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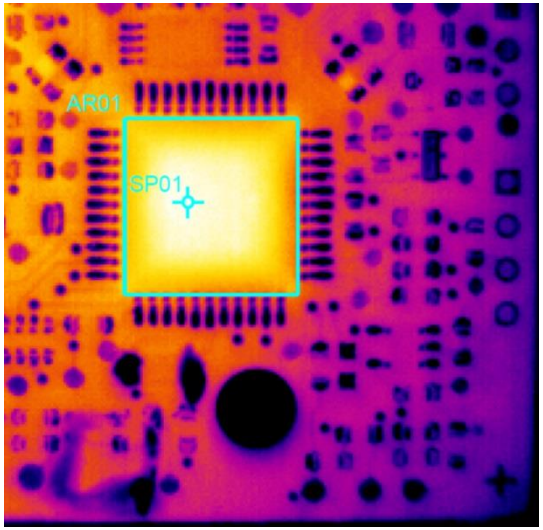





PRESENTATION OF THE

# PROFESSIONAL SERVICES

OFFERED BY

# FERDINANDO SEVERI

8th February, 2021

# SERVICE OFFER

- **Electronic Design Services**: from specifications through certifications to production
- Expert on **BLDC / PMAC Motion applications**: motor characterization on dynamometric bench, hardware development, electrical and thermal validation, support to certification
- Motion control **algorithm development**: advanced algorithms in Matlab Simulink (simulation of power electronics and motor, algorithm development, c code generation, execution with tracing)
- **Power electronics**: electrical and thermal characterization

# COLLABORATIONS

Collaborates with PRAEL Srl, a team of experienced designers of embedded systems

Established a consolidated relationship with Chinese PCB manufacturer CviLux

# CURRICULUM VITAE

from sept. ′13

**Electronic Engineer, small business owner**:

- electronic design services: from specifications through certifications to production
- expert on BLDC / PMAC motion applications
- power electronics design and characterization
- motion control algorithm development in Simulink

may ′08 - feb. ′13



**Sr. Customer Application Eng., International Rectifier** (now **Infineon**):

- motor commissioning and application support of IRMCx family of motion controllers
- thermal characterization of µIPM, IRAM power modules with IR camera and dynamometric bench
- motion control algorithm development in Simulink
- firmware development in C and support in Keil µVision for 8051

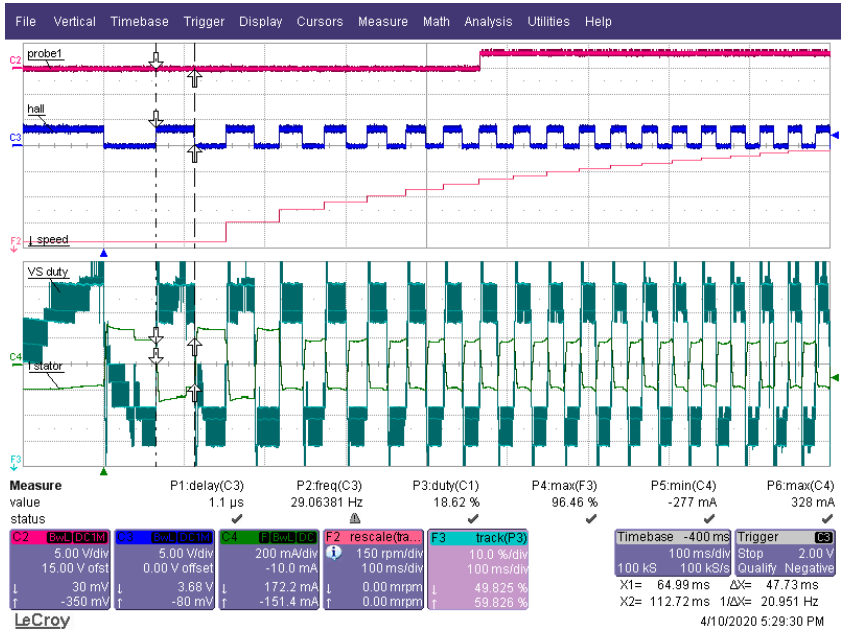
# CURRICULUM VITAE

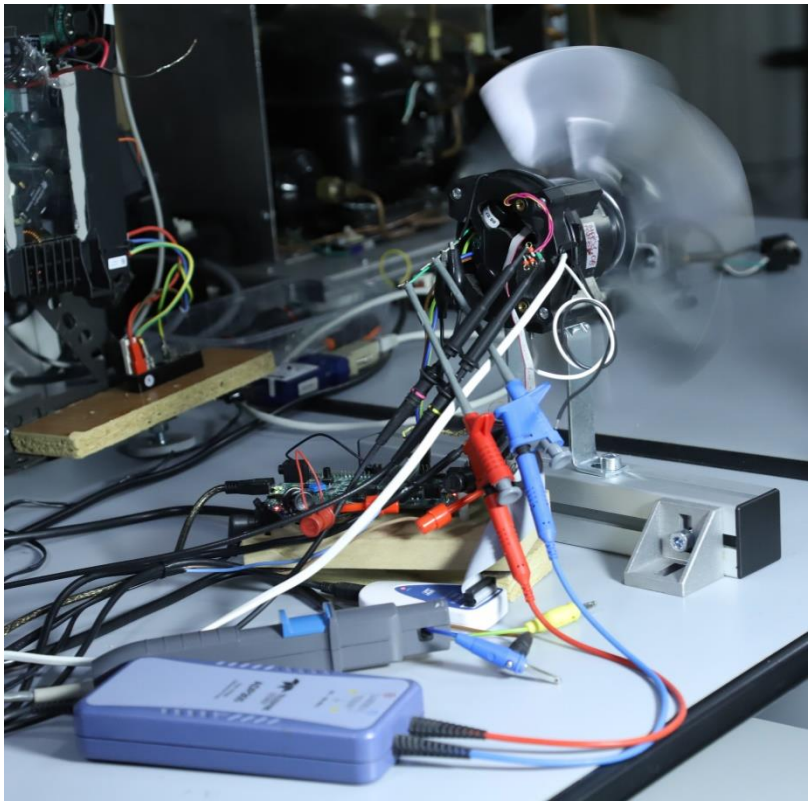
| | |
|---|---|
| apr. ′ 01 - may ′ 08 | **Senior Analog IC Designer, International Rectifier:** HVICs for industrial and appliance motion control applications (gate drivers IRS2234, IRS26310, IR21364, IR2214, current sensor interface IR2277): design, layout, characterization, application support |
| dec. ′98 - apr. ′01 | **Senior Consultant, Accent Srl.:** technical project leader of pressure sensor interface IC for automotive applications |
| jan. ′97 - nov. ′98 | **Analog IC Designer, Silicon Systems Design Ldt.:** design of channel ICs for hard disk drivers |
| ′06-′08 | Passed 8 modules of **Electrical Engineering**, University of Pavia |
| 1996 | B.Sc. **Electronics Engineering**, Microelectronics, University of Pavia |

# LABORATORY

# POWER ELECTRONICS EQUIPMENT

- LeCroy WaveRunner 6200A **oscilloscope** with trend capability: 2GHz 10Gs/s 4 channels
- LeCroy ADP305 **HV differential probe**
- LeCroy AP015 **current probe**
- Tektronix A6302 **current probe** and AM503B amplifier

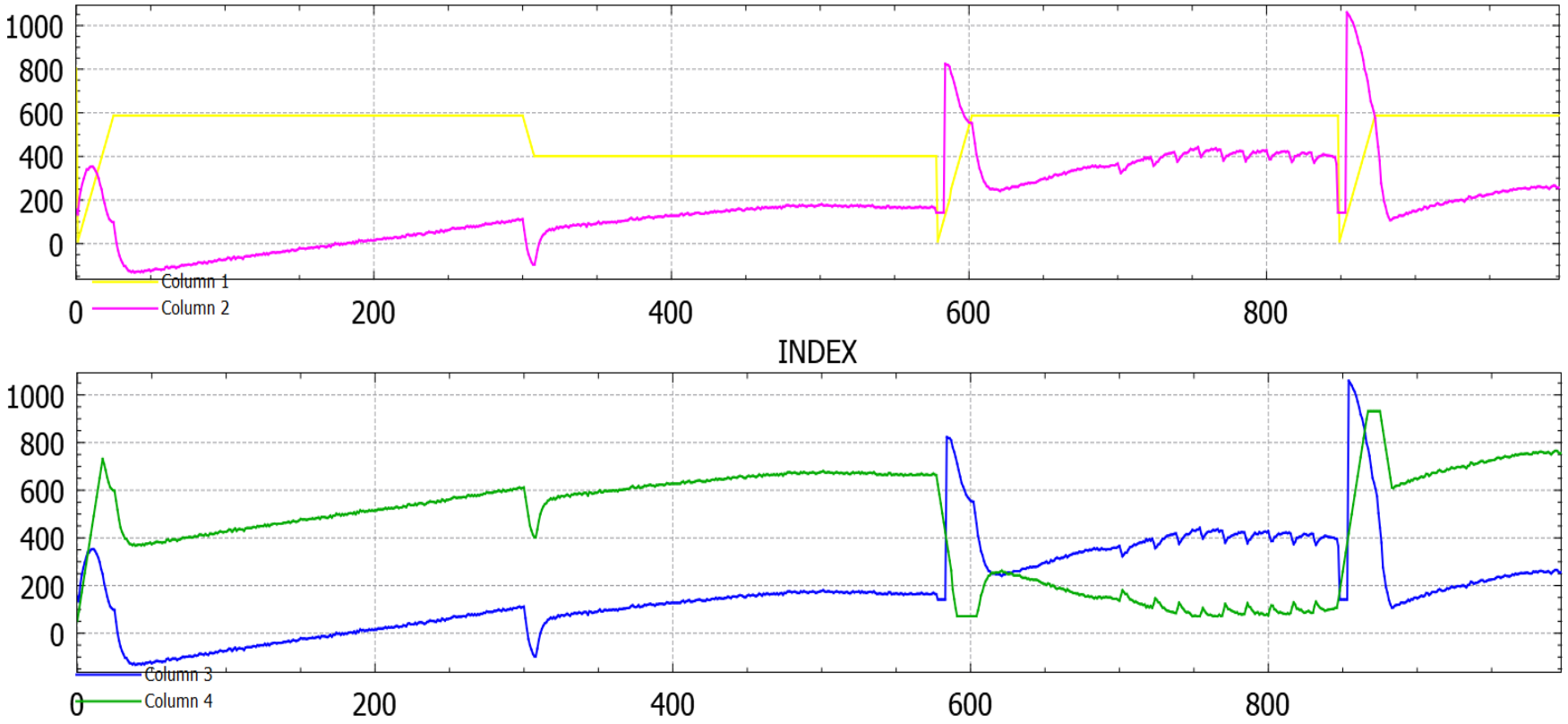


# ALGORITHMS DEVELOPMENT SOFTWARE

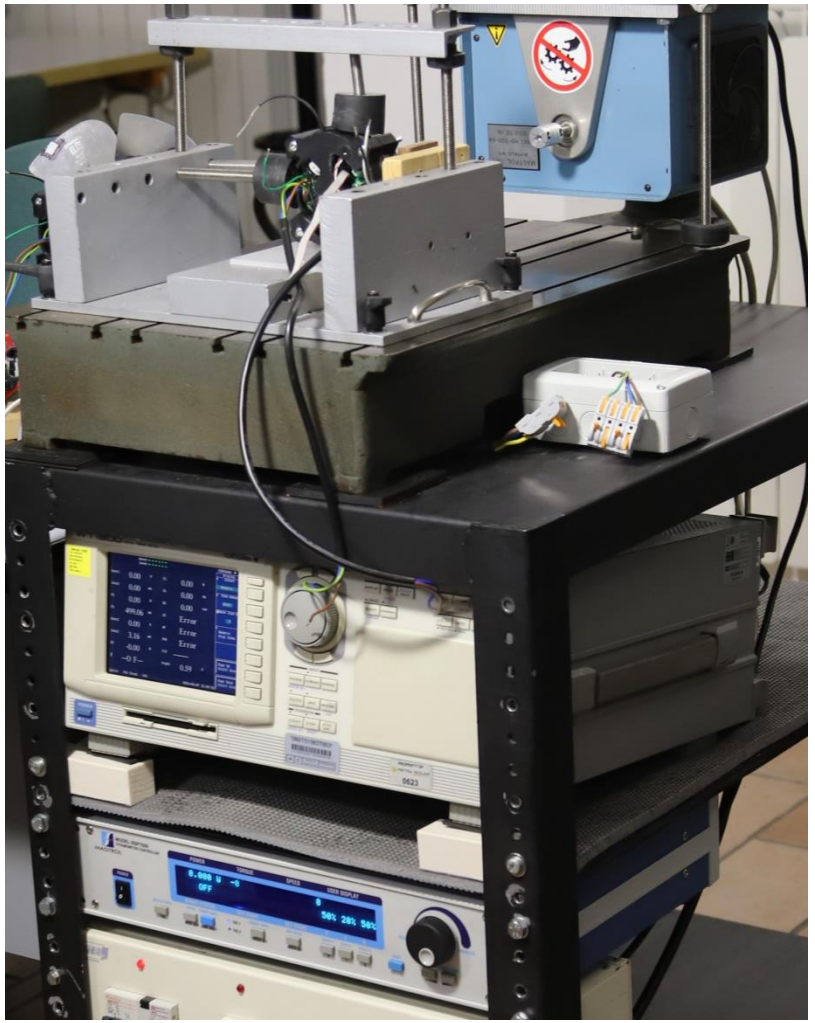
Expert in algorithm development in Simulink

Algorithm tracing capability during run time to monitor the evolution of the algorithm internal variables



# MOTOR CHARACTERIZATION EQUIPMENT

- Magtrol HD-500-6N hysteresis **dynamometer**: 0.85Nm 400W
- Yokogawa WT1600 digital power meter: 6 channels 1kV 50A
- Magtrol DSP7000 controller



# OTHER LABORATORY INSTRUMENTS

- FLIR **IR camera** A40 with close-up lens: 320x240pixel, FOV 64x48mm
- Thermotron S1.2 **temperature chamber**
- HP 34970A **acquisition unit**
- Yokogawa WT110 single phase **power meter**: 600V 20A
- Lecroy LC534AL digital **oscilloscope**: 1GHz 1Gs/s 4 channels
- HP 33120A function / arbitrary **waveform generator**: 15MHz
- BK Precision 8540 **electronic DC load**: 60V 30A 150W
- Wayne-Kerr AP4005 DC **power supply**: 400V 5A 500W
- HP 6032A programmable **power supply**: 60V 50A 1000W
- HP 6634B programmable **power supply**: 100V 1A,100W
- HP 34401A and HP34410A bench digital **multimeters**: 6½ digits
- HP 4263B **LCR meter**
- JBC, Metcal, Bofa **rework equipment**

# ACHIEVEMENTS WITH MATLAB / SIMULINK

- Developed a motion algorithm for single phase BLDC motors:
  - the algorithm includes: current loop, speed loop, angle anticipation
  - modelling and simulation in Simulink of the motor and of the algorithm
  - Generation of c code for STM32 M0 MCU
- From http://www.google.pl/patents/US20080191659, developed a novel control to start single phase IM of refrigerator compressors:
  - modelling and simulation in Simulink of the motor and of the control
  - F/W development in c and Simulink for the IRMCK171
  - H/W development and verification on loaded compressors
- From http://www.google.nl/patents/US7928677, developed an auto-tuning algorithm to compensate the vibrations of single stroke HVAC compressors (company secret, implemented in production):
  - F/W development in Simulink for the IRMCK171
  - H/W verification on HVAC and on air conditioning system

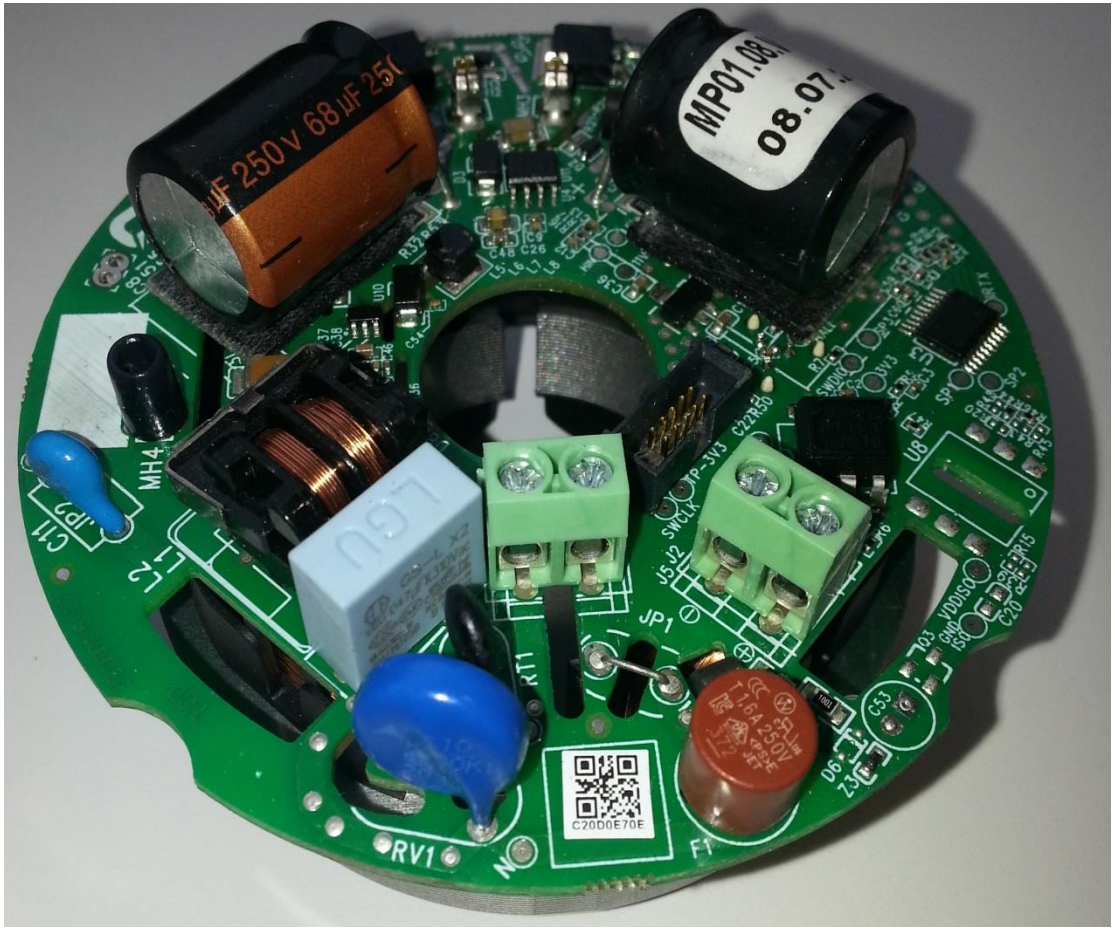
# OTHER ACHIEVEMENTS

- Inventor of the European patent EP3499326: “Driving system for a thermoregulation apparatus”, June 2019

PUBLICATIONS

- “A 200-Ms/s 10-mW switched-capacitor filter in 0.5um CMOS technology”, IEEE 2000
- “10mW 200Ms/s SC filter in 0.5μm CMOS technology”, ISSCC 1999
- “164 Ms/s tape drive channel IC with 4 independent digital peak detect R/W channels and automatic tape speed tracking over 1:3 range”, ESSCIRC 1999
- “A 108MS/s continuous-time PR1 tape R/W channel front-end”, IEE colloquium on SoC, 1999

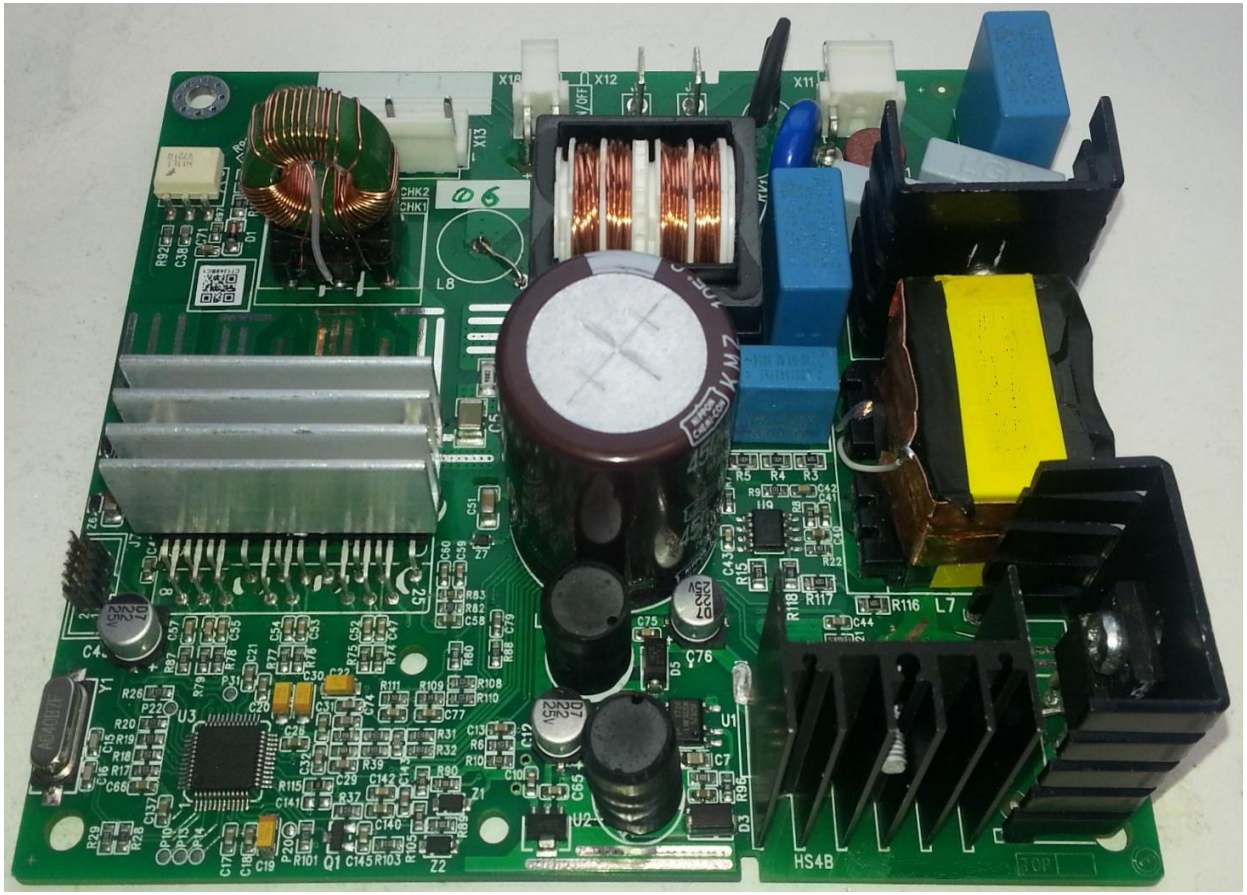
# PROJECTS




20W / 30W hall-sensored **single phase BLDC fan**

- hardware design
- innovative motion algorithm development (modelling in Simulink, c code generation)
- tuning on dynamometric bench
- certifications approval

# PROJECTS

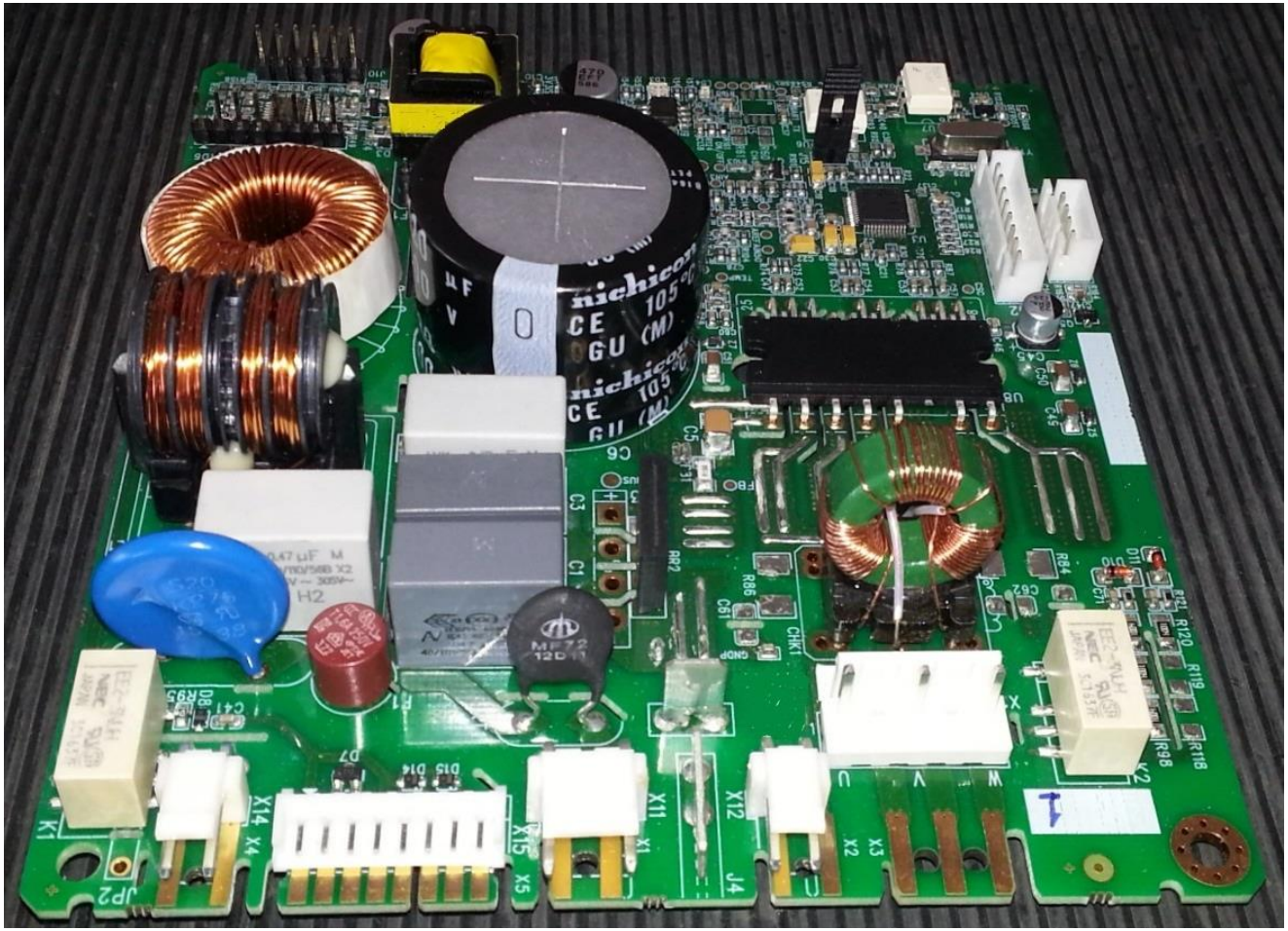


350W sensorless 3 phase FOC driver of

**PMAC compressor**

- hardware design (with active PFC)
- tuning on dynamometric bench
- certifications approval

# PROJECTS

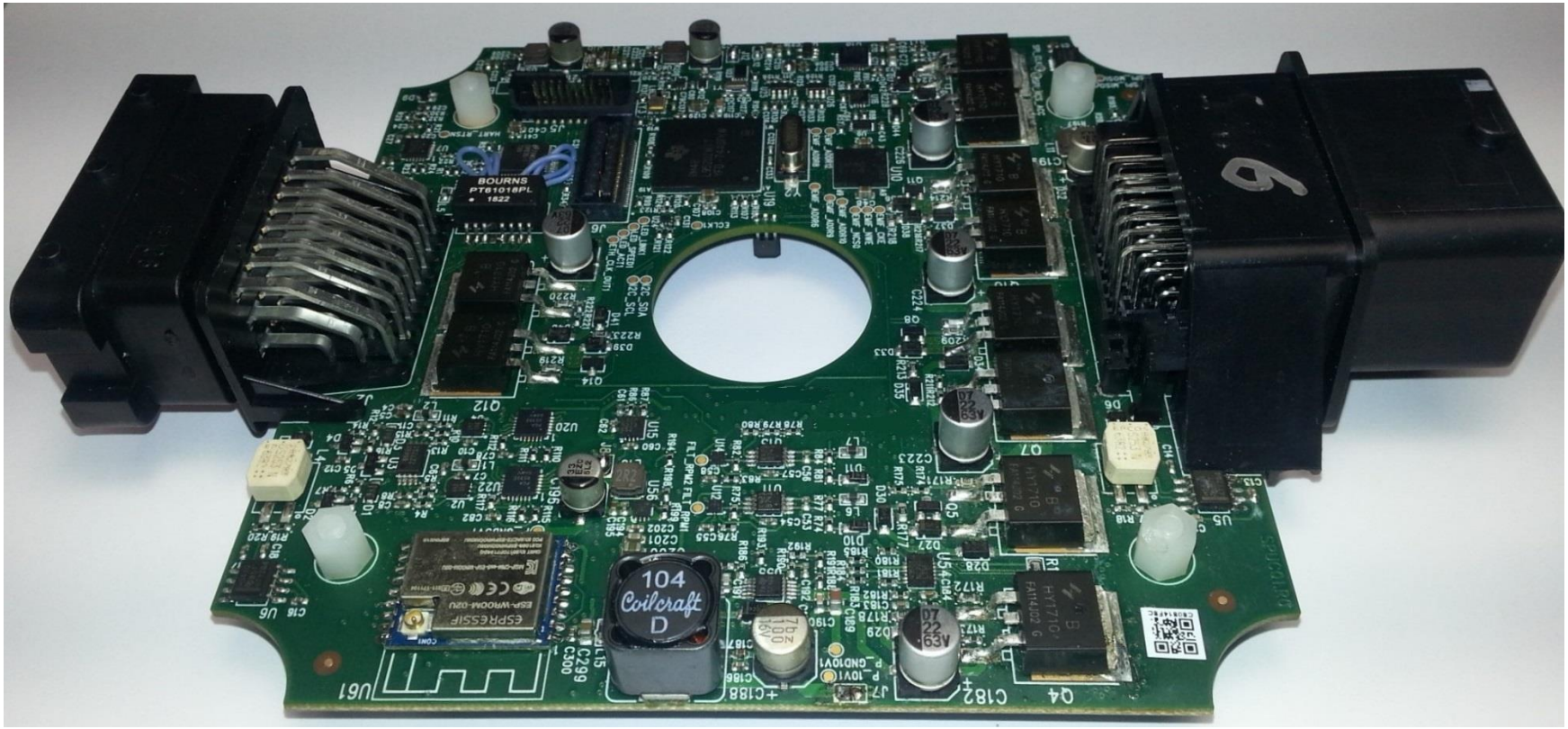



150W sensorless 3phase FOC driver of **BLDC fan**

- hardware design
- tuning on dynamometric bench
- certifications approval

# PROJECTS

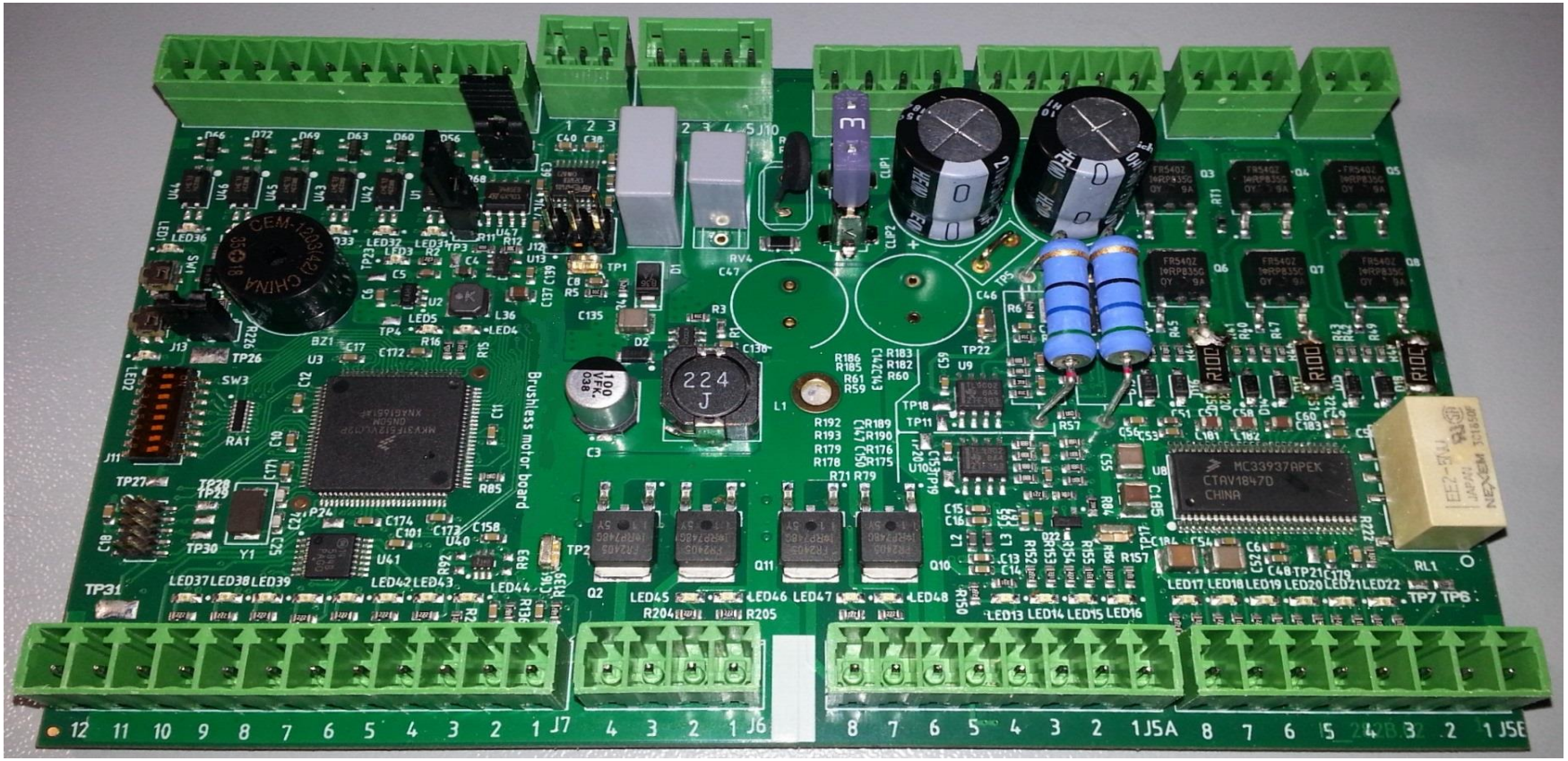





8 layers **proportional valves driver** with WiFi, CAN, ethernet connectivity for automotive SIL II applications: hardware development and current loop algorithm (c code generation from Simulink)

# PROJECTS






100W low voltage sensorless FOC 3phase **BLDC driver** for revolving doors

# PROJECTS


3phase **smart meter** with WiFi, GSM / UMTS / NB-IoT connectivity: hardware design, certification approval (EN61010, EMC, RED)