



正基科技股份有限公司



AP6676P & AP6676PR3

Evaluation Board User Manual

Address:

6F-2, No. 23, Huanke 1st Rd., Zhubei City, Hsinchu County 302047,
Taiwan

<http://www.ampak.com.tw>





Revision

Revision	Date	Description	Revised By
0.1	2024/ 10 / 07	Initial released	Jason



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1. EVB Introduction

AP6676P & AP6676PR3 Evaluation board (EVB) likes as figure1. That is designed for IEEE802.11 a/b/g/n/ac/ax WLAN with integrated Bluetooth application. It is subject to provide a convenient environment for customer's verification on WiFi or Bluetooth function. There are many controller pins and reserved GPIO on Evaluation board which describes as below.

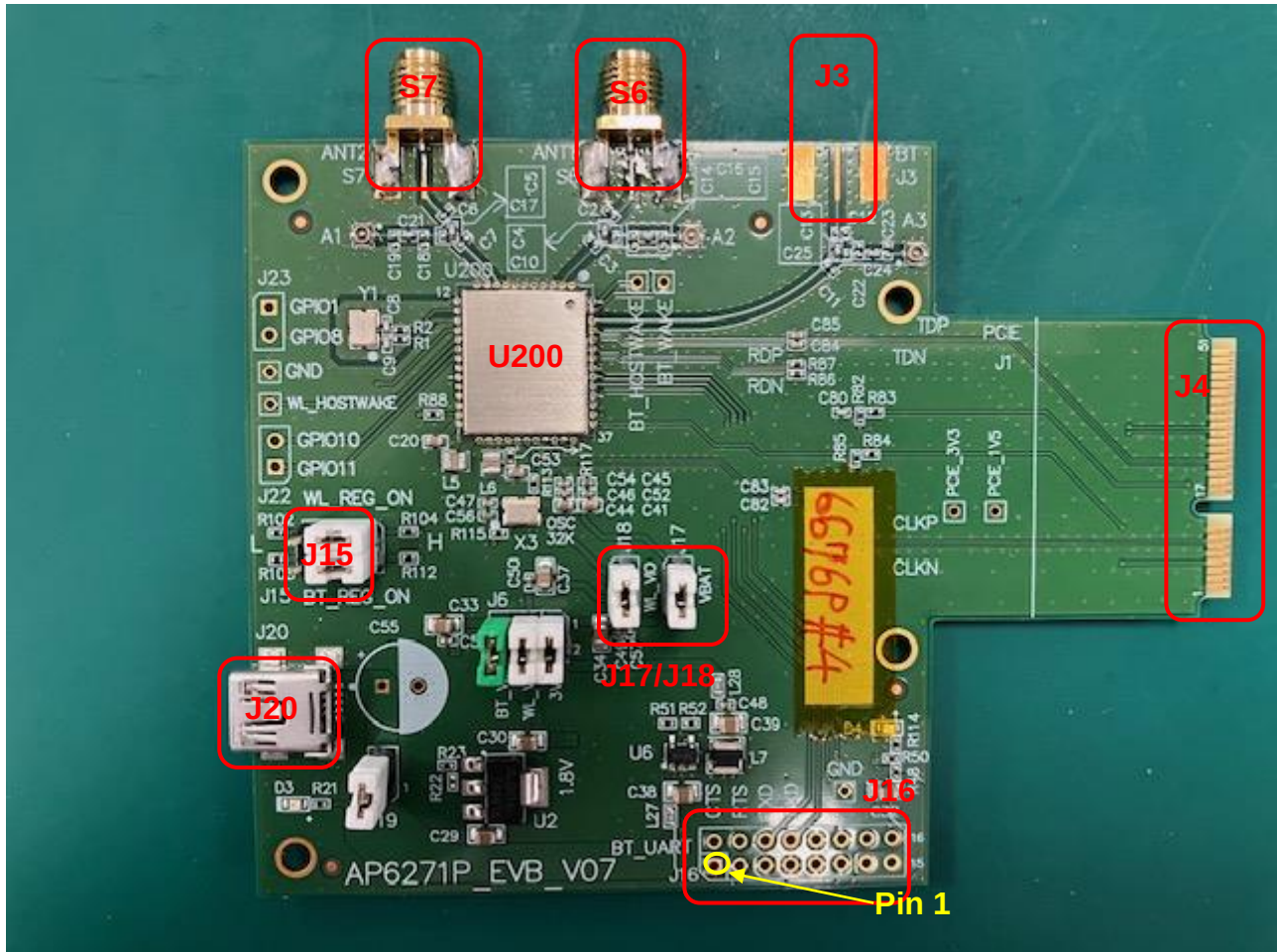


Figure1. Top view of AP6676PR3 EVB

Interface highlights:

1. U202: AP6676P or AP6676PR3 SIP module.
2. J16: UART interface connects with UART transport board for BT measuring.
3. J15: Enable(H) or disable(L) Bluetooth, WiFi function.
4. J17/J18: VBAT / WL_VIO / BT_VIO for main system I/O power path.
5. J20: 5V DC mini USB input connector.
6. J4: PCIE interface half mini PCI (gold finger) for WIFI.
7. S6: SMA connector let RF ANT1 signal in/out path(WiFi and Bluetooth share antenna for AP6676P / WiFi only for AP6676PR3), you could connect with RF cable or Dipole antenna.
8. S7: SMA connector let RF ANT2 signal in/out path (WiFi only), you could connect with RF cable or Dipole antenna.
9. J3: SMA connector let RF ANT3 signal in/out path(Bluetooth only for AP6676PR3), you could connect with RF cable or Dipole antenna.

AMPAK Technology Inc.



2. WiFi Function Verification Step

2.1 WiFi PCIe

PCIe interface definition as below J4 gold finger.

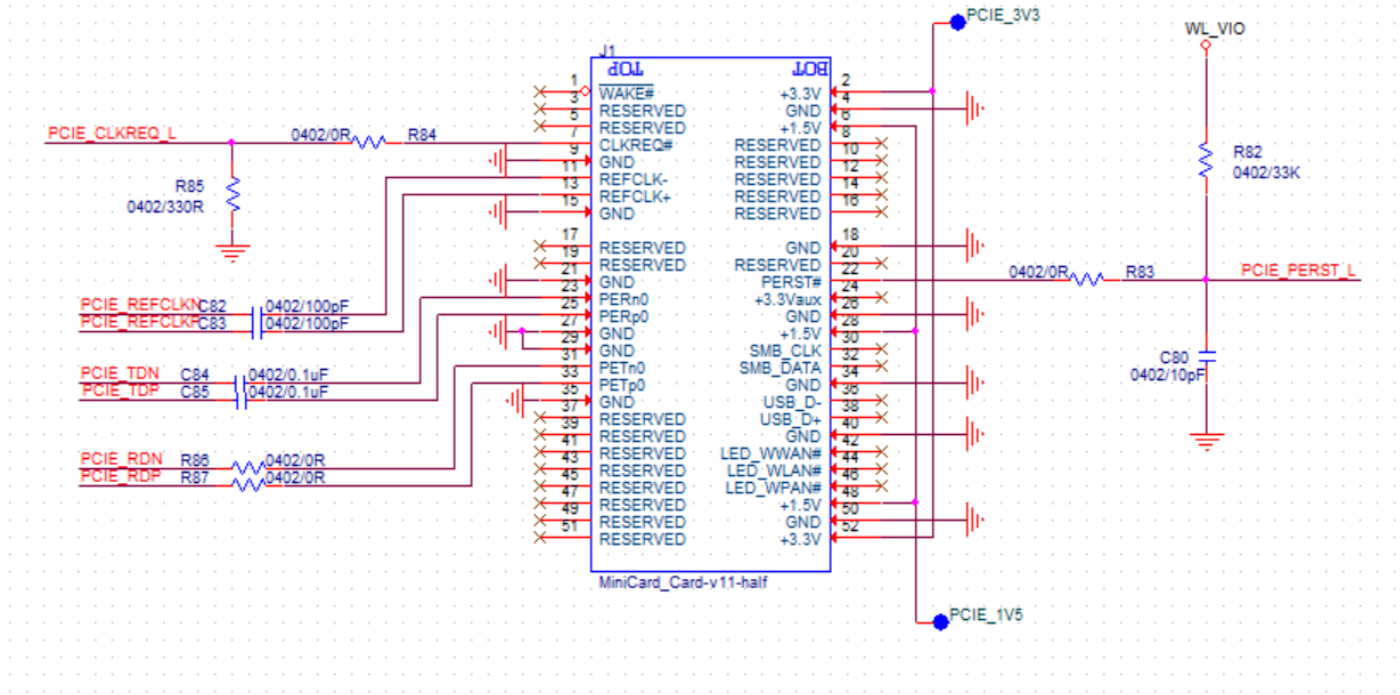


Figure2. WiFi verification connection interface to Host PCIe

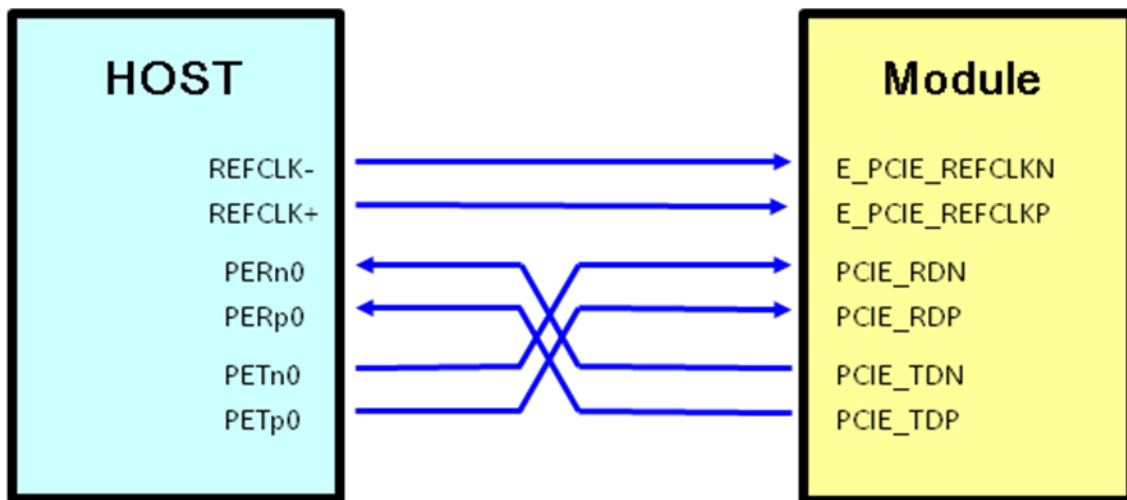


Figure3. EVB PCIe interface to HOST PCIe

2.2 Hardware Setup

- ❖ Refer to Figure2 PCIe pin definition connects the J4 interface of AP6676P/PR3 evaluation board to Host PCIe control interface.
- ❖ Connects an external antenna at SMA connector on the evaluation board.
- ❖ Note to the VDDIO voltage level should be the same with GPIO voltage level of Host CPU.

2.3 WiFi Software Setup

- ❖ Please follow up software guideline of Ampak official released.

3. Bluetooth Function Verification Step

3.1 Bluetooth UART

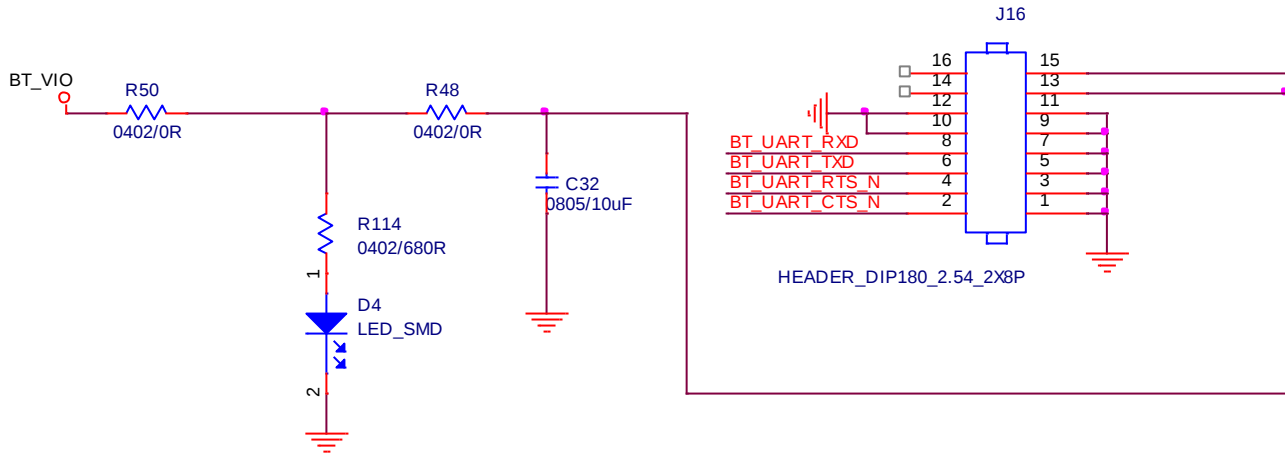


Figure4. Bluetooth verification connection interface to Host UART

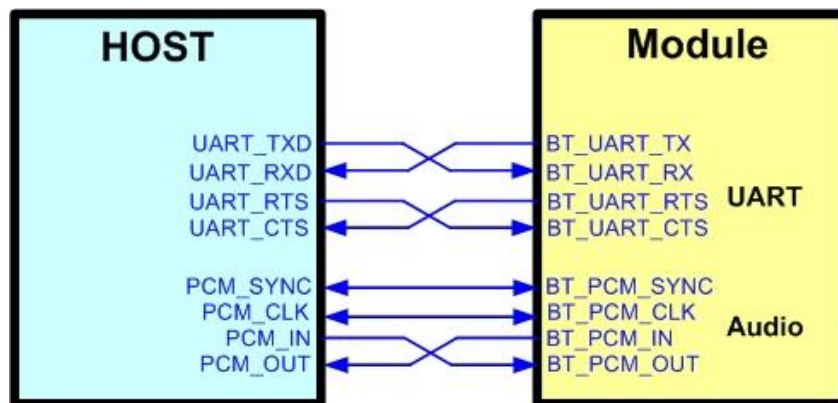


Figure5. EVB UART interface to HOST UART

3.2 Hardware Setup

- ❖ Refer to Figure4 UART pin definition connects the J16 interface of AP6676P/PR3 evaluation board to Host UART control interface.
- ❖ Connects an external antenna at SMA connector on the evaluation board.
- ❖ Note to the VDDIO voltage level should be the same as GPIO voltage level of Host CPU. (AP6676P/PR3 only be used in 1.8V)

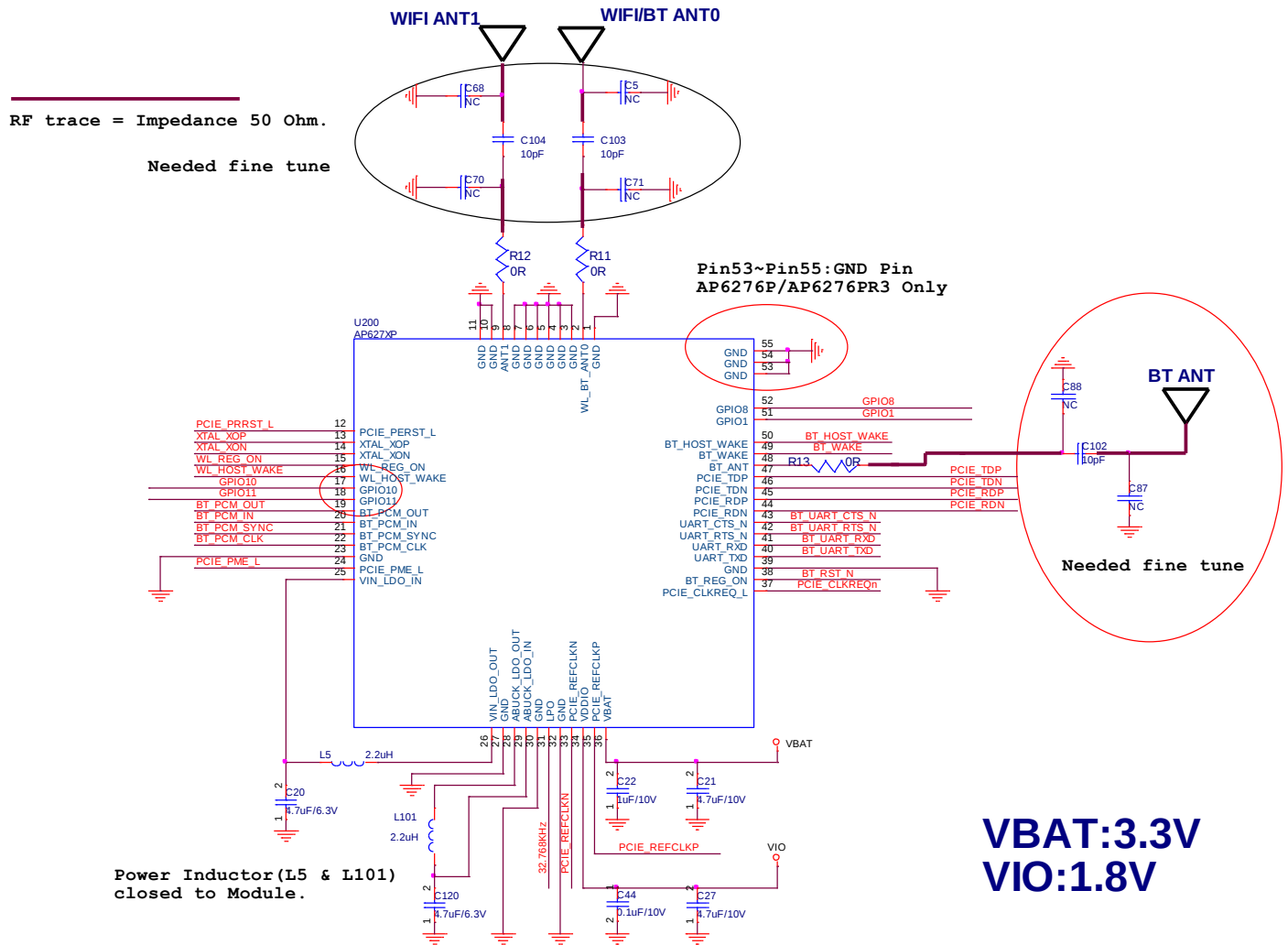
3.3 Bluetooth Software Setup

- ❖ Please follow up software guideline of Ampak official released.

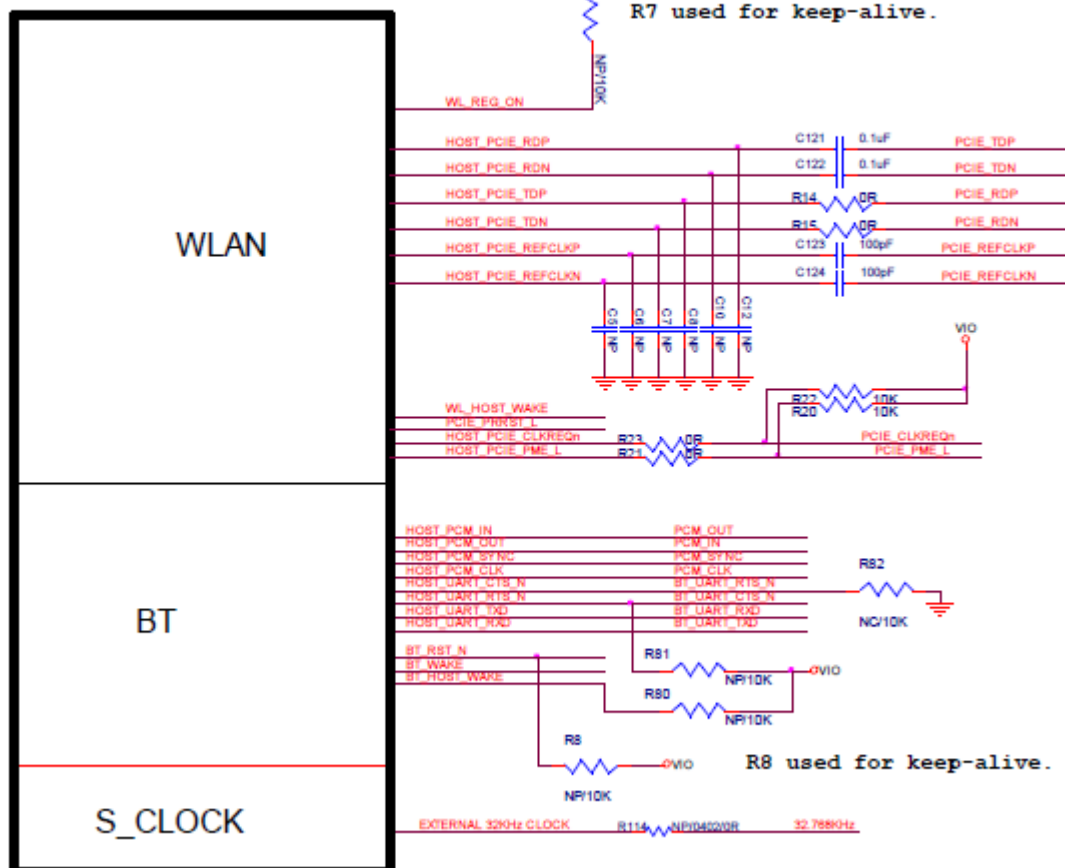


4. Reference Design

4.1 Module Reference Design

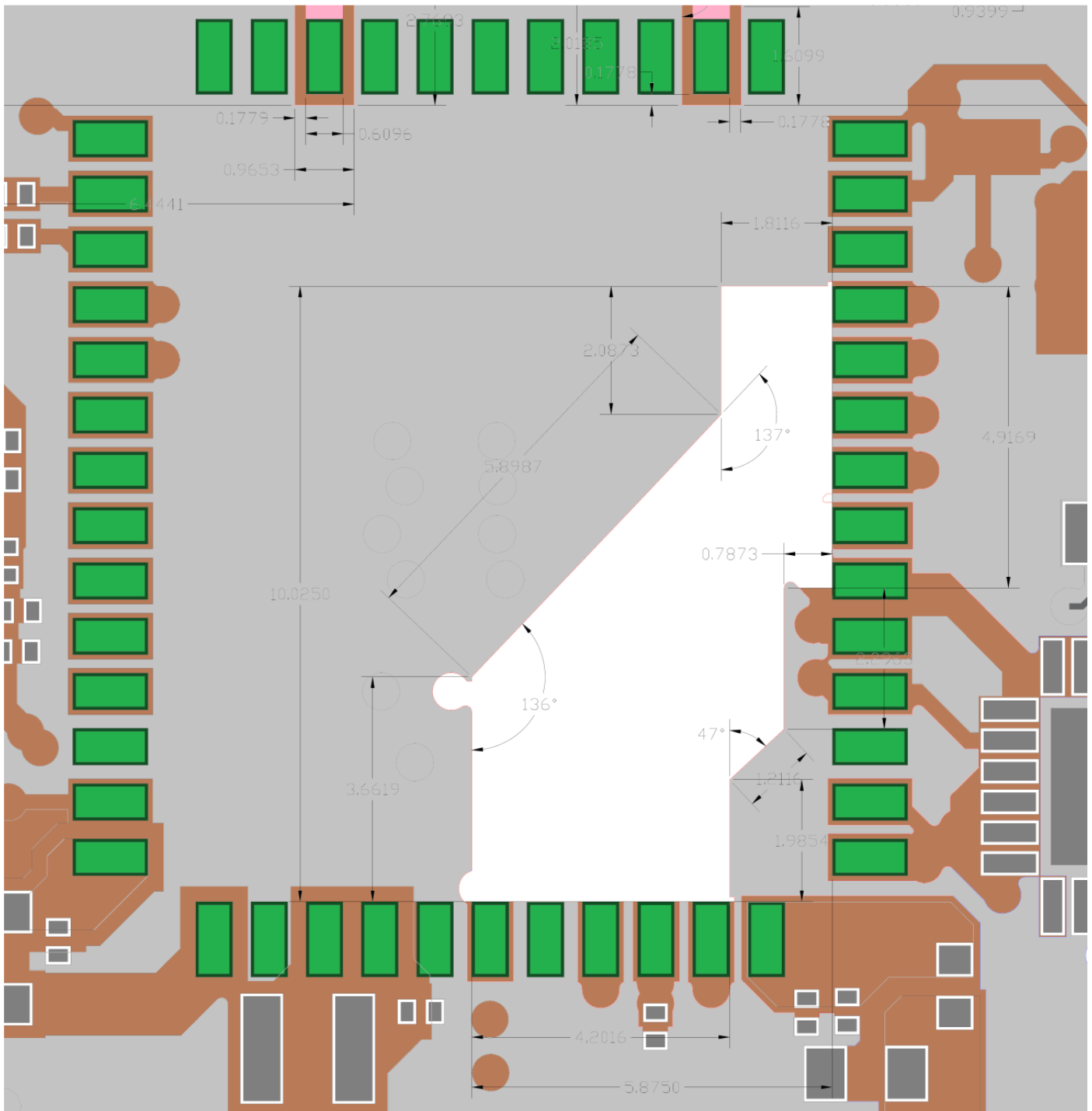


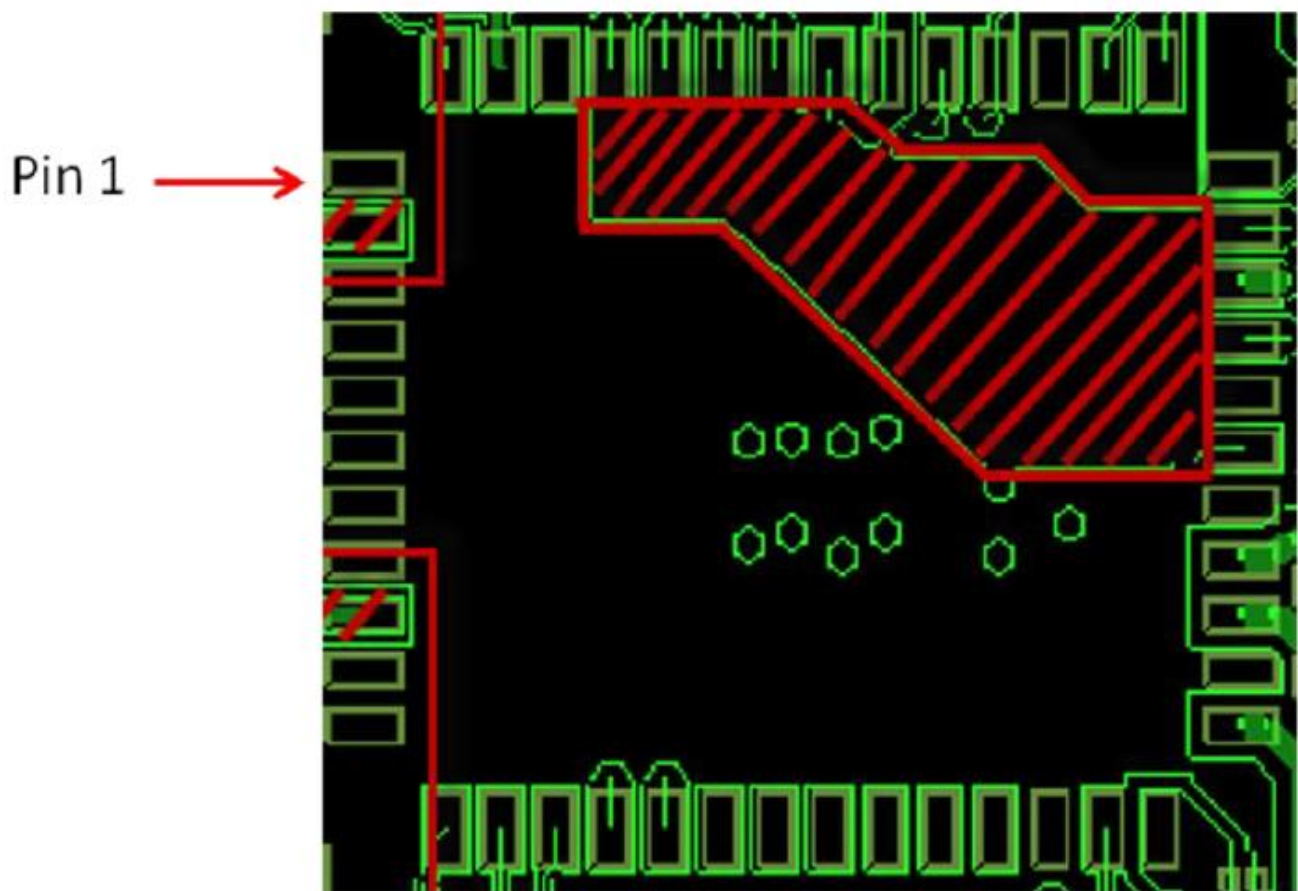
Connected to HOST I/O



4.2 Layout guide

Keep-out Area



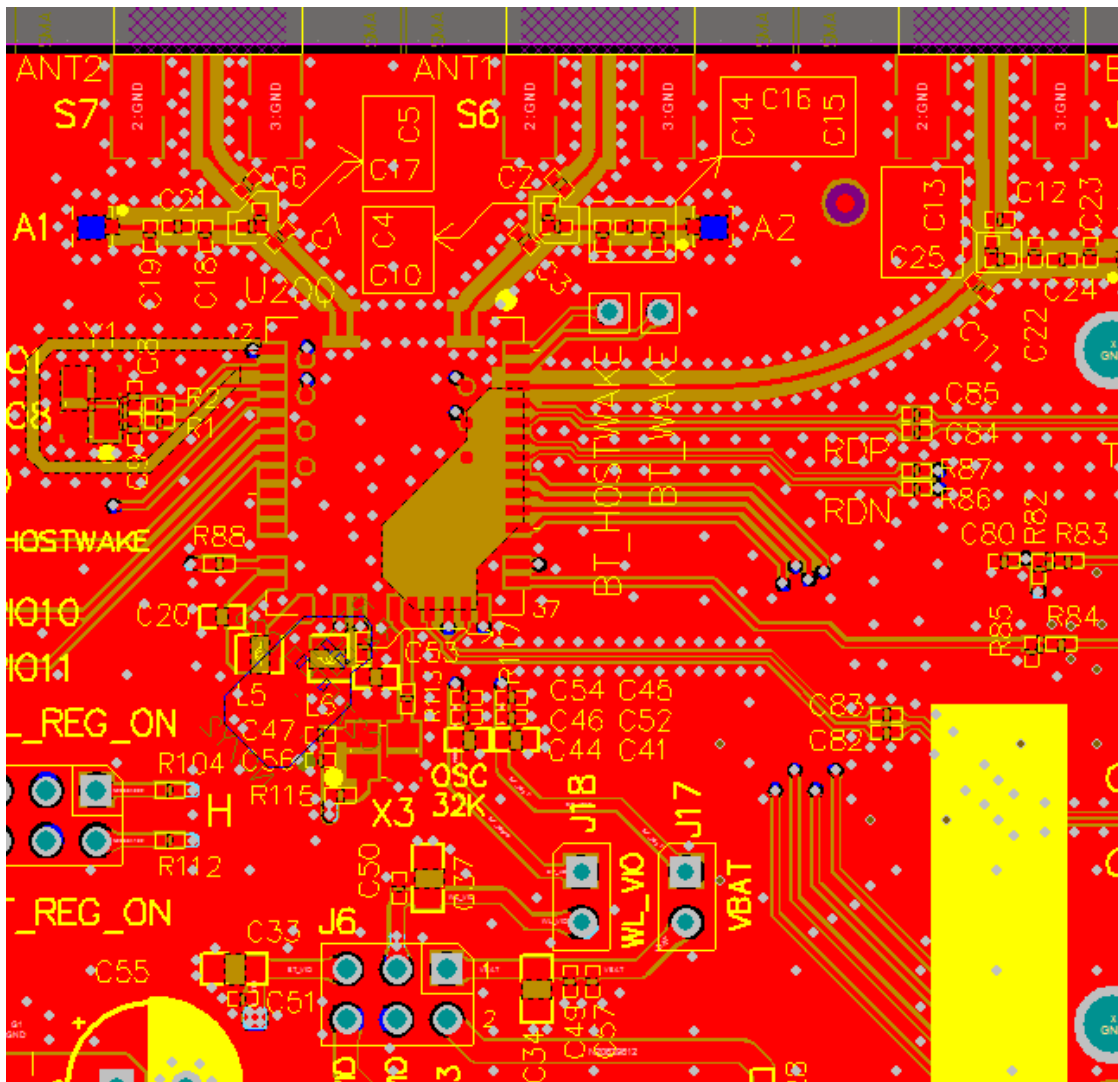


TOP VIEW

RF Trace and Layout Reference

The fundamental design concepts are as follows with regarding to placement of antenna parts:

- Make sure the RF PAD impedance is 50 ohm +/- 10%.
- Place the antenna parts near the RF output port of wireless module as close as possible to avoid more insertion loss of RF transmission line on main board.
- Keep antenna parts away any metal materials. The clearance is 4cm or above in order to guarantee radiation performance.
- Metal housing or metal-plated housing can influence antenna performance seriously.
- Keep antenna parts away any noise sources, for instance, HDMI or high speed data buses, DDR, PMU, SSD...etc.
- Ensure the isolation between Wi-Fi and Bluetooth antenna, 25 dB or above, for ideal Wi-Fi / BT co-existence.



The essential design rules of RF transmission lines are as follows:

- The characteristic impedance of RF transmission line is 50 Ohm +/- 10%.
- Keep the RF transmission lines on the same layer as module and RF connector mounted in order to guarantee 50 Ohm characteristic impedance and optimal matching.
- Put some ground through holes properly to guarantee the ideal grounding effects.

