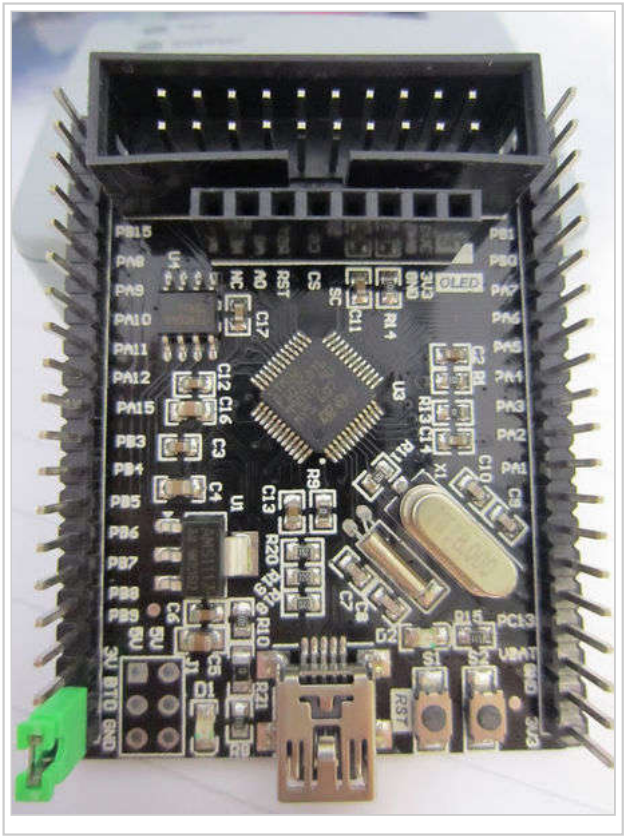
STM32 Smart V2.0

From STM32duino wiki



Level of support	Good
Bootloader	Probably works untested [1] (https://github.com/rogerclarkmelbourne/STM32duino-bootloader/raw/master/STM32F1/binaries/generic_boot20_pc13.bin)
Flash	64KB (128Kb in user testing)
RAM	20KB
User LED(s)	PC13 (lights when is LOW)
User button(s)	One (PA0 - pulled directly to GND when pressed)
RTC Crystal	Yes
ST-Link header	Jtag style
OLED connector	Wired to SPI2
Schematic	media:STM32_Smart_Schematics.pdf
Manufacturer data	UNKNOWN

Contents

General information

This board seems to be made by an as yet unidentified Chinese manufacturer.

If you know the website for this company, please PM me Andy Hull(ahull), or update the wiki with this information.

The board has 1 mini USB connector.

It may be possible to use the stm32flash binary to trigger the DTR and RTS lines in the correct order for the STM32 to be put into serial bootloader mode, but this has not been tested and currently the core doesn't specify any DTR or RTS values as part of the upload

It is also possible to install the bootloader. LED is on PC13. Tested with...
st-flash write ./generic_boot20_pc13.bin 0x08000000
.. although new version may need to be compiled to use the button on this board.

Hardware installation

No hardware modifications are required in normal operation, removing R9 or replacing it with a diode might be prudent, see Known Issues below.

Software installation

Bootloader needs to be flashed using USB to Serial or ST-Link (SWD) See Flashing the bootloader

Follow the normal Installation guide

Where to buy

Available on ebay and Ali from various sellers, but the one pictured was a pot luck purchase. If you want one, you will need to search for STM32F103C8T6 ARM STM32 Minimum System Learning Evaluation Development Board Module OLED, or STM32 Smart board or similar.
NOTE, it is often listed as "ARM STM32 Minimum System Board STM32F103RCT6/RBT6 C51 AVR Development Board", but this is clearly wrong, as the processor is only a 48 pin STM32F103C8T6 or CBT6

Additional notes

Has very green eyes :~)

Features

- ARM Cortex M3
- 72Mhz
- 64k Flash†
- 20k RAM
- Reset button
- User Button (Pulls PA0 to GND when pressed, no current limiting resistor)
- Power LED (a pleasant soft green colour)
- 1 User LED on PC13 (also soft green colour). Lit when PC13 is pulled LOW. Current limiting resistor (510 Ohns) is R15
- 32khz RTC clock crystal is present
- RTC Battery pin is broken out on the header pins. WARNING This is tied to 3v3 via zero Ohm resistor R9

```
    Remove R9 if using an external RTC battery.
```

- AMS1117 3v3 voltage regulator

Pins.

- 20 pin 0.1"(2.54mm) JTag style connector for SWD (pinout is shown in images below).
- 8 pin 0.1" (socket) header in the middle of the board for 0.96" OLED SWD (pinout is shown in images below).
- Two single rows of 20 x 0.1"(2.54mm) pins for GPIO etc one on each of the long edges of the board (pinout is shown in images below).
- Unpopulated 6 pin 0.1" header (3 x 2 pins each of 3v3, Gnd, 5V).

Other Features

- 24c04 2 wire EEROM 512 byte (4K bits) - on PB6 (I2C_SDA) and PB7 (I2C_SCL) - Address lines A0,A1,A2 and WP are tied to GND

```
            NOTE: This will restrict use of PB6 and PB7 for other purposes.
```

The 24c04 can be accessed with the stm32duino Wire library.

More details can be found here. http://stm32duino.com/viewtopic.php?f=28&t=1432&p=20537#p20537 In effect the 24c04 can be treated as two 256 byte eeroms on addresses 50 and 51.

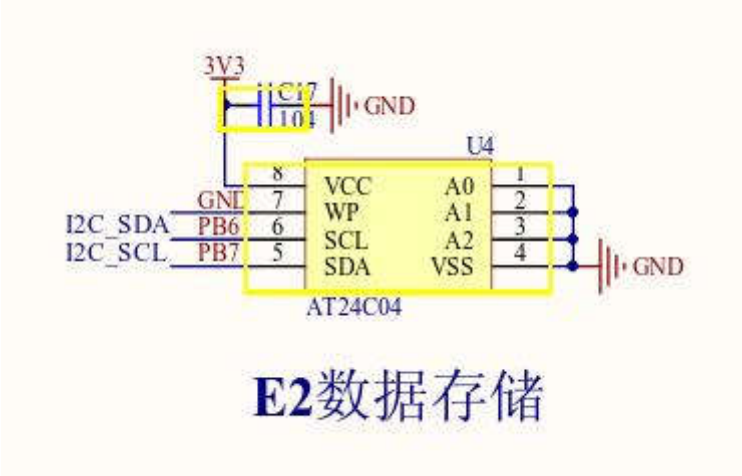
The 24c04 on my board contained the following data from the manufacturer.

```
Scanning...
I2C device found at address 0x50
-- : 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00 : 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F  -
10 : 40 1F 41 1F EE 02 16 17 18 19 1A 1B 1C 1D 1E 1F  -
20 : FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  -
.....
```

```
F0 : FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  -
.....
```

Note: There is also a usable EEPROM emulation library that uses some pages of FLASH on the STM32F103 The STM32F10XX flash EEPROM emulation library is included with the stm32duino libraries, along with a working example.

If you have data that changes relatively frequently or need all of the flash for other purposes then the 24c04 eerom is a better bet than flash.



Also worth noting is that there are no pullup resistors fitted for the 24c04 so you will need to add those. Presumably these have been omitted to allow PB6 and PB7 to be used for other purposes. These two pullups go between PB6 and 3V3 and PB7 and 3V3. I used 10k and these worked fine.

Note: if you don't fancy soldering resistors to your board you can simply add them with Du Pont wires as per this picture. The speed of the 2wire bus is sufficiently slow that I managed to get away with 20 cm wires, but keep the leads as short as possible to avoid interference (noise, reflections etc) caused by the cables.


10K pullup resistors

TI have a good reference for calculating the value of the i2c pullup resistors -> http://www.ti.com/lit/an/slva689/slva689.pdf

(1k or 4k7 would probably work just as well, 2 wire and i2c are relatively low speed, so this value is probably not critical).

The datasheet for the 24C04 (Atmel) is here - http://www.atmel.com/Images/doc0180.pdf

Known issues

This board is missing the Maple style USB reset circuitry, but the STM32F10X NRST line is broken out to the JTAG header and the OLED connector, so remote reset is possible.
The OLED interface differs from many of the cheap OLED boards on ebay, so check carefully before inserting your OLED board.
Pay particular attention to the VCC and GND pins, many of the OLED boards have them the other way round.

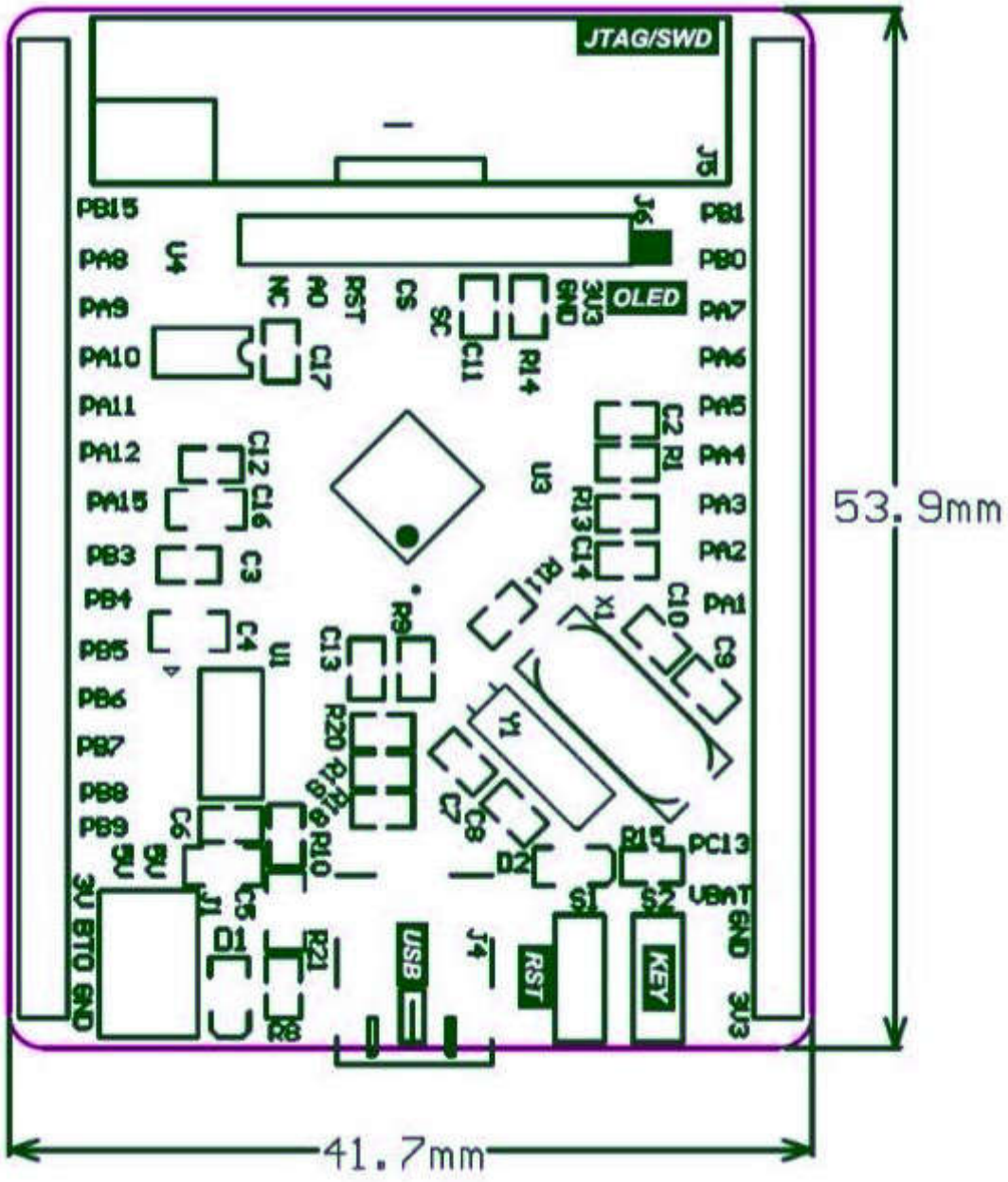
Using the wrong OLED board may destroy both the OLED board and the regulator on the STM board.
R9 ties VBAT to 3v3 Remove this when adding an RTC battery or the battery may explode.[2]
(http://stm32duino.com/viewtopic.php?t=22&start=10#p1558)

Other images

Rear view

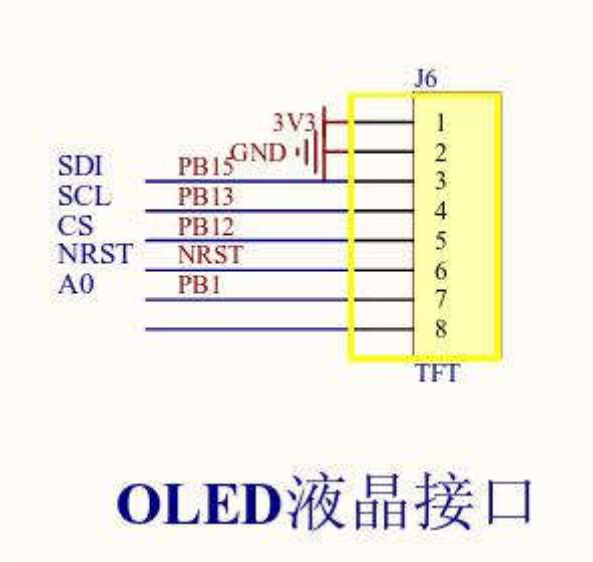
Rear with pin numbers on silkscreen

Component Layout



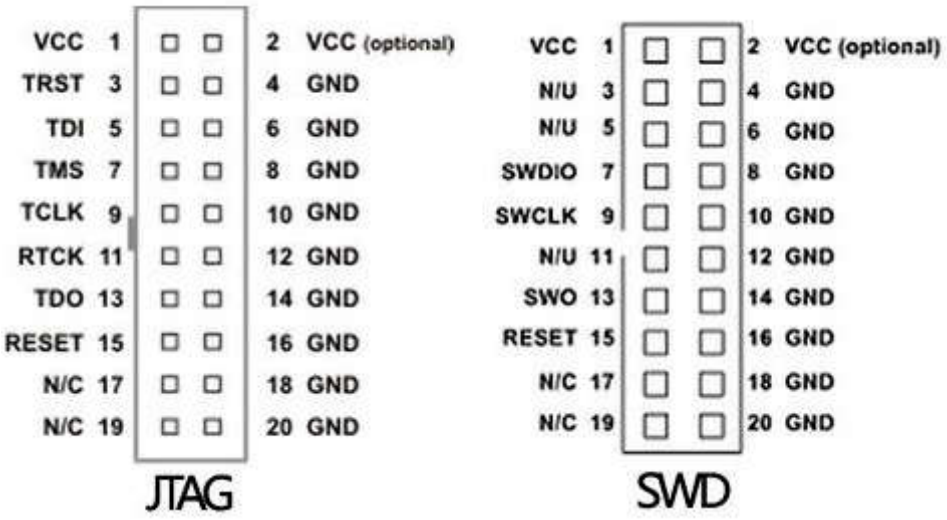
OLED Interface.

1	3v3
2	Gnd
3	PB15
4	PB13
5	PB12
6	RST
7	PB1
8	N.C.



Pins number right to left looking at front with the 20 pin connector above, or left to right looking at the rear
Pin 1 has the square pad (looking at rear) and is adjacent to the J6 lettering on the silkscreen if looking at the front of the board.

JTAG



ST-Link (SWD) and JTAG pinout for 20 pin header looking in to pins.

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