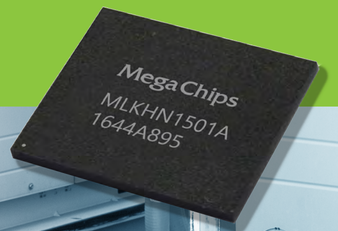
MEGACHIPS HD-PLC SoC
HVAC APPLICATIONS GUIDE



MORE DATA. MORE NODES. MORE SECURITY.
MORE COST SAVINGS.

MegaChips' HD-PLC SoC delivers extraordinary benefits, over the same control lines you're using today. It's the fastest and most cost-effective way to upgrade your HVAC system—and deliver new ROI-enhancing features to your customers.

MegaChips

ADDRESSING THE DEPLOYMENT COST CHALLENGE IN SMART BUILDINGS.

Advanced automation, energy savings, sophisticated new use cases. There are a lot of reasons why facility managers are deploying new HVAC systems and other smart building technologies. But the biggest one, without a doubt, is cost savings.

The problem is that making the case for new cost-saving technology is difficult when the capital expense of deploying new HVAC systems is so high. The culprit isn't just equipment cost—it's the expense of planning a new control network, installing new high-speed cabling and pulling it through walls. If you could eliminate these added costs, you would remove a key obstacle to deployment and be able to win more deals.

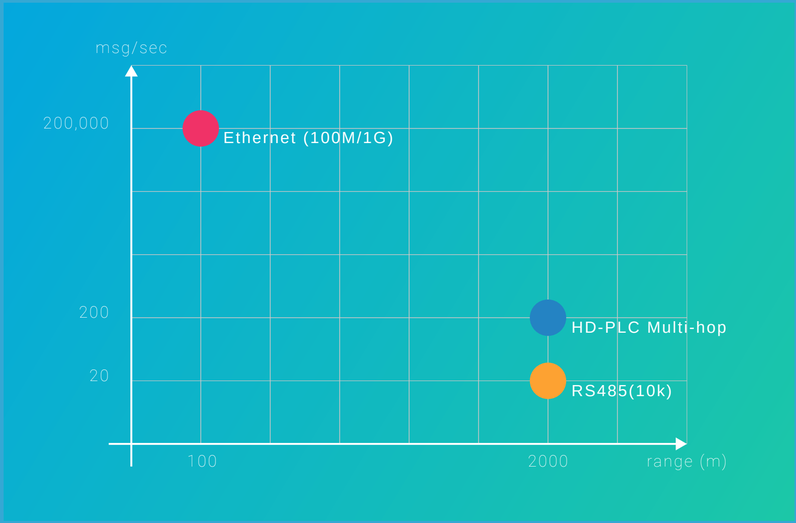
Well, now you can. In this Applications Guide, we introduce MegaChips' HD-PLC solution and show you how it can transform your value proposition. With HD-PLC, you're able to deliver the bandwidth demanded by today's most advanced HVAC systems without replacing a single cable.

HD-PLC is the smartest way to build smarter networks. Keep reading to learn all about it.

HD-PLC:
A PRIMER

Based on IEEE 1901 and ITU G.9905, HD-PLC is an international standard for high-speed, long-range, IP-based communication over any wire.

You can use HD-PLC with twisted-pair, coax, Ethernet, power and even phone lines. Regardless of your choice, you can count on PHY speeds up to 240Mbps and transmission distances in the several kilometer range. With MegaChips HD-PLC SoC, you're able to instantly upgrade your systems and deliver powerful new features to your customers over the same wiring infrastructure they're already using today.



ADVANTAGES OF MEGACHIPS' HD-PLC SoC

Megabit Speeds: PHY data rates up to 240Mbps give you plenty of bandwidth to deliver whatever data you need, even video. With HD-PLC, you're able to develop sophisticated new use cases to help your customers reduce energy use, increase comfort and convenience, and more.

Built-in IPv6 Support: HD-PLC supports IPv6 over twisted-pair, coax, power lines and any other type of cable. This enables you to design bigger networks, with more throughput, using your existing wiring infrastructure.

Extended Range & Robustness: An innovative multi-hop capability allows any device to act as a repeater. Supports up to 10 hops and networks up to 1024 nodes. Improves system performance and robustness by dynamically calculating the fastest route between nodes.

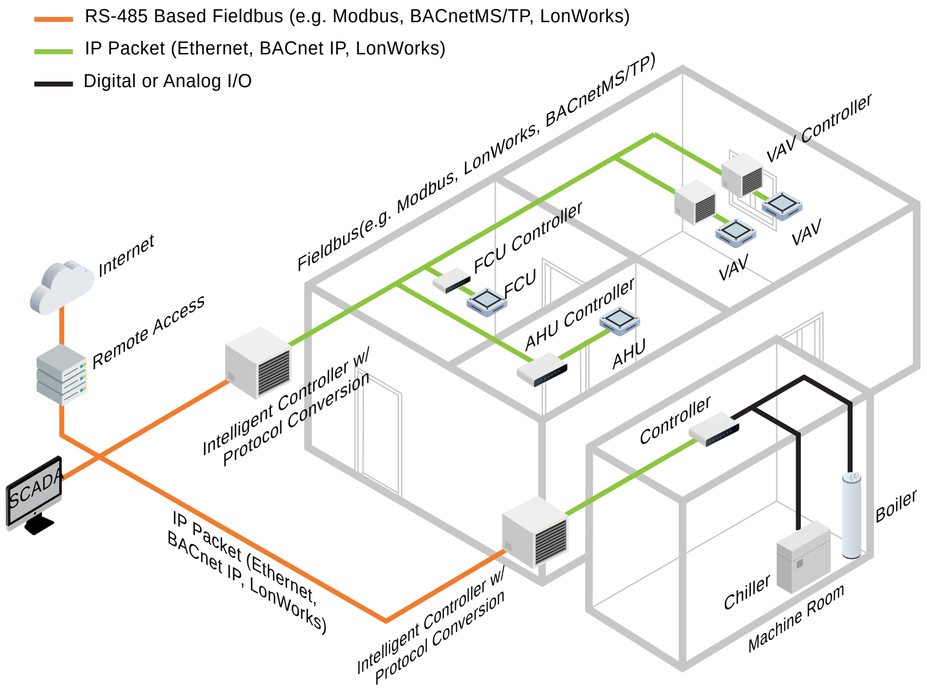
Fast & Easy Installation: Offers the convenience of mesh networking with support for any topology (bus, daisy chain, star, etc.). This eliminates the complexities of network planning and commissioning. Installation is as simple as plugging and powering the devices.

Ethernet-to-Serial Bridging: This innovation allows HD-PLC to be used in place of the costly gateways required by other protocols. Now you can extend IP all the way to endpoints for seamless integration into other IP-based building automation systems.

CENTRAL AIR CONDITIONING

Legacy system based on RS-485

Costly gateways, shorter bus lengths, complex protocol conversion. RS-485 networks bring all kinds of unwelcome trade-offs.



LIMITATIONS OF RS-485-BASED SYSTEMS

1. Ethernet backbone connects HVAC systems to other building automation systems and enterprise servers. However, the low throughput (9.6kbps) of serial networks limits application possibilities and makes it difficult to extend IP all the way to HVAC end-points.
2. Costly gateways are required to bridge between Ethernet and serial networks. Protocols like BACnet/IP, LON IP and KNX IP enable system integrators increase bandwidth and extend IP beyond the gateway; however, they require the installation of costly new wiring.
3. One advantage of serial networks is that they allow long-range communication over a multidrop bus. However, system integrators increasingly have to reduce bus lengths and add control equipment to support the high bandwidths required by modern applications.

CENTRAL AIR CONDITIONING

With throughput of just 9.6kbps, RS-485 struggles to meet the demands of next-gen HVAC applications. HD-PLC provides plenty of speed and performance over your existing wiring infrastructure.

THE PROBLEM

Today’s data-hungry HVAC systems have stretched serial networks to their limits. HVAC control packets keep getting bigger, as more sensors are being added for temperature, air flow, motion detection and more. Yet the typical data pipes (EIA-485 twisted-pair) are the same size as they’ve been for decades.

Solving this problem has become a major cost in automation projects. System designers often have to choose between deploying expensive (and often unreliable) wireless infrastructure or ripping out wiring and pulling new high-speed cables through walls.

Both of these approaches dramatically increase CapEx for project owners—and can lead them to postpone HVAC upgrades until deployment costs are more manageable.

THE SOLUTION

No more costly gateways or cable replacements. No more network bottlenecks. And no more installation challenges. MegaChips’ advanced wireline communication technology and solutions enable you to design next-generation HVAC systems that leverage the existing wiring infrastructure.

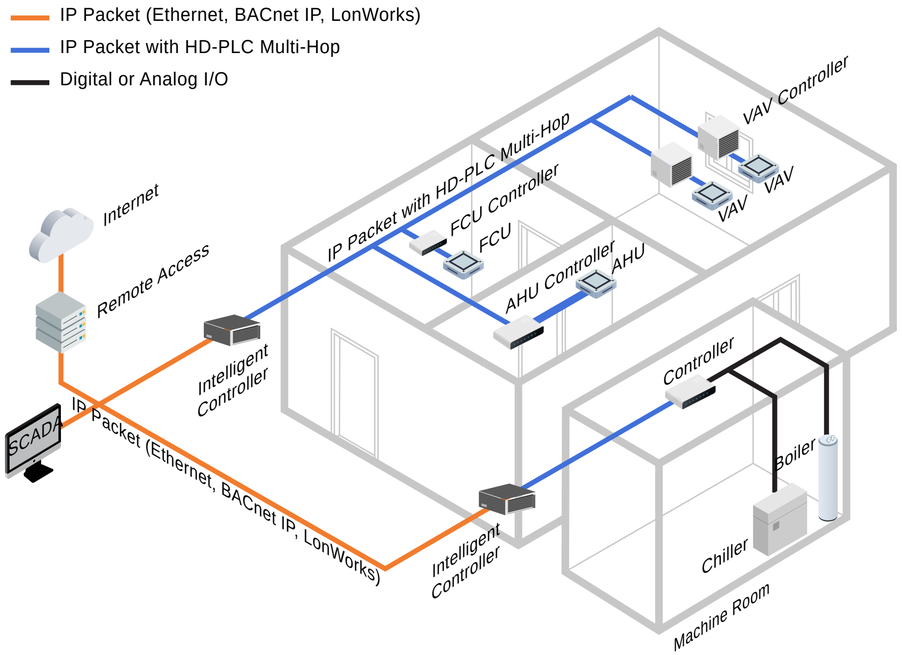
With MegaChips’ solution, you simply replace expensive gateways with low-cost HD-PLC Bridges. These devices give you a powerful IP-based interface between Ethernet networks and wireless and wireline endpoints.

Now you can create faster, smarter HVAC systems—and easily deploy them across project sites—without having to replace a single cable.

CENTRAL AIR CONDITIONING

Modern system based on HD-PLC

With a simple, low-cost HD-PLC bridge, you can eliminate costly gateways, achieve megabit speeds, and extend IP all the way to HVAC endpoints.



ADVANTAGES OF HD-PLC BASED SYSTEMS

1. A simple, low-cost HD-PLC Bridge replaces costly gateways, effortlessly connecting Ethernet networks to other wireline (serial, powerline, coax, etc.) and wireless networks (WiFi, BLE). Now you can extend IP to endpoints without the added cost of costly gateways.

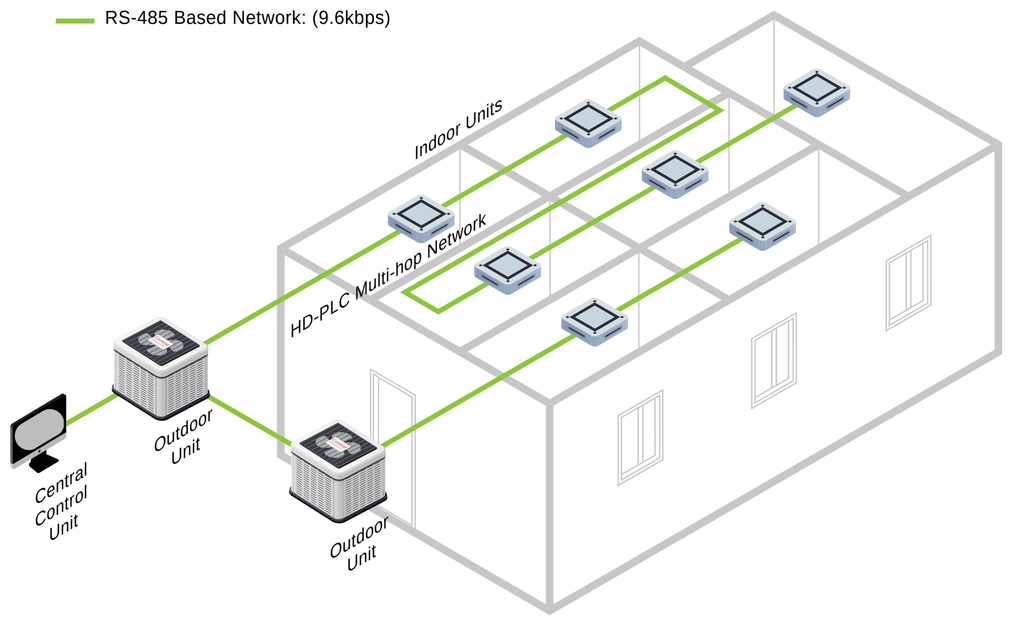
2. HD-PLC delivers megabit speeds and IP networking over any wiring. With MegaChips' HD-PLC solution, you're able to instantly upgrade your control network with higher speeds, longer distances, cybersecurity, and other advanced features without costly cable installations.

3. MegaChips' HD-PLC SoC includes an innovative multi-hop feature that allows any node to act as a repeater. Capable of up to 10 hops, our solution enables you to run longer buses and support up to 1024 nodes to meet the requirements of large HVAC installations.

PACKAGED AIR CONDITIONING

Legacy system based on RS-485

With RS-485, you may need to add control units or reduce the number of network nodes in order to run more advanced HVAC applications.



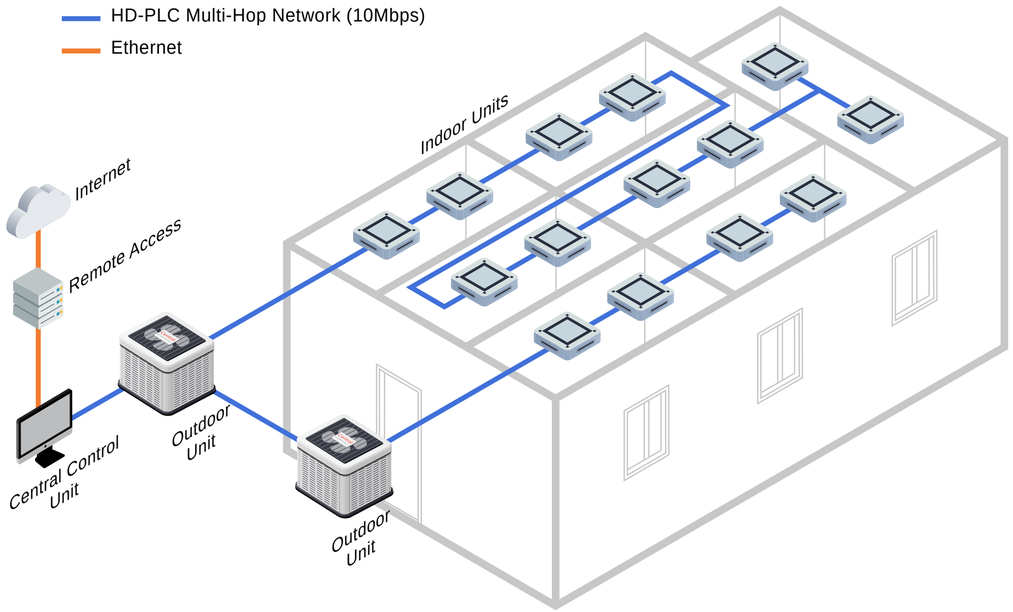
LIMITATIONS OF RS-485-BASED SYSTEMS

1. With just 9.6kbps of throughput, RS-485 struggles to meet the demands of modern applications. This leaves you having to reduce the number of nodes to support new features, which means higher installation cost or reduced coverage.
2. In the past, 10 outdoor units could support as many as 64 indoor units. Increasingly, customers must install more outdoor units to support greater functionality with the limited throughput offered by RS-485.
3. Offering just 20 messages/second for long-range communications, RS-485 makes it difficult to add new control capabilities or send the larger packets required for in-field updates using the same number of devices.

PACKAGED AIR CONDITIONING

Modern system based on HD-PLC

HD-PLC enables you to reach more nodes—and higher throughput—over your existing wiring infrastructure.



ADVANTAGES OF HD-PLC BASED SYSTEMS

1. HD-PLC delivers megabit throughput, giving it ample performance for the rich feature sets demanded today, with plenty of band-width to spare. By integrating HD-PLC into your systems, you'll free yourself from ever having to worry about the limitations of wiring infrastructure again.

2. HD-PLC multi-hop is capable of supporting megabit speeds for up to 1024 nodes. Now you can add new differentiating features without needing to add additional outdoor units or limiting the number of indoor units per network.

3. HD-PLC lets you instantly upgrade to higher speeds and the most advanced features without replacing a single cable. Offering 10x the performance (messages/sec) of RS-485, HD-PLC enables the most advanced HVAC control applications.

THE BUSINESS CASE FOR HD-PLC

MegaChips' HD-PLC SoC enables you to deliver new HVAC innovations over existing wiring infrastructure. Now your customers can get all the advanced capabilities they want, without the high cabling and equipment costs required by alternative approaches.

Complete HD-PLC Compact Circuit Design (15mm x 40mm)

ADVANTAGES OF HD-PLC OVER RS-485

	RS-485	MegaChips' HD-PLC
Speed	9.6kbps	240Mbps
Max Range	2km	2km
No. of Nodes	512	1024
IP-Based	✗	✓
Secure	✗	✓
Plug-and-Play	✗	✓
Mesh Networking	✗	✓
On-Chip Bridging	✗	✓
Repeater Functionality	✗	✓

Order your evaluation kit and get started with HD-PLC today.
www.megachips.com/HD-PLC