A move into computing

Today's vehicles are a far more complex beast than those of yesteryear

OVER TIME, discussions on the repair of vehicles has moved from one of mechanical to one of computing. Diagnosing a fault used to be about listening, reading the symptoms and trying various things to fix it. Now, this process also involves plugging into the ECU to test, read measurements and sleuth through the wiring network.

This is because an increasing number of parts entering the aftermarket are electronic components. It's no longer a question of just a handful of sensors and one ECU – far from it. Once purely mechanical, products like fuel, A/C and even braking are now controlled by a vehicle's electrical system. With the growth of active safety technologies such as adaptive collision mitigation, cruise control and autonomous driving, the number of components that rely on electrification will continue to increase. Today's vehicles can have up to 50 computers embedded beneath the skin… all communicating with each other through tens of millions of lines of computer code.

Advanced parts

Therefore, electronics are also revolutionising the way that vehicles are serviced and repaired. A visual check and good working knowledge of the system is no longer enough. Technicians need to have an in-depth knowledge of the vehicle's systems and how they interact with each other. For example, when replacing a throttle position sensor, the link between it and the throttle motor needs to be adapted. If performed incorrectly, it can cause issues in related systems such as cruise control and ABS. It's no longer about replacing a part individually, one component can affect another if not diagnosed and repaired properly, because of this, training and ongoing education of such systems is critical.

In addition, workshops are now faced with the challenge of servicing vehicles fitted with everything from start/stop technology to advanced driver assistance systems (ADAS) and even the prospect of maintaining an electric vehicle, which all has an enormous impact on the aftermarket, especially as many of these new components, such as sensors, are intrinsically integrated into the vehicle's engine management system.

The complexity has also increased thanks to drive-by-wire systems. In modern vehicles, the accelerator pedal is generally no longer connected mechanically by a cable or throttle linkage; instead a sensor measures the position of the pedal and transfers this data to the electronic control unit (ECU) so that the throttle is adjusted accordingly. Advantages of sensor technology include smooth and precise activation, which contributes to reduced CO2 emissions, and,

in concert with the ECU, a reduction of wear on the clutch and drivetrain.

Companies that manufacture sensors and electronic management systems are well placed to be able to provide replacement parts and training on such areas. Hella, for example, has experience in multiple areas. One example is in the vacuum pump. According to the company, traditionally, the vacuum required to operate most power-assisted braking systems was generated through the engine's air intake. However, with the surge in new engine design, such as that used for hybrid vehicles and so called 'down-size' engines, the vacuum produced by the engine has become insufficient and electric vacuum pumps have been introduced to ensure the reliable operation of power-assisted brakes.

The interesting part of this statement is around downsized engines and hybrid vehicles. These are markets that are increasing their share rapidly, and part of their appeal is that they can use electronics to control a number of other systems, either for reduced fuel consumption in the case of downsized components, or for energy recovery in the case of hybrids.

Right tools

Delphi believe that having the right diagnostic tool is equally important. Without these, the operation could take much longer, costing garages valuable service time, and potentially be unsafe for technicians. Take a Ford Focus as an example; vehicles fitted with Hill Launch Assist require a procedure to correctly adjust rear drum brakes. As well as helping to diagnose any faults, the use of a diagnostic tool, such as Delphi's DS, provides this capability, ensuring that brakes are adjusted and associated functions operate correctly.

Other companies are developing their diagnostic tools to be able to reach further into a vehicle's electronically controlled systems. Pico, for example, is constantly improving its oscilloscope products to ensure technicians can find faults with ease. Scoping is as big today as it ever has been, due to the need to work with electronics rather than simple mechanical problems.

It is not just the tooling, however, that garages today need to be aware of. The ECU today is the brain of a vehicle, and as such it costs a lot to replace should it fail. Remanufacturing the ECU is a viable alternative. A complex system requires complex understanding, and ACtronics is aware of this. Each product it receives for repair is catalogued and faults are added to its database. This means when another unit comes in, the company may already know how to fix the fault, or in the least, futureproof it by repairing potential faults.

The future

Of course, today's cars may be complex, but how about tomorrow's? We are already beginning to see future technologies in vehicles, in fact, autonomous driving technology is available in some of the cars purchased today, with self-parking systems and adaptive cruise control.

The automotive industry is pushing forward with the introduction of new connected technologies, which will keep cars in constant contact with a server and allow them to be monitored for problems and issues, with potential diagnostic work being done via a wireless connection.

In addition, work on self-driving cars is continuing at apace. Ford plans to release such vehicles on the road in 2020, while Volvo is testing driverless trucks in Sweden, evidenced by a video shown at the IAAF Conference in December 2016. What was once deemed as a flash in the pan or a fad, is now becoming a reality.

The work that goes into these types of vehicles is incredibly complex, and at their base is a series of intricate electronics, attaching

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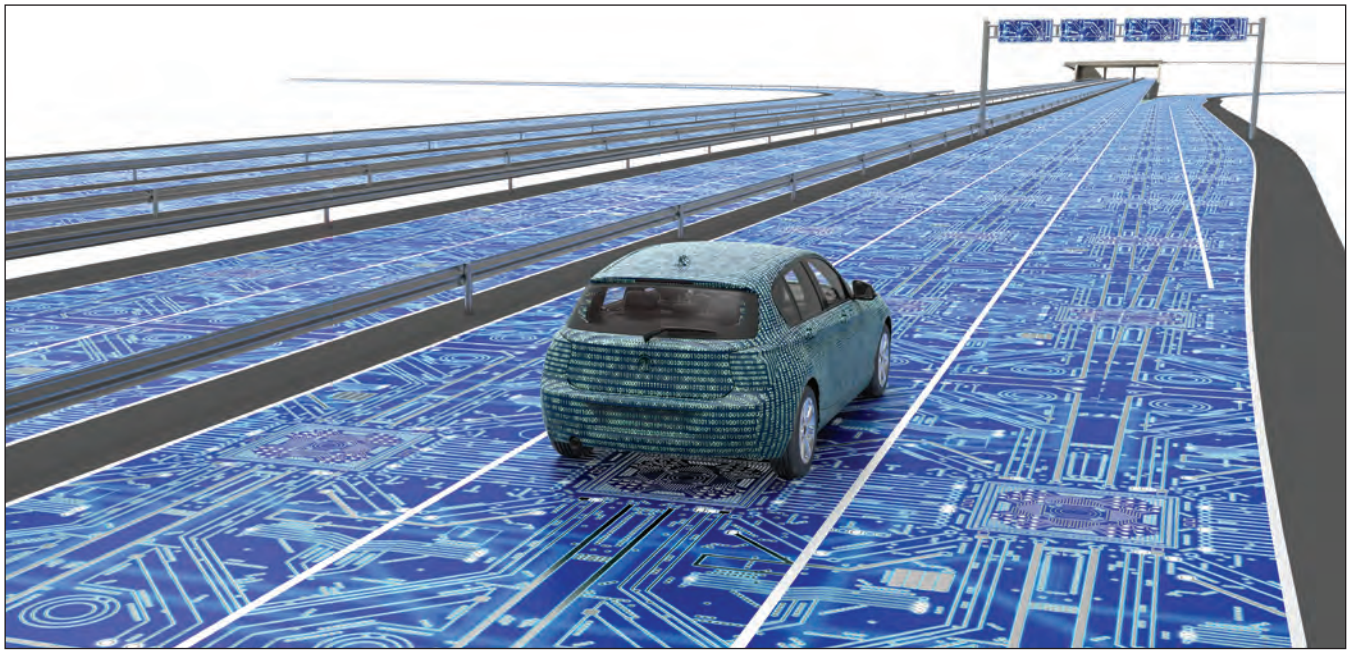

to various sensors and cameras that monitor the road, compute the best route to destination and plan every little driving detail, from acceleration to braking, turning and indicating, every function a driver thinks of. To repair these systems will take a lot of knowledge, yet until they are fully introduced, it is hard to establish just what training will need to be undertaken.

Today we are working less and less on cars, and more and more on computers. This is only set to increase, as engine management and other vehicle systems find electronic control. There is a reason why the industry has shifted away from the term 'mechanics' and into the world of technicians, after all.

www.aftermarketonline.net

ADAS advantages

Advanced driver assistance systems are systems designed to assist the driver in driving the vehicle and improve the car safety. They are one of the fastest growing segments in automotive electronics and the list of systems that is included in ADAS is long and growing;

A series of afternoon presentations and demonstrations from Hickleys will explain the rise in ADAS, the advantages and opportunities of offering 3D wheel alignment, the advantages and opportunities of offering ADAS calibration, the equipment required and the payback scenarios available. The presentations include live demonstrations on both 3D wheel alignment and ADAS calibration and the specialists from Hickleys, Bosch and Texa will be there to answer questions and offer advice on your circumstances. Each event will take place between 2pm and 5pm at the following:

8th March – GTG, Wolverhampton
9th March – Bosch Service and Training Centre, Uxbridge
15th March – Hickleys, Taunton
16th March – Training 2000, Blackburn

01823 328531 | www.hickleys.com

Complex knowledge

The EDC16U1 Engine control unit (ECU) is one of the most common ECU's on the VAG group models and is seen on pretty much all of the models throughout the VAG group range.

Even though the ECU is a common unit, it is still a complicated computer which has lots of small components inside that go faulty.

For us to be able to fully remanufacture the Bosch EDC16U1 ECU we would need the key, instrument cluster and ECU from the vehicle. This is just one of a number of ECUs we remanufacture, contact us for more details.

01206 849920 | www.actronics.co.uk

Sensory roles

HELLA is a leading innovator in intelligent battery sensor (IBS) technology, with its products being used by a number of vehicle manufacturers worldwide. Therefore, its new aftermarket range conforms to exacting OE specifications and is adapted to suit individual applications. The IBS assumes a key role in successful energy management: it measures the current, voltage and temperature directly at the battery. By producing data on the state of charge, state of health and state of function, the IBS enables the engine to reduce CO2 emissions.

The HELLA sensor range also includes: air-mass, crankshaft, temperature, camshaft, wheel speed, lambda, throttle position and exhaust emission pressure sensors.

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