

The schematic diagram illustrates the STM32L152RET6 microcontroller board. The central component is the STM32L152RET6 microcontroller (U2). The board includes the following components and connections:

- Power Supply:** +3.3V and GND connections are shown at the top and bottom of the board.
- Reset:** A reset button (J1) is connected to the NRST pin (pin 7) through a 10k resistor (R1).
- Crystal:** A 16MHz crystal (Y2) is connected to the PH0 and PH1 pins (pins 5 and 6) with 20pF capacitors (C12 and C14).
- Capacitors:** Several capacitors are connected to the power supply pins: C1 (10uF), C2 (0.1uF), C3 (0.1uF), C4 (0.1uF), C5 (0.1uF), C6 (0.1uF), C7 (1uF), C10 (1uF), and C12 (20pF).
- GPIOs:** The board features several GPIO pins connected to a connector (J3):
 - GPIO0 (pin 1)
 - GPIO1 (pin 2)
 - GPIO2 (pin 3)
 - GPIO3 (pin 4)
 - GPIO4 (pin 5)
 - GPIO5 (pin 6)
 - GPIO6 (pin 7)
 - GPIO7 (pin 8)
- LEDs:** Three LEDs are connected to the board: LED_BLUE (pin 51), LED_GREEN (pin 52), and LED_RED (pin 53).
- Other Pins:** The board includes various other pins such as PA0-PA15, PB0-PB15, PC0-PC15, GPIOD, and various VDD and VSS pins.

The diagram illustrates the hardware setup for a CAN bus interface using two Microchip MCP25xx CAN controllers. The MCP2510 (U1) is configured as a CAN transceiver, connected to the SPI1 of the microcontroller. It provides the CAN_H and CAN_L signals to the MCP2562 (U3), which is configured as a CAN controller. The MCP2562 is connected to a CAN bus with a 120-ohm termination resistor (R9). The circuit includes power supplies of +3.3V and +5V, and various capacitors (C8, C9, C11, C15, C16) for decoupling and timing. A crystal oscillator (Y1) is used for the microcontroller's clock.

Component Connections:

- U1 (MCP2510-xS0):**
 - Pin 14 (SI): SPI1_MOSI
 - Pin 15 (SO): SPI1_MISO
 - Pin 16 (CS): SPI1_CS
 - Pin 13 (SCK): SPI1_CLK
 - Pin 2 (CAN_RX): CAN_RX
 - Pin 1 (CAN_TX): CAN_TX
 - Pin 12 (INT): CAN_INT
 - Pin 11 (RX0BF): CAN_RX0BF
 - Pin 10 (RX1BF): CAN_RX1BF
 - Pin 4 (TX0RTS): CAN_TX0RTS
 - Pin 5 (CAN_TX1RTS): CAN_TX1RTS
 - Pin 6 (TX2RTS): CAN_TX2RTS
 - Pin 17 (RESET): RESET
 - Pin 7 (OSC2): Connected to 8MHz crystal (Y1)
 - Pin 8 (OSC1): Connected to 8MHz crystal (Y1)
 - Pin 3 (CLKOUT/SOF): Connected to 8MHz crystal (Y1)
- U3 (MCP2562-H-SN):**
 - Pin 3 (VDD): +5V
 - Pin 1 (CAN_TX): CAN_TX
 - Pin 4 (CAN_RX): CAN_RX
 - Pin 5 (Vio): +3.3V
 - Pin 8 (STBY): GND
 - Pin 7 (CAN_H): Connected to CAN_H
 - Pin 6 (CAN_L): Connected to CAN_L

Power and Timing Components:

- C9 (20pF):** Decoupling capacitor for the 8MHz crystal.
- C11 (20pF):** Decoupling capacitor for the 8MHz crystal.
- C8 (0.1uF):** Decoupling capacitor for the +3.3V supply.
- C15 (0.1uF):** Decoupling capacitor for the +5V supply.
- C16 (0.1uF):** Decoupling capacitor for the +3.3V supply.

Pin connections for the Raspberry Pi 4B:

- H1: SPI1_CS
- M3: SPI1_CLK
- H2: SPI1_MISO
- M3: SPI1_MOSI
- H3: CAN_P
- M4: CAN_N
- H4: CAN_L
- M3: CAN_R
- VBUS_DETECT: GND

Conn_ARM_JTAG_SWD_10 V3.3_JTAG

J5

Vtref

RESET

SWDCLK/TCK

SWDIO/TMS

SWO/TDO

NC/TDI

GNDDetect

GND

D5

XBP15SRV05W-G

101 104

GND NC

102 I03

1 2 3 4 5 6

Andy Smit	
University Of Calgary Solar Car Team	
Sheet: /	
File: software_dev_board.kicad_sch	
Title: Gen 6 Software Dev Board	
Size: USLetter	Date: 2021-11-12
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