

FOR ENERGY EFFICIENT INNOVATIONS

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Motor Development Kit (MDK)

Solutions Engineering Center (SEC)

Public Information



Motor Development Kit (MDK)

Motor Development Kit Family (MDK)

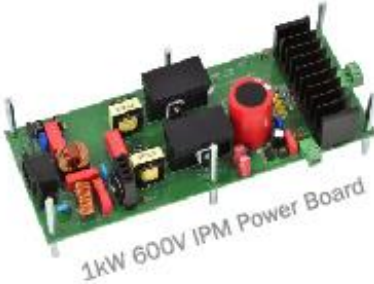
Universal Controller Board
(UCB)



Power Boards



Motor Development Kit
(UCB + Power Board)



More Power Boards from ON Semiconductor to be added to the MDK Family



Motor Development Kit (MDK)

Universal Controller Board (UCB)

MCU
Zynq 7000 series SoC - Xilinx
667 MHz CPU Cortex A9
NCD9801
10 Channel Differential ADC



Power Boards

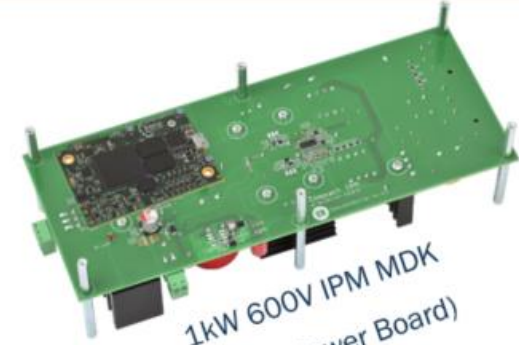


NFAQ1060L33
Compact Intelligent Power Module
NCP1632
Interleaved PFC Controller
NCP1063
DC-DC Regulator
GBU6K
Bridge Rectifier
NCS2250
Fast Comparator
NCS213
Precision Current Sense Amplifier

1kW 600V IPM
Power Board



Motor Development Kits



1kW 600V IPM MDK
(UCB + Power Board)



4kW 650V SPM 31 MDK
(UCB + Power Board)



Universal Controller Board

➤ MCU

- Zynq 7000 series SoC - Xilinx
- 2x 667 MHz CPU Cortex A9

➤ Peripherals

- 10 channel differential ADC (ON Semiconductor NCD9801)
- 12 complementary PWM channels
- Freely configurable digital peripherals
- USB to JTAG/UART interface for configuration/debug
- On-board: ETH PHY and USB OTG
- Off-board: CAN (external transceiver required), USB OTG connector and ETH connector

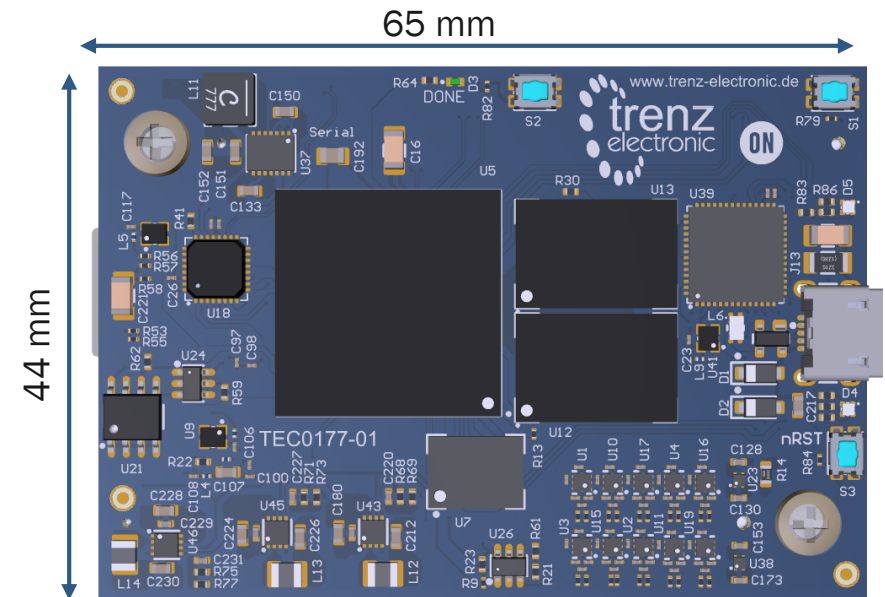
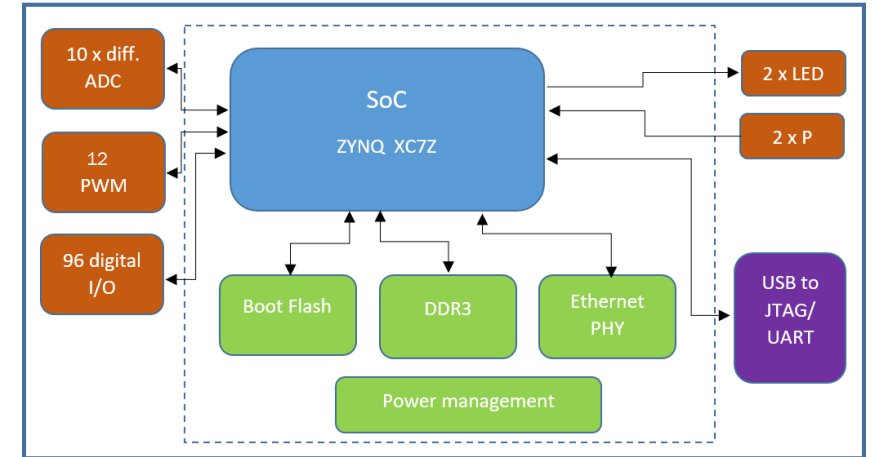
➤ Memory

- 512MB RAM
- 512kB EEPROM (ON Semiconductor CAT24C512)
- Micro SD card

➤ User interface

- Bootloader capability for user upgradability via UART
- Strata compatibility planned
- LEDs/buttons

Complete ON Semiconductor solution around Xilinx Zynq SoC



Motor Development Kit (MDK)

Applications

- Industrial Motor Drive
- White Goods
- HVAC
- Pumps
- Fans

Targeted Motor Technology

- BLDC
- BLAC
- Switched Reluctance
- PMSM
- Induction

Cloud Power



Energy Infrastructure



Industrial Power and Motion



Advanced control strategies

Diagnostics and predictive maintenance

IoT gateways and protocols

AI, Machine Learning, Deep Learning, ...

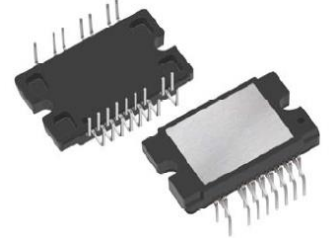
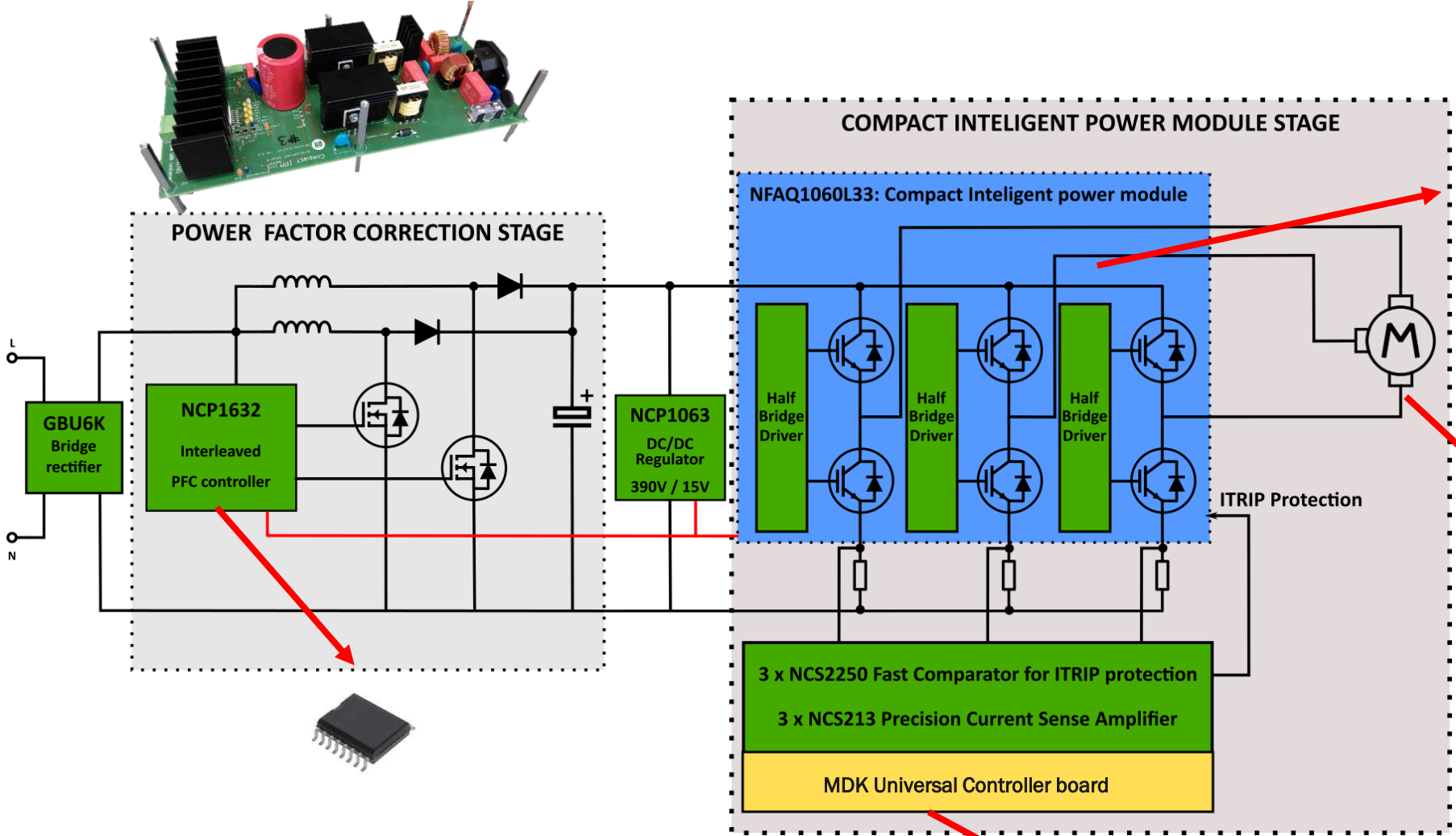
Machine vision

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Block Diagram - 1 kW Compact IPM Power Board

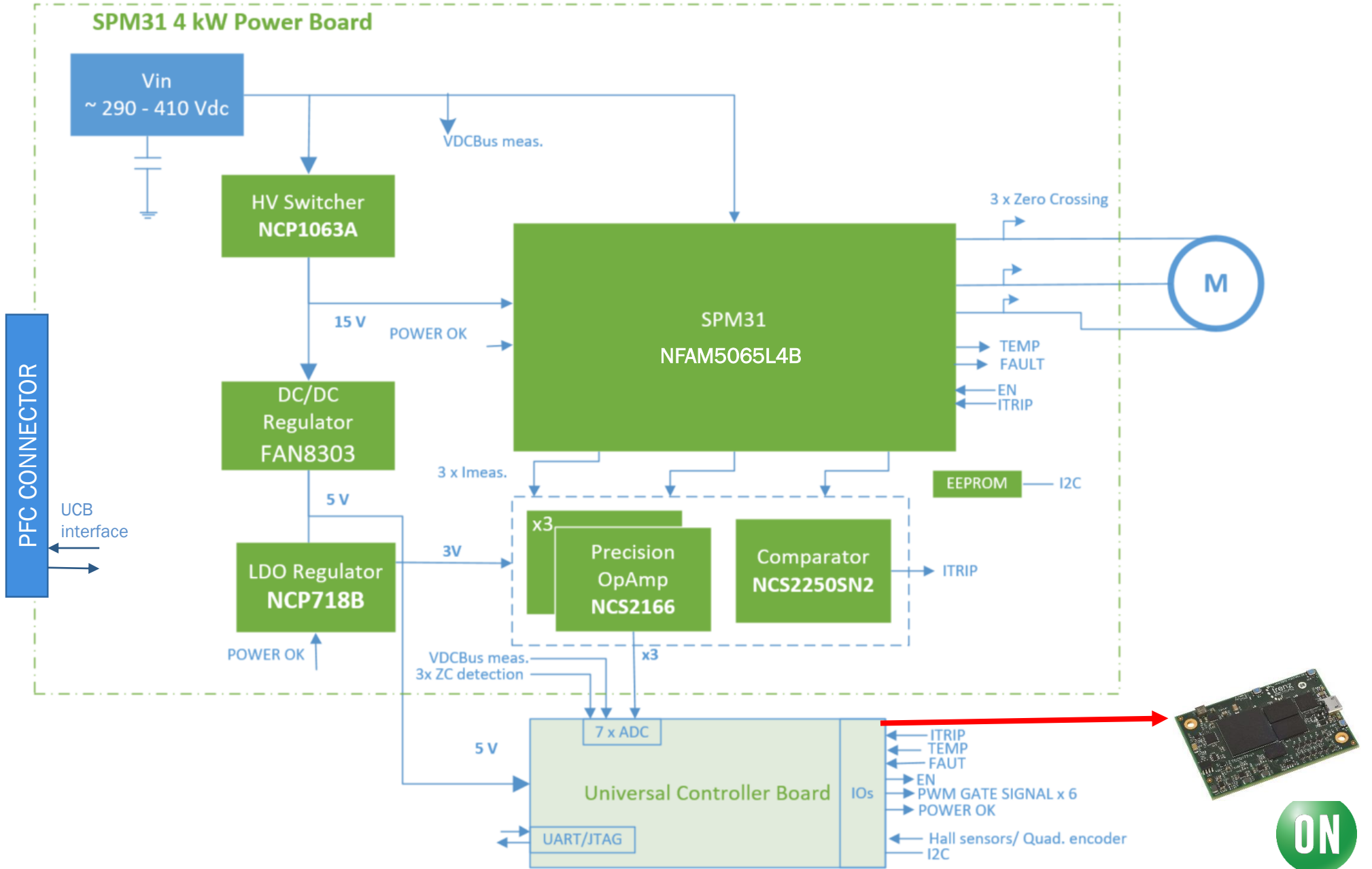
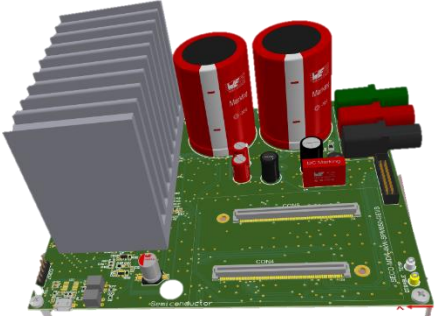
SECO-1KW-MCTRL-GEVB

* With Arduino DUE adaptor
SECO-MDK-DUE-GEVB



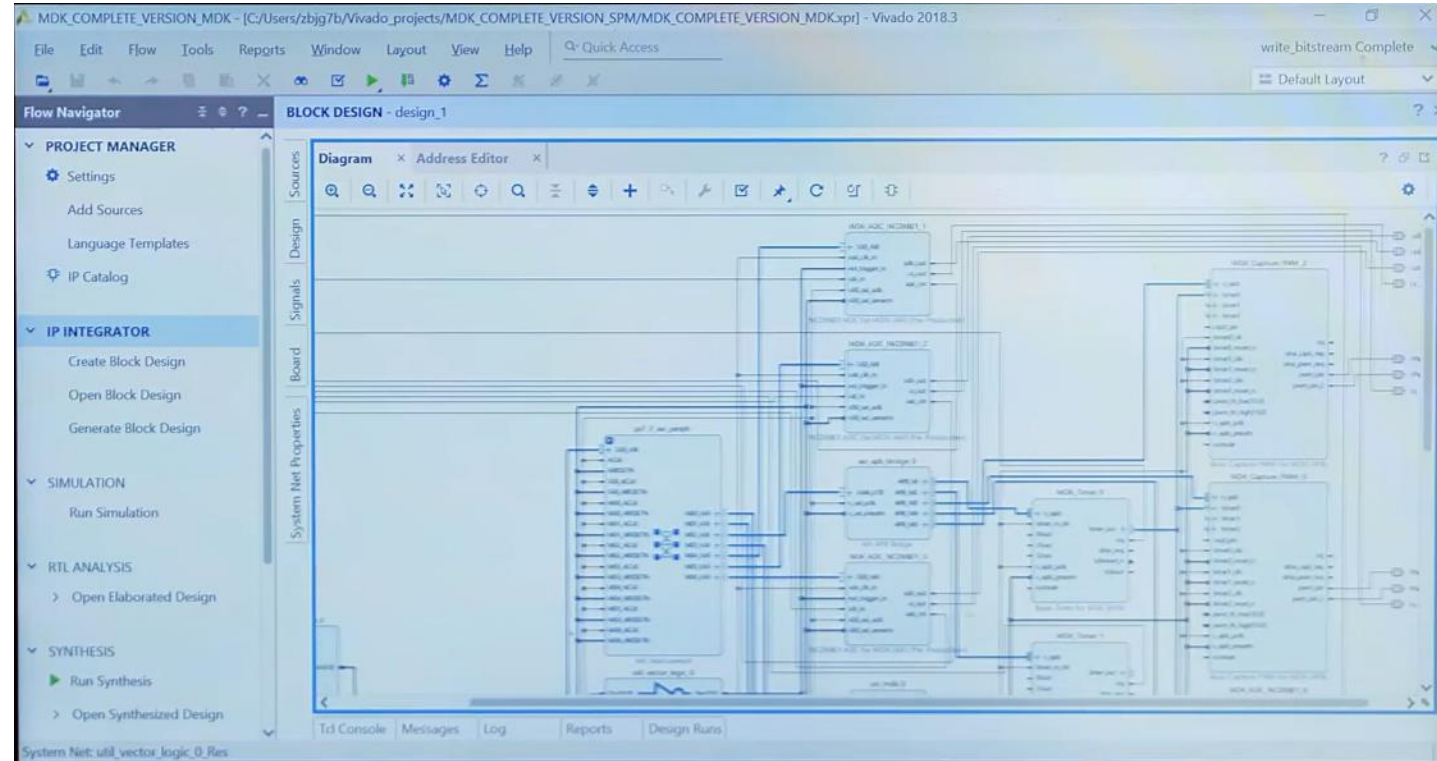
Block Diagram - 4 kW Compact IPM Power Board

SECO-MDK-4KW-65SMP31-GEVB



➤ Xilinx Tool Key Features:

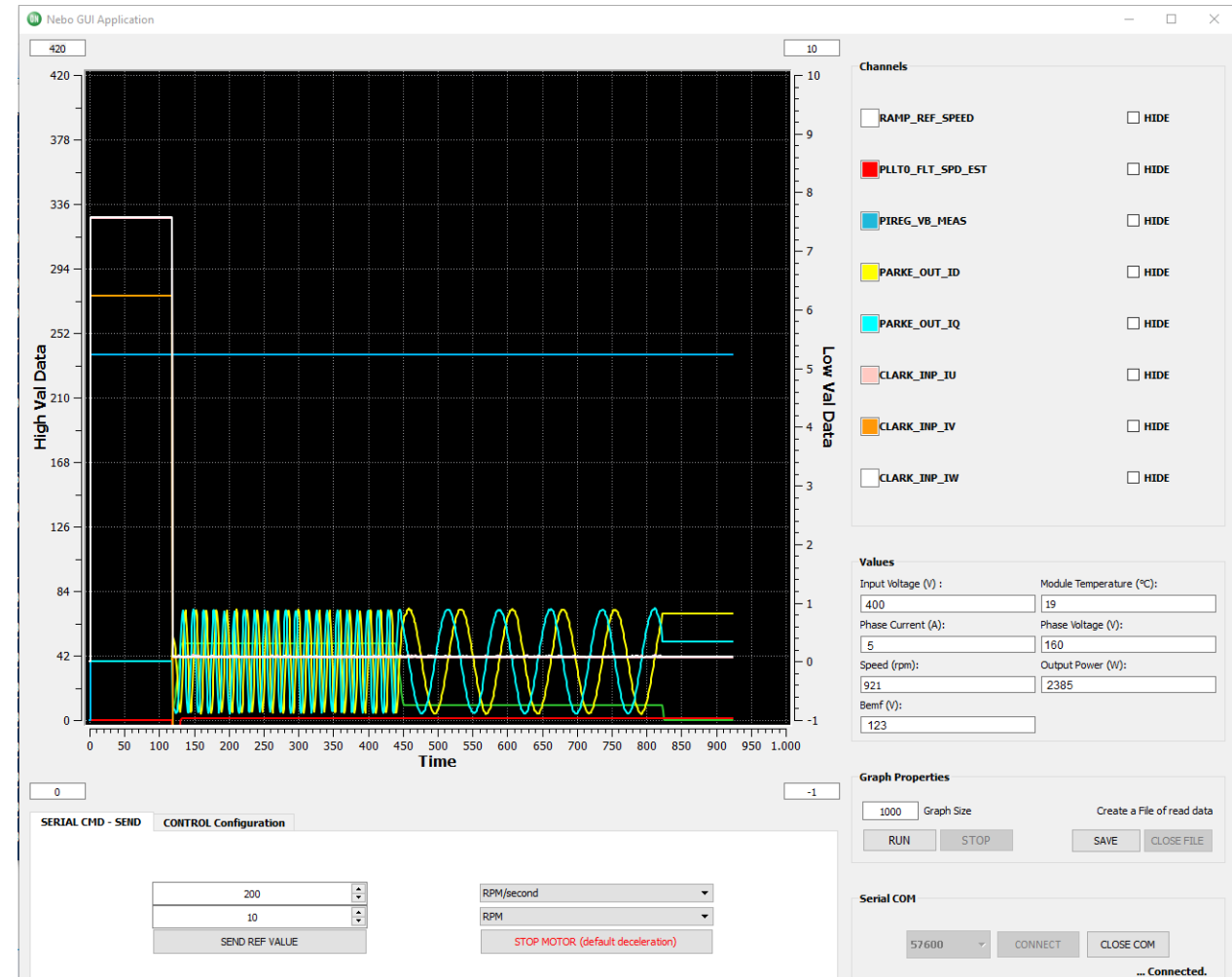
- Program FPGA (UCB)
 - View & edit block design
 - Set Softcore of FPGA in different view mode
-
- ❑ User Guide describing the steps to integrate VHLS Xilinx IP blocks in the MDK is available.
 - ❑ Use case for each MDK board preflashed to run the motor through a GUI out of the box.
 - ❑ Other Xilinx software tools compatible with UCB (Zynq 7000).



ON Semiconductor Graphical User Interface



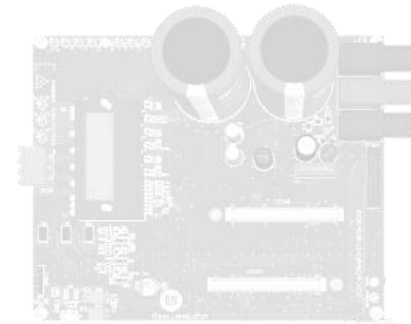
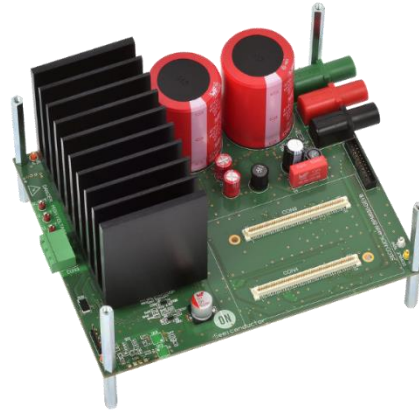
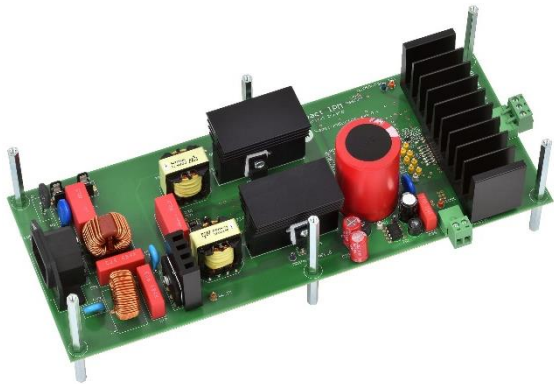
- Easy to use ON Semiconductor GUI for rapid evaluation
 - ❑ Control over speed, B_{emf}, output power, and many more to measure and evaluate the motor at different speeds.
 - ❑ Controllable RPM
 - ❑ Measure telemetry like Input voltage, module temperature and motor current



What's Next for the Motor Development Kit Family?



Efficient and reliable electric motor drives are complex systems to develop, but with Motor Development Kit (MDK), ON Semiconductor makes it easy. ON Semiconductor is planning on developing various additional power boards like MV MOSFET BLDC Motor Driver, 8 kW TMPIM and many more to address a wide variety of industrial motor control applications, cover a broad power range and provides state-of-the-art computational capabilities with the Universal Controller Board, which allow for the development of low and high-end motor control applications.



Additional Resources

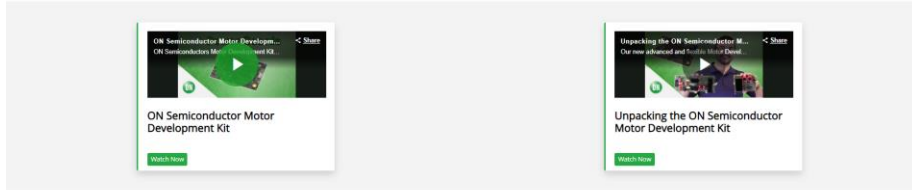
Motor Development Kits (MDK)

Landing Page [click here](#)

Motor Development Kits (MDK)

Industrial Motor Control System Solutions At Your Fingertips

Efficient and reliable electric motor drives are complex systems to develop, but with the Motor Development Kit (MDK) ON Semiconductor makes it easy. The comprehensive prototyping platform consists of the Universal Controller Board (UCB) which connects to an expanding variety of Power Boards to create quick-start platforms to run your motor, allowing you to rapidly test, evaluate and optimize your system before designing any hardware. Sporting the powerful Zynq®-7000 PPAKARM SoC, the UCB is suited for high-end control and AI based applications. The Power Boards feature ON Semiconductor's leading power device and module together with all other necessary components and drivers from our broad portfolio to develop complete motor driver solutions.



Motor Development Kit Family (MDK)



Webpages

➤ Control + Power Kit

- [SECO-1KW-MDK-GEVK](#): 1kW 600V Industrial Motor Development Kit (MDK) with Compact Intelligent Power Module (IPM) board and Universal Controller Board (UCB)
- [SECO-MDK-4KW-65SPM31-GEVK](#): 4kW 650V Industrial Motor Control Development Kit with Intelligent Power Module (IPM) and Universal Controller Board (UCB)

➤ Power Boards

- [SECO-1KW-MCTRL-GEVB](#): 1kW 600V Industrial Motor Control Power Board with Compact Intelligent Power Module (IPM)
- [SECO-MDK-4KW-65SPM31-GEVB](#): 4kW 650V Industrial Motor Control Power Board with Compact Intelligent Power Module (IPM)

➤ [Universal Controller Board](#)

- Universal Controller Board (UCB) with Zynq®-7000 SoC FPGA and ARM®-based processor

Thank you