Hue Bridge 2.0

3241312018
User Manual

The hue bridge 2.0 is a small square box that is located somewhere in the home. It is powered by an external power adaptor.

One of the functions is to bridge between wired Ethernet (orWiFi) and RF ZigBee network. The Ethernet interface is a RJ45 connector to support 10/100-TX Ethernet networks. The RF antennas for the ZigBee and WiFi are internally.

There are some LEDs on the box to provide user feedback. There is also link-button which should be illuminated by a lightring, and a factory reset button (on the back).

The consumer product package includes the hue bridge 2.0, Ethernet cable, power supply, manual and packaging.

The bulk package includes the hue bridge 2.0 only.

The hue bridge 2.0 is derived from a Linux based router platform, where the Linux distribution is provided and supported by ODM.

The image below shows a hue bridge in a hue system.
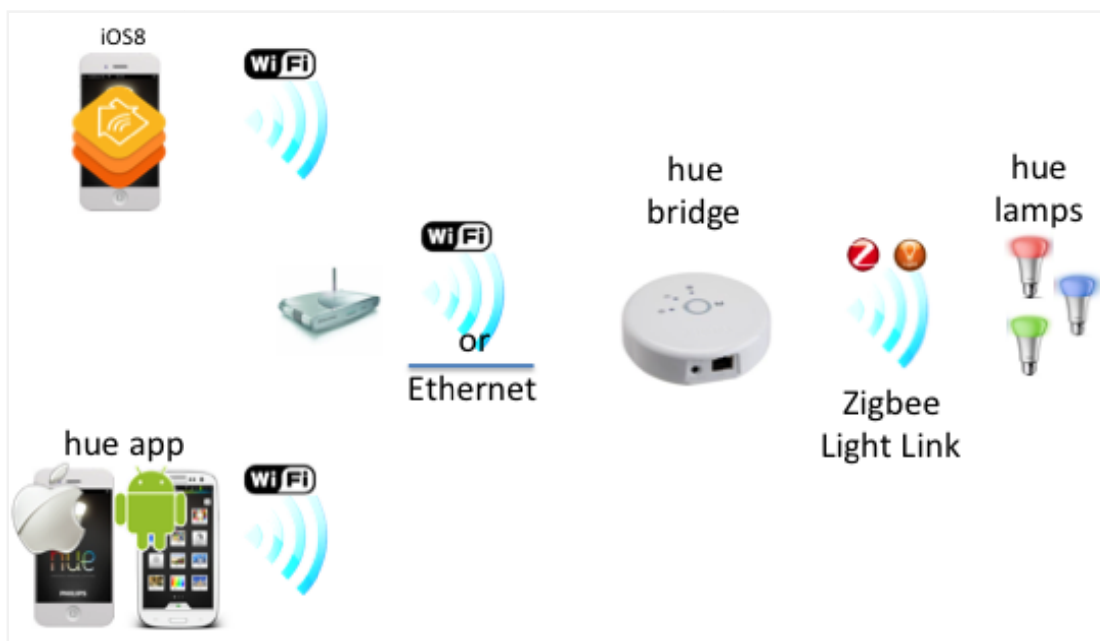
Specification

1   ESTHETIC

The Bridge is rectangular box with rounded corners. The push button is in the middle.
The power cable and the LAN cable shouldplug in on same side.
Below picture can be the reference(though LED color should be blue).
The push button should be smaller than the one in the picture below, and have a
uniform touch feeling. Philips to review and approve industrial design of Liteon.

The Philips word mark must exist on the surface.

Finishing:

High gloss white plastic RAL 9003;

Some parts might be painted: Silver Pantone 10103C

Color of signaling LED's: blue

Brightness of LEDs: to be clearly visible on a viewing distance of 1 meter in daylight,
final samples to be approved by Philips. All LEDs should have the same perceived
brightness. LED ring should be lit in a uniform manner. No light leakage between the
LEDs allowed.

2   BUTTONS

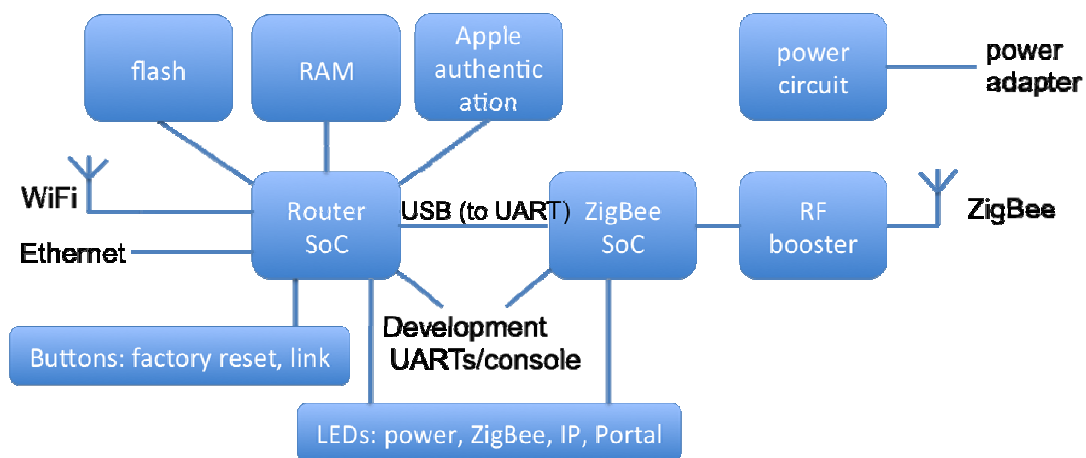### 2.1   LINK Push button surrounded by blue lit ring.

2.2   FACTORY RESET (Backside).

Small push button (same as the current bridge)

3   ARCHITECTURE

3.1   Electrical

The below diagram is the function block of the board.

ZigBee SoC: Atmel SAMR21

ZigBee RF booster chip to achieve maximum allowed output power in 2.4GHz ISM
band

IP network and router SoC: ARM or MIPS based

DDR1, 2 or 3, minimum 64 MByte

FLASH minimum 32 MByte

ZigBee and WiFi Antenna designs: see section 6.5

1x Ethernet (10/100 Mbit)

Connection between ZigBee SoC and routerSoC: UART (or USB)

Internal SW development/debugging connection:

UART and Atmel debug interface for the ZigBee SoC

UART for the routerSoC for booter and Linux console + kernel start-up.

JTAG or other means to debug/update the routerSoC

WiFi and ZigBee PCB antenna

3.2   Software

The software for the product consists of:

- Supplier: Booter (or Boot loader) to start Linux

- Supplier: Linux distribution (full source code, makefiles, build scripts etc.)

- Supplier: software for testing basic board functions + approbation software

- Philips: hue bridge applications

- Philips: software image for ZigBee SoC

For a final product Philips will build the software image for both SoCs. In order to do so the Linux distribution for the router SoC is to be provided to Philips for application development. The relevant peripherals should be fully supported by the Linux distribution. All supplier provided software shall be based on open source from a known contemporary Linux distribution for routers (OpenWRT 14.07). Philips should be able to build the software images for booter, Linux, root file system, and so on. All licenses shall be reported.

Part of the hue bridge application will be Apple HomeKit support, which requires access to the Apple Authentication IC. Support for this shall be via a supplier provided driver; connection via I2C.

The image below shows software blocks for the router SoC.

Requirements:

- Maximum of 50% RAM and FLASH memory used without hue applications (electrical requirements are 64 MByte RAM and 32 MByte flash).

- Start-up time (booter and kernel) till application start less than 20 seconds.

- Linux kernel version 3.10 or higher, relevant peripherals support in kernel.

- Full open source Linux distribution and booter, not limited to one router SoC supplier.

- The product needs to be able to be used as both WiFi access point and WiFi client, using IEEE 802.11g (also 11n to be considered in roadmap) in the 2.4 GHz band.

3.3   Software development

For software development access is need to:

- ZigBee SoC

  o Serial port

  o Reset (independent of Router SoC reset)

  o Atmel debug interface

- Router Soc

  o Serial port: boot, kernel logging, Linux console

  o JTAG

For factory testing and configuration (e.g. MAC address, HomeKit PIN code) these ports might be used as well.

4 OPERATIONS

4.1   Programming in factory

Philips will provide binaries and keys ("keys" refers to ZLL and SmartLink keys) to be programmed. These binaries and keys shall be handled in a secure way, using IT servers that have limited access and access registration. The same holds for the programming stations. Supplier to indicate how Apple HomeKitPIN code will be handled in production, in line with Apple requirements.

Philips will provide tables of

- ZigBee MAC addresses
- IP network MAC addresses and key combinations

4.2   Factory testing

Factory test plan as well as factory test software and approbation software to be delivered by supplier. Exception: ZigBee approbation software is delivered by Philips.

4.3   Product traceability

TBD either based on IP MAC address / key combination or ZigBee mac address

Component traceability required.

4.4   Labelling and packaging

For the scenario where the hue bridges are sent directly to customer (i.e. in commercial final package (to be delivered to Supplier by Philips-designated packaging supplier)):

- Product label on fixed location (backside), label size optimised for content, preferably only a single label, for global use
    - Philips wordmark (see associated requirements)
    - Hue logo (see associated requirements)
    - Serial#, IP MAC addresses
    - Approvals and compliance text (for global use, only mandatory ones)
    - HomeKit logo and PIN code

4.5   Adaptor

There should be 3 kinds of the power adaptors.

1. US version

2. APR version

3. EU version.

   Preferably, a single EU+UK version should cover both the normal EU as well as the UK style adaptor. Supplier should clarify the cost uplift on this EU+UK combined adapter approach over separate EU and UK adapters so Philips can use this to make a decision.

5   RELIABILITY AND QUALITY TARGET

5.1   Quality target

Field call rate: <0.1% (1000PPM) (year average)

Philips does not have the intention to do Incoming quality control.

Therefore Supplier should perform outgoing quality inspection in full compliance and in accordance to AQL-failure classification (acc.ISO2859):

MILESTONE	RETAIL VERSION	
Outgoing Quality	Therefore Supplier should perform outgoing quality inspection in full compliance and in accordance to AQL-failure classification (acc.ISO2859):	
For Pilot Run	100% for each Pilot Run pallet in any case	
From Mass Production start until end of ramp-up	100% for the first 5000 units of each model name (ex. : CD17)	
After the ramp-up	Normal O.Q.A. at 0.4 – Level II for MAJOR failure Normal O.Q.A. at 1.5 – Level II for MINOR failure OQA shall be kept at 100% if the manufacturing FPY is not at the expected target.	
Target	OQA < 1000 ppm; FPY>98%	
EMS/ODM	SHIPMENT RELEASE	
LCC (Late Configuration Center)	COMMERCIAL RELEASE	

Said levels shall be reviewed during the quarterly business review meetings and can be adjusted by Philips.

5.2   Reliability

Operating condition

    T-ambient $0 < T_a < 40$ C

    Humidity $0 < H < 80\%$ non condensing

Storage condition (packaged)

    T-storage $-40 < T_s < 80$ C

    Humidity $0 < H < 90\%$ non condensing

Environmental testing

    Packaged: drop, vibration, stacking, damp heat

    Unpackaged: Cold exposure, temperature change rapid, Damp heat cyclic, cold start-up

Mechanical test:

    Surface Test (Rubbing, Paint)

    Surface rigidity test

    Cosmetic test

    DC power jack plug in test

For all the above testing, Liteon should provide the test detail conditions and Philips will review, add any necessary test and approve the QTP.

6 APPROBATION AND CERTIFICATION

6.1   The country list of the approbation

US / Canada / Mexico
EU
Taiwan /Korea / Japan
Brazil / Argentina / Chili
Australia / New Zeeland
China /Hong Kong / Singapore
India

Note 1:

For all countries in the above list except US,Canada,Mexico,EU: Liteon is requested to provide the additional cost and throughput time for approbation for each of these countries.

Note 2:

For roadmap purposes, Liteon is requested to provide the additional cost and throughput time for approbation if Thailand, Malaysia, United Arab Emirates and Indonesia are added to this list.

6.2 Approbation and certification

WiFiand WAC certification: to be done by the Supplier.
Certificates should be registered with Philips' name.
ZigBee certification: will be arranged by Philips.

Supplier to provide list of required approbations/certifications for this product, and recommendation for associated test labs/notify bodies; Philips will review and approve. Supplier to submit to Philips after certification: Test reports, copies of the certificates, name of Notified Body and test house used for certification.

6.3 Sustainability

RoHS and REACH compliant

WEEE compliant

Philips Green Policies (www.philips.com/sustainability)

6.4 Energy efficient

Energy Efficiency of PSU and IP bridge should be conform industry standards.

Standby of the PSU should be Energy Star class 5 compliant, or better.

6.5 WiFi and ZigBee radio

ZigBee Radio IEEE 802.15.4, ISM bands 2.4GHz and WiFi radio IEEE 802.11. Maximum output power, ZigBee range should be comparable to wifi range.

EIRP should be as good as possible with a cost effective solution not exceeding country regulations (e.g., 20 dBm for Europe). WiFi and ZigBee antennas are internal.