"Amethyst"

Performance Mappable Ignition System

Quick Installation Guide

Revision 1.0

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Disclaimer

Severe engine damage can result if ignition timing is either excessively advanced or excessively retarded. Aldon Automotive can accept no liability for injury or damage to property resulting from the use of this product.

We strongly recommend that you use the data in your car's workshop manual as the starting point for centrifugal and vacuum advance settings, and only deviate from these settings cautiously and in small steps. If you are not 100% confident in your ability to set the timing correctly, you should entrust this work to a reputable garage.

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About this guide

This guide is a summary of the steps needed to install and configure the Amethyst mappable ignition unit in your car. It is intended to be read in conjunction with the full Amethyst instructions, which can be downloaded from our website. The page references given at each step refer to the full instructions.

Unit description

The Amethyst unit has five *wires*: power (red), earth (thick black), distributor input (green), coil output (yellow) and immobiliser/map select (thin black with blue sleeve).

The *LED* indicates the state of the Amethyst unit, as follows:

- start mode (with the engine stopped, or cranking over): LED is on when the coil is on (e.g. points closed), off when the coil is off. The LED will flash on and off as the engine is cranked over.

- run mode (normal operation, computing advance): LED is off.

- rev limit: LED is on.

The projecting pipe is a *manifold pressure sensor* which measures inlet manifold vacuum, or pressure is your Amethyst is a boost version. If your Amethyst is a throttle position sensor (TPS) version, the sensor is replaced with three wires which go to the TPS.

The *USB port* is used to connect the Amethyst to a PC (Windows XP, 7 or 8).

Part A: Installing Amethyst

Step 1: Check whether Amethyst suitable for your car (page 3)

Amethyst is not suitable for use with coils of less than 1.5 ohms resistance.

Amethyst is suitable for engines with *equal firing intervals* only. Nearly all engines are suitable, but not V-twins, V4's or some V6's.

Amethyst is suitable for 12v negative earth only.

Step 2: Lock the centrifugal advance mechanism (page 4)

Because Amethyst calculates ignition advance electronically, the existing centrifugal advance mechanism needs to be disabled. This can be done with light extension springs or with lock wire.

Fig. 1. Advance mechanism locked using springs

We recommend that you lock the centrifugal mechanism in the fully advanced position, as shown above, since this is the natural position for the advance weights.

If you are using Amethyst with the original points, discard the condenser.

Step 3: Mount Amethyst (page 5)

Mount the Amethyst unit in a convenient position in the engine bay or inside the passenger compartment. The unit should be mounted well away from sources of

moisture, heat and electrical interference. Preferably, it should be mounted fairly high up in the engine bay, well away from road dirt, and not too close to the exhaust, coil or HT leads.

Step 4: Connect Amethyst wires

Connect the wires as shown in the diagram below. The immobiliser/map select wire (thin black, with a blue sleeve) may be left unconnected if you do not intend to use these features. Note that *the unit may be destroyed if the wires are connected incorrectly.*
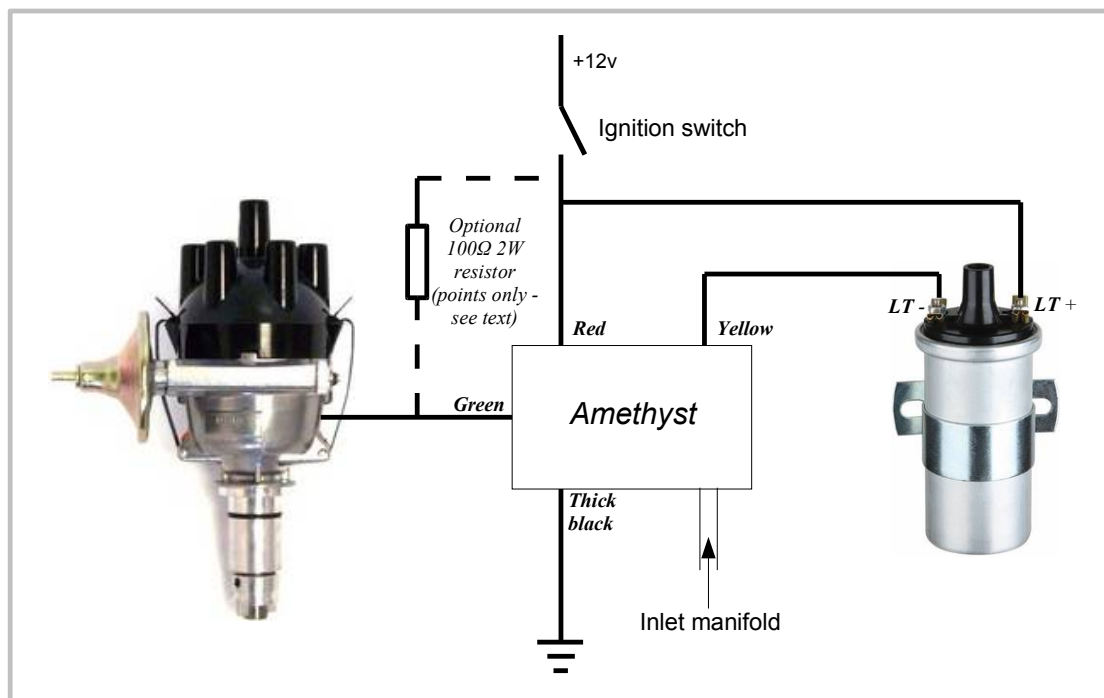

Notes

(a) If you are using Amethyst in combination with an Aldon Ignitor, connect the green wire from the Amethyst unit to the black wire from the Ignitor. (page 6)

(b) If you are using points, the green wire should be connected to the contact breaker. If you are using points, we recommend that a 100 ohm resistor (supplied) be connected as shown above.

(c) If you are using an optical trigger such as Lumenition or Piranha, refer to Appendix D in the full instructions.

(d) If you are using a reluctor, include a type 1N4004 diode (or higher specification, e.g. 1N4005, 1N4006 or 1N4007) as shown below: (page 7)
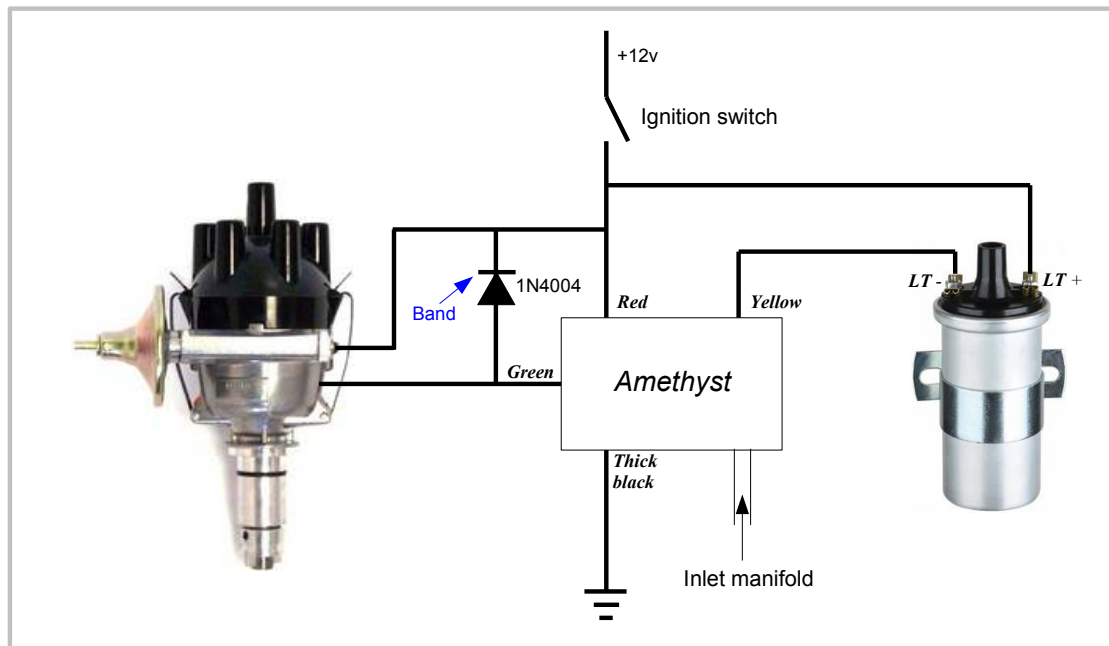
(e) If you intend to use either the immobiliser or the map select feature, connect the thin black wire to +12v via a suitable switch.

Step 5: Connect vacuum pipe or throttle position sensor (page 8)

If you are using vacuum advance, or measuring boost on a supercharged engine, connect a length of vacuum pipe from the vacuum take-off on the inlet manifold to the manifold pressure sensor on the Amethyst unit.

If you are using a Throttle Position Sensor (TPS), connect the multi-way connector from the Amethyst unit to your TPS.

Step 6: Set the static timing

Note that this step cannot be carried out if your distributor is fitted with a reluctor.

(a) Disconnect the yellow lead from the coil.

(b) Remove or loosen the spark plugs to make the engine easier to turn accurately.

(c) Turn on the ignition. The LED will be on when the coil is on (i.e. with the points closed on a traditional system), and off when the coil is off. Adjust the distributor so that the LED turns off just as the engine passes the vehicle manufacturer's specified timing point. Alternatively, you can set the trigger point to top dead centre (TDC) and enter the official static timing figure as an offset (see below).

(d) Re-fit or tighten the spark plugs

(e) Reconnect the yellow wire to the coil LT terminal

(f) Start the engine. The engine will be using the Amethyst unit's default map. Almost immediately, the unit will switch from *start mode* into *run mode* and the LED will go out.

Part B: Configuration

Step 1: Install Amethyst software, and connect Amethyst to the PC (page 10)

Connect the Amethyst unit to the PC via the supplied USB lead.

Connect the USB memory stick to the PC, navigate to USB stick folder and double-click on the "Amethyst Ignition" application. A window will appear showing the Amethyst control panel.

Turn on the ignition, but do not start the engine. Amethyst will only communicate with your PC if the ignition is on.
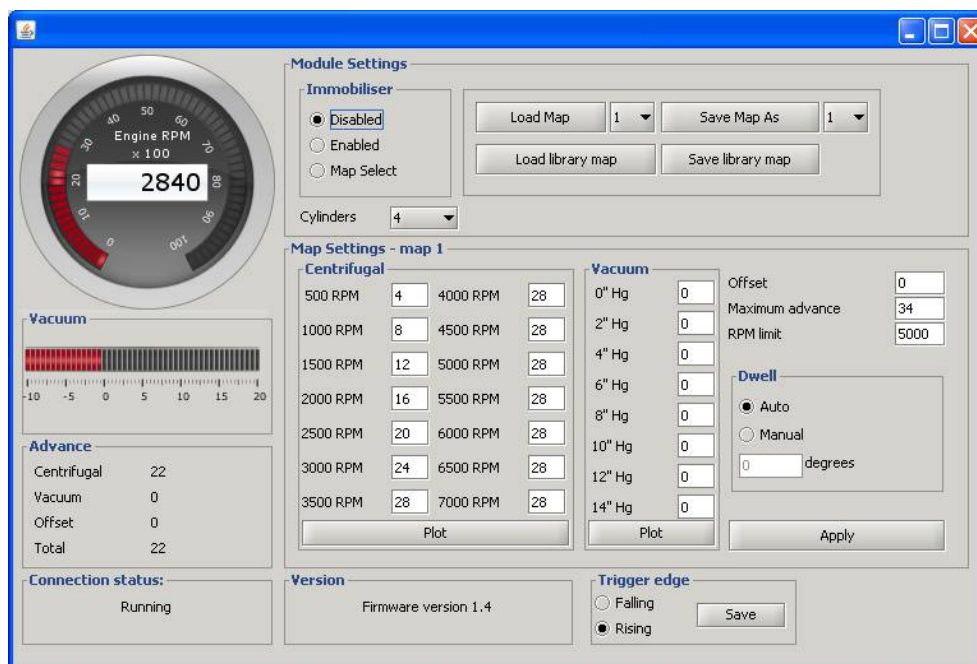
Step 2: Set the number of cylinders (page 12)

The number of cylinders must be correct, otherwise Amethyst will calculate RPM wrongly and therefore look up the advance wrongly. The default figure is four cylinders. If this is wrong, select the correct number from the drop-down list and press "Apply".
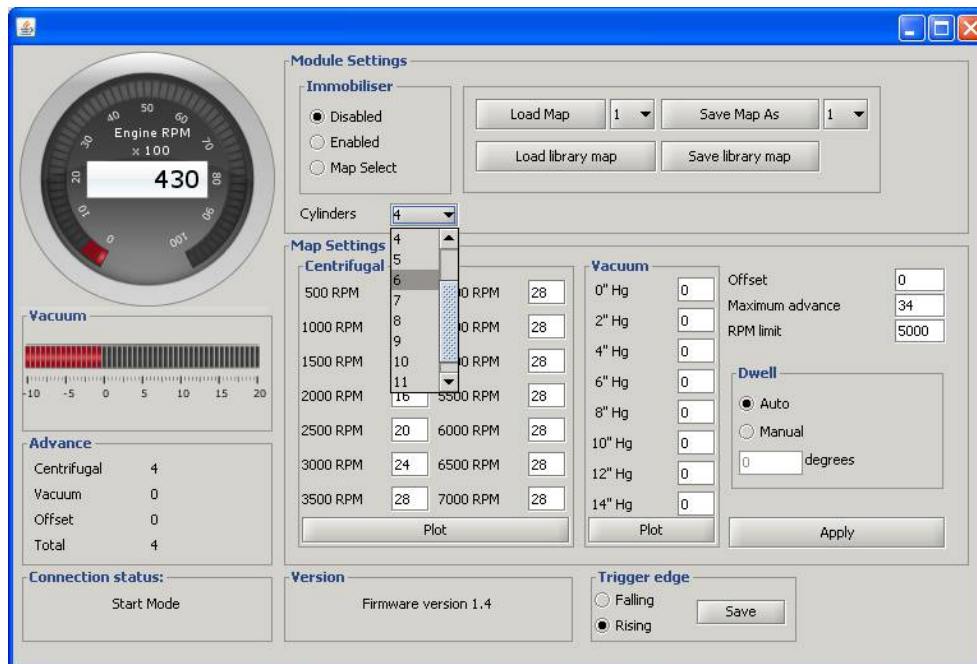
Step 3: Set up the ignition map (page 15)

To make any changes to the ignition map, type in the figures required and press "Apply".

You can change:

- centrifugal advance, at 500RPM intervals from 500RPM to 7,000RPM. Between these points, the advance is interpolated.

- vacuum advance, at 2" Hg intervals between 0 and 14" Hg. If you have a boost type Amethyst, you can set boost pressure instead. If you have a throttle position sensor, the throttle angle is shown.

- an offset, which is applied throughout the RPM range. This is useful for advancing or retarding the entire map without changing its shape.

- the maximum permitted advance, a limit which is applied in case the sum of offset *plus* centrifugal advance *plus* vacuum (or boost, or throttle position) advance adds up to more than a safe amount.

- a rev limit

- the dwell angle. For most applications, you can leave the unit on automatic dwell.

- the trigger edge. Normally, the unit will trigger on the rising edge, when the input goes from 0v to 12v. If it is more convenient with your distributor and trigger to use the falling edge (12v to 0v), you can select this.

Note that the current map will be lost when the ignition is turned off. If you want to save changes to the Amethyst's flash memory, you will have to press "Save map as..." to save it as any of the eight stored maps.

The advance figures are all specified in *crankshaft degrees*. However, the dwell angle is specified in *distributor degrees*.

Note: No vacuum advance is applied below 1,000 RPM. This means that the vacuum sensor can be connected directly to the inlet manifold with no risk of full advance being applied at idle.

For full information on dwell calculation, the immobiliser and map select mode, and library maps, please refer to the full Amethyst instructions.