Arduino Anti-theft Vehicle Device / AVAD Technical Manual

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1. Installation

1.1 Sim card installation

On the back of the AVAD there is a sim card tray. Push the tray forward and then open the tray and insert a sim card. Make sure the sim card lines up with the connections on the sim tray. When inserting the sim card, ensure that there is no pin code on the card and make sure that you have the number of the sim card written down as this will be needed later.

1.2 Positioning antenna

There are two antennae used by the AVAD. A GPS antenna for location and a GSM antenna for mobile connectivity. It is essential that the GPS antenna has a good view of the sky in order to get a fix on its location. As a result the optimal position for the antenna to be placed is in the front windscreen above the dash.
This is also a good location for the GSM antenna as it will also ensure that the antenna can acquire a good signal with the least interference.

1.3 Power source

The AVAD needs to be wired into the car in order for it to receive power. The way to do this is to acquire a cigarette lighter, a double usb cigarette lighter adapter and the adequate cables. The AVAD should be wired to ‘switched power’ in the car so that it won't run the battery down of the car when the car is not running. Switched power is a power source that is only active when the keys are in the ignition of the vehicle.

1.4 Selecting location

The idea of the AVAD is to remain undetected in the case of a theft of a vehicle. As a result it is recommended that the AVAD be placed inside the dash of the vehicle well hidden in order to remain hidden and unnoticed. The wires for the antennae can then be snaked through the dash to their mounting positions in the windscreen

1.5 Ensuring phone compatibility

The AVAD is currently aimed at androids and must have an SPP bluetooth profile manager installed. These are available for free in the app store. An example of one is this https://play.google.com/store/apps/details?id=at.rtcmanager&hl=en_IE . Once installed simply enable anytime SPP server connection.

1.6 Ready to go

Ensure that once plugged in the LEDs light up. If this happens you are ready to go!

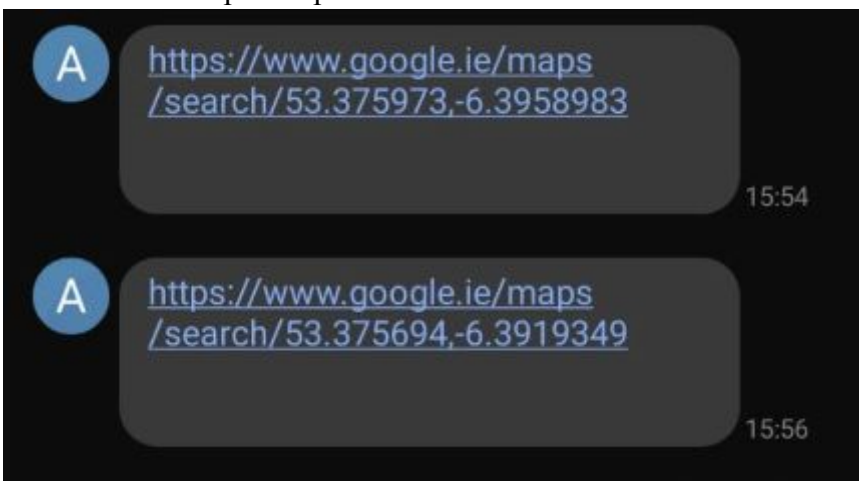
2. User Guide

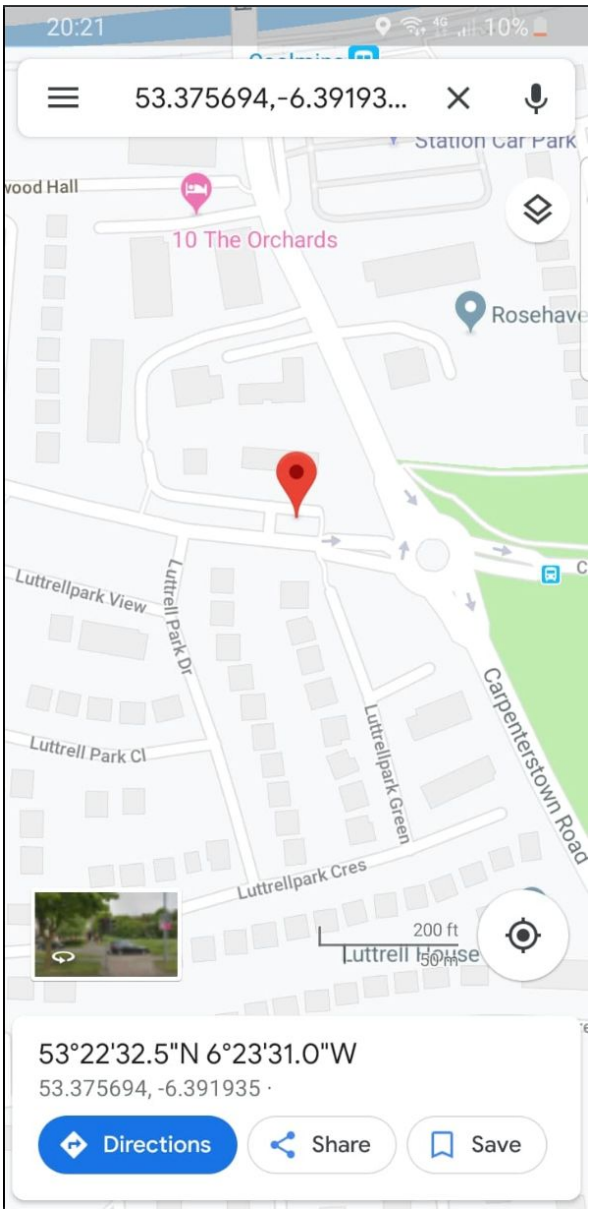
2.1 What is 'The AVAD'?

The AVAD is an arduino vehicle anti-theft device. It alerts a vehicle owner to the theft of their vehicle. The AVAD provides GPS tracking through text messages enabling a stolen car to be tracked. The aim of the AVAD is to help a vehicle owner recover their vehicle when it has been stolen.

2.2 How does it work?

The AVAD works by using GPS coordinates to determine the location of the vehicle. If the AVAD detects that the the vehicle is moving and the users device has not connected to the AVAD through bluetooth, it then determines that the vehicle has been stolen and will text the owner periodic updates of the location of the vehicle in the form of google maps link. This link will open google maps (if installed) when pressed. The vehicle will be shown as a red marker on the map. The position of the vehicle would then aid in the recovery of the vehicle.





2.3 Initial setup

Setting up the device begins with a text message. The text message consists of the word "setup" followed by a space and a four digit pin specified by the user. It is not recommended to set the pin to 0000 or 1234. Pick something that is unlikely to be guessed by another person. An example message is "setup 3254". Send this message to the number of the sim card installed in the AVAD.

The AVAD will then begin to setup the device. It will store the number which you have texted from as the user or owner of the car and will store the pin. The AVAD will begin to search for bluetooth devices. It will attempt to initiate a connection with all bluetooth devices found. In order to allow the AVAD to find your device you must make your device discoverable.

When the AVAD finds your device it will try to initiate a connection with it. It will prompt you for a passcode. This passcode will be the passcode that you entered when you sent the setup text message.

Once paired with your phone the AVAD will connect to your phone and will turn off the red LED to indicate that the device is no longer in setup mode and turn off the blue LED to show that the AVAD has connected to a bluetooth device. After this process has been completed once, the AVAD will quietly check for your bluetooth device, without and user input, every time you start your vehicle to ensure that it is you operating the vehicle.

2.4 Modes

2.4.1 Setup mode

In this mode the AVAD is waiting to be setup. It does nothing until it is sent a setup text. All three LEDs will be lit when this mode is active.

2.4.2 Waiting mode

In this mode the AVAD has been setup and is waiting for a bluetooth connection to send the device into safe mode. Alternatively if the AVAD detects that the car has started to move it will send the device into stolen mode. In this mode the red LED will not be lit while the blue led and the green LED will be lit.

2.4.3 Stolen mode

In this mode the AVAD will send a text message to the owner of the vehicle with up to date coordinates every minute. Similarly to waiting mode, the red LED will not be lit while the blue led and the green LED will be lit.

2.4.4 Safe mode

In this mode the AVAD waits for commands sent through text such as a find text message or a reset text message. In this mode only the green led will be lit. The red and blue LEDs will not be lit.

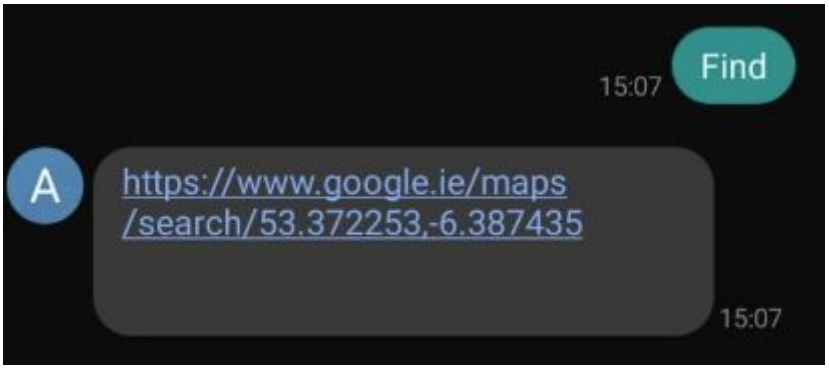
2.5 Commands

2.5.1 Setup

Sending a text message “setup 0000” to the AVAD will result in the AVAD initiating the setup of the device, unless the device is already setup. The ‘0000’ should be substituted for four user chosen digits.

2.5.2 Find

Sending a text message “find” to the AVAD will result in the AVAD texting the owner the location of the vehicle in the form of google maps link. This link will open google maps (if installed) when pressed. The vehicle will be shown as a red marker on the map.



2.5.3 Silence

Sending the text message “silence” to the AVAD will result in the AVAD not sending text messages unless a find command is sent to it.

2.5.4 Unsilence

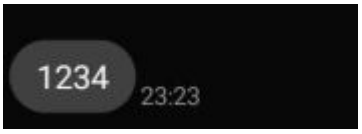
Sending the text message “unsilence” to the AVAD will result in the AVAD re-enabling text messages sent from the AVAD.

2.5.5 Reset

Sending the text message “reset” to the AVAD will restore the AVAD to its factory defaults. This will wipe stored user data. As a result it is wise to keep the phone number of the sim card installed in the AVAD confidential.

2.5.5 Help

Sending the text message “help” to the AVAD will result in the AVAD sending a text to the owner of the car with the pincode.



2.6 Day to day running

To ensure smooth day to day running of the AVAD it is recommended to keep your devices bluetooth turned on or to remember to turn it on before driving your vehicle. This will ensure that no mistake text messages are sent to your device. It will also keep costs down as less text messages will be sent.