

Smart Meter to
HAN Connectivity



What Interface is Best for Your Deployment?



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Smart meter to Home Area Network (HAN) connectivity is an important requirement driving customer engagement and allowing utilities to get more value out of their smart meter investment. HAN connectivity enables utilities to offer new services to customers beyond simple billing applications. These higher value applications include dynamic pricing, in home load control and energy monitoring which have the potential to drive new revenue opportunities for grid operators.

The two most popular ways to achieve HAN connectivity is through the use of either the Multipurpose Expansion Port (MEP) interface or Universal Serial Bus (USB) interface available in smart meters. Utilities considering HAN connectivity should make sure the interface they choose complies with the following requirements:

- Hot-pluggable
- Ability to supply limited amounts of power directly to the device
- Data uplink / downlink implemented through the full stack of the architecture independent of the attached device
- Protocol is not proprietary and an open published specification
- Protocol has to implement at least two levels of authentication with a read only access and a read/write access
- Protocol has to implement data payload encryption

This article evaluates these popular interfaces with case examples from three recent utility MEP deployments in Austria and Finland.

MEP and USB Interoperability with Smart Meters and Smart Grid Devices

What makes MEP different to a standard serial port is that this interface was designed to enable developers and utilities to extend the functionality of smart grid devices and smart meters. MEP is a flexible, open and powerful interface which allows smart meters with a MEP option to be integrated into any kind of HAN including MBus (Wireless or Wired MBus), ZigBee, LonWorks, etc. The MEP protocol is a session-less, bi-directional protocol built on ETSI GS OSG 001, the Open Smart Grid Protocol with authentication and encryption of all message exchanges.

When provided on smart meters, in general MEP is just a four wire hot-pluggable serial port, optional offering +12V on a fifth wire to power attached devices. The total energy consumption of a MEP device cannot exceed 1W.

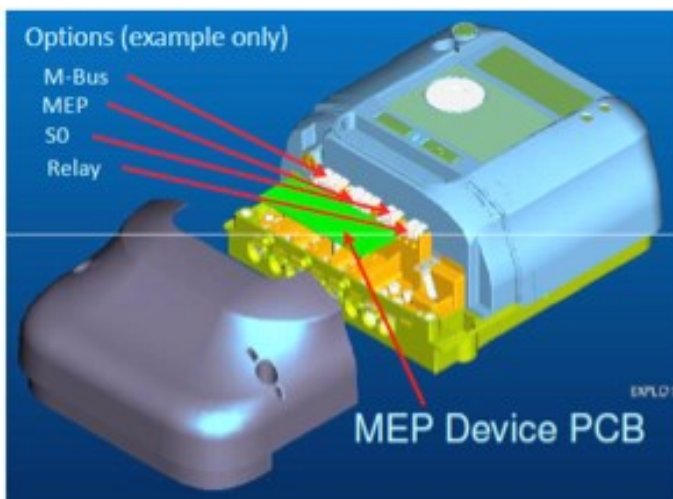


Figure 1

USB interfaces, on the other hand, were not specifically designed for smart meters. The meter's software must have a suitable driver for the attached device and then must implement the functionality to establish and receive communication over that interface. Even if some general purpose drivers will work for a group of devices, the meter has to implement communication stacks for those and it will not be able to take advantage of the device's specific features. Considering this, the broad variety of available USB devices and the openness of the system shrink down to only a few devices with already implemented driver stacks embedded in the meter firmware. Adding new generic USB devices will result in going back to the meter vendor for a software update of the smart meter. Implementing new drivers and functions in the meter firmware will also result in a new homologation certification for that firmware, which in turn means that adding some new USB device will take a lot more time, effort and investment. In the case of smart meters, the concept of having standard USB connectivity turns out to be more costly in the end.

MEP works the other way around. The connectivity and functionality implemented in the MEP device when attached to the meter is shown in figure 2. In this example, there is no need to change anything on the meter's firmware when a MEP device is replaced by some other MEP device. This ability to have 100% interoperability means meters are future upgradable which lowers the risks of deploying technology that becomes outdated over the life of the investment. Because MEP even allows new firmware to be downloaded directly to the MEP device, field service costs and the cost of replacing hardware is dramatically reduced. Because MEP was designed for smart meters and grid devices, the cost and effort of the investment are dramatically reduced when compared to the USB interface option.

