STM32F4x1Cx Black pill

Hardware Wiring Diagram

1. Title Block

2. Version History

Version No	Date	Author	Change History
1.1	14-NOV-2024	Mohan Kumar C	Added wiring diagram and configuration diagram to connect the Datalogger system
1.2	19-NOV-2024	Mohan Kumar C	Update the document for SDCARD format image

3. Acronyms

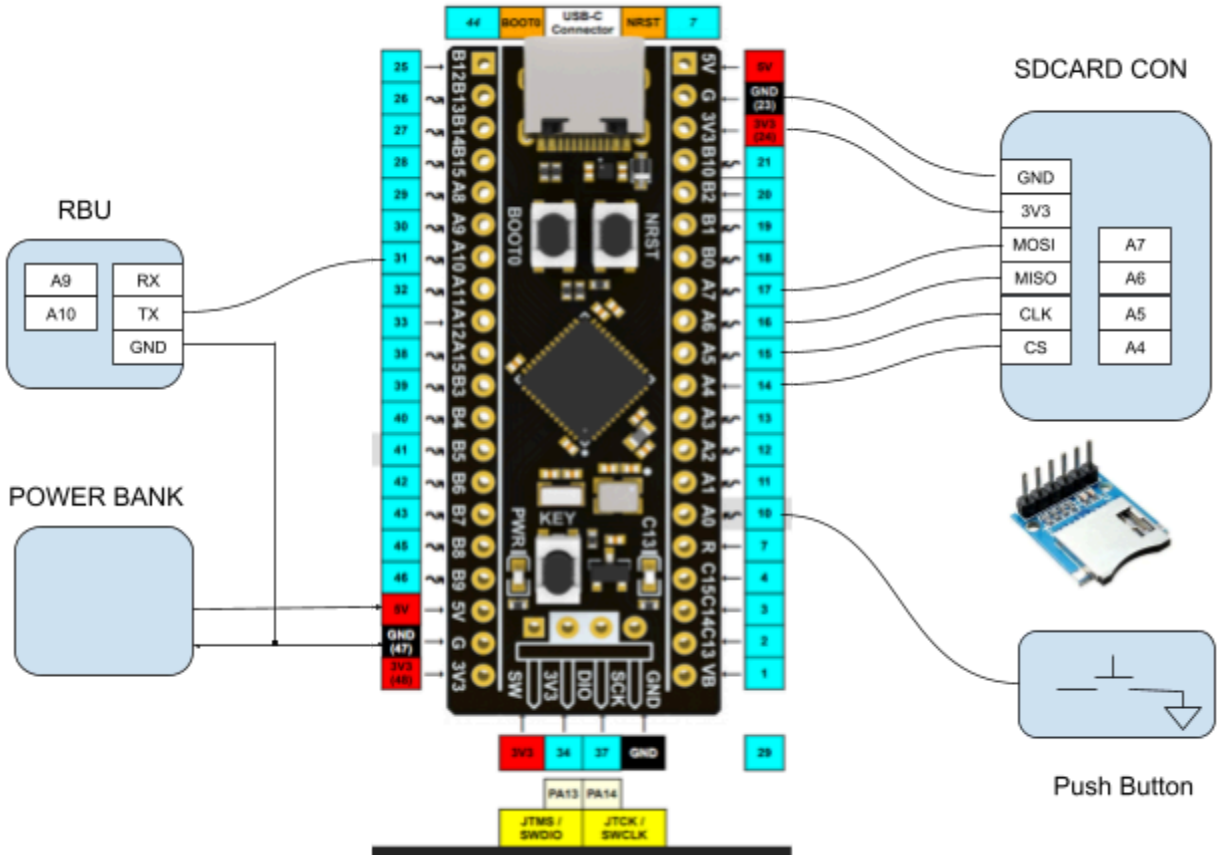
Acronymes	Abbreviations

4. Objective

STM32F401CCU6/STM32F411CEU6 black pill board based datalogger design for logging the UART data which is configured at rate 2Mbp/s, save data in to SDCARD filesystem to particular folder and write the file inside that folder and write UART data into text file.

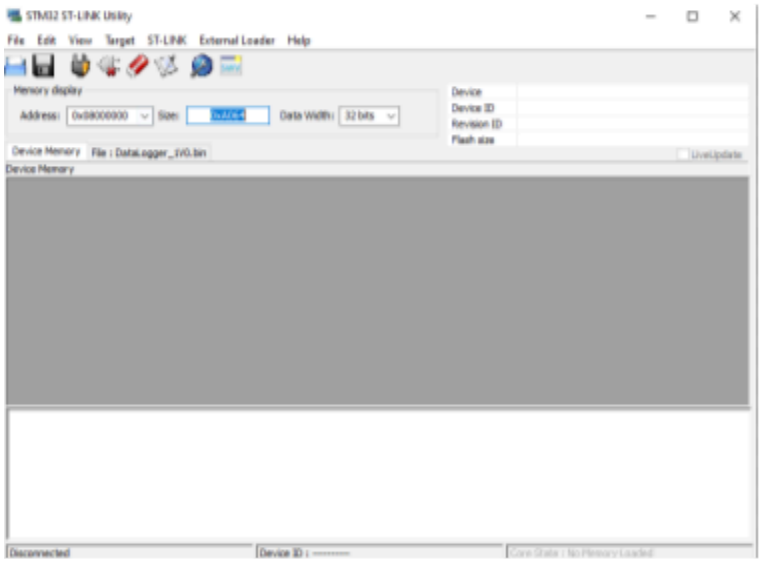
5. Hardware Setup

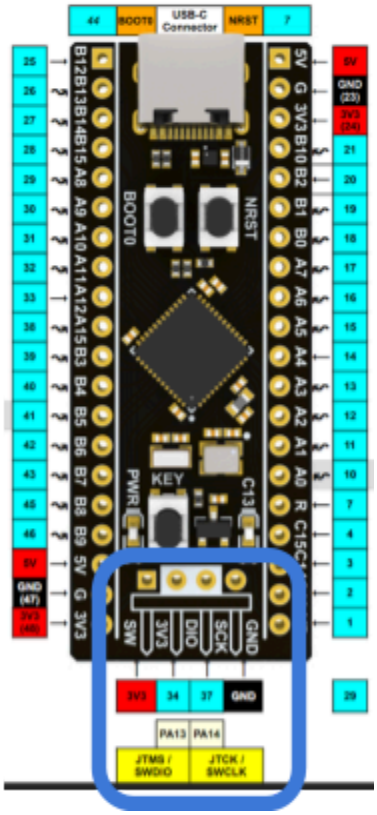
Below is the pinout diagram of STM32F4x1Cx Black pill board. We need SPI pins to connect to SDCARD breakout PCB and UART pins to connect to RBU unit for 2Mb/s data capture.



6. Programming Connections

Connect the SWDIO, SWCLK & GND to STLink debugger to program the STM32F4x1Cx Black pill board. Install stm32 ST0LINK Utility tool for programing the binary to internal flash for STM32.

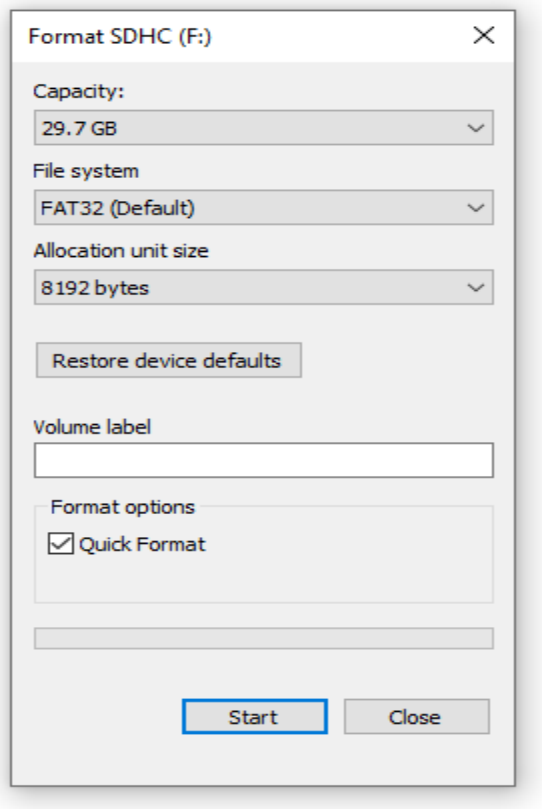




7. How Data logger works

Below are the steps to be followed,

- Connect the RBC UART connections to STM32F4x1Cx Black pill board.
- Connect the SDCARD breakout board connections to STM32F4x1Cx Black pill board.
- Connect the 32GB SDCARD to SDCARD SLOT
- Connect the Power bank to Datalogger, Make sure Power bank is charged and power on as soon as it has been connected to Datalogger. We can use on board USB connector or jumper wires as explained in the block diagram.
- Make Sure we have 32GB CLASS 10 SDCARD. Format using Windows PC with 8KB sector size, FAT32 format.(Refer image below)
- If SDCARD is present on board the LED will stay ON SOLID BLUE.
- If SDCARD is not present then the LED will blink continuously, reinsert the SDCARD and reset the system.
- If SDCARD is present on board the LED will stay ON SOLID BLUE, then in case RBU starts sending debug messages at 2Mb/s then it will start to log. Will see BLUE LED toggles at the rate data starts coming. When it is writing to the SDCARD LED will be fast blinking.
- In order to safely unmount, press and hold the button for >2 seconds. It will safely unmount the SDCARD. It is safe to have this Keypress feature in order to have a proper unmount process for SDCARD.



8. Known Issues

- STM32F4x1Cx Black pill board ESD Protection
- Power Bank may come with a Low power shutdown feature, we need to make sure it does not power off.

9. References

- Schematics of STM32F411CEU6 black pill board. https://github.com/mcauser/WEACT_F411CEU6/blob/master/docs/STM32F411CEU6_schematics.pdf