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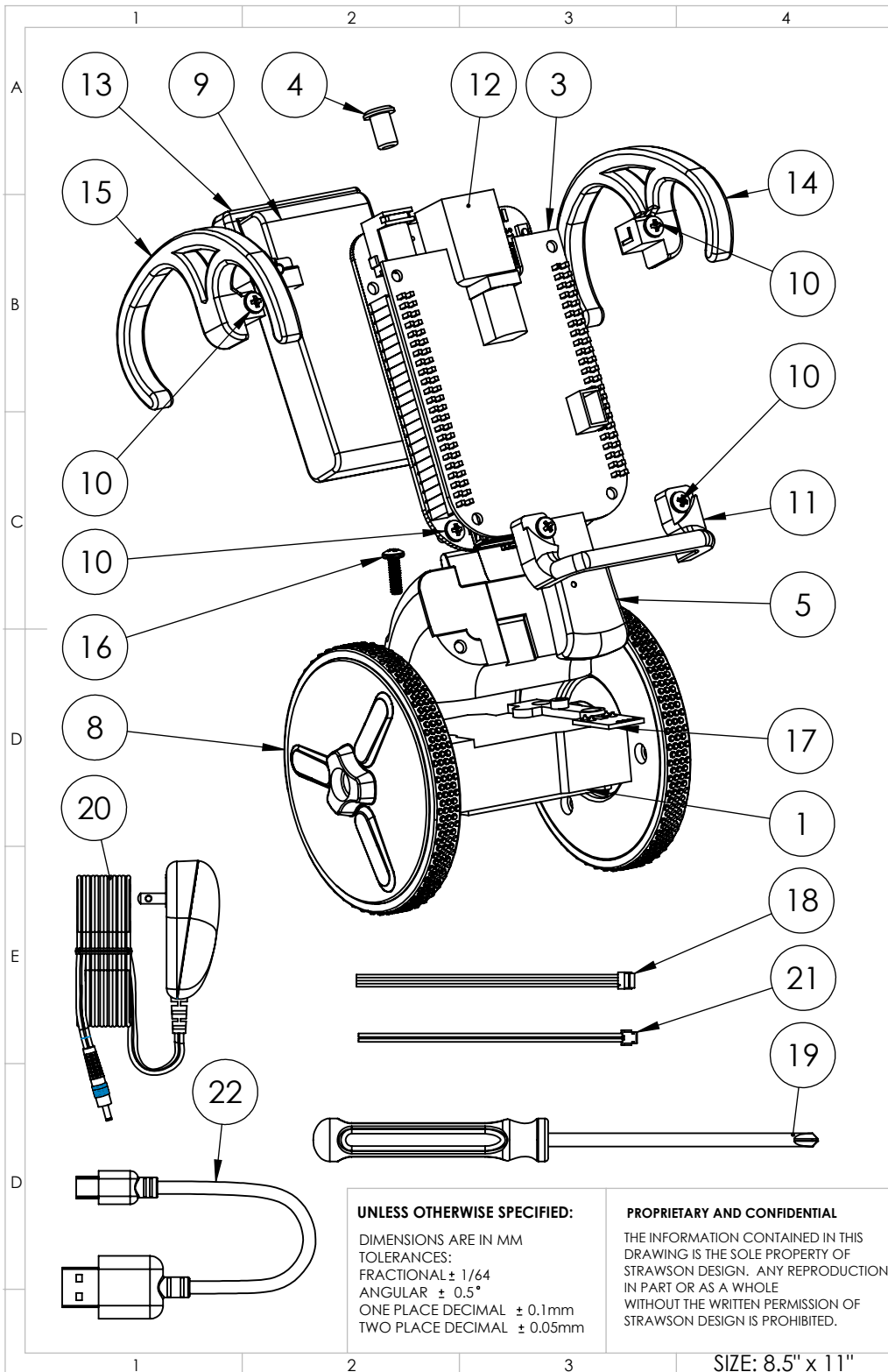
DIMENSIONS ARE IN MM
 TOLERANCES:
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 ANGULAR $\pm 0.5^\circ$
 ONE PLACE DECIMAL $\pm 0.1\text{mm}$
 TWO PLACE DECIMAL $\pm 0.05\text{mm}$

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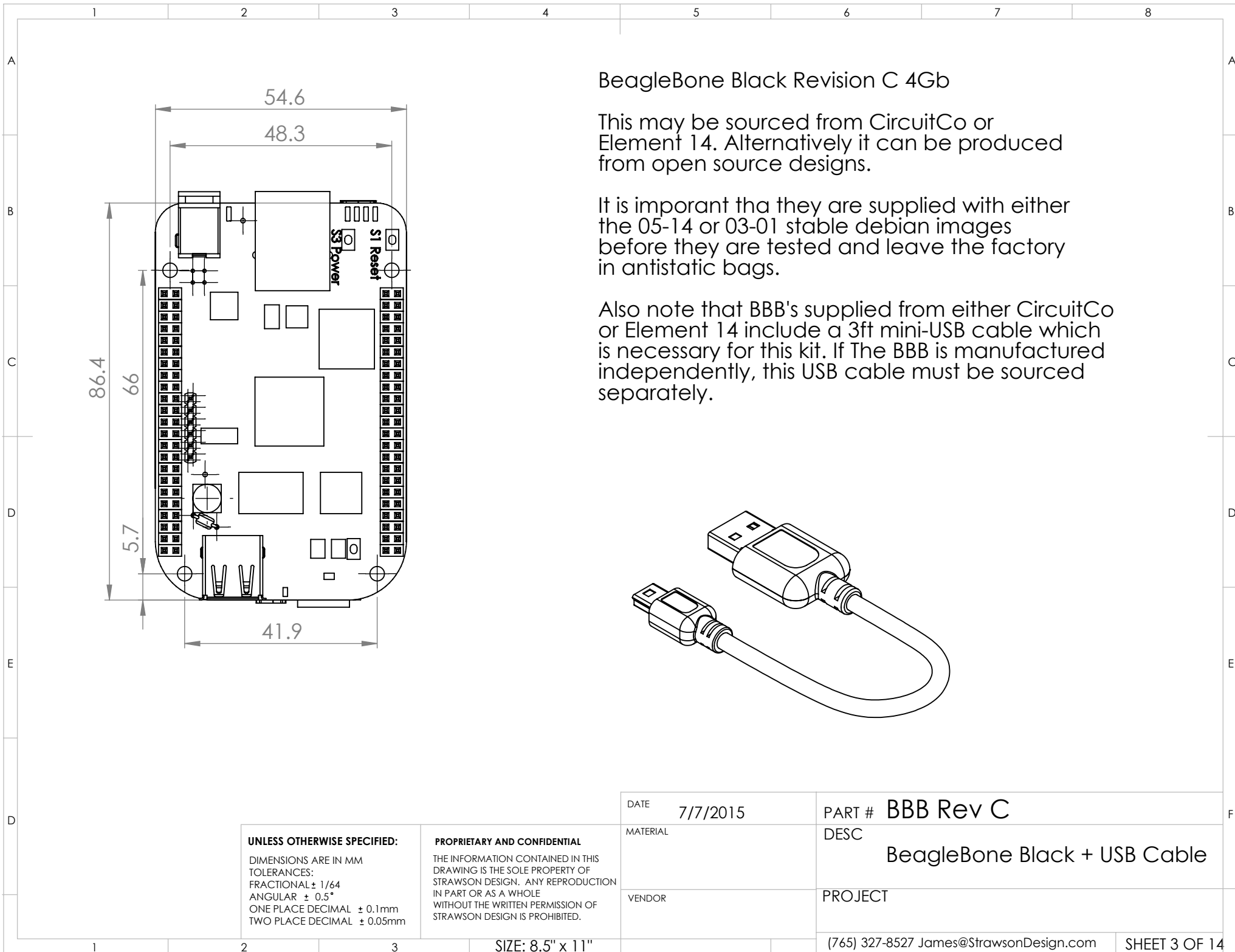
SIZE: 8.5" x 11"

DATE	7/7/2015	PART # SD-103
MATERIAL		DESC BealgeMiP Educational Kit
VENDOR		PROJECT BealgeMiP
		(765) 327-8527 James@StrawsonDesign.com
		SHEET 1 OF 14



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	WW drivetrain	Motors, gearboxes, wheels	1
2	SD-104	Bottom Bulkhead	1
3	SD-101C	Robotics Cape	1
4	SD-105	Plastic DC Socket Plug	1
5	BT Dongle	BT Dongle	1
9	N1300.2S.25	Turnigy Nanotech 1300mah 2S	1
10	91772A106	4-40 1/4" BHCS	6
11	SD-111	Lower Front Bumper	1
12	BeagleBone Black	BBB Rev C	1
13	SD-107	Top Battery Clip	1
14	SD-109	Top Skid Left	1
15	SD-110	Top Skid Right	1
16	91772A108	4-40 3/8" BHCS	4
17	encoder board	WW encoder with transistors	2
18	JST SH 4-Pin Pigtail	100mm Pigtail for Encoders	2
19	Philips Screwdriver	Screwdriver for kit screws	1
20	12v 1A DC power supply	12v 1A 5.5mm barrel jack adapter	1
21	JST ZH 2-Pin Pigtail	100mm Pigtail for Motors	2
22	mini usb cable	Mini USB included with BBB	1

DATE	7/7/2015	PART # SD-103
MATERIAL		DESC: BealgeMiP Educational Package
VENDOR		PROJECT: BealgeMiP
	(765) 327-8527 James@StrawsonDesign.com	SHEET 2 OF 14

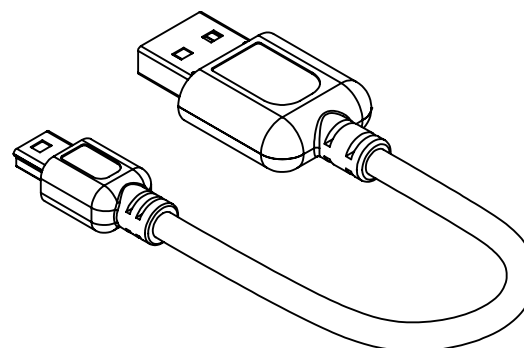


BeagleBone Black Revision C 4Gb

This may be sourced from CircuitCo or Element 14. Alternatively it can be produced from open source designs.

It is important that they are supplied with either the 05-14 or 03-01 stable debian images before they are tested and leave the factory in antistatic bags.

Also note that BBB's supplied from either CircuitCo or Element 14 include a 3ft mini-USB cable which is necessary for this kit. If the BBB is manufactured independently, this USB cable must be sourced separately.



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TWO PLACE DECIMAL $\pm 0.05\text{mm}$

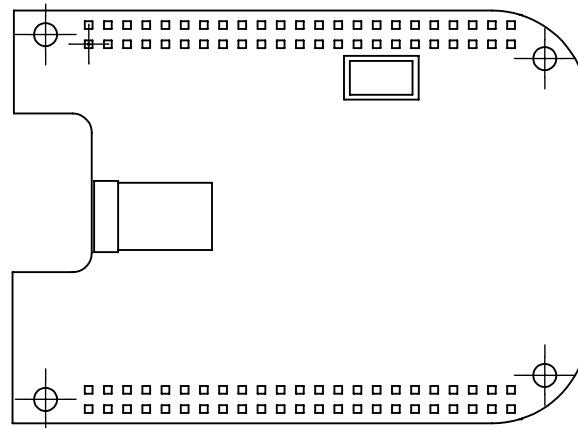
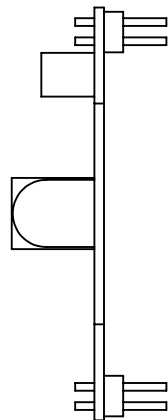
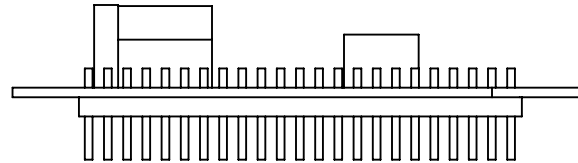
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DATE	7/7/2015	PART #	BBB Rev C
MATERIAL		DESC	BeagleBone Black + USB Cable
VENDOR		PROJECT	
		(765) 327-8527 James@StrawsonDesign.com	SHEET 3 OF 14

Consult the following repository for open-source documentation
https://github.com/StrawsonDesign/Robotics_Cape_RevC_Documentation

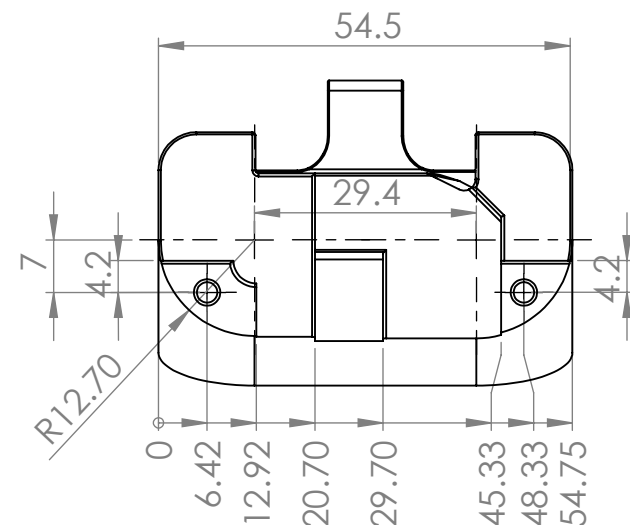
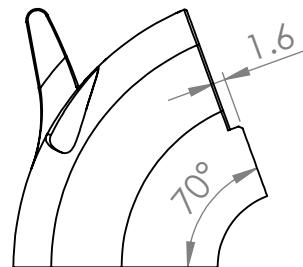
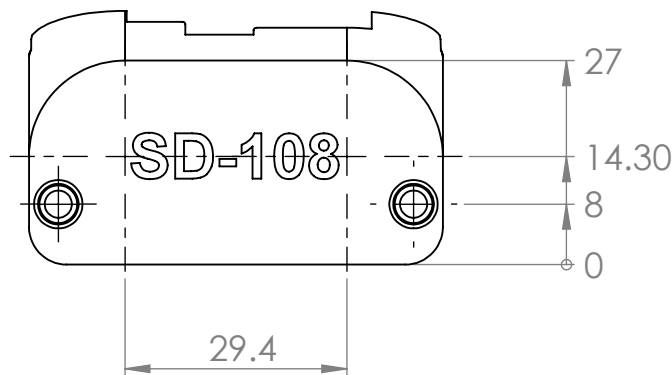
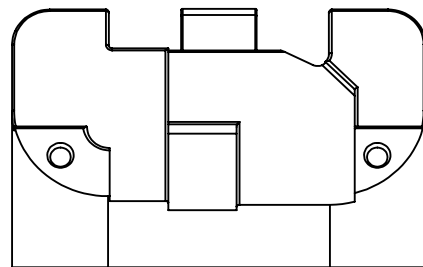
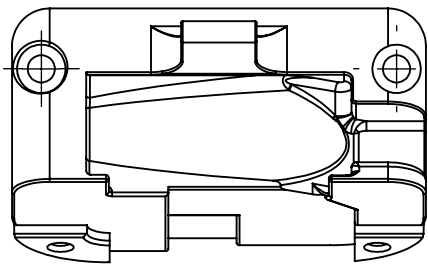
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DATE	7/7/2015	PART #	SD-101
MATERIAL		DESC:	Robotics Cape
VENDOR		PROJECT:	BealgeMiP
		(765) 327-8527 James@StrawsonDesign.com	SHEET 4 OF 14



SD-108 Bulkhead may be hollowed out or reduced to save plastic cost. However, the front interface with the BeagleBone dimensioned immediately below this note may not be changed as it mates very closely with components of the BeagleBone's PCB. Furthermore the 12.7mm arcs dimensioned below must remain of the same curvature and position in order to align precisely with the corners of the BeagleBone.

Due to geometric complexity the curved battery slot is not dimensioned here, I refer the user to the included 3D Cad models for geometry. This battery slot may have to change dimensions slightly depending on battery supplier as it fits very snugly to the prototype's battery.

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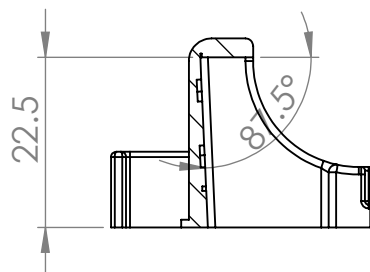
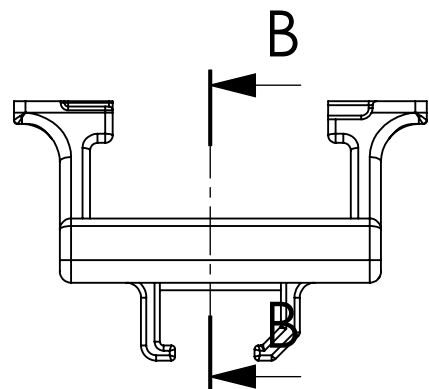
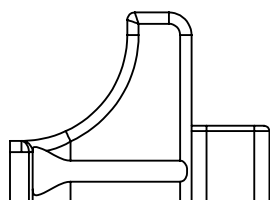
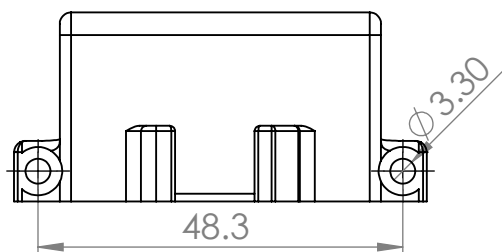
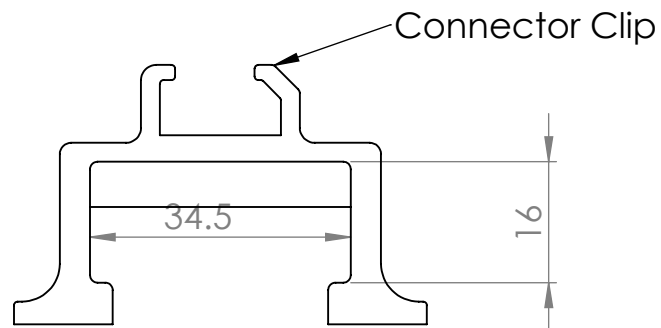
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SIZE: 8.5" x 11"

DATE	7/7/2015	PART #	
MATERIAL		DESC:	Bottom Bulkhead
VENDOR		PROJECT:	BeagleMiP
		(765) 327-8527 James@StrawsonDesign.com	SHEET 5 OF 14



SECTION B-B
SCALE 1 : 1

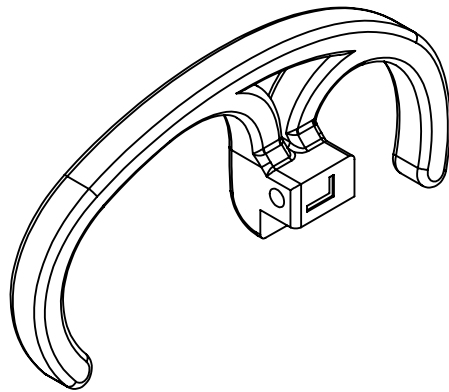
Please note that the connector clip protruding from the back of this part is ONLY for use with batteries that have an XT-60 connector in addition to the mandatory JST-XH balance connector. If the Manufacturer wishes to source batteries without this unnecessary connector then the connector clip indicated to the left can be removed from this part entirely.

For MAE143c we source batteries from Turnigy and unfortunately come with these connectors so our in-house printed BeagleMiPs have these clips.

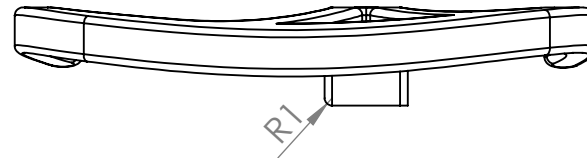
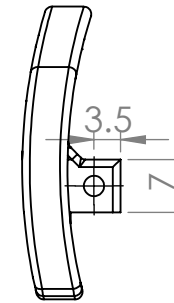
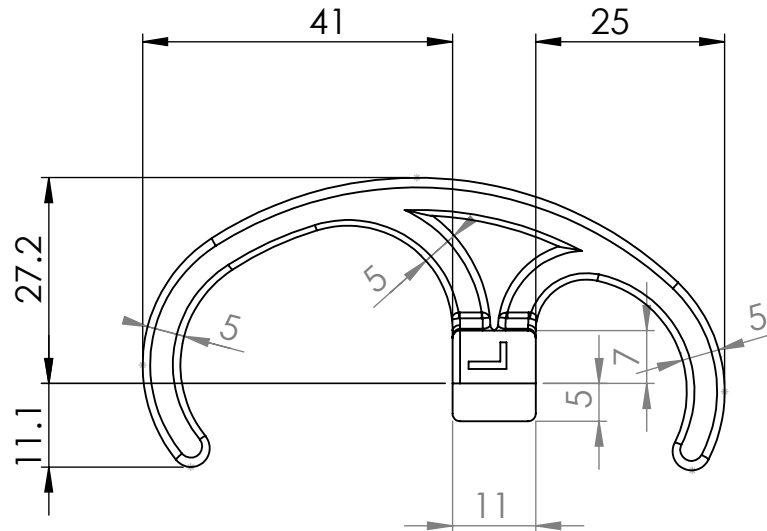
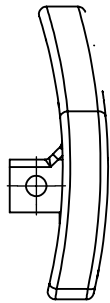
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DATE	7/7/2015	PART #	SD-107
MATERIAL		DESC:	Top Battery Clip
VENDOR		PROJECT:	BeagleMiP
		(765) 327-8527 James@StrawsonDesign.com	SHEET 6 OF 14



Left skid attaches to the top left two mounting holes on the Robotics Cape and BBB. It serves to protect the electronics in the case of a fall. The user should consult the included 3D cad models for curvature geometry. Important dimensions are given here.



1mm fillet necessary to clear solder on BBB

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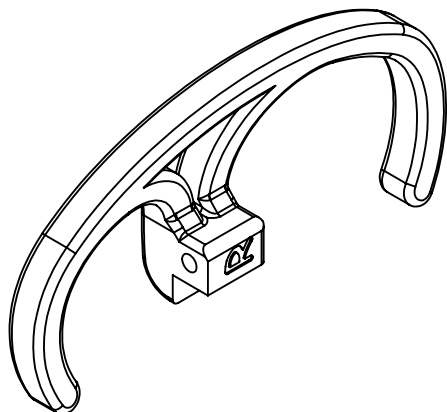
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TWO PLACE DECIMAL $\pm 0.05\text{mm}$

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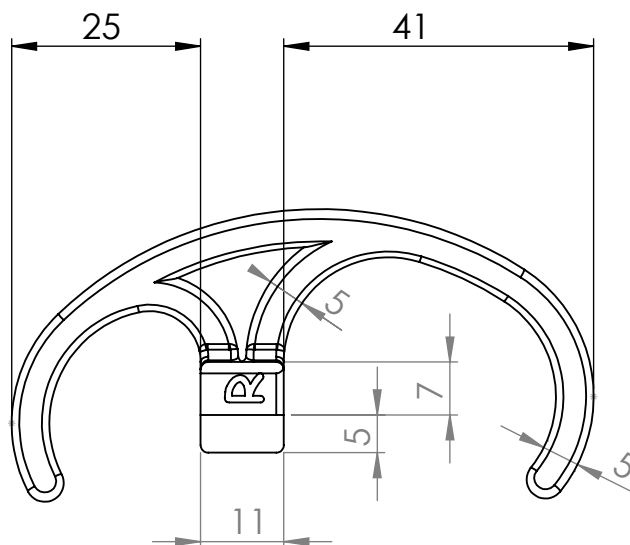
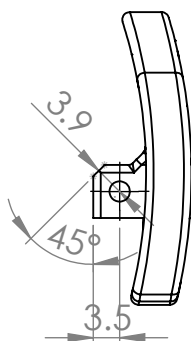
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SIZE: 8.5" x 11"

DATE	7/7/2015	PART #	SD-109
MATERIAL		DESC:	Top Skid Left
VENDOR		PROJECT:	BealgeMiP
			(765) 327-8527 James@StrawsonDesign.com
			SHEET 7 OF 14



The right skid here is almost a mirror copy of the left skid except for the 45 degree chamfer specified in the leftmost view. This is important as it clears a connector on the BeagleBone.



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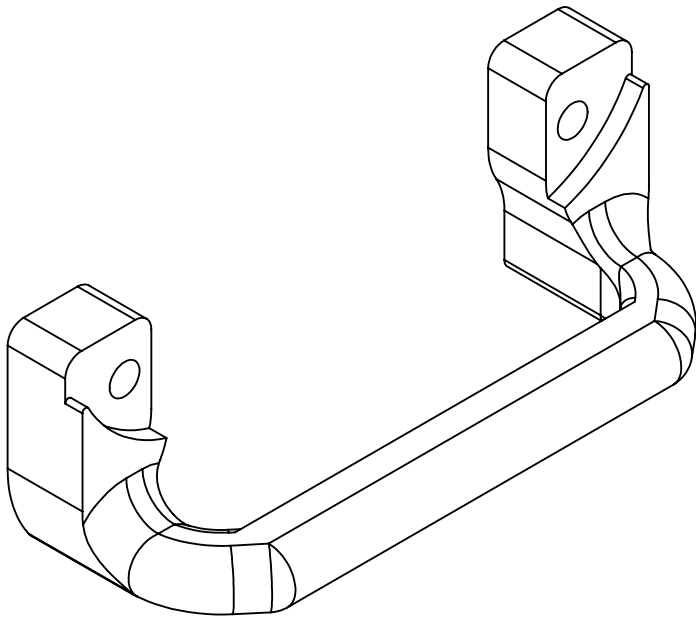
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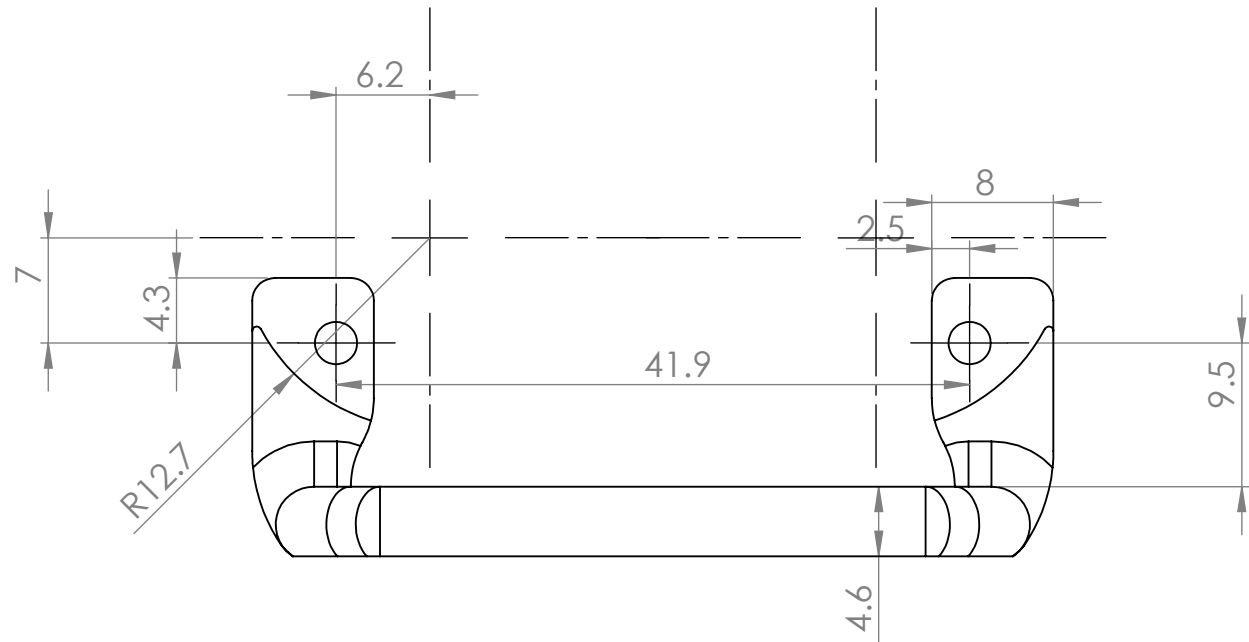
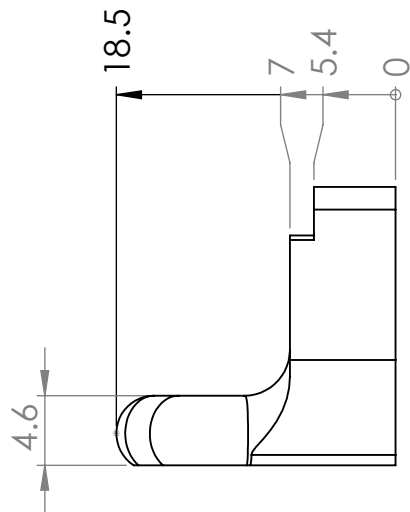
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SIZE: 8.5" x 11"

DATE	7/7/2015	PART #	SD-110
MATERIAL		DESC:	Top Skid Right
VENDOR		PROJECT:	BealgeMiP
		(765) 327-8527 James@StrawsonDesign.com	SHEET 8 OF 14



The Lower front bumper mounts to the bottom two mounting holes of the Robotics Cape and serves to protect the encoder and motor connectors. Note that the crossbeam has been lowered to improve clearance to the connectors since the initial concept drawing.



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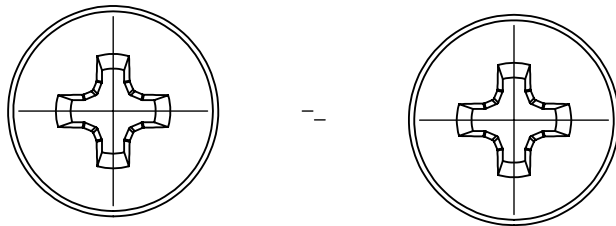
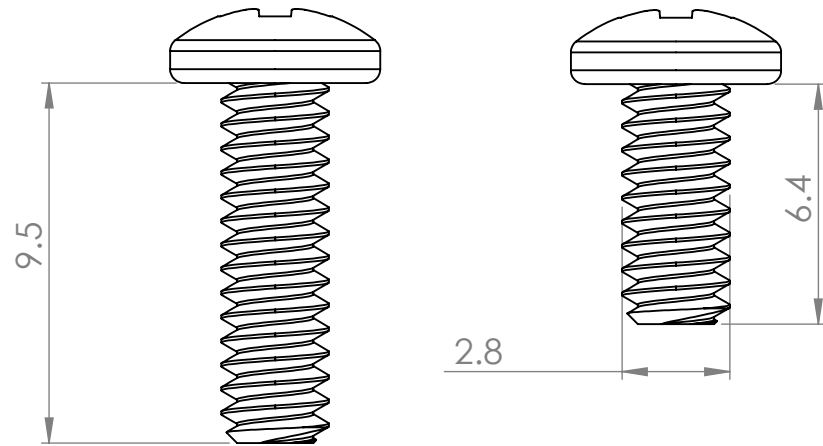
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SIZE: 8.5" x 11"

DATE	7/7/2015	PART #	SD-111
MATERIAL		DESC:	Lower Front Bumper
VENDOR		PROJECT:	BealgeMiP
			(765) 327-8527 James@StrawsonDesign.com
			SHEET 9 OF 14



For the 3D printed prototypes we use only 3/8" and 1/4" long 4-40 thread button head cap screws with #2 philips heads. Even though the rest of BeagleMiP is designed around a metric standard, 4-40 thread self-taps very well into 3D printed PLA. As a result, all screw holes given in the 3D Cad models are for this size screw.

The initial test pieces provided by WowWee came with very nice self-tapping screws which are perfectly fine as long as the screw holes are sized to match.

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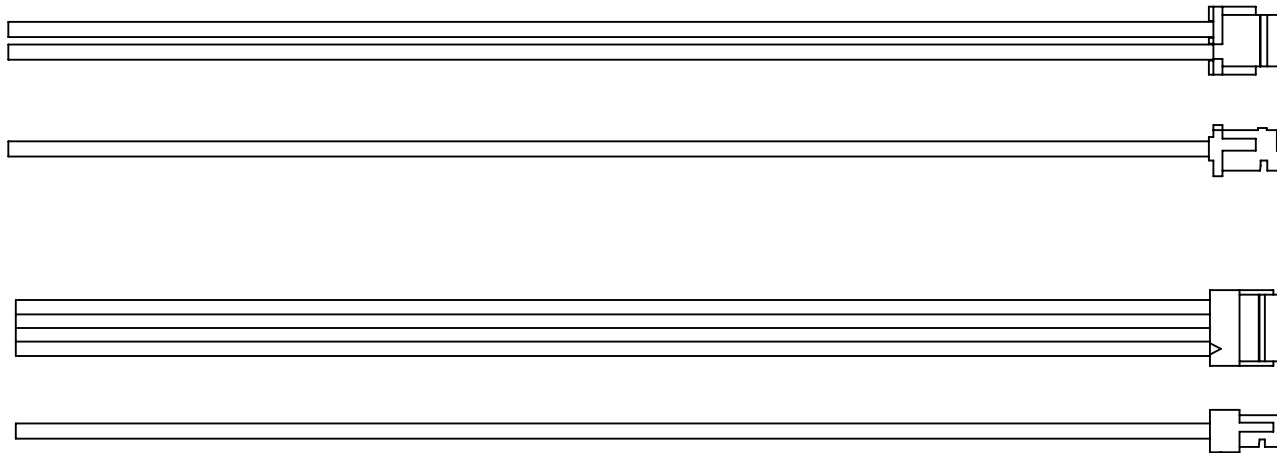
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DATE	7/7/2015	PART #	
MATERIAL		DESC:	4-40 3/8" BHCS
VENDOR		PROJECT:	BeagleMiP
		(765) 327-8527 James@StrawsonDesign.com	SHEET 10 OF 14

BeagleMiP requires two pairs of pigtails to operate which may be soldered by the end-user as part of kit assembly or soldered by WowWee, I leave this decision to WW.

The first pair are 2-pin ZH connectors with 100mm leads not including the length of the connector. One is meant to be cut down by the user to 50mm and the other left at 100mm length before stripping and soldering to motors. Pin 1 is red and pin 2 is black. 26AWG wire should be used.

The second pair of pigtails are 4-pin JST ZH connectors with 100mm leads not including the length of the connector. One is meant to be cut to 50mm by the user and the other left at 100mm before stripping and soldering to the encoder boards. Pin 1 is brown, Pin 2 is Red, Pin 3 is orange, and Pin 4 is yellow. These correspond to Ground, 3.3v power, signal A, and signal B respectively. 28 AWG wire should be used.



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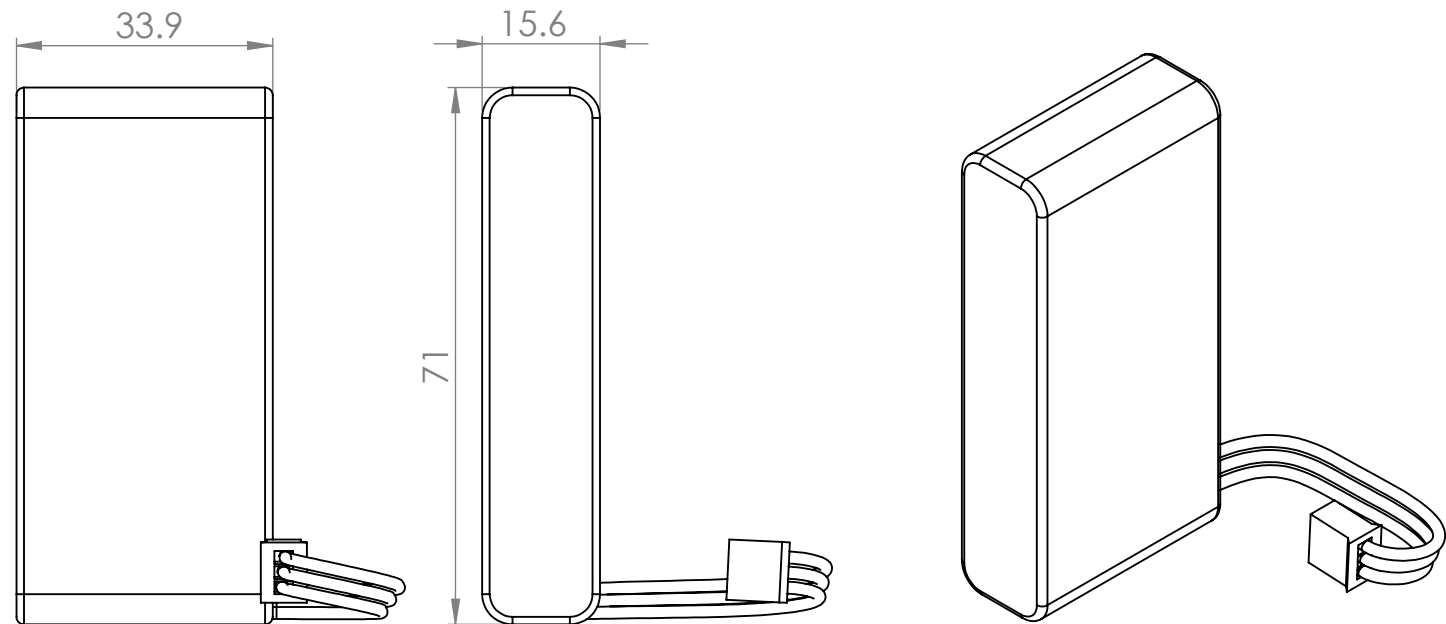
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DATE	7/7/2015	PART #	
MATERIAL		DESC:	100mm Pigtail for Encoders
VENDOR		PROJECT:	BeagleMiP
		(765) 327-8527 James@StrawsonDesign.com	SHEET 11 OF 14

We use Turnigy Nanotech 2S 1300mah LiPo batteries sourced from HobbyKing.com
WowWee is encouraged to find a cheaper supplier which allows for custom connectors and wire length.

NOT SHOWN HERE is the XT60 connector that comes attached to these battery packs which we do not use. To keep the connector out of the way, our prototype SD-107 Top Battery Clip has an extra XT60 connector clip integrated. The Robotics Cape charges and discharges through a standard JST XH 3-pin 'balance' connector. These turnigy packs have 50mm leads between the battery edge and base of the connector. 55mm is preferred with a tolerance ± 5 mm.



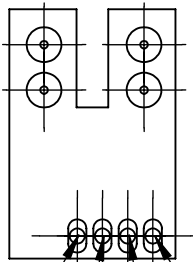
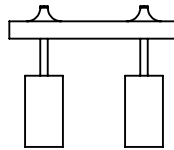
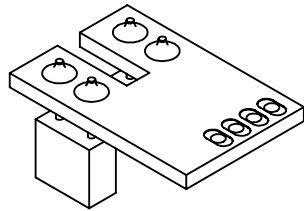
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DATE	7/7/2015	PART #	
MATERIAL		DESC:	Turnigy Nanotech 1300mah 2S
VENDOR		PROJECT:	BealgeMiP
		(765) 327-8527 James@StrawsonDesign.com	SHEET 12 OF 14



Signal B

Signal A

Ground

3.3V

These are the extended encoder boards provided by WowWee for the 2014 BeagleMips. They are identical to the production MiP boards with the addition of passive components necessary to generate two square wave output signals. The user is instructed to solder the included 4-wire pigtails to these boards during assembly.

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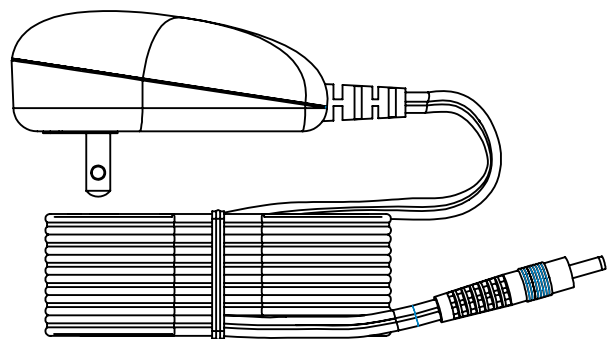
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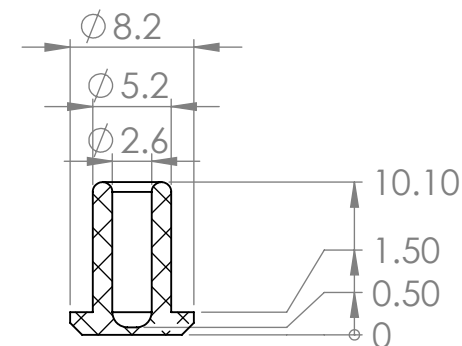
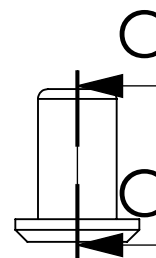
SIZE: 8.5" x 11"

DATE	7/7/2015	PART #	
MATERIAL		DESC:	WW encoder with transistors
VENDOR		PROJECT:	BeagleMiP
		(765) 327-8527 James@StrawsonDesign.com	SHEET 13 OF 14

Included Accessories



12V 1A DC power supply with 5.5mm center-positive barrel connector. At least 1m wire length preferred.



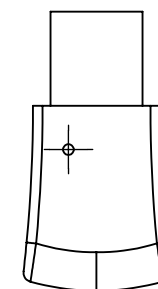
SECTION C-C
SCALE 2 : 1

SD-105 DC Plug serves to plug the BeagleBone's 5.5mm 5V input to prevent the 12V DC supply from being accidentally plugged into the wrong socket.



Philips screwdriver. This is for visual representation only, it does not have to look like this. It should be a good fit for the screws chosen for the rest of the kit.

USB Bluetooth Dongle is NOT INCLUDED with the initial run of 1000. Once a compatible unit is found we can start including them with production units.



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