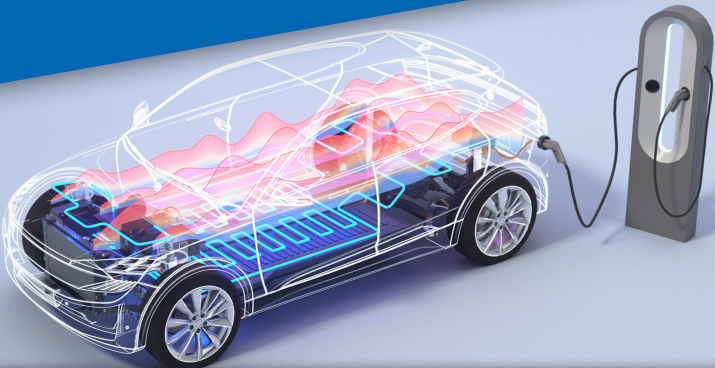


# HVC 5x

Compact Motor-Controller Family  
for BLDC, BDC, or Stepper Motors



SmartHVC  
Technology



After having served a rapidly growing market with our popular HVC 4x fully program-mable, automotive motor drivers for many years, the HVC 5x family presents an evolution from the “one size fits all” approach of their HVC 4x with a focus on smaller size, lower cost, and less external components. To increase supply robustness, the HVC 4x and HVC 5x families are sourced from two different wafer foundries.

HVC 5221D, HVC 5222C, and HVC 5223C are all 32 KB flash devices with 2 KB SRAM and 512 byte EEPROM. To maintain compatibility to the HVC 4x family, all HVC 5x devices uses the same Arm® Cortex®-M3 CPU based microcontroller with largely the same peripheral motor-control features and LIN bus connectivity as their predecessors.

Our newest motor controllers, HVC 5x22D support currents up to 1 A for BLDC and stepper motors, and up to 2 A for DC motors, while expanding memory capacity from previous HVC 5x devices. The devices include 4 KB SRAM and 2 KB EEPROM. HVC 5222D features 32 KB Flash, HVC 5422D features 64 KB Flash.

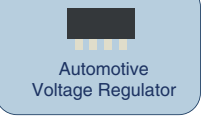
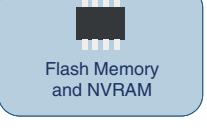
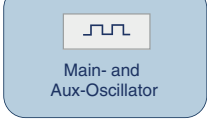
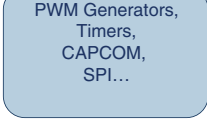
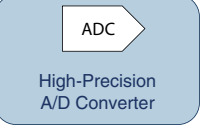
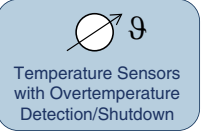
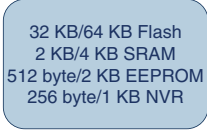
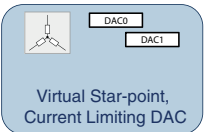
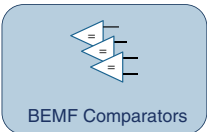
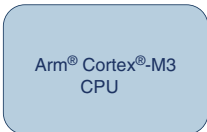
Seven general purpose I/O pins (LGPI/O) and reduced pins for internal supplies, minimize bill of material (BOM) cost.

Additional features, such as differential input channels, digital timers, capture-compare units, and an SPI master interface enable integration of application functions as well as TDK-Micronas’ large portfolio of Hall switches or 2D/3D sensors for more precise motor control.

All current HVC 5x devices are qualified according to AEC-Q100 Grade 1, come in a thermally efficient 5 x 5 mm PQFN24 package and are pin compatible with each other as well as with future devices with higher currents and more memory.

## HVC Variants

	Flash	RAM	Drivers	Package
HVC 422xF	32 KB	2 KB	6 × 0.5 A	QFN40
HVC 442xF	64 KB	4 KB	6 × 0.5 A	QFN40
HVC 5221D	32 KB	2 KB	4 × 0.5 A	QFN24
HVC 5222C	32 KB	2 KB	3 × 1.0 A	QFN24
HVC 5223C	32 KB	2 KB	3 × 2.0 A	QFN24
HVC 5422D	64 KB	4 KB	4 × 1.0 A	QFN24



Functional Safety Support, ISO-Pulses, AEC-Q100, LIN ISO conform, EMC conformity according to worldwide OEM Specifications, ESD (8 kV @ LIN Port), -40 °C ≤ T<sub>A</sub> ≤ +125 °C

# HVC 5x



## Main Features

- ◆ Supply voltage range from 6 V to 18 V (transient from 4.5 to 40 V)
- ◆ 3.3 V, 15 mA supply for peripherals
- ◆ 32-bit Arm® Cortex®-M3 CPU core
- ◆ 20 MHz system clock, 35 kHz watchdog oscillator
- ◆ 32 KB flash memory with 2 KB SRAM or 64 KB flash memory with 4 KB SRAM
- ◆ 12-bit, 1 µs ADC for internal and external measurements
- ◆ 2 x 8-bit current DAC for motor current limiting
- ◆ 12-bit PWM generators with center- and edge alignment and ADC triggering
- ◆ 16-bit timers for input and output PWM signal handling
- ◆ 7 GPIOs for application interface
- ◆ LIN Transceiver for auto-addressing using the bus shunt method\*
- ◆ Small thermally efficient QFN24 package

## Evaluation Boards (see Fig. 1)

- ◆ HVC 5x Application Board, 120 mm x 90 mm
- ◆ Clamshell socket for QFN24 package
- ◆ Driving brushed DC, brushless DC and stepper motors using the integrated half-bridges
- ◆ Prepared for commutation via Hall-sensor feedback or BEMF sensing
- ◆ Standard 20-pin (0.1") debug interface header
- ◆ LIN-bus header with auto-addressing support

## Software Development

- ◆ Keil MDK 5 µVision IDE and Arm® Cortex® debug adapter or SEGGER J-LINK debug probes, IAR Development Environment
- ◆ Various Application Notes available (BLDC- and Stepper-Motor Control, LIN, Bootloader, ...)

## Demo Boards (see Fig. 2)

- ◆ HVC 5x Small Demo Board SDB-I, 40 mm diameter
- ◆ Configurable by solder jumpers, to drive either brushed DC, brushless DC or stepper motors using the integrated half-bridges of the HVC 5x
- ◆ Prepared for commutation via Hall-sensor feedback or BEMF sensing
- ◆ 10-pin (0.05") Cortex Debug Connector
- ◆ LIN-bus interface with auto-addressing support

For further information see <https://www.micronas.tdk.com/en/products/embedded-motor-controllers-smart-actuators>

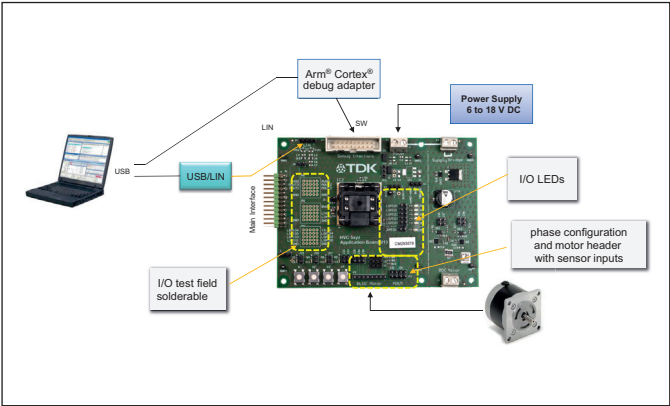


Fig. 1: HVC 5x Application Board

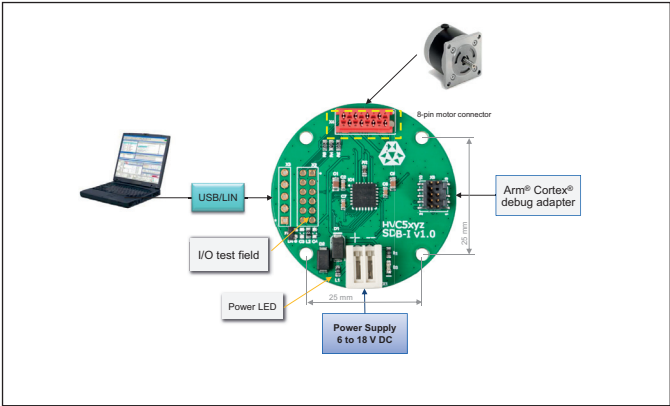


Fig. 2: HVC 5x Small Demo Board SDB-I

\*IP-Notice: If LIN auto-addressing features are used, third-party rights such as EP 1490 772 B should be considered.

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