Translate M-Bus transparently

Reading out meter data via the wired M-Bus gains more and more in importance. Because on the one hand, there is the topic of Smart Metering and on the other hand, the demand for solutions in industrial environments is growing tremendously. There are some main drivers: The requirement for energy efficiency, the need for energy audits, ISO 50001 and the need for optimizing energy costs. In any case, a growing number of intelligent meters are installed in processes, plants, facilities or real estates. But the very special M-Bus physical layer is not directly available in most cases. So-called level converters are used for interfacing M-Bus meters with a data acquisition system.

M-Bus - An easy architecture

The M-Bus is a field bus system standardized in the norm EN 13757. It is primarily used for the collection of consumption data. The transfer of the data takes place on a 2-wire bus between a master and the connected slaves (meters or sensors). The M-Bus utilizes a request-response-method.

The master is sending a request on the bus using voltage modulation. The low level of the bus voltage (logical 0) is 24 V and the high level (logical 1) is 36 V. A slave gets selected by its bus address and answers to the master's request with a response that modulates the current on the 2-wire bus. A low signal (logical 0) is defined with a current draw by the slave of about 11-20 mA, for a high signal (logical 1) the current draw is about 1.5 mA (the so-called "unit load"). In idle state one meter draws about this current of 1.5 mA.

The M-Bus provides baud rates of 300, 2400 or 9600 bps. These rather slow baud rates are enabling communication distances of more than 1 km on a simple two-wire line. As the M-Bus slaves can use the energy given by the unit load, the M-Bus master can power all the slaves.

Interfacing data acquisition systems

The M-Bus is a serial bus system. The signal levels are very special, but the bit timing is very common. It uses 8 data bits, even parity and 1 stop bit (8-E-1). This is also available at other serial interfaces like RS-232 or RS-485.

So, the interfacing of M-Bus with a PC is only a question of the signaling. The main task is to transfer the signal levels from the RS-232 or RS-485 to the M-Bus levels. Devices which are accomplishing that are simply called level converters.

Level converters are devices which are transferring the data transparently from one side to the other without changing the content. At the same time they are also changing the signal levels, this means the physical representation of logical 1 or 0.

Level converter for standard applications

The bigger part of M-Bus installations includes 1 to 60 meters. This range allows the acquisition of consumption data for individual appliances and small facilities like single-family homes, apartment buildings or heat stations.

Regarding these use cases we are offering compact level converters for DIN rail mounting. In the cabinet, the slim design takes only 1 modules width. There are also other advantages. The devices do not need to be configured and they are equipped with LEDs showing their status. That means easy installation by only connecting it the right way.

Our standard level converters are integrating an RS-232 interface. The products MBUS-PS6 and MBUS-PS32 is covering installations of up to 32 unit loads.

Level converters for huge M-Bus networks

M-Bus networks with more than 60 meters and more than 1 km cable length can be called huge networks. Such installations are challenging. The M-Bus master has to power high currents into the bus with many meters as well as it has to compensate the voltage drop across the long bus lines.

This scenario is handled by our high-performance level converters with RS-232 interface. The products MBUS-PS125, MBUS-PS250 und MBUS-PS500 can directly drive up to 125, 250 or 500 unit loads. In spite of these parameters the devices are only taking 3 modules width on the DIN rail in the cabinet.

Like the products before, these devices do not need to be configured and the installation process is quite simple.

Level converter for field service

Stationary applications come with the installation of level converters in the cabinet. In contrast to it, field service needs a mobile solution for commissioning and maintenance. Often it is all about configuring or reading one single meter. The physical requirements are less high than in stationary applications.

One product that is especially developed for temporary reading and the field service is our level converter MBUS-PU3. It converts from USB to M-Bus. This enables mobile devices like Smartphones or laptops to communicate directly with the meter. The device is entirely bus-powered by the USB port.

The MBUS-PU3 is equipped with LEDs showing their operational state.

Level converter for remote applications

IP communication is usually used for remote access. Ethernet is the main communication channel in such applications and it could also be used for transferring serial data streams like the M-Bus.


Our MBUS-GE20V and MBUS-GE80V are two level converters for remote applications. They can handle up to 20 or 80 unit loads and are translating the serial data into data packets sent via Ethernet. The IP network allows having the remote device on-site or far-off. A simple TCP socket (or optional a virtual COM port; we recommend the driver from company Eltima) on the data terminal end is used for transparent M-Bus communication over Ethernet.

The devices have status LEDs to indicate the operating status.

Level converters for OEM customers

It might be also interesting for some customers to integrate an M-Bus interface into their own devices. We can also offer additional products. We offer OEM modules, a communication stack and know-how. For this, we provide a design-in support specially coordinated up to a product-specific adaption.

Our M-Bus module MBUS-M13 is subassemblies for converting a TTL UART to M-Bus signals. It eases integrating the M-Bus physical layer into devices. The module is capable of driving up to 60 unit loads directly.
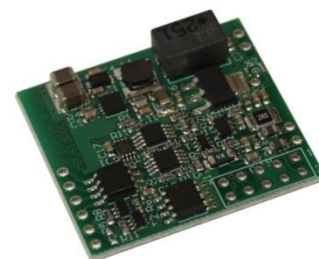
One thing is similar for all the different level converters: The M-Bus protocol has to be implemented in software.