Hi, I'm Alan Hawse. Welcome back to Amazon FreeRTOS 101 with the Cypress 43907 and 54907 Wi-Fi devices.

Before we get into the details of how to setup the Amazon FreeRTOS environment, download the examples, compile and program the kits – you know all of that stuff - I'd like to spend a little time talking about another set of videos that I created based on our 2-day WICED Wi-Fi class. The videos can be found at the Cypress training website and they cover how to use our 43907 devices with the WICED Studio IDE. Much of this information is useful in the Amazon FreeRTOS environment as well so I'd like to introduce you to it now.

The videos are broken into 8 chapters as you can see here. Each chapter is further divided into one or more sub-sections, so you can jump around all crazy all over the place and just watch the sections that are of interest to you.

From the top-level site, there is a link to a GitHub site that has an electronic copy of the book that accompanies these videos if you'd rather read it at your own pace or use it as a reference manual. In fact, I like to learn from a book and not from videos, but I know that everybody is different. You will also find solutions to all of the exercises that are in the book. I think all of these will be valuable resources for you to use as a starting point to create your own firmware and your own applications.

The first chapter consists of 3 sub-sections: an overall introduction to the class, a brief introduction to the WICED Studio IDE, and a tutorial on how to build and program sample applications that are provided as part of the IDE. We're big believers in short tutorial snip applications that explain how different features of the system work. We know that you want to pick up code segments and use them in your own application, so I show you how to use those things to continue your own learning.

The second chapter covers peripherals that are available on the 43907 as well as the 54907 and how to interact with them in the firmware. It covers things like GPIOs, UARTs, PWMs, and I2Cs. If you do the exercises in this chapter you'll learn how to blink the LEDs, read the state of buttons, setup interrupts, dim LEDs, print debug information to the UART terminal, and so on. You know, all of those things that you need to know how to do in order to build a real system.

Chapter three is an introduction to the fundamentals of RTOSs. The days of programming on the bare metal are mostly over and you'll get great value by using an RTOS in your applications. It's my personal crusade to get people with the program … well actually the RTOS, not the program. I'll teach you all the basics RTOS. These concepts include threads, semaphores, mutexes, and queues. All of these fundamental things apply directly to Amazon FreeRTOS, which is actually the first RTOS that I personally used and it's my favorite one for building projects.

Chapter four covers some of the middleware libraries that Cypress supports. Specifically, I talk about the U8G graphics library as well as two different JSON parsers. JSON parsers are particularly relevant for the IoT and Amazon FreeRTOS because most of the cloud data is stored in JSON format. You should know that JSON is really the "lingua franca" of the internet and it is

the most common data exchange format. This is particularly true of the Amazon IoT Cloud, where JSON is used for a wide range of purposes from device shadows all the way to security credentials.

The fifth chapter is an introduction to Wi-Fi networking and how to connect to Wi-Fi from a WICED device.

The sixth chapter builds on chapter five and I explain how data is moved back and forth over a Wi-Fi network to and from the cloud and how to do it maybe more importantly, securely – you know – encryption, certificates and all that other jazz.

Chapter seven discusses different commonly used IoT protocols that are supported by Cypress including HTTP, MQTT, AMQP and CoAP. Amazon Web Services supports HTTP as well as MQTT – but I'll tell you that most IoT devices on AWS use MQTT so if you watch these videos, pay particular attention to the MQTT. In chapter 7 part C, I have a particular focus on Amazon Web Services. I teach you about MQTT, Things, Certificates, Policies, Shadows, Topics, Message Brokers. Basically, all of the things that will apply directly to your Amazon FreeRTOS experience. I really show you how to connect and use the AWS cloud using MQTT.

Chapter 8 introduces an IoT weather station that we use as a final project when we teach this class in person. The weather station reads data from local weather station - a temperature, humidity, and ambient light - and it sends it out to the cloud. It can also pull and display weather information for all of the other weather stations that are connected to the same AWS MQTT broker. It's awesome really, to see a room full of people all successfully sending data to and from the cloud. I find it incredibly gratifying and I think that the example project is a really good place for you to learn about building these things.

That, in a nutshell, is what you will find in our WICED Wi-Fi 101 video series. I hope you will take some time to explore the book, the projects, and the videos. I really think they'll be invaluable when you get into the nuts and bolts of using AWS on your own IoT applications.

You can post your comments and questions in our developer community where one of the application engineers working for Cypress will make sure your question is answered, or as always you're welcome to email me a personal comment or question to alan_hawse@cypress.com or tweet me @askioexpert. Thank You!