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About Billion

Billion Electric Co., Ltd. (TaieX: 3027, trading as BILLION) was founded in Taiwan in 1973 and has grown to be a leading provider of network equipment and power supply products in the Asia Pacific. With the establishment of the Communication Division, Billion has reinforced its commitment to developing next-generation network equipment and Internet access devices to meet the needs of home users, telecommuters, SOHOs and SMBs around the globe.

Billion has received a number of awards for its networking products and has acquired a considerable customer base across Europe, America, the Middle East, Africa and the Asia Pacific. Since March 2009, Billion's Power Division has increased its investment in R&D and manufacturing of Smart Grid business tools. This division was officially renamed the "Power and Energy Management Division" (PEM Division) to emphasize Billion's long-term focus on "Green" product development. With the supply of Smart Grid to reduce carbon emissions resulting in more energy-saving products, Billion aims to contribute to environmental protection and the green planet philosophy. For more information, please visit: www.billion.com and www.smartgrid.com.tw

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www.billion.com
www.smartgrid.com.tw



Smart Energy Solution and Broadband Access Guide

BPL Access, EoC, and ZigBee Technologies





Broadband over Power Lines



Founded in 1973, Billion is a leading provider of network equipment and power supply products, has deep roots in energy and communications and has successfully developed next generation network devices.

Partnered with system integrators around the world, Billion provides reliable products and offers design modifications to fit customization needs. Supported by experienced R&D engineers who are experts in their respective fields, in-house manufacturing facilities and a seamless quality control system, Billion's proven business success allows them to competently offer a wide range of very high quality power and communication devices; including Broadband Power Line Communication (BPL), Ethernet over Coax (EoC) Home Gateway, Energy Management and many other components for multiple broadband services and energy management applications.



Broadband Access



Smart Energy Management

Why Billion

- **Advanced Networking Capability**

With the development of information technology and the growth of bandwidth demand, system integrators can extend their services with Billion's cost effective BPL Access and EoC solutions, which enables residential districts network deployment quickly and effortlessly.

- **Smart Energy Management Technology**

By leveraging with Billion Smart Energy Management technology, system integrators can offer state-of-art solutions to their customers and help them increase energy efficiency. This results in effective cost reductions and also benefits the environment by decreasing energy consumption.

- **R&D Expertise**

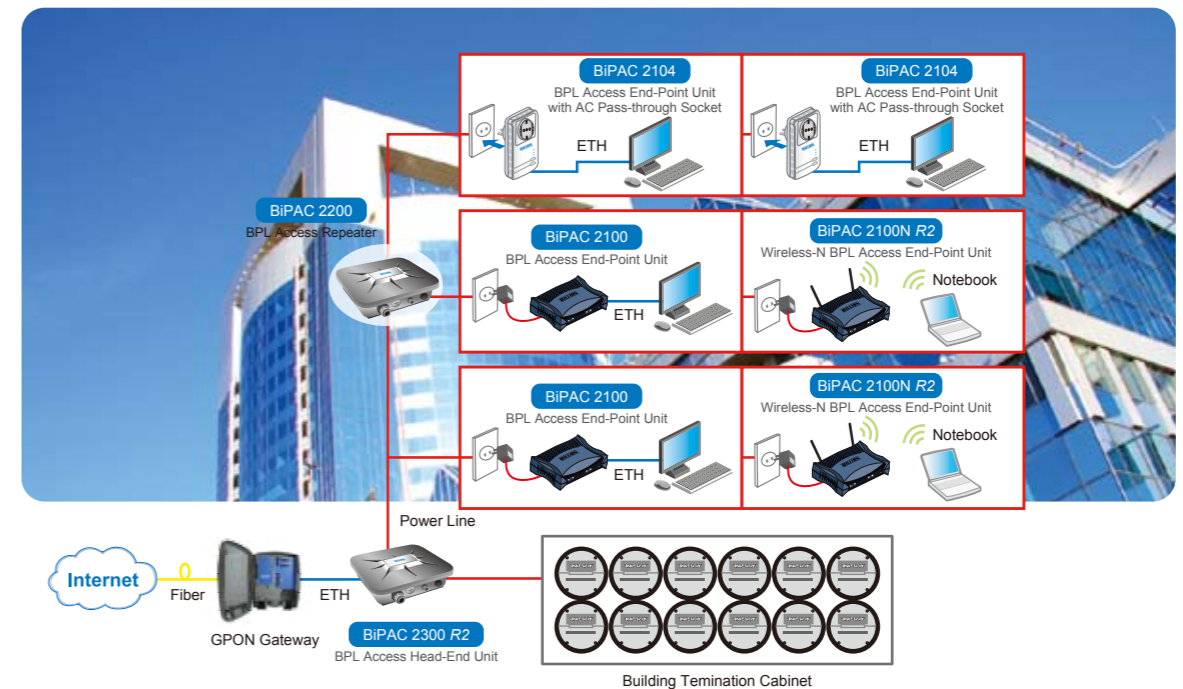
Staffed by more than 185 engineers stationed in Taiwan and China, the Billion R&D group has experts in communications, networking, power supply and energy management. Billion R&D team members work together to pursue the innermost goals / objectives of clients across the globe.

BPL Access, bringing multi-unit business and residential customers up to speed

Broadband over power lines (BPL) Access is a broadband power line access technology that deploys the electricity grid to run broadband applications. It is a low-cost, scalable, secure system that integrates broadband, radio, Ethernet, networking, HomePlug technologies to deliver high-speed data over existing power lines. The BPL Access solution works in even the hardest-to-reach building environments, and can use any type of Internet signal, including DSL, T1, E1, cable and satellite.

Advantages

- ▶ **Cost-effective**
Ideal networking solution for buildings in rural areas where re-wiring or re-modeling is difficult and where there is a lack of telecommunications infrastructure.
- ▶ **Fast and easy installation**
There's no cost-prohibitive drilling or cabling needed. Allows service providers to deploy and manage BPL Access devices for multi-dwelling unit buildings such as apartment buildings or hotels.
- ▶ **Scalability**
Supports an increasing number of customers in large-building networks by quick and easy network establishment.
- ▶ **High speed**
Provides fast data transmission rate over existing power wire.
- ▶ **In-demand application**
Added value by using the system to streamline building operations through applications such as centralized energy management, video surveillance, advanced alarming and more.

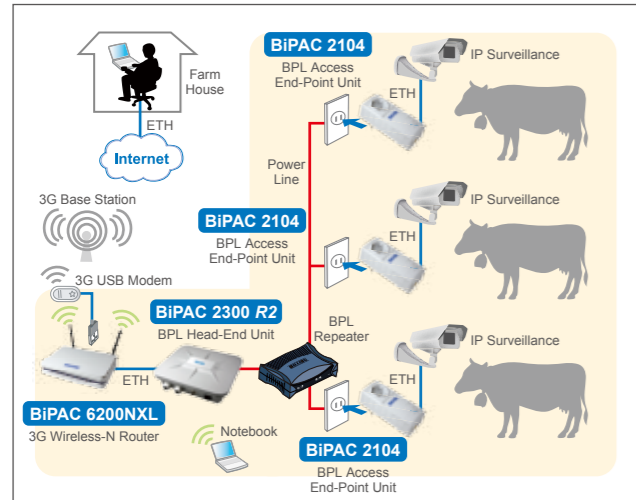


BPL Access application for in-building networking

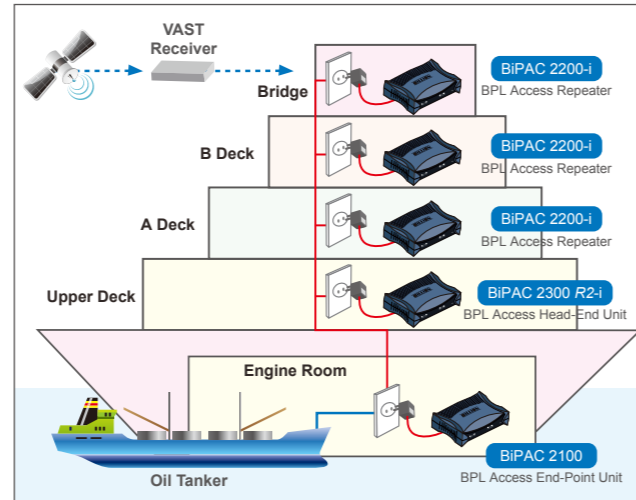
Ethernet over Coax



In-farm BPL Access application



BPL Access application for in-vessel networking

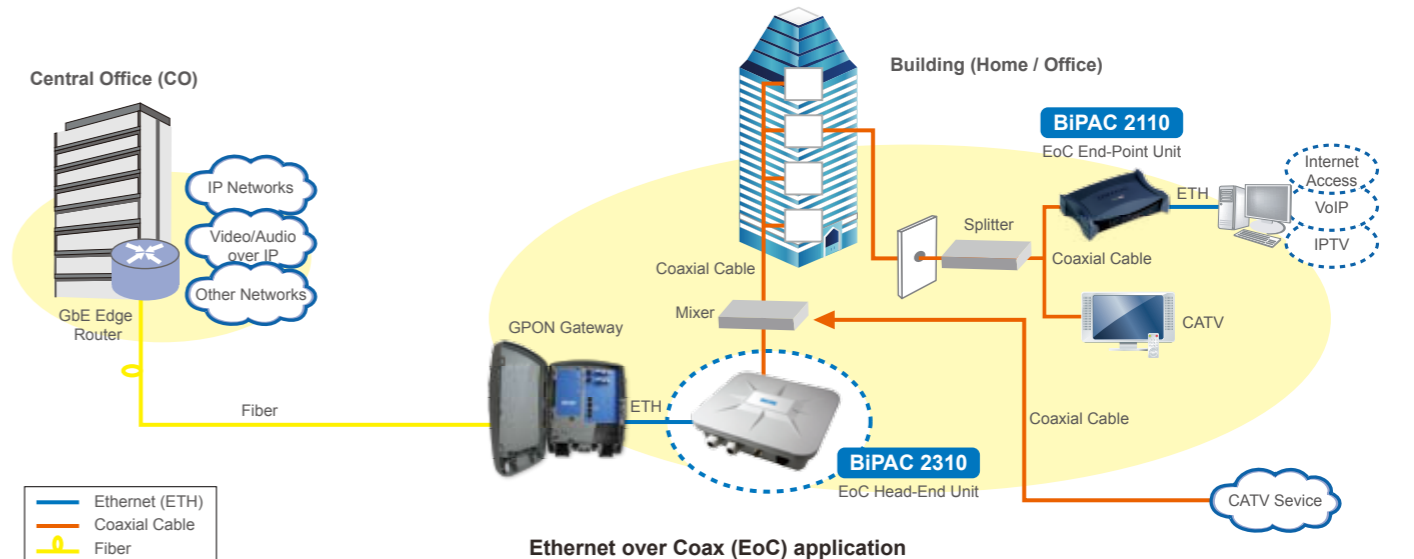


EoC, Ethernet over the existing coaxial cables for MDU' s, campus and the last mile

Upgrading last mile networks to high speed broadband access could not be easier. An EoC solution enables you to use existing coaxial cabling to bring broadband access and services to end-user customers, without costly and time consuming re-cabling. Ethernet over Coax (EoC) is designed to deliver Ethernet data service over pre-existing coaxial cables, take advantage of existing CATV networks to provide multiple broadband services, thus minimizing installation cost and ensuring optimal performance. Using coaxial cable for broadband access ensures the high streaming bitrates and error free transmission necessary for video and IPTV services, something for which wireless networks cannot be relied on.

Advantages

- ▶ **Easy to install**
Simply for CATV operators to connect EoC End-Point Unit to a splitter using the provided Ethernet cable and to an available coaxial outlet in the room to access your home' s coaxial wiring to establish a network connection.
- ▶ **Reliable HD streaming**
Delivers a faster and more reliable stream of High-Definition quality entertainment seamlessly across your home.
- ▶ **Network security**
Provides data encryption with password protection to establish a secure connection to help keep your data safe from unauthorized access.



BiPAC 2300 R2



BPL Access Head-End Unit

- 200Mbps physical connection bandwidth
- 2 x 10 / 100 Mbps Ethernet ports
- AC power: 90-250VAC, 50 / 60Hz
- Able to configure as a head-end master or a repeater
- VLAN / OVLAN
- 802.1D bridging protocol
- Up to 1024 MACs table size
- Up to 32 direct PLC connections
- DES and 3DES encryption
- QoS with 8 level priority queues
- 802.1P traffic priority classification
- SNMP and web network management protocol
- Configurable bandwidth from 2 to 32MHz

BiPAC 2200



BPL Access Repeater

- 200Mbps physical connection bandwidth
- 2 x 10 / 100 Mbps Ethernet ports
- AC power: 90-250VAC, 50 / 60Hz
- Able to configure as a head-end master or a repeater
- VLAN / OVLAN
- 802.1D bridging protocol
- Up to 128 MACs table size
- Up to 31 direct PLC connections
- DES and 3DES encryption
- QoS with 8 level priority queues
- 802.1P traffic priority classification
- SNMP and web network management protocol
- Configurable bandwidth from 2 to 32MHz

BiPAC 2100



BPL Access End-Point Unit

- 200Mbps physical connection bandwidth
- 10 / 100 Mbps Ethernet port
- Maps Ethernet QoS to powerline QoS using VLAN priority
- Bandwidth management
- Web GUI management

BiPAC 2104



BPL Access End-Point Unit with AC Pass-through Socket

- 200Mbps physical connection bandwidth
- 10 / 100 Mbps Ethernet port
- Maps Ethernet QoS to powerline QoS using VLAN priority
- AC pass-through power socket with noise-filtering
- Bandwidth management
- Web GUI management

BiPAC 2100N R2



Wireless-N BPL Access End-Point Unit

- 200Mbps physical connection bandwidth
- Support 802.11n 300Mbps high data rate transmission
- 10 / 100 Mbps Ethernet port
- Maps Ethernet QoS to powerline QoS using VLAN priority
- Bandwidth management

BiPAC 2103



BPL Access End-Point Unit

- 200Mbps physical connection bandwidth
- 10 / 100 Mbps Ethernet port
- Maps Ethernet QoS to power line QoS using VLAN priority

BiPAC 2310



EoC Head-End Unit

- 200Mbps physical connection bandwidth
- 2 x 10 / 100 Mbps Ethernet ports
- 1 x coaxial cable interface 75 Ohm F connector
- AC power: 90-250VAC, 50 / 60Hz
- Able to configure as a head-end master or a repeater
- VLAN / OVLAN
- 802.1D bridging protocol
- Up to 128 MACs table size
- 802.1P traffic priority classification
- SNMP and web network management protocol
- Configurable bandwidth from 2 to 32MHz
- Up to 32 direct CATV connections
- DES and 3DES encryption
- QoS with 8 level priority queues

BiPAC 2110



EoC End-Point Unit

- 200Mbps physical connection bandwidth
- 10 / 100 Mbps Ethernet port
- Performs coaxial cable to Ethernet conversion
- QoS supported
- Bandwidth management

Smart Energy Management

ZigBee Technology delivers low power consumption / low cost and high security / high interoperability and high reliability. Using ZigBee-based network devices to communicate and transmit wirelessly, consumers can monitor, manage and control energy usage, while optimizing performance and reducing energy losses from major appliances, such as heating, cooling, and lighting. ZigBee can deliver cost-effective energy management solutions for users and power utilities throughout the day, without compromising their lifestyles.

Power Line Communication (PLC) technology enables high-speed broadband applications running over existing power loops. Its unique broad bandwidth allows users to share multimedia applications with family around home.

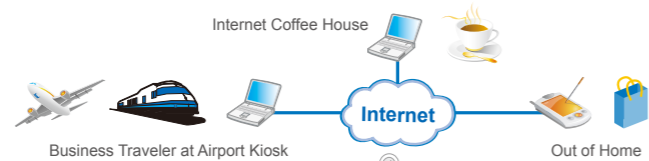
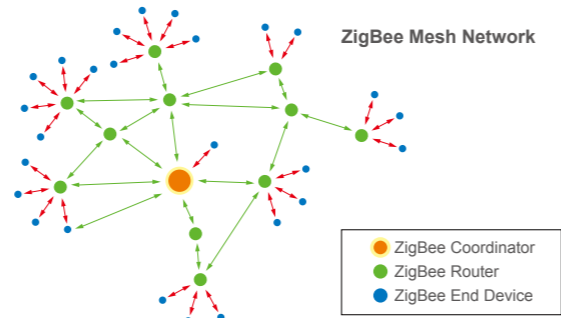
Advantages

ZigBee Technology

- ▶ Simple and intuitive user scenario
- ▶ Bidirectional power consumption data transmission security over Home Area Network to ensure effective and efficient energy management
- ▶ Built-in platform to support device interoperability

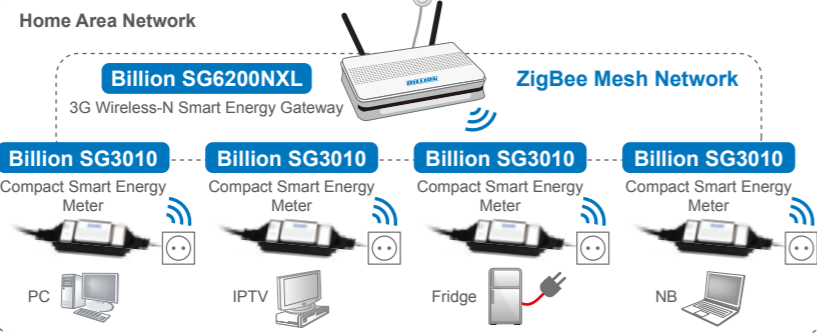
PLC Technology

- ▶ Utilizes pre-existing power line for network communications
- ▶ Provides high-speed network connectivity over power loops
- ▶ Easy to establish networks for multiple broadband application



Remote Control

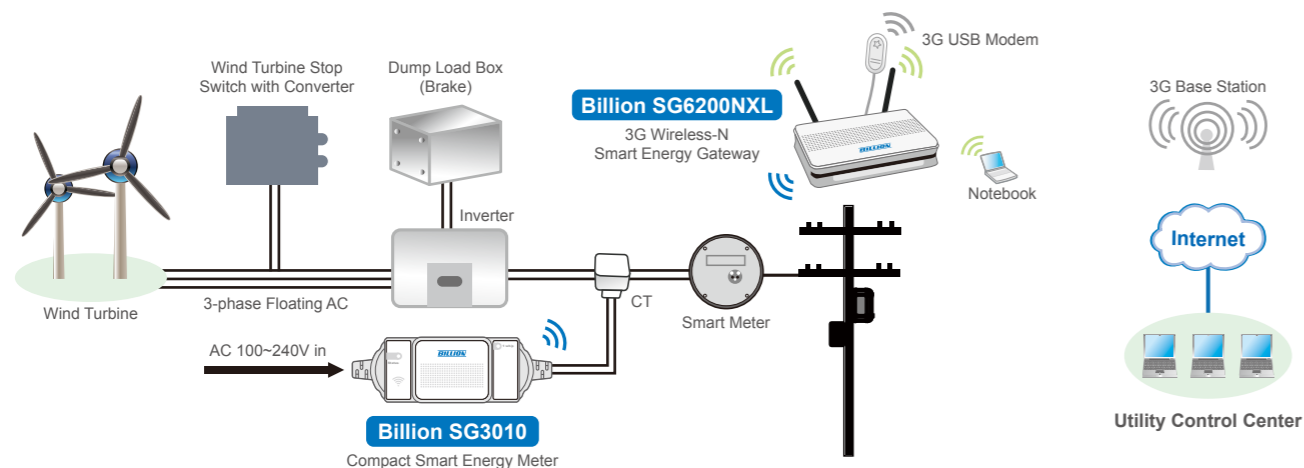
Via ZigBee gateway, users on-the-go can remotely control in-home electrical appliances that connect to a ZigBee meter by using an Internet-based device, even a smart phone.



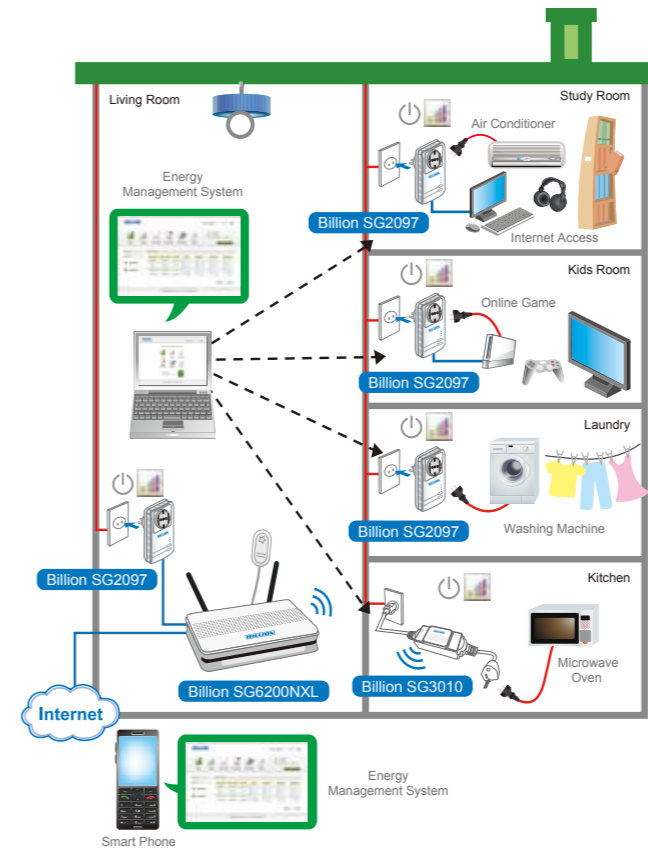
ZigBee Energy Management application in Home Area Network

In-home Control

Via Billion SG3010 ZigBee meter or PMS installed in PC, user can monitor, control and obtain in-home electricity usage information and analysis profile.



Distributed Generation (DG) application



Hybrid Energy Management Solution in Home Area Network

Utilizes in-home power line loops for network communications, Billion SG2097 delivers high speed Internet access in each room and features power metering and remote switch functions to enable home users to manage in-home power consumption.

Billion Energy Management Solutions give consumers insight and control of home energy usage by intuitive online interface. Combining access energy data through ZigBee and PLC protocol, it enables customers to reduce the amount of energy consumers waste.

Billion SG3010

Compact Smart Energy Meter

- Compliant with IEEE 802.15.4 ZigBee standard
- Measures and collects electricity usage data
- < 0.5% Wh accuracy
- Power surge protection
- Electricity cost calculation
- Four connector types
- Remote power control on connected electrical appliances (available in Type T1 & T2)



Billion SG6200NXL

3G Wireless-N Smart Energy Gateway

- ZigBee for reliable and flexible RF network
- EWAN and 3.5G / 3.75G connections
- 802.11n wireless up to 300 Mbps data rate
- Wireless security supports WPA / WPA2 and WPS
- Auto fail-over for always-on connection
- Collect power data via ZigBee meters
- Remote monitor & control power usage
- 2 x USB 2.0 ports
- Supports multiple SSIDs
- QoS and firewall support



Patent No. M418481

Billion SG2097

Smart Energy PLC Adapter

- 200Mbps data rate
- One AC pass-through power socket with noise-filtering
- Built-in smart power meter
- Built-in Smart AC power switch to remotely control home appliances
- Smart power saving
- QoS control
- Supports Triple Play applications
- 10 / 100 Mbps Ethernet port



Billion SG1100

Smart Energy Adapter

- Compliant with IEEE 802.15.4 / ZigBee
- 16 channels in the 2.4GHz ISM band
- Integrated omni-directional antenna
- AES-128 hardware supported encryption
- Radio output power from -43dbm to +3dbm
- Easy commissioning with single button
- Together with Power Management System as energy management tool
- RX sensitivity -95dbm
- USB powered



Billion SG2095

Broadband PLC Ethernet Adapter with Remote Power On / Off Control

- 200Mbps data rate
- One AC pass-through power socket with noise-filtering
- Built-in Smart AC power switch to remotely control home appliances
- Smart power saving
- QoS control
- Supports Triple Play applications
- 10 / 100 Mbps Ethernet port

