GND GND GND

C20
CAP 0603 X7R 16V
10nF

C21
CAP 0603 X7R 16V
0.1uF

C22
CAP 0603 X7R 16V
2.2uF

C23
CAP 0603 X7R 16V
0.1uF

3V3

SCK
MOSI
MISO
CS1

U4

16 15 14

VDD
RESV_6
REGOUT

1 VDDIO   GND   13
2 SCL/SPC   RESV_5   12
3 SDA/SDI   RESV_4   11
4 SA0/SDO   RESV_3   10
5 CS   RESV_2   9

INT
RESV_1
FSYNC

6   7   8

R15
RES 0603 5%
0R

INT ICM

GND

Schematic Explanation for Sensor Interface

This schematic shows a part of the robot controller design focused on a peripheral sensor interface.

Below is the explanation of the key components and connections:

1. Main Component: U4 (Sensor IC)

  - Description: This is a sensor IC with SPI/I2C communication options.

  - Key Pins and Connections:

    - VDDIO: Connected to a 3.3V supply to power the sensor's input/output interfaces.

    - SCL/SCLK: Clock lines for I2C/SPI communication.

    - SDA/SDI: Data input line for I2C/SPI.

    - SA0/SDO: Data output line for SPI communication or address selection for I2C.

    - CS: Chip Select for SPI communication.

    - INT (Interrupt): Signal pin to alert the microcontroller of events or data readiness.

    - GND: Ground pin for power return.

2. Power Supply Decoupling

  - Decoupling capacitors are placed close to the IC to stabilize the power supply and filter noise:

    - C20: 10nF capacitor for high-frequency filtering.

    - C21: 0.1μF capacitor for stabilizing the power line.

3. Pull-Up Resistor

  - R15 (10k?): Pull-up resistor used on the interrupt line (INT_ICM) to ensure it remains in a defined

state when not actively driven.

4. Communication Configuration

    - The sensor supports both SPI and I2C communication, allowing flexibility depending on the

application.

   - For SPI, SCLK, SDI, SDO, and CS are used.

   - For I2C, SCL and SDA are used.

  - These lines connect to the microcontroller for data transmission and reception.

5. General Notes

  - The capacitors and resistors are surface-mounted components (0603 size).

   - The schematic provides a modular interface for integrating sensors with embedded systems, particularly for applications like robotics or IoT.