

# ARB Accessory Controller, ECU specification

## Overview

The ARB Accessory Controller is a system for controlling and monitoring various vehicle accessories such as switching on and off lights, and monitoring pressure transducers. The system is composed of two main parts: a touch screen graphical user interface (GUI), and an electronic control unit (ECU). The GUI provides the user with a dashboard / switchboard to display the on/off state of the accessories and allow the user to switch them. The ECU is the brains of the system, it communicates with the GUI, electronically switches the accessories, stores the states of all accessories. The interface between the ECU and the GUI is USB and Bluetooth, the command structure is basic serial messaging structure.

## Scope

This covers the design of the ARB Accessories Controller ECU and gives specific technical requirements and implementation details.

## Electrical General Specifications

This covers the electrical specifications that apply to the unit as a whole.

Item	Specification
Input battery voltage range	9VDC to 16VDC for normal operation
Load dump	Load dump tolerant
Cranking voltage	Crank voltage of 6VDC for 1 second with no reset to the MCU. Tablet and output load dropout is acceptable.
Reversed battery	The system is tolerant of a reversed battery for a period of 1 minute. Load activation during reversed battery is allowable.
Short Circuit	All inputs and outputs shall not be damaged by either short circuit to battery or ground with the exception being ground pins being shorted to battery.
Quiescent current	There is no requirement for a specific quiescent current.
Loose battery terminals	Momentary interruption in power supply (loose battery terminal). The module shall not reset for battery dropouts less than 50ms no more frequent than every 2 seconds.
Fusing	The unit is not fused. It relies on upstream fusing.
Battery connections	6.3mm spade terminals
Total current	<20A

## Outputs

Item	Specification
Output count	25 (excluding brake PWM)
Load maximum power	5W per output
Load inductive energy	6mJ maximum It is assumed that the outputs primarily drive relays.
Inrush current handling	Not required
Fault diagnostics	Not required
Short circuit handling	Tolerant of short circuit to ground
Short to battery	This can back feed through and power the unit
Proportional trailer brake PWM output	12VDC, 100W, PWM approx. 100Hz

## Digital Inputs

Item	Specification
Input count	8
Input Voltage low	<0.5VDC
Input Voltage high	>4.5VDC
Wetting current	5mA nominally
PWM voltage tolerant	On High Beam, Low Beam and Reverse 100Hz maximum PWM rate 20Hz minimum PWM rate

## Analogue Inputs

Item	Specification
Battery monitor input count	2 external and 1 internal from the battery in
Battery monitor input range	0-15VDC
Battery monitor accuracy	Error less than 5%
5V Analogue input count	7
5V Analogue input power feed	0.5A maximum
5V Analogue input range	0-5VDC

## Communications

Item	Specification
USB	USB2.0
USB connector type	Type A female connector
USB 5VDC charge current	1.4A maximum
RF	Bluetooth V4.0 compliant, SSP profile, client/slave

## Environment

Item	Specification
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Temperature range	-10C to +60C
Water proofing	Not required
Conformal coating	Not required
Enclosure	Custom plastic injected moulding
EMC susceptibility	Automotive transients present on power supply, inputs and

### Certifications

Item	Specification
Bluetooth module	Must have type test and on board antenna
EMC	CISPR 22:2009 + A1:2010 Class B (primary EMC requirement) AS/NZS 4268 (Bluetooth for modules on PCB – no RF paths outside module)

### FCC Part 15.19 Caution:

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
  - (1) this device may not cause harmful interference and
  - (2) this device must accept any interference received, including interference that may cause undesired operation
2. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.
3. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

### IMPORTANT NOTE:

#### FCC Radiation Exposure Statement:

**This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.**

### FCC Statement in User's Manual (for class B)

#### FCC Section 15.105

##### "Federal Communications Commission (FCC) Statement"

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

# ARB Product Testing

30/01/2017

Kit Contents:

1 x Controller



1 x Display



1 x USB Cable



1 x Power Cable



1 x Interface Cable (used for ARB Air Locker & Air Compressor connectivity – sold separately)



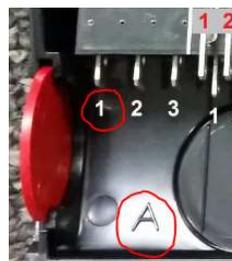
Running the system via USB connection:

1. Expose the connection points of the controller by pressing inward on the terminal cover and pulling upward as below.



2. Connect the controller to 12V DC power by attaching the positive lead to terminal A1, and the negative terminal to A2.

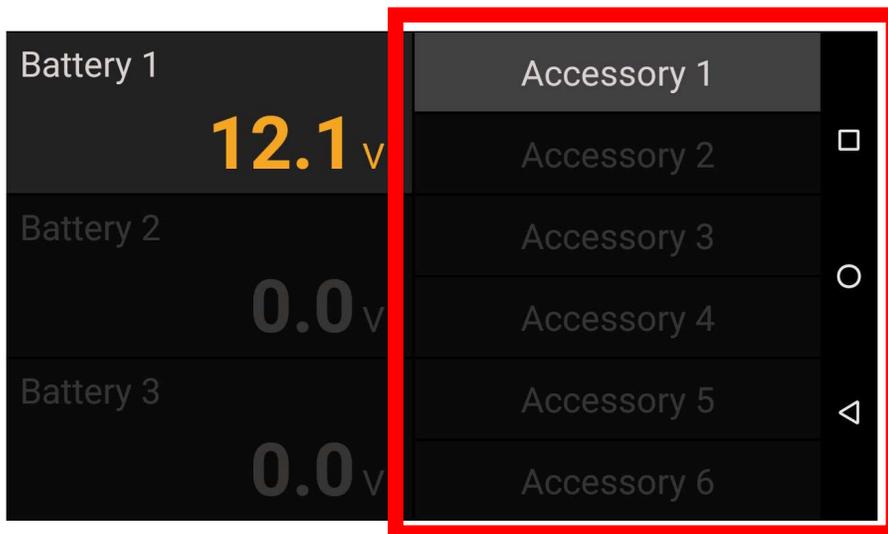
Note: All terminals are designated with a letter and a number according to the diagram.



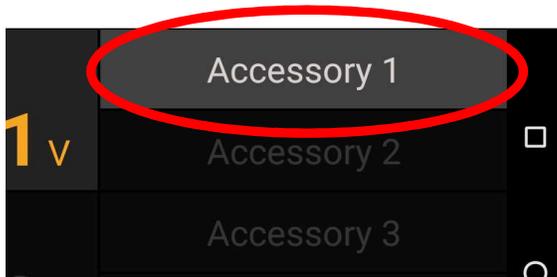
3. Connect the USB cable between the Micro USB 'B' port of the display and the USB 'A' port of the controller.



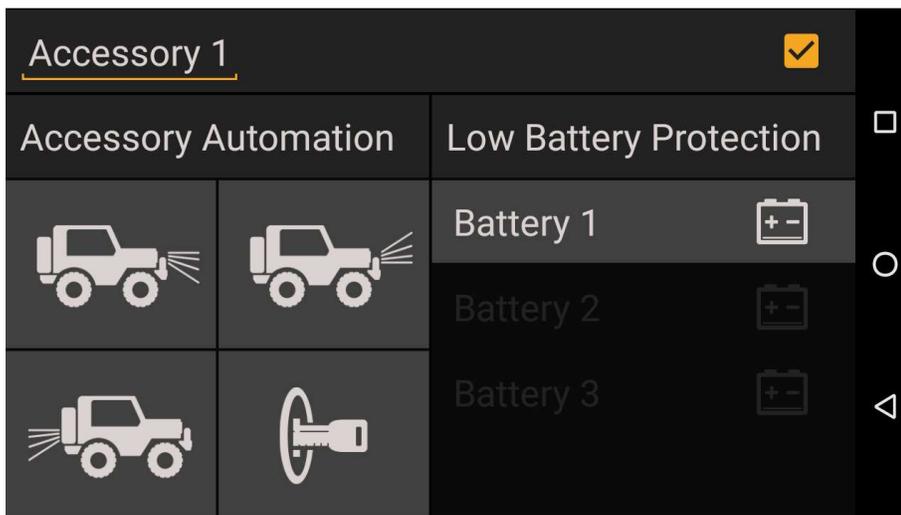
4. Switch on the display by long-pressing on the ON BUTTON as above. The display may take a few minutes to boot up.
5. The ARB app should automatically launch very shortly after the display boots up.
6. Once the app loads, use 1 finger to scroll up or down on either half of the screen until you get the 'switchboard module'. It will look like the pic below.



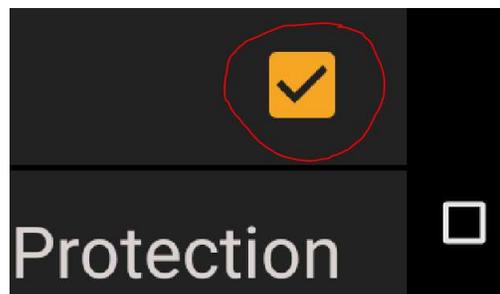
7. Long press on 'Accessory 1' (as below) to go to the settings page.



It should look like the pic below.

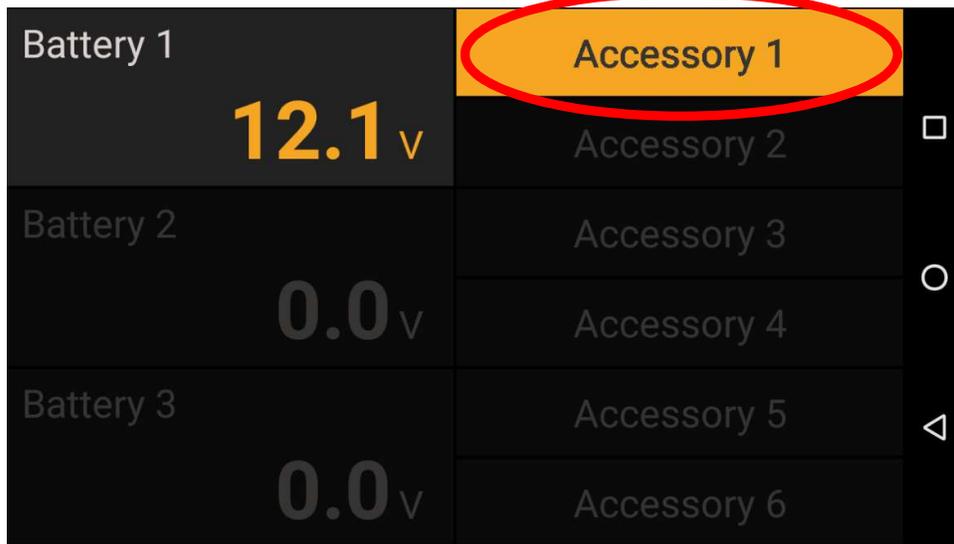


8. Press on the check box to activate Accessory 1 (with a tic mark). If it is already ticked then nothing need be changed.



9. Press the back button (triangle on the right hand side) to return to the switchboard.
10. Using a multimeter, test for DC volts between A2 and C3. It should read zero.

11. Turn on Accessory 1 by pressing it (short pressing only). It should highlight to indicate that it is now ON (as below).



12. Using a multimeter, test for DC volts between A2 and C3. It should read approx. 12V.

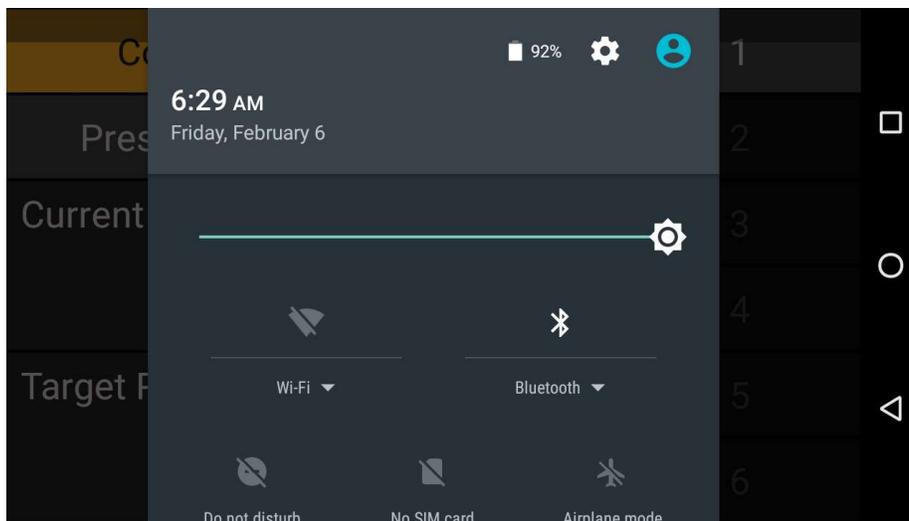
This concludes the USB connection and function test.

Running the system via Bluetooth connection:

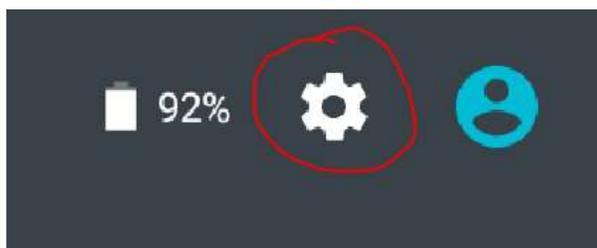
1. Disconnect from USB connection with the controller by unplugging the Micro USB 'B' terminal from the display. The app will revert to a connection screen as it looks for another connection.



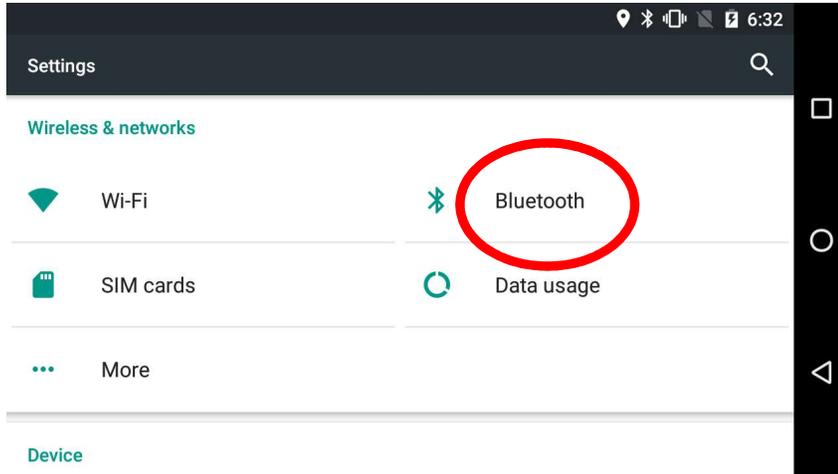
2. Swipe down from the top border of the screen 3 times. You should now see the screen below.



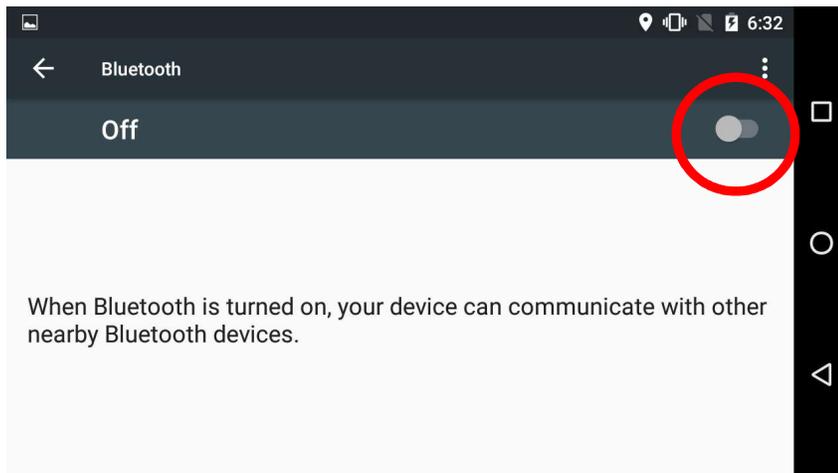
3. Press the settings button.



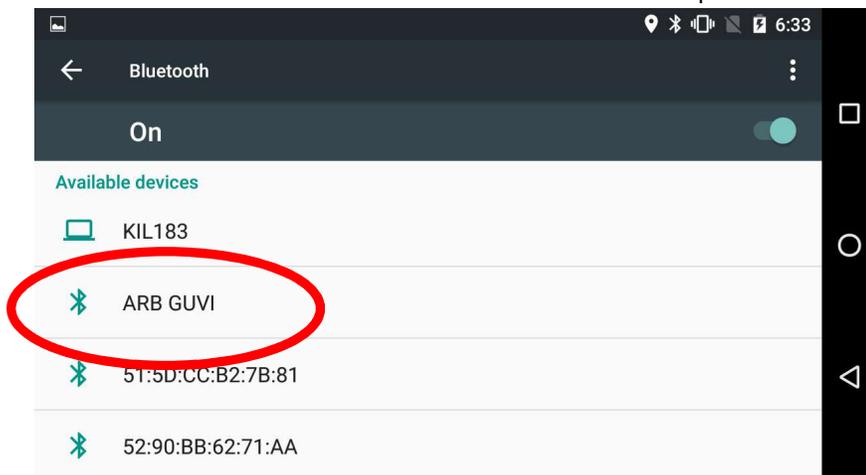
4. Press Bluetooth.



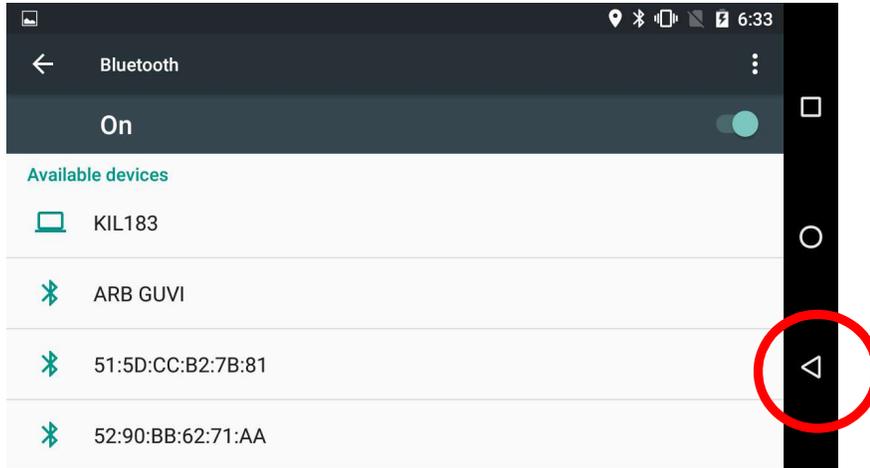
5. Turn Bluetooth ON.



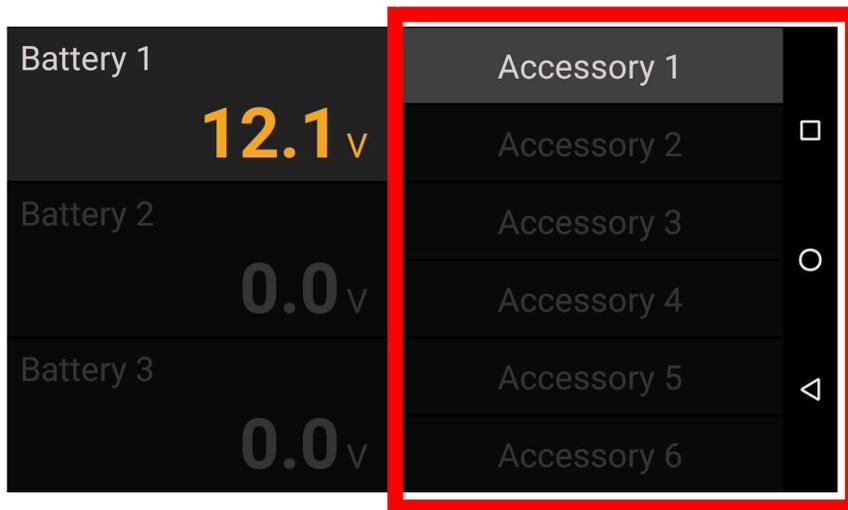
6. ARB GUVI should be available in the devices list. Press it to pair with the controller.



7. Once paired you can press the back button until you get back to the app.

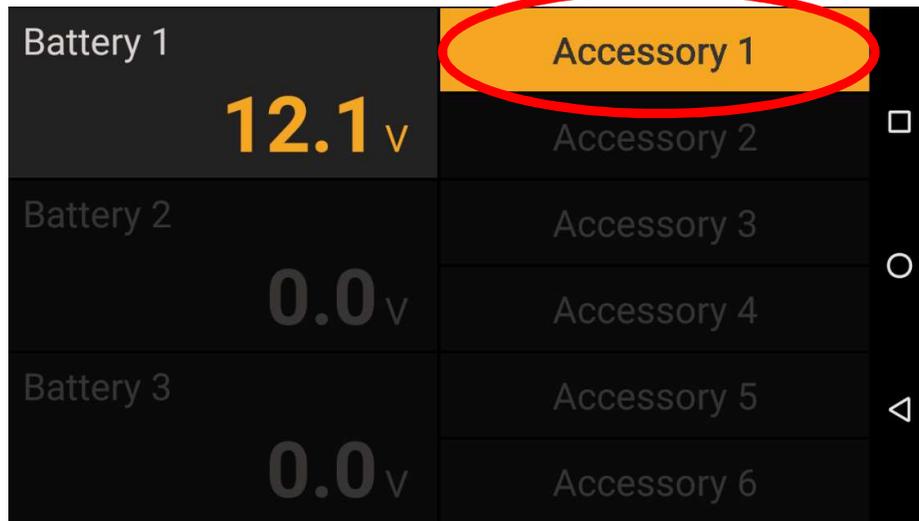


8. Once the app loads, scroll up or down on either half of the screen until you get the 'switchboard module'. It will look like the pic below.



9. Using a multimeter, test for DC volts between A2 and C3. It should read zero.

10. Turn on Accessory 1 by pressing it (short pressing only). It should highlight to indicate that it is now ON.



11. Using a multimeter, test for DC volts between A2 and C3. It should read approx. 12V.

This concludes the Bluetooth connection and function test.