1、首先要确保电脑上已经安装 keil 软件(具体安装方法请查阅百度)

2、选择需要测试的示例,找到以".uvproj"结尾的文件,双击打开工程,如下图所示:

| | | entero_naranare_en | I F OOLI | · [·] [2000 0000 | |
|------------------------------|------------------|--------------------|----------|---------------------|---|
| | | | | | |
| 件夹 | | | | | 1 |
| 名称 | 修改日期 | 类型 | 大小 | | |
| system_stm32f10x.h | 2011-03-10 10:51 | 日文件 | 3 KB | | |
| dest.c | 2018-07-06 20:22 | sourceinsight.c | 11 KB | | |
| d test.h | 2014-02-27 12:11 | H文件 | 2 KB | | |
| TOUCH.map | 2018-07-06 20:21 | Linker Address | 97 KB | | |
| TOUCH.plg | 2014-02-17 21:59 | HTML文档 | 2 KB | | |
| TOUCH.uvgui.Administrator | 2018-07-07 11:00 | ADMINISTRATO | 141 KB | | |
| TOUCH.uvgui.IBM | 2015-04-03 21:15 | IBM 文件 | 139 KB | | |
| DUCH.uvgui_Administrator.bak | 2018-07-06 20:23 | BAK文件 | 140 KB | | |
| TOUCH.uvgui_IBM.bak | 2015-04-02 13:58 | BAK 文件 | 139 KB | | |
| DUCH.uvopt | 2018-07-06 20:23 | UVOPT 文件 | 15 KB | | |
| TOUCH.uvproj < 点击打开工程 | 2018-07-06 19:24 | 礦ision4 Project | 19 KB | | |
| DUCH_Target 1.dep | 2018-07-06 20:21 | DEP 文件 | 36 KB | | |
| TOUCH_uvopt.bak | 2018-07-06 19:24 | BAK 文件 | 16 KB | | |
| TOUCH_uvproj.bak | 2017-12-13 14:20 | BAK 文件 | 19 KB | | |

3、打开工程后,进行工程编译,点击编译按钮进行工程编译,如果出现"FromELF: creating

hex file..."提示,则表示编译成功,如下图所示:

| E:\project\3.2inch\QDtech_3.2inch_ILI | 9341_SPI_V1.0\2-STM32测试程序\STM32_Demo_STM32F103RCT6_Hardwar 😑 😐 | X |
|--|---|----------|
| File Edit View Project Flash Debug F | eripherals Tools SVCS Window Help | |
| □ 28 ■ 8 3 4 28 9 8 4 4 | 陀 隐 隐 微 讓 課 /// /版 🙋 delay_ms 💿 🗟 🦑 🔍 🔵 📀 🔗 🐽 🔚 | - 3 |
| 🤒 🖾 🕎 🥔 📇 🗱 Target 1 | 💌 添 🛔 🗟 🗇 🍘 | |
| Project 日本编译 早 🖬 | i main.c | ▼ × |
| □-⇒ Target 1 □-⇒ USER □-⇒ USER □-⇒ test.c □-⇒ GULc □-⇒ delay.c □-⇒ system_stm32f10x.c □-⇒ HARDWARE □-⇒ key.c □-⇒ lcd.c □-⇒ lcd.c □-⇒ lcd.c □-⇒ lcd.c | 36 //SDI(MOSI)接PB15 //SPI总线写数据 37 //SCK接PB13 //SPI总线时钟信号 38 //LED接PB9 //背光控制信号(高电平点亮)如男 39 //SDO(MISO)接PB14 /SPI总线时钟信号 40 | |
| Build Output | | 4 |
| <pre>compiling stm32fl0x_usart.c linking Program Size: Code=18374 RO-data=885 FromELF: creating hex file "\OBJ\TOUCH.axf" - 0 Error(s), 0 W {</pre> | 4 RW-data=112 ZI-data=1648 arning(s). | * * |
| | * JLink Info: ETM fitted. J-LINK / J-TRA | CE Cc |

- 4、设置 JTAG,步骤如下:(如果已经设置好,则不要设置)
 - A、将 JTAG 连接电脑和开发板,点击魔法棒图标->Debug->下拉菜单选择
 J-LINK/J-TRACE Cortex,如下图所示:

| E:\project\3.2inch\QDtech | _3.2inch_ILI9341_SPI_V1.0\2-STM32测试程序\STM32_Dem | o_STM32F103RCT6_Hardware_SPI\USER\TOUCH.uvproj - µ ¹ | Vision 🗖 🖾 |
|------------------------------|---|--|------------|
| File Edit View Project Flash | Debug Peripherals Tools SVCS Window Help | | |
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| 🥹 🖽 🕮 🥔 🖽 🗱 Targe | 1 💽 🔊 🛔 🗟 🔶 ớ 🌚 | | |
| roject | 7 🖻 主 main.c | | ▼ × |
| - 🔄 Target 1 | Options for Target 'Target 1' | X | <u> </u> |
| □- 🔂 USER □- 🔠 main.c | Device Target Output Listing User C/C++ Ass | Linker Debug Utilities | VCC常亮 |
| ⊞- 🗄 test.c | C Use Simulator Settings | © Use: J-LINK / J-TRACE Cortex 		 Settings | |
| ⊕ 🖹 GUI.c ⊕ 🖹 delav.c | Limit Speed to Real-Time | Ŷ | |
| ⊕– 🖹 system_stm32f1 | I Load Application at Startup | 下拉菜单选择 ▼ Load Application at Startup ▼ Run to main() | |
| HARDWARE | Initialization File: | Initialization File: | |
| ⊞– la lcd.c | Edit | Edit | |
| ⊞– 🗄 myiic.c | Restore Debug Session Settings | Restore Debug Session Settings | Ξ |
| ⊞- 🟦 24cxx.c | Image: Figure 3 Image: Fi | Image: wide of the set of the s | ***** |
| Touch.c | Watch Windows & Performance Analyzer | Vatch Windows | |
| ⊞- 📴 FWLib | V Memory Display V System Viewer | Viewory Display | |
| | CPU DLL Parameter | Driver DLL: Parameter | - |
| Project 🕜 Books { } Funct. | SARMCM3.DLL -REMAP | SARMCM3.DLL | P |
| uild Output | 1 1 | | † 🖬 |
| | Dialog DI Li Baramatar | Dislas DU : Bormatar | * |
| | DCM.DLL -pCM3 | TCM.DLL -pCM3 | |
| | | | |

B、点击 Settings,将 ort 设置为 SW,Max 设置为 2MHz,如下图所示:

| E:\project\3.2inch\QDtech | _3.2inch_ILI9341_SPI_V1.0\2-STM32测试程序\STM32_Demo_STM32F103RCT6_Hardware_SPI\USER\TOUCH.uvproj - μ | Vision 😐 🖾 |
|------------------------------|---|------------|
| File Edit View Project Flash | n Debug Peripherals Tools SVCS Window Help | / |
| 000000 | * (*) (*) (*) (*) (*) (*) (*) (* | |
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| Project | 4 🔟 🖹 main.c | ▼ × |
| E-Target 1 | 🕅 Options for Target 'Target 1' | 1 |
| e-⊡ USER | Device Target Output Listing User C/C++ Asm Linker Debug Utilities | vcc常亮 |
| e-∄ test.c | C Use Simulator Settings € Use: J-LINK/J-TRACE Contex ▼ Settings | |
| ⊕ 🖆 delay.c | Limit Speed to Real-Time | |
| ⊞– 🗄 system_stm32f1 | Cortex JLink/JTrace Target Driver Setup | |
| 🖻 🔄 HARDWARE | Debug Trace Flash Download | |
| E lcd.c | J-Link / J-Trace Adapter | |
| ı myiic.c | SN: 308621590 IDCODE Device Name Nove | = |
| ⊞- 🗄 24cxx.c | Device: J-Link ARM SWDI(👁 0x1BA0 ARM CoreSight SW-DP Up | ***** |
| E- i touch.c | HW: V8.00 dll V4.80g | |
| E FWLib | FW : J-Link ARM V8 compiled P | |
| | ort: Nax @ Automatic Detectic ID CODE: | |
| Project Books { Funct. | ST ZARZ V ARMAN CONFIGURATI DEVICE Rare; | |
| Build Output | Auto CIk Add Delete opdate ik ien: | 4 |
| | | A |
| | Connect: Normal | |
| 1 | Recet after Conn. | |

- 5、设置 flash,步骤如下:(如果已经设置好,则不要设置)
- A、先选择单片机型号,点击魔法棒图标->Device->选择 STM32F103RC 单片机型号,如下图所示:

| E:\project\3.2inch\QDtech_3.2inch_ILIS |)341_SPI_V1.0\2-STM32测试程序\STM32_Demo_STM32F103RCT6_Hardware_SPI\USER\TOUCH.uvproj - µVision 🕒 💷 🐰 |
|--|--|
| File Edit View Project Flash Debug Po | aripherals Tools SVCS Window Help |
| □ | ● 28 28 津 津 // // / 29 delay_ms • Q ● ○ ◇ 28 回 ● ▲ |
| Project 🛛 🕫 🖬 | 🗄 main.c 🔻 🗙 |
| B → Target 1 B → SER B → B main.c | Options for Target 'Target 1' Device Target Output Listing User C/C++ Asm Linker Debug Utilities |
| B - B test.c B - B delay.c B - B delay.c B - B delay.c B - B key.c B key.c B - B key.c B key.c | Device Database Vendor: STMicroelectronics Device: STM32F103RC Toolset: ARM Search: StM32F103RC STM32F103RG STM32F103RF STM32F103RG STM32F103RF -LCD parallel interface, 8080/6800 modes -5 Wholerant I/0a |

B、再选择 flash 型号,点击 Utilities->Settings->Add->选择 STM32F10x High-density

Flash->Add,如下图所示:

| ile Edit View Project Flash Debug Peripherals Tools SVCS Wind | w Help |
|---|---|
| ● 2 2 2 3 4 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 | 🤅 🌁 delay_ms 💽 🗟 🛷 🍳 😐 🔗 🎄 💷 🔹 |
| oject | · · · |
| Options for Target 'Target 1' | |
| Device Target Output Listing User C/C++ Asm Link Configure Flash Menu Command © Use Target Driver for Flash Programming | rr Debug Utilities E) 如果不需要控制可接VCC常完 按 ▼ Use Debug Driver |
| Use Debug Driver Settings | Add Flash Programming Algorithm |
| Debug Trace Flash Download Download Function C Erass Evall Cl @ Program @ Erass Sectors @ Verify C Do not Erase @ Reset and Run | Description Tristh Size Device Type Origin Each Device Family Package STM32F10xHigh-density |
| Programming Algorithm Description Device Size Device Type STMS2F10x High-dens 512k On-chip Flash | 08 |
| :art: | d\Keii_v5\ARM PACK Keil STM32F1xx_DFP\1.0.4 Flash\STM32F10x_512.FLM |
| Add Renove | Add Cancel |

6、将 JTAG 和 flash 都设置好后,就可以进行程序下载了。进行程序下载,点击下载按钮, 下载 hex 文件到开发板,如果出现"Programming Done. Verify OK."提示,则表示下 载成功,如下图所示:

| E:\project\3.2inch\QDtech_3.2inch_I | I9341_SPI_V1.0\2-STM32测试程序\STM32_Demo_STM32F103RCT6_Hardwar 😑 😐 | X |
|--|---|-----------|
| ile Edit View Project Flash Debug | Peripherals Tools SVCS Window Help | |
| 🗋 🗃 🖬 🕼 🕹 🖏 🖏 🖛 🕬 | 🔹 🥐 🥂 🐘 🗊 津 川川 🖉 delay_ms 💿 🗟 🌮 🔍 🌢 🔹 🔗 🎊 | - 3 |
| 🥸 🆽 🥔 🛃 🗱 Target 1 | 💌 🔊 🛔 🕾 🗇 🍘 | |
| roject 🔐 中 🖬 | 🖹 main.c | ▼× |
| Target 1 | 36 //SDI (MOSI) 接PB15 //SPI总线写数据 37 //SCK 接PB13 /SPI总线时钟信号 38 //LED 接PB9 /背光控制信号(高电平点亮)如果 39 //SDO (MISO) 接PB14 /SPI读信号如无需读取可不接 40 41 //=================================== | |
| Project Books {} Funct. 0. Temp. | | P. |
| uild Output | | д |
| ase Done. :ogramming Done. rrify OK. pplication running | | * |
| | * JLink Info: ETM fitted. J-LINK / J-TRA | CEC |

7、程序下载成功后,如果模块没有任何反应,则需要按 reset 键才能正常运行,如果想要 程序下载成功后自动运行,需要按如下设置:

点击魔法棒图标->Utilities->Settings->勾选 Reset and run,如下图所示:

| 😨 E:\project\3.2inch\QDtech_3.2inch_ILI9341_SPI_V1.0\2-STM32测试程序\STM32_Demo_STM32F103RCT6_Hardware_SPI\USER\T | |
|--|----------------|
| File Edit View Project Flash Debug Peripherals Tools SVCS Window Help | |
| 🗋 🐸 🖬 🎒 あ 塩 🕲 タ P タ P タ キ 陀 御 御 御 淳 津 川川川 🐸 delay_ms 🛛 🔽 🗟 🌌 🍭 🕢 🔍 🍕 💷 🔦 | |
| 🕹 🖽 🥥 🗟 🛱 Target 1 🔽 🔽 💰 着 📚 🐡 🃾 | |
| Project 🕈 🖬 🔛 main.c | ▼ × |
| E Target 1 Options for Target 'Target 1' | - |
| B - S USER B - S ma Device Target Output Listing User C/C++ Asm Linker Debug Utilities B - S tes Configure Flash Menu Command | 要控制可 |
| B → ☐ GU GU G Use Target Driver for Flash Programming G Use Debug Driver G Sys G → ∐ ARD G Use Target Defore Debugging | |
| E ■ key Cortex JLink/JTrace Target Driver Setup E ■ Icd Debug Trace Flash Download | = |
| ⊕-≦ 24c Download Function ⊕-≦ tou C Erase Full Cl ✓ Program ⊕-⊆ CORE € Erase Sector: ✓ Verify ⊕ FWLib C Do not Erase ✓ Reset and Run | ****** |
| Programming Algorithm Programming Algorithm Description Device Size Device Type Address Range SIM32F10x High-dens 512k On-chip Flash 08000000H - 0807FFFFH | + + # 12 |
| Erase Done. Programming Do Verify OK. Application ru | |

8、模块如果正常显示字符和图形,则说明程序运行成功

注意事项:

1、下载程序时,如果出现如下错误,则说明 JTAG 设置不正确,请按照操作说明步骤 4 进行设置:

| No Cortex-M SW Device Found |
|-----------------------------|
| 确定 |
| JTAG已连上电脑,但没有连上开发板 |
| |

2、如果出现如下错误,则说明 flash 设置不正确,请按照操作说明步骤 5 进行设置:

| Vision | | X |
|--------|--------------------------------|-------------|
| Â | Error: Flash Download failed - | "Cortex-M3" |
| | | 确定 |