BRIGHT SPARKS

If there's one modification every classic car owner should make to their cars then it is converting the ignition system over to electronic, advises Robert Couldwell. Here's why

Racing, as the old saying goes, improves the breed and predictably, electronic ignition systems first surfaced in motorsport. During the early 1970s, retro-fit systems were first offered for the road going enthusiast before becoming a standard factory fit on some cars before the decade was out.

Of course all cars now use electronic ignitions and even sticklers for originality will admit it's a good alteration from standard. So if you want to make your classic run better, start more easily and do away with those horrid fiddly contact breaker points that are becoming more pricey and perhaps harder to obtain as the years roll on, then join the electronic age NOW!

MODERN RETRO-FITS

Perhaps the V12 E-Type Jaguar with its Lucas Opus transistorised set up really set the ball rolling, because aftermarket types quickly gained widespread approval back in the early 1970s as a result. Initially these usually consisted of 'capacitive discharge' types which still retained the cb points; the electronic ignition provided a fatter more concise spark, although the more expensive types did away with the points and replaced it with an infra-red beam. Now virtually all electronic ignition systems are of the latter sort as it is far superior.

As far as aftermarket electronic systems are concerned, it was the Autocar Electrical Equipment Company who pioneered the reliable application of electronics to vehicle ignition systems, actually ahead of major motor manufacturers, when the then Managing Director, Eric Ford (father of the current one) came up with the idea of replicating the function of contact breakers by using a unique, patented optical electronic trigger.As a reward for his invention he actually received a Duke of Edinburgh design award. Under the Lumenition brand, systems were developed and sold not only in the aftermarket but also to vehicle manufacturers such as Lotus and Mercedes-Benz who fitted the equipment under licence in the USA. Lumenition systems have even been fitted to light tanks because they were the only systems able to survive on a battlefield.

This optical trigger concept has been developed into the Optronic system in which an infra-red beam is detected by a silicon phototransistor and interrupted by a revolving 'chopper' fixed to the distributor cam with one blade for each cylinder. Unlike some optical systems it is unaffected by light, dirt and dampness. The optical plate replaces the points on the base plate so that speed and vacuum advance are unaffected. The optical switch sends pulses to the power module which, with its internal high power Darlington transistor, charges the coil. The spark timing is determined by the exact positioning of the 'chopper' and the dwell time by the width of the 'chopper' to give variable dwell performance.

There is also the Performance system, which is similar to the Optronic but has a

Why switch over to electronic?

It was a Frenchman, Etiene Lenoir, who invented the spark plug way back in 1860, but it took an American, Charles Kettering to develop the rest of the ignition and electrical system starting with the generator in 1909. In association with Edward Deeds he formed the Dayton Engineering Laboratories Company, or DELCO as we know it today, before going on to invent the first electrical ignition system in 1911 plus the self-starter in 1912. The ignition system became known as the Kettering system. With points, condenser and coil it stood the test of time before gradually giving way to electronic systems over the last 40 years.

It is amazing that this traditional system has lasted so long because it has many disadvantages:

- Contact breaker points wear and erode
- If points get wet, they stop working altogether
- Contact breaker points limit power input to coil
- Distributor mechanical advance and vacuum advance wear causing poor running
- Ignition advance cannot be mechanically adjusted for all variables, especially detonation

On the other hand electronic ignition has many benefits:

- Generally maintenance-free
- Easier engine start on cold days
- Consistent performance (can't go out of adjustment)
- Improved burning of the mixture for greater efficiency and power
- Increased fuel economy
- Faster, smoother acceleration
- Reduced exhaust emissions
- Longer spark plug life
- Accommodates some distributor wear

different power module with variable dwell angle for optimum performance. It is also supplied with a high energy coil which has the added benefit of switching itself off when the ignition is on but the engine not running. This is useful if your radio is wired through the ignition and you want to listen to it when cleaning or working on the car.

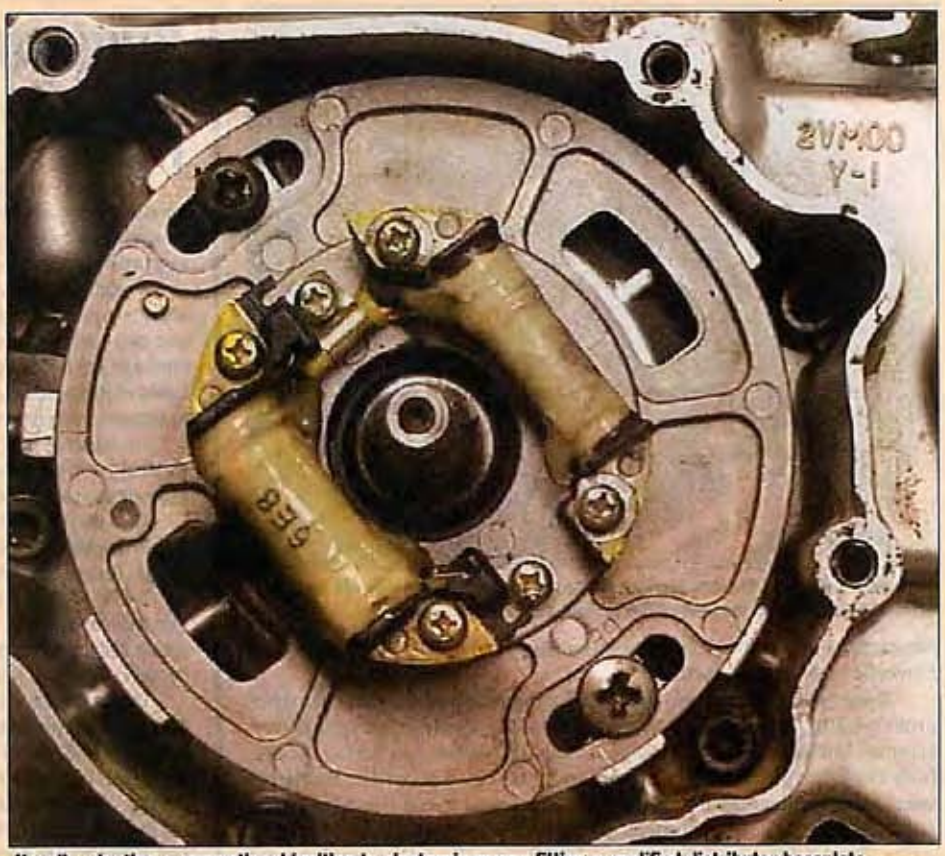
Lumenition also offers a simpler more compact kit called Magnetronic, which is ideal for DIY installation. It is so compact that it is completely self-contained within the distributor cap. Sadly, this system is more limited in applications and tends not to be suitable for older cars or those featuring positive earth.

A real friend to classic car owners is Aldon Automotive in the West Midlands, which is one of the longest-established tuning companies in the UK. It is extremely serious about the business having invested heavily in two fully equipped Rolling Road bays for tuning and fault diagnosis. It also has a service bay complete with ramps, an engine machine shop and engine dyno test cell.

More than 10 years ago Aldon developed the 'Ignitor' for use with not only its tuned road and race cars, but also particularly for the classic owner and restorer. The great advantage of the Ignitor is that it is housed entirely within the distributor cap and is very easy to fit. The last thing classic owners want is a big power unit defacing their carefully detailed engine bays. The Ignitor fits a very wide range of cars whether 4, 6, 8 or 12 cylinders and can probably be adapted for most old cars. This is of particular interest to the owners of rare cars where original ignition parts are no longer available. The Ignitor can even replace some original equipment electronic systems.

A new more powerful 'Ignitor II' has been recently launched. It shares all the same features as the original 'Ignitor', but takes the electronic ignition module one stage further by adding a powerful microcontroller, which controls the dwell period, for the best possible spark over the entire rev range. The 'Ignitor II' should be used in conjunction with the new Flame Thrower II super low resistant coil.

Apart from ignition systems, Aldon also supplies a wide range of tuning and replacement parts. These include an Octane Booster, Weber carburettors, Weber carburettor spare parts and service kits, together with K&N air filters, J.R. air filters, Magnex, Janspeed, Milltek and Peco performance exhausts.



Usually adapting a conventional ignition to electronic means fitting a modified distributor baseplate

The full kit; can also mean a completely new distributor in some cases

It's good-bye to all this as cb points become harder to obtain

Heart of the electronic ignition is this box of tricks. Sports coil (left) useful mod

No matter how good the new ignition set up, worn out components will limit its effectiveness, so give the rest of the system a thorough going over

Magnecor and Spitfire performance ignition leads, NGK spark plugs and Powerflex suspension bushes.

Of particular interest are the high quality Aldon performance distributors which are now fully available and are made from brand new original Lucas or Bosch castings in the UK. Aldon has been successfully modifying distributors for many years and all of the modified specifications have been continually developed using dyno facilities. Aldon Performance Distributors are available from stock for 'A' and 'B' series, Ford X/Flow and Pinto, Ford V6 (Essex), Twin Cam engines and also tuned Triumphs. All Aldon performance distributors are available with the Aldon 'Ignitor' electronic ignition unit fitted.

A third supplier is Newtronic Systems Limited which manufactures electronic accessories for more than 65 makes of car and motorcycle covering more than 1000 models. Formerly known as that well known exponent, Piranha Ignition Systems, it has been designing and manufacturing automotive electronic products for over 25 years. It also designs and manufactures products for other companies under their own brand names.

Located in a purpose built factory as part of a Technology Management Centre, it is ideally situated to take advantage of the latest available technologies. The Newtronic system uses an optical trigger which has the advantage that it can work well at very low speed unlike some magnetic pick up varieties. Newtronic is very customer focussed and will always try to adapt the system to cars not covered in the application list.

USEFUL INFORMATION

Autocar Electrical Equipment (Lumenition): 0207 403 4334 www.lumenition.co.uk

Newtronic Systems (formerly Piranha): www.newtronic.co.uk

Sort out your sparks!

Fitting electronic ignition is a great idea – but it will only perform as well as the rest of the ignition system will allow and with many old worn out classics, that's not too good at all...

So sort out your sparks with a thorough overhaul at the same time, starting with the distributor. A somewhat crude device, electronic ignition will only counteract so much wear; if the spindle, bearings and the auto advance are all clapped out, it will lead to timing scatter and you'll never get the engine to perform right.

A good diagnostic engine tune-up will discover whether the distributor is failing under high revs. If it is, them have it overhauled or replaced (there are specialists who deal solely with distributor repairs) otherwise you're wasting your time and money on any further upgrades. And talking of upgrades, any serious performance tuning of old engines means that the distributor's auto advance usually needs to be re-calibrated with different springs and bob weights.

The higher operating power of an electronic ignition will usually find the weakest link in the system - and it usually means good-bye to tired old ignition leads that may be years out of date.

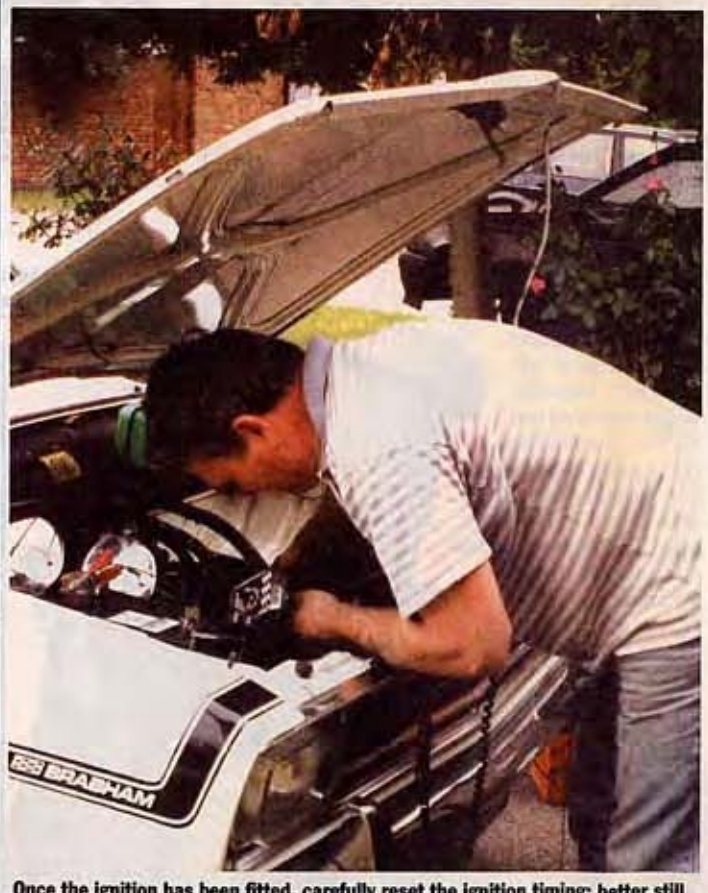
Although you may strike lucky at an autojumble and find NOS (new old stock) carbon graphite period leads, it is almost essential to go for today's silicon type designs to cope best with the added zap!

Talking of leads, remember that any dodgy ignition wiring can lead to a higher than desired resistance in the circuit, resulting in weaker operating voltages. So ensure that the wiring is in good shape and that all connections are sound, tight and corrosion-free if you want to get the best out of it.

The ignition coil usually works or it doesn't. Sports coils used to be very popular back in the old days as they provided a fatter spark (a typical coil would boost the 12v input up to 40,000 volts at the plugs). Sport coils are a lot harder to get hold of in high streets now but you may strike lucky at an autojumble. Ditto second-hand electronic ignitions, although be careful here as you are buying an unknown quantity and they can be more expensive to repair than their worth plus obtaining the base plates to switch over from cb points to a trigger design may prove hard for some engines.

Most classic car enthusiasts use copper-cored spark plugs these days; you can still get cheaper metal cored types but don't be such a stickler for originality! With electronic ignitions you can usually extend the spark plug gap a touch more and so benefit from a fatter spark.

Any of the leading electronic ignition companies will help with additional tuning tips and after fitting, it is probably best to have the car set up on a rolling road to fine tune the engine; in many cases the ignition timing can be individually set for that specific engine under load for optimum effect.



Once the ignition has been fitted, carefully reset the ignition timing; better still have the engine set up electronically - under load on a rolling road if you can