

# HVC 2480B

Feb/2011



## HVC 2480B 8-Bit Controller for Direct 12V Operation

The Micronas HVC 2480B, a high-voltage controller for use in automotive and industrial applications, 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 fully 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 family contains voltage regulators that allow the device to be connected to the 12 V battery supply directly and 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 embedded amplifier allow users to minimize the number of external components and to control BLDC motors 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 with up to 24 MHz
- ◆ Up to 1.75 kbyte RAM
- ◆ Flash versions with up to 32 kbyte Flash
- ◆ Up to 512 byte of EEPROM
- ◆ On-chip oscillator
- ◆ On-chip debug system
- ◆ Single-wire debug interface

### High-Voltage Technology

- ◆ Direct 12 V operation
- ◆ Embedded voltage regulators withstanding 40 V load-dump
- ◆ Integrated triple half-bridge driver stage
- ◆ Pre-drivers for external half-bridges
- ◆ Switchable 5 V power supply output
- ◆ 19 high-voltage digital inputs
- ◆ Six combined high-voltage/high-current I/O ports
- ◆ LIN 2.x transceiver

### Advanced Integration

- ◆ Logic modules dedicated to control BLDC motors
- ◆ Digital and window watchdog timers with different, independent clocks
- ◆ 14-input/4-prio level interrupt controller
- ◆ Three comparators with integrated virtual star point or external reference
- ◆ 10-bit queued ADC, with selectable reference, configurable conversion time down to 2.6  $\mu$ s, 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 6x12-bit edge/center-aligned signals with non-overlapping capability
- ◆ SPI and enhanced LIN 2.x UART
- ◆ Active EMI suppression hardware
- ◆ Supply & temperature supervision
- ◆ Power saving modes (down to 70  $\mu$ A)
- ◆ PQFN40 package (6x8 mm<sup>2</sup>)
- ◆ Temperature range up to 125 °C ambient

# HVC 2480B

## BLDC motor applications

- ◆ Directly driving motors with up to 3×300 mA
- ◆ Driving of motors with higher current via external half-bridges
- ◆ Closed-loop control of Pumps for fuel, oil, water, etc.
- ◆ Control of fans, e.g. for LED headlamps
- ◆ General-purpose actuators

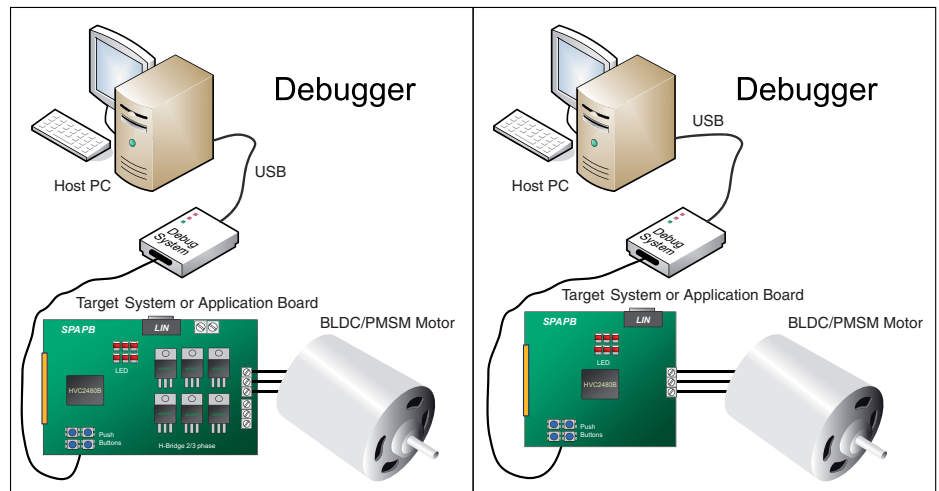
## Development Tools

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

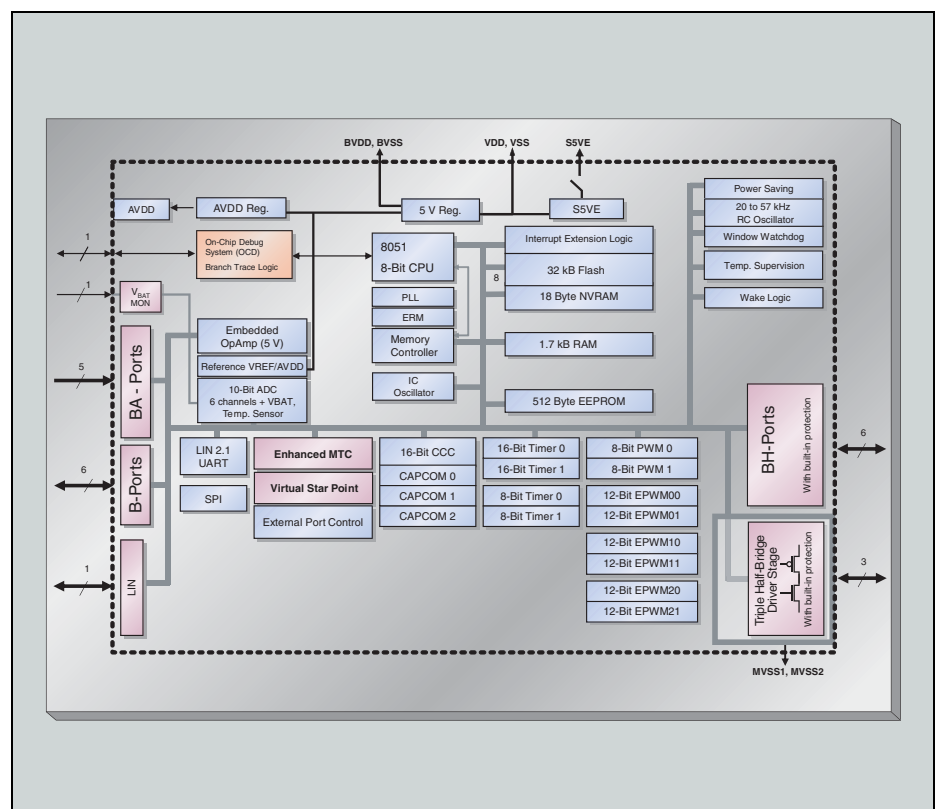
## System Architecture

The HVC 2480B is based on the 8051 processor with two-clock machine cycle and operates with clock frequencies of up to 24 MHz. Due to an integrated oscillator with adjustable system clock there is no external crystal needed. An internal RC clock is used for the independent window watchdog and wake timer. I/O ports have multiple functions, work in the battery voltage range, and withstand the ISO 7637-2:2004 pulses. The built-in active EMI suppression logic minimizes the generation of disturbing electro-magnetic peak values.

For more information about Micronas HV controllers, please email to [info\\_hvc@micronas.com](mailto:info_hvc@micronas.com).



**Fig. 1: Development tools for HVC 2480B**



**Fig. 2:** Block diagram of the HVC 2480B

All information and data contained in this product information are without any commitment, are not to be considered as an offer for conclusion of a contract, nor shall they be construed as to create any liability. Product or development sample availability and delivery are exclusively subject to our respective order confirmation form. By this publication, Micronas GmbH does not assume responsibility for patent infringements or other rights of third parties which may result from its use.

No part of this publication may be reproduced, photocopied, stored on a retrieval system, or transmitted without the express written consent of Micronas GmbH.

Edition Feb. 25, 2011; Order No. PI000137\_002EN