



OPEN ECU™
EMBEDDED CONTROL

Nx3

OpenECU™ Supervisory & Gearbox Control

Enabled by
**MATLAB®
& SIMULINK®**
MathWorks

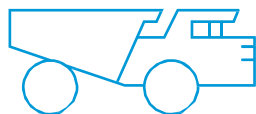
Versatile

- Suited for prototype to production for a wide variety of applications through:
 - Highly customizable I/O
 - Flexible application software development using OpenECU MATLAB Simulink or C-code
 - Model-based control strategies available as software libraries to accelerate start-up and integration
- Developed according to ISO 21434 with integrated HSM⁽¹⁾ to support latest cybersecurity requirements
- Equipped to meet ISO 26262 up to ASIL-D functional safety requirements
- Comprehensive diagnostics to support functional safety and OBD requirements
- Integrated EVCC functionality for xEV charging
- Powerful Infineon Aurix microcontroller
- 80 pins with diverse I/O capabilities



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Ideal for light, commercial, and off-highway vehicles.



Core Offering

VCU+EVCC: Vehicle Control Unit + Charging

- **Charging:** CCS and Megawatt Charging capabilities
- **Cybersecurity:** Integrated HSM + dev per ISO 21434
- **FuSa:** Capable of ASIL-D per ISO 26262
- **Comms:** CAN (CAN-FD capable), LIN, SENT, ethernet
- **Sensing:** current monitoring, speed sensors, analog I/O
- **Commands:** H-bridge switching, high-side and low-side drivers
- **Diagnostics:** Comprehensive fault diagnostics, with OBDII and J1939 compliance
- **Over-the-Air Flashing (OTA)** memory swap capable from a parent module
- **Flexible wake capabilities:** Ignition, CAN, charge plug insertion, timer
- **Supervisory control capabilities:** ICE, EV, or hybrid^(II)

Off the Shelf Options

VCU:

Vehicle Control Unit

- Cost-effective vehicle supervisory control unit – ICE, EV, hybrid
- Omits charging capabilities in favor of more flexible I/O for applications with another charging control unit solution or no need for one

EVCC:

Electric Vehicle Charge Controller (CCS + MCS)

- **CCS Charging:** Control Pilot (CP), Proximity Pilot, CP Shield, and PLC communication^(IV)
- **Megawatt Charging:** MCS insertion detection, MCS charge enable, and ethernet communication
- **Control and Feedback:** 2 charge contactors + 2 plug lock motors with lock position feedback
- **Sensing:** 3 temperature sensors per CCS/MCS standard
- Outputs for up to 6 charging LEDs

Customization

- **Inputs:** Analog input pull voltages and values, resistor-divider presence and scale single-pull filter frequency^(V)
- **Outputs:** Half-bridge feedback: high precision for control or low precision for diagnostics only.
- **Comms:** CAN termination presence, CAN shielding (AC coupled to GND per J1939), additional CAN channel, LIN slave capability, additional SENT inputs

Capabilities

Features		Core: VCU+EVCC	Option 1: VCU	Option 2: EVCC
Operating Voltage	Supply Voltage 8 - 32V	24V	24V	24V
CAN Communications	Up to 6x CAN-FD	4	5	2
LIN Communications	Up to 2 (1 - Master or Slave, 1 - Master only)	2	2	1 (Master or Slave)
SENT Input	Up to 4	2	2	--
Speed Sensor Inputs	Up to 6	6	6	--
Analog/Digital Inputs	Up to 18	10	12	14
Temperature Sensor Inputs	Up to 4	4	4	4
Low Side Outputs	2x 1A, 7x 2A (PWM), 4x 4A (PWM)	13	13	2
High Side Outputs	4x 1A, 5x 4A (PWM)	9	9	7
LED Outputs	Up to 3x 100mA	2	3	3
Speedometer Outputs	Up to 1 (push/pull 0V to Battery V, 10kHz)	1	--	--
H-bridge Outputs	Up to 4	4, with load current feedback	4, no load current feedback	2, no load current feedback
Ignition		Included	Included	Included
CCS Charging Interface	PLC, CP, CP Shield, PP	Included	--	Included
MCS Charging Interface	Ethernet, Insertion Detect, Charge Enable	Included	--	Included
Over-the-Air Capability	A cache / B flash	Included	Included	Included
Cybersecurity	ISO 21434 with integrated HSM	Included	Included	Included

Notes:

- Full feature set of base software to allow vehicle manufacturers to satisfy UN R155 and R156. Base software compliant with ISO 21434. Offering Secure Boot, Code Signing, Enhanced Security Lifecycle, HSM Secure Firmware Update, Secure Keystore, Security Access, Secure Logging, etc.
- Highly customizable I/O with model-based, software library strategies available to expedite development of xEV architectures. Engineering support and development available upon request to support from prototype to production.
- Supports common calibration tools such as ATI Vision, and Vector CANape via CCP in addition to the in-house OpenECU Calibrator™ calibration tool
- Standalone CCS is supported by Dana CCU.
- Inputs are highly configurable. See pinout template and technical specifications for details. Output diagnostic signals can be used as inputs if output channels are not used.

