

## Open System Platform Powers New Hi-O™ Technology

ASSA ABLOY's Hi-O™ (Highly Intelligent Opening) technology is a new concept for electronic door solutions that simplifies installation, service and upgrade of a building's security and life-safety system.

The foundation of the Hi-O system is a CANbus (CAN for Controller Area Network) data network that connects electronic door components together, allowing them to exchange and share encrypted information. Every device (the lock, exit device, electric strike, proximity reader, door operator, push button, etc.) is connected through a 4-wire cable; two wires for power and two for data communication.

Building on that foundation, Hi-O is the application embedded into each component determining how it behaves with different components under different circumstances. CAN provides the physical and networking architecture for connecting next generation opening hardware. Hi-O enabled opening components allow access control and other systems to leverage the intelligence of the opening.

The ISO-standard for controller area networks, established in 1995, is used by numerous companies in a variety of industries, from ships to cars and even in automatic coffee machines. Building on the open CAN-bus standard allows every lock and access device manufacturer in the world to be a potential partner with the adoption of Hi-O.

### **What is CANbus?**

CANbus was built to manage short messages on short wires in noisy electrical environments. Intel built the first CAN chip, the 82526, way back in the mid-late 80s and Philips delivered one a few years later. Today around 20 CAN chip makers serve a range of industries, the most prominent being auto manufacturers which gobbled up more than 200 million CAN controllers in 2005. This latter is a symbiotic relationship of great importance given CANbus technology has been significantly strengthened by the demands of auto makers who insist on processors with a minimum lifespan of 15 years.

The upshot of it all is that CANbus is among the most dominant and most capable of bus protocols. It is governed by the CAN in Automation (CiA) users and manufacturers association which was formed back in 1992 and dedicated itself to bringing about standards allowing the exchange of data at the application level where the existing CAL (CAN Application Layer) meant every user had to build their own comms profile.

The result of a series of parallel efforts with CAL were 2 protocols, CANopen and DeviceNET, with CANopen ideal for embedded networks in all kinds of machine controls. Essentially, CANopen makes proprietary application layers unnecessary. CANbus is perfect for electronic locking applications where a simple flying lead and 2-wire data cable replace the complexity of the analog cabling that's currently required.

## **Broad Platform**

The widespread nature of CANbus means other developers can easily build CANbus ports into existing equipment, allowing them to integrate with Hi-O locking devices. Whether such systems are alarm panels, fire panels or building automation solutions depends on third party developers. The plug-and-play capability means these devices are interworkable even if they have been developed by different manufacturers.

Standardized profiles (device, interface and application profiles) developed by CiA members simplify the system designer job of integrating a CANopen network system. Off-the-shelf devices, tools and protocol stacks are widely available. For system designers, it is very important to reuse application software. This requires not only communication compatibility, but also interoperability and interchangeability of devices. In the CANopen device and interface profiles, defined application objects exist to achieve the interchangeability of CANopen devices. CANopen is flexible and open enough to enable manufacturer-specific functionality in devices, which can be added to the generic functionality described in the profiles.

The open standard platform makes expansion simple, since all new devices will automatically identify themselves on the network. A Hi-O-enabled device will work with its basic configuration as soon as it gets connected – just as when a USB device is plugged into a computer. The communication between the devices is encrypted in order to prevent intrusion.

## **Building an Open Door Network**

Since Hi-O is an application layer that runs on the CANbus, partners can leverage the available hardware and expertise around CAN to implement the Hi-O application. CANbus architecture makes the system robust and cost-effective while Hi-O delivers the installation and ownership value of an intelligent opening. By embedding Hi-O technology, hardware manufacturers ensure their components work with others to configure the door properly. Manufacturers have a variety of choices from different suppliers for the necessary components.

After installation, owners can be assured that the information that makes Hi-O enabled openings valuable can be consumed by a variety of systems, not just the one they initially implement. Traditional opening devices only monitor a state change and report to one system in a proprietary fashion. Openings with Hi-O operate in an entirely different fashion, along the lines of computers on a network. Each device is in constant communication with the others and they know all the other authorized components. Multiple systems can consume that information flow for security, management and maintenance purposes.

## **Incubating the Standard**

ASSA ABLOY realized at the start that the next generation architecture for door management could start with one company but would need many to succeed. Only ASSA ABLOY has the capability of developing an architecture as comprehensive as Hi-O. The other large hardware manufacturers do not have the software neutrality to work with multiple software systems and a collection of smaller suppliers would have difficulty generating a tight working set of products. Conversely, Hi-O will be most successful when companies outside of the ASSA ABLOY Group adopt it.

To that end, ASSA ABLOY is working to establish the legal groundwork for an independent method for a community of manufacturers to adopt and support Hi-O. The precedent for that has already been set by establishing third party certification of

Hi-O components and systems. While the technology is being incubated at ASSA ABLOY and with a handful of other key partners, we see the other method becoming the primary vehicle for maintaining, extending and promoting Hi-O.

Choosing CANbus as the underlying platform fit that need as well as the technology need. With CANbus, other device manufacturers need not worry about being locked into ASSA ABLOY as a technology supplier. It also establishes Hi-O as a technology that clearly belongs to part of a larger, interoperable community. Several companies have asked why Hi-O needs to be a separate technology set, beyond CAN. Rest assured, Hi-O fully embraces CAN. In fact, components of Hi-O are already embedded in draft CANopen specifications. On the other hand, Hi-O very specifically addresses door openings and the needs of those consumers extend beyond the scope of CAN standards bodies.

Beyond CAN, the Hi-O collection of technologies are candidates for adoption by other standards bodies. To further that cause a group whose sole focus is the maintenance, extension and promotion of Hi-O will be necessary. More public announcements will be available as the initial software partners near their launch dates.

### **End-User Benefits**

While the CANbus operators and plug-in system makes installation easier, the real benefits accrue to end users who end up with an access control system that has intelligence all the way down to the door.

Hi-O has the ability to troubleshoot or run a self-diagnostic check of the system more effectively because the CANbus system is always aware of failures on the network. System technicians and administrators can also analyze door behavior and check on things like over-voltage that in the past would have required a site visit. This additional processing power means maintenance can happen automatically with problems sorted out before they develop. And at another level, security managers can now know that doors are closed, locked, functional and fully maintained.

With Hi-O, it's possible to build an open platform, auto-configuring access control system that is easily expandable and offers reliable and highly secure distributed architecture at lock level.