

# Under new management

## A NEW PRODUCT PLATFORM FOR MACHINE MANAGEMENT ENABLES SMARTER NEXT-GENERATION MACHINES THAT PROVIDE A HOST OF BENEFITS FOR THE USER

FIGURE 1 (BELOW RIGHT): CrossLink RX is just one of the products in CC Systems machine management platform  
 FIGURE 2 (RIGHT): Cargotec was a pioneer in the adoption of the machine management approach

Industrial vehicle OEMs can offer machines and services that provide higher user value by using modern CANbus controls and telematics technology in their next-generation machines. In addition, this new technology helps OEMs to reduce their costs, through higher efficiency in aftermarket operations, for example.

Early generation electronic control systems reduced wiring and made onboard automation possible. Today, a control system is used not only for controls but rather for machine management – a concept incorporating a total machine control system, diagnostics and prognostics, machine telematics and fleet management, advanced logging and more.

CC Systems has developed a machine management product platform from which products for controls, advanced logging and machine telematics are derived. The platform can be used for any one, or a combination, of these tasks. Early adopters are now engineering these various hardware devices into next-generation vehicles.

### State-of-the-art platform

The platform is based on the ARM9/ARM11-families of CPUs, a technology widely adopted in the automotive sector, making it future-proof and well-supported. The ARM architecture offers high computing power at very moderate power consumption.

The Linux operating system means the platform is open and OEMs and system developers can choose to develop applications with the tools and programming languages of their preference. It is also possible to use high-level application programming frameworks, such as IEC 61131-3 with tools such as CoDeSys.

Up to four CAN interfaces are supported – with this amount, a more optimal physical network architecture on the vehicle can be created, letting the central unit act as



gateway between the different networks. To facilitate the integration of non-CAN subsystems, the platform has Ethernet as well as host and device USB interfaces.

The platform supports various interfaces for remote access and fleet management. The built-in wireless communication interfaces are GPRS/3G and WLAN and the platform also supports built-in GPS for positioning functionality. A built-in web server makes basic configuration and loading of application software easy. SSH communication can be used for remote access and service.

The product platform offers extraordinarily high resistance against tough environmental loads. The IP67 aluminium enclosure is filled with silicon, protecting the electronics against severe shock loads, vibrations and water/dust intrusion. The platform offers a wide power supply range and an extensive operating temperature range. Connectors are DIN M12, giving high reliability in connections, with standard, moulded cables bringing wiring cost down to a minimum. The platform offers also lengthy electrical protection, such as galvanic isolated CAN ports.

Products based on the platform will go into next-generation machines launched late 2009/early 2010 by early adopters. These products are explained below.

**Controller with four CAN:** CrossCore XA is a powerful, versatile and robust controller module for advanced machine controls. This has a powerful ARM9 CPU, which gives enough computing power to manage the role as master controller for four different CAN networks. CrossCore XA can be used as the central component in a total machine control system, with all controls integrated seamlessly.

Operating system and application frameworks are stored in one memory bank, application data in another. To make certain that application data is preserved properly at system shut down, the system has a built-in power backup and functionality to ensure safe writing of data to the flash memory. With up to 8GB of flash memory capacity, the unit is prepared for extensive monitoring and data storage.

**Combined telematics and controls:** The interest for machine telematics solutions is increasing in the market and CrossLink RX is a powerful controller and feature-rich telematics gateway in one unit. It is designed to be easily integrated into an existing control system solution, via dual CAN interfaces with CANopen and/or SAE J1939.

With the powerful ARM kernel, CrossLink RX can act as control system master, typically running an IEC 61131-3 runtime, like CoDeSys. In parallel, the unit can run an advanced diagnostics and prognostics framework, adapted to the signal interface of CoDeSys. When applied in a system where the master functionality runs in another controller, the same diagnostics framework can be used, then communicating with the

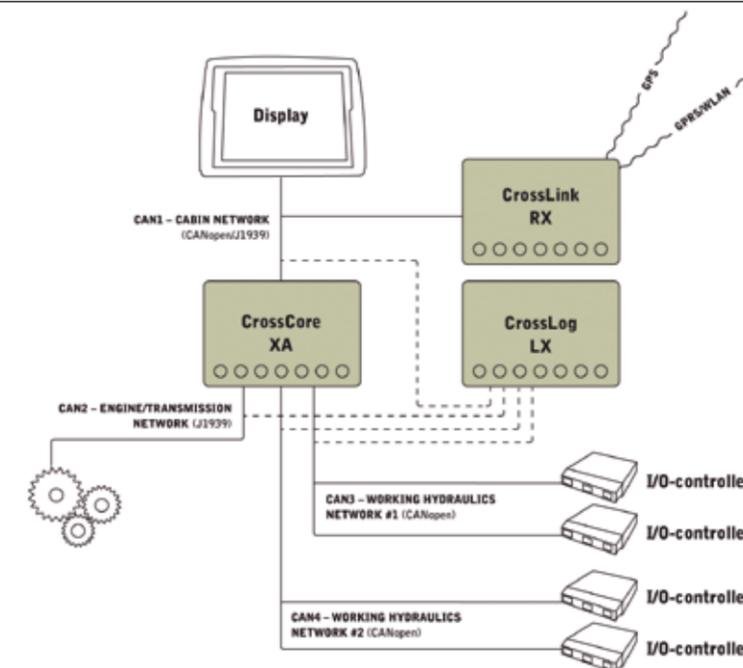


FIGURE 3: System example where CrossCore XA is used as a controller for four CAN networks, CrossLink RX acts as a telematics gateway and CrossLog LX logs CAN data on the different networks

master via CAN instead of via signals. This offers an easy route to implementation of advanced telematics.

CrossLink RX has a built-in GPRS/3G modem and WLAN for remote access and fleet-management communication. It has a built-in GPS receiver and an accelerometer, intended for fleet management applications where position and movement information is needed.

**Network logging:** CrossLog LX is a device for various memory-consuming logging tasks. It can be used as a system-independent CAN network logger, logging communication on up to four CAN networks simultaneously. It can be fitted to any CAN network, with any protocol, as it is not acting as an active node on the network; it just sniffs the bus.

With the 8GB flash disk it can store four hours of CAN communication at 1Mb/s bitrate and full bus load. With this functionality CrossLog LX essentially operates as a 'black box' that makes it possible to perform advanced analysis after an incident.

CrossLog LX has redundant power supply, via separate power supply or CAN. The switch between the two power supplies is automatic. This means the unit is

always operational when there is traffic on the CANbus.

Another feature of CrossLog LX is logging of surveillance video images. IP cameras are to an increasing extent now being applied in industrial vehicles, for surveillance of vehicle functions as well as conditions around the vehicle and at the work site. With CrossLog LX, the vehicle owner is able to document a situation, such as a condition at the work site that hindered the vehicle in the performance of its task. This kind of documentation is critical business information for users of certain machines, as it can be used to support a claim.

These are a few examples of products based on CC Systems' product platform for machine management. These products, and new derivatives from the platform, will be presented at Agritechnica in November 2009 and at Bauma 2010. There is a lot of activity towards next generation control systems in the business. It is time for machine management. **ivt**

Lars Olsson is product manager at CC Systems. He has worked in electronics design for more than 15 years

**CONTACT**  
[www.cc-systems.com](http://www.cc-systems.com)  
[info@cc-systems.com](mailto:info@cc-systems.com)