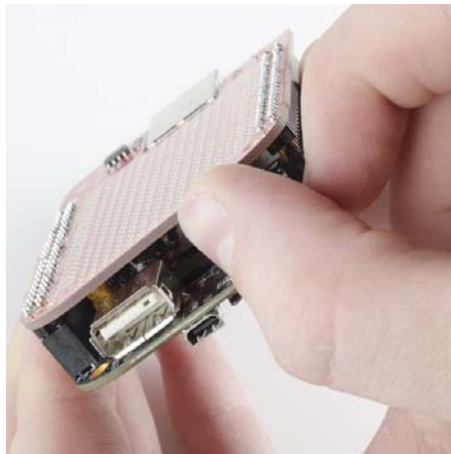
Stackable Header 2x23 (PRT-12790)

Soldering Headers

It is important when soldering the headers that they are held in straight. Tack two opposite pins and check the alignment before finishing the rest of the pins. When you are complete allow the cape to cool before inserting.



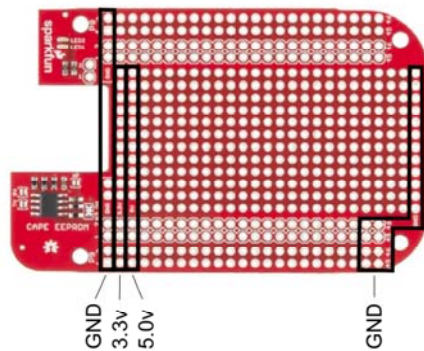
Removing capes can be quite difficult. Do not try to pull them off in one motion. Try to rock or slowly apply pressure to the corners. Separating in this fashion will prevent the pins from being bent.



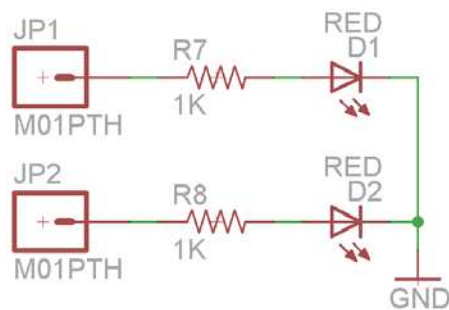
Let's take a look at how the prototyping area is laid out.

Proto Area

There is plenty of space on which to prototype. There are two power buses provided along with ground connections on both sides of the board, all .1" spaced through holes.



Two LED's have been provided for quick and easy debugging or general purpose use.



Simply apply a current to each LED to illuminate. They work with both 3.3v and 5v inputs.

Now, let's look at the EEPROM and its features.

Using the EEPROM

The Cape EEPROM is great for storing pin configuration data. The cape EEPROM is read by the BeagleBone Black during boot. It can then automatically setup the pins for use. There are several steps to understand how the EEPROM is used. For now, we will show you the possible settings available. The cape comes with a blank EEPROM.

Table 14. Expansion Board EEPROM

Name	Offset	Size (Bytes)	Contents
Header	0	4	0x 54, 0x55, 0x56, 0x57
EEPROM Revision	4	2	Revision number of the overall format of this EEPROM in AN311-A1
Board Name	6	32	Name of board in ASCII as seen on read when the EEPROM is changed. Up to developer of the board to be what they call the board.
Version	38	4	Hardware version code for board in ASCII. Version format is up to the developer. (e.g. 00.1.0000.1000)
Manufacturer	42	16	ASCII name of the manufacturer. Complete or individual's name.
Part Number	58	16	ASCII characters for the part number. Up to maker of the board.
Number of Pins	74	2	Number of pins used by the daughter board including the power pins used. Decimal value of total pins used, stored in HEX.
Serial Number	76	12	Serial number of the board. This is a 12 character string which is: WWYYAAAA where: WW = 2 digit week of the year of production YY = 2 digit year of production AAAA = Assembly code to let the manufacturer document the assembly number or product. A way to quickly tell from reading the serial number what the board is. Up to the developer's discretion. <small>NOTE = Increasing board number for that week of production</small>
Pin Usage	88	140	Pin Usage for each configurable pin of the 74 pins on the expansion connectors <small>Bit 0-13 = Pin 1-14</small> <small>Bit 14 = Pin 15</small> <small>Bit 15 = Pin 16</small> <small>Bit 16 = Pin 17</small> <small>Bit 17 = Pin 18</small> <small>Bit 18 = Pin 19</small> <small>Bit 19 = Pin 20</small> <small>Bit 20 = Pin 21</small> <small>Bit 21 = Pin 22</small> <small>Bit 22 = Pin 23</small> <small>Bit 23 = Pin 24</small> <small>Bit 24 = Pin 25</small> <small>Bit 25 = Pin 26</small> <small>Bit 26 = Pin 27</small> <small>Bit 27 = Pin 28</small> <small>Bit 28 = Pin 29</small> <small>Bit 29 = Pin 30</small> <small>Bit 30 = Pin 31</small> <small>Bit 31 = Pin 32</small> <small>Bit 32 = Pin 33</small> <small>Bit 33 = Pin 34</small> <small>Bit 34 = Pin 35</small> <small>Bit 35 = Pin 36</small> <small>Bit 36 = Pin 37</small> <small>Bit 37 = Pin 38</small> <small>Bit 38 = Pin 39</small> <small>Bit 39 = Pin 40</small> <small>Bit 40 = Pin 41</small> <small>Bit 41 = Pin 42</small> <small>Bit 42 = Pin 43</small> <small>Bit 43 = Pin 44</small> <small>Bit 44 = Pin 45</small> <small>Bit 45 = Pin 46</small> <small>Bit 46 = Pin 47</small> <small>Bit 47 = Pin 48</small> <small>Bit 48 = Pin 49</small> <small>Bit 49 = Pin 50</small> <small>Bit 50 = Pin 51</small> <small>Bit 51 = Pin 52</small> <small>Bit 52 = Pin 53</small> <small>Bit 53 = Pin 54</small> <small>Bit 54 = Pin 55</small> <small>Bit 55 = Pin 56</small> <small>Bit 56 = Pin 57</small> <small>Bit 57 = Pin 58</small> <small>Bit 58 = Pin 59</small> <small>Bit 59 = Pin 60</small> <small>Bit 60 = Pin 61</small> <small>Bit 61 = Pin 62</small> <small>Bit 62 = Pin 63</small> <small>Bit 63 = Pin 64</small> <small>Bit 64 = Pin 65</small> <small>Bit 65 = Pin 66</small> <small>Bit 66 = Pin 67</small> <small>Bit 67 = Pin 68</small> <small>Bit 68 = Pin 69</small> <small>Bit 69 = Pin 70</small> <small>Bit 70 = Pin 71</small> <small>Bit 71 = Pin 72</small> <small>Bit 72 = Pin 73</small> <small>Bit 73 = Pin 74</small> <small>Bit 74 = Pin 75</small> <small>Bit 75 = Pin 76</small> <small>Bit 76 = Pin 77</small> <small>Bit 77 = Pin 78</small> <small>Bit 78 = Pin 79</small> <small>Bit 79 = Pin 80</small> <small>Bit 80 = Pin 81</small> <small>Bit 81 = Pin 82</small> <small>Bit 82 = Pin 83</small> <small>Bit 83 = Pin 84</small> <small>Bit 84 = Pin 85</small> <small>Bit 85 = Pin 86</small> <small>Bit 86 = Pin 87</small> <small>Bit 87 = Pin 88</small> <small>Bit 88 = Pin 89</small> <small>Bit 89 = Pin 90</small> <small>Bit 90 = Pin 91</small> <small>Bit 91 = Pin 92</small> <small>Bit 92 = Pin 93</small> <small>Bit 93 = Pin 94</small> <small>Bit 94 = Pin 95</small> <small>Bit 95 = Pin 96</small> <small>Bit 96 = Pin 97</small> <small>Bit 97 = Pin 98</small> <small>Bit 98 = Pin 99</small> <small>Bit 99 = Pin 100</small> <small>Bit 100 = Pin 101</small> <small>Bit 101 = Pin 102</small> <small>Bit 102 = Pin 103</small> <small>Bit 103 = Pin 104</small> <small>Bit 104 = Pin 105</small> <small>Bit 105 = Pin 106</small> <small>Bit 106 = Pin 107</small> <small>Bit 107 = Pin 108</small> <small>Bit 108 = Pin 109</small> <small>Bit 109 = Pin 110</small> <small>Bit 110 = Pin 111</small> <small>Bit 111 = Pin 112</small> <small>Bit 112 = Pin 113</small> <small>Bit 113 = Pin 114</small> <small>Bit 114 = Pin 115</small> <small>Bit 115 = Pin 116</small> <small>Bit 116 = Pin 117</small> <small>Bit 117 = Pin 118</small> <small>Bit 118 = Pin 119</small> <small>Bit 119 = Pin 120</small> <small>Bit 120 = Pin 121</small> <small>Bit 121 = Pin 122</small> <small>Bit 122 = Pin 123</small> <small>Bit 123 = Pin 124</small> <small>Bit 124 = Pin 125</small> <small>Bit 125 = Pin 126</small> <small>Bit 126 = Pin 127</small> <small>Bit 127 = Pin 128</small> <small>Bit 128 = Pin 129</small> <small>Bit 129 = Pin 130</small> <small>Bit 130 = Pin 131</small> <small>Bit 131 = Pin 132</small> <small>Bit 132 = Pin 133</small> <small>Bit 133 = Pin 134</small> <small>Bit 134 = Pin 135</small> <small>Bit 135 = Pin 136</small> <small>Bit 136 = Pin 137</small> <small>Bit 137 = Pin 138</small> <small>Bit 138 = Pin 139</small> <small>Bit 139 = Pin 140</small>
VDD_3V3 Current	236	2	Maximum current in millamps. This is HEX value of the current in decimal (0000 to 0xFF) (0 to 255 mA)
VDD_5V Current	238	2	Maximum current in millamps. This is HEX value of the current in decimal (0000 to 0xFF) (0 to 255 mA)
5V_3V Current	240	2	Maximum current in millamps. This is HEX value of the current in decimal (0000 to 0xFF) (0 to 255 mA)
DC Supplied	242	2	Indicates whether or not the board is supplying voltage on the VDD_5V rail and the current rating 000=No 1=0.1A 2=1.0A 3=1.5A 4=2.0A 5=2.5A 6=3.0A 7=3.5A 8=4.0A 9=4.5A 10=5.0A 11=5.5A 12=6.0A 13=6.5A 14=7.0A 15=7.5A 16=8.0A 17=8.5A 18=9.0A 19=9.5A 20=10.0A 21=10.5A 22=11.0A 23=11.5A 24=12.0A 25=12.5A 26=13.0A 27=13.5A 28=14.0A 29=14.5A 30=15.0A 31=15.5A 32=16.0A 33=16.5A 34=17.0A 35=17.5A 36=18.0A 37=18.5A 38=19.0A 39=19.5A 40=20.0A 41=20.5A 42=21.0A 43=21.5A 44=22.0A 45=22.5A 46=23.0A 47=23.5A 48=24.0A 49=24.5A 50=25.0A 51=25.5A 52=26.0A 53=26.5A 54=27.0A 55=27.5A 56=28.0A 57=28.5A 58=29.0A 59=29.5A 60=30.0A 61=30.5A 62=31.0A 63=31.5A 64=32.0A 65=32.5A 66=33.0A 67=33.5A 68=34.0A 69=34.5A 70=35.0A 71=35.5A 72=36.0A 73=36.5A 74=37.0A 75=37.5A 76=38.0A 77=38.5A 78=39.0A 79=39.5A 80=40.0A 81=40.5A 82=41.0A 83=41.5A 84=42.0A 85=42.5A 86=43.0A 87=43.5A 88=44.0A 89=44.5A 90=45.0A 91=45.5A 92=46.0A 93=46.5A 94=47.0A 95=47.5A 96=48.0A 97=48.5A 98=49.0A 99=49.5A
Available	244	32543	Available space for other non-volatile codes/data to be used as needed by the manufacturer or SW driver. Could also store presets for use by SW.

The default address for the EEPROM is 0x57. You can change it to addresses 0x54 - 0x57 with the selection of the two address jumpers. They are Labeled A0 and A1. Changing the address of the Cape is important when you are using multiple capes.

Address Table

A2	A1	A0	7-bit address
1	0	0	0x54
1	0	1	0x55
1	1	0	0x56
1	1	1	0x57

Once you have created your next great thing you can register your settings with the BeagleBone foundation. This registration allows them to upload your settings to the latest operating system available. This removes the need for users to setup their board to use your cape.

Resources and Going Further

Now, go forth and build something awesome! Here are some additional links to get you started using the BeagleBone Black.

Further reading:

- BeagleBone Black Homepage
- Bone Script Library Support

If you have any problems or questions, our technical support department can help. Please don't hesitate to contact us. We also love to hear about your projects!