



ATS282X 开发板使用说明

最新版本：1.0

2015-10-30

1 声 明

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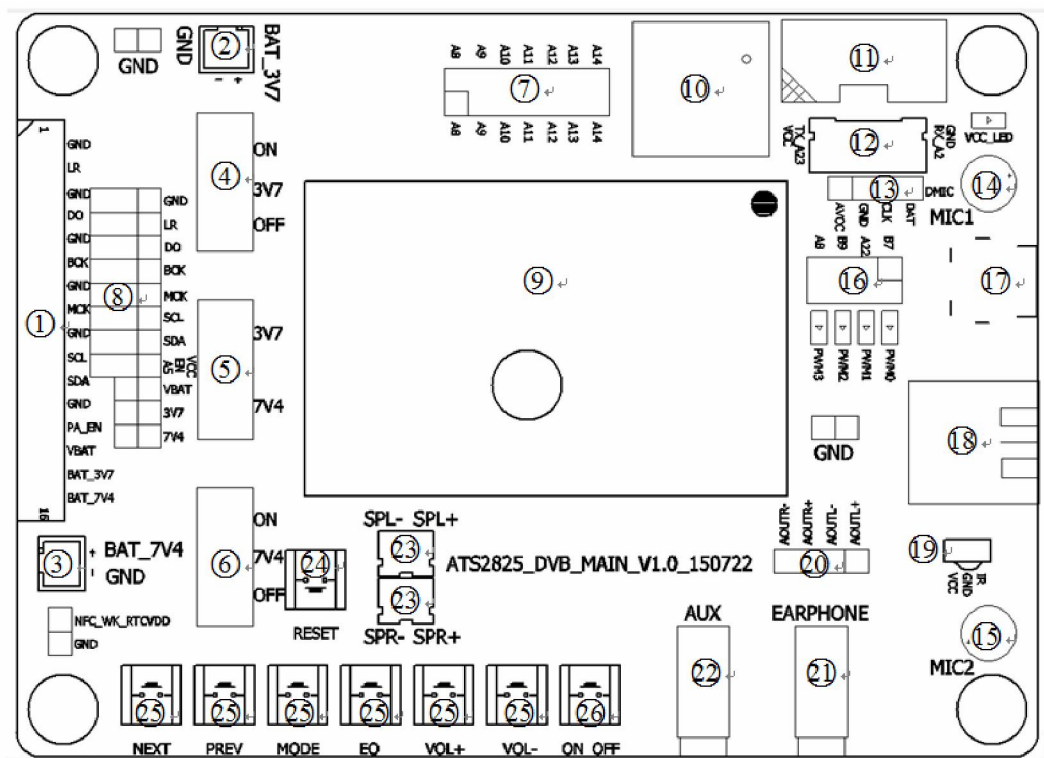
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3 编写目的

- 1 ATS282X 开发板接口概述
- 2 指导客户使用 ATS282X 开发板进行音频指标和功耗测试；

4 ATS282X 开发板接口概述

4.1 ATS282X 开发板主板

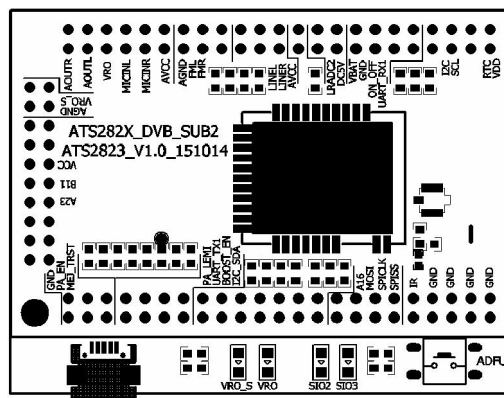


Pinout diagram of the AT292525 SUB1 V1.0_150715 component. The pins are labeled as follows:

- Top Pins (A1-A16):** AOUTR, AOUTL, VRO, MICINL, MICINR, SPOCK, AGND, AUXOL, AUXOR, AUXIL, AUXIR, AVCC, A7, B0, DC5V, VBAT, GND, ON/OFF, A2, A1, AO, MIC, RTC, VDS.
- Bottom Pins (B9-B1):** GND, A5, A21, A6, A23, A22, A15, A14, A13, A12, A11, A10, A9, A8, A16, MCSEL, SPKCLK, SPKSS, B11, GND, GND, GND, GND, GND.
- Left Pins (A17-A20):** VCC, DP, DM, AGND.
- Right Pins (A1-A4):** A1, A2, A3, A4.

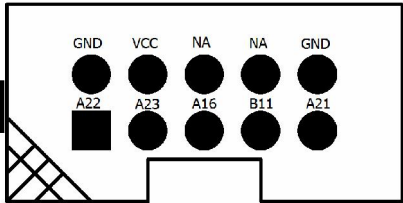
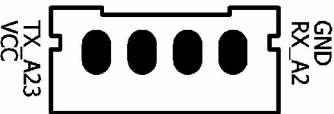
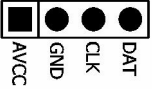
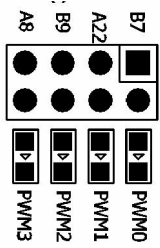
The component is labeled AT292525 SUB1 V1.0_150715.

ATS2825 Module SUB Board



ATS2823 Module SUB Board

NO.	PART	Description																																																							
1	J3	I2S 功放接口, I2S、I2C、POWER 信号到功放																																																							
2	JP1	3.7V 锂电池座																																																							
3	JP13	7.4V 锂电池座																																																							
4	SP1	3.7V 锂电池供电控制开关																																																							
5	SP3	3.7V 锂电池和 7.4V 锂电池供电切换开关																																																							
6	SP2	7.4V 锂电池供电控制开关																																																							
7	UD2	7 PIN 数码管, 也可以用作 GPIO 口, 从左到右依次为 GPIOA8~GPIOA14																																																							
8	JP14 JP2 JP5 JP5 JP6 JP7 JP4 JP8 JP3 JP8 JP3 JP11 JP15 JP16	<table border="1"> <tr> <td>JP14</td><td>● ● ■</td><td>GND</td><td></td><td></td></tr> <tr> <td>JP2</td><td>● ● ■</td><td><i>I2S_LRCLK</i></td><td><i>GPIO_A6</i></td><td>GPIO_A6</td></tr> <tr> <td>JP5</td><td>● ● ■</td><td><i>I2S_DATA</i></td><td><i>GPIO_B7</i></td><td>GPIO_B7</td></tr> <tr> <td>JP6</td><td>● ● ■</td><td><i>I2S_BCLK</i></td><td><i>GPIO_B8</i></td><td>GPIO_B8</td></tr> <tr> <td>JP7</td><td>● ● ■</td><td><i>I2S_MCLK</i></td><td><i>GPIO_B9</i></td><td>GPIO_B9</td></tr> <tr> <td>JP4</td><td>● ● ■</td><td><i>I2C_SCL</i></td><td><i>GPIO_A0</i></td><td>GPIO_A0</td></tr> <tr> <td>JP8</td><td>● ● ■</td><td><i>I2C_SDA</i></td><td><i>GPIO_A1</i></td><td>GPIO_A1</td></tr> <tr> <td>JP3</td><td>● ● ■</td><td>GPIO_A5</td><td>PA_EN</td><td>VCC</td></tr> <tr> <td>JP8</td><td>● ■</td><td></td><td>AMP_POWER</td><td>VBAT</td></tr> <tr> <td>JP3</td><td>● ■</td><td></td><td>AMP_POWER</td><td>3.7V</td></tr> <tr> <td>JP11</td><td>● ■</td><td></td><td>AMP_POWER</td><td>7.4V</td></tr> </table> 以 3.7V 锂电池供电为例, 使用 I2S 功放请按照上图中有加粗体显示的位置进行跳线。	JP14	● ● ■	GND			JP2	● ● ■	<i>I2S_LRCLK</i>	<i>GPIO_A6</i>	GPIO_A6	JP5	● ● ■	<i>I2S_DATA</i>	<i>GPIO_B7</i>	GPIO_B7	JP6	● ● ■	<i>I2S_BCLK</i>	<i>GPIO_B8</i>	GPIO_B8	JP7	● ● ■	<i>I2S_MCLK</i>	<i>GPIO_B9</i>	GPIO_B9	JP4	● ● ■	<i>I2C_SCL</i>	<i>GPIO_A0</i>	GPIO_A0	JP8	● ● ■	<i>I2C_SDA</i>	<i>GPIO_A1</i>	GPIO_A1	JP3	● ● ■	GPIO_A5	PA_EN	VCC	JP8	● ■		AMP_POWER	VBAT	JP3	● ■		AMP_POWER	3.7V	JP11	● ■		AMP_POWER	7.4V
JP14	● ● ■	GND																																																							
JP2	● ● ■	<i>I2S_LRCLK</i>	<i>GPIO_A6</i>	GPIO_A6																																																					
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JP7	● ● ■	<i>I2S_MCLK</i>	<i>GPIO_B9</i>	GPIO_B9																																																					
JP4	● ● ■	<i>I2C_SCL</i>	<i>GPIO_A0</i>	GPIO_A0																																																					
JP8	● ● ■	<i>I2C_SDA</i>	<i>GPIO_A1</i>	GPIO_A1																																																					
JP3	● ● ■	GPIO_A5	PA_EN	VCC																																																					
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JP3	● ■		AMP_POWER	3.7V																																																					
JP11	● ■		AMP_POWER	7.4V																																																					
9	U1	模块子板, 可支持 ATS2825 模块和 ATS2823 模块																																																							

10	UC1	TF 卡，ATS2825 模块支持卡播放，ATS2823 模块仅支持卡升级固件。 <table border="1"> <tr> <th>SD 卡信号线</th><th>ATS2825</th><th>ATS2823</th></tr> <tr> <td>SD_CLK</td><td>GPIOA17</td><td>GPIOB11</td></tr> <tr> <td>SD_CMD</td><td>GPIOA16</td><td>GPIOA16</td></tr> <tr> <td>SD_DATA</td><td>GPIOA20</td><td>GPIOA23</td></tr> </table>	SD 卡信号线	ATS2825	ATS2823	SD_CLK	GPIOA17	GPIOB11	SD_CMD	GPIOA16	GPIOA16	SD_DATA	GPIOA20	GPIOA23
SD 卡信号线	ATS2825	ATS2823												
SD_CLK	GPIOA17	GPIOB11												
SD_CMD	GPIOA16	GPIOA16												
SD_DATA	GPIOA20	GPIOA23												
11	J2	EJTAG 调试接口 												
12	J1	UART 接口  <table border="1"> <tr> <th>UART 信号线</th><th>ATS2825</th><th>ATS2823</th></tr> <tr> <td>UART_RX</td><td>GPIOA2</td><td>GPIOA21/GPIOA16</td></tr> <tr> <td>UART_TX</td><td>GPIOA23</td><td>GPIOA23</td></tr> </table> ATS2823 的 RX 为 GPIOA21 或 GPIOA16，可通过子板上的跳线电阻调整。	UART 信号线	ATS2825	ATS2823	UART_RX	GPIOA2	GPIOA21/GPIOA16	UART_TX	GPIOA23	GPIOA23			
UART 信号线	ATS2825	ATS2823												
UART_RX	GPIOA2	GPIOA21/GPIOA16												
UART_TX	GPIOA23	GPIOA23												
13	JM1	DMIC 接口 												
14	MIC1	用于单 MIC 电路或双 MIC 电路												
15	MIC2	用于双 MIC 电路												
16	UD3	PWM LED 跳线 												
17	JU1	MINI-USB 接口，ATS2825 用作 USB 口，ATS2823 仅用作 DC5V 供电。												

18	JU2	USB-A 接口，ATS2825 支持 U 盘播放，ATS2823 不支持。										
19	UA1	IR 接收头，ATS2823 子板需要设置相应跳线电阻										
20	JE2	音频差分输出接口 AOUTR- ● AOUTR+ ● AOUTL- ● AOUTL+ ■ <table><tr><td>差分信号</td><td>ATS282X</td></tr><tr><td>AOUTL-</td><td>VRO</td></tr><tr><td>AOUTL+</td><td>AOUTL</td></tr><tr><td>AOUTR-</td><td>VRO_S</td></tr><tr><td>AOUTR+</td><td>AOUTR</td></tr></table>	差分信号	ATS282X	AOUTL-	VRO	AOUTL+	AOUTL	AOUTR-	VRO_S	AOUTR+	AOUTR
差分信号	ATS282X											
AOUTL-	VRO											
AOUTL+	AOUTL											
AOUTR-	VRO_S											
AOUTR+	AOUTR											
21	JE1	耳机输出接口，单端非直驱接法，最大输出幅度为 950mVrms。耳机线也作为 FM 天线。										
22	JL1	Audio in 输入接口，最大不失真输入信号幅度为 950mVrms										
23	JS1-2	D 类功放喇叭接口，可接 4 欧姆喇叭										
24	KK11	RTCVDD_ON/OFF 复位按键										
25	KK1-6	ADC 按键 <table><tr><td>ATS2825</td><td>GPIOB0 (LRADC1)</td></tr><tr><td>ATS2823</td><td>GPIOA22 (LRADC2)</td></tr></table>	ATS2825	GPIOB0 (LRADC1)	ATS2823	GPIOA22 (LRADC2)						
ATS2825	GPIOB0 (LRADC1)											
ATS2823	GPIOA22 (LRADC2)											
26	KK12	ON OFF 按键，可复用为 PLAY/PAUSE 按键										

5 音频指标测试注意事项

5.1 测试准备

去掉 RE2，RE2 是接到耳机检测的 GPIO_A23，而 GPIO_A23 是标案默认的打印 GPIO，若不去掉 RE2 则打印的信息可能会干扰音频指标。

默认固件的音频输出幅度为 945mV，此时主控的输出能力比较弱，因此测试时负载电阻请接 10K 欧姆的电阻。如果需要测试直接带 32 或 16 欧姆耳机的音频指标，请修改软件，将 enable_pa 中的 pa_swing 的峰峰值改为 1.6pp。

软件使用标案固件，在测试音频指标时需要在配置项中将 EQ 设置为 BYPASS，且 Precut 要设置为 0dB，这样测试的指标才真实。如果有 EQ 和音效会导致音频指标变差，如失真度大，输出幅度不平衡等。

5.2 测试参考值

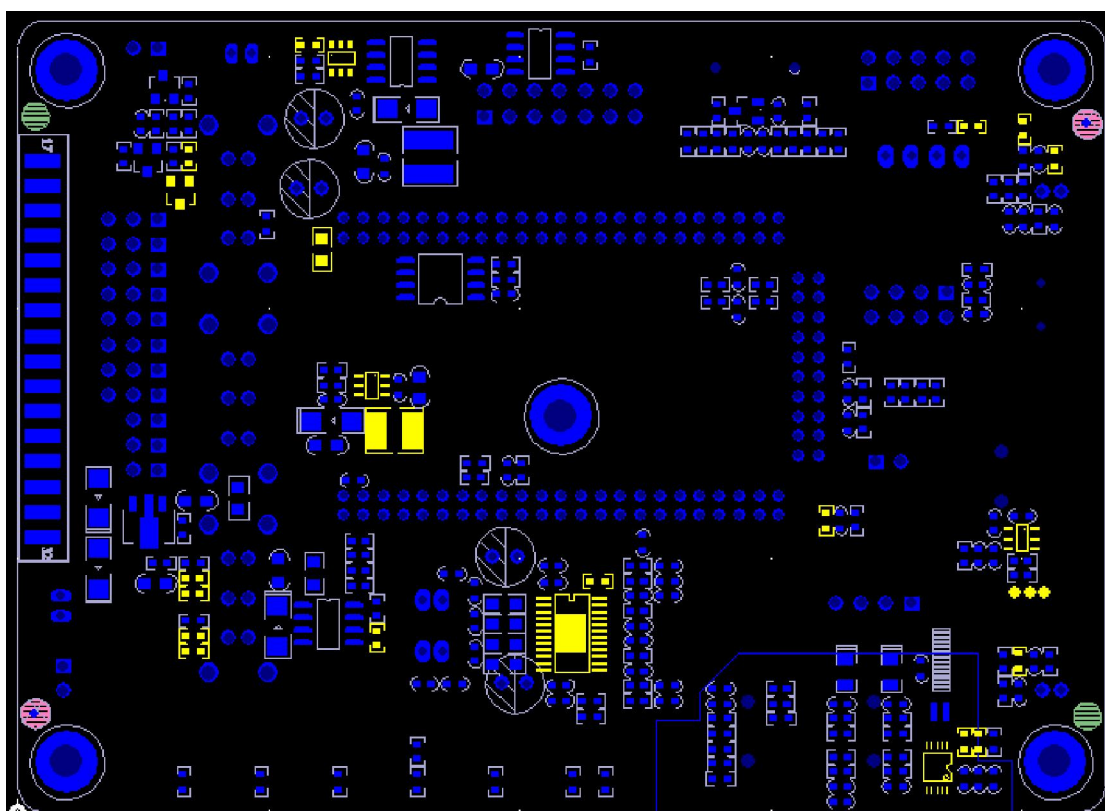
测试条件：				
1. 标案软件+BYPASS+0dB precut				
2. iPhone 手机/TF 卡/AP				
3. 锂电池供电，电压 3.7V				
4. 耳机输出，负载 10K Ω				
5. 不加权				
测试项		测试文件	左声道	右声道
BT	最大输出幅度 (mV)	1KHZ 0dB 正弦波信号	947	952
	失真度 THD+N (%)	1KHZ 0dB 正弦波信号	0.031	0.031
	底噪 Ground Noise (uV)	静音信号	12.3	12.6
	信噪比 SNR (dB)	1KHZ 0dB/静音信号	97.6	97.5
	串音 Crosstalk (dB)	1KHZ 0dB 左声道或右声道信号	92.6	92.6
TF 卡	最大输出幅度 (mV)	1KHZ 0dB 正弦波信号	946	952
	失真度 THD+N (%)	1KHZ 0dB 正弦波信号	0.007	0.007
	底噪 Ground Noise (uV)	静音信号	11.9	11.1
	信噪比 SNR (dB)	1KHZ 0dB/静音信号	97.9	98.6

	串音 Crosstalk (dB)	1KHZ 0dB 左声道或右声道信号	93	93
Line in	最大输出幅度 (mV)	1KHZ 950mVrms 正弦波	862	860
	失真度 THD+N (%)	1KHZ 0dB 正弦波信号	0.031	0.024
	底噪 Ground Noise (uV)	静音信号	40	35
	信噪比 SNR (dB)	1KHZ 950mVrms / 静音信号	86.4	87.6
	串音 Crosstalk (dB)	1KHZ 500mVrms 左声道或右声道信号	65	65

6 功耗测试注意事项

6.1 硬件准备

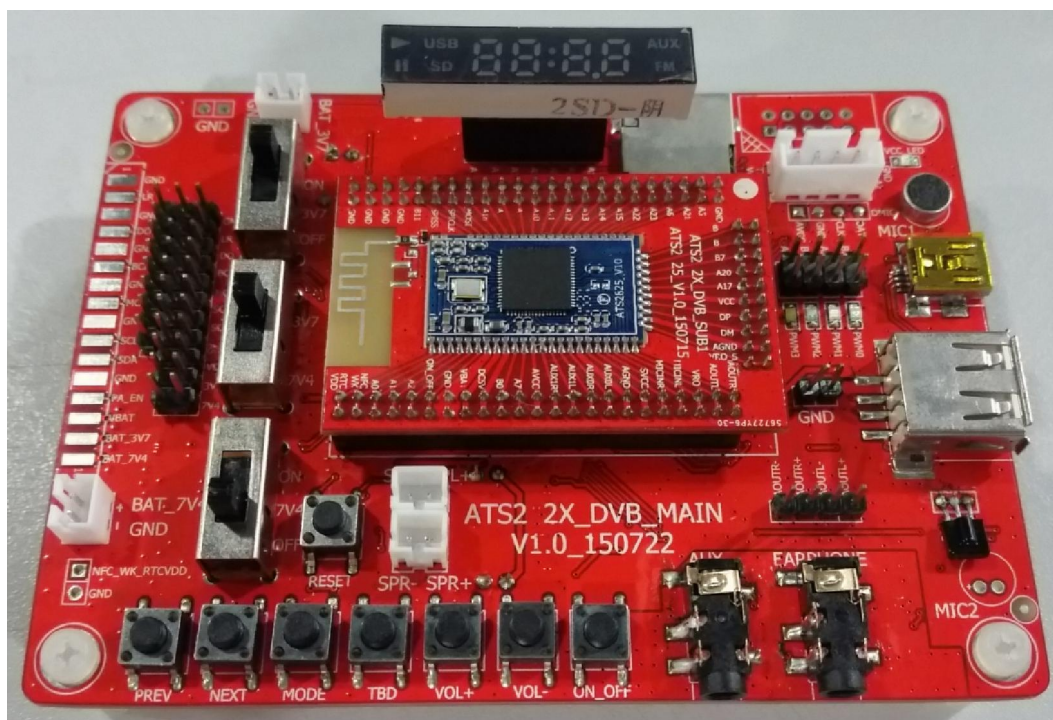
在测试 ATS282X 最小系统功耗时需要排除外围电路的功耗：请去掉 RP6、RP8、RP9、UP3、RP10、RP15、RP2、RP13、LP2、UP6、RP1、RP18、UU1、UA1、RM1、RM5、UT1、BT2、RT1、RT2、US1、RD1、RS1、数码管，QP1 改为 0R（接在 D 极和 S 极），如下图黄色标示的器件为需要去掉的器件。



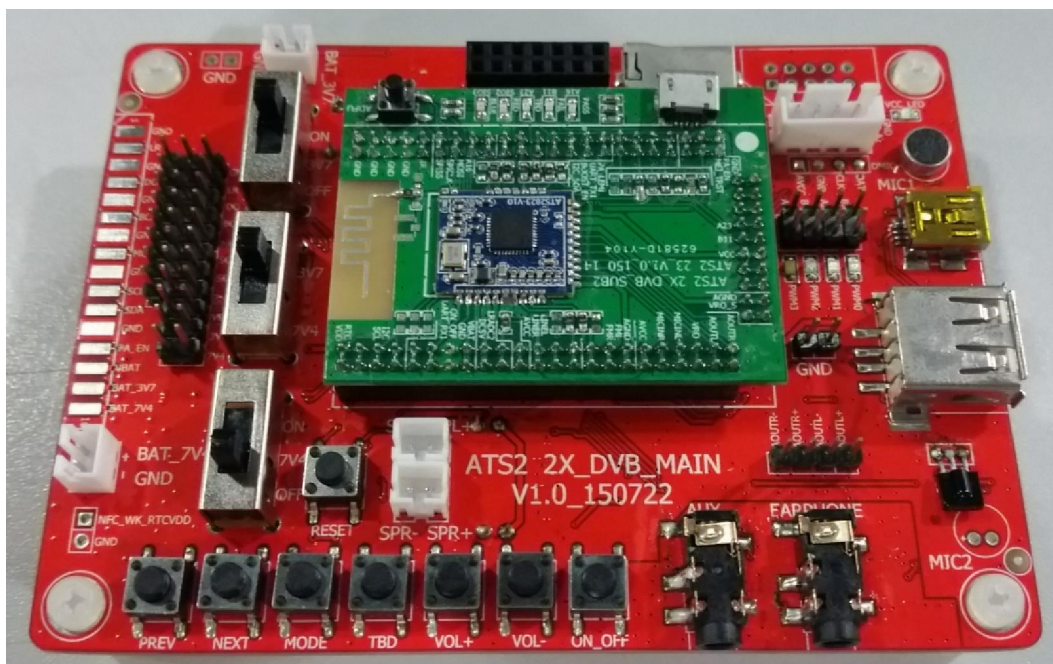
6.2 软件配置

软件要在配置项中将 EQ 设置为 BYPASS，precut 设为 0dB，要关闭 BLE。有条件的话建议使用示波器电流探头测试电流真有效值，更为准确。

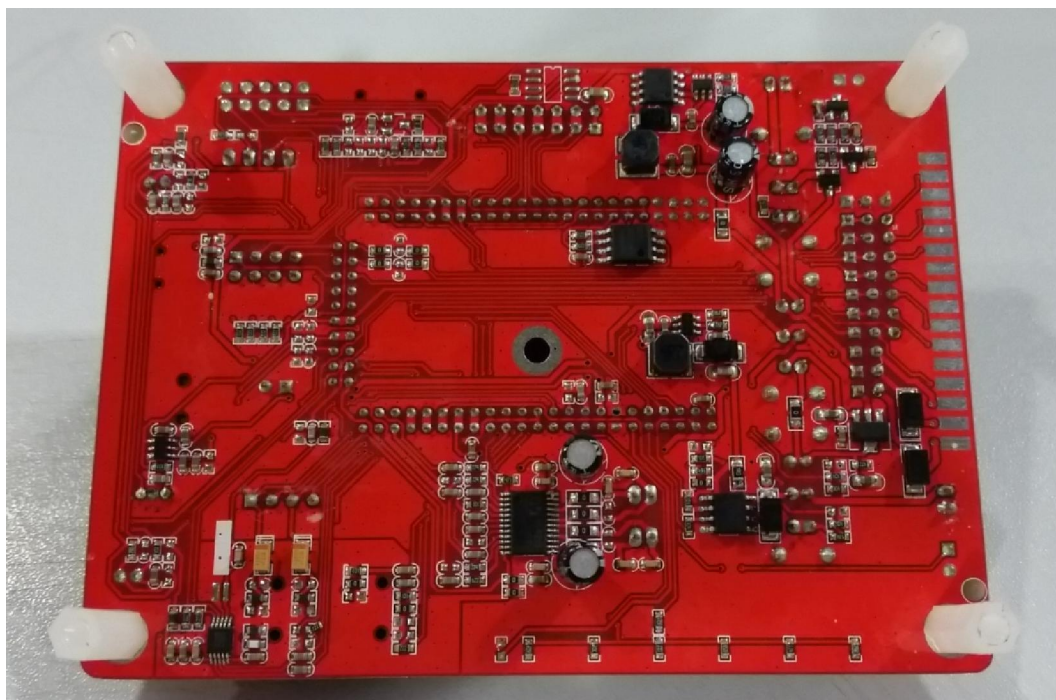
7 开发板外观图



ATS2825 开发板正面图



ATS2823 开发板正面图



ATS282X 开发板背面图

8 版本历史

日期	版本号	注释	作者
2015-10-30	1.0	建立初始版本;	CZG

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