EC2C Basics

edsc Automotive Products

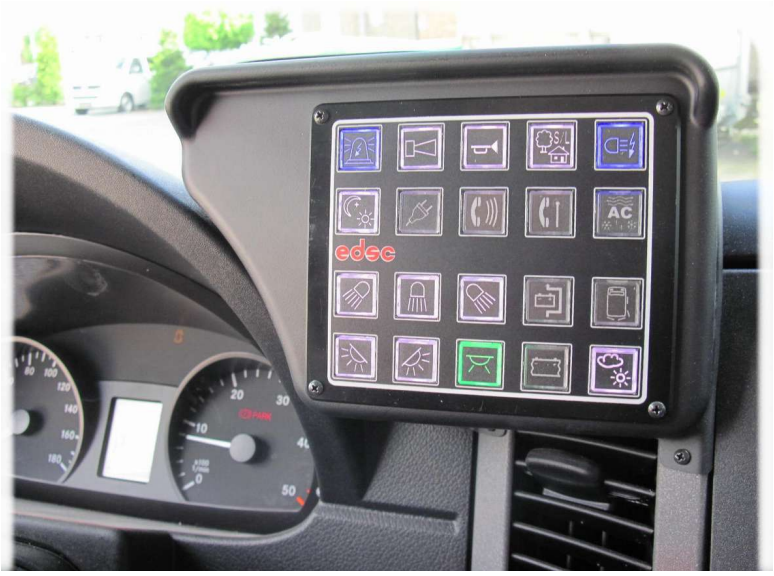
EDSC GmbH & Co. KG
Teutonenweg 5
D-73433 Aalen
Fon: +49(0)7361 – 973801

Internet: www.edsc.de
E-Mail: info@edsc.de

Modular CAN-Bus systems ensure tidiness in automotive environment

The modular systems provide benefits for the vehicle mnanufactor as well as for the operator

In addition to the steering wheel two additional switches! One for the signal light, a second for the signal system. It all started so easy. But the technical progress requires steadily additional control elements: A lock allows the operation of the signal system only together with the emergency blue light. For the passage of the signal system when operating the vehicle horn another switch is provided. And then follow switches, buttons and indicator lights for jumping lights, exterior lights, auxiliary heating with multi-stage fan, heat exchanger, interior lighting, emergency light, door contact control and much more ...



This is it should look like: A clean and clear cockpit with a user friendly console. For the driver results in a simple and safe operation even in stressful situations and for the manufacturer a cheap production solution.

In short, it is clear that only specialists can handle the necessary relay logic and the wiring tricks to realize this. Robust and solid technology, but complex, confusing and often individual for different vehicles. If the customer just wants it and if changes are necessary, they should be realized as quickly and cost efficiant as possible. A necessary documentation often falls by the wayside. Suppliers of signaling systems or lights have reacted and offering their components with integrated electronics and control elements. The comfort increases, but the controls, as handsome as they may be, optically do not match in the current installation environment. If then several control elements from usually different manufacturers, have to find their place. The total optics is no longer acceptable, apart from the user friendliness.

Simple wiring with high comfort

Modular CAN-Bus systems bring many advantages for both, the vehicle manufactuer and the operator. The heart of such a system is the main control module. It could be individually programmed or parameterized by the vehicle manufactuer. The EC2C-CAN-Bus module system presented here emphasized the importance of working with as little training as possible and no programming knowledge. Basic knowledge in the operation of a PC are required, but our experience has shown that this is always present.

In this device, all information merge: The EC2C master with EA is the control center of the CAN-Bus module system. It also has a variety of inputs and outputs for different applications.

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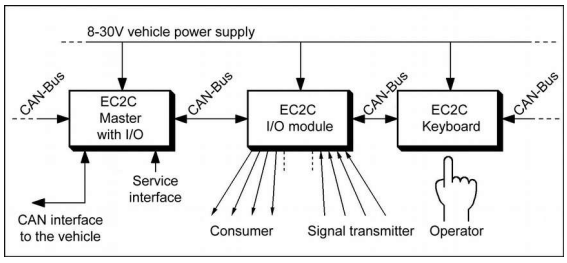
With the free support from EDSC GmbH & Co.KG, the user has the posibility to develop a own parameter setting framework in short time, which ensures a well-engineered software version already from the first vehicle and replaces his present conventional state. The user is able to extend, configurate or adapt this framework. For the EC2C CAN-Bus module system, the main control is called master with a few inputs and outputs to get easy started. This master is connected to the various EC2C add-on modules via two-wire CAN-Bus. These are always input and output modules which must be supplied via the vehicle electrical system. The cabling effort, which was previously necessary to realize the logical links, is completely eliminated. The electrical consumers used by the vehicle converter (blue lights, fans, etc.) as well as signal transmitters (switching contacts, feedback, etc.) are connected directly to such an I/O module. This will be even easier if such modules are placed in close proximity to the devices. Special knowledge is not required for this cabling. In addition, all connections and functions can be tested with a PC-based diagnostic software even before final commissioning.

This is what a simple parameterization framework looks like. The user selects the desired functions in the active column and transfers the created program to the EC2C master. With a mouse click, the frame is additionally stored and can be reloaded at any time.



The example of this graphic illustrates the principle interconnection of the EC2C CAN bus module system.

Different I/O modules in any number and combination increase flexibility and reduce costs

The I/O modules of the EC2C CAN-Bus module system have different inputs and outputs. The inputs are essentially digital low and highside inputs. Lowside inputs only require a switching contact with the vehicle ground (eg door contact). High-side inputs, on the other hand, indicate whether there is sufficient voltage.

Many modules also offer the possibility to record analog voltages or currents. The outputs are essentially electronically switching low and high side outputs with different current load capacity . These are short circuit proof and usually designed for larger currents. But also PWM and half-bridge outputs, especially for the use of regulated fans, are available. Many outputs have a current measurement and therefore provide flexible monitoring options. Without further devices and additional wiring effort, it is possible to report to the operator by simple program modification, for example the failure of a luminaire. For very special applications, especially when galvanic isolation is required, classic relay outputs are also available.

Several, partly different, EC2C I/O modules mounted as a tower.

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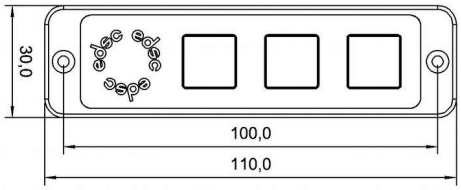
Due to the easy-to-wire CAN-Bus connection, the location of the I/O modules in the vehicle is relatively independent and can be positioned according to the cable lengths to the devices.

"Not another keypad!" The EC2C-CAN-Bus module system offers a comprehensive keyboard family for almost all vehicle interiors. The keyboard modules have a unified, simple design that integrates with the vehicle environment and draws attention to the essentials. Since several, even different, keyboard modules can be used, it is possible to offer both the operator in the cockpit and the colleagues in the rear area of the vehicle the same key functions. These are also clearly identified by identical insert symbols, which makes faster and error-free operation possible. A case that is of particular importance in the rescue service. At this point, it should be mentioned that keyboard modules are also able for installation in a „DIN-Standard“ slot. Especially with special vehicles this installation variant is preferred.

EC2C 14th keyboard for the DIN slot, installed above the rearview mirror in the upper of the cockpit.

Every single button can be illuminated in 7 different colors. White is usually used as the backlight, green indicates a powered on-state, and red serves as a warning message. The other colors blue, yellow, purple and turquoise and flashing options also offer a lot of comfort and flexibility. It is not necessary to explain how important it is to indicate a dangerous situation by means of a red flashing light (for example: side door not closed). Of course, the lighting functions are not fixed, but freely defined by the choice of appropriate parameters.



Small and compact.
EC2C keyboard with only 16mm installation depth. Installed as a foil version edgewise.

EC2C 6-key keyboard installed transversely

Finally, it should be mentioned that each individual keyboard can be adjusted darker overall to avoid dazzling when driving at night. For automation of keyboard dimming or other applications, a brightness sensor has been developed which is optionally available. Furthermore, the dimming of the keyboards can also be controlled by other parameters such as, for example, low beam light, etc.

Various optional accessories available

The EC2C-CAN-Bus module system has already been successfully in use for several years and is constantly finding new areas of application. Thus, the range of special accessories is constantly growing. Particularly noteworthy here is a climate controller for retrofitting and a control unit for our Plx luminaire series. This luminaire series are special recessed luminaires in different variants. These are specially designed for special vehicle construction, have integrated electronics and are dimmable. Furthermore, these can be controlled conventionally as well as connected to the EC2C system.

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Vehicle information can be queried centrally

If the existing vehicle electrics are changed or extended - even if it is just an additional turn signal - the vehicle's operating permit will generally be extinguished. In newer motor vehicles, manufacturers therefore already install a configurable CAN module on request, which serves as an interface for communication with customer-specific installations. In most cases, this module also has some inputs and outputs and can also handle minor control tasks. The above-named master of the EC2C CAN-Bus module system has an additional CAN bus interface for communication with this CAN module. In this way, the vehicle manufactuer gets some vehicle information - for example, on the handbrake, the horn or the side door - use for his needs. Conversely, of course, there is also the possibility of forwarding information to the vehicle. Here are particularly the control of the central locking or the lifting of the stagnation gas worth mentioning. It certainly requires no clairvoyant abilities to venture the claim that in the near future, an even greater amount of information about the vehicle is to be available.

What has long been commonplace in the computer sector could then also find its way into vehicle converters: Via the Internet, updates could be made available in order to extend the state of operating convenience or to improve it. The master of the EC2C CAN-Bus module system is already prepared for this scenario. In such a case, the standard service interface would be connected to a PC or laptop and the data exchange could start.

The vehicle technology of tomorrow

The PC sector is still the fastest developer of new developments, mostly in the form of programs. The navigation system could then be parameterized, for example, already from the control center. The direction to the place of use would thus already given when boarding the vehicle. The image processing of the camera data could, for example, provide interesting reversing or parking aids, and a uniform operation of radios - even from different manufacturers - would provide especially the rescue team in the rescue and operational area a significant benefit and they can focus more on their main tasks.

Markus Riedel & Eugen Michalak

INFORMATION

Markus Riedel (Photo) studied electronics / technical computer science at the “Fachhochschule Aalen“. Since 2000 the author works for the company EDSC GmbH Co. KG, as a project engineer. His responsibilities include the development of customer-specific hardware and software solutions in the areas of automotive and embedded control as well as the programming of software applications for mobile devices.

The contact details of the company:

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