IoT Powerline Communication LSI

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Overview

This IoT Powerline Communication (PLC) LSI provides a secure wired communication for IoT PLC devices that can be connected by using the existing infrastructure, the Power Line.

It creates more freedom for innovations while transmitting more data from and to Urban areas, Home and Factory environments for further evolving our society to Society 5.0.
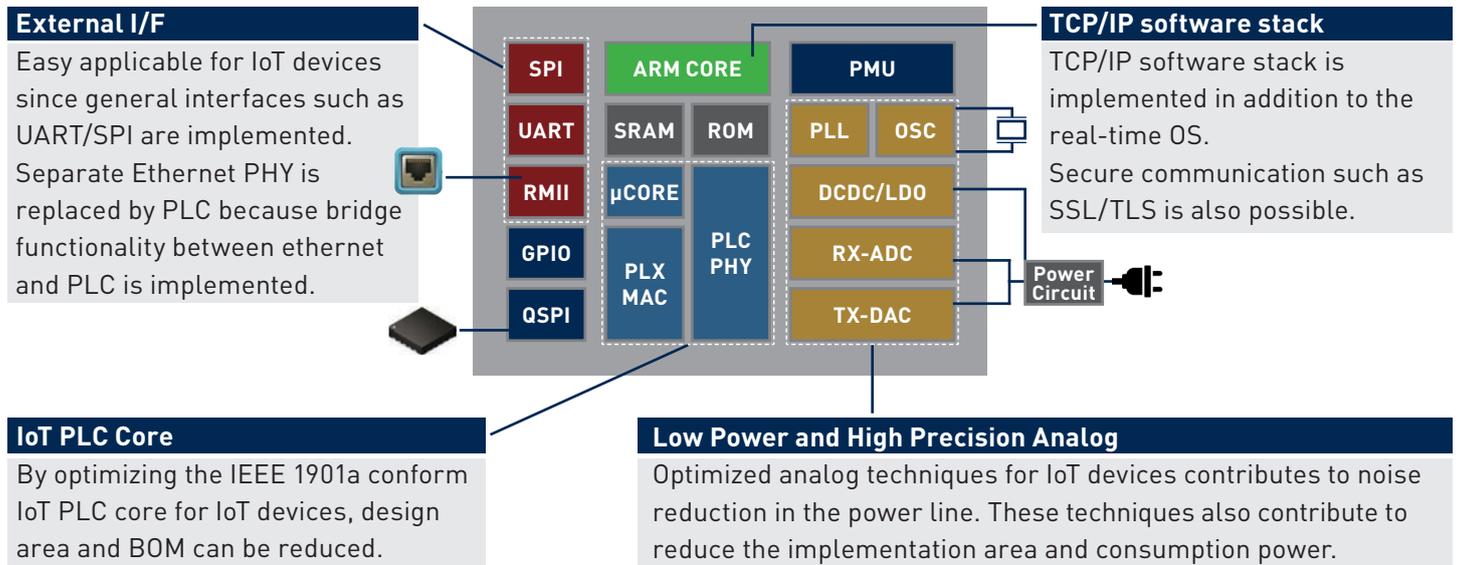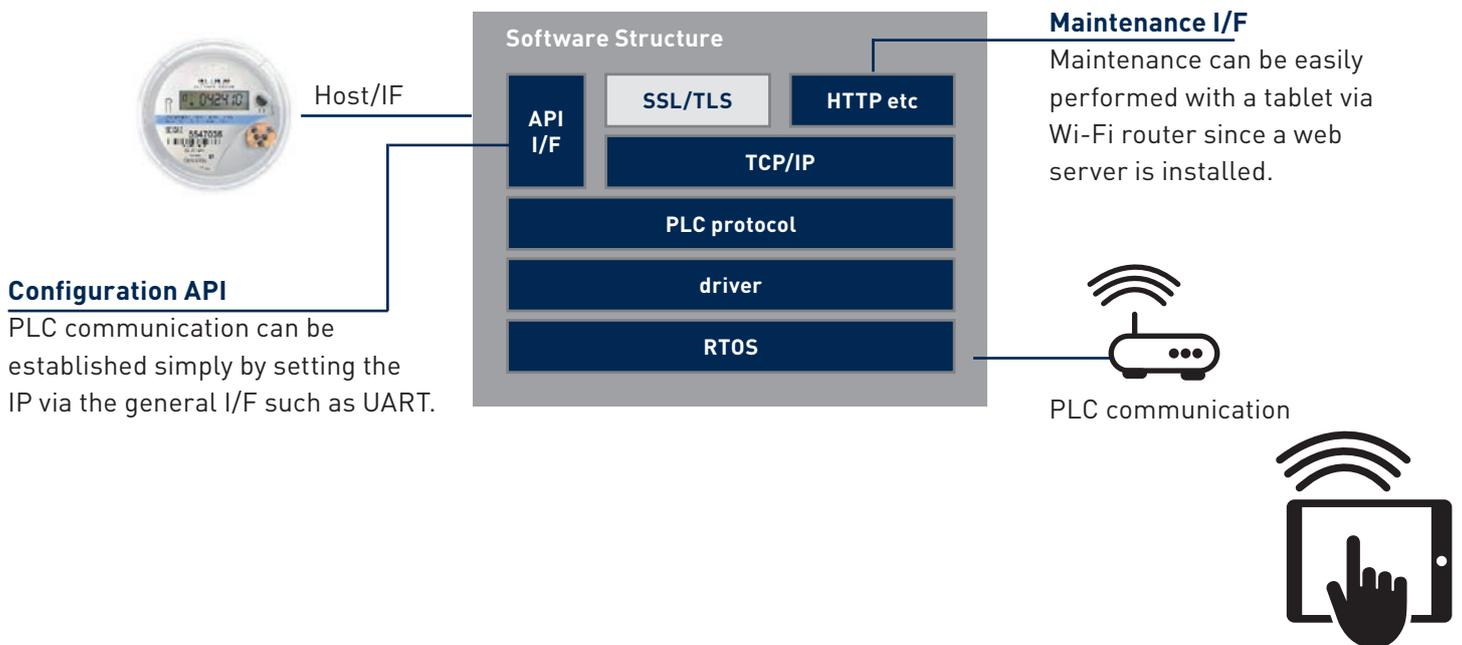
Features

- IoT PLC core conform to IEEE 1901a is optimized for IoT devices.
- "HD-PLC" standard with wavelet OFDM, multi hop capable, wide range and low power.
- Adoption of advanced process leads to a compact package size.
- Stable powerline communication is achieved by the combination of high quality analog and noise reduction techniques.
- With a compact power circuit design the PCB design and BOM costs can be optimized.
- Easy applicable for IoT devices since TCP/IP software stack is included and general interfaces such as UART/SPI are implemented.

System structure

External I/F
Easy applicable for IoT devices since general interfaces such as UART/SPI are implemented. Separate Ethernet PHY is replaced by PLC because bridge functionality between ethernet and PLC is implemented.

TCP/IP software stack
TCP/IP software stack is implemented in addition to the real-time OS.
Secure communication such as SSL/TLS is also possible.

SPI	ARM CORE	PMU
UART	SRAM ROM	PLL OSC
RMII	µCORE	DCDC/LDO
GPIO	PLX MAC / PLC PHY	RX-ADC
QSPI		TX-DAC

Power Circuit

IoT PLC Core
By optimizing the IEEE 1901a conform IoT PLC core for IoT devices, design area and BOM can be reduced.

Low Power and High Precision Analog
Optimized analog techniques for IoT devices contributes to noise reduction in the power line. These techniques also contribute to reduce the implementation area and consumption power.

Solution

Maintenance I/F
Maintenance can be easily performed with a tablet via Wi-Fi router since a web server is installed.

Host/IF

Software Structure

API I/F	SSL/TLS	HTTP etc
	TCP/IP	
	PLC protocol	
	driver	
	RTOS	

Configuration API
PLC communication can be established simply by setting the IP via the general I/F such as UART.

PLC communication

Specification (planning)

Item	Spec.
CPU	ARM Cortex-M series
Clock	125MHz
Flash	External (Quad-SPI)
Interface	SPI/UART/RMII

Item	Spec.
Supply voltage	3.3V unity
Package	QFP
Temperature	-40°C~85°C
Power	200~300mW (Typ)