Automotive
connector solutions

Vehicle markets worldwide are changing quickly, as factors such as electric vehicles and rising car ownership in fast-growing economies empower new brands to challenge established players. Innovations like vehicle buses, LED lighting and hybrid or all-electric powertrains are especially demanding on interconnect and switch components.

From specialist government and commercial vehicles, to motorsport and custom cars, the automotive industry demands top reliability, top performance and top cost-effectiveness. Although many suitable solutions are available, they are commonly targeted at manufacturers ordering in high volumes. Where does this leave the specialist vehicle manufacturer, or those developing prototype or test designs? RS is expanding its range of switch and interconnect solutions through partnerships with top manufacturers.

Automotive connectors

There is a huge amount of interconnection in today's vehicles, whether signals are routed by conventional wiring looms or automotive buses such as CANbus, FlexRay or LINbus, for example. Increasingly, the trend is to use low-voltage differential signalling (LVDS) instead of conventional serial or parallel data, with its advantages of high speed and excellent EM shielding.

The durable, two-conductor JAE MX38 is able to withstand tight bend radii and more than 82,000 flex cycles and is ideal for distribution of high-speed data at LVDS levels, for example carrying serial data from externally-mounted cameras in advanced parking and vehicle guidance systems. LVDS interconnects will also distribute DVD and TV video and audio to seat-mounted LCDs, as part of Rear Seat Entertainment (RSE) systems.

As with other automotive interconnects, the overall aim is to reduce the size and weight of components, whilst at the same time handling a larger number of I/O and higher currents. This can only be achieved with smaller pitch: automotive connectors have to deal with wires less than 0.05mm², yet still operate at temperatures up to 125°C. Features like secondary locks, straight-angle "scoop-proof" mating and low insertion forces are mandated by standards bodies like USCAR 2 to ensure that automotive interconnects are assembled correctly and will therefore perform within specifications for the whole design life.

High brightness, low power

The latest automotive designs are putting still-greater demands on interconnection. Take, for example, the increasing trend for LED lighting as daytime running lights for cars. High-power LEDs have significantly different requirements from conventional incandescent lamps: in particular, there is a need to keep junction temperatures as low as possible in order to maximise light output and unit life. Manufacturers like JAE are developing connectors for main driver modules, cable assemblies with built-in heat-sinks and wiring harness connectors to meet these emerging requirements.

Another technology that pushes interconnection to extremes is that of hybrid and electric cars. Even the charging connectors require extreme power capacity, reliability and safety. Connectors developed by ODU for the new MINI E have two power contacts rated at 60A, 240V AC, three signal contacts rated at 1A 42V, nominal current, and a safety-protected earth offering 60A short-circuit current capability. The connectors are protected to IP 66 when mated and operate in ambient temperatures up to 80°C.

Demands like this are already filtering from the volume market to systems for lower-volume applications, such as emergency vehicles, construction equipment, prototypes and racing cars, as well as after-market products.

That is why RS is expanding its portfolio rapidly. For example an exclusive agreement with FCI Connectors has just been announced to introduce FCI's family of automotive products through high service level distribution for the first time. OE-quality connectors are produced by FCI's Motorized Vehicles Division, and include wire-to-wire connectors, flex interconnects, wire-to-PCB and wire-to-device connectors, power terminals, signal terminals, squib interconnects, high-reliability enclosures, pin headers and press-fit pins. Such agreements give customers rapid access to specialist automotive interconnect and switch solutions, with no minimum order quantity for prototyping, test programmes, replacement-parts supply and specialist markets such as industrial vehicles.

See the latest additions to our range of automotive components at rswww.com/electronics

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