Arrow Electronics, Inc of Michigan will be hosting its Third Annual Arrow Technology Expo. The event provides you the opportunity to learn about the latest innovations in technology and build valuable relationships with industry leading suppliers. Choose from 20 one hour technical seminars to attend addressing solutions to today’s design challenges presented by our supplier partners. There will also be an open forum Vendor Exposition floor room where you can meet and chat with supplier and supplier representatives from over 50 manufacturers outside of the classroom.

This event is Free for Arrow Customers!

Click HERE for Map and Directions
CLICK HERE TO REGISTER

**REGISTRATION** 8:00am to 8:45am

| Technical Session 1 | Silex - Overview of Silex's Ultra Low-Power low cost hostless Wi-Fi IoT module(SX-ULPGN) | Texas Instruments - Tips and Tricks of Power Supply Design | Renesas - Experience the Renesas Synergy Platform Firsthand | Epson - Gyro sensors – how do they work and where are they used. An in-depth look at the properties and advantages of quartz based gyro.
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|-------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|--------------------------------------------------|
| 9:00am - 10:00am | Silicon Laboratories - Understanding Tradeoffs of Low Power Wireless Solutions | TDK-Lambda - Power Supply Topology | Analog Devices - How to design Precision Analog Front Ends for today’s demanding sensor applications | ISSI - How to get the most out of Linear LED Drivers for Automotive and Consumer applications |
| Technical Session 2 | 10:15am - 11:15am | Semtech - Long Range / Low Power Wireless IOT Solutions | On Semiconductor - Designing for Automotive Transients | NXP - Sensors for Automotive, Medical & Industrial Applications |
| 11:30am - 12:30pm | Technical Session 3 | Kingston Technology - Storage and Memory Solutions for Embedded Systems |
| LUNCH and OPEN EXPO FLOOR | 12:30pm TO 2:00pm | |
| 2:00pm - 3:00pm | Technical Session 4 | Linear Technologies - uModules | Microchip - Selecting Clock Sources for Embedded Systems | STMicroelectronics - Extensive portfolio of MEMS and sensors |
| 3:15pm - | Technical Session 5 | NXP - Motor Control Fundamentals | Infineon Sensors – Mobile, Wearable, HMI, | Honeywell - Electromechanical Switches that are used in multiple Industrial and Transportation | Embedded Planet - epConnect for complete IoT Solutions using wireless sensors. |
**Technical Session 1  9:00am - 10:00am**

**Silex** - Overview of Silex's Ultra Low-Power low cost hostless Wi-Fi IoT module (SX-ULPGN)

An Overview of Silex's Ultra Low-Power low cost hostless Wi-Fi IoT module (SX-ULPGN) based on the QCA4010 radio from Qualcomm. This session will cover the module's high level architecture, features, benefits, customer applications, and use cases. It will also compare this module to Silex's dual-band IoT module (SX-ULPAN). Also included is a quick overview on how one can begin the SX-ULPGN evaluation.

**Texas Instruments** - Tips and Tricks of Power Supply Design

TI's Power Supply Design group will once again take attendees through tips and tricks they have learned while designing and debugging power supply circuits for TI's customers with a focus on automotive applications. Content in this session will include such tips as picking your major passives, closing the control loop, estimating load transient response, designing for automotive EMI compliance, and more. You will leave this class amazed at what you learn! To see more of these on-line, go to [https://training.ti.com/](https://training.ti.com/) and search under keyword “power”.

**Renesas** - Experience the Renesas Synergy Platform Firsthand

Are you looking for a comprehensive way to bring a complex design to market fast? Synergy is a complete and qualified platform that accelerates embedded development, inspiring innovation and enabling differentiation. The Synergy Platform platform has 5 Major components: Professional Qualified Software, Scalable Microcontrollers, Tools and Kits, Solutions and Cloud Connectivity! Come see what the buzz is all about…learn what Renesas Synergy can do for your next complex design!

**Epson** - Gyro sensors – how do they work and where are they used. An in-depth look at the properties and advantages of quartz based gyros.

Many people use Gyros without knowing it. They are used in many automotive (and other) applications and the potential uses are limited only by one’s imagination. Come and learn about this exciting, rapidly growing market. We will discuss the following topics and in the end one will walk away with a basic understanding of Epson Electronics America’s gyro product line and it’s benefits.

- Quartz Mem vs Silicon Mem (advantages of Quartz)
- Basic principles of operation
- Current applications (including safety, navigation, medical and many others).
- A look at new and creative applications
Technical Session 2 10:15am - 11:15am

Silicon Laboratories - Understanding Tradeoffs of Low Power Wireless Solutions

With an estimated 50 billion sensing nodes by 2020, wireless connectivity is the primary means of communicating to these devices. The design tradeoffs for wireless communications usually involve cost, range, latency, power, and data rate and protocol stack features. The aim of this class is to educate engineers at the forefront of low power wireless development about these tradeoffs.

Our discussion will including the following wireless topics:

• Modules vs. chip-down
• Proprietary vs. standards-based protocol stacks
• Hardware and Software development tools
• Example Applications
• Demonstrations of easy to use development platforms.

In the end, you will better understand wireless design tradeoffs and Silicon Labs' wireless solutions.

TDK-Lambda - Power Supply Topology

Professor Jim Mankowski, Technical Applications Engineer will be discussing TDK-Lambda's DC-DC products and approach for Distributed Power with a broad introduction of several new products. TDK-Lambda manufactures a complete line of AC/DC and DC/DC Industrial, Medical, Military and Modified Power Supplies.

Analog Devices - How to design Precision Analog Front Ends for today's demanding sensor applications

In this course we will analyze the precision system circuit to define amplification challenges providing the class with an overview of sensor, signal, and op amp characteristics for various design requirements. Analog Front End (AFE) applications highlighting the impact of their characteristics on overall system precision and performance within different applications. Want to learn more? Please attend our class and see live sensors demonstrations with interactive ‘real world’ discussions.

ISSI - How to get the most out of Linear LED Drivers for Automotive and Consumer applications

ISSI will demonstrate how to best solve issues surrounding proper biasing, calculating thermal dissipation, and flexibility of constant current in LED Driver applications. In addition, we will introduce you to our new ECC DRAM products, which solve bit errors without additional DRAMs

Technical Session 3 11:30am - 12:30pm

Semtech - Long Range / Low Power Wireless IOT Solutions

Have you met LORA? Here’s your chance! Overview and technical demonstration of Semtech Long Range Wireless technology that best enables the Internet of Things. Technical discussion includes how to achieve unmatched receiver sensitivity, signal strength, battery life and cost efficiency.
**On Semiconductor - Designing for Automotive Transients**

This class will discuss mitigation of transient voltages that occur in Automotive Systems including ESD, Load Dump, Double Battery and Inductive Loads using ON Semiconductor's portfolio of circuit protection devices.

**NXP - Sensors for Automotive, Medical & Industrial Applications**

This session will provide an overview of NXP motion, magnetic field, and pressure sensors for automotive safety and comfort, medical, and industrial applications.

**Kingston Technology - Storage and Memory Solutions for Embedded Systems**

This session will provide a brief review of NAND flash basics followed by a discussion of managed NAND storage technology with focus on embedded Multi-Media Card (eMMC). With eMMC, system designers can choose from a variety of configurations to tailor the eMMC storage solution to best fit their design requirements. Considerations to high-reliability, capacity and performance trade-offs will also be discussed. Additionally, an overview of available integrated storage and memory packaging solutions will be presented.

**Technical Session 4  2:00pm - 3:00pm**

**Silicon Expert - Current developments in Electronic Component Research and Data Management Applications**

An informative seminar and product demonstration covering the industry’s most recent hot topics such as Conflict Minerals, RoHS and REACH Compliance, Counterfeits, as well as Lifecycle and Obsolescence Risk Management, finding suitable alternates quickly, accessing datasheets and other document types, and change event monitoring for pro-active vs. reactive responses to Supply Chain challenges.

**Linear Technologies - uModules**

LTC uModule family allows designers the ability to design high power DC/DC solutions with simplicity, small space, high efficiency & fast time-to-market. We will discuss our broad based portfolio of uModules that include DC/DC Buck, Boost, Buck-Boost, LED Driver & Isolated solutions.

**Microchip - Selecting Clock Sources for Embedded Systems**

If you are using communications peripherals in your design (such as USB, Ethernet or wireless), you may need to select a higher performance clock source than the internal RC clock. If you are digitizing real-time data with an ADC, the same considerations apply. Otherwise, clock frequency inaccuracy and jitter can cause unstable operation, data errors or packet loss. In this class, you will learn about clock source options for your product: crystals, crystal/MEMS oscillators (integrated XO/MO) and integrated clock products. We’ll walk through some application specific design examples, examine clock options and balance design time, risk, component count, performance and cost.

**ST Microelectronics - Extensive portfolio of MEMS and sensors**
ST Microelectronics has an extensive portfolio of MEMS and sensors which address a broad range of applications and markets. The presentation will provide an overview of our inertial sensors (motion and position sensing), environmental sensors (pressure, temperature and humidity) as well as MEMS microphones and associated software for noise cancellation and voice recognition. The first half of the presentation will focus on automotive applications while the second half will address industrial markets and applications.

**Technical Session 5  3:15pm - 4:15pm**

**NXP - Motor Control Fundamentals**

Basics of motor control focusing on 3-phase brushless motors, including synchronous and trapezoidal control as well as control of induction motors. There will be a brief demo of available development systems.

**Infineon Sensors – Mobile, Wearable, HMI**

Low Cost to High Accuracy – Sensors to make your HMI designs more intelligent. Learn the what and how to Infineon’s low power Barometric Pressure sensor for Mobile and Wearables markets. Learn Infineon’s low cost 3D magnetic sensor for multi-axis HMI controls and sensing. Demo’s of each will be used in the presentation.

**Honeywell - Electromechanical Switches that are used in multiple Industrial and Transportation Applications**

“Honeywell’s Embedded Products Division of Sensing & Productivity Solutions will present their Electromechanical Switches that are used in multiple Industrial and Transportation Applications. Learn the anatomy of Basic Switches and of Limit Switches. This presentation will also show Focus Applications and Success Stories.”

**Embedded Planet - epConnect for complete IoT Solutions using wireless sensors.**

Embedded Planet is an Arrow ACES partner, supplier and a customer. We will present epConnect for complete IoT Solutions using wireless sensors. Getting data from the wireless sensor to the cloud will be demonstrated and the implementation detailed. The software and hardware behind the Embedded Planet’s epGateway and epSensors using SmartMesh IP and LoRa wireless technologies will be discussed. epSOM modules for NXP, TI and Altera will be reviewed. We will review the software and hardware behind our NXP solutions using QorIQ Layerscape, TI solutions using BeagleBone Black Commercial and Industrial, Beagle Board X15 and Altera Cyclone V SoC.