

2019 IEEE-SA ETHERNET & IP @ AUTOMOTIVE **TECHNOLOGY DAY**

24-25 September 2019 Detroit, Michigan, USA

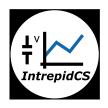
www.ethernettechnologyday.com

PROGRAM

2019 Host



Diamond Exhibitor





Platinum Exhibitors







Gold Exhibitors



















Silver Exhibitors



















Welcome to the 9th Ethernet & IP @ Automotive Technology Day.

This conference on Automotive Ethernet which began in Germany has been to various locations in previous years including Detroit, Tokyo, Paris, San Jose, London, and now back to Detroit.

The conference and its supplier exhibitions provide the opportunity to learn about the latest technology developments in the world of Automotive Ethernet and the connected vehicle. This year's host is Ford Motor Company; Automotive Innovators that started with Henry Ford's Automotive Assembly Line.

The program for this two-day conference contains a variety of presentations, which will expand participants' understanding of the Evolution of Automotive Ethernet implementations and Use Cases. This knowledge will help their companies take the next steps towards 'Faster and/or Cheaper' networks to address the next level of challenges in the arena of Automated Driving, Electrification, Vehicular Connectivity and Transportation as a Service.

Presentations will provide insights into vehicle applications and will discuss networking, connectivity, testing or validation and architecture issues along with trends and solutions for coping with the many real world aspects of automotive Ethernet. We hope to share lessons-learned to improve the reliability and quality of our Ethernet network configurations.

In addition, we have many displays from our sponsors and vendors, all under one roof, to help you select the best partners for your Ethernet based electrical architecture plans. Please be sure to visit the supplier/vendor booths; without their support, this conference would not be possible.

In addition I would like to welcome Steve Carlson who will give the Keynote Speech on "Ethernet: why does it always win?". Steve is the Co-founder of ESTA ANSI-E1-Entertainment Technology and has been involved with Ethernet systems since the early 1990's. He has been an active participant in the development of IEEE 802.3 standards since 1999.

On Tuesday afternoon, there will be a Special Panel Session where industry experts will address the challenges of developing a complete Ethernet Vehicle which will also cover topics such as security, physical layers, protocols and Ethernet network testing. The panel session will consist of questions both from the audience and from the moderator.

On behalf of IEEE and Ford Motor Company, I thank you for your participation and interest in this conference.

Jim Lawlis, 2019 IEEE-SA EIP@ATD Chair Ford Motor Company - Research and Advanced Engineering, Multiplex Technologies

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CONFERENCE COMMITTEES

CONFERENCE STEERING COMMITTEE:

James Lawlis – Ford Motor Company (Chair)

Daniel Hopf – Continental Automotive (Vice Chair)

Joan Woolery – IEEE-SA (Conference Organizer)

Prathap Venugopal – General Motors Syreeta Bath – Jaguar Land Rover Ryohei Kawabuchi – (Mazda) – JASPAR Jinhwa Yun – Hyundai Motor Company Jonathan Kuhn – Fiat Chrysler Josetxo Villanueva – Renault Damon Martini – Robert Bosch

CONFERENCE PROGRAM COMMITTEE:

Syreeta Bath – Jaguar Land Rover (Chair) Damon Martini – Robert Bosch (Vice Chair) Joan Woolery – IEEE-SA (Conference Organizer)

Daniel Hopf, Michael Ziehensack (Elektrobit) – Continental Automotive Ali Muhialdin – Fiat Chrysler Prathap Venugopal, Soheil Samii – General Motors Steve Carlson – HSP Design

John Simon – Intrepid Control Systems

Chris Mash

Mike Jones – Microchip

Don Pannell – NXP

Josetxo Villanueva – Renault

Greg Destexhe – Techpoint Consulting LTD

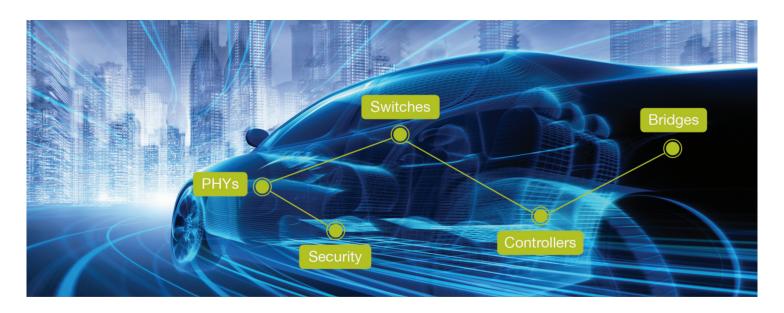


Monday, 23 September 2019		
13:00 – 18:00	Exhibitors Set-up (Terrace Level – Grand A, Grand C) *** Exhibitors' Delegates Only ***	
16:00 – 18:00	Registration Counter Opens (Terrace Level) Get your badge today and skip the registration line tomorrow!	
Tuesday, 24 September 2019		
07:30 – 19:00	Registration Counter Open (Terrace Level)	
08:00 – 09:00	Breakfast (Terrace Level:	in front of Grand A, B, C)
08:00 – 19:00	Exhibit Halls Open (Terrac	e Level: Grand A, Grand C)
	General Session Presentations (Grand B) These presentations were selected by the Program Committee for their technical content	Paid Sponsor Presentations (Pontchartrain) Lobby Level One floor below Terrace Level
09:00 – 09:30	Opening Remarks Master of Ceremonies – Rudi Schubert (IEEE Standards Association) Welcome Speech John H. Schneider (Ford Motor Company)	
09:30 – 10:00	KEYNOTE: Ethernet: Why Does It Always Win? Steven B. Carlson – High Speed Design, Inc.	
NETWORK, ARCHITECTURE, CONNECTIVITY		
10:00 – 10:30	From the Cloud to the Car – The End to End Picture Rajeev Roy (NXP), Michael Johnston (NXP)	Testing Self-Driving, Connected Cars: Why Ethernet as a Logging Network is the Optimal Solution Thomas Königseder (Technica Engineering GmbH)
10:30 – 11:00	Coffee Break (Terrace Level: in front of Grand A, B, C)	
11:00 – 11:30	TSN Ethernet as Core Network in the Centralized Vehicle E/E Architecture: Challenges and Possible Solution Hoai Hoang Bengtsson (Volvo), Martin Hiller (Volvo), Samuel Sigfridsson (Volvo)	The Need for Multi-Gigabit Speeds for In-Vehicle Connectivity John Michalik (Valens) This presentation will discuss the increasing challenges as we progress towards autonomous vehicles, such as the need for higher speeds, the problems of latency and electromagnetic interference, and the need for a better and more reliable infrastructure. Learn about the expectations for higher bandwidth, and how the transmission of multi-Gig Ethernet, in addition to the tunneling of video (CSI-2/DSI-2), audio, data, PCIe, USB will be essential to the future of the connected and autonomous car, while handling EMC in the noisy car environment.
11:30 – 12:00	Early-Stage Topological and Technological Choices for TSN-Based Communication Architectures Nicolas Navet (University of Luxembourg), Josetxo Villanueva (Renault), Jörn Migge (Real Time at Work)	

Tuesday, 24 September 2019 (continued)			
12:00 – 12:30	Zonal EE Architecture: Towards a Fully Automotive Ethernet-Based Vehicle Infrastructure Jochen Klaus-Wagenbrenner (Visteon Electronics Germany)	High Speed Data Connectors and Bird View Systems for Towing Vehicles Sasha Babenko & Marc Tieleboerger (Erich Jaeger USA) The presentation will go over the following: • Erich Jaeger Data Connectors • Erich Jaeger High Speed Data Connections • ECU Systems / Bird View	
12:30 – 14:00	Lunch (Lobby Level:	Windsor Ballroom)	
	VALIDATION & TEST		
14:00 – 14:30	Crash Farming and Gang Programming Over Ethernet: Old Concepts Meet New Challenges John Simon (Intrepid Control Systems), Samir Bhagwat (Intrepid Control Systems)		
14:30 – 15:00	Measuring the Performance of Automotive Ethernet Switch Under Variety of Realistic and Worst Case Scenarios Sravanthi Manthripragada (Ford Motor Company)	Architecture Changes That are Driving the Requirement for >10Gbps Network Technology Hamid Salehi (Marvell Semiconductor)	
15:00 – 15:30	Coffee Break (Terrace Leve	el: In front of Grand A, B, C)	
15:30 – 16:00	Testing the Security and Reliability of Ethernet Communications Using Fuzzing, in the Era of Software-Oriented Automotive E/E Architecture Razvan Petre (Spirent)	ARXML for Automotive Ethernet Intrepid Control Systems Describing automotive Ethernet including pdus and service oriented architecture using AUTOSAR ARXML	
16:00 – 16:30	Power Efficient Ethernet PHY for Camera and Display Amir Bar-Niv (Aquantia), George Zimmerman (CME Consulting), Paul Langner (Aquantia)	Use Case Studies for AE Active Taps (Automation, Flashing, API Integration – RAD-Star 2 and RAD-Galaxy) Intrepid Control Systems This presentation will discuss three specific use-cases in detail: Multi ECU Flashing ECU over Ethernet, Application SW integration and Automation Testing of Ethernet ECU.	
16:30 – 1 <i>7</i> :00	Break/Panel Session Set-up		
17:00 – 19:00	Panel Session: Ethernet Bandwidth— Where Does it End? Moderator: James Lawlis (Ford Motor Company) Panelists: Christopher Mash, Claude R. Gauthier (NXP), Jace A Mogill (General Motors), Joe Stenger (Molex), Mark Zachos (DG Technologies)		
19:00 – 21:00	Networking Dinner (Lobb	y Level: Windsor Ballroom)	

Wednesday, 25 September 2019		
07:30 – 12:00	Registration Counter	Open (Terrace Level)
08:00 – 09:00	Breakfast (Terrace Level:	in front of Grand A, B, C)
08:00 – 17:00	Exhibit Halls Open (Terrace Level: Grand A, Grand C)	
	General Session Presentations (Grand B) These presentations were selected by the Program Committee for their technical content	Paid Sponsor Presentations (Pontchartrain) Lobby Level One floor below Terrace Level
	SAFETY & SECURITY	•
09:00 – 09:30	Design and Implementation of IDS for AVB/TSN Networks Rodrigo Alves (Universidade Federal de Pernambuco), Michael Buchalik (Robert Bosch), Divanilson Campelo (Universidade Federal de Pernambuco), Timo Lothspeich (Robert Bosch)	A Merging of Worlds, Industry and Data Centers Transcending the In-Vehicle Network Harsh Patel (Molex) A presentation to explore the lessons learned from the data center and industrial hardware solutions and utilizing that knowledge to transcend to meet the automotive Ethernet in-vehicle networks.
09:30 – 10:00	Security Areas and Modular IDPS – Architecture Design Elements Protecting Automotive Ethernet Networks Roman Pallierer (Elektrobit), Michael Ziehensack (Elektrobit), Georg Gaderer (Elektrobit)	
10:00 – 10:30	Real Life Experience: Feasibility, Benefits and Drawbacks from Implementation of Next Generation Ethernet Firewall, Router and Intrusion Detection System on Smart Ethernet Switch and End (Host) Microcontroller Siddharth Shukla (Robert Bosch), Jan Holle (Escrypt)	Transitioning to Automotive Ethernet – 10Mbps to 10Gbps and Beyond Mike Jones & Bernd Sostawa (Microchip Technology) The migration to SoA (Service oriented Architecture) facilitates the need for a true Ethernet in-vehicle network, offering improved scaling, cross-domain/backbone data transfer, reduced software development and faster time to market. Zonal ECUs demand all Ethernet speed grades from 10Mbps to 10Gbps and beyond. This presentation will provide an insight into the vision of a total Ethernet based architecture. More specifically we will demonstrate the new IEEE 802.3cg 10BASE-T1 technology and show the benefits and ease of migration from traditional CAN / CAN-FD, in addition to how it fits into new applications for next generation vehicles. The presentation will provide both implementation and simulation results of the 10BASE-T1 network solutions.
10:30 – 11:00	Coffee Break (Terrace Leve	l: in front of Grand A, B, C)
	PHY, SWITCH, μC	
11:00 – 11:30	Beyond 10Gb/s: Automotive Ethernet Rates for the 2020's Will Chu (Marvell), Steven B. Carlson (High Speed Design)	
11:30 – 12:00	Robust Connectivity Solutions for Next Generation Automotive Ethernet Bert Bergner (TE Connectivity), Eric DiBiaso (TE Connectivity)	A Merging of Worlds, a System Level View of In-Vehicle Networks Eric Scott (Molex)

Wednesday, 25 September 2019 (continued)		
12:00 – 12:30	Automotive Physical Layer System Design for High Bandwidth Protocol Ajeya Gupta (Ford Motor Company), Haysam Kadry (Ford Motor Company)	Automotive Ethernet Compliance and System Level Testing Using Non-Intrusive Signal Separation Techniques Darshan Mehta (Tektronix India) Automotive Ethernet is a Full-duplex signal, so it's difficult to perform Signal Integrity analysis or Protocol Decoding without using a Directional coupler. Tektronix introduced a new method of signal separation without cutting cables or loading ECUs, while still performing accurate Signal Integrity tests and Protocol Decoding. Now you can do faster, cheaper "non-intrusive" Automotive Ethernet Analysis.
12:30 – 14:00	Lunch (Lobby Level:	Windsor Ballroom)
	AVB/TSN, HIGHER LAYER PROTOCOLS, SOFTWARE	
14:00 – 14:30	The Study of TSN Profiling for Safety and Reliability on Automotive Network Takumi Nomura (Honda), Katsuyuki Akizuki (NEC), Ken Ueda (NEC), Ryohei Kawabuchi (Mazda), Yoshifumi Hotta (Mitsubishi Electric) – All representing JASPAR	AllGo Connectivity Middleware Based on TSN for Autonomous Sanjeev Madhavankutty & Magesh Margabandhu (AllGo Systems) With Ethernet becoming the network of choice within the car, there is a need for reliable, time sensitive connectivity for Autonomous car architectures. AllGo brings in Ethernet Connectivity Middleware for Autonomous, the highlight of which is TSN. We discuss how TSN enables time critical and reliable connectivity for multi-zonal gateway based architectures. The rich tools offered with the middleware, create a full ecosystem for the customer to integrate the middleware in an effective way.
14:30 – 15:00	Why Do We Need Data Distribution Service (DDS) and Service-Oriented Architecture for Automotive Applications Prachi Joshi (General Motors), Prathap Venugopal (General Motors), Massimo Osella (General Motors)	
15:00 – 15:30	Coffee Break (Terrace Leve	el: In front of Grand A, B, C)
15:30 – 16:00	Time Synchronization in Redundant Networks Thorsten Hoffleit (Renesas)	Compliance and Signal Integrity Analysis of Automotive Ethernet Networks Steve Murphy (Teledyne LeCroy) This PHY Layer seminar reviews both the compliance testing for 100Base-T1 (BroadR-Reach) and 1000Base-T1 networks as well as the tools to analyze signal integrity issues within the Automotive Ethernet links. We will briefly summarize each of the recommended compliance tests and highlight common causes of signal integrity, link failures. Recommendations will be provided for performing system debug and qualification using oscilloscope tools that include Eye Diagrams, measurements with and without equalization, Bit Error Rate analysis, and TDR.
16:00 – 16:30	Choosing the Right TSN Tool(s) to Meet a Network's Bounded Latency Requirement Don Pannell (NXP)	
16:30 – 16:50	Closing Remarks & Raffle Drawing Master of Ceremonies: Rudi Schubert (IEEE Standards Association) Raffle Prize: GoPro HERO7 Black Action Camera with a SanDisk Extreme* 64GB microSDXC** Visit the exhibit booths each day and ask nicely for a raffle ticket. Write your name on one half of the raffle ticket and leave the half with your name on it in the Raffle Bag at the Registration Desk. Keep the other half of the raffle ticket to present at the raffle drawing. No limit on the number of raffle tickets you can enter. You must be present at the raffle drawing to win the prize.	



Accelerating the Connected Car

Flexible, Scalable and Secure Automotive Ethernet Solutions







As the leading supplier of automotive-qualified Ethernet devices with the broadest portfolio in the market, Microchip has the solution you need to get connected. Our automotive-grade PHYs, switches, bridges, controllers and security ICs are designed to meet the rigorous demands of a wide variety of in-vehicle networking applications. Microchip's industry expertise and proven Ethernet solutions from 10 Mbps to 10 Gbps help you reduce complexity and risk. From hardware reference designs, software and LANCheck® review to compliance testing and validation tools, we are always with you on your journey. Devices exceed AEC-Q100 qualifications, are Production Part Approval Process (PPAP) supported and have a track record of delivering high quality and reliability via Microchip's zero-PPM program.

Applications Include

- Telematics
- Backbone
- Advanced Driver-Assistance Systems (ADAS)
- Infotainment





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MARVELL PRESENTATIONS

Architecture Changes That are Driving the Requirement for > 10 Gbps Network Technology

Pontchartrain Room, Lobby Level Tuesday, Sep 24, 2:30 – 3:00 p.m.

Beyond 10Gb/s: Automotive Ethernet Rates for the 2020's

Grand Terrace Ballroom, Terrace Level Wednesday, Sep 25, 11:00 – 11:30 a.m.

№ BROADCOM®

Broadcom Inc. is a global infrastructure technology leader built on 50 years of innovation, collaboration and engineering excellence.

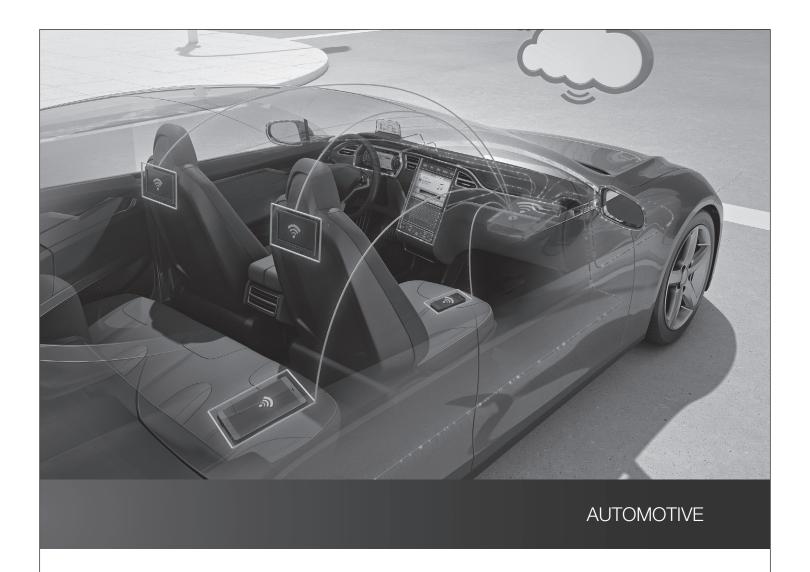
Broadcom combines global scale, engineering depth, broad product portfolio diversity, superior execution and operational focus to deliver category-leading semiconductor and infrastructure software solutions so its customers can build and grow successful businesses in a constantly changing environment.



- Inventor of BroadR-Reach® Ethernet technology
- Shipped more than 140 million automotive Ethernet ports and growing rapidly
- Steering automotive Ethernet standardization for next-generation in-vehicle networking applications
- Most comprehensive automotive Ethernet portfolio including PHY, switch and MCU:
 - IEEE-compliant 100/1000BASE-T1 PHY with best-in-class EMC/EMI performance over UTP cables and supporting OPEN Alliance TC10 ultra-low power modes
 - Multi-layer switch with integrated PCIe connectivity, hardware layer 3 routing capability, and advanced multi-level security
 - Smart camera MCUs capable of computer vision and video encode over wired Ethernet, GMSL and wireless

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Automotive Connectors

Rosenberger develops and manufactures innovative connector systems which fulfill the tough requirements in modern vehicles – today and even in future.

FAKRA- or high-speed-FAKRA-miniconnectors, high-power- or high-speed data connectors, high-voltage or magnetic connectors – Rosenberger provides automotive connectivity systems in the highest

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quality and best performance for a variety of applications:

- Driver assistance systems
- Autonomous driving
- Navigation and telematics
- Infotainment and fond entertainment
- Internet and mobile communication
- Battery charging and power transmission in electric and hybrid vehicles

Rosenberger

DIAMOND EXHIBITOR



PLATINUM EXHIBITORS





GOLD EXHIBITORS













SILVER EXHIBITORS





















BRONZE EXHIBITORS

























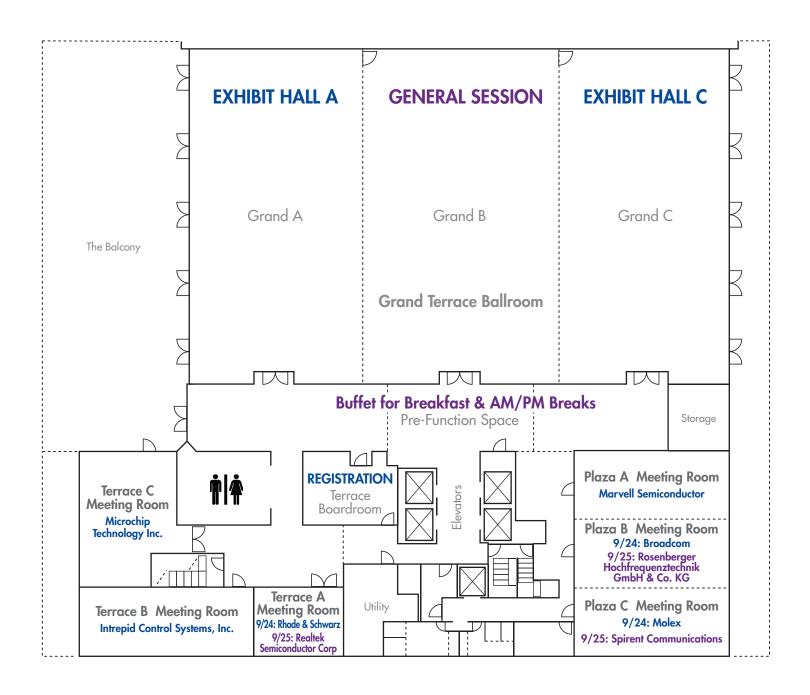








TERRACE LEVEL FLOOR PLAN



LOBBY LEVEL FLOOR PLAN

(One Floor Below the Terrace Level)

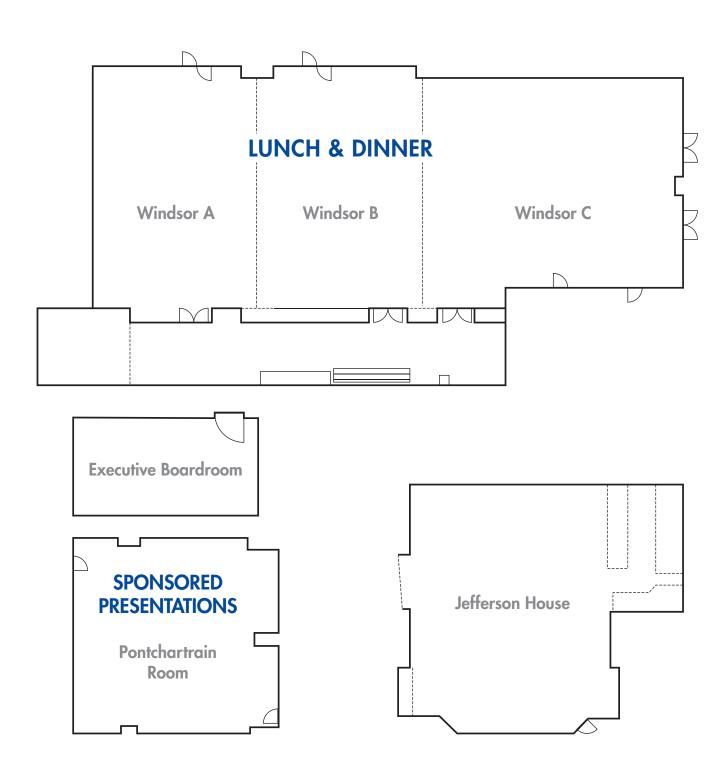
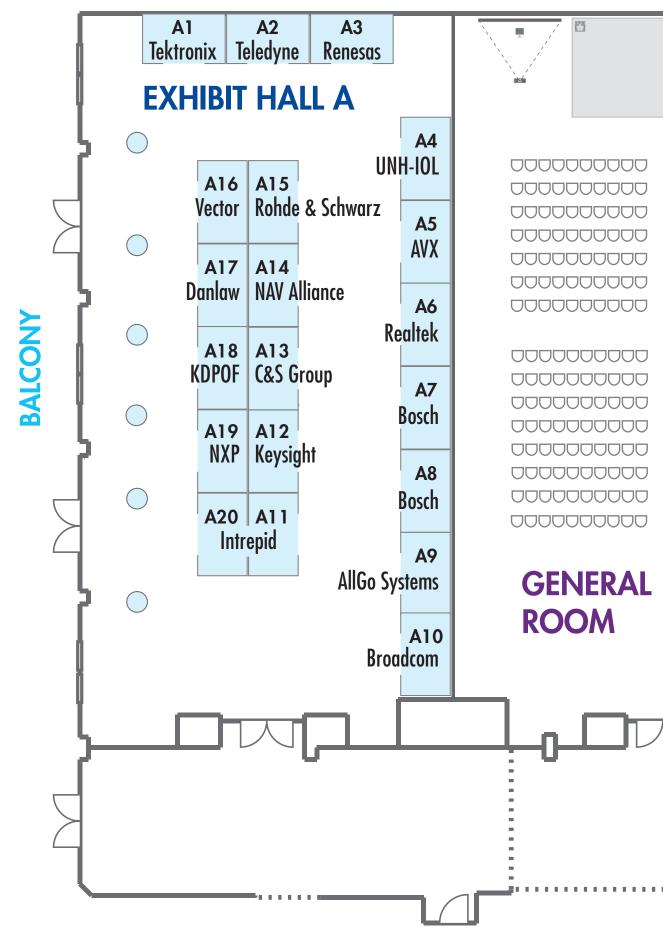
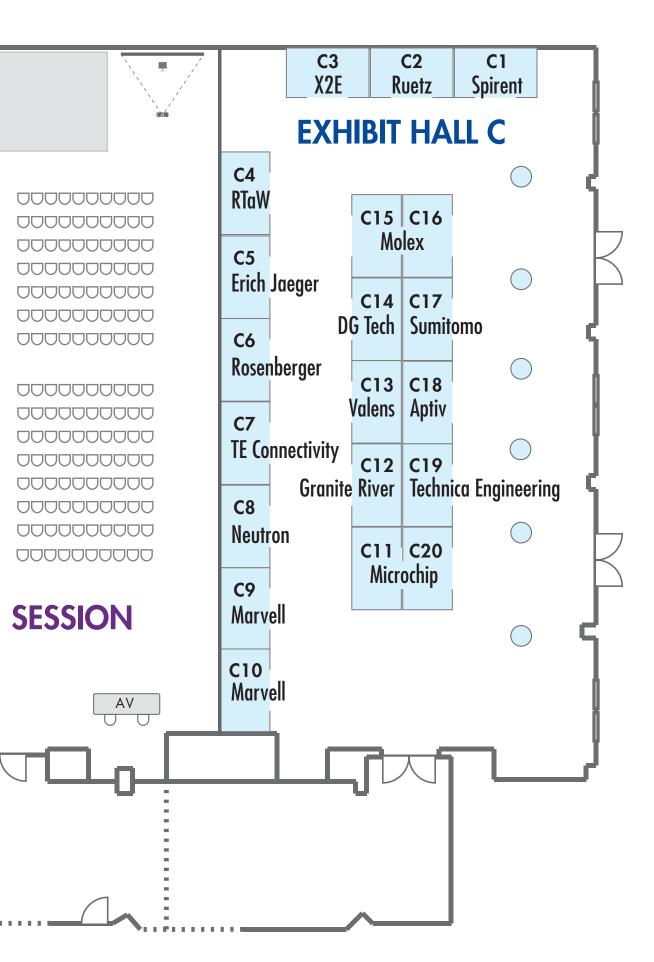


EXHIBIT HALLS





EXHIBITORS

Booth Number: A9

Company Name: AllGo Systems

Company Address: #6,PSS Plaza, Murugeshpalya, New Wind

Tunnel Road, Bengaluru - 560017

City/State/Country: Bengaluru/Karnataka/India Website: www.allgosystems.com

Company Contact: Indira Moola
Title: Marketing Manager
Email Address: indira@allgosystems.com

Contact Phone: +91 7259266373

AllGo is a leading product design company providing automotive software solutions to OEM's and Tier's worldwide. AllGo is uniquely positioned to meet the software needs of automotive industry by licensing software products to customers. As on today tens of millions of cars across the world run AllGo middleware.

The key domains that AllGo caters to are Technology for Automotive Ethernet, Multimedia and Smartphone Mirroring and Driver Monitoring Systems. The wide range of offerings include Automotive Ethernet solutions such as TSN, AVB, RTO over ethernet, SOME/IP, DoIP, Multimedia,Smartphone Mirroring(CarPlay, Android Auto, SDL, Mirrorlink), Bluetooth, Smartphone Media Protocols, Audio and Video Codecs, Distributed Streaming(HDCP, Miracast), Camera-based Driver Monitoring System, Driver Activity and Expression Sensing and more along with service expertise in Android, Certification(3PL) and Application Development.

AllGo is headquartered in Bengaluru, India and has global presence across US, Europe, China, Japan, Taiwan and Korea.

Booth Number: C18 Company Name: Aptiv

Company Address: 5825 Innovation Drive
City/State/Country: Troy, MI 48098
Website: www.aptiv.com
Company Contact: Kirk Ulery

Title: Senior Product Line Manager – High Speed

Connectors & Assemblies

Email Address: kirk.d.ulery@aptiv.com Contact Phone: +1 248.630.5574

Aptiv (formerly Delphi Automotive) brings unparalleled capabilities in solving the complex challenges associated with safer, greener and more connected transportation. At the core of this capability is the software and vehicle architecture expertise that enables the advanced safety, automated driving, user experience, and connected services that are making the future of mobility work.

Aptiv is a global technology leader, with more than 160,000 people across more than 125 manufacturing facilities and 15 major technical centers worldwide. With a presence in 44 countries, we address mobility's toughest challenges through our deep software and systems integration expertise, delivering market relevant solutions for our customers.

Aptiv's advanced technologies and deep systems knowledge across the brain and nervous system of the vehicle allows us to conceive, specify, and deliver solutions for some of our customers toughest challenges. We provide the advanced hardware required to support increased data and computing needs.

Booth Number: A5

Company Name: AVX Corporation
Company Address: 1 AVX Boulevard
City/State/Country: Fountain Inn, SC 29644

Website: avx.com
Company Contact: Daniel West

Title: Field Applications Engineer
Email Address: daniel.west@avx.com
Contact Phone: +1.864.967.2150

AVX is a worldwide leading supplier of passive electronic components, connectors, passive and active antennas, sensors and control units. We offer a wide range of components manufactured to the highest quality and reliability standards. Our worldwide manufacturing capability includes facilities located in seventeen countries in four continents, allowing us to continue meeting customer needs on a global basis. Our products include ceramic, tantalum, niobium oxide, conductive polymer and film capacitors, varistors, thermistors, filters, connectors, antennas, sensors and control units. Our long track record and more than 30 years of expertise in automotive products enable customers to rely on AVX as the one stop source for passive components needs.

AVX offers significant competitive advantages, including delivery and production capabilities optimized to suit each individual customer's just-in-time inventory requirements, and global engineering teams experienced in developing new-to-market product solutions especially designed to fulfill customer's unique application requirements. AVX has an abundance of patents, continues to invest heavily in R&D, and submits several new patent applications every year to further expand the company's strong technology base with newly innovated, next-generation product solutions. To learn more about AVX, visit www.avx.com.

Booth Number: A10 Company Name: Broadcom

Company Address: 1320 Ridder Park Drive

City/State/Country: San Jose, California, 95131, United States

Website: http://www.broadcom.com/

Company Contact: Kabi Prakash Padhi

Title: Senior Product Line Manager Email Address: Kabi.padhi@broadcom.com

Phone Number: +1.949.926.4770

Broadcom Inc. is a diversified global semiconductor leader built on 50 years of innovation, collaboration and engineering excellence. Broadcom's extensive product portfolio serves multiple applications within four primary end markets: wired infrastructure, wireless communications, enterprise storage and industrial & others. Applications for our products in the automotive in-vehicle connectivity segment include: Advanced Driver Awareness Systems, Infotainment, Telematics and Gateways. Broadcom invented the existing 100Base-T1 BroadR-Reach technology which has been adopted by multiple Automotive OEMs worldwide and has shipped more than 120 Million ports into production.

Broadcom Inc. combines global scale, engineering depth, broad product portfolio diversity and superior execution and operational focus to deliver category-leading connectivity products so its customers can build and grow successful businesses today and in the future.

Booth Number: A13

Company Name: C&S Group GmbH
Company Address: Schweigerstrasse 13A

City/State/Country: 38302 Wolfenbuettel, GERMANY

Website: www.cs-group.de
Company Contact: David Bollati
Title: President

Email Address: D.Bollati@cs-group.de Contact Phone: +49 5331 905550

C&S Group – our tests, your safety.

The enormous increase of vehicle functions realized through electronic components significantly impacts the communication within the vehicle network. More functions increase the complexity of the networked systems and the risks of systemic failures. With our testing solutions and consultancy services we support you in mitigating risks, reducing costs and managing the rising complexity of your systems. We enjoy an international appreciation, not only as independent testing company, but also as competent partner for the analysis and conception of automotive networked systems and their testability. As an accredited test house according to ISO17025, we conduct conformance and interoperability tests for customer specific and standardized IVN protocols such as CAN(FD), LIN, and FlexRay. Following the E/E-architectures' trends required by autonomous vehicles we have expanded our services covering the emerging protocols Automotive Ethernet and CAN XL. Our long-lasting testing experiences are also applied in our consulting services for the conception and safeguarding of the proper operability of networked systems. We are offering Automotive Ethernet test services across all layers and different qualification levels like component-/ECU- or network-level qualification. We participate in standard-setting organizations like OPEN, Avnu, ISO and IEEE in order to help establishing new technologies. www.cs-group.de

Booth Number: A17 Company Name: Danlaw Inc.

Company Address: 41131 Vincenti Court City/State/Country: Novi, MI 48375 Website: www.danlawinc.com

Company Contact: Brian Wright

Title: Senior Account Manager Email Address: cyrillam@danlawinc.com Contact Phone Number: +1.248.476.5571

For over 30 years, Danlaw has been a global leader in connected car and automotive electronics. We engineer, test, and manufacture embedded software, electronics and network communications for millions of vehicles around the world. This includes manufacturing OBD dataloggers and ECUs for automotive customers. Our embedded development test tool team is showcasing its comprehensive MxSuite Test Automation Platform for network level validation. Enabling automation, this single tool comes with a standard suite of network test cases and easy test creation tools to give engineers unprecedented control from the smallest details at the electrical level to the entire ABS and infotainment clusters. MxSuite is designed to test every aspect of an ECU, starting with interoperability of data messages thru the communication layer protocols. All of this power is portable to allow bench and in-vehicle testing.

Booth Number: C14

Company Name: DG Technologies

Company Address: 33604 West Eight Mile Road City/State/Country: Farmington Hills / Michigan / USA

Website: www.dgtech.com
Company Contact: John McNelis

Title: Sales and Marketing Manager

Email Address: sales@dgtech.com Contact Phone: +1.248.888.2000

DG Technologies

Transforming ideas into products and services in an ever changing vehicle electronic network industry. Continuous technology improvement, enhanced efficiency, customer service.

DG Mission

DG Technologies specializes in the design and development of intelligent software and hardware for existing and advanced vehicle networks. DG will continue to play a significant role in the growth of advanced in-vehicle networking. We will strive to expand our advanced technology globally. DG Technologies will strengthen our reputation among vehicle and equipment manufacturers, Tier suppliers and end-users to deliver quality products, training, and services.

DG Customers

Our products and services are used by a variety of customers: engineers, service technicians, vehicle security professionals among others. We also provide custom products, software and training. Our products are currently utilized in the automotive, heavy truck, military, industrial, agriculture, construction and recreation industries. Engineers and technicians attend our training seminars to understand advanced networks and their applications.

Booth Number: C5 Company Name: Eric

Company Name: Erich Jaeger USA Inc
Company Address: 470 Forest Ave #22
City/State/Country: Plymouth, Michigan, USA
Website: www.erich-jaeger-usa.com

Company Contact: Terri Miller

Title: President, Director of Sales and Marketing

Email Address: sales-usa@erich-jaeger.com

Contact Phone: +1.734.404.5940

ERICH JAEGER is a leading global manufacturer of premium performance electrical trailer tow connectors and cables for heavy-duty trucks, passenger cars, agricultural equipment and military vehicles. For 92 years, the company has set the bar for product innovation, quality, durability and performance.

Today, the company is leading the way with innovative highspeed connector designs for modern trailer towing applications that increasingly require placement of cameras and sensors on the trailers for safety and trailer/load monitoring.

ERICH JAEGER has developed several high-speed connector and cable designs for automotive, heavy-duty and agricultural applications that incorporate automotive ethernet data links for speeds up to 1 Gbit/s for harsh trailer tow applications.

The company is also actively involved in developing a bird's

EXHIBITORS (continued)

eye view safety and trailer/load monitoring system in partnership with a CV truck OEM.

ERICH JAEGER GROUP has 11 locations worldwide supported by a global manufacturing footprint with factories in China, Czech Republic and Mexico. The company serves over 2,200 customers in 70 countries with roughly 6,000 unique products. Learn more at www.erich-jaeger-usa.com.

Booth Number: C12

Company Name: Granite River Labs
Company Address: 3500 Thomas Road
City/State/Country: Santa Clara, CA 95054
Website: https://graniteriverlabs.com/

Company Contact: Vamshi Kandalla
Title: Executive VP and GM

Email Address: vkandalla@graniteriverlabs.com

Contact Phone: +1.408.627.7608

The world's leading Engineering Services and Test Automation Solutions firm for connectivity, GRL helps engineers solve tough design and validation challenges. GRL began in 2010 with a vision to provide affordable test services to help hardware developers implement digital interface technologies as they become faster, more complex, and more challenging to test. Today, GRL has worked with hundreds of companies from our worldwide test facilities and R&D centers. Learn more at https://graniteriverlabs.com/.

DIAMOND EXHIBITOR

Booth Number: A11, A20

Company Name: Intrepid Control Systems, Inc.

Website: www.intrepidcs.com

Company Contact: Don Hatfield

Title: Director of Global Sales Email Address: icssales@intrepidcs.com Phone Number: +1.586.731.7950 x 2

Intrepid Control Systems (www.intrepidcs.com) has been thriving for 25 years, producing advanced hardware and software tools for engineers in vehicle autonomy, connectivity, automotive Ethernet and embedded engineering. Intrepid also produces industry-leading devices for 10GBASE-T, 1000BASE-T1 and 100BASE-T1 and supports the latest networks and protocols, including AUTOSAR, CAN FD, CAN, LIN, FlexRay, Automotive Ethernet, Keyword, UART, J1939, ISO 14229 and GMLAN. Intrepid's customers include many global automakers and major tier one suppliers working on autonomous and connected vehicles. Headquartered in metro Detroit, Intrepid has offices in the United States, China, Japan, the United Kingdom, Germany, India, Korea and Australia.

Booth Number: A18

Company Name: KDPOF Knowledge Development for POF, S.L.

Company Address: Ronda de Poniente 14, 2ª Planta City/State/Country: 28760 Tres Cantos, Spain

Website: www.kdpof.com
Company Contact: Óscar Ciordia

Title: Sales and Marketing Director

Email Address: E sales@kdpof.com Phone Number: +34 918043387

KDPOF delivers Gigabit Ethernet Plastic Optical Fiber (GEPOF) for electric and autonomous driving to perfectly solve the electrical challenges and interferences of new powertrain architectures. KDPOF's automotive GEPOF transceiver KD1053 provides high connectivity with a flexible digital host interface, low latency, low jitter, and low linking time. In battery management systems (BMS), galvanic isolation is necessary between primary and secondary systems due to hazardous high voltage. By the end of 2019, the first BMS application by a carmaker will go into production. Looking into the near future, KDPOF drives efforts for a new optical multi-gigabit automotive standard with scalable network technology to enable high data rates of 25 Gb/s and beyond. The team of individuals affiliated with more than 15 key carmakers, Tier1s, and components suppliers, incl. KDPOF, led a Call for Interest (CFI) with the approval of the IEEE to start the standardization of a corresponding IEEE 802.3 standard.

Booth Number: A12

Company Name: Keysight Technologies
Company Address: 1400 Fountaingrove Parkway
City/State/Country: Santa Rosa, CA 95403 USA

Website: www.keysight.com

Company Contact: Steve Mango

Title: Market Industry Manager, Automotive &

Energy Solutions

Email Address: steve_mango@keysight.com

Contact Phone: +1.443.285.7728

Keysight Technologies - YOU DREAM. WE TEST.

Automotive Ethernet will become the backbone of the connected car and in-vehicle network of future autonomous vehicles. Requirements for higher data speeds and bandwidth will demand the next-generation performance of automotive Ethernet. Unlike low-speed buses like CAN or LIN, the IEEE Standards Association and the OPEN Alliance demand rigorous compliance verification with test cases that cover automotive Ethernet transceiver (Tx), receiver (Rx), as well as link segment (Lx) harness/connector assemblies. In this new and highly complex territory, reviewing, understanding, and staying current with standards and test cases is critical for success and can add up to weeks of development time. Interoperability issues can be tough to debug in low-speed environments, and it only gets more difficult at gigabit speeds. Success starts with a committed technology partner that can help you understand, integrate, and deploy this new technology - successfully. Keysight's automotive Ethernet test solutions provide automated compliance testing for Tx, Rx, Lx, and is the only vendor for validation solutions spanning across layer 1 to layer 7. With the only Rx and Lx testing option on the market, Keysight offers the most comprehensive automotive Ethernet compliance solution available. www.keysight.com/find/connected-car & www.ixiacom.com/solutions/iot/automotive-ethernet-testing

PLATINUM EXHIBITOR

Booth Number: C10, C9

Company Name: Marvell Semiconductor, Inc.

Company Address: 5488 Marvell Lane

City/State/Country: Santa Clara, California, USA

Website: www.marvell.com

Company Contact:

PUBLIC RELATIONS: For media inquiries,

please contact pr@marvell.com

INVESTOR RELATIONS: For investor relations inquiries,

please contact ir@marvell.com

Phone Number: +1.408.222.2500

Marvell first revolutionized the digital storage industry by moving information at speeds never thought possible. Today, that same breakthrough innovation remains at the heart of the company's storage, processing, networking, security and connectivity solutions. With leading intellectual property and deep system-level knowledge, Marvell's semiconductor solutions continue to transform the enterprise, cloud, automotive, industrial and consumer markets. To learn more, visit: https://www.marvell.com

PLATINUM EXHIBITOR

Booth Number: C11, C20

Company Name: Microchip Technology Inc Company Address: 2355 W Chandler Blvd

City/State/Country: Chandler, Arizona, USA 85224-6199

Website: http://www.microchip.com/

Company Contact: Mike Jones

Title: Sr. Automotive Marketing Manager

Email Address: Mike.Jones@microchip.com

Microchip Technology Inc. is a leading semiconductor supplier of smart, connected and secure embedded control solutions. Its easy-to-use development tools and comprehensive product portfolio enable customers to create optimal designs which reduce risk while lowering total system cost and time to market. The company's solutions serve more than 125,000 customers across the industrial, automotive, consumer, aerospace and defense, communications and computing markets.

As a leading supplier of real-time automotive networking and connectivity solutions, including Ethernet, USB, Controller Area Network (CAN), LIN and Media Oriented Systems Transport (MOST*) technology, Microchip has extensive experience delivering embedded solutions to automotive customers around the world. Since releasing the industry's first AEC-Q100 qualified Ethernet devices in 2008, Microchip has continued leading the market in providing high quality products and services that improve all aspects of vehicle connectivity. The company also has a broad portfolio of automotive-grade PHYs, switches, bridges, microcontrollers and security ICs to meet varying application needs. Microchip's industry expertise and proven Ethernet solutions, from 10Mbps to 10Gbps and beyond, help reduce complexity, risk and time-to-market.

Headquartered in Chandler, Arizona, Microchip offers outstanding technical support along with dependable delivery and quality. For more information, visit the Microchip website at www.microchip.com

Booth Number: C15, C16 Company Name: Molex

Company Address: 3499 Hamlin Road

City/State/Country: Rochester Hills, MI 48309 USA Website: molex.com/connected-mobility

Company Contact: Ashley Taylor

Title: Technical Marketing Manager Email Address: Ashley.Taylor@Molex.com

Contact Phone: +1.586.381.3608

As a leading supplier of high-speed networking solutions, Molex is supporting Automotive OEMs in the development of in-vehicle networks that are secure, prioritized, reliable and high bandwidth. Molex has a long-term expertise and deep experience in high-speed networking, datacom, rugged industrial and automotive solutions that enables the industry to incorporate next-generation vehicle applications.

Complete end-to-end signal integrity within a full-vehicle network architecture is fundamental. To support this, Molex is developing groundbreaking solutions, establishing an ecosystem, investing in key technologies and working alongside industry-leading suppliers and collaborators who share our vision.

Building upon its strength in networking, Ethernet gateways and switches, media modules and signal integrity innovation, Molex is addressing the increased demand for invehicle processing power by providing an end-to-end multi-zone Ethernet-based solution that operates at high bandwidth across multiple hardware and software components.

ADAS/AD

The center of our solution are the Molex Switches and Gateways, secure hubs that gather and process data from all components and zones, then route it to a vehicle compute platform. The Molex Switch and Gateway solutions seamlessly integrate multiple hardware and software systems as well as legacy automotive protocols.

In-Vehicle Infotainment

Molex solutions provide the in-vehicle connectivity needed for effective communication within an intelligent vehicle network and the smart device vehicle integration expected by today's drivers and passengers.

Vehicle Connectivity

Seamless communication with the cloud is one of the most critical factors for the connected vehicle. As a company trusted by the world's leading automotive brands, we are providing sophisticated antenna design combined with the development of vehicle-communication devices.

For more information please visit www.molex.com/connected-mobility

Booth Number: A14
Company Name: NAV Alliance
Company Address: 3855 SW 153rd Drive

City/State/Country: Beaverton, OR USA www.navalliance.org

Company Contact: Daniel Hopf

Title: NAV Alliance Marketing Working Group Chair

Email Address: pr@navalliance.org

AV Alliance was created to provide a platform for the automotive

EXHIBITORS (continued)

industry to develop the next generation of in-vehicle network infrastructure for autonomous vehicles and facilitate wide deployment of networking technologies and products. The Alliance was founded by leading vehicle manufacturers, technology suppliers and networking players in the automotive market, sharing the goal of developing the ecosystem required for next-generation Multi-Gig Automotive Ethernet networks in the vehicle. Member companies include, Amphenol, Aquantia, Bosch, Continental, Harman International, Huawei, LEONI Bordnetz-Systeme, Molex, NVIDIA, Rosenberger Hochfrequenztechnik, Sumitomo Electric, Tektronix and Volkswagen.

NAV Alliance invites member companies to participate in our technical working groups:

TWG1 – 25G and 50G Automotive Ethernet PHY Specifications

TWG2 - EMC Requirements and Limits

TWG3 - Physical Layer System and Component Integration

TWG4 – Protocol Encapsulation for Ethernet TWG5 – System Controls and Management To become a member of NAV Alliance visit http://www.nav-alliance.org

Booth Number: C8

Company Name: Neutron Automotive Controls

Company Address: 350 Palladium Drive, Suite 102, Ottawa,

Ontario, K2V 1A8

City/State/Country: Ottawa, Canada

Website: www.neutroncontrols.com

Company Contact: Dave Stubbs Title: President

Email Address: stubbs@neutroncontrols.com

Contact Phone: +1.613.599.1263

Neutron Controls is an Engineering firm in Canada that has created a development platform to accelerate customer projects in the Industrial and Automotive Embedded space.

Our Team is experienced in Ethernet Communications, having created the first Redundant Gigabit Ethernet Network for Automotive. We are working on a new platform for High Speed Switching up to 100Gigabit, Critical for Sensor Fusion and Autonomous Functionality.

Check us on the web: www.neutroncontrols.com for a growing portfolio of hardware and software products to accelerate your project.

Booth Number: A19

Company Name: NXP Semiconductors

Company Address: Schatzbogen 7

City/State/Country: 81829 Munich, Germany

Website: www.nxp.com
Company Contact: Nicola Concer

Title: International Product Manager -

Automotive Ethernet

Email Address: nicola.concer@nxp.com Phone Number: +49 173 435 0721

NXP Semiconductors N.V. (NASDAQ:NXPI) enables secure connections and infrastructure for a smarter world, advancing solutions that make lives easier, better and safer. As the world

leader in secure connectivity solutions for embedded applications, NXP is driving innovation in the secure connected vehicle, end-to-end security & privacy and smart connected solutions markets.

NXP is shaping the future car networks by enabling the transition to a new vehicle network architecture, one that supports the ADAS applications and the connected car. With true automotive safe and secure networks, we offer complete solutions with NXP MCUs, Ethernet Switches, Physical layers and PMICs along with production ready software. NXP's simple and consistent approach across the network offers end to end security framework.

Built on more than 60 years of combined experience and expertise, the company has approximately 30,000 employees in more than 30 countries and posted revenue of \$9.41 billion in 2018.

Find out more at www.nxp.com.

Booth Number: A6

Company Name: Realtek Semiconductor Corp.

Company Address: No.2, Innovation Road II,

Hsinchu Science Park

City/State/Country: Hsinchu, Taiwan
Website: http://www.realtek.com/

Company Contact: Gary Lee

Title: Senior Project Manager Email Address: garylee@realtek.com Phone Number: +886-35780211

Realtek Semiconductor Corporation is a world-leading IC provider. With advanced design expertise in RF, analog, and mixed signal circuits, and with strong manufacturing and system knowledge, Realtek offers total solution of Automotive Ethernet. More information on Realtek can be found on the website at www.realtek.com.

Booth Number: C4

Company Name: RealTime-at-Work (RTaW)

Company Address: Immeuble "les Thiers", 4 Rue Piroux,

54000 Nancy

City/State/Country: Nancy / France

Website: http://www.realtimeatwork.com/

Company Contact: Jérôme MICHEL
Title: Managing Director

Email Address: jerome.michel@realtimeatwork.com

Phone Number: +33 (0)6 87 23 21 36

Company Description: RTaW builds on 20+ years of experience in Simulation and Timing Analysis for critical systems. Our ability to produce highly applicable solutions is proven by our success in helping our clients design cars, planes, helicopters, space launchers, power grids and industrial systems. RTaW is leading the way in Ethernet TSN design, performance evaluation and configuration tools. Our unique ZeroConfig-TSN design-space exploration method means that your TSN network is configured

for correctness and maximum efficiency.

Booth Number: A3

Company Name: Renesas Electronics Europe

Company Address: Arcadiastr. 10
City/State/Country: D-40472 Dusseldorf
Website: www.renesas.com
Company Contact: Mr. Thorsten Hoffleit

Title: Manager Automotive Solution Business Unit

Email Address: Thorsten.Hoffleit@renesas.com

Phone Number: +49 211 6503-0

Renesas Electronics Corporation delivers trusted embedded design innovation with complete semiconductor solutions that enable billions of connected, intelligent devices to enhance the way people work and live. A global leader in microcontrollers, analog, power, and SoC products, Renesas provides comprehensive solutions for a broad range of automotive, industrial, home electronics, office automation, and information communication technology applications that help shape a limitless future. Learn more at renesas.com.

Booth Number: A8, A7

Company Name: Robert Bosch GmbH

Company Address: Postfach 16 61, 71206 Leonberg

City/State/Country: Germany

Website: http://products.bosch-mobility-solutions.

com/en/de/homepage/homepage_1.html

Company Contact: Damon Martini Title: AE-BE/EKE1

Email Address: Damon.Martini2@de.bosch.com

Phone Number: +49 (711) 811-14118

Bosch Automotive Electronics division (AE) develops and manufactures microelectronics. The product portfolio ranges from components such as semiconductors, MEMS sensors and IP modules, through control units for body electronics, central gateways, braking control systems, and engine management systems (as well as contract manufacturing of the above), to non-automotive applications such as MEMS sensors for consumer electronics by Bosch Sensortec GmbH.

Bosch Connected Devices and Solutions GmbH, Reutlingen in Germany, also offers sensors, software, and complete solutions for the Internet of Things.

The team at AE-BE/EKE1 ComNet provide services and consulting for next generation vehicle architecture design and network communications simulation, with over 100 years of combined experience in Ethernet, AVB/TSN, cyber security, central gateway development and more.

Booth Number: A15

Company Name: Rohde & Schwarz USA, Inc.

Company Address: 6821 Benjamin Franklin Drive City/State/Country: Columbia, MD 21046

Website: http://www-rohde-schwarz.com/

Company Contact: Julianne Pirog Webster
Title: MarCom Program Manager

Email Address: Julianne.Pirog@rsa.rohde-schwarz.com

Phone Number: +1.410.910.7836

Rohde & Schwarz is a leading manufacturer of test and measurement equipment with a comprehensive test expertise in all types of

electronic and wireless applications. For the automotive industry, we provide the insight and tools needed to efficiently design, develop and test components, modules and systems. Our expertise extends to the following areas: infotainment, security, wireless communications & connectivity (IoT, OTA, cellular and non-cellular technologies), audio, eCall, V2X, RED, GNSS, ADAS, radar, in-vehicle buses such as BroadR-Reach, EMC / EMI pre-compliance / full compliance and device characterization at mmWave frequencies.

Booth Number: C6

Company Name: Rosenberger Hochfrequenztechnik

GmbH & Co. KG

Company Address: Hauptstraße 1

City/State/Country: 83413 Fridolfing, Germany Website: www.rosenberger.con

Company Contact: Fritz Herrmann

Email Address: fritz.herrmann@rosenberger.de

Phone Number: +49 (0)8684 18-1263

Rosenberger Hochfrequenztechnik GmbH & Co. KG, founded in 1958, is a family owned company and ranks today among the world-wide leading manufacturers of standard and customer-specific connectivity solutions in high frequency, high voltage and fibre optic technology.

For automotive electronics Rosenberger develops and manufactures connectivity systems for a variety of applications, e.g. driver assistance systems, autonomous driving, navigation and telematics, infotainment, fond entertainment, internet and mobile communication or battery charging and power transmission in electric and hybrid vehicles.

The product range also covers RF coaxial products, fibre optic products and cable assemblies for applications in telecommunication, data systems, medical electronics, industrial test & measurement electronics or aerospace engineering.

Rosenberger is certified to IATF 16949:2016, DIN EN 9100, ISO 9001 und ISO 14001.

The headquarters of Rosenberger is located in Fridolfing (Oberbayern, Germany) where today approx. 2,200 people are employed. Worldwide, the Rosenberger group operates manufacturing and assembly locations and sales offices in Europe, Asia and North and South America where – in total – approx. 11,000 employees develop, produce and sell our products.

Booth Number: C2

Company Name: RUETZ SYSTEM SOLUTIONS GmbH

Company Address: Oskar-Schlemmer-Str. 13

City/State/Country: 80807 Munich / Bavaria / Germany Website: www.ruetz-system-solutions.com

Company Contact: Mr. Michael Zapletal Title: Senior Sales Engineer

Email Address: michael.zapletal@ruetz-system-solutions.com

Contact Phone: +49 (89) 2000413-70

Experts for Data Communication in Vehicles

With comprehensive expertise in automotive data communication and the interconnected world, RUETZ SYSTEM SOLUTIONS provides full service for manufacturers and suppliers for a smooth and on-time start of production (SOP).

EXHIBITORS (continued)

As technology partner, we assist with engineering services and test laboratory solutions as well as with broad competence for data transmission, so that your products will fulfill the highest standards for quality, robustness and compliance.

RUETZ SYSTEM SOLUTIONS is a competent partner in the definition and validation of Ethernet solutions. Special attention rests on the assessment of migrating the standard of carrier systems into the automotive world. Our customers profit in particular from our competence at the Physical Layer, the middleware as well as from the adaptation of existing systems into reliable, robust and automotive-ready solutions.

Our service portfolio includes training for automotive Ethernet and the design of architecture and system specifications. In addition, we provide support for the development of Ethernet, AVB, TSN and TCP-IP software as well as for the design of hardware for different physical layers. Furthermore, we offer a broad service spectrum ranging from requirements engineering over test specifications and the design of test setups to the implementation of unit, system integration, application and compliance testing.

Booth Number: C1

Company Name: Spirent Communications

Company Address: 101 Crawfords Corner Road, Suite 4-207

City/State/Country: Holmdel, NJ 07733

Website: www.spirent.com/Automotive

Company Contact: Thomas Schulze

Email Address: Thomas.schulze@spirent.com

Phone Number: +49 175 1888124

Spirent is the leading global provider of testing, assurance, analytics, and security solutions. From physical and virtual service provider networks and enterprise data centers to mobile communications and connected vehicles. At the IEEE-SA event, Spirent will showcase brand new developments for engineers working on Automotive Ethernet projects. The new product will enable advanced, automated testing of Ethernet, AVB/TSN, CAN(FD) and LIN based on test specifications from OPEN, Autosar, IEEE and Avnu. Spirent works with leading automotive innovators to help the world communicate, drive, and collaborate faster, better, and more safely to provide a superior user experience.

Booth Number: C17

Company Name: Sumitomo Electric Group

(Sumitomo Electric Industries: SEI,

Sumitomo Electric Wiring Systems: SEWS)

Company Address: 4-5-33, Kitahama,

Chuo-ku / Osaka/ Japan (SEI)

27360 Drake Road Farmington Hills /

Michigan/ USA (SEWS)

Website: https://global-sei.com/ (SEI)

http://www.sewsus.com/(SEWS)

Company Contact: Kerri Gruebner

Title: Advanced Business Planning Manager

Email Address: Kgruebner@sewsus.com

Contact Phone: +1.248.949.8067

The Sumitomo Electric Group operates its wiring harness business globally to offer various products that meet the needs of the times

with superb technologies and quality. Sumitomo Electric group is a leader in the wire harness market with a 27% share globally. The product lineup includes wiring harnesses for transmitting electric power and information in vehicles and products for environmentally friendly electrified vehicles, and the components for them such as the electric wires, terminals, connectors. Sumitomo's experience in developing Ethernet technology for consumer electronics has resulted in cross over applications for automotive high speed communications using Ethernet technology.

Booth Number: C7

Company Name: TE Connectivity

Company Address: 900 Wilshire Drive, Suite 150

City/State/Country: Troy, MI 48084 USA
Website: www.TE.com
Company Contact: Huzefa Bharmal

Title: Sr. Manager – Product Management

Email Address: huzefa.bharmal@te.com

Phone Number: +1.248.273.3372

TE Connectivity Ltd. is a \$14 billion global technology and manufacturing leader creating a safer, sustainable, productive, and connected future. For more than 75 years, our connectivity and sensor solutions, proven in the harshest environments, have enabled advancements in transportation, industrial applications, medical technology, energy, data communications, and the home. With 80,000 employees, including more than 8,000 engineers, working alongside customers in approximately 140 countries, TE ensures that EVERY CONNECTION COUNTS. Learn more at www.te.com and on LinkedIn, Facebook, WeChat and Twitter.

Booth Number: C19

Company Name: Technica Engineering GmbH

Company Address: Leopoldstr.236

City/State/Country: 80807 Munich, Germany
Website: www.technica-engineering.de

Company Contact: Thomas Königseder

Title: CTC

Email Address: Thomas.Koenigseder@technica-engineering.de

Phone Number: +49 176 30735403 2nd Company Contact: Erick Parra

Title: Business Development Manager Email Address: erick.parra@technica-engineering.de

Phone Number: +49 89 200 07 24 – 29 Mobile Number: +49 176 6086 8699

We are pioneers in the integration of Automotive Ethernet. Since 2008 we supported the standardization of 100Base-T1 (BroadR-Reach ™) via BMW and the OPEN Alliance and specialized in complex ECU test solutions for OEM's like BMW, Audi, Volvo and Renault. With our ECU prototyping activities and our testing solutions, we have acquired an especially important role in the introduction of Ethernet as a communication technology inside the automobile.

We apply our knowledge for engineering at all stages of E/E development and work with major OEM's and Tier 1 suppliers worldwide. Our comprehensive network of distributors and partners enable us to provide optimal service and delivery on-site.

Our products combine 100BASE-T1 and 1000BASE-T1 with

CAN, CAN-FD, FlexRay, LIN and analogue interfaces and have the best reputation in the market for performance and conformance. Support of AVB/TSN is part of our scope which is key to ADAS and other key features.

We combine our own product development with consulting. In close cooperation with our customers, our engineers and consulting teams draw up tailored solutions that are reliable, flexible and innovative.

More details on this contact: info@technica-engineering.de

Booth Number: A

Company Name: Tektronix, Inc.

Company Address: 14150 SW Karl Braun Drive, P.O. Box 500 City/State/Country: Beaverton, OR 97077, United States

Website: http://www.tek.com

Company Contact: Victor Osai
Title: Account Manager
Email Address: victor.osai@tektronix.com
+1.313.549.2262

Tektronix: Reducing the distance between inspiration and realization.

We are the measurement insight company committed to performance, and compelled by possibilities.

Tektronix designs and manufactures test and measurement solutions to break through the walls of complexity, and accelerate global innovation. Together we empower engineers to create and realize technological advances with ever greater ease, speed and accuracy.

Tektronix solutions have supported many of humankind's greatest advances of the past 70 years. Health. Communication. Mobility. Space. With offices in 21 countries, we are committed to the scientists, engineers and technicians around the world who will define the future.

Beyond technologically-advanced, precise instruments, our customers seek the competitive advantage of measurement insights, domain expertise and applications expertise.

To make this more accessible, you'll find Tektronix around the world at trade shows, seminars, and conferences offering the latest technologies, techniques and standards. We look forward to problemsolving with you.

Booth Number: A2

Company Name: Teledyne LeCroy
Company Address: 700 Chestnut Ridge Rd.
City/State/Country: Chestnut Ridge, NY 10977
Website: http://teledynelecroy.com

Company Contact: Hilary Lustig

Title: Marketing Communications Manager

Email Address: hilary.lustig@teledyne.com

Phone Number: +1.845.578.6120

Teledyne LeCroy is a leading manufacturer of advanced oscilloscopes, protocol analyzers, and other test instruments that verify performance, validate compliance, and debug complex electronic systems quickly and thoroughly. Since its founding in 1964, the Company has focused on incorporating powerful tools into innovative products that enhance "Time-to-Insight". Faster time to insight enables users to rapidly find and fix defects in complex electronic systems, dramatically improving time-to-market for a wide variety of applications and end

markets. Teledyne LeCroy is based in Chestnut Ridge, N.Y. For more information, visit Teledyne LeCroy's website at teledynelecroy.com.

Booth Number: A4

Company Name: UNH InterOperability Lab
Company Address: 21 Madbury Rd, Ste 100
City/State/Country: Durham NH 03824
Website: www.iol.unh.edu
Company Contact: Curtis Donahue

Title: Senior Manager, Ethernet Technologies

Email Address: donahue@iol.unh.edu Contact Phone: +1.603.862.0090

The UNH InterOperability Lab (UNH-IOL) is an independent provider of broad-based testing and standards conformance solutions for the networking industry. Beginning in 1988, we have built a multimillion dollar testbed and developed testing solutions to help companies efficiently and cost effectively deliver products to market. UNH-IOL's services include interoperability and conformance testing of networking, data, telecommunications, and storage products.

The UNH-IOL offers testing for Automotive Ethernet devices including automotive development platforms, switches/car master boxes, cabling, and sensors and infotainment systems. Our services include:

- PHY Conformance:
 - 1000BASE-T1 PMA
 - 100BASE-T1 PMA, PCS, PHY Control
 - BroadR-Reach PMA, PCS, PHY Control
- Interoperability:
- 100BASE-T1
- Avnu Automotive Certification
- 802.1AS, 802.1Q, 802.1BA, 1722, and 1722.1 testing
- Test Tools:
 - BitPhyer for 100BASE-T1 (BroadR-Reach)
 - vIOLett* for Avnu

In addition, we are an OPEN Alliance approved test laboratory, offering TC1 and TC10 test specifications for 100BASE-T1 PHY conformance. Learn more at www.iol.unh.edu.

Booth Number: C13

Company Name: 8 Hanagar St.

Company Address: Valens

City/State/Country: Hod Hasharon, Israel Website: www.valens.com
Company Contact: Ronnie Finer

Title: Marketing Events Manager
Email Address: ronnie.finer@valens.com
Contact Phone: +972-9-7626900
Valens: Smart Chipset for Smart Architecture

Established in 2006, Valens is a fabless semiconductor company headquartered in Israel.

Valens automotive Valens brings resilient ultra-high speed in-vehicle connectivity, driving the future of the automotive industry. Valens' chipsets bring a simple, holistic, and cost-effective approach to in-vehicle connectivity, with unprecedented multi-Gigabit throughput over simple wiring (single UTP for up to 15m), extraordinary capabilities to handle EMC requirements without compromising performance, convergence of several native interfaces over the same

EXHIBITORS (continued)

link, and scalable architecture, for multiple applications.

The company is the world leader in HDBaseT technology, addressing the needs of the different sectors that depend on advanced digital media distribution, such as audiovisual, industrial, medical, and automotive.

Valens automotive technology lowers total system costs, while supporting more bandwidth and applications. Valens is paving the way for the autonomous car.

Booth Number: A16

Company Name: Vector North America

Website: www.vector.com
Company Contact: Anna Barcelos
Title: Director of Marketing
Email Address: anna.barcelos@vector.com
+1.248.449.9290

For 30 years, Vector has been a capable partner for the development of automotive electronics. Driven by passion for technology, the company develops solutions that help engineers manage their demanding tasks. Vector tools, software components and services include e-mobility, safety and security, ADAS and autonomous driving, AUTOSAR Adaptive, and more. Vector North America Inc was established in 1997 as a wholly owned North American subsidiary of Vector Informatik GmbH. More detailed information on Vector can be found at www.vector.com.

Booth Number: C3 Company Name: X2E GmbH

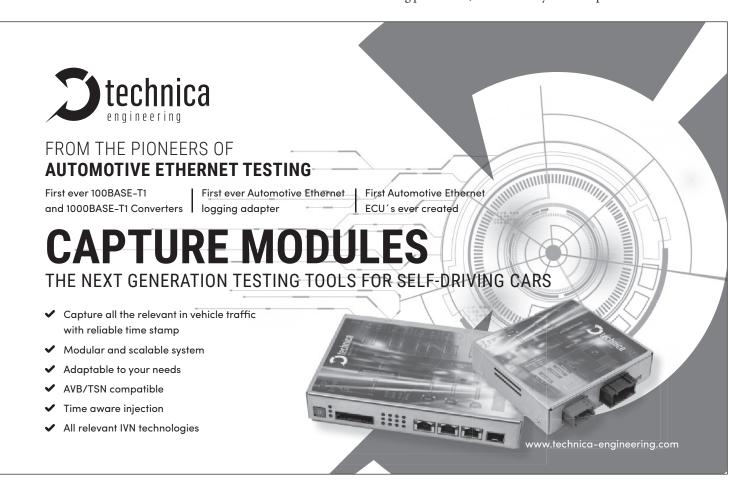
Company Address: Jahnstraße 2b
City/State/Country: 76870 Kandel
Website: www.x2e.de
Company Contact: Matthias Müller
Title: Technical Sales
Email Address: sales@x2e.de

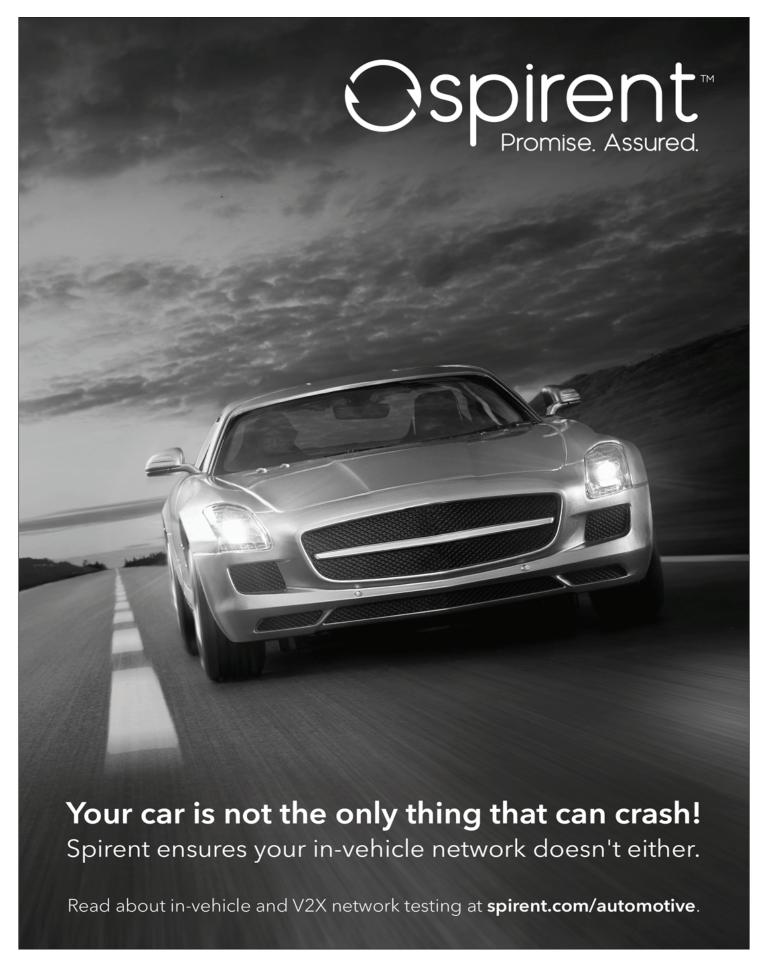
Contact Phone: +49 (0) 72759143100

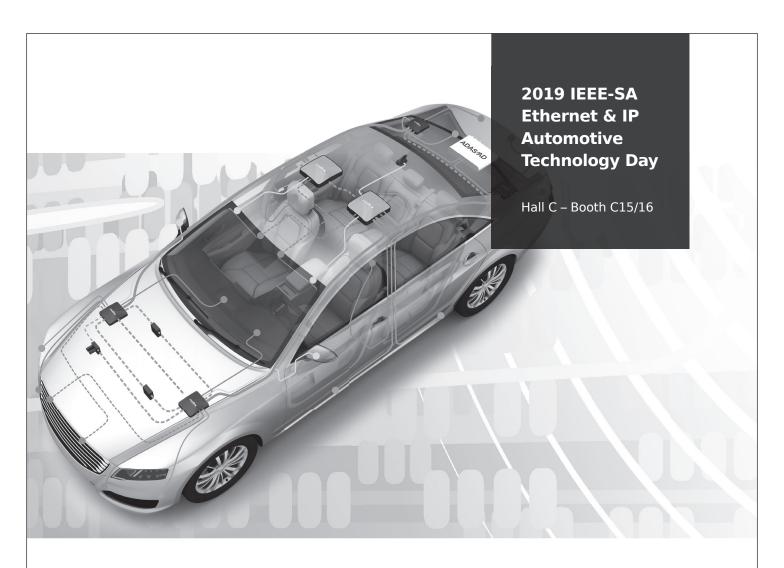
X2E is an innovative and flexible partner in the development and production of advanced electronic solutions for automotive applications.

Our main products are high-performance multibus data loggers, which are capable of recording data from several automotive bus systems (100/1000Base-T1, 10 Gbit Ethernet, CAN, FlexRay, RS-232, LIN, MOST, PSI5, analog signals, GNLog and DLT) simultaneously with a 100 ns precision timestamp. The modular design of our XORAYA series allows numerous customizations. For example, the devices can be assembled or retrofitted according to customer requirements. As a result, the data loggers can quickly and efficiently be adapted to changing conditions and can develop continuously with your projects.

With an in-house production facility, X2E also offers a broad range of Manufacturing Services. They encompass the hardware and software development, THT and SMD assembly, reworking, individual housing production, cable assembly and final production tests.







At the Center of **Connected Mobility**

Delivering the Future: The Leading 10 Gbps Multi-Zone Ethernet Network Platform

With its end-to-end 10 Gbps Ethernet network, Molex produces connected mobility solutions that enable the vehicles of tomorrow. Our solutions provide the processing power and connectivity for the latest in vehicle safety and reliability. We seamlessly connect the technology required for advanced driver assistance systems (ADAS), automated driving (AD), infotainment systems, OTA updates, real-time vehicle diagnostics and more.

∲IEEE IEEE STANDARDS ASSOCIATION

Attend our Molex presentation sessions and visit our booth for an in-vehicle network demo.







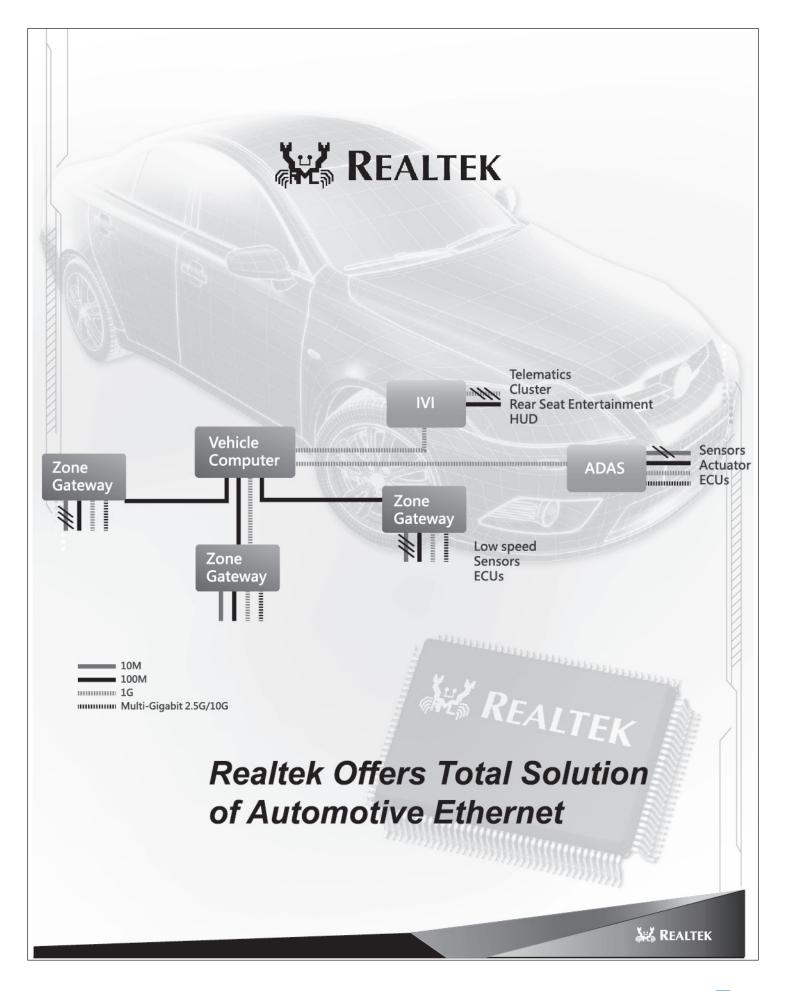




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ROHDE&SCHWARZ

Make ideas real



100/1000BASE-T1 AUTOMOTIVE ETHERNET TEST SOLUTION

- Complete solution including oscilloscope, VNA and test fixtures
- Automated test execution and reporting
- Superior signal fidelity up to 16 bit and high acquisition rate
- Intuitive GUI with step-by-step guidance



R&S®RTO and R&S®ZND required for the 100/1000BASE-T1 compliance testing.

ETHERNET LIVE MONITOR

Live Testing with Intelligent Data Management



- → The Ethernet Live Monitor (ELM) allows the testing of TSN/AVB implementations in Ethernet networks.
- → Implemented rule checkers identify errors in real time and initiate a recording in the data logger through the trigger output.
- → An additional monitoring function displays analysis data in real time on the PC client and informs about time deviation of the TSN/AVB implementation.

RUETZ SYSTEM SOLUTIONS

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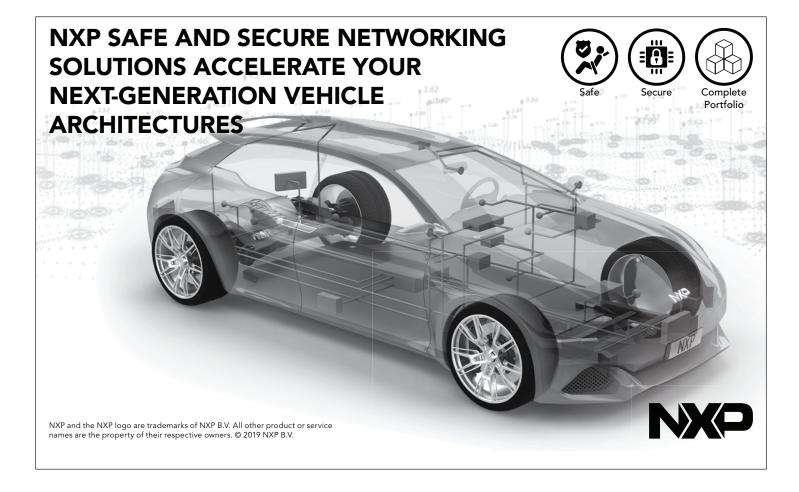


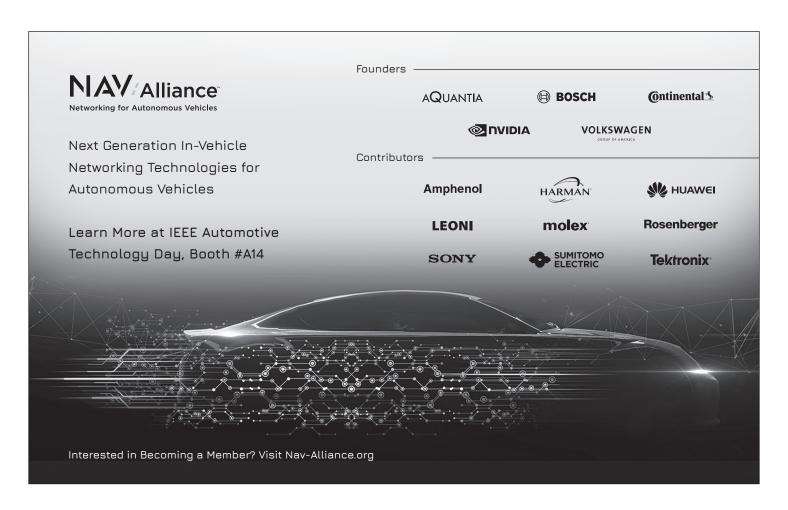
Our Team of Engineers have created a Hardware and Software Environment that Accelerates time to market for Embedded customers using the Infineon AURIX™ ISO26262 Microcontroller.

Neutron Controls has developed the first
Redundant Gigabit Ethernet Network for Automotive Applications,
We are scaling to include 100G Ethernet Switching
for Sensor Fusion and Autonomous Applications.

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HIGH-SPEED DATA CONNECTIONS FOR TOMORROW'S TRAILERS



ERICH JAEGER is leading next-gen trailer tow technology with ERICH JAEGER ETHERNET, delivering the high-speed connections required for advanced vision systems, sensors and more. With 92 years of innovating, **ERICH JAEGER** is smart towing technology.™



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A Complete Toolset for AUTOMOTIVE ETHERNET

SWITCHES

MEDIA CONVERTERS





RAD-Pluto and RAD-Jupiter: 5 and 7 port managed switches for 100BASE-T1, 1000BASE-T1, and 1000BASE-T. RAD-Jupiter also supports AVB/TSN with

also supports AVB/TSN with deep packet inspection. Both include 2x CAN FD and 1x LIN.



RAD-Moon 2:

100/1000BASE-T1 media converter based on the Marvell 88Q2112.



RAD-Moon DUO:

100BASE-T1 to USB dongle plus dual 100BASE-T1 to 100BASE-TX media converter all in one!

ACTIVE TAPS

DATA LOGGERS



RAD-Galaxy: 6x active tap, 12x media converter and standalone in-vehicle data logger with 100BASE-T1 and 8x CAN/CAN FD support.



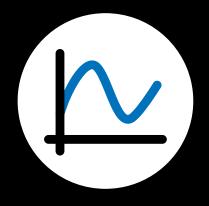
RAD-Gigalog: Log 6+ TB of data! Includes autonomous controller logging, camera/radar tapping, CAN logging, XCP logging & more.



RAD-Gigastar: 1000BASE-T1 active tap, gateway, media converter, vehicle interface & data logger all in one!



RAD-Galaxy: Standalone in-vehicle data logger with 8x CAN/CAN FD support.



INTREPID CONTROL SYSTEMS

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