



*With HomePlug technology, the electrical wires in your home can now distribute broadband Internet, HD video, digital music and Smart Energy applications.*

The HomePlug® Green PHY (GP) Specification is a new powerline technology designed to the specific requirements of Smart Grid applications, while interoperating with HomePlug AV products and the IEEE 1901 standard. It was developed in cooperation with major utilities with the goal of dramatically reducing power consumption and cost.

The Green PHY Specification will be published and available for download from HomePlug's website in June, 2010.

### **HomePlug Green PHY Specification**

HomePlug GP targets smart grid applications such as HVAC/thermostats, smart meters, home appliances and plug-in electric hybrid vehicles. HomePlug GP has been developed in cooperation with major utility companies including Consumers Energy, Duke Energy, Pacific Gas & Electric, and Southern California Edison to help optimize the specification for real-world deployments.

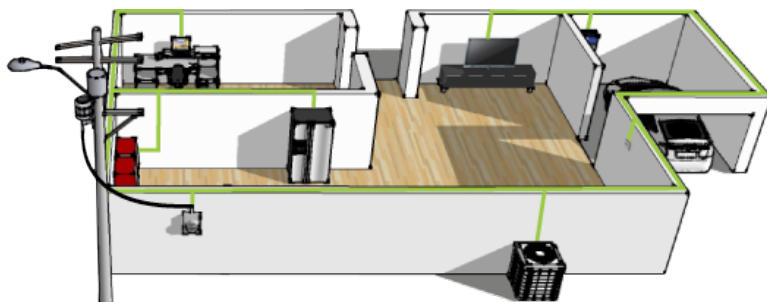
"The Smart Grid continues to be a major focus for HomePlug with the GP specification at the center of our efforts," said Rob Ranck, president of the HomePlug Powerline Alliance. "Our new GP spec meets the specific performance and interoperability requirements solicited from utilities and appliance manufacturers."

"HomePlug GP is a trimmed down, lower data rate, lower power version of HomePlug AV, making it easier for multiple silicon suppliers to produce Green PHY chips

with relative ease and speed. Backwards interoperability allows use of current HomePlug AV chips to deploy prototypes and early implementations now."

*The many benefits of easy-to-use, secure, and reliable PLC technology are about to be realized by more people than ever before as this global standards-based technology is incorporated into products for smart homes and the Smart Grid.*

HomePlug GP has ample bandwidth to support critical functionality such as IP networking, but with power consumption an estimated 75% lower than HomePlug AV, with similar cost savings projected. Certified chips and products are expected to ship in the first half of 2011. HomePlug GP was developed to be a certification profile of the IEEE 1901 PLC standard. This means that products based on HomePlug GP will be fully interoperable with HomePlug AV and IEEE 1901 products and will be included in HomePlug's well-established Compliance and Interoperability Certification Logo program.



## Working with the Industry

The HomePlug Powerline Alliance is committed to working with the industry in support of Smart Grid interoperability initiatives. Atheros Communications, Inc. has been awarded a \$4.5 million grant by the U.S. Department of Energy for HomePlug GP development. Atheros is the only semiconductor company to receive such a grant under the \$3.4 billion Smart Grid Investment Grant program for modernization of the U.S. power grid.

The HomePlug Powerline Alliance has also worked with the ZigBee Alliance to develop the ZigBee/HomePlug Smart Energy Profile, a common application layer enabling interoperability between applications which may run in ZigBee wireless and HomePlug powerline devices. The ZigBee/HomePlug Smart Energy Profile has also been named in the National Institute for Standards and Technology Smart Grid interoperability standards roadmap.



HomePlug devices account for over 80 percent of the world's broadband powerline communications market, and over 45 million devices have shipped to date.

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The Alliance operates the powerline networking industry's largest Compliance and Interoperability Certification Program to ensure true multi-vendor co-existence and interoperability. It has certified more than 190 products and will begin certifying IEEE 1901 products in 2010.



## About the Smart Grid

Development of a smart grid involves overlaying a unified two-way communications capability on the existing power delivery infrastructure to provide the right information to the right entity – whether appliances in homes, transmission and distribution equipment or utilities – at the right time to take actions beneficial to the entire system. The smart grid should optimize power supply and delivery, minimize losses, be “self-healing” and enable next-generation energy efficiency and demand response applications.

The Smart Grid infrastructure requires an open standard for two-way communications between many different transmission and distribution devices, appliances and other end-use devices, along with an advanced metering infrastructure (AMI), the two-way communications between a utility and its customers, and smart interconnections to distributed energy resources.

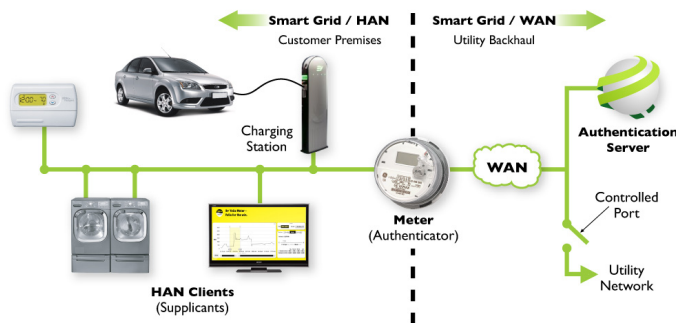
The emerging Smart Grid will facilitate charging stations for plug-in hybrid electric vehicles (PHEVs) that can be plugged into electrical outlets – ultimately at homes and public places – for recharging.

The Smart Grid will enable dynamic energy management that, along with smart energy-efficient end-use devices, advanced building control systems, and smart distributed energy resources will yield energy savings and peak demand reductions greater than what could otherwise be realized. A Smart Grid would potentially link all of these elements together and provide constant communications between a utility and its customers to optimize energy efficiency and mitigate emissions.

## HomePlug Green PHY Enables Smart Homes

While the smart grid comprises a variety of new technologies that would allow more efficient usage of energy on a local and national scale, it will ultimately enable Home Area Networks

(HANs) inside homes and give homeowners more control over their individual energy usage and electricity rates. A HAN inside the home means home appliances can communicate with the power meter to determine the most economical times to run.



*The smart home's HAN communicates through the smart meter to the smart grid WAN.*

In addition to Green PHY-enabled smart meters, consumers can expect the development of in-home displays to allow them to program their big Green PHY-enabled appliances. In addition to many different "smart" appliances in the home, companies are developing Programmable Communicating Thermostats (PCTs) that put monitoring and control of the HVAC system in the consumer's hands. Also, charging stations for homes and public places are in development; these will also have powerline communications capability to inform the customer of the current rate or allow the home owner to program when the electric vehicle should be charged.



*Smart thermostats that communicate over home electrical wiring give users more control over their energy usage.*

## Key Features of HomePlug Green PHY

HomePlug Green PHY will be interoperable with HomePlug AV, IEEE 1901 (expected to become a certification profile of IEEE 1901) and the HomePlug AV2 Specification for next generation broadband (now under development).

## Green PHY Features

- Operate with 75% less power consumption (than current HomePlug AV implementations)
- Reduce total Bill of Materials by 75% (from current HomePlug AV implementations)
- Provide Internet (IP) networking (802.2, IPv6) support
- Provide 256 Kbps minimum effective networking throughput.
- Provide 10 Mbps peak PHY rate

## Key Technical Working Group Contributors

Arkados, Atheros Communications, Cisco, Corporate Systems, Duke Energy, GE Energy, Gigle Networks, Marvell, NEC Electronics, PG&E, Renesas, SPiDCOM, ST Microelectronics, and Watteco.

### **About the HomePlug Powerline Alliance**

Founded in 2000, the HomePlug Powerline Alliance, Inc. is an industry-led initiative with 70 member companies that creates specifications and certification logo programs for using the powerlines for reliable home networking and Smart Grid applications. The Alliance accelerates worldwide adoption for HomePlug technology by collaborating with international standards organizations such as the IEEE and through market development and user education programs. Sponsor members include Atheros Communications (ATHR); Cisco (CSCO); Comcast (CMCSK); Duke Energy (DUK), GE Energy, an affiliate of General Electric Co. (NYSE: GE); Giga Networks; Motorola, Inc. (MOT); Renesas Electronics Corporation (TSE: 6723); SPiDCOM Technologies, and ST Microelectronics (STM). Contributor members include Arkados (OTCBB: AKDS) and Corporate Systems Engineering. For more information, visit <http://www.homeplug.org>.



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