

HomePlug C&C V1.0 ZEP – ZigBee Extension over PLC

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Agenda

- HomePlug C&C
- IT700 ASIC – First C&C Ready SOC
- Next Generation – DCSK Turbo
- ZEP – ZigBee Extension over Power Line

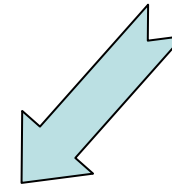
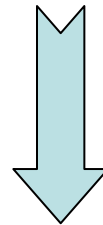
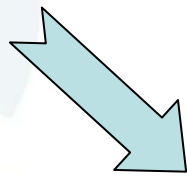
Yitran HomePlug C&C V1.0 Basics

- Open Standard
- Multiple Sources
- Based on three foundations:

Stack Specification:
PHY & MAC, Network
Layer, Host Layers.

Compliance &
Interoperability
Certification Program

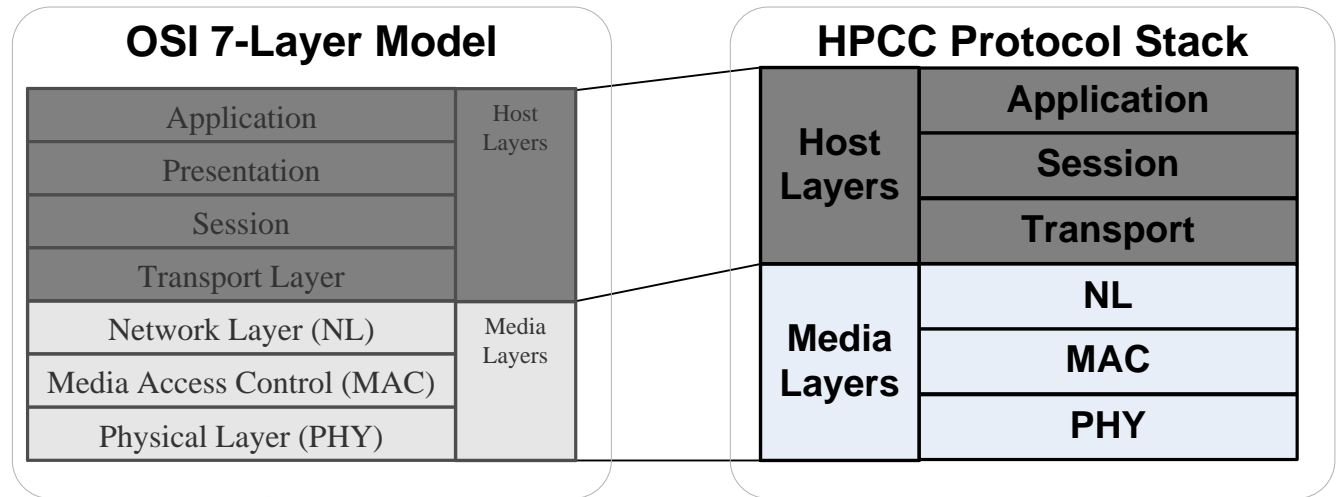
Product Profilization
and Scenario



**Full Interoperability
for all products from
all vendors**



C&C Stack Overview



- PHY – DSCK modulation.
- MAC – Adaptive CSMA/CA.
- NL – Security, Admission, Routing (Tree & Mesh).
- Transport – Multicast, End-End ACK
- Session – Discovery, Binding, Controlling & Eventing
- Application - Profiles



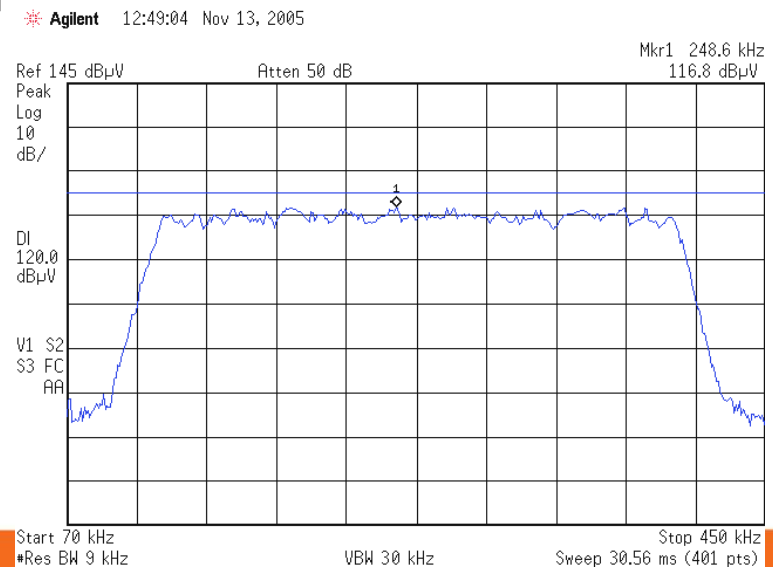
C&C Modes & Performance

Mode	Encoding	Interleaving	Modulation	Rate (kbps)
SM	(7,9)	used	DCSK6	7.5
RM	(5,7)	used	DCSK4	5
ERM	(5,7)	used	DCSK4 with block repeating.	1.25

Mode	Dynamic Range [dB]	SNR		Burst Noise [msec]
		AWGN [dB]	CW [dB]	
SM	103	-4	-25	1.7
RM	105	-6	-25	2.0
ERM	106	-7	-27	3.5

DCSK Advantages

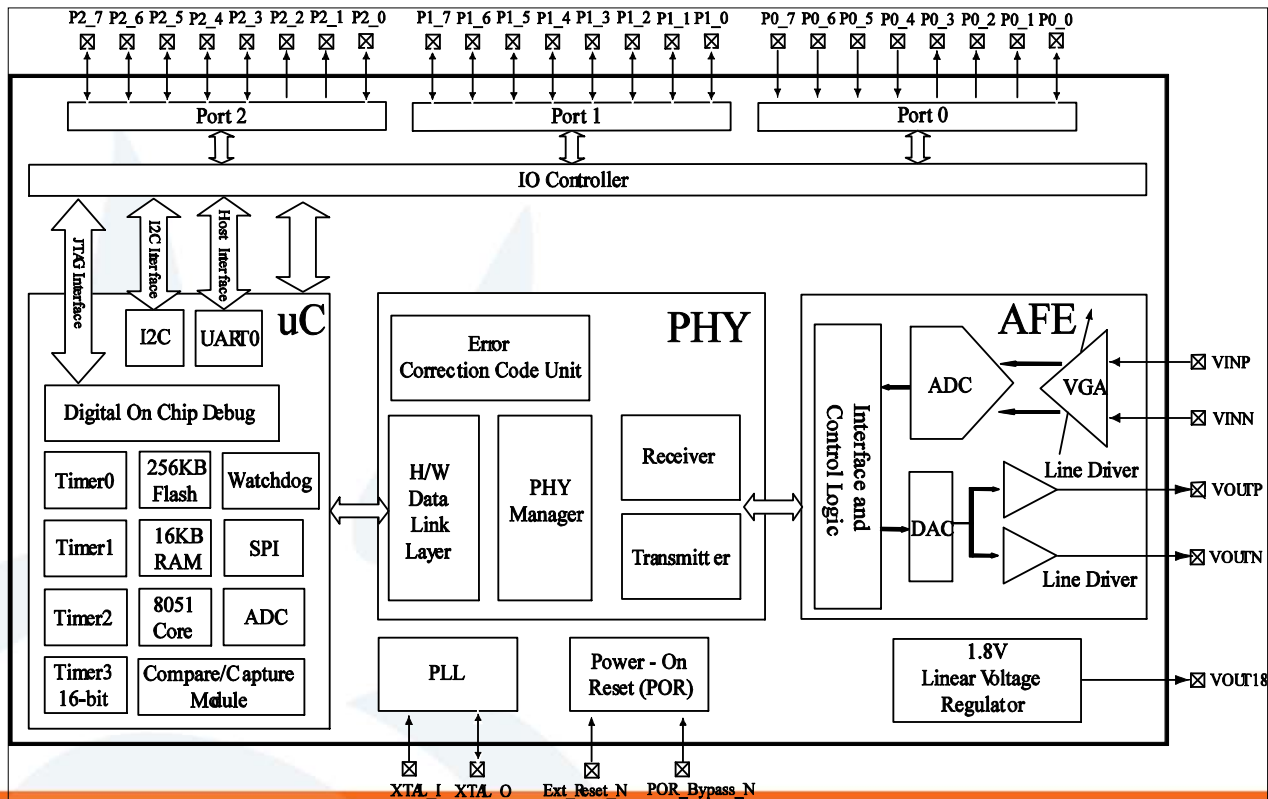
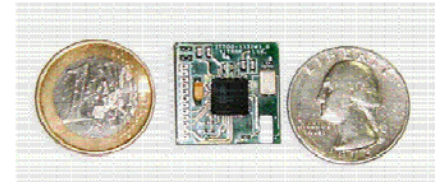
- Spread spectrum - provides maximal spectral diversity
- Resists burst noise, and allows to work in negative SNR.
- Excellent performance in long channels
- Resistance to impedance modulation.
- Fast recovery from severe fade or jamming.
- Cross power line phases without coupling





IT700 SoC ASIC

(Samples Available)



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Next Generation – DCSK Turbo

- Fully backward interoperable with HomePlug C&C 1.0.
- Throughput – 250 kbps
- Field Tested – provides excellent performance and coverage.
- In extreme conditions reduces speed to DCSK.
- Adopts the same upper layers as HomePlug C&C V1.0
- Multiple Sources – Licensed by Renesas.



ZEP

ZigBee Extension Over Power Line

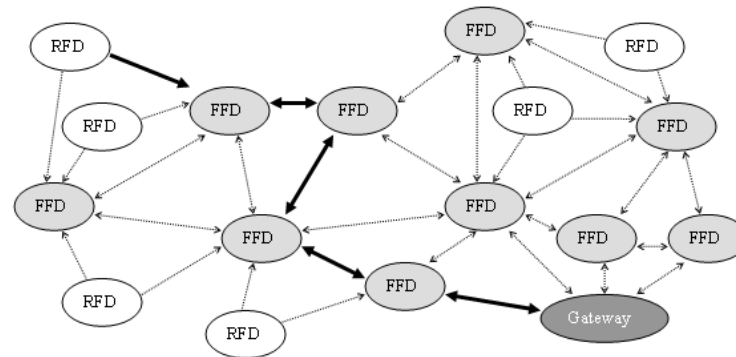
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Standard ZigBee Topology

- ZigBee topology is built as a Mesh Network, where at the heart of the network is the Network Coordinator.
- Each ZigBee device communicates with other devices in the network.
- ZigBee RF transceiver can not provide 100% connectivity and some devices require routing.



A mesh network showing a signal that originates at an RFD, routes through FFDs, and ends at a Gateway device. The dotted lines represent possible signal paths.

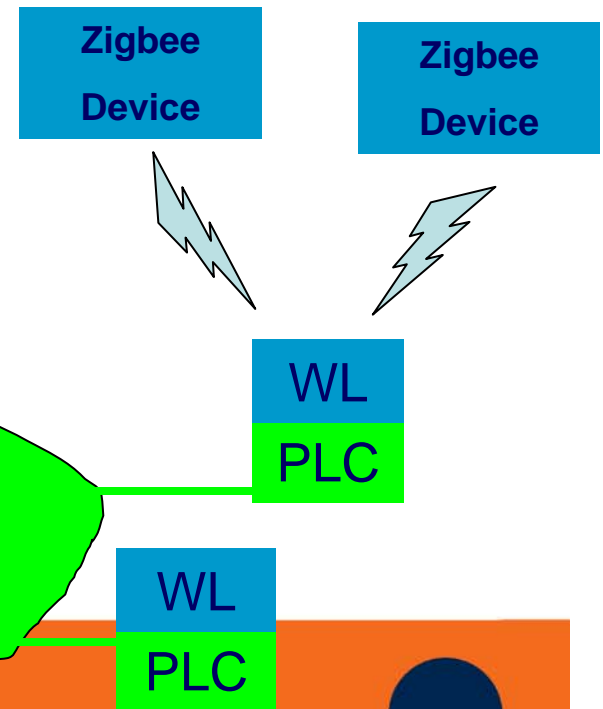


The ZEP concept

Connectivity between ZigBee devices utilizing power line backbone

Advantages:

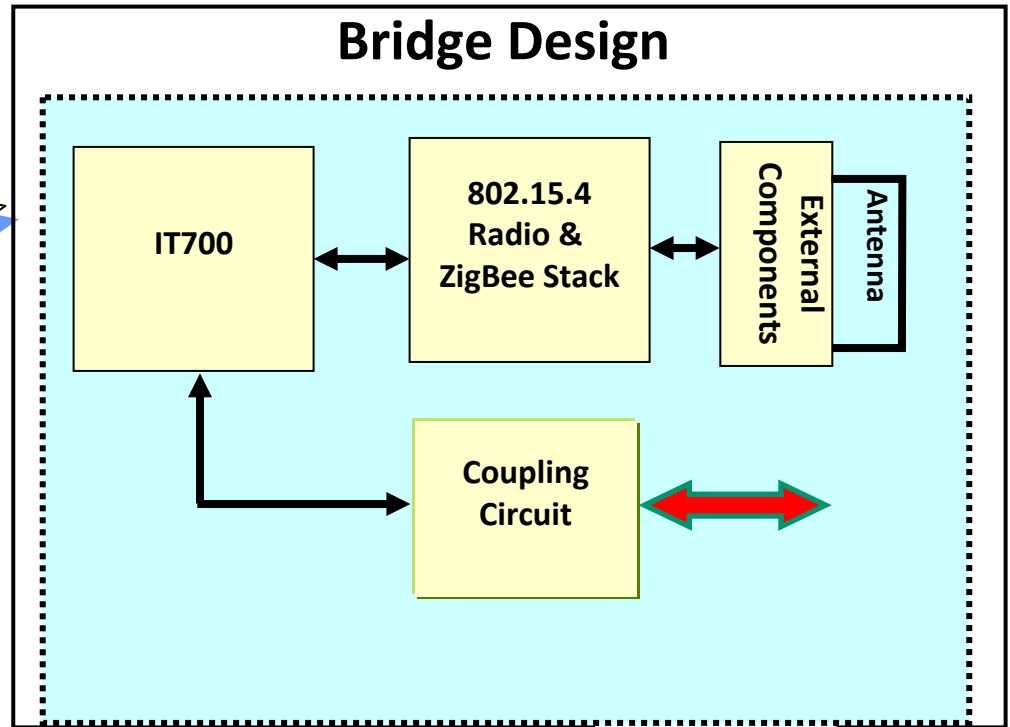
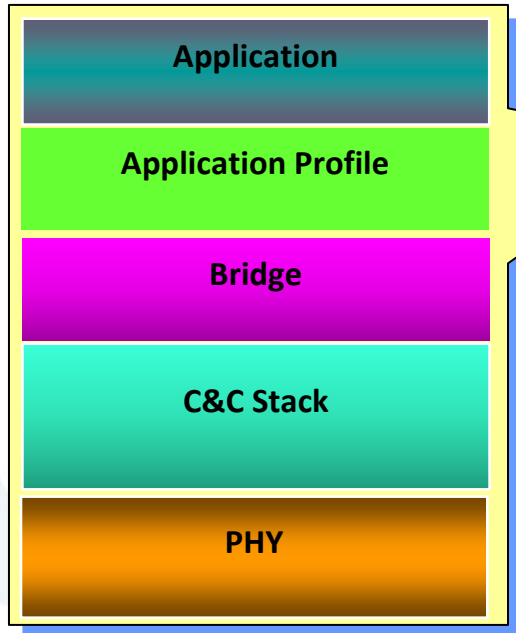
- Extended coverage
- Supports ANY Zigbee Device
- Reduce battery power consumption
- Easy to install
- Extension to HomePlug C&C networks





ZEP Design

The Solution for Today's Problem



Yitran offers an end user ready Bridge Reference Design



Summary

- 1. HomePlug C&C is an open standard that provides low cost, low footprint, highly robust power line communication solution.**
- 2. IT700 - the first HomePlug C&C ready samples available now.**
- 3. DCSK Turbo provides 250kbps throughput, with backward interoperability to HomePlug C&C.**
- 4. ZEP provides a solution for TODAY's ZigBee installations:**
 - 1. Extends range**
 - 2. Reduces battery power consumption**
 - 3. Simplifies installation.**
 - 4. Provides extension to HomePlug C&C network.**



Q & A

For further information contact me at:

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