WICED Smart Tag Hardware User Manual

BCM920737TAG-03

WICED™ Development System

920737TAG03-HWUM100-R

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Revision History

Revision	*Date*	*Change Description*
920737TAG03-HWUM100-R	03/28/14	Initial release

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About This Document

The Broadcom Wireless Internet Connectivity for Embedded Devices (WICED; pronounced "wicked") Smart™ SDK is shipped with the BCM920737TAG-03 evaluation board. This document provides board layout, schematics, and instructions on how to use this board.

This document is for software developers who are using the WICED Smart Development System to create applications for Broadcom Bluetooth Smart devices.

Acronyms and Abbreviations

In most cases, acronyms and abbreviations are defined on first use. For a comprehensive list of acronyms and other terms used in Broadcom documents, go to:
http://www.broadcom.com/press/glossary.php.

Document Conventions

The following conventions may be used in this document:

Convention	*Description*
Bold	User input and actions: for example, type **exit**, click **OK,** press **Alt+C**
`Monospace`	Code: `#include <iostream>` HTML: `<td rowspan = 3>` Command line commands and parameters: `wl [-l] <command>`
< >	Placeholders for *required* elements: enter your <username> or `wl <command>`
[ ]	Indicates *optional* command-line parameters: `wl [-l]` Indicates bit and byte ranges (inclusive): [0:3] or [7:0]

References

The references in this section may be used in conjunction with this document.

Note: Broadcom provides customer access to technical documentation and software through its Customer Support Portal (CSP) and Downloads and Support site (see Technical Support).

For Broadcom documents, replace the “xx” in the document number with the largest number available in the repository to ensure that you have the most current version of the document.

Document (or Item) Name	*Number*	*Source*
Broadcom Items		
[1] WICED Smart™ Quick Start Guide	WICED-Smart-QSG2xx-R	WICED Website

Technical Support

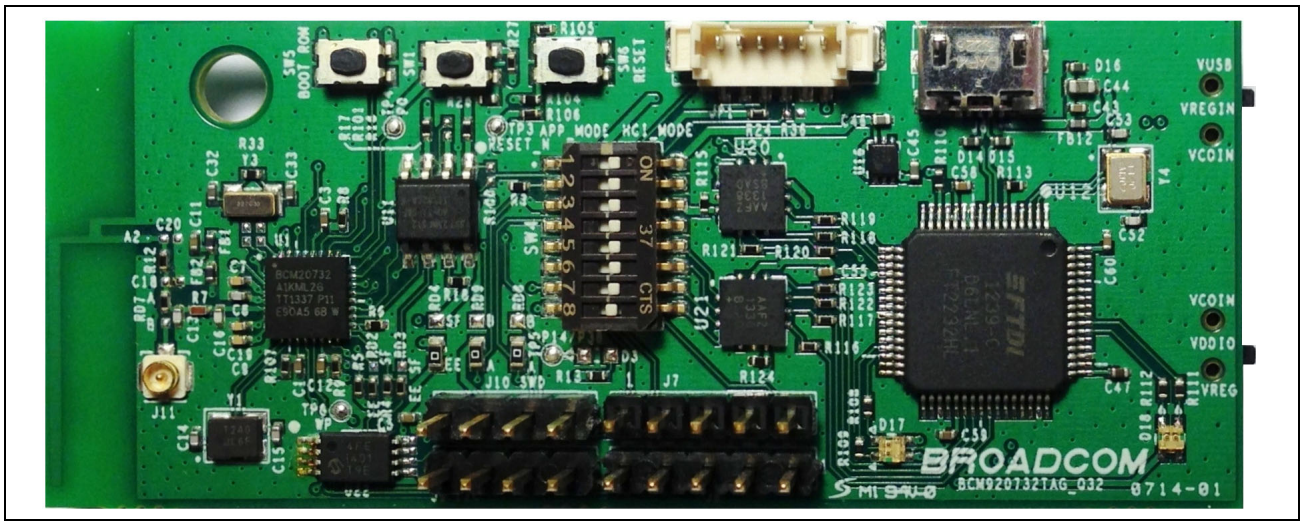
Broadcom provides customer access to a wide range of information, including technical documentation, schematic diagrams, product bill of materials, PCB layout information, and software updates through its customer support portal. For a CSP account, contact your Broadcom Sales or Engineering support representative.

General WICED support is available to registered users in the Broadcom Support Community forum: http://community.broadcom.com/welcome

Product Description

The BCM27036 and BCM20737 are Bluetooth Low Energy (BLE)-compliant, stand-alone baseband processors with integrated 2.4 GHz transceivers. The Broadcom WICED Smart Tag (Figure 1) is an evaluation board that makes various pins on the BCM2073X available for debug, evaluation, and troubleshooting.

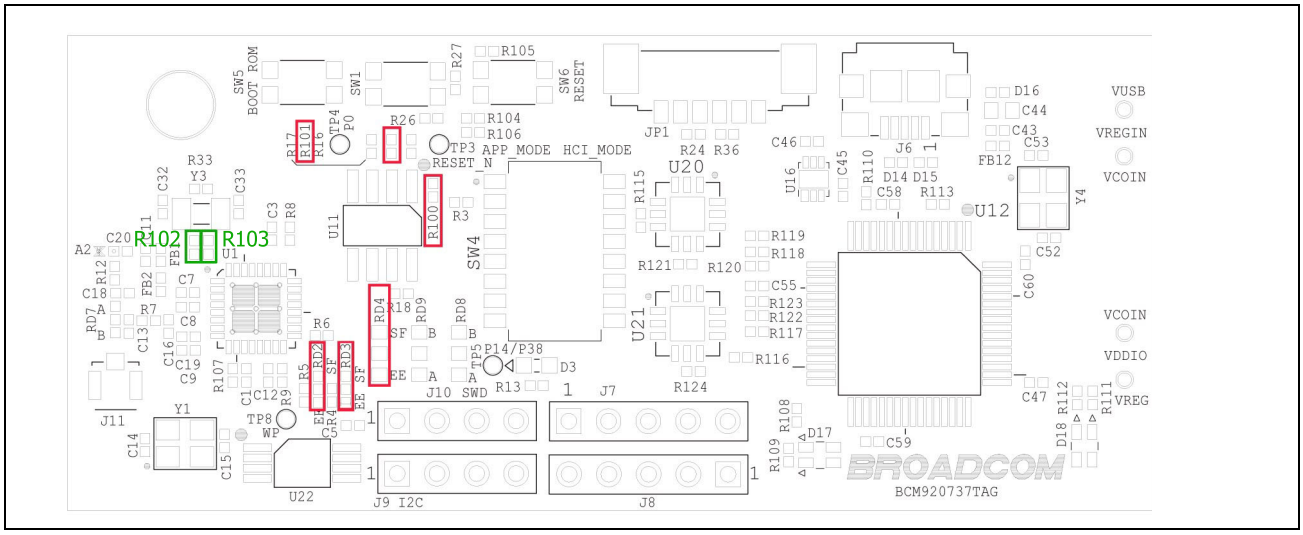
Figure 1: WICED Smart Tag



Board Layout

The Smart Tag evaluation board assembly top view is shown in Figure 2. The resistors for memory selection are highlighted in red.

Figure 2: Board Assembly (Top View)



By default, the board is set to use the internal LPO for sleep, but it can be set to use external LPO by installing R102 and R103, highlighted in Figure 2, above. Resistor values are listed in Table 1, below.

Table 1: Resistor Settings for External 32 KHz Crystal

Resistor	*Internal LPO*	*External LPO*
R102	DNI	0 Ohm
R103	DNI	0 Ohm

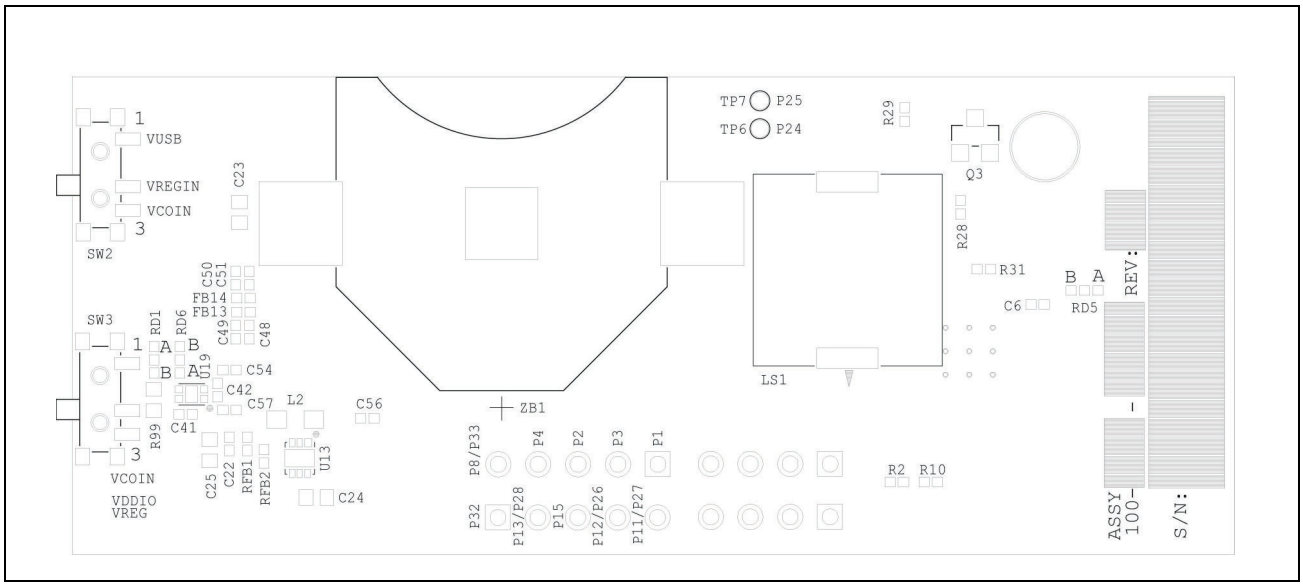
By default, the board is set to use EEPROM but can be set for serial flash by adjusting the resistors highlighted in Figure 2 to the desired setting (shown in Table 2).

Table 2: Resistor Settings for Memory

Resistor	*Serial Flash*	*EEPROM*
RD2	B-C	A-C
RD3	B-C	A-C
RD4	B-C	A-C
R100	Install	DNI
R101	Install	DNI

The Smart Tag evaluation board assembly bottom view is shown in Figure 3.

Figure 3: Board Assembly (Bottom View)



Power-Up Options

VDDIO can be sourced from three options:

- Coin cell unregulated
- Coin cell regulated
- USB regulated

These options are set using **SW2** and **SW3** (see Figure 2 on page 9), as listed in Table 3. The default regulator output is 1.8V.

Table 3: Switch Settings for Power

Switch	*Coin Cell Unregulated*	*Coin Cell Regulated*	*USB Regulated*
SW2	1-2 (VUSB)	2-3 (VCOIN)	1-2 (VUSB)
SW3	2-3 (VCOIN)	1-2 (VREG)	1-2 (VREG)

To adjust the regulator output, feedback components can be adjusted as shown in Table 4.

Table 4: Voltage Regulator Output

VOUT	*Component Values*
3.3V	RFB1=470 kΩ, RFB2=150 kΩ, C22=100 pF
3.0V	RFB1=330 kΩ, RFB2=120 kΩ, C22=150 pF
1.8V	RFB1=300 kΩ, RFB2=240 kΩ, C22=150 pF

UART Boot-Up

The following procedure describes how to power up the tag board with the UART interface enabled.

1. **SW2** and **SW3** should be placed in any desired power configuration, as shown in Table 3.
2. **SW4** should be in HCI mode by placing all eight switches in the ON position.
3. Plug in the USB cable to connector **J6**. The Smart Tag will display in the Windows Device Manager as two COM ports named USB Serial Port.

Note: If the device driver does not load correctly, the FTS2232H driver must be downloaded from the FTDI website (see http://www.ftdichip.com/Drivers/VCP.htm).

The evaluation board can now accept HCI commands or download firmware through the UART interface.

Boot from ROM

The following procedure describes how to boot the Smart Tag board from ROM. This is available if the NVRAM is corrupted and the device is unable to boot correctly.

1. **SW2** and **SW3** should be placed in position 1-2.
2. **SW4** should be in HCI mode by placing all eight switches in the ON position.
3. Press and hold the BOOTt ROM button (**SW5**) and power up the device by plugging in the USB cable to connector **J6**. The BOOT ROM button (**SW5**) can be released after the device is identified in the Windows Device Manager.
   Or
   Press and hold the BOOT ROM button (**SW5**), press and release RESET (**SW6**), release the BOOT ROM button (**SW5**).

The evaluation board can now accept HCI commands or download firmware through the UART interface.

Application Firmware Software Boot-Up

The procedure below describes how to power up the Smart Tag board to run application firmware.

1. **SW2** and **SW3** should be placed in positions 1-2.
2. **SW4** should be in App mode by placing all eight switches in the OFF position.

The Smart Tag is now ready to be run application firmware stored in EEPROM or serial flash, depending on the jumper configuration.

Note: Step 2 is optional. When firmware starts up it tries to detect presence of the UART. If there is no connection firmware will proceed with loading patches from memory even if HCI mode is configured.

Hardware Settings

Configurable Resistor Descriptions

Hardware configuration for the Smart Tag board is defined in Table 5.

Table 5: Configurable Resistor Descriptions

Resistor	*Configuration*	*Description*
RD1	A-C	Connects LDO_IN to VBAT
	B-C	Connects LDO_IN to VDDIO
RD2	A-C	Connects SDA for EEPROM
	B-C	Connects SI for serial flash
RD3	A-C	Connects SCL for EEPROM
	B-C	Connects SCK for serial flash
RD4	A-C	Connects VDDIO to EEPROM VCC
	B-C	Connects VDDIO to serial flash VDD

Connector/Switch Descriptions

Connector/switch descriptions are defined in Table 6.

Table 6: Connector/Switch Descriptions

Connector/Switch	*Description*
SW1	GPIO0 button
SW2	Regulator input from coin cell/USB switch
SW3	VDDIO from coin cell/regulator output switch
SW4	Application mode/HCI_UART mode switch
SW5	EEPROM/SF bypass button
SW6	Hardware reset button
JP1	6-wire UART header
J6	USB connector

Schematics

Figure 4: Baseband and PMU Schematics

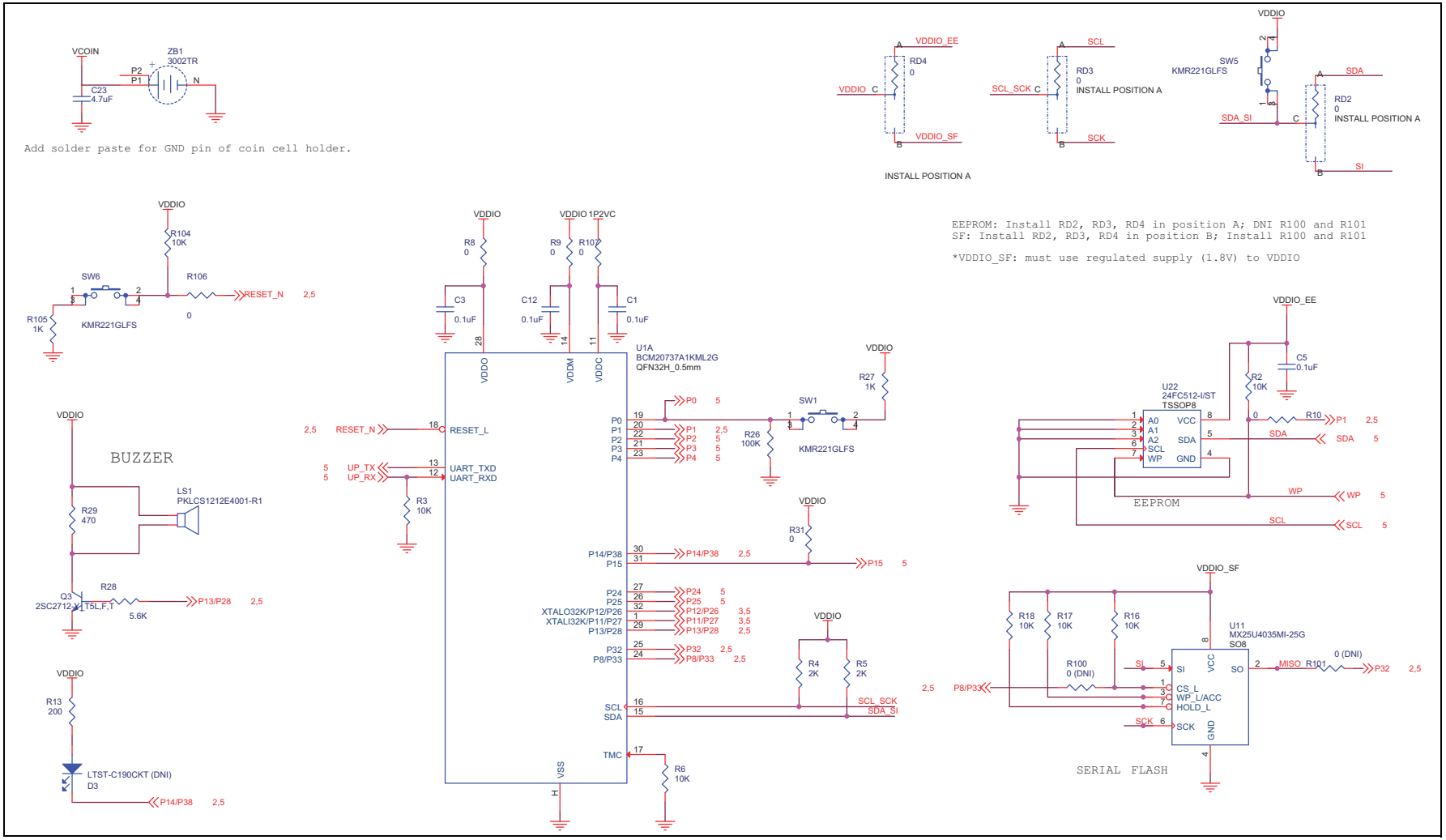


Figure 5: RF Schematics

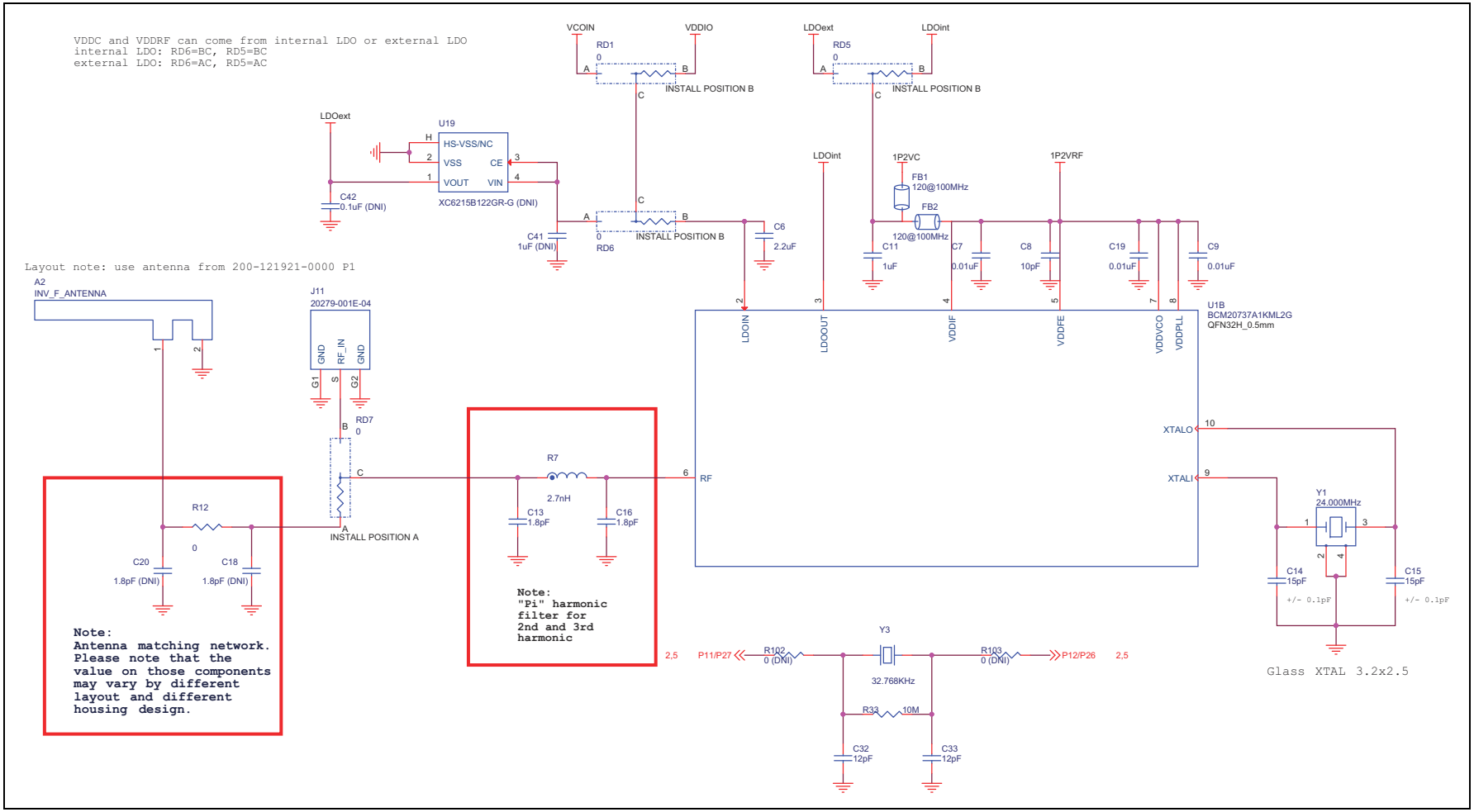


Figure 6: I/O and Interface Schematics

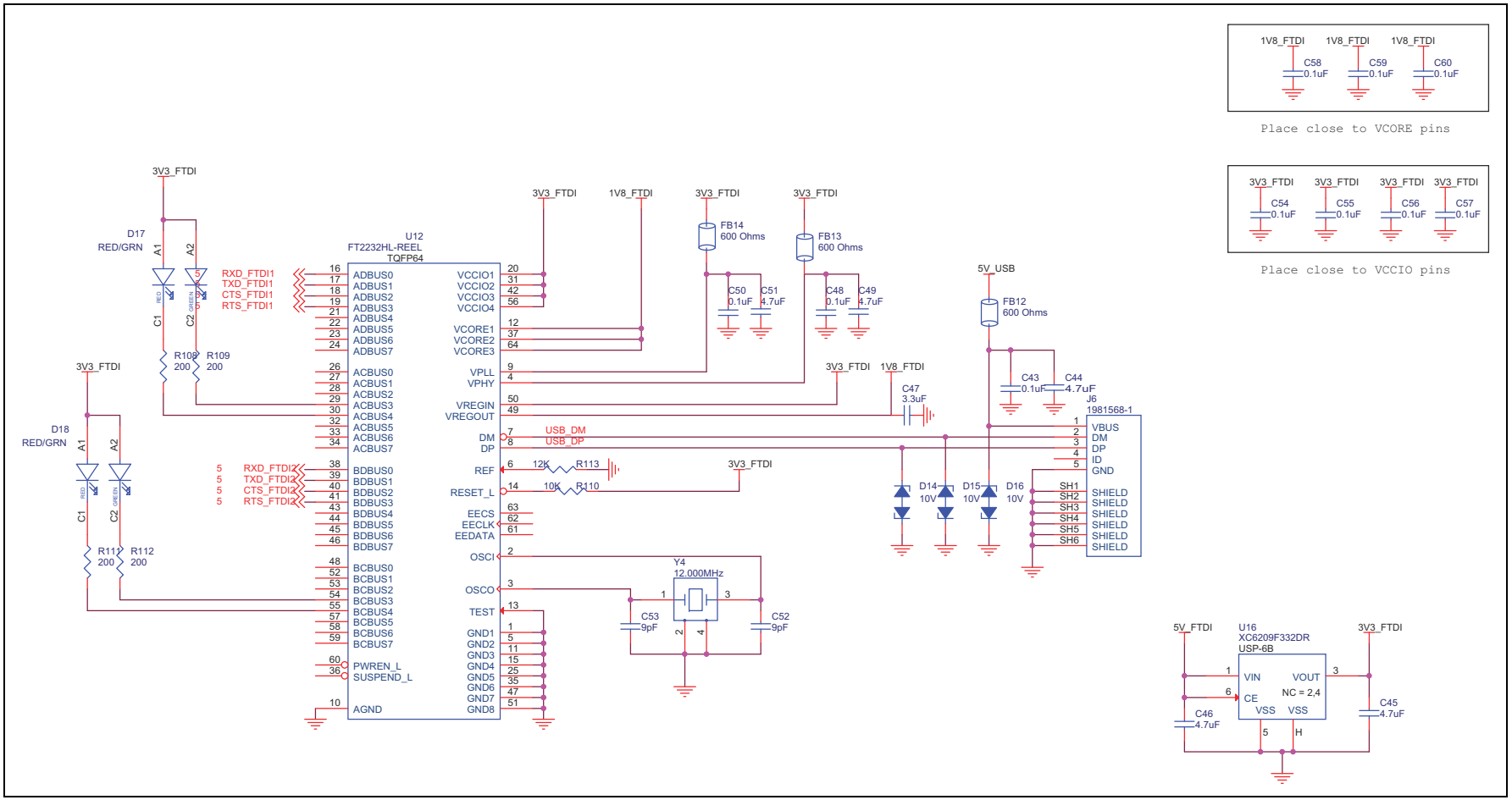
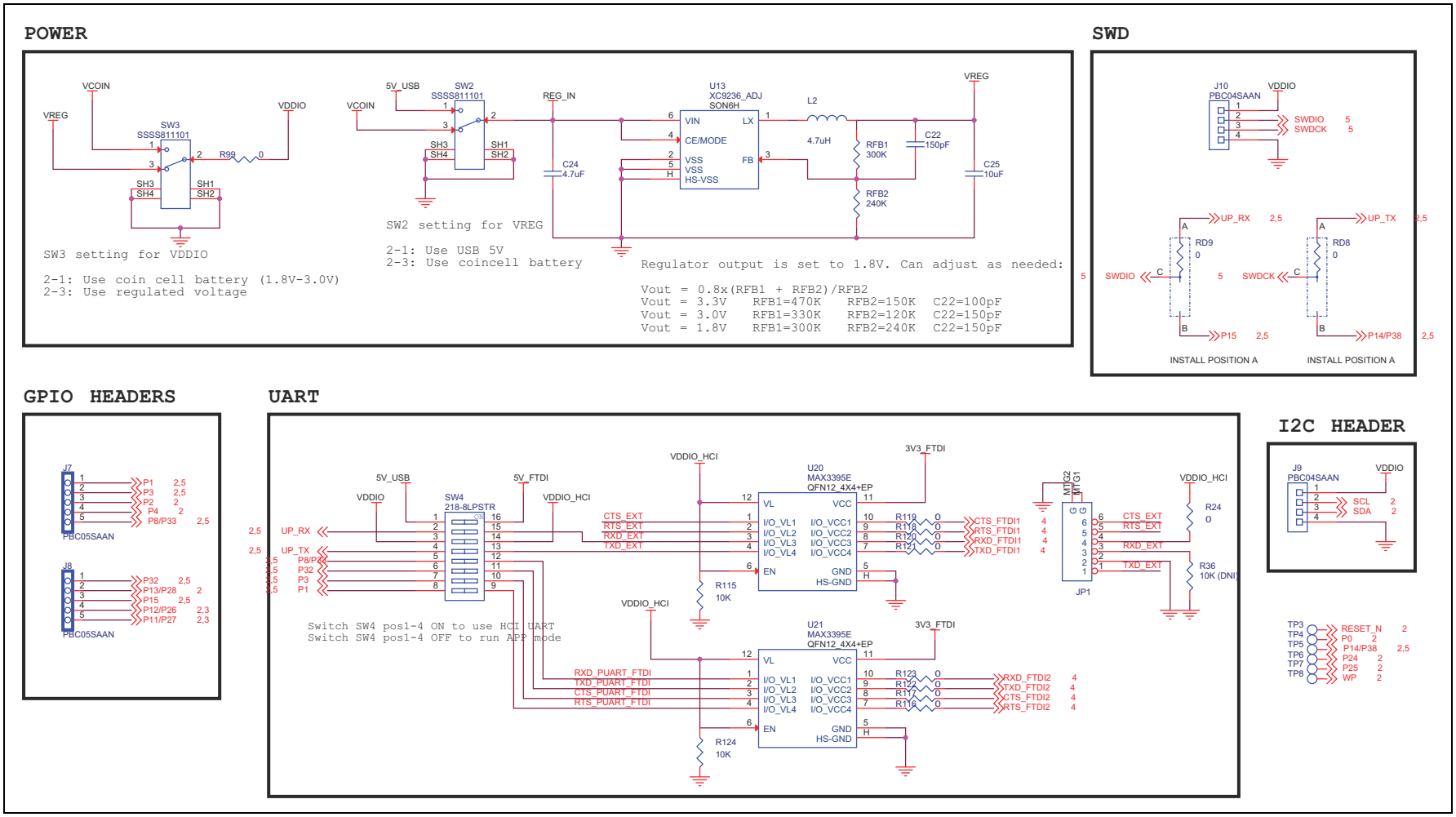


Figure 7: Switches and Headers



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