

# HVC 2480B

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## HVC 2480B 8-Bit Controller for BLDC/BDC Motors with Small Form Factor

The Micronas HVC 2480B, a high-voltage controller for use in automotive applications and beyond (industrial, consumer, instrumentation, etc.) features advanced integration for a compact and cost-effective system design.

Reducing the number of external components to a minimum, the product's flexible peripherals provide all means to control brush-type and brushless direct current (BLDC) motors either directly with the three integrated half-bridges or by driving external MOSFETs with six enhanced PWM outputs. The chip provides an ideal solution for smart actuator and smart sensor applications.

Beside timers/counters, interrupt controller, multichannel A/D converter, and enhanced PWMs, this device contains voltage regulators for direct connection to a 9-18 V power supply as well as a LIN transceiver. Three fully integrated half-bridges allow to connect a BLDC motor without the need for external components. Various integrated digital and analog circuit units such as comparators with virtual star point reference or an embedded amplifier allow users to minimize the number of external components and to control brushless motors (BLDC and PMSM) by different means like six-step commutation with sensor feedback or

sensorless control with BEMF evaluation up to space vector control for permanent magnet synchronous motors (PMSM).

### Core

- ◆ 8-bit 8051 core (two-clock machine cycle) running up to 24 MHz
- ◆ 1.75 kbyte RAM
- ◆ 32 kbyte Flash
- ◆ 512 byte of EEPROM
- ◆ Two on-chip oscillators, no external crystal needed
- ◆ Single-wire debug interface

### High-Voltage Technology

- ◆ Direct 9-18 V operation
- ◆ Embedded voltage regulators withstanding 40 V load-dump
- ◆ Three integrated half-bridges for direct motor connection
- ◆ Gate drivers for external half-bridges
- ◆ Switchable 5 V power supply output
- ◆ 17 high-voltage digital inputs
- ◆ Six combined high-voltage/high-current I/O ports
- ◆ LIN 2.1 transceiver

### Advanced Integration

- ◆ Digital and window watchdog timers with different, independent clocks
- ◆ Three comparators with integrated virtual star point or external reference
- ◆ 10-bit queued ADC, with selectable reference, configurable conversion time and flexible start of conversion trigger
- ◆ Operational amplifier
- ◆ Several external and internal digital/analog wake-up and interrupt sources
- ◆ 16-bit free running counter with 3 capture/compare-modules
- ◆ Two 16-bit timers, two 8-bit timers and one wake timer
- ◆ Three enhanced PWMs (EPWMs), providing 6×12-bit edge/center-aligned signals with non-overlapping capability
- ◆ SPI and enhanced LIN 2.1 UART
- ◆ Active EMI suppression hardware
- ◆ Supply & temperature supervision
- ◆ Power saving modes (down to 70 µA)
- ◆ PQFN40 package (6×8 mm<sup>2</sup>)
- ◆ Temperature range up to 125 °C ambient

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## BLDC and BDC motor applications

- ◆ Directly driving BLDC/PMSM motors with up to 300 mA (600 mA peak)
  - Automotive (e.g. grille shutter, LED headlamp fan, advanced headlights, small cooling fan)
- ◆ Driving of BLDC/PMSM motors with higher current via external half-bridges
  - Automotive (e.g. exhaust gas recirculation, windscreen wipers, electric seats, water/oil/fuel pumps)
- ◆ Directly driving up to two BDC motors in H-bridge configuration (e.g. door mirrors)
- ◆ Non-automotive applications: Consumer (e.g. printer/scanner, small fans/blowers), Industrial (e.g. air sampling/gas analyzer, bar code reader, automation) as well as instrumentation products

## Development Tools

- ◆ Single-wire debug interface
- ◆ Application development boards
- ◆ Motor control software packages with API, drivers, application notes, and LIN SW stack to realize
  - Sensored and sensorless six-step commutation
  - Space-vector modulation “SVPWM”
  - BDC motor control
- ◆ Integrated development environments from several 3<sup>rd</sup> party vendors

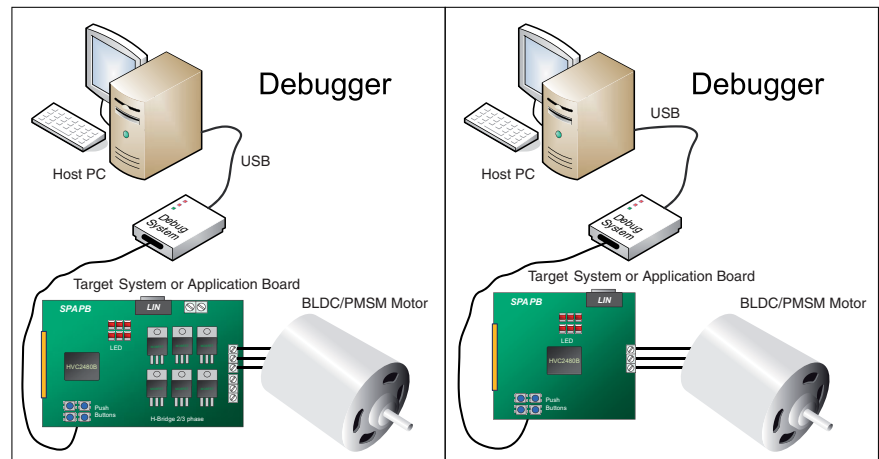


Fig. 1: Development tools for HVC 2480B

## System Architecture

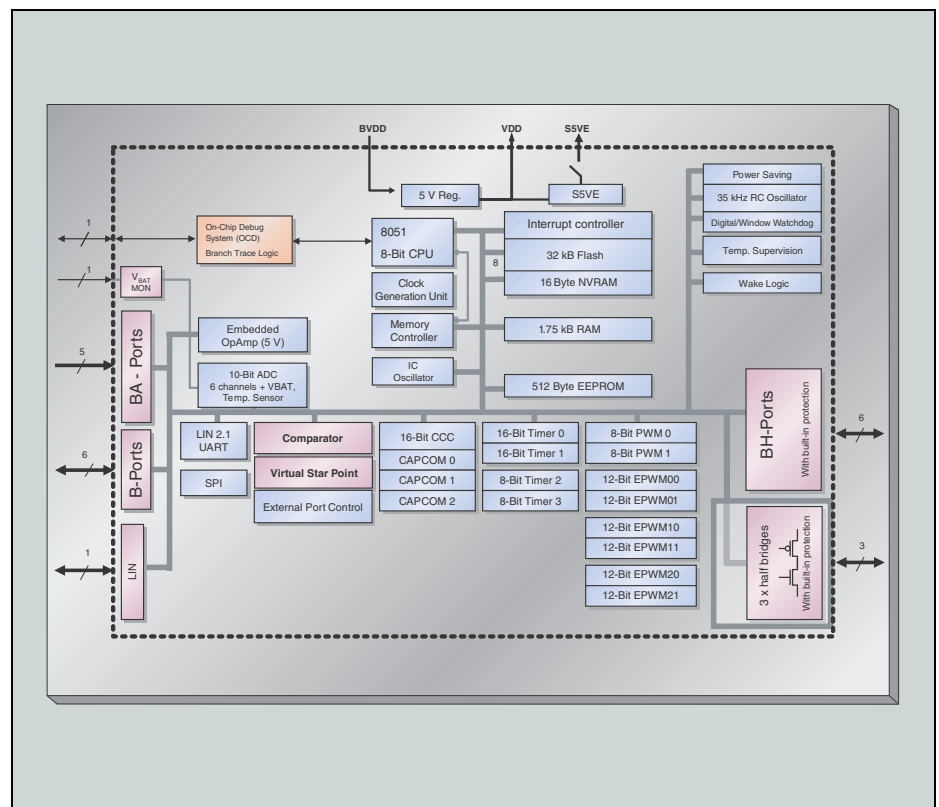


Fig. 2: Block diagram of the HVC 2480B

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