Silicon Mobility Introduces OLEA® APP INVERTER, Application Software Enabling Best in Class Control of Electrified Powertrains

Sophia Antipolis, France (February 23rd, 2021) – Silicon Mobility today announced the immediate release of OLEA® APP INVERTER, a powerful software application platform for advanced control of inverters and electric motors, addressing the growing need of EV/HEV manufacturers and automotive Tier 1s for short time-to-market solutions. Exploiting the superior performance and safety of Silicon Mobility's OLEA® T222 FPCU (Field Programmable Control Unit), this new product uniquely positions Silicon Mobility as the sole provider of automotive real-time control solutions combining chip, application software, and system integration expertise.

Accelerating the transition

The revolution of vehicle electrification is now tangible. Despite the global economic impact of the current sanitary crisis, the BEVs/PHEVs made a breakthrough progress on the auto sales with a record of 3.2 million units sold in 2020 - a growth of +43% over 2019 (ev-volume.com). This is just the beginning, as it is estimated that OEMs plan to introduce more than 450 new EV models by 2022 (McKinsey & Company). With the release of OLEA® APP INVERTER, Silicon Mobility is supporting this transition by offering vehicle manufacturers and their Tier 1s a quick start into the development of applications for best-in-class control of electric powertrains.

No more software bottleneck

The application is based on the OLEA T222 FPCUs parallel architecture, which allows extremely high-performance real-time control of advanced power electronics and electric motors. It provides efficient and safe torque and speed control using Field Oriented Control (FoC) and variable Space Vector Pulse Width Modulation (SVPWM) algorithms. The modular software can be flexibly adapted to a large variety of customer applications, being it Low or High-Voltage systems, or PMSM or WRSM multi-pole/ multi-phase motor. The high controller performance supports not only MOSFET and IGBT power transistors – it is particularly suited for the latest technology SiC or GaN based inverters. By exploiting the programmable and parallel hardware of the OLEA T222 FPCU chip, it allows real-time control loops and switching frequencies up to 100 kHz. The application has two independent stacks – one for control and one for the functional safety – designed as AUTOSAR Complex Device Drivers. Thus, the application is ready to satisfy the increasing demands of next generations electric powertrains without software bottlenecks.

Intuitive application

To support customers' developments, the OLEA APP INVERTER platform enables a fully integrated model-based design flow along the development cycle, from Model-in-the-Loop over Hardware-in-the-Loop simulations including easy calibration and validation thanks to its native ASAM standard support.

"More EVs maker, more models, and little support to catch up. With OLEA® APP INVERTER, OEMs and their, Tier 1s can have a quick start to build differentiated and powerful EV/HEV systems » says Rainer Kallenbach, CEO of Silicon Mobility. "Based on a common, modular open platform, our solution may be used both as a standalone control, or to extend the capability of an existing system to make it future proof."

Fully featured

- **E-motor Control**
  - ✓ Torque, Current and Speed Control for 3/6 phases PMSM/WRSM
  - ✓ Rotor Control for WRSM only
  - ✓ Current Control Loop based on Field Oriented Control
  - ✓ Flux Weakening management
  - ✓ Active Discharge
  - ✓ Torque derating based on speed/DC-Link and T°
  - ✓ Clockwise/Anti-clockwise direction support

- **Modulation :**
  - ✓ Variable SVPWM (Space Vector Pulse Width Modulation)
  - ✓ Dynamic switching frequency scaling
  - ✓ Dead-time compensation

- **Position: Motor sensor signals processing:**
  - ✓ Position Tracking Loop (PTL) algorithm for SIN/COS signals with a configurable number of e-motor/Resolver pole pairs number
  - ✓ Position Sensor auto-calibration at boot & update at high speed
  - ✓ Tachometer

- **Safety and diagnostic :**
  - ✓ Safety Finite State Machine (FSM) managing the Faults containment
  - ✓ Configurable safety faults detections and reactions
  - ✓ 4 categories of faults detections: Digital Inputs mechanism, ADC min/max, Analog Comparison or Software
  - ✓ Warning detections: over/under temperatures warning, motor over speed, and over/under DC-link voltage

- **VCU Interface:**
  - ✓ E-motor Control FSM supporting the VCU operating states
  - ✓ Fully featured set of APIs (Control, Diagnostics, Safety, Calibration/Configuration) allowing integration with a VCU

Silicon Mobility offers various starter kits for evaluation, proof of concept, or quick system design start. It includes a generic inverter and e-motor control board, user documentation, and evaluation licenses for OLEA® APP INVERTER and OLEA® COMPOSER development framework. Extensive customer support services including training as well as customer-specific engineering and application support are offered by Silicon Mobility's global team.

For more information about OLEA® APP INVERTER, click here, or contact Silicon Mobility: reach us here.

Stay safe

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About Silicon Mobility:

Silicon Mobility is a technology leader inventor of the FPCU semiconductor architecture for ultra-fast and critically safe real-time control. Silicon Mobility accelerates all e-mobility transitions in the cleanest, safest, secured, and smartest way. The company designs, develops, and sells flexible, real-time, safe, and open semiconductor solutions for the automotive industry used to increase energy efficiency and reduce pollutant emissions while keeping passengers safe.

Silicon Mobility's products control electric motors, battery, and energy management systems of hybrid and electric vehicles. By using Silicon Mobility's technologies, manufacturers improve the efficiency, reduce the size, weight, and cost of electric motors and increase the battery range and durability. Its technologies and products accelerate the car's powertrain electrification for OEMs. Silicon Mobility is headquartered in Sophia- Antipolis, France, with a global presence in Germany, Silicon Valley, CA., China, and Japan. For more information, visit: www.silicon-mobility.com.