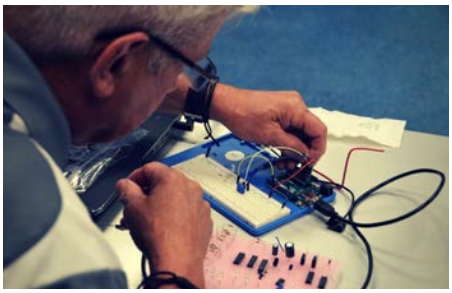

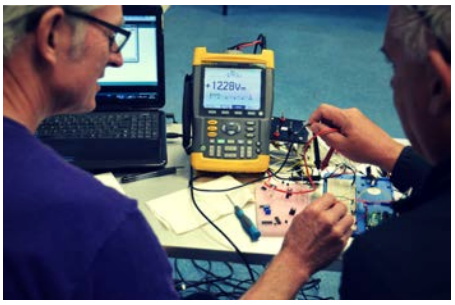

AUTOMOTIVE SOFTWARE & ELECTRONICS INTERMEDIATE BOOT CAMP

Future Tech

$1,995 Early Bird Registration

($2,195 thereafter)

July 22-26, 2019 *(Portland, OR)*
December 9-13, 2019 *(Las Vegas, NV)*

The automotive service and diagnostic market is speeding into more advanced electronic systems and software controls, and these changes will challenge Automotive Instructors and Technicians in creating new solutions and techniques in service and diagnosing advanced automotive systems. Additionally, it is equally important that those professionals working with advanced automotive systems understand HOW to work with them.

The Intermediate Boot Camp will use integrated circuits, electronic components, and the popular Arduino Microcontroller. Participants will have exposure to more advanced MC, electronics, data acquisition, and communications systems for the purposes of building new H/W, F/W, & S/W knowledge and tools that can be used directly with automotive systems.

For registration, boot camp bundles, location information, complete overviews and more, visit:
futuretechauto.com/swbootcamp

Pre-requisites:
Fundamentals Boot Camp

Instruction:
80% hands-on, 20% lecture

Hours:
8:30AM-4:30 PM

This boot camp is designed for individuals who have completed the Fundamentals Boot Camp, but otherwise have minimal experience in s/w development or coding, and minimal to average experience with analog & digital electronics circuits and devices.

Instructor
Dr. Mark Quarto
(CTO, QTS LLC)

- **Agenda of daily hands-on activities in FutureTech's Automotive Software & Electronics Intermediate Boot Camp:**

  - **Monday**

  - Review of Vehicle Control and Electronic Systems Architectures
  - Discuss H/W and S/W Interactions in Control Systems
  - Analog and Digital Circuit Operation and failure modes
  - Review and build Analog and Digital Signal Conditioning circuits: The purpose of Signal Conditioning is to ensure that external signals can safely connect the MC to the outside world of motors, relay drivers, sensors, other controllers, networks, and more: This course will cover Why and What is needed, and How to build Analog Digital Signal Conditioning circuits that will interface with the MC. As part of learning and interfacing Signal Conditioning with the MC, it is necessary that participants understand the operation and application of electronic devices. The focus will be how to use these devices for building Signal Conditioning and Control Systems, and how to use these devices with a MC.
  - Review and build Electronic Device Circuits: Resistor, Resistor Network, Rectifier Diodes, and Zener Diodes, and Opto-Isolators, Operational Amplifiers, Level Shifters, Logic Gates, Magnetic Field Sensing, and more!

  - **Tuesday**

MC Control Software Syntax and Functions Review: FOR, WHILE, IF, ELSE IF, and IF Loop statement usage for the purpose of connecting the MC to the outside world to control motors, relays, sensors, other controllers, networks, and more:

- Circuits that will be built to work with S/W Loops for the purposes of Signal Conditioning, Pulse Counting, and Level Sensing, Counter-Divider Circuits, Operational Amplifiers, and Voltage Level Shifters, Schmitt Trigger Circuits
- Power Electronics Switching and Amplification Devices: BiPolar Transistor Circuits, MOSFET Transistor Circuits
- Electronic Components: Logic Sensing, Magnetic Field Sensing, and Signal Conditioning: Buffers, Logic Gates, and Hall Effect Sensor
- New MC Control Software Syntax and Functions: Using Arrays for Writing and Reading Data and Millis function instead of Delay function more robust S/W code
- Using and Loading Serial Libraries into S/W to Add Device Functions and Controls: This section will teach participants how to use Serial Libraries (i.e., driver software) to control an almost endless number of inputs or outputs.

- **Wednesday**

The I2C Data Bus and using it for Network Control of Devices: Participants will be introduced to the new world of the I2C Data Bus and how to use data bus communications to control devices based on hex addressing. Learning the I2C data bus will help prepare the participant for learning the automotive CAN bus.
High Voltage Battery Management System Circuit (class project): This circuit will be constructed and S/W code completed by course Participants to build an operational High Voltage Battery Management Sensing and Balancing System for a Lithium Ion battery pack cell system.

- **Thursday**

Automotive Temperature Sensing Circuit (class project): Temperature sensing is the most important data that can be acquired by a MC. This circuit will be constructed and S/W code completed by course Participants to build an operational circuit Temperature sensing circuit that could be used to monitor the temperature for any automotive circuit.
Automotive ADAS Collision Avoidance System (class project): ADAS systems are quickly becoming a mainstream system on almost every vehicle product. A basic ADAS Collision Avoidance Sensing circuit will be constructed and S/W code completed by course Participants to build an operational circuit.
Automotive Proximity Sensing System (class project – time permitting): Proximity Sensing Circuits are one of the most important sensing system that are used by a MC to anticipate when a circuit should be actuated or triggered. This circuit will be constructed and S/W code completed by course Participants to build an operational circuit.

- **Friday**

Using the MC to Control Circuits Over the Internet: Using the internet to control or monitor circuits is one of the most flexible alternatives when controlling or diagnosing an automotive circuit. This circuit will be constructed and S/W code completed by course Participants to build an operational circuit with an internet control interface.
Audio Sensing Circuits (time permitting): Electronic circuits can be triggered or controlled by a noise input. This circuit will be constructed and S/W code completed by course Participants to build an operational Audio Sensing circuit.