

UMI[®] – Universal Metering Interface



UMI is a new low power, wired board-to-board interface which has been developed by Cambridge Consultants to enable Smart Meters and Home Automation products to support the many wireless and wired communications and security standards which are being considered in different regions around the world.

Many smart metering developments are stalled because the communications and security standards are not yet finalised by the regulating authorities. Including UMI allows a single design of meter to be developed and metrologically approved for a large market e.g. Europe. The meter is then either deployed as Smart ready with the communications added later or configured with the communications required for that region or utility at production.

Similarly for home automation products UMI provides flexibility in a market where a variety of communications standards are being used. The features and services in UMI to support Smart metering are also applicable to smart energy and home automation products including displays, gateways, controllers and appliances.

UMI Open Standard

UMI is an Open Standard. The specifications are available under a fixed licence agreement. There are no licence fees for using UMI. The standard is tightly controlled to prevent divergence and ensure interoperability. To request the agreement please email: umi@cambridgeconsultants.com



UMI Alliance

At present Cambridge Consultants is the caretaker of the UMI standard. In the future these responsibilities will be taken over by the UMI Alliance which will be formed as an independent, not-for-profit organisation, funded and managed by its members. Current licensees are listed at: www.cambridgeconsultants.com/umi

Benefits of UMI

Utilities: Can purchase Smart ready meters with UMI now and add communications later avoiding the cost of “stranded” assets.

Meter manufacturers: Can develop Smart ready meters which are configured with the required communications to cater for regional variations at production or later in the field.

Communications Module Manufacturers: Will have a large market for standard UMI modules created by the inclusion of UMI ports in meters, displays, gateways and appliances.

Home Automation: Including one or more UMI ports in a product enables the required network interfaces in the customer’s home to be added when the product is set up, or later when a Smart meter is installed.

The Consumer: Will have a wide range of products that are compatible with their Home Automation System and the Meters from their Energy providers.

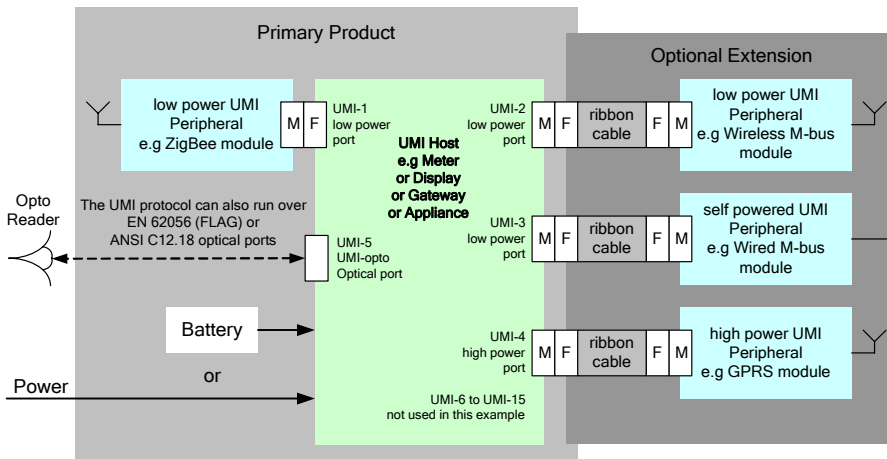
Description of UMI

UMI is a star network topology like USB but much lower power making it suitable even for battery powered devices like gas or water meters.

A system comprises a Host and up to 15 Peripherals. The Host powers Peripherals as either low power (3.3V <50mA) e.g. ZigBee, or high power (5V <1A) e.g. GPRS. They can also be self powered.

Connection is via a 10-way IDC either directly between boards or via a ribbon cable. Peripheral board dimensions are fixed and the boards are robust enough for in field installation. The hardware interface is SPI with additional control signals.

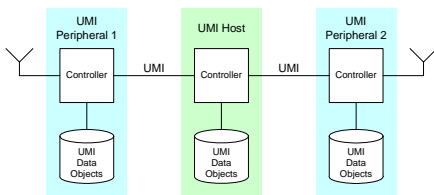
UMI specifies a link and application layer packet protocol. Transactions consist of commands, which are initiated by the Host or the Peripheral, and responses. Logically UMI is peer-to-peer and Peripherals can communicate via link layer forwarding on the Host.



1) Power management

Either the Host or Peripheral can initiate power shut down. The Host initiates power up based on a local event or at a pre-arranged time for the Peripheral's communications. Power down is essential in battery powered products as leakage current, due to moisture across connector pins, will limit battery life.

2) Data Objects



UMI has a flexible system of data objects. All data objects are identified by a unique 32-bit code. Banks of UMI codes are allocated to device manufacturers.

The types of product that use UMI include: meters, gateways, appliances and PCTs. These products have data and commands specific to their function and these will include differentiating features for the product.

Communication with the product can be via many different communications standards, each implemented as a UMI Peripheral. The Host stores its data as UMI objects, and the Peripheral maps between the UMI data objects and

the data format of the standard interface e.g. ZigBee SmartEnergy.

This enables manufacturers to fix their product independent of the communications and security standards. This is a benefit to all products. For example with meters the metrology can be fixed and approved and all the meter functions and data coded as UMI objects. Communications modules can be added later to support the standards defined by a regulator or utility customer.

3) Software Upgrade

Any UMI device can provide a software upgrade to another UMI device. The service allows the transfer of arbitrarily large binary images with error detection and cryptographic authentication.



4) Authentication and Security

The UMI security scheme defines the algorithms and data structures for Authentication, Read signature and

Write authorisations. 256 schemes are available with 3 predefined in the standard (simple password, symmetric and asymmetric). UMI supports 16 security roles.

How can Cambridge Consultants help?

We provide software stacks and test services for UMI along with a range of expert design services covering consumer products, meters and communications. Our capabilities include: sensor physics, electronics, software, mechanical and industrial design.

Wireless

We are a centre of excellence for wireless system design and can develop hardware and software for any standard including Consumer and Metering band devices at 868MHz, 915MHz or 2.4GHz. The standards we use include ZigBee®, M-Bus, GPRS, DECT, Bluetooth and WiFi.



Cambridge Consultants

Cambridge Consultants develops breakthrough products, creates and licenses intellectual property, and provides business consultancy on technology critical issues for clients worldwide. For 50 years, the company has enabled its clients to turn business opportunities into commercial successes.

We have a team of over 300 engineers, designers, scientists and consultants, based in Cambridge (UK) and Boston (USA).

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