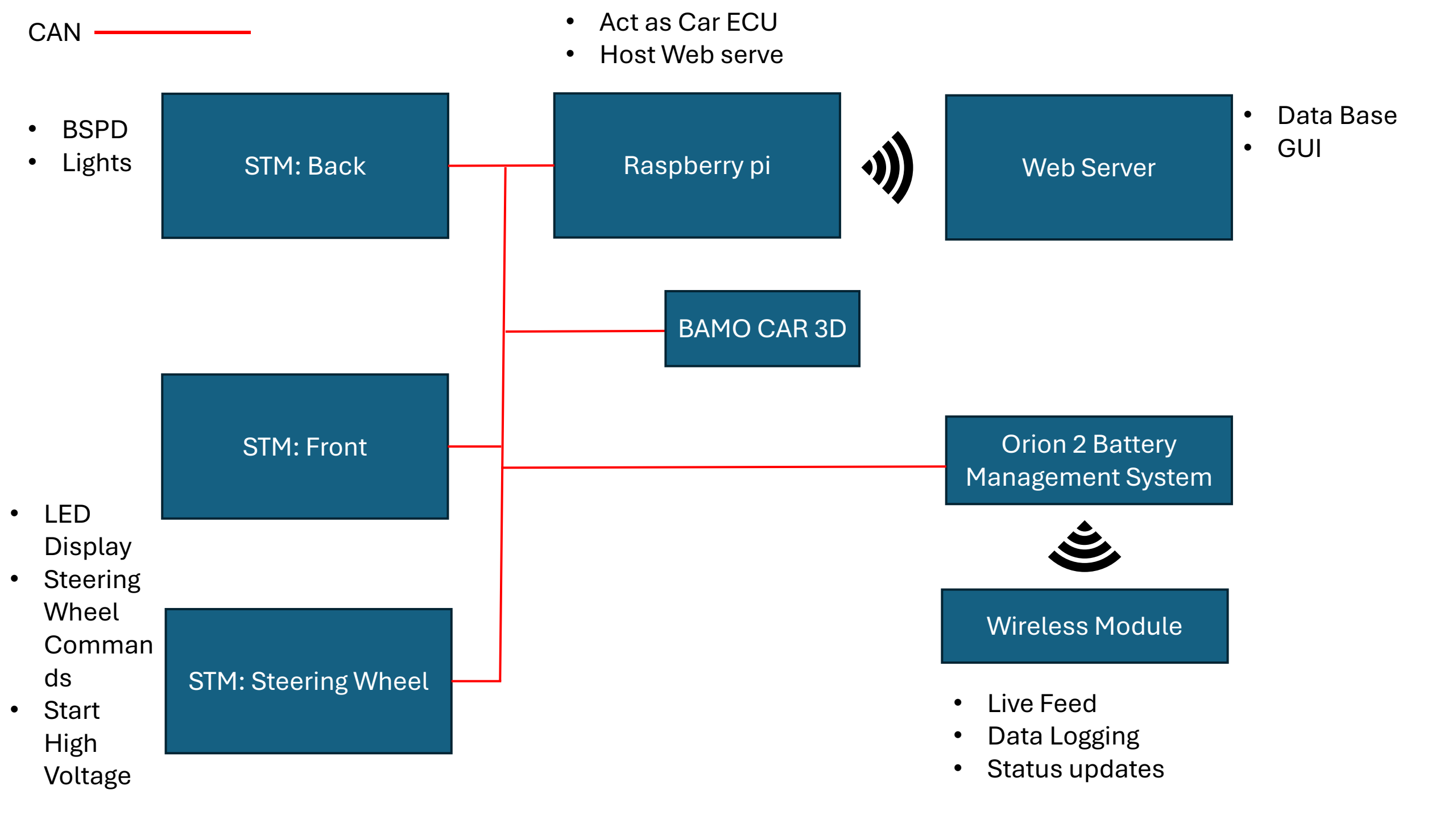
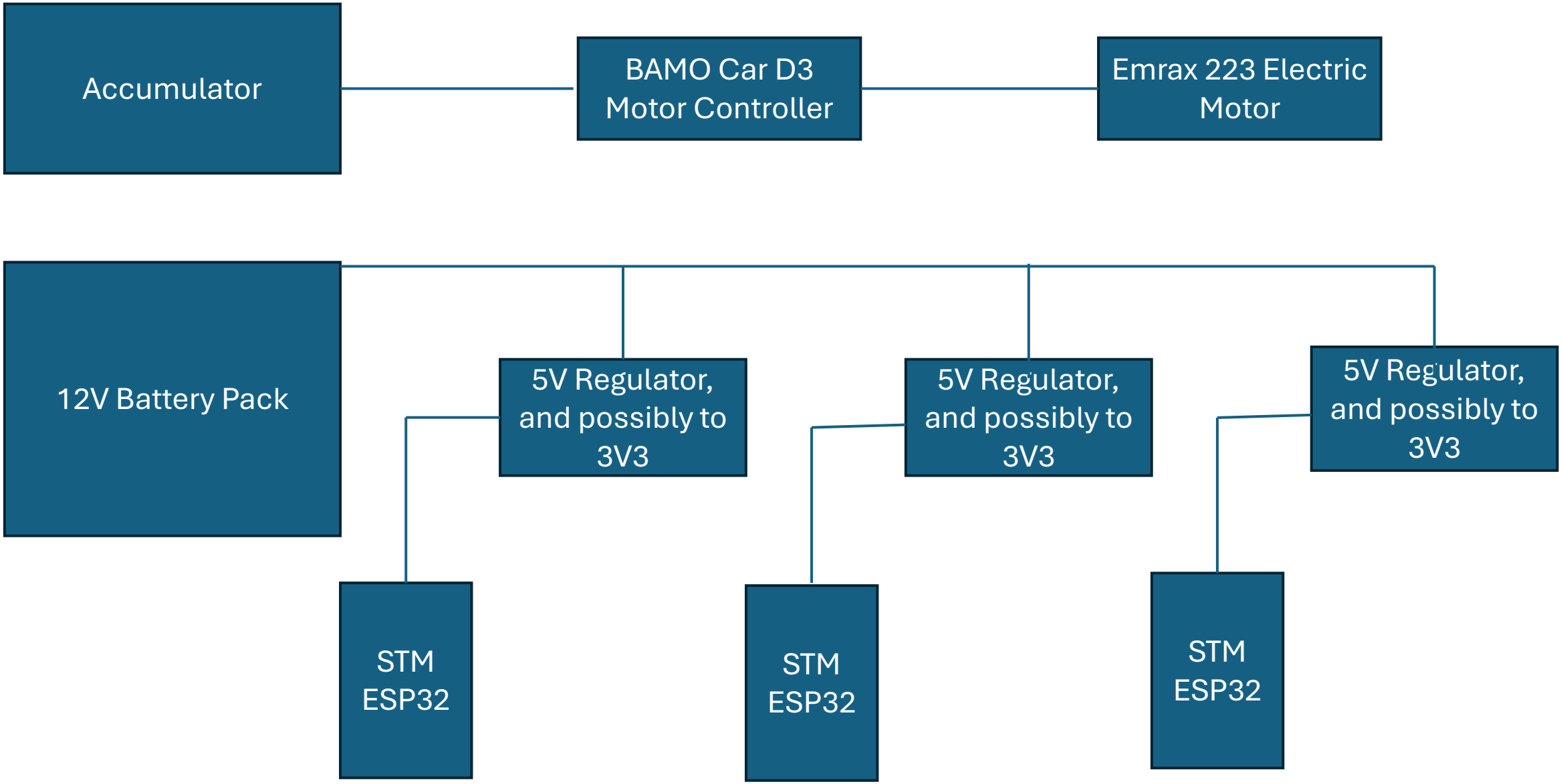
Communication Block Diagrams


CAN
Act as Car ECU
Host Web serve
BSPD
Lights
STM: Back
Raspberry pi
Web Server
Data Base
GUI
BAMO CAR 3D
STM: Front
Orion 2 Battery Management System
LED Display
Steering Wheel Commands
Start High Voltage
STM: Steering Wheel
Wireless Module
Live Feed
Data Logging
Status updates

Power distribution Block Diagrams



Accumulator

-Battery Segments
-Temp Sensors for cells
-Container requirements
-Pre-charge and discharge
-Fusing
-interlocks

Accumulator Node Peripherals

- 12v-5v regulator
- Tempature sensors x3
- General purpose 12v output replays x3
- Can transceiver + opticadecuplar
- 12v input relays

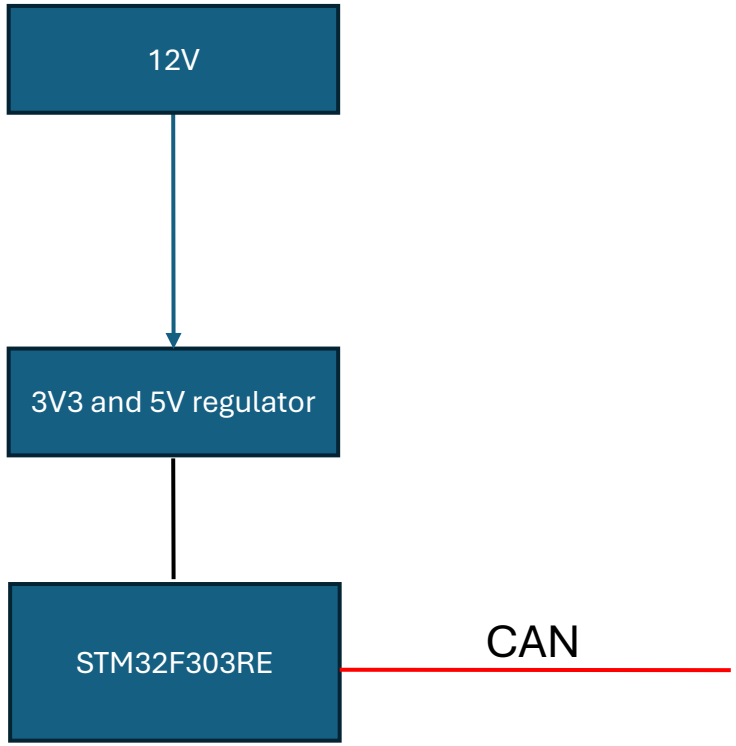
Back Node Peripherals

- 12v-5v regulator
- Tempature sensors x3
- Wheel speed sensors(TBD)
- General purpose 12v output replays x3
- Can transceiver + opticadecuplar
- 12v input relays
- Lights

Steering Wheel Node
Peripherals

- 12v-5v regulator
- Tempature sensors x3
- Wheel speed sensors(TBD)
- General purpose 12v output replays x3
- Can transceiver + opticadecuplar
- 12v input relays
- Steering angle/encorder

Front Node Peripherals



Raspberry Pi-Server Layout

- Sheild for CAN Trancever
- 9Dof Sensor

Tractive System

- Motor Controller
- Emmrax 228 Tractive system Master switch
- primary disconnect for AIR insulated relays
- Insulation Monitoring device
- Shutdown circuit
- Tractive system active light and signal tractive system ready button

Grounded Low Voltage System

- GVL battery
- Power distribution
- Fuses wiring harness
- CANBUS network Cooling fans

Shutdown Circuit

- Emergency Shutdown buttons
- Break and accelerator sensors
- throttle plausibility
- system interlocks
- inertia switch

- Micro Controller Shields
  - 12 and 5V regulator
  - Can 0 and Can 1
- Embedded
  - STM or ESP
    - CubeIDE
- Orion BMS
  - Temperature Sensors
  - MCU in the accumulator
  - 136S4P
    - 8 Segment 4x17
    - 400 A peak, 200 A Continuous
    - 503V Nominal, 571V Peak
- ECU (R-pi)
  - Can 0 Vs Can 1 priority
  - Ground Fault
  - Server
    - Change parameters
    - Monitor Changes

- STM-Steering Wheel Display
  - These will be condensed version of what is displayed on the on the ECU web server
  - S.O.C
  - Speed
  - Temperature
  - HV Warnings

Sub Systems (Nodes)

Webserver	Rear Node	Front Node	Steering Node	Accumulator	Orion Battery Management System	Insulation monitor	Motor Controller
•RPi •Host Web Server •CAN Bus •Car ECU •Data Base	•STM32 •CAN •BPSD •Lights	•STM32 •CAN	•STM32 •CAN •LED Display •Steering Wheel Commands •Start High Voltage	•STM32	•(has its own wireless module for live feed and data logging)	•Safety	•Motor Speed

Block Diagram Checklist

- Communication Block Diagram
  - Webserver & Database
    - Top level, Live feed (battery speed, brake sensors, etc), what are we storing, where is it stored…
  - STM32
    - STM32 --- Peripheral (Sensors, LCD Screen, LED, etc)
  - CAN Bus
    - Rpi --- STM32 --- ORION
    - CAN 0 and CAN 1
- Power Block Diagram
  - Accumulator Battery Pack
  - 12V System
  - 5V System

Design

Web Server

CAN Bus

Other CAN Bus Node to communicate with

Rear Node

Front Node

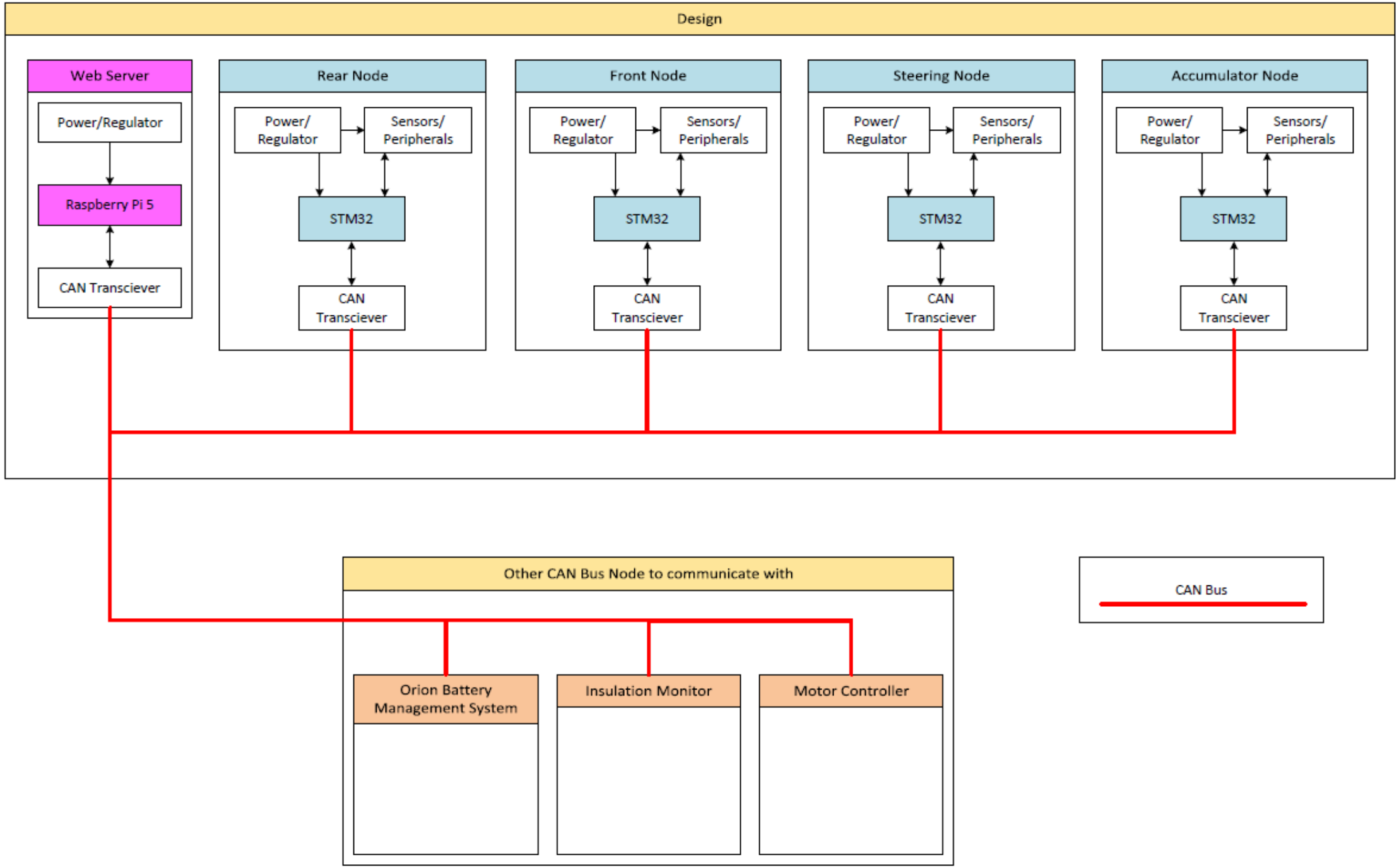
Steering

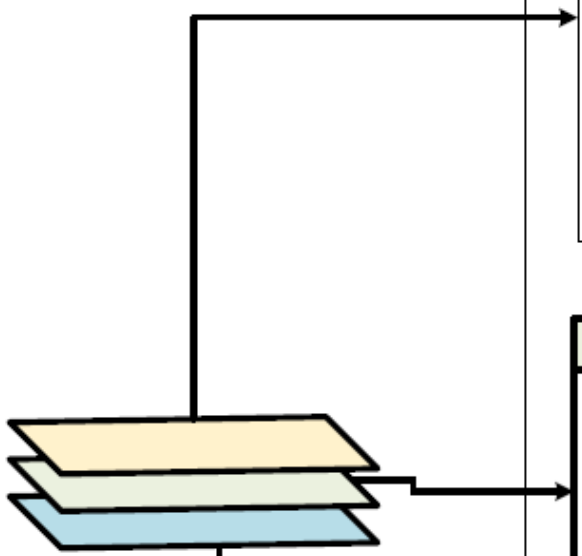
Accumulator

Orion Battery Management System

Insulation Monitor

Motor Controller


Design
Web Server
Power/Regulator
Raspberry Pi 5
CAN Transciever
Rear Node
Power/ Regulator
Sensors/ Peripherals
STM32
CAN Transciever
Front Node
Power/ Regulator
Sensors/ Peripherals
STM32
CAN Transciever
Steering Node
Power/ Regulator
Sensors/ Peripherals
STM32
CAN Transciever
Accumulator Node
Power/ Regulator
Sensors/ Peripherals
STM32
CAN Transciever
Other CAN Bus Node to communicate with
Orion Battery Management System
Insulation Monitor
Motor Controller
CAN Bus



Stack Breakdown

Hat 2

- Sensors
  - Temp Sensor
  - Wheel Speed
  - Accelerometer
- Peripherals
  - LCD Display
  - Relays/Switches
  - GPIOs

Hat 1

- Comms
  - CAN Transciever
- Power
  - 12V to 5V Regulator
  - 5V to 3.3V Regulator

MCU

- STM32F303RE

PCBA Stack Breakdown

Hat 2 PCB

- Sensors
  - Temp Sensor
  - Wheel Speed
  - Accelerometer
- Peripherals
  - LCD Display
  - Relays/Switches
  - GPIOs
- Connectors
  - MCU Connector

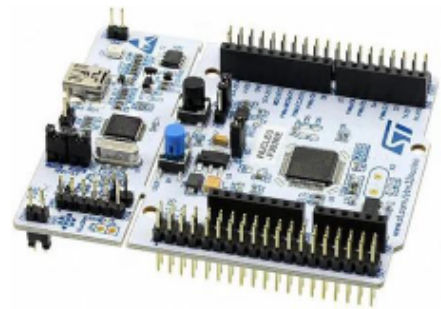
*Hat 2 should be populated as needed

Hat 1 PCB

- Comms
  - CAN Transciever
- Power
  - 12V to 5V Regulator
  - 5V to 3.3V Regulator
- Connectors
  - MCU Connector
  - Rpi Connector
  - Power Connector
  - CAN Bus Connector

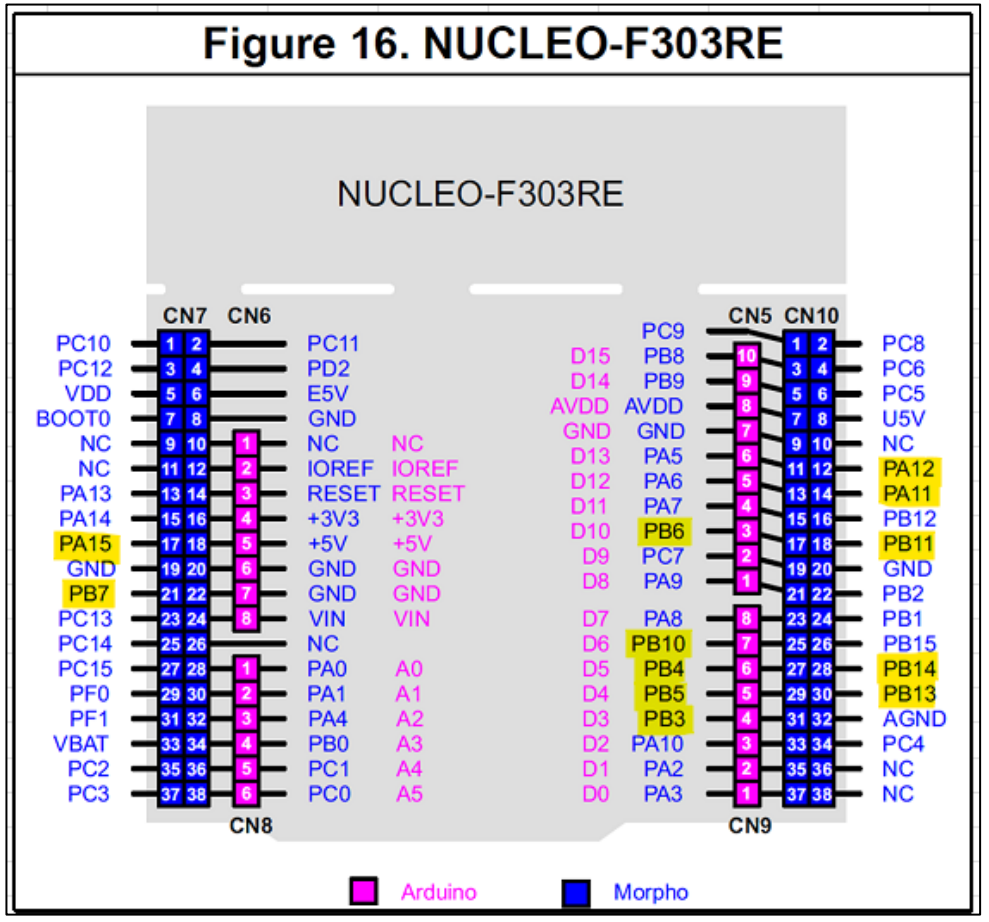
*Hat 1 should be compatible with Both MCU and R-Pi 5

MCU



Nucleo Fan out (for comms)

Nucleo Pin	Purpose	Nucleo Function	Verified and Confirmed
	CAN BUS		
PA.12	CAN Rx	CAN Rx	
PA.11	CAN TX	CAN TX	
	I2C		
PB.6	I2C SCL	I2C Serial Clock	
PB.7	I2C SDA	I2C Serial Data	
	SPI (user LED)		
PB.3	SCK	SPI Serial Clock	
PB.4	POCI	SPI MISO Data	
PB.5	PICO	SPI MOSI Data	
PA.15	CS	SPI Chip Select	
	COM PORTS (UART)		
PB.10	Serial Tx - HW	real UART Tx out	
PB.11	Serial Rx - HW	real UART Rx in	
PB.13	Serial RTS - HW (optional)	real UART RTS out	
PB.14	Serial CTS - HW (optional)	real UART CTS in	



Nucleo Fan out (for comms)

Nucleo Pin	Purpose	Nucleo Function	Verified and Confirmed
	CAN BUS		
PA.12	CAN Rx	CAN Rx	
PA.11	CAN TX	CAN TX	

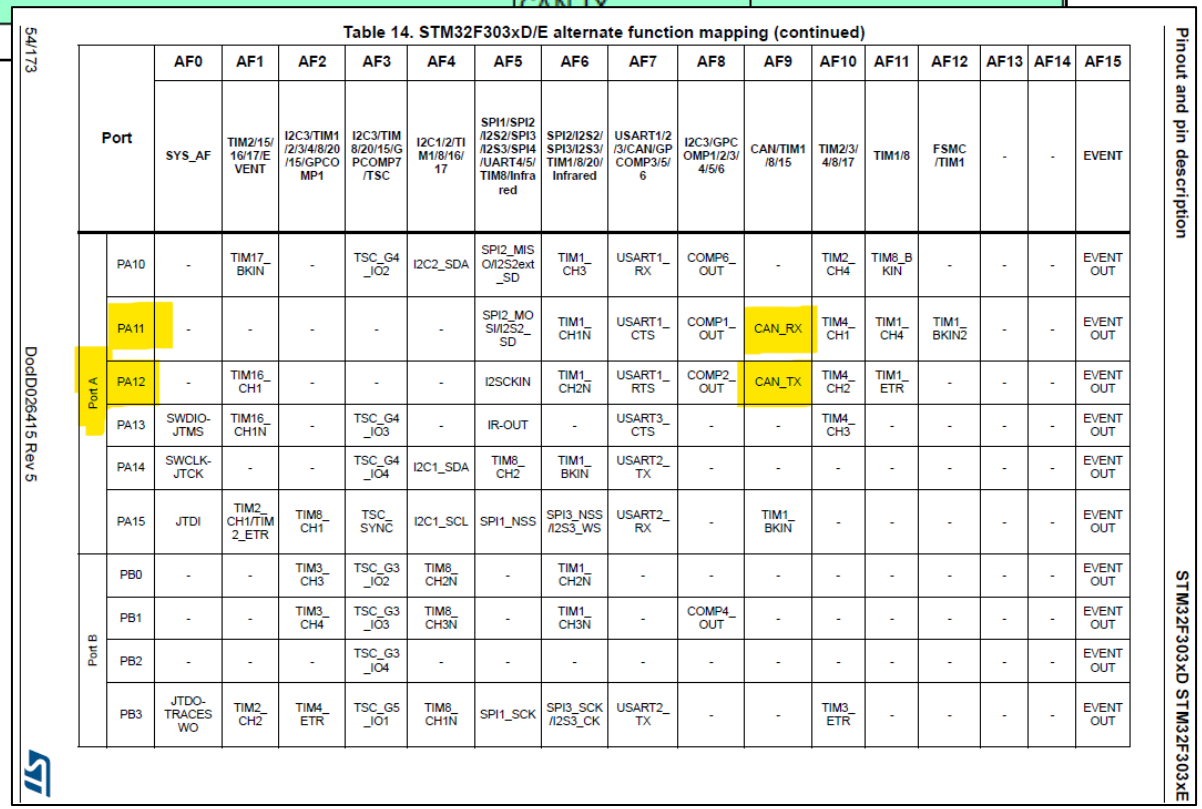


Table 14. STM32F303xD/E alternate function mapping (continued)

Port		AF0	AF1	AF2	AF3	AF4	AF5	AF6	AF7	AF8	AF9	AF10	AF11	AF12	AF13	AF14	AF15
		SYS_AF	TIM2/15/16/17/EVENT	I2C3/TIM1/2/3/4/8/20/15/GPCOMP1	I2C3/TIM8/20/15/GPCOMP7/TSC	I2C1/2/TIM1/8/16/17	SPI1/SPI2/I2S2/SPI3/I2S3/SPI4/UART4/5/TIM8/Infrared	SPI2/I2S2/SPI3/I2S3/TIM1/8/20/Infrared	USART1/2/3/CAN/GPCOMP3/5/6	I2C3/GPCOMP1/2/3/4/5/6	CAN/TIM1/8/15	TIM2/3/4/8/17	TIM1/8	FSMC/TIM1	-	-	EVENT
Port A	PA10	-	TIM17_BKIN	-	TSC_G4_IO2	I2C2_SDA	SPI2_MISO/I2S2ext_SD	TIM1_CH3	USART1_RX	COMP6_OUT	-	TIM2_CH4	TIM8_BKIN	-	-	-	EVENT OUT
	PA11	-	-	-	-	-	SPI2_MOSI/I2S2_SD	TIM1_CH1N	USART1_CTS	COMP1_OUT	CAN_RX	TIM4_CH1	TIM1_CH4	TIM1_BKIN2	-	-	EVENT OUT
	PA12	-	TIM16_CH1	-	-	-	I2SCKIN	TIM1_CH2N	USART1_RTS	COMP2_OUT	CAN_TX	TIM4_CH2	TIM1_ETR	-	-	-	EVENT OUT
	PA13	SWDIO-JTMS	TIM16_CH1N	-	TSC_G4_IO3	-	IR-OUT	-	USART3_CTS	-	-	TIM4_CH3	-	-	-	-	EVENT OUT
	PA14	SWCLK-JTCK	-	-	TSC_G4_IO4	I2C1_SDA	TIM8_CH2	TIM1_BKIN	USART2_TX	-	-	-	-	-	-	-	EVENT OUT
	PA15	JTDI	TIM2_CH1/TIM2_ETR	TIM8_CH1	TSC_SYNC	I2C1_SCL	SPI1_NSS	SPI3_NSS/I2S3_WS	USART2_RX	-	TIM1_BKIN	-	-	-	-	-	EVENT OUT
Port B	PB0	-	-	TIM3_CH3	TSC_G3_IO2	TIM8_CH2N	-	TIM1_CH2N	-	-	-	-	-	-	-	-	EVENT OUT
	PB1	-	-	TIM3_CH4	TSC_G3_IO3	TIM8_CH3N	-	TIM1_CH3N	-	COMP4_OUT	-	-	-	-	-	-	EVENT OUT
	PB2	-	-	-	TSC_G3_IO4	-	-	-	-	-	-	-	-	-	-	-	EVENT OUT
	PB3	JTDO-TRACESWO	TIM2_CH2	TIM4_ETR	TSC_G5_IO1	TIM8_CH1N	SPI1_SCK	SPI3_SCK/I2S3_CK	USART2_TX	-	-	TIM3_ETR	-	-	-	-	EVENT OUT

Nucleo Fan out (for comms)

	I2C		
PB.6	I2C SCL	I2C Serial Clock	
PB.7	I2C SDA	I2C Serial Data	

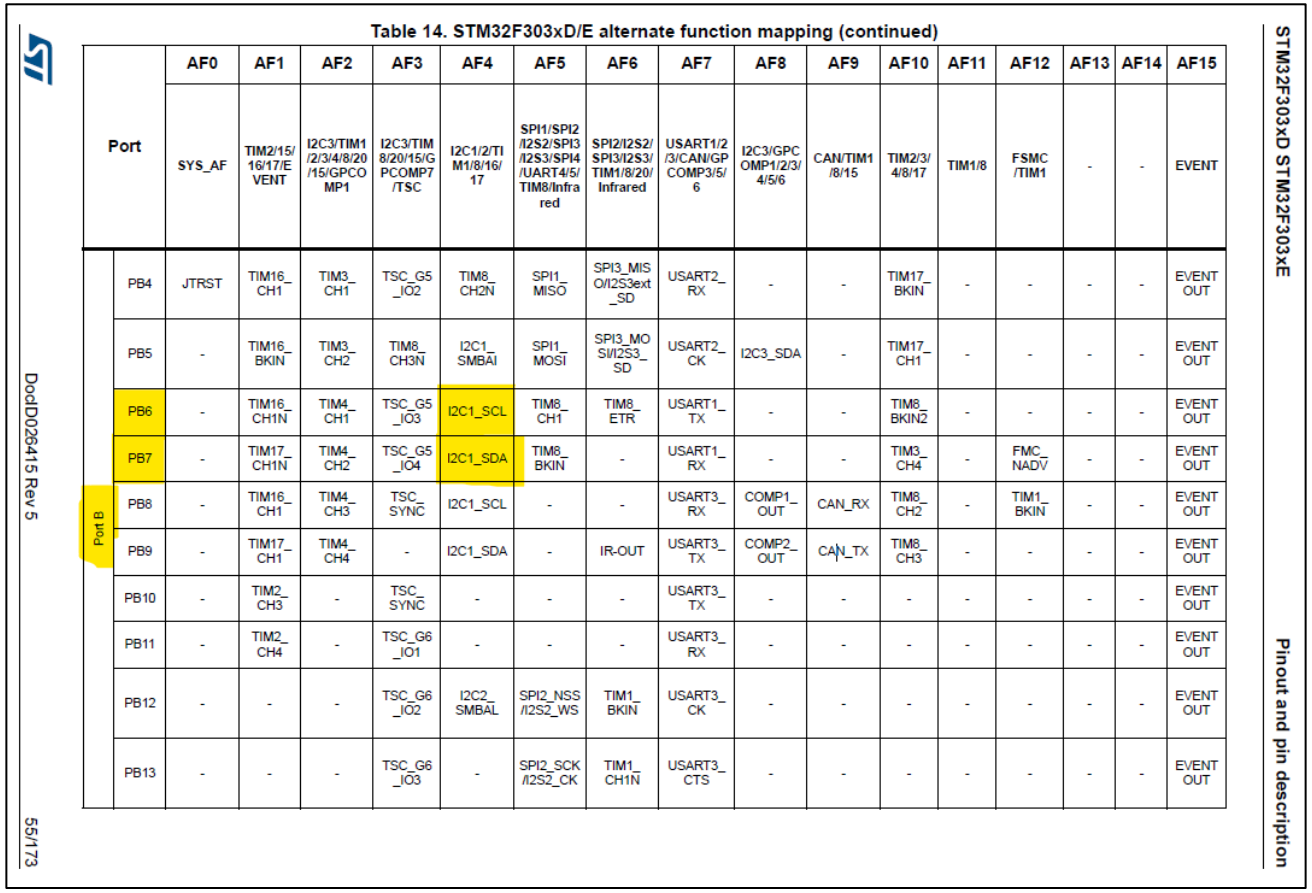


Table 14. STM32F303xD/E alternate function mapping (continued)

Port		AF0	AF1	AF2	AF3	AF4	AF5	AF6	AF7	AF8	AF9	AF10	AF11	AF12	AF13	AF14	AF15
		SYS_AF	TIM2/15/16/17/EVENT	I2C3/TIM1/2/3/4/8/20/15/GPCOMP1	I2C3/TIM8/20/15/GPCOMP7/TSC	I2C1/2/TIM1/8/16/17	SPI1/SPI2/I2S2/SPI3/I2S3/SPI4/UART4/5/TIM8/Infrared	SPI2/I2S2/SPI3/I2S3/TIM1/8/20/Infrared	USART1/2/3/CAN/GPCOMP3/5/6	I2C3/GPCOMP1/2/3/4/5/6	CAN/TIM1/8/15	TIM2/3/4/8/17	TIM1/8	FSMC/TIM1	-	-	EVENT
Port B	PB4	JTRST	TIM16_CH1	TIM3_CH1	TSC_G5_IO2	TIM8_CH2N	SPI1_MISO	SPI3_MISO/I2S3ext_SD	USART2_RX	-	-	TIM17_BKIN	-	-	-	-	EVENT OUT
	PB5	-	TIM16_BKIN	TIM3_CH2	TIM8_CH3N	I2C1_SMBAI	SPI1_MOSI	SPI3_MOSI/I2S3_SD	USART2_CK	I2C3_SDA	-	TIM17_CH1	-	-	-	-	EVENT OUT
	PB6	-	TIM16_CH1N	TIM4_CH1	TSC_G5_IO3	I2C1_SCL	TIM8_CH1	TIM8_ETR	USART1_TX	-	-	TIM8_BKIN2	-	-	-	-	EVENT OUT
	PB7	-	TIM17_CH1N	TIM4_CH2	TSC_G5_IO4	I2C1_SDA	TIM8_BKIN	-	USART1_RX	-	-	TIM3_CH4	-	FMC_NADV	-	-	EVENT OUT
	PB8	-	TIM16_CH1	TIM4_CH3	TSC_SYNC	I2C1_SCL	-	-	USART3_RX	COMP1_OUT	CAN_RX	TIM8_CH2	-	TIM1_BKIN	-	-	EVENT OUT
	PB9	-	TIM17_CH1	TIM4_CH4	-	I2C1_SDA	-	IR-OUT	USART3_TX	COMP2_OUT	CAN_TX	TIM8_CH3	-	-	-	-	EVENT OUT
	PB10	-	TIM2_CH3	-	TSC_SYNC	-	-	-	USART3_TX	-	-	-	-	-	-	-	EVENT OUT
	PB11	-	TIM2_CH4	-	TSC_G6_IO1	-	-	-	USART3_RX	-	-	-	-	-	-	-	EVENT OUT
	PB12	-	-	-	TSC_G6_IO2	I2C2_SMBAL	SPI2_NSS/I2S2_WS	TIM1_BKIN	USART3_CK	-	-	-	-	-	-	-	EVENT OUT
	PB13	-	-	-	TSC_G6_IO3	-	SPI2_SCK/I2S2_CK	TIM1_CH1N	USART3_CTS	-	-	-	-	-	-	-	EVENT OUT

Nucleo Fan out (for comms)

	SPI (user LED)		
PB.3	SCK	SPI Serial Clock	
PB.4	POCI	SPI MISO Data	
PB.5	PICO	SPI MOSI Data	
PA.15	CS	SPI Chip Select	

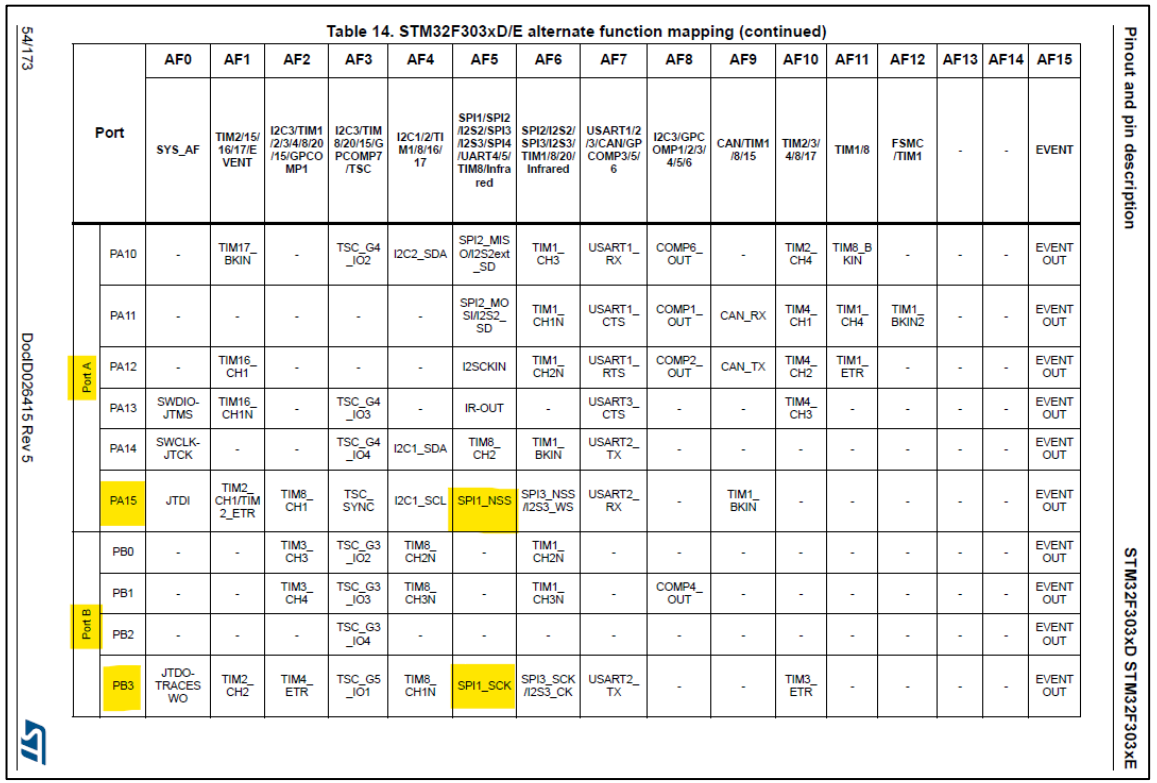


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Table 14. STM32F303xD/E alternate function mapping (continued)

Port		AF0	AF1	AF2	AF3	AF4	AF5	AF6	AF7	AF8	AF9	AF10	AF11	AF12	AF13	AF14	AF15
		SYS_AF	TIM2/15/16/17/EVENT	I2C3/TIM1/2/3/4/8/20/15/GPCOMP1	I2C3/TIM8/20/15/GPCOMP7/TSC	I2C1/2/TIM1/8/16/17	SPI1/SPI2/I2S2/SPI3/I2S3/SPI4/UART4/5/TIM8/Infrared	SPI2/I2S2/SPI3/I2S3/TIM1/8/20/Infrared	USART1/2/3/CAN/GPCOMP3/5/6	I2C3/GPCOMP1/2/3/4/5/6	CAN/TIM1/8/15	TIM2/3/4/8/17	TIM1/8	FSMC/TIM1	-	-	EVENT
Port A	PA10	-	TIM17_BKIN	-	TSC_G4_IO2	I2C2_SDA	SPI2_MISO/I2S2ext_SD	TIM1_CH3	USART1_RX	COMP6_OUT	-	TIM2_CH4	TIM8_BKIN	-	-	-	EVENT OUT
	PA11	-	-	-	-	-	SPI2_MOSI/I2S2_SD	TIM1_CH1N	USART1_CTS	COMP1_OUT	CAN_RX	TIM4_CH1	TIM1_CH4	TIM1_BKIN2	-	-	EVENT OUT
	PA12	-	TIM16_CH1	-	-	-	I2SCKIN	TIM1_CH2N	USART1_RTS	COMP2_OUT	CAN_TX	TIM4_CH2	TIM1_ETR	-	-	-	EVENT OUT
	PA13	SWDIO-JTMS	TIM16_CH1N	-	TSC_G4_IO3	-	IR-OUT	-	USART3_CTS	-	-	TIM4_CH3	-	-	-	-	EVENT OUT
	PA14	SWCLK-JTCK	-	-	TSC_G4_IO4	I2C1_SDA	TIM8_CH2	TIM1_BKIN	USART2_TX	-	-	-	-	-	-	-	EVENT OUT
	PA15	JTDI	TIM2_CH1/TIM2_ETR	TIM8_CH1	TSC_SYNC	I2C1_SCL	SPI1_NSS	SPI3_NSS/I2S3_WS	USART2_RX	-	TIM1_BKIN	-	-	-	-	-	EVENT OUT
Port B	PB0	-	-	TIM3_CH3	TSC_G3_IO2	TIM8_CH2N	-	TIM1_CH2N	-	-	-	-	-	-	-	-	EVENT OUT
	PB1	-	-	TIM3_CH4	TSC_G3_IO3	TIM8_CH3N	-	TIM1_CH3N	-	COMP4_OUT	-	-	-	-	-	-	EVENT OUT
	PB2	-	-	-	TSC_G3_IO4	-	-	-	-	-	-	-	-	-	-	-	EVENT OUT
	PB3	JTDO-TRACESWO	TIM2_CH2	TIM4_ETR	TSC_G5_IO1	TIM8_CH1N	SPI1_SCK	SPI3_SCK/I2S3_CK	USART2_TX	-	-	TIM3_ETR	-	-	-	-	EVENT OUT

Pinout and pin description

STM32F303xD STM32F303xE

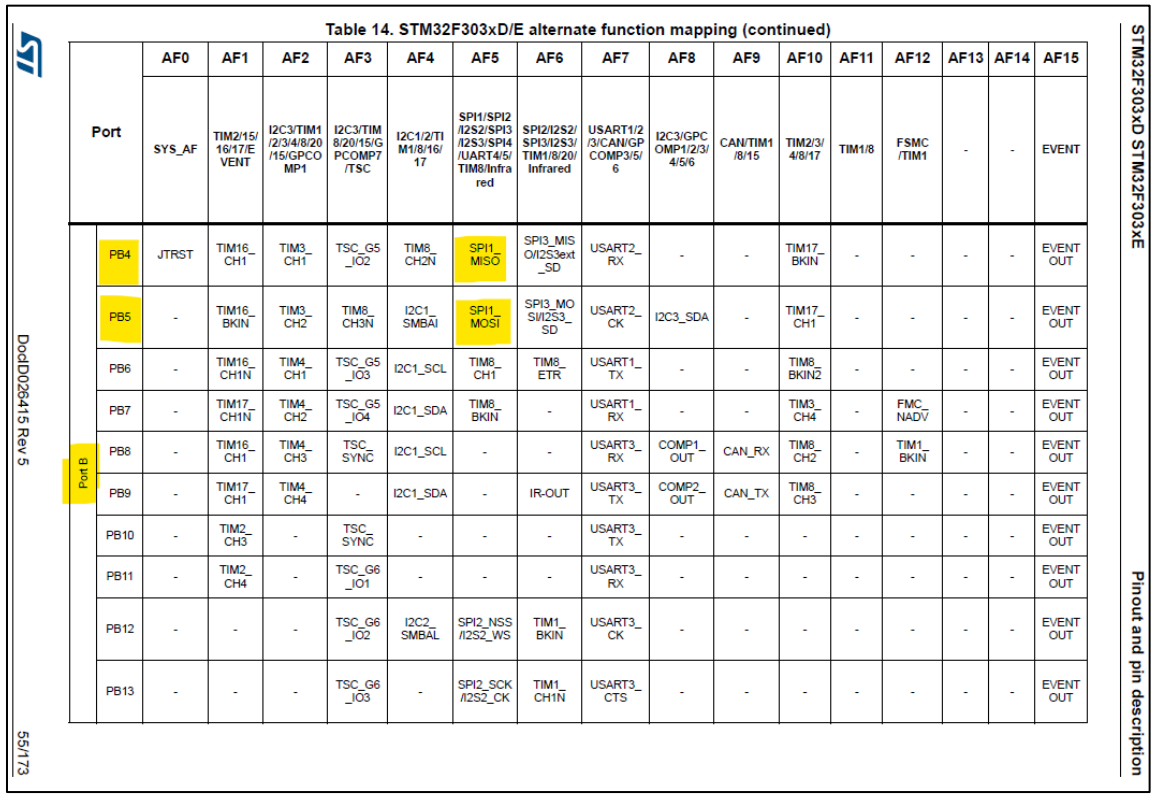

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Table 14. STM32F303xD/E alternate function mapping (continued)

Port		AF0	AF1	AF2	AF3	AF4	AF5	AF6	AF7	AF8	AF9	AF10	AF11	AF12	AF13	AF14	AF15
		SYS_AF	TIM2/15/16/17/EVENT	I2C3/TIM1/2/3/4/8/20/15/GPCOMP1	I2C3/TIM8/20/15/GPCOMP7/TSC	I2C1/2/TIM1/8/16/17	SPI1/SPI2/I2S2/SPI3/I2S3/SPI4/UART4/5/TIM8/Infrared	SPI2/I2S2/SPI3/I2S3/TIM1/8/20/Infrared	USART1/2/3/CAN/GPCOMP3/5/6	I2C3/GPCOMP1/2/3/4/5/6	CAN/TIM1/8/15	TIM2/3/4/8/17	TIM1/8	FSMC/TIM1	-	-	EVENT
Port B	PB4	JTRST	TIM16_CH1	TIM3_CH1	TSC_G5_IO2	TIM8_CH2N	SPI1_MISO	SPI3_MISO/I2S3ext_SD	USART2_RX	-	-	TIM17_BKIN	-	-	-	-	EVENT OUT
	PB5	-	TIM16_BKIN	TIM3_CH2	TIM8_CH3N	I2C1_SMBAI	SPI1_MOSI	SPI3_MOSI/I2S3_SD	USART2_CK	I2C3_SDA	-	TIM17_CH1	-	-	-	-	EVENT OUT
	PB6	-	TIM16_CH1N	TIM4_CH1	TSC_G5_IO3	I2C1_SCL	TIM8_CH1	TIM8_ETR	USART1_TX	-	-	TIM8_BKIN2	-	-	-	-	EVENT OUT
	PB7	-	TIM17_CH1N	TIM4_CH2	TSC_G5_IO4	I2C1_SDA	TIM8_BKIN	-	USART1_RX	-	-	TIM3_CH4	-	FMC_NADV	-	-	EVENT OUT
	PB8	-	TIM16_CH1	TIM4_CH3	TSC_SYNC	I2C1_SCL	-	-	USART3_RX	COMP1_OUT	CAN_RX	TIM8_CH2	-	TIM1_BKIN	-	-	EVENT OUT
	PB9	-	TIM17_CH1	TIM4_CH4	-	I2C1_SDA	-	IR-OUT	USART3_TX	COMP2_OUT	CAN_TX	TIM8_CH3	-	-	-	-	EVENT OUT
	PB10	-	TIM2_CH3	-	TSC_SYNC	-	-	-	USART3_TX	-	-	-	-	-	-	-	EVENT OUT
	PB11	-	TIM2_CH4	-	TSC_G6_IO1	-	-	-	USART3_RX	-	-	-	-	-	-	-	EVENT OUT
	PB12	-	-	-	TSC_G6_IO2	I2C2_SMBAI	SPI2_NSS/I2S2_WS	TIM1_BKIN	USART3_CK	-	-	-	-	-	-	-	EVENT OUT
	PB13	-	-	-	TSC_G6_IO3	-	SPI2_SCK/I2S2_CK	TIM1_CH1N	USART3_CTS	-	-	-	-	-	-	-	EVENT OUT

STM32F303xD STM32F303xE

Pinout and pin description

Nucleo Fan out (for comms)

	COM PORTS (UART)		
PB.10	Serial Tx - HW	real UART Tx out	
PB.11	Serial Rx - HW	real UART Rx in	
PB.13	Serial RTS - HW (optional)	real UART RTS out	
PB.14	Serial CTS - HW (optional)	real UART CTS in	

Table 14. STM32F303xD/E alternate function mapping (continued)

Port		AF0	AF1	AF2	AF3	AF4	AF5	AF6	AF7	AF8	AF9	AF10	AF11	AF12	AF13	AF14	AF15
		SYS_AF	TIM2/15/16/17/EVENT	I2C3/TIM1/2/3/4/8/20/15/GPCOMP1	I2C3/TIM8/20/15/GPCOMP7/TSC	I2C1/2/TIM1/8/16/17	SPI1/SPI2/I2S2/SPI3/I2S3/SPI4/UART4/5/TIM8/Infrared	SPI2/I2S2/SPI3/I2S3/TIM1/8/20/Infrared	USART1/2/3/CAN/GPCOMP3/5/6	I2C3/GPCOMP1/2/3/4/5/6	CAN/TIM1/8/15	TIM2/3/4/8/17	TIM1/8	FSMC/TIM1	-	-	EVENT
Port B	PB4	JTRST	TIM16_CH1	TIM3_CH1	TSC_G5_IO2	TIM8_CH2N	SPI1_MISO	SPI3_MISO/I2S3ext_SD	USART2_RX	-	-	TIM17_BKIN	-	-	-	-	EVENT OUT
	PB5	-	TIM16_BKIN	TIM3_CH2	TIM8_CH3N	I2C1_SMBAI	SPI1_MOSI	SPI3_MOSI/I2S3_SD	USART2_CK	I2C3_SDA	-	TIM17_CH1	-	-	-	-	EVENT OUT
	PB6	-	TIM16_CH1N	TIM4_CH1	TSC_G5_IO3	I2C1_SCL	TIM8_CH1	TIM8_ETR	USART1_TX	-	-	TIM8_BKIN2	-	-	-	-	EVENT OUT
	PB7	-	TIM17_CH1N	TIM4_CH2	TSC_G5_IO4	I2C1_SDA	TIM8_BKIN	-	USART1_RX	-	-	TIM3_CH4	-	FMC_NADV	-	-	EVENT OUT
	PB8	-	TIM16_CH1	TIM4_CH3	TSC_SYNC	I2C1_SCL	-	-	USART3_RX	COMP1_OUT	CAN_RX	TIM8_CH2	-	TIM1_BKIN	-	-	EVENT OUT
	PB9	-	TIM17_CH1	TIM4_CH4	-	I2C1_SDA	-	IR-OUT	USART3_TX	COMP2_OUT	CAN_TX	TIM8_CH3	-	-	-	-	EVENT OUT
	PB10	-	TIM2_CH3	-	TSC_SYNC	-	-	-	USART3_TX	-	-	-	-	-	-	-	EVENT OUT
	PB11	-	TIM2_CH4	-	TSC_G6_IO1	-	-	-	USART3_RX	-	-	-	-	-	-	-	EVENT OUT
	PB12	-	-	-	TSC_G6_IO2	I2C2_SMBAL	SPI2_NSS/I2S2_WS	TIM1_BKIN	USART3_CK	-	-	-	-	-	-	-	EVENT OUT
	PB13	-	-	-	TSC_G6_IO3	-	SPI2_SCK/I2S2_CK	TIM1_CH1N	USART3_CTS	-	-	-	-	-	-	-	EVENT OUT

Table 14. STM32F303xD/E alternate function mapping (continued)

Port		AF0	AF1	AF2	AF3	AF4	AF5	AF6	AF7	AF8	AF9	AF10	AF11	AF12	AF13	AF14	AF15
		SYS_AF	TIM2/15/16/17/EVENT	I2C3/TIM1/2/3/4/8/20/15/GPCOMP1	I2C3/TIM8/20/15/GPCOMP7/TSC	I2C1/2/TIM1/8/16/17	SPI1/SPI2/I2S2/SPI3/I2S3/SPI4/UART4/5/TIM8/Infrared	SPI2/I2S2/SPI3/I2S3/TIM1/8/20/Infrared	USART1/2/3/CAN/GPCOMP3/5/6	I2C3/GPCOMP1/2/3/4/5/6	CAN/TIM1/8/15	TIM2/3/4/8/17	TIM1/8	FSMC/TIM1	-	-	EVENT
Port B	PB14	-	TIM15_CH1	-	TSC_G6_IO4	-	SPI2_MISO/I2S2ext_SD	TIM1_CH2N	USART3_RTS	-	-	-	-	-	-	-	EVENT OUT
	PB15	RTC_REFIN	TIM15_CH2	TIM15_CH1N	-	TIM1_CH3N	SPI2_MOSI/I2S2_SD	-	-	-	-	-	-	-	-	-	EVENT OUT
Port C	PC0	-	EVENT OUT	TIM1_CH1	-	-	-	-	-	-	-	-	-	-	-	-	-
	PC1	-	EVENT OUT	TIM1_CH2	-	-	-	-	-	-	-	-	-	-	-	-	-
	PC2	-	EVENT OUT	TIM1_CH3	COMP7_OUT	-	-	-	-	-	-	-	-	-	-	-	-
	PC3	-	EVENT OUT	TIM1_CH4	-	-	-	TIM1_BKIN2	-	-	-	-	-	-	-	-	-
	PC4	-	EVENT OUT	TIM1_ETR	-	-	-	-	USART1_TX	-	-	-	-	-	-	-	-
	PC5	-	EVENT OUT	TIM15_BKIN	TSC_G3_IO1	-	-	-	USART1_RX	-	-	-	-	-	-	-	-
	PC6	-	EVENT OUT	TIM3_CH1	-	TIM8_CH1	-	I2S2_MCK	COMP6_OUT	-	-	-	-	-	-	-	-
	PC7	-	EVENT OUT	TIM3_CH2	-	TIM8_CH2	-	I2S3_MCK	COMP5_OUT	-	-	-	-	-	-	-	-
	PC8	-	EVENT OUT	TIM3_CH3	-	TIM8_CH3	-	-	COMP3_OUT	-	-	-	-	-	-	-	-
	PC9	-	EVENT OUT	TIM3_CH4	I2C3_SDA	TIM8_CH4	I2SCKIN	TIM8_BKIN2	-	-	-	-	-	-	-	-	-

Nucleo Fan out (for comms)

Nucleo Pin	Purpose	Nucleo Function	Verified and Confirmed
	CAN BUS		
PA.12	CAN Rx	CAN Rx	
PA.11	CAN TX	CAN TX	
	I2C		
PB.6	I2C SCL	I2C Serial Clock	
PB.7	I2C SDA	I2C Serial Data	
	SPI (user LED)		
PB.3	SCK	SPI Serial Clock	
PB.4	POCI	SPI MISO Data	
PB.5	PICO	SPI MOSI Data	
PA.15	CS	SPI Chip Select	
	COM PORTS (UART)		
PB.10	Serial Tx - HW	real UART Tx out	
PB.11	Serial Rx - HW	real UART Rx in	
PB.13	Serial RTS - HW (optional)	real UART RTS out	
PB.14	Serial CTS - HW (optional)	real UART CTS in	

Power/Regulator Circuit

- Protective Circuit
  - Fuse
  - TVS
- WEBENCH
  - 12 VDC → 5VDC
  - 5 VDC →3.3 VDC

Switching

- Relays/Optocoupler
- Debouncer
  - Pushbuttons
- Level Shifter
  - 3.3V to 5V

CAN Bus Test Plan: Software functionality

- R-Pi
  - WriteToCAN
  - ReadFromCAN
- STM32
  - WriteToCAN
  - ReadFromCAN

CAN Bus Test Plan: Software functionality

I. System ON
   I. R-Pi opens a terminal and shows logs/information
   II. Terminal prints the date & ip address of the device (maybe a welcome message)

II. R-Pi
   I. R-Pi WRITES to the CAN Bus
   II. STM32 READS from the CAN Bus
   III. IF READ is good, then FAST blink LEDs on STM32

III. STM32
   I. One-by-one, STM32 WRITES a message
   II. R-Pi READS from the CAN Bus
   III. IF READ is good, then R-pi prints on the terminal and logs the message