



MegaChips | GEN4-BPL

# GEN4-BPL POWER LINE COMMUNICATIONS SOLUTION

Empowering the next-generation of smart applications in cities, buildings, and homes

## Product Overview

Blazing-fast broadband speeds, industrial-grade reliability, and unparalleled cost efficiency. MegaChips' Gen4-BPL technology packs four generations worth of innovation into a new family of solutions for smart cities, buildings, and homes.

Gen4-BPL High-Speed Power Line Communication Solution is a state-of-the-art, highly integrated system-on-chip (SoC) that delivers the highest flexibility, performance, robustness, response time, security and power efficiency available for your most demanding applications.

Based on the new IEEE 1901-2020 HD-PLC standard, Gen4-BPL delivers fast, consistent multichannel, bidirectional, IP-based communication over any type of wiring (AC or DC power lines, coaxial cables, twisted-pair, phone lines, etc.), so it can easily be installed using the wiring that's already in place. With PHY rates up to 500Mbps, Gen4-BPL gives you plenty of bandwidth to deliver whatever data you need, even video.

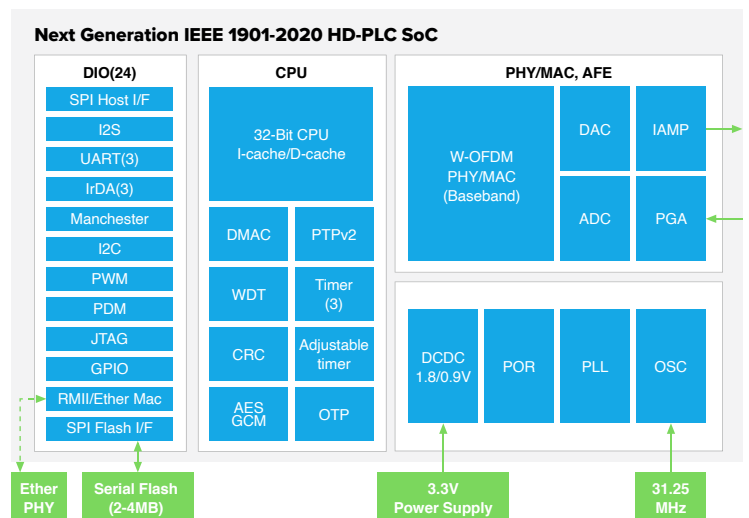
## Key Features

- Plug and play
- Works on any wire
- IEEE 1901-2020 (PHY/MAC)
- ITU-G.9905 (routing)
- Flexible frequency band
- Long-range with Multihop
- PHY speeds up to 500Mbps
- AES-128 encryption engine
- Highly integrated, single chip solution
- Industrial operating temperature range
- Meets EN50561-1 EMC requirements

## Smaller, Faster and More Affordable

Gen4-BPL takes performance to the next level for applications that demand not only higher performance but also lower power consumption and overall cost. Using the latest Silicon technologies, architecture, and high integration, the Gen4-BPL offers the lowest power, size, and overall bill-of-materials in the industry for your ENERGY STAR designs.

Gen4-BPL combines the Physical (PHY), Media-Access-Control (MAC), Analog-Front-End (AFE) including high precision A/D, D/A data converters, programmable gain amplifier (PGA), bandpass filter, DC-DC converters, and line driver in a single compact package to deliver speeds of up to 500Mbps at the PHY layer, and distances of several kilometers.



# Key Specifications

|                             |                  | Gen4-BPL                      |
|-----------------------------|------------------|-------------------------------|
| Communication<br>(Any wire) | Frequency band   | 62.5MHz                       |
|                             | Modulation       | Wavelet OFDM                  |
|                             | Error correction | RS/CC, LDPC                   |
| CPU                         |                  | RISC-V                        |
| System clock                |                  | 125 MHz                       |
| Interface                   | Peripherals      | GPIO(24), UART, I2C, SPI etc. |
| Power consumption           | Typical          | 0.27W                         |
| Supply voltage              |                  | 3.3V                          |
| Operating Temperature       | Industrial       | -40~ +85°C                    |
| Encryption                  |                  | AES128                        |
| Package                     |                  | QFN64                         |

# Channels of Operation

Users can select between available channels for optimum throughput and range based on their application needs.

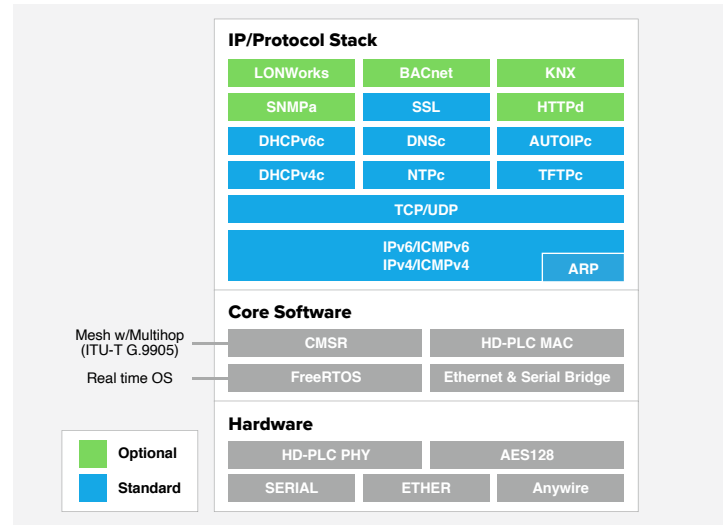
|        | Frequency Band (MHz) | PHY Rate (Mbps) |
|--------|----------------------|-----------------|
| x 2    | 4 - 56               | 500             |
| x 1    | 2 - 28               | 240             |
| x 1/2  | 1 - 14               | 120             |
| x 1/4  | 0.5 - 7              | 60              |
| x 1/8  | 0.25 - 3.5           | 30              |
| x 1/16 | 0.13 - 1.8           | 15              |
| x 1/32 | 0.06 - 0.88          | 7.5             |



# Gen4-BPL Development Resources

The Gen4-BPL Suite gives you the tools you need to quickly get to market. The EVK simplifies evaluation with tools for power control, channel monitoring, net test, and more. The included Network Manager makes it easy to configure, monitor, and manage complex networks.

# Software Stack



# Options for Smart Homes and Smart Cities

Offering higher-performance at a fraction of the size, cost, and power consumption of the previous generation, Gen4-BPL comes in two versions – “Streamer” for high-speed applications and “Multihop” for long-range.

Gen4-BPL Multihop uses a Centralized Matrix-based Source Routing (CMSR) mechanism based on ITU-T G.9905. This allows each node to act as a repeater, extending range up to 10x. Together with its advanced MESH routing capabilities, Multihop supports up to 1024 nodes and eliminates costly gateway devices.

Choose between Multihop and Streamer versions to suit your application needs:

| Multihop<br>(for smart cities and buildings) | Streamer<br>(for video streaming & multimedia) |
|--|--|
| Speeds up to 320Mbps (PHY)                   | Speeds up to 500Mbps (PHY)                     |
| Supports up to 1024 nodes                    | Supports up to 128 nodes                       |
| 10-hop MESH / Repeater                       | Single-hop MESH Network                        |
| CSMA/CA Protocol                             | DVTP (TDM), and CSMA/CA                        |

# Purchasing Information

Two variations of Gen4-BPL optimized for various network structures are available. An integrated on-chip 800-Ohm RX impedance circuit mainly used in daisy chain networks, and an 200-Ohm version for Free Topology networks.

| Part Number                | Version  | RX Impedance     |
|----------------------------|----------|------------------|
| MLKHN2500DM<br>MLKHN2600DM | Streamer | 200OHM<br>800OHM |
| MLKHN2501DM<br>MLKHN2601DM | Multihop | 200OHM<br>800OHM |