



ARG FOUNDATIONAL PLATFORM · CONNECTIVITY MODULE

ARG G3-PLC Power Line Module

Hybrid G3-PLC + RF Connectivity Module · Microchip PL460 · ARG IP

Rev A · August 2026 | Status: In Production | Used in: iAQ-Pro-D, GSB-01

- G3-PLC CENELEC B & FCC
- Hybrid PLC + RF
- 255-node mesh



Built on the Microchip PL460 — ARG is a Microchip Authorized Design Partner.

OVERVIEW

The ARG G3-PLC Module is a hybrid power-line + RF connectivity module built around the Microchip PL460 OFDM modem. It runs the G3-PLC standard (ITU-T G.9903) on both the CENELEC B band (Europe) and the FCC band (North America), and layers the G3-Hybrid profile on top — a secondary sub-GHz RF radio (SUN FSK, IEEE 802.15.4-2020) that shares one mesh with the power-line link. Every node is reachable over the wiring, over the air, or both; the mesh routes each hop over whichever medium is stronger and re-routes across the two as conditions change, so a noisy phase or a blocked radio link never takes a node offline.

The module exposes the ARG Common Host API — the same binary UART interface used across every ARG comm module — so the host sends application payloads and the module handles the G3 stack, mesh commissioning, routing, security, and medium selection autonomously. Up to 255 nodes per network, auto-commissioning, self-healing, no new cabling.

Hybrid, automatically. Where the power line is noisy, RF carries the traffic; where RF is blocked or out of range, the wiring does — one network, two media, chosen per hop with no second network to manage.

ELECTRICAL & NETWORK SPECIFICATIONS

PLC Chipset	Microchip PL460 OFDM Power Line Modem
PLC Standard	G3-PLC (ITU-T G.9903) — CENELEC B (95–125 kHz, Europe) & FCC (154–488 kHz, North America). Band selectable in firmware.
RF (G3-Hybrid)	Secondary sub-GHz RF medium — SUN FSK per IEEE 802.15.4-2020, license-free ISM. Shares one G3 mesh with the PLC link.
Modulation	OFDM (G3-PLC) on the power line; SUN FSK on RF
Data Rate	Up to ~40 kbps on CENELEC B; higher on the wider FCC band
Line Voltage Range	80–305 VAC, 50/60 Hz, single & three phase — via the host-board coupling network. The module has no direct mains connection.
Network Size	Up to 255 nodes per network
Network Topology	Auto-commissioning mesh with self-healing; per-hop medium selection across PLC and RF
Security	Network PAN ID + private PSK; optional ECC 256-bit encryption
12 V Power Rail	12 V, 70–150 mA (analog front end) — supplied by host board
3.3 V Power Rail	3.25–3.35 V, 56–65 mA (digital section) — supplied by host board
Digital IO	3.3 V UART (TX, RX), active-low reset, 2× digital outputs
Host Interface	ARG Common Host API — UART, binary framed, CRC16-CCITT
Connector	Samtec plug-in headers, board-mount pins
Form Factor	2.0" × 1.0" (50.8 × 25.4 mm) — common ARG module footprint
Operating Temperature	–40°C to +85°C
Storage Temperature	–40°C to +120°C

HOST-BOARD COUPLING NETWORK (CENELEC B — SUPPLIED REFERENCE DESIGN)

The mains-referenced coupling network lives on your host board, between the module signal interface and the AC line — roughly four parts and about \$6 per node in standard distributor stock. Band is set by C5 plus the firmware setting; changing band is a capacitor swap, not a different module. An evaluation carrier with the network pre-fitted, plus the reference schematic and mechanical drawing, are supplied to integrators.

Ref	Component	Reference Part
C5	Band-setting film capacitor — 470 nF, 480 VAC X1 (CENELEC B)	Kemet PHE844 family
L3	Series inductor — 4.7 μH, 2 A shielded	Murata 1231AS-H-4R7M
D2	Bidirectional TVS — 12 V	Littelfuse SMBJ12CA
TR1	PLC coupling transformer (isolation + matching)	VAC T60403-K5024-X044

HOST API INTERFACE

Protocol	ARG Common Host API (binary framed)
Physical	UART, 8N1, hardware flow control (RTS/CTS)
Frame Format	SOF + VER + TYPE + LEN[2] + PAYLOAD + CRC16-CCITT[2]
CPU Burden	Minimal — host sends a payload and receives data; the module runs the full G3 stack, mesh routing, and medium selection
Compatibility	Protocol-identical across all ARG comm modules — cellular, Wi-Fi, G3-PLC. Swap connectivity with no host firmware change.

CERTIFICATION

Designed to the EN 50065-1 CENELEC B conducted-emission limits; the underlying Microchip PL460 / G3-PLC stack is used in certified smart-metering and building-automation equipment worldwide. Formal CE / EN 50065 certification is undertaken as part of a production programme, since conducted emissions in the CENELEC band are substantially a property of the finished assembly and its coupling network. ARG runs that certification path with you as part of the build.