



(Photo: Roboteq)

## The CANopen logical device approach suites mobile robots and AGVs

*CANopen devices can support up to eight instances of logical devices. They can implement the same or different profiles. A typical example, is a multi-axes controller. It targets mobile robots and automatic guided vehicles (AGV).*

The arrangement of the CANopen dictionary is structured. All parameters in this list are addressable by means of a 16-bit index and an 8-bit sub-index. The index range from 6000<sub>h</sub> to 9000<sub>h</sub> is assigned to standardized profile parameters. These parameters can be process, configuration, or diagnostic data. This area is logically divided into eight blocks of 800<sub>h</sub> addresses. In each of these blocks can be one CANopen profile implemented. This means, eight different profiles can be implemented. Alternatively, you can implement the same profile. Then you have multiple instances of this profile, but a logical device can not be distributed to several CANopen devices.

### Two- and three-axes controllers

Roboteq's motion controllers are an example of using this CANopen feature. Mobile robots need two motors to move and steer, and Roboteq can make this work with a single controller. Compared to the traditional single-motor controller approach, the dual-channel motion controller is simpler, cheaper, and easier to integrate and maintain. The two motors are coordinated within the controllers, resulting in superior and safer drive characteristics. Using two of such controllers can team up to drive four motors with Mecanum wheels to move omnidirectional robots.

The FDC2360 is even able to drive directly three DC motors up to 60 V and 60 A. The motion controller targets mobile robots and automatic guided vehicles (AGVs).

The product comprises a Basic language interpreter capable of executing over 50 000 instructions per second. This feature can be used to write scripts for adding custom functions, or for developing automated systems without the need for an external PLC or host controller. The motors may be operated in open- or closed-loop speed or position modes with a 1-kHz update rate.

The second and third instance of the CiA 402 profile starts at 6800<sub>h</sub> respectively 7000<sub>h</sub>. This means the controlword of the second logical drive has the address 6840<sub>h</sub> respectively 7040<sub>h</sub> for the third logical axis. The 512 PDOs (process data objects) are also assigned to the logical devices. The first 64 PDOs belong to the first logical devices, etc.

### Robot I/O extender

The company offers also a robot I/O extender with CANopen interface. This device is companion of Roboteq's motion controller. The Riox provides a 9-degree of freedom (DoF) accelerometer, gyroscope, and magnetometer. That's not including, of course, its fusion algorithm for creating a precise attitude and heading reference system (AHRS). The Riox electronic compass and artificial horizon functionality, when added to the motion controllers, opens a world of applications in sea, land, or airborne unmanned robotics vehicles.

A self-balancing robot or scooter is easy to create when you know its inclination with precision and in real-time. The 3-axis gyroscope and accelerometer work together to sense and compute this information. Communication with the motion controller ensures the robot's quick response and stability.

The Riox features 12 inputs, each of which can be individually configured as digital, 0-V-to-5-V analog, or as a pulse input. In the pulse mode the inputs can capture pulses from RC radios, frequency, duty cycle, or counts from quadrature encoders. These inputs can also be used to connect up to 12 ultrasound distance sensors for 360-degree obstacle detection and environment mapping. The 12 digital inputs can also be configured to generate a variable width pulse for driving RC servos. This allows ▶

to use third-party servos for building low cost robot arms, pan & tilt heads, gimbals, or anything else what needs to be move. Two analog outputs and up to 16 industrial-grade and protected outputs are available for connecting lights, solenoids, buzzers, or any module with a 1-A load.

The Riox device combined with motion controllers, the supplier's magnetic guide sensors, and battery management systems is a solution for mobile robots and AGVs. The device can be programmed using the built-in programming language. This means the I/O signals can be pre-processed. Via CANopen, the product can be connected to PLC or any other host controller. In addition, the supplier supports the proprietary RoboCAN application layer.

hz

[www.roboteq.com](http://www.roboteq.com)

## CAN Newsletter Online: Roboteq



Motion controller

### *Driving up to three DC motors*

Roboteq offers the FDC3260 motion controller, which supports the CiA 402 profile. It is able to control up to three motors.

[Read on](#)



Magnetic guide sensor

### *Suitable for line following robots*

Roboteq (USA) has introduced a sensor capable of detecting and reporting the position of a magnetic field along its horizontal axis. The CAN-interface is available at the M12 connector.

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Motor controller

### *Networking up to 127 drives via CAN*

Roboteq has introduced the RGLB1860 and RGLB1896 motion controllers for brushless DC motors. They are suitable for electric vehicles, material handling robots, electric boats, or agricultural robots.

[Read on](#)



I/O expansion card

### *With optional inertial measurement unit*

Roboteq (USA) has introduced the I/O Extender (Riox) module. It is an I/O expansion card with an optional inertial measurement unit. It integrates with Roboteq motor controllers.

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2 x CAN FD, 4 x CAN



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- Increase your system reliability and protect devices by galvanic isolation (up to 4 kV)
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