



Whitepaper

Automotive Lighting and New Horizons

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Written By:
Stuart Kingswell
Director Automotive Product
Management

Technology to Inspire Innovation



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JAE has a long and established reputation as a supplier of high quality connectors to the automotive lighting market. In feedback from established customers', two factors are regularly cited as reasons why they return to JAE solutions again and again. Namely, miniaturization and reliability.

Image: LED leading the way



We are already seeing a shift in illumination technology from Halogen and Xenon as LED brings brighter, higher intensity lighting with less power. Automotive lighting suppliers are now offering smart lighting solutions that can assist drivers in cornering, bad weather conditions and can even eliminate glare for other road users and pedestrians. In addition, as the automotive market bravely embraces the high frequency technology needed to enable connectivity and autonomous driving, the demands on automotive lighting suppliers have further increased. Along with the usual geometric and aesthetic demands, the suppliers are finding ADAS technologies such as Lidar, ultrasonic and sensing cameras are starting to appear on the headlight technology wish list from some OEMs as they struggle to shoehorn new technologies into their units with no allowable size increases.

This white paper touches on some of the ways that JAE connector technology has addressed this dynamic market.

Firstly, we need to subdivide the topic by the connector location. Inside lighting modules, we are seeing an increase in demand for smaller, low profile, high-density product lines.

The MX34 series enjoys repeated usage inside lighting applications, particularly in Headlamp driver modules. Utilizing the extensive MX34 series with large wire range, high current handling and availability of both vertical and right angle PCB Header orientations. Recently, the range has

expanded to include through-hole and surface-mount (SMT) reflow processing solutions to make optimum use of available real estate. This is a real testament to the product quality as suppliers of these modules demand complete electrical reliability throughout the vehicle lifetime and have complete trust in the MX34 series.

Automotive Lighting suppliers are facing a new challenge with the implementation of ADAS functionality into lighting modules. With autonomous driving and vehicle connectivity technology approaching, the carmakers are now focusing on lighting modules to locate some of the key sensing functionality they need. Smart headlights, fitted with ultrasonic sensor systems for detecting surrounding objects and generating a composite view around the vehicle, automatic headlight dimming are all in demand. In addition, sensing technology such as Lidar and millimetre-wave Radar systems for traffic measurement and detecting incidents are also growing.

The JAE, MA01 (AX01) series 'floating' board-to-board connector system is helping lighting suppliers by offering compact connector options coupled with high frequency compatibility.

The extensive MA01 (AX01) range offers pin counts from 30-140-ways, 180o and 90o orientations, with various board 'stand-off' options, coupled with transmission speeds up to 8.0Gbps (or higher), ideally suited for ADAS technology.

Connections to lighting modules (rather than inside), have a completely different set of criteria. The first deciding factor is their environment. Unsealed connectors, sited in a dry cabin environment or behind module foam sealing pads should be considered separately from those in wet, exposed locations. In both cases, connectors are again subdivided. Direct coupling connections to modules are often preferred and the JAE MX77 and MX34 series provide an extensive connector selection of compact 'wire to board' solutions using PCB Headers. Examples include Rear combination lamps and Auto-levelling modules.

Roof console modules are a perfect example, where customers must find ultra-low profile connectors as space is extremely limited. With a PCB offset of only 9.7mm (double row) and 6.5mm (single row), they MX77 series is the ideal solution.

In many cases, available physical space and operator access means the electrical supply must be delivered via in-line (or relay) connectors. For in-line connectors in dry locations, MX34 'wire to wire' connectors provide compact solutions, with pin counts from 3 to 32-ways.

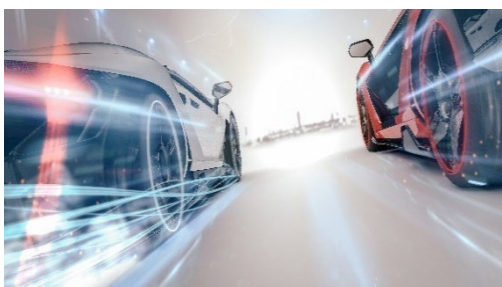
Exterior lighting modules often demand very compact in-line 'wire-to-wire' connections in wet locations. Examples include door mirror lighting; turn indicators, CHMSL, license plate illumination applications and fog lamps to name but a few. For many years, JAE customers' have selected the MX19 series, selected based on miniature physical size and panel mounting capability with a basic performance level. However, JAE has since received several requests for a higher performance alternative to the MX19 series. To address these requests, JAE has developed MX80 connector series.

MX80 series offers the perfect combination of miniaturization and power handling coupled with high technical performance capability. Tested to USCAR and LV214 specifications, MX80 can accept an extensive wire range from 0.13 to 1.0mm² conductors. Delivered with all the features the OEMs demand, MX80 terminals can accept up to ~10Amps current loading (with 1.0mm² wire in place), truly impressive for such a compact connector.

JAE's expertise in the field of lighting not only encompasses solutions for the automotive market. JAE also has a long history of providing connector solutions to the wider lighting market, particularly with LED connector solutions.

These connector product lines are not ruggedized for use in automotive installations. However, experience has shown that technology is often transferrable from one industry to another. Therefore, if these solutions provoke interest, please contact us to discuss further. It may be possible to test them or develop adaptations for use in harsher environments.

At JAE, we have a proud heritage of offering connector & sub harness solutions that address our customers' needs for miniaturization, high frequency data transmission coupled with unrivalled reliability. The increasingly challenging technology in the automotive lighting market is ideally suited to the JAE product portfolio and our growth aspirations. If you have questions or would like to discuss further, please do not hesitate to contact us.



About JAE

As a globally recognized supplier of electronic connectors, JAE Europe, Ltd. (subsidiary of Japan Aviation Electronics Industry, Limited (JAE)) designs, manufactures and markets superior electronic connectors and aerospace products to a variety of industries. With the philosophy “Explore, Create, and Practice”, the company continues to lead the way in providing innovative solutions to an increasingly demanding industry. By combining divergent technologies from experience gained in the aerospace and automotive industries, JAE has been able to transfer these technologies into advanced connector designs with the most demanding applications in the industry. Our parent company, Japan Aviation Electronics Industry, Limited (JAE), is a globally oriented supplier of electronic components, fibre optic connectors, LCD monitor connectors, waterproof electrical connectors and other digital systems. Wholly owned by JAE, JAE Europe, Ltd. was established on 1996. Solutions for a Wide Variety of Industries: At JAE Europe, Ltd., we offer a wide selection of connector and sensor solutions for a variety of different industry applications.

Stuart Kingswell

Director Automotive Product Management, JAE Europe, Ltd

Stuart Kingswell is Director Automotive Product Management at JAE Europe. Within his field of expertise, Stuart is responsible for the connector sector in automotive division at JAE Europe.

For product inquiries, please contact him at:
kingswells@jae.co.uk



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Contact us

JAE Europe, Ltd.
Royal Pavillon, Tower 3, Floor 1
Wellesley Road
Aldershot, Hampshire
GU11 1PZ, United Kingdom
+44 1252 55 11 00



JAE Europe, Ltd.
Fürstenrieder Straße 51
80686 München
Germany
+49 89 5792049-10