Modification of HDK 20190520

1. **32.768KHz crystal**

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| --- | --- |
| Target Boards | D3F, D3FP, D3FV, COB |
| Modification | The capacitor for 32.768KHz crystal should be less than 9 pF |
| Description | To avoid the startup issue of 32.768KHz crystal when PMU\_SF is low. The capacitor for 32.768KHz crystal should be less than 9pF to increase the loop gain of crystal circuit. |

Schematic:



1. **PWR\_EN**

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| Target Board | D3F, D3FP, D3FV, COB |
| Modification | Remove the capacitor of PWR\_EN and change the pull up resistor to 100K ohm. |
| Description | There are 2 way to use PWR\_EN pin.   1. PWR\_EN and VBAT rise at the same time. PWR\_EN voltage should follow the VBAT when power on. That’s why the capacitor is removed. 2. PWR\_EN rise after VBAT is ready. In this case, the rise time of VBAT should be less than 500ns.   Therefore, removing the capacitor to increase the rise time of PWR\_EN.  To avoid the bounce of the PWR\_EN, the pull up resistor is change to 100K ohm. |

Schematic:



1. **RST\_N**

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| Target Board | D3F, D3FP, D3FV, COB |
| Modification | Keep the resistor and capacitor of RST\_N |
| Description | The time of VBAT rising to RST\_N rising is 2ms, so we keep pull-up resistor and the capacitor. |

Schematic:



1. **WP and HOLD pins of Flash**

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| --- | --- |
| Target Board | COB |
| Modification | Remove pull up resistors and pull them up by GPIO |
| Description | WP and HOLD pins should keep high when reading SPI flash. But if we have redundant GPIO, we can use it to pull the WP and HOLD pins high and remove both resistors.  Make sure WP and HOLD are high before accessing flash. So only the **unused and internal pull-up GPIO** can used when you trying to remove the WP and HOLD resistors.  GPIO16 and GPIO17 are set to output high in the ROM code, so GPIO16(WP) and GPIO17(HOLD) are recommended for WP and HOLD. |

Schematic:



1. **Decouple capacitors**

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| --- | --- |
| Target Board | COB |
| Modification | Decide what decouple capacitors can be removed |
| Description | There are decouple capacitors for following power domain: VDD\_RF, EX\_DCDC, VBAT, VDDC. According to below performance test, the capacitor of VBAT, VDDC, EX\_DCDC can be removed. The removing of decouple capacitors for VDD\_RF depends on the requirement of RF performance. If the lower performance is accepted, decouple capacitors for VDD\_RF can be removed, too. |

