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external Hardware Design Description (eHDD) for DH10

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1 General

1.1 Scope

This document describes the hardware design of DH10 on a high functional block level.

DH10 is DECT handset. In addition to normal DECT telephony and messaging, DH10 also include Bluetooth connectivity.

1.2 Abbreviations

N/A	Not Applicable
TBD	To Be Determined
TBC	To Be Decided

1.3 Document History

Version	Date	Author	Description
1.0			

2 Top level block diagram for DH10

Below you can see a top-level electronic block diagram of the DH10 handset. Note that the functionality inside the dotted boxes are different mounting options of the PCBA.

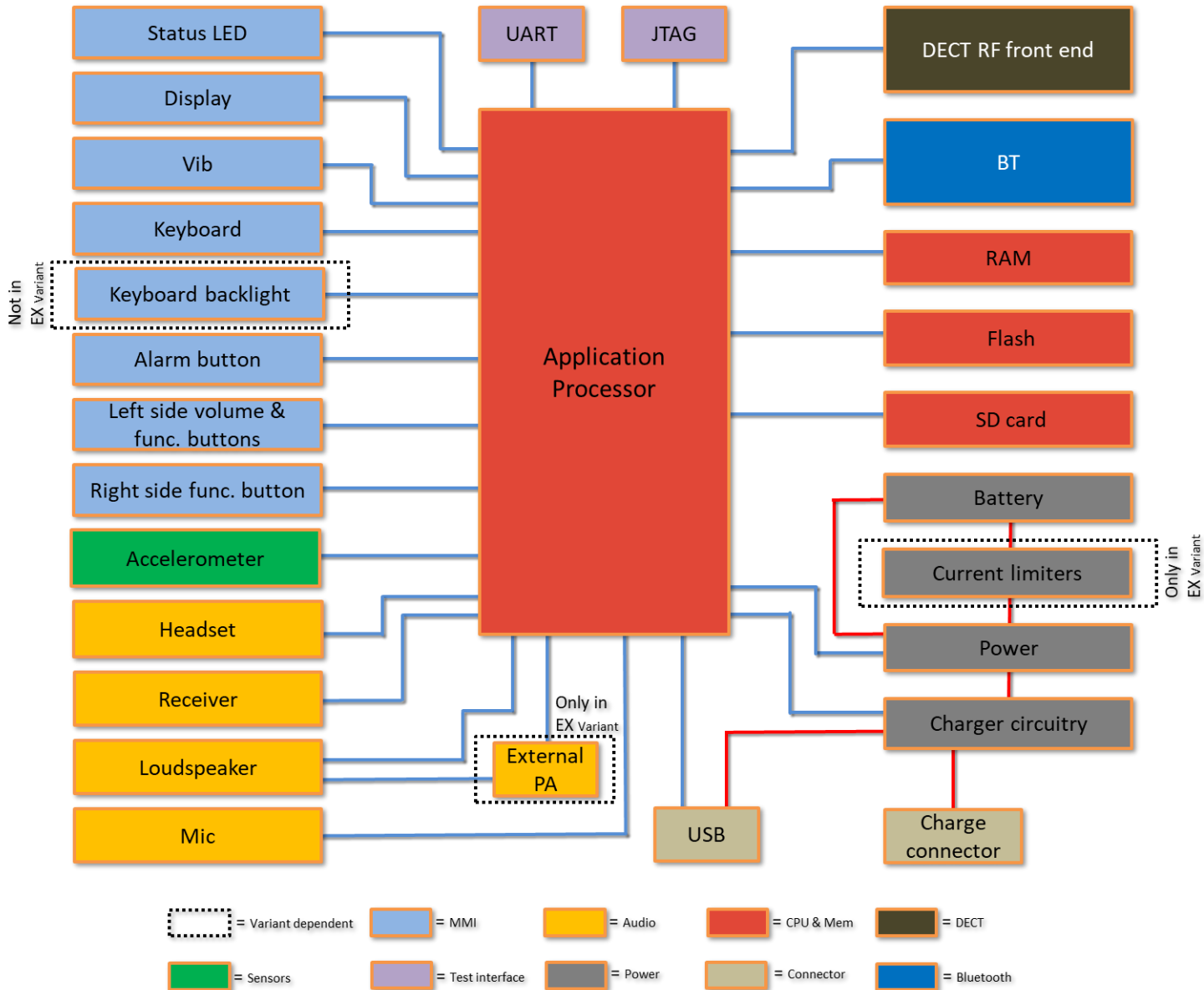


Figure 1: Top level block diagram

3 Product view and pictures

3.1 Exploded product view

Below is a product exploded view, consisting of the front-cover assembly, the frame assembly, the main PCB assembly and the back-cover assembly.



Figure 2: Product exploded view

3.2 External product pictures



Figure 3: DH10 front



Figure 4: DH10 back



Figure 5: DH10 left side



Figure 6: DH10 right side



Figure 7: DH10 top



Figure 8: DH10 bottom

3.3 Internal product pictures

Below are pictures of the main PCB assembly, front and back. The front side is facing the front of the phone. The back side is facing the back of the phone. The upper PCB antenna is DECT, and the lower PCB antenna is Bluetooth.

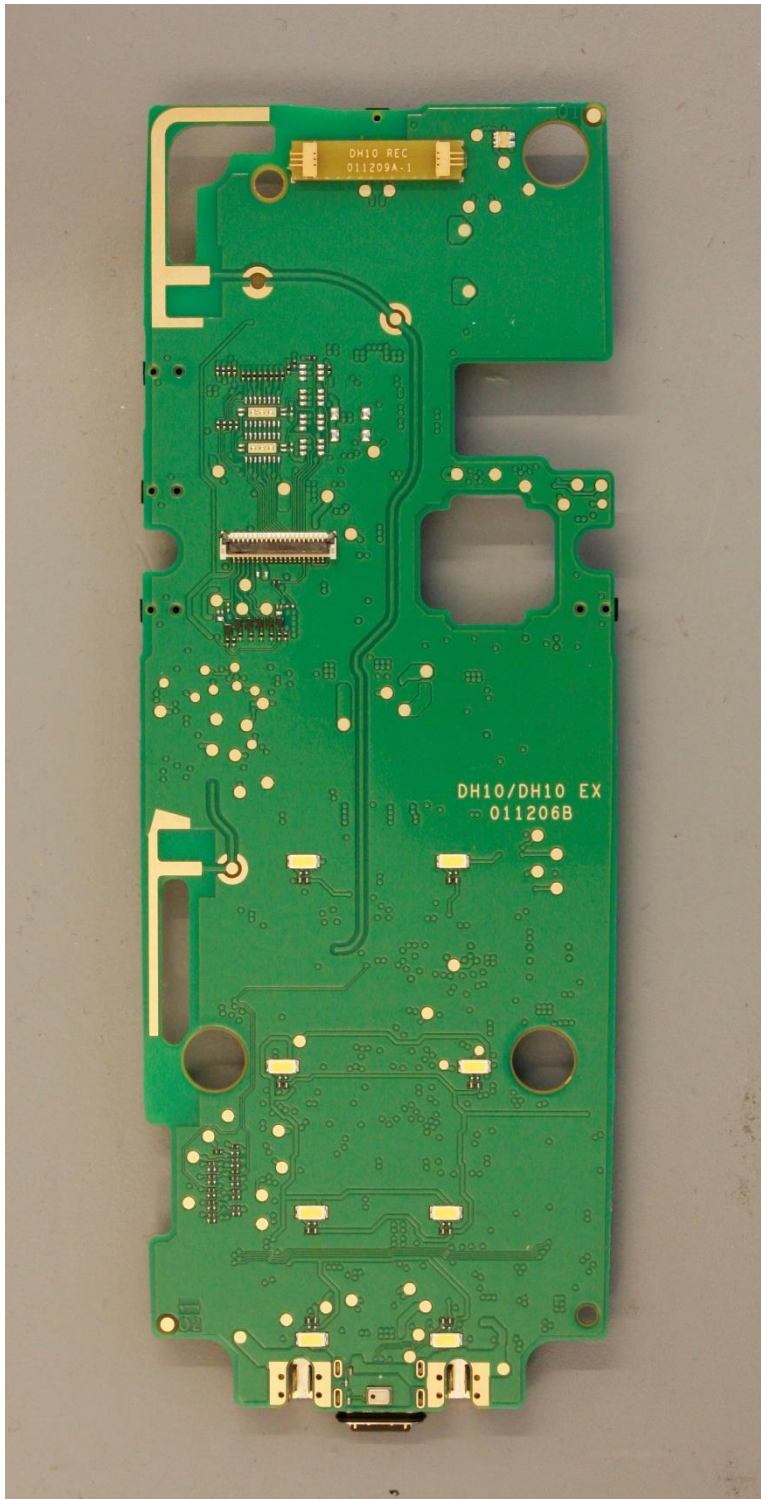


Figure 9: Main PCBA front side

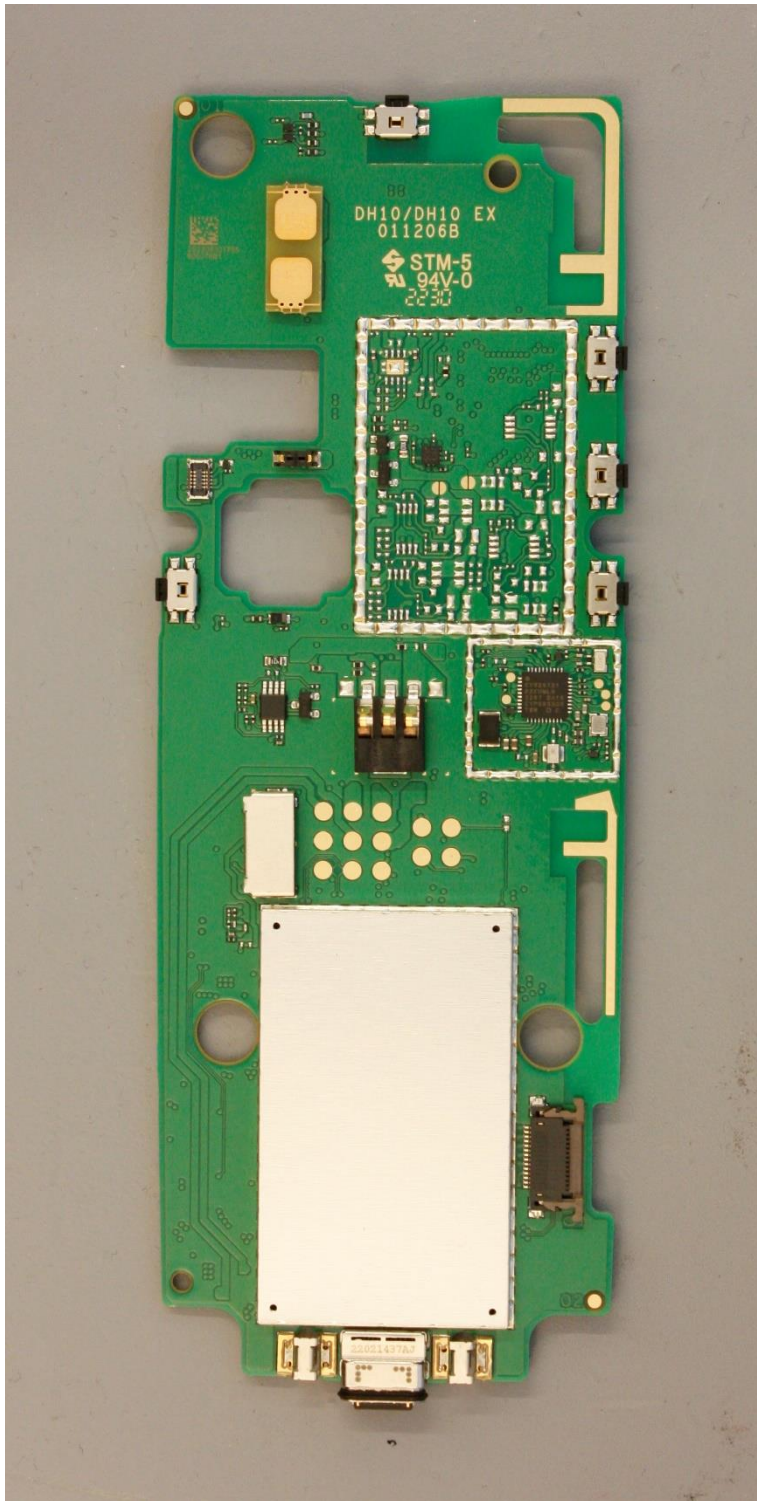


Figure 10: Main PCB back side

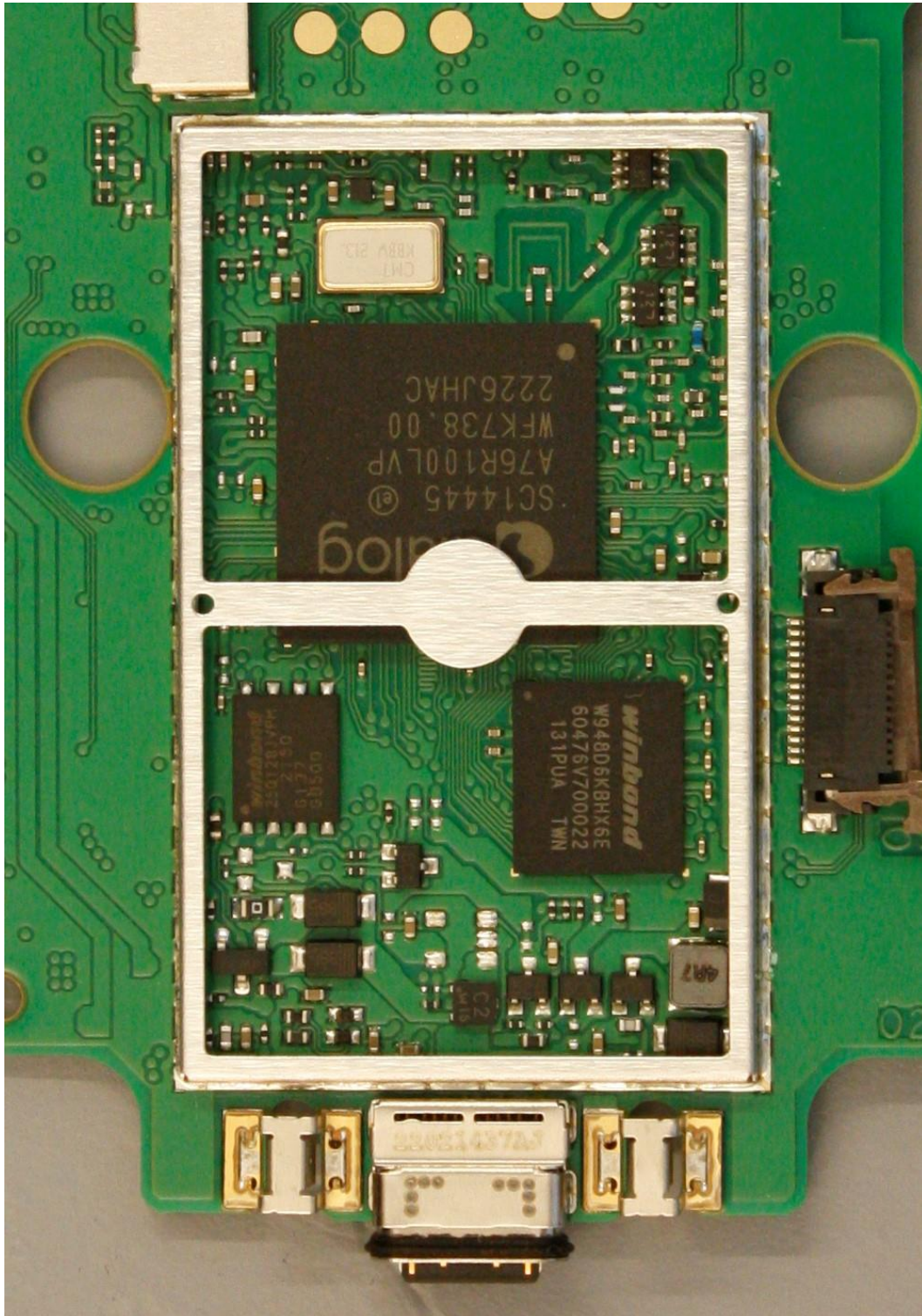


Figure 11: Shield can, back side

3.4 Label placement



Figure 12: DH10 label placement

4 Model differences/similarities

4.1 General

As can be seen in the block schematics, DH10 exists in different mounting options.

There are two different variants. Both variants share the same PCB and the same PCB antennas but has different component BOMs.

From an EMC/ESD point of view, worst case is the DH10-DA "Industrial".

From a radio point of view, they are identical.

4.2 Table of functional differences

Functionality	DH10-DA "Industrial"	DH10-DB "Industrial EX"
Status LED	Yes	Yes
Display	Yes	Yes
Vibrator	Yes	Yes
Keyboard	Yes	Yes
Keyboard backlight	Yes	-
Alarm button	Yes	Yes
Left side buttons	Yes	Yes
Right side button	Yes	Yes
Accelerometer	Yes	Yes
Headset connector	Yes	Yes
Earpiece/receiver	Yes	Yes
Loudspeaker	Yes	Yes
Microphone	Yes	Yes
Charger interface	Yes	Yes
Current limiter	-	Yes
SD-card connector	Yes	Yes
DECT radio	Yes	Yes
Bluetooth radio	Yes	Yes

4.3 Mechanical differences

The mechanical differences between the DH10-DA “Industrial” and the DH10-DB “Industrial EX” are:

- The battery has 5 poles on “Industrial EX” instead of 3 poles on the “Industrial”.
- The battery is secured by screws on “Industrial EX” instead of a sliding lock in “Industrial”.

5 Operational description

5.1 Oscillators

The main CPU and DECT parts use a 10.368 MHz crystal oscillator.

The Bluetooth module is using a 24 MHz and a 32.768 kHz crystal.

5.2 CPU

The main CPU is a SC14445 from Dialog.

5.3 DECT radio

The DECT radio is based on a DECT chip (SC14445 from Dialog), which has a complete DECT radio transceiver integrated, designed to perform the complete receive function without an external SAW filter at IF. For transmit, an RF Power Amplifier (RFPA) has been implemented. During receive mode, the signal at the Rx input is down converted to an intermediate frequency of 864kHz.

For EU-DECT 1881.792MHz – 1897.344MHz are used and for US-DECT 1921.536MHz – 1928.448MHz are used. GFSK is used as modulation, which is the standard for DECT.

The antenna is a quarter wave PCB antenna with a 50 Ohm feed. The antenna type looks like the IFA antenna (Inverted F Antenna), but the ground plane orientation differs. The antenna gain is 1dBi.

5.4 Bluetooth radio

A Bluetooth chip (CYW20721 from Cypress) with almost all RF functionality on chip is used. Only a bandpass filter and the antenna are external.

A 26MHz + 32.768kHz crystals are used as frequency reference.

The Bluetooth antenna is of the same type as the DECT antenna also integrated in the PCB. The antenna gain is <3dBi.

6 Tune-up values

US DECT power ≤ 20.4 dBm

EU DECT power ≤ 25 dBm

Bluetooth power ≤ 3 dBm