



*How far can Kappa take your design?*

[www.kappaiq.com](http://www.kappaiq.com)

## Meet Kappa Electronics!

On February 22, 2016, three of the industry's leading experts in motor control came together to form a new consulting company. Kappa Electronics was born with the mission of advancing the cause of motor control technology by helping our customers get to market quickly, affordably, and with the latest technology in hardware and software design of motor control systems. Meet the team...

### Jorge Zambada

With over 15 years of experience, Jorge has amassed an extensive background in motor control software development across multiple microcontroller platforms. He has led motor control development activities at three major semiconductor companies, including Freescale, Microchip and Texas Instruments. Jorge is able to implement just about any type of control on any microcontroller, even when the MCU features are very limited. His extensive problem solving skills have evolved into a keen insight for debugging software and motor systems.



While working at Freescale, Jorge was well known and respected throughout the appliance industry for leading the algorithm development for a new generation of Brushless Direct Drive Washing Machines. During his time at Microchip, Jorge was the lead engineer for their motor control activities, where he developed several innovative motor control solutions. He also authored numerous application notes and papers on PMSM and ACIM Field Oriented Control techniques.

Some of Jorge's most significant accomplishments are in the area of embedded software architecture and algorithm development. He has pioneered new techniques for library partitioning and ROM code development. He has advanced the field of embedded software testing by using vectors and scripts to exercise corner case conditions, thus improving software robustness. While working at Texas Instruments, Jorge contributed to the ROM code

development of InstaSPIN-FOC, which is arguably the best sensorless motor control solution available from any semiconductor manufacturer. He has developed groundbreaking new solutions for refrigerator compressor controllers, garage door openers, air conditioning compressors, washing machines, fans, drones, and automotive motor controllers such as fluid pumps, and more. His list of accomplishments also includes numerous articles and application notes related to motor control which are referenced in the “Kappa IQ Corner” of our website.

Jorge enjoys surfing, snowboarding, camping, traveling around the world, coral beaches and of course, controlling motors! 😊

## Eric Thomas

Eric Thomas is the “Jack of all Trades” and creative force behind Kappa Electronics. Although he received a degree in Electrical Engineering from Michigan State University in 1997, he has “the knack” for all things engineering, both electrical and mechanical. Toward the end of his bachelor’s degree, Eric became very interested in motor control and power electronics. This led him to the University of Illinois in 1998 where he became a key contributor to their Hybrid Electric Vehicle project. During his time there he was awarded the highly coveted Grainger Power Engineering Award.



Eric obtained his Master’s Degree in Electrical Engineering in 1999, and was recruited by General Electric to lead their software design activities for Electrically Commutated Motors. While at GE, he developed much of their control and communications software on Microchip, Freescale, and TI platforms. His interpersonal skills were quickly recognized, and he was targeted for a fast-track career into management. But Eric’s heart was in engineering, where he continued to design hardware and software for a variety of high profile motor control projects. Before leaving GE, he graduated from the GE Edison Engineering Development Program.

In 2006 Eric moved to the Advanced Technical Design group at Stryker Instruments. This was a time of career growth for Eric as he expanded his knowledge into medical systems, designing RF components and custom software for IEEE 802.15.4 radios for medical instruments. He became an expert with Finite Element Analysis techniques, where he electromagnetically modeled the human body and developed ways to power internally implanted devices. But Eric’s true love was still power electronics and motor control. While at Stryker, he also designed an FPGA based field oriented controller for a high speed motor used in medical cutting applications.

In 2010, Eric was recruited by Texas Instruments as a senior engineer on the Central Motor Control Applications Marketing Team. His interpersonal skills combined with his technical savvy allowed him to effectively work with customers to solve their motor control problems using TI products. His expertise was quickly recognized throughout Texas Instruments, and he became a leading champion for motor control innovation at TI. In his spare time, Eric designed a

proprietary dynamometer system that ended up being used extensively throughout TI. In 2012 he moved to the C2000 motor control applications team where he developed the InstaSPIN-BLDC product; a sensorless control technique for BLDC motors. He was also a key contributor and designer of InstaSPIN-FOC, which is a proprietary sensorless field oriented control algorithm available from Texas Instruments. Eric became well known throughout the industry for his innovative work with e-bike motor controllers, direct drive washers, fan controllers, and automotive pumps, just to name a few. He recently authored a paper on a non-conventional Space Vector Modulation technique he designed for InstaSPIN-FOC.

Eric enjoys cycling, ice skating and skiing with his wife Anne and their two daughters. He is always tinkering with things around the house, re-designing them to make them work better. He even helped a friend build a generator from scratch for a wind power generation station. His passion for power systems and motor control continues to drive his hobby activities.

## Dave Wilson

Dave Wilson has been passionately designing motor control systems ever since he graduated in 1979 with a BSEE degree from John Brown University. This passion led him to obtain his MSEE degree in 1986 from the University of Wisconsin-Milwaukee, with a focus on digital control systems, digital signal processing, and power systems. For 12 years he worked in industry designing motor control systems such as a PWM based cycloconverter, a high speed servo for X-Ray beam filters, and a six-axis stage controller for a scanning electron microscope.

In 1991, Dave joined Motorola Semiconductor as a Field Applications Engineer. This was a time of career growth for Dave as he learned how important customer relationships are to a healthy business. During this time, he furthered his expertise in motor control and heavily influenced the direction of Motorola's motor control products. This included working with a leading drives manufacturer to design a new PWM module which was used on the MC708MP16. In 2004, he architected the eFlexPWM (mcPWM) module which has served as the high-end PWM solution for multiple platforms and devices within Freescale Semiconductor.

After a brief stint with Cirrus Logic, Dave joined Texas Instruments in January of 2010. During this time, Dave developed an interest in motor control simulation techniques, including model-to-code solutions. Many of these simulations can be found in the "Kappa IQ Corner" of our website. He also wrote several articles and blogs discussing new developments in Field Oriented Control, PWM techniques, and digital control algorithms. He developed lasting friendships with many motor control engineers through the motor control seminar series he taught every year while at TI. Most recently, Dave was part of the C2000 applications team that developed the "InstaSPIN" algorithms, including InstaSPIN-BLDC, InstaSPIN-FOC, and InstaSPIN-MOTION. In particular, InstaSPIN-FOC is arguably the highest performance sensorless control algorithm for ACIM, PMSM, and IPM motors that is currently available on the open market. Dave enjoys hiking, camping, photography, playing guitar, target shooting, simulating, rotating metal, and most recently, "droning". ☺



## How Can We Help You?

Whether you need a turnkey motor control solution, or just a little training to catch up on the latest technology, Kappa can help.

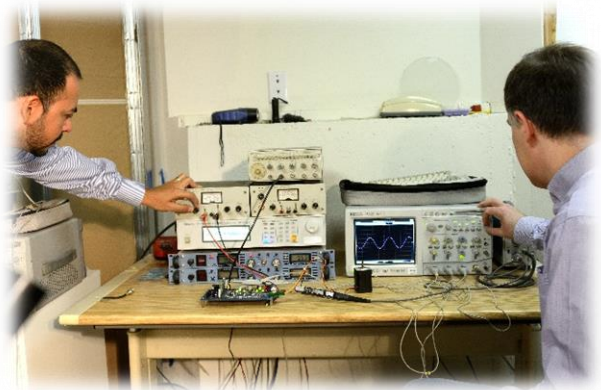
### Training

As former employees of some of the largest semiconductor companies on the planet, we have been doing motor control seminars around the world for years; in some cases, over 20 years! We do both customized training for your company staff, or from time to time we do regional training events. Please check the Kappa website for news of pending events coming to your area in the future: [www.kappaiq.com](http://www.kappaiq.com).



### Debugging

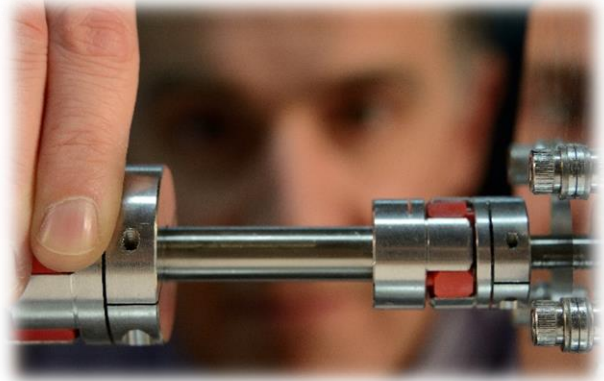
Despite their simplistic functionality, motor control system requirements can be very demanding. The embedded software requires that system signals be sampled with extreme precision, and new outputs must be calculated within microseconds. The gate driver circuits which control the power transistors must be carefully designed and laid out, or unwanted ringing and oscillations will result. Many designs require high voltage and high current to power the motor, which often results in unwanted switching noise being coupled into sensitive input signals.



As former motor control applications engineers, we understand the demanding requirements of motor control designs, and know what to look for when your system starts acting temperamental. For example, we just recently helped a customer exterminate a well-hidden bug in their 2 kW inverter which turned out to be a noise coupling problem. By simply grounding some capacitors to a different part of the circuit board, we were able to eliminate their problem. Any consultant can find the obvious bugs on the surface. But because of our applications engineering experience, we can often find the deep bugs that others leave behind.

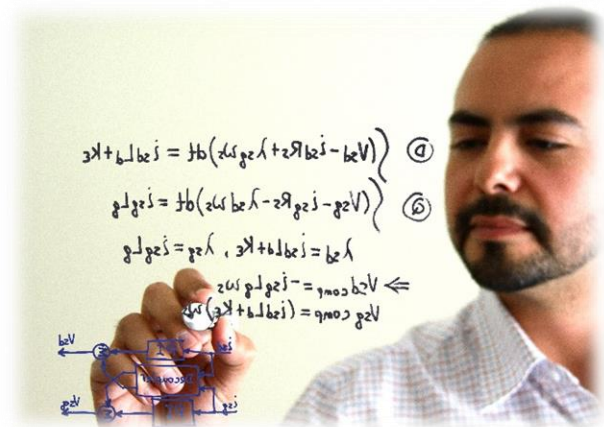
## Testing

Many companies don't have the resources to design their own motor control systems, but instead choose to use a reference design from a semiconductor manufacturer, or buy a third-party solution. But navigating through the myriad of options and control topologies can be very confusing, even if you **do** know a little bit about motor control. Should you use trapezoidal control, or Field Oriented Control? Do you need a shaft sensor, or can it be sensorless? Is efficiency important for your design, and if so, what are the design criteria that affect efficiency? Again, Kappa can help you make the best decision based on your system requirements. And then after you have made your selection for a system supplier and control topology, Kappa can perform an independent evaluation of the solution and generate a detailed report of its performance measured against your design requirements. We can often identify issues at the beginning of the design cycle, saving you months of productivity by finding problems early.



## Design

Whether you are a large company who needs a little more resource bandwidth to finish a project, or a small company that needs a complete turnkey solution for controlling the motors in your product, Kappa should be the first place you call for help. We can take your visionary concept and turn it into a full-fledged production solution, including the hardware design, software design, board layout, product testing, and more. Let us take the worry out of your motor control design, and free you up to deal with the more important aspects of running your business.



## Experience the “Kappa Difference”

So how is Kappa different from other consulting firms you may have dealt with in the past? For one thing, motor control is not just a job for us... it’s a burning passion that we share! Every customer design we do, and every customer problem we solve, is a manifestation of this passion. It’s our way of advancing the field of motor control; by making sure you succeed! Please give us the opportunity to demonstrate that these are not just high-sounding words. Let us personally show you the “Kappa Difference”!



Please visit us at [www.kappaiq.com](http://www.kappaiq.com)

