Host controller with integrated inclination sensor

(Source: Adobe Stock/STW)

STW has introduced the ESX.4ct host controller dedicated for mobile machinery. It is based on the 300-MHz Aurix micro-controllers by Infineon coming with up to three CAN CC (classic) ports. Optionally, the device is equipped with a 6-axis acceleration and inclination sensor.

Sensor-Technik Wiedemann (STW), CiA member since 1993, has combined its core competences in host controllers and sensor technologies: The outcome is the compact ESX.4ct device measuring 174 mm (length) x 117 mm (width) x 36 mm (height). It comes in ingress protection (IP) rated housings up to IP69K, suitable for outdoor applications.

The host controller is programmable in C/C++, logi.CAD 3 (IEC 61131-3), or Matlab/Simulink. Intended are control applications in smaller mobile machines such as mini excavators, truck-mounted cranes, or for implementing automated assistance and vehicle systems in larger machines. The control is suitable for safety-related applications up to PL (performance level) b according to EN ISO 13849-1:2015.

The integrated 6-axes acceleration and inclination sensor measures accelerations and rotation rates in all three spatial axes in a measuring range of ±2/±4/±8/±16 g and ±125 to ±4000 degree per second. This data can be used for position compensation of GNSS (global navigation satellite system) data. Christoph Filser from STW explained: "Navigation modules for mobile machinery are usually located on the roof of the driver's cab. However, the data can be inaccurate for GNSS-guided steering or lane-keeping systems, if the machine is, for example, operating on a slope. For high-precision work, the position of the axles and implements must however be precisely determined. Errors in the position can be corrected using calculations based on the data from the inclination sensor."

Should the satellite navigation system be interrupted, the acceleration and angle data from the integrated sensor can be used to maintain guidance. The integrated sensor therefore contributes to greater safety, precision, and work quality in the automated processes typically found in agriculture. "In the long term, the integration of intelligent filter algorithms that pre-process the measurement data and predict further dynamic responses is also conceivable. Such a functionality would enable even more precise position correction," added Christoph Filser.

Automated steering systems are the basis for smart farming applications. Track guidance can minimize travel distances, working time, and fertilizer use, meaning more efficient and resource-saving cultivation. The host controller provides two CAN interfaces by default and an optional CAN interface. These CAN ports are CAN FD capable. One of them features optionally wake-up capability. Isobus (ISO 11783-3) compliant higher-layer protool support is available. Isobus is widely used in agriculture and forestry (off-road) vehicles.

The host controller is based on a 300-MHz processing core and is equipped with up to 13 outputs and 14 multi-functional inputs, as well as several other interfaces. The sensor supply can be adjusted between 5 V_{DC} and 12 V_{DC} with an available current of 250 mA. The inputs are configurable, SENT and Namur are supported. The eight half-bridge outputs can control proportional valve groups (PVG). ◀

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Brief news: Host controller

- ***Syslogic:*** At the Innotrans tradeshow, the Swiss company has launched the IP67-rated RML A4NX controller based on the Jetson Orin processor by Nvidia. The product intended for AI (artificial intelligence) applications complies with the EN 50155 rail vehicle standard and features multiple CAN ports. The company also offers the RS A4NA controller suitable for AI applications in AGVs (automated guided vehicles). Another AI computer is the RML A4AGX providing up to six CAN FD ports.
- ***Inonet/Eurotech:*** The Reliacor 54-13 embedded controller is based on the Intel and Nvidia processors. It is certified according to IEC 62443-4-2. The device comes with multiple CAN FD interfaces.
- ***STW:*** The IP6K9-rated BCX.4cs-ag electronic control unit (ECU) is designed for controlling agriculture implements. It features CAN-CC-based Isobus connectivity (ISO 11783 series). The product is programmable in C and logi.CAD (IEC 61131-3). The company's flagship for mobile machines is the ESX.4cm-ag controller, providing four CAN interfaces with Isobus support. It features 34 configurable analog and digital inputs and two 10-A half-bridges for electrical motors.
- ***Ubiqconn Technology:*** The Vortex vehicle-mounted computer is based on the i5 processor by Intel. It features CAN connectivity and can be connected to the Iridium satellite network.
- ***B&R:*** The Austrian company, a member of the ABB group, offers the X90 CP150 controller, featuring a stand-by mode. The CAN-connectable device for off-highway and agriculture vehicles remains active and monitors the vehicle to immediately switch back to operating mode after a wake-up event.
- ***Peak-System:*** The PCAN-Micromod FD electronic control unit has a CAN FD interface and provides several I/O (input/output) ports. Configuration is possible by means of a Windows software. The device is designed for use in commercial and heavy-duty vehicles coming in an IP67-rated housing and dual automotive connectors. The ECU has received ECE type approval E1.
- ***Advantech:*** The Taiwanese company has launched the ROM-6881 controller suitable for AGV/AMR applications. It is based on the RK3588 processor (Cortex-A76) by Rockchip. The product provides two CAN interfaces. Additionally, the company has introduced the Jetson Orin (Nvidia) processor-based AMR-S100 box PC for AMRs. It comes with a ROS-2 suite software and optional CAN connectivity.
- ***Aaeon:*** The VPC-5640S device for in-vehicle applications is equipped with a galvanic-isolated CAN interface. It is based on an Intel processor and complies with Mil-Std-810H vibration and shock tolerance. The temperature range is -40 °C to +70 °C. The Taiwanese company, established in 1992, has also launched the IMX8PL rugged PC and an equivalent 2,5-inch Pico-ITX board based in the i.MX 8M Plus micro-controller (NXP) featuring CAN FD connectivity.
- ***B-Plus:*** The compact B-Cancubemini Sealed Plus 32-bit control unit is intended for mobile machinery. It is equipped with three CAN interfaces. The IP69K-rated product is programmable in C.
- ***TT-Control:*** The company is a joint venture of Hydac and TTTech. It's Fusion controller series is a multi-interface and multi-screen platform equipped with AI acceleration for off-highway and off-road vehicles. The products offer several CAN CC and CAN FD as well as Ethernet interfaces. The possible AI applications include a camera-based spraying function for agriculture implements. Isobus higher-layer protocols are supported.
- ***Wachendorff Prozesstechnik/Aplex Technology:*** The Auhmi-9 panel-PC developed by the Taiwanese company can be equipped optionally with CAN interface modules by means of Mini-PCIe modules. The fan-less controllers are based on Intel pro-cessors (Tiger Lake Core i3 or i5). *hz*