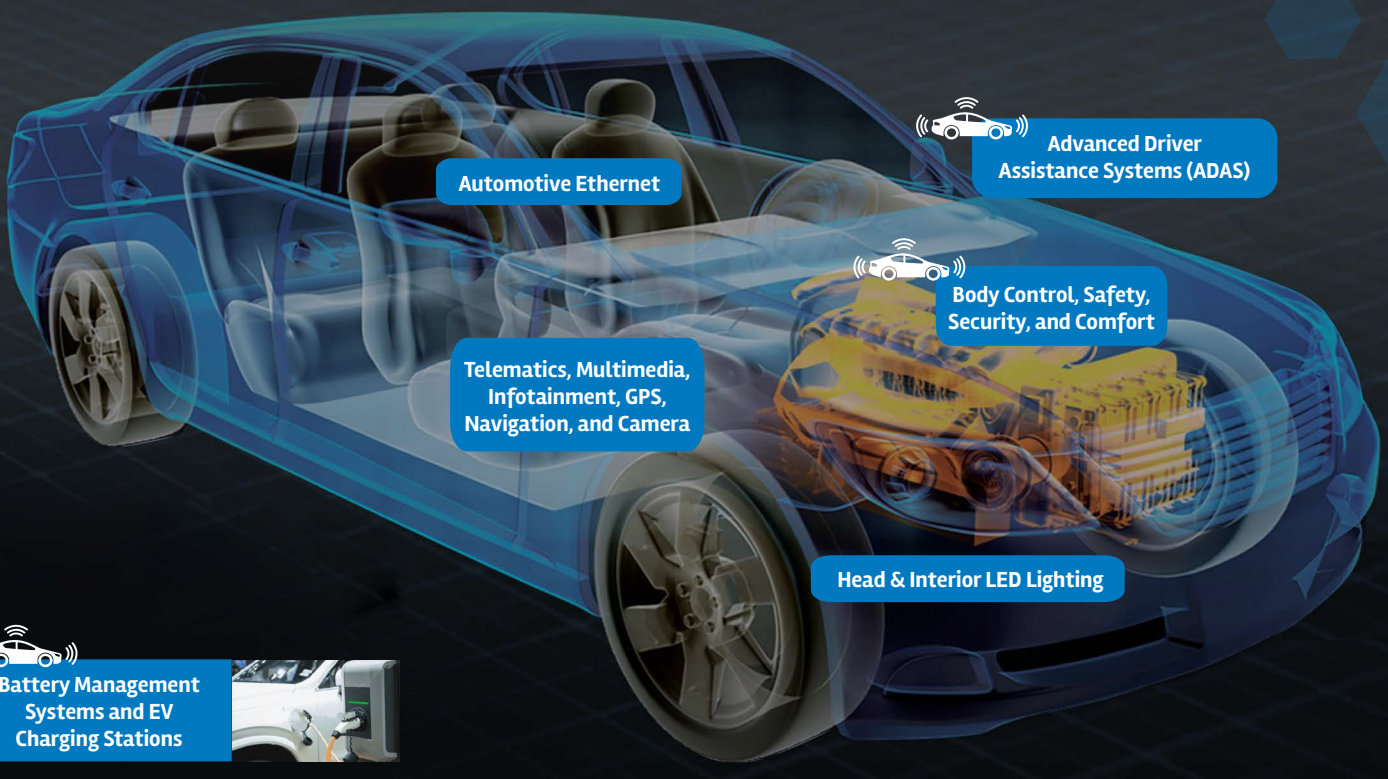
Amphenol ICC

Automotive Electronics

Amphenol
Advanced Sensors



Enabling the Automotive Industry with our Connection Innovation and High Speed Technology

ABOUT AMPHENOL ICC AUTOMOTIVE

Amphenol ICC brings a broad array of innovative technology and solutions to support the growth in the automotive industry, particularly in plating, signal integrity performance, and power management. As automobiles become more ADAS rich and head towards being a total autonomous operation, the key differentiator between suppliers will be their capabilities, and performance. Amphenol ICC's capable engineering team develops connector solutions according to customer needs, even during the design phase of application.

INDUSTRY LEADER

- Products accommodate standards like Open Alliance, USCAR, LV214, ISO 8092, Kojiri,and SAE J 2223
- Solutions enable signaling technologies like LVDS and Ethernet
- Leader in Automotive Ethernet and committed to Open Alliance TC2 / TC9 with 100 BASE-T1 (100 Mbps) and 1000 BASE-T1 (1 Gbps). Adhered to IEEE 802.3 bp/bw and BroadR-Reach™.

TECHNOLOGIES & CAPABILITIES

- Leverage in deploying new solutions for Automotive applications:
  - Signal integrity: HS Signal Transmission and EMC
  - Power contact design and simulation capabilities
  - Contact and connector miniaturization
  - PCB contact technologies
  - Plating technology

SOLUTIONS EXPERT

- Automotive offerings in WTB, BTB, I/O, and FFC/FPC
- Strength of existing portfolio in modular BTB & WTB
- Focus on new standard IO connectors and integration of new standard consumer electronics IO
- Interconnect solutions for High Speed Networking and LED Lighting

CUSTOMER SATISFACTION

- Meet short lead time requirements
- Advocate value-added custom solutions wherever possible
- Better value
- Close proximity to customers' location

Legend
BTB: Board-to-Board
FFC/FPC: Flexible Flat Cable/ Flexible Printed Circuit
I/O: Input/Output
WTB: Wire-to-Board

STANDARDS & PROTOCOLS

Amphenol ICC develops standard connectors and customized solutions in accordance to Automotive industry standards and protocols.

- Our organization is compliant with automotive standard: IATF 16949, VDA6.3
- Our design are based on main Automotive standards: USCAR, LV214
- We are supporting the main communication protocols in the car: CAN, LVDS, Ethernet, MOST, FlexRAY

PRODUCT SOLUTIONS & CAPABILITIES

HIGH SPEED TECHNOLOGIES

- PCB and IO Connectors
- Signal Integrity
- EMI Simulation and Measurements

BOARD-TO-BOARD

- Multi-row BTB
- Various stack heights
- PCB terminations like Ball Grid Array (BGA), Surface Mount (SMT), Through hole (TH) and Compression

INPUT/OUTPUT CONNECTORS

- Shielded
- Standard Input/Output
- Ruggedized version (IP65, 67)
- IDC (Insulation-Displacement Contact), CTW (Crimp-to-Wire), DAC (Direct Attach Copper)
- Signal speed up to 56Gb/s

STORAGE, MEMORY & EDGE CARD CONNECTORS

- Memory cards and sockets
- HDD (Hard Disk Drive) and SSD (Solid State Drive)
- High speed edge card
- High power edge card

WIRE-TO-BOARD & FFC/FPC CONNECTORS

- Modular BTB & WTB
- IDC (Insulation-Displacement Contact), CTW (Crimp-to-Wire)
- Customized headers
- Fine pitch FFC/FPC connectors (up to 0.21mm)

POWER SOLUTIONS

- Up to 200A/contact
- BTB & WTB
- Stamp/formed
- Thermal Simulation Capability
- Busbar Connectivity

PCB MOUNT TERMINATION EXPERTISE

Press-fit (PF)
Press-fit technology plays a key role in offering reliable signal and high power transmissions within automobiles and electric vehicles. For this reason, we bring you our press-fit design and manufacturing expertise in PCB contacts and busbars. PCB contacts are tooled in various hole sizes.

Surface Mount (SMT)
Space-saving Surface Mount connections are inevitable in today's automotive electronics as they help to realize dense mezzanine board designs in Electronic Control Units. We offer SMT technology in standard and custom interconnects.

Ball-Grid Array (BGA)
We introduced Ball-Grid Array SMT technology to the world. We continue to apply this expertise to the world of automotive mezzanine PCB designs.

PLATING TECHNOLOGIES

Innovative Plating Solutions
GXT®, our preferred plating alternative to Gold, adds Palladium and Nickel to the mix to create a cost-effective but equally efficient solution for a quality connection. Our 30+ years of commitment to offer GXT®-plated products will help to bring the best cost-quality balance into your automotive designs.

Silver Plating
Interconnects plated with silver provide a higher current rating due to its low contact resistance. In addition, silver tolerates much higher temperatures and is more economical than gold. This is why it is the preferred plating solution in electric vehicles and standard automobiles. Our silver plating solutions come in two proprietary versions, GCS® and AGT®.

Whisker-free Solutions
Since the turn of the 21st century, connector tail-plating is being done on tin to make it lead-free. However connector tails can grow "tin whiskers", which are microscopic projections that can impede the reliability of connection over time. Our research to prevent whisker-growth helped us land a solution based on matte-tin which were then tested on our products against automotive constraints like heat, humidity, and aging.

APPLICATION FOCUS

TELEMATICS, MULTIMEDIA, INFOTAINMENT, GPS, NAVIGATION, AND CAMERA

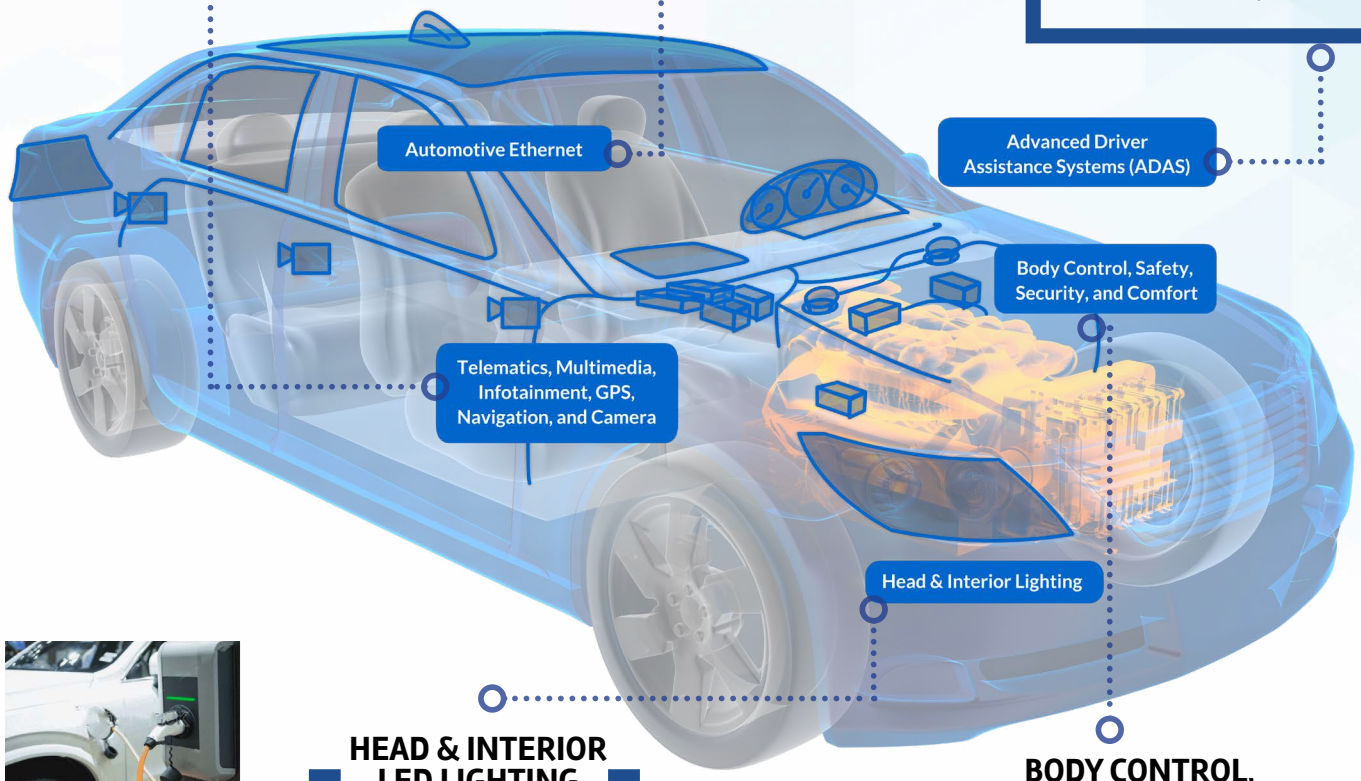
- Audio System
- Car Infotainment Computer (CIC Module)
- Display Module
- HMI Module (Human Machine Interface)
- In-Vehicle HD Camera
- Programmable Instrument Cluster
- Roof Antenna / Shark-fin Antenna
- Telematics Control Unit (TCU)
- Two Wheeler Instrument Cluster
- USB Adapter

AUTOMOTIVE ETHERNET

- Top camera
- Side camera
- Rear camera
- TRSVC Module (All Round View Camera Computer)
- CIC Module (Car Infotainment Computer)
- Display Module
- USB Adapter
- Roof Antenna / Shark-fin Antenna

ADVANCED DRIVER ASSISTANCE SYSTEMS (ADAS)

- Lighting Based Driver Assistant System
- Top Camera
- Rear Camera
- TRSVC Module (All Round View Camera Computer)



BATTERY MANAGEMENT SYSTEMS AND EV CHARGING STATIONS

- Charging Stations
- e-Bike / e-Scooter

HEAD & INTERIOR LED LIGHTING

- Auxiliary Lamps
- CHMSL (Center High Mount Stop Lamp)
- Head Light Control Unit
- Head Lighting
- Interior Lighting
- Lighting Modules
- Rear Lighting

BODY CONTROL, SAFETY, SECURITY, AND COMFORT

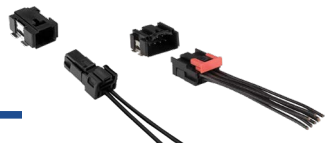
- Air Conditioning Control
- e-Call System
- Power Steering Lock Motor
- Seat System
- Window Control
- Window Switch Module

APPLICATION MATRIX

Automotive Product Solutions		Body Control, Safety, Security, and Comfort	Battery Management Systems and EV Charging Stations	Advanced Driver Assistance Systems (ADAS)	Head & Interior LED Lighting	Telematics, Multi-media, Infotainment, GPS, Navigation, and Camera
Board/Wire-to-Board						
1.25mm	Wire-to-Board	●	●	●		●
1.27mm	Minitek127®	●	●	●		●
1.27/1.50/1.80mm	NEW! Minitek MicroSpace™	●	●	●	●	
1.50mm	Wire-to-Board	●	●	●	●	●
2.00mm	Minitek® 2.00mm	●	●	●	●	●
2.54mm	BergStik® Header/ Dubox® Receptacle	●	●	●	●	●
3.00mm	RotaConnect® WTB				●	
3.00mm/ 4.20mm	Minitek® Pwr		●			
5.00mm	Griplet®		●		●	
Board-to-Board						
0.50mm	MezzoStak®	●		●		
	BergStak®	●		●		●
0.80mm	BergStak®	●		●		●
1.00mm	Conan®	●		●		●
1.27mm	Rib-Cage®	●	●	●		●
Floating	NEW! BergStak® 0.40mm Floating Board-to-Board Connector	●		●		●
	NEW! FLTStack 0.50mm Floating Board-to-Board Connector	●		●		●
	BTFW 1.00mm Floating Board-to-Board Connector	●		●	●	●
Storage & Server IO						
12G SAS/ 6G SATA				●		●
FFC/FPC Connectors						
0.30mm High Speed FPC Series (up to 10Gb/s)				●		●
NEW! 0.50mm AutoLock FPC Connector				●		●
0.40mm FFC/FPC Connectors				●		●
0.50mm FFC/FPC Connectors				●		●
Power						
NEW! SheerPwr® Circular (up to 160A/contact)		●				
BarKlip® IO (up to 200A/contact)			●			
PwrBlade+® Cable Assembly (up to 60A/contact)			●			
Input/Output Connectors						
HDMI Type E				●		
NEW! HSD (High Speed Data) Connector System		●		●		●
NEW! HSC Connector System		●		●		●
NEW! HSBridge Connector System		●		●		●
NEW! NETBridge™ Connector System		●		●		●
NEW! USB 3.1 Type C/ USB 2.0 High Durability				●		●
SD Card						●
3.5mm Audio Jack						●
Amphenol Advanced Sensors						
Temperature Sensors		●	●			
Pressure Sensors		●	●			
Humidity Sensing Elements		●				
Gas Sensors		●				
Infrared Sensors		●				
Solar & Twilight Sensors		●				

PRODUCT HIGHLIGHTS

NEW!



MINITEK MICROSPACE™ CRIMP-TO-WIRE CONNECTOR PLATFORM

COMPACT, ROBUST AND VERSATILE CONNECTOR SYSTEM

Minitek MicroSpace™ Crimp-to-Wire connector platform's unique design enables LV214 Severity-2 and performs at 1.8, 1.5 and 1.27mm pitch. Minitek MicroSpace™ will be available in single and double row versions, with top and side latch configuration.

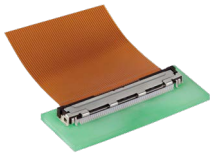
- LV214 Severity-2 Compatible
- Keying to prevent visual mismatching
- Terminal Positioning Assurance (TPA)
- Primary and secondary contact retention
- Connector Positioning Assurance (CPA)

BERGSTAK® 0.40MM FLOATING BOARD-TO-BOARD CONNECTOR

3-AXIS FLOATING FEATURE, SHIELDED DESIGN

BergStak® 0.40mm is a floating type Board-to-Board (BTB) connector. This solution comes with an all-round shield for superior EMI performance. Its unique connector design has a floating range of ±0.40mm in the X, Y and Z directions. BergStak® 0.40 ideal for automotive applications, especially cameras mounted on vehicles.

- Fine pitch design at 0.40mm
- Supports speed performance up to 3Gb/s
- Floating range of ±0.40mm in the X, Y and Z directions
- Shielded design for superior EMI performance
- Polarized key for Poke Yoke mating



AUTOLOCK FPC CONNECTOR

SINGLE ACTION AUTO-LOCKING FPC

The AutoLock FPC connector is a 0.50mm pitch reliable and robust solution. It comes with an auto-locking mechanism that secures flex cable. It is ideal for Automotive and Industrial applications such as car navigation systems and robotics.

- Auto-locking mechanism
- Poka Yoke Insertion mechanism
- High speed data rate up to 5Gb/s

HSD (HIGH SPEED DATA) CONNECTOR SYSTEM

COMPLIANT WITH USCAR-2 SPECIFICATIONS; IDEAL FOR AUTOMOTIVE APPLICATIONS

HSD connector system is a fully shielded interconnect system that can be used with shielded twisted quad cables. It is a high-performance digital system for low-voltage differential signals which prevents interference from crosstalk and external sources. It has the minimum size to satisfy global automotive requirements such as LVDS camera, USB, and IEEE 1394 applications.

- USCAR-2 compliant
- 2.5x enhanced retention force
- Simple assembly design that is patent protected
- Resistant to reflow soldering temperature
- Compatible with other competing products

HSBRIDGE CONNECTOR SYSTEM

COMPLIANT WITH USCAR EWCAP & USCAR-2 SPECIFICATIONS; IDEAL FOR AUTOMOTIVE APPLICATIONS

HSBridge connector system has a standard USCAR EWCAP & USCAR-2 interface. It is a high-performance digital system for low-voltage differential signals which prevents interference from crosstalk and external sources. It has the bandwidth to support advanced infotainment, telematics and camera devices across the automotive and commercial vehicle industries.

- USCAR EWCAP & USCAR-2 compliant
- Supports multiple protocols such as LVDS, USB 2.0, HDMI, VGA and DisplayPort
- Simple assembly design that is patent protected
- Resistant to reflow soldering temperature
- Compatible with other competing products

NETBRIDGE™ CONNECTOR SYSTEM

COMPLIANT WITH USCAR-2 SPECIFICATIONS; IDEAL FOR AUTOMOTIVE APPLICATIONS

NETBridge Automotive Ethernet Connector System is designed for the harsh automotive environment and can transmit up to 100 Mbit/s and 1 Gbit/s according to IEEE 100BASE-T1 and 1000BASE-T1. NETBridge is developed in accordance with USCAR-2, VDAAK LV214 and ISO 8092-2.

- 0.5mm x 0.4mm tab terminal system
- Temperature range up to +105°C in sealed and unsealed configuration
- Sealing class IP 68 / IP69K
- CCPA and TPA for secondary lock of contact carrier assembly
- Optional ESD Shielding and CPA for secondary lock in mated condition
- UTP and STP cable possible to crimp

AMPHENOL ADVANCED SENSORS

Amphenol Advanced Sensors is a leading innovator in advanced sensing technologies and innovative embedded measurement solutions customized for regulatory and industry driven applications, creating value by providing critical information for real time data decisions.

A Global Resource For Your On-Vehicle Measurement Needs

- **Engine Management**
- **Battery Management**
- **HVAC Cabin Comfort**
- **Safety System**
- **Air Quality**

Reliable and accurate on-vehicle measurement is critical to long-term performance and everyday dependability.

To deliver these results, Amphenol Advanced Sensors offers a complete line of innovative and high-performing on-vehicle Sensors that brings your automotive systems together—to protect the vehicle, its occupants and the environment.

Our automotive Sensors regulate the temperature and air quality of the cabin. They monitor engine temperature, battery temperature, as well as protect the environment from harmful emissions.

For more information on Amphenol sensors products, please visit www.amphenol-sensors.com

TEMPERATURE

Amphenol Advanced Sensors temperature Sensors are suitable for numerous applications of Tier 1 and OEM products. We tailor sensing elements to your systems, with packaging customized for your platform's requirements.

PRESSURE

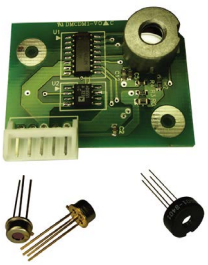
With our own MEMS fabrication for piezo-resistive pressure die and expertise in high-volume Sensor packaging, we can meet all of your pressure needs.

HUMIDITY

Our resistive, capacitive and silicon-based humidity sensing elements are used in Sensors for such applications as air intake and cabin comfort.

GAS

We offer cabin air quality and exhaust gas Sensors to provide a comfortable cabin while reducing the emissions level of the exhaust.



INFRARED

From driver and passenger temperature sensing for in-cabin comfort control to rotating part temperature measurement, we have small-to-dual Sensor packages that meet your application requirements.

SOLAR & TWILIGHT

With the increased number of automatic climate control systems seen in vehicles today, we supply solar and twilight Sensors for use with both HVAC and lighting systems.

Amphenol ICC

Amphenol ICC, a division of Amphenol, is a world leader providing interconnect solutions for the Information, Communications and Commercial electronics markets.

For more information, please visit **www.amphenol-icc.com**

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