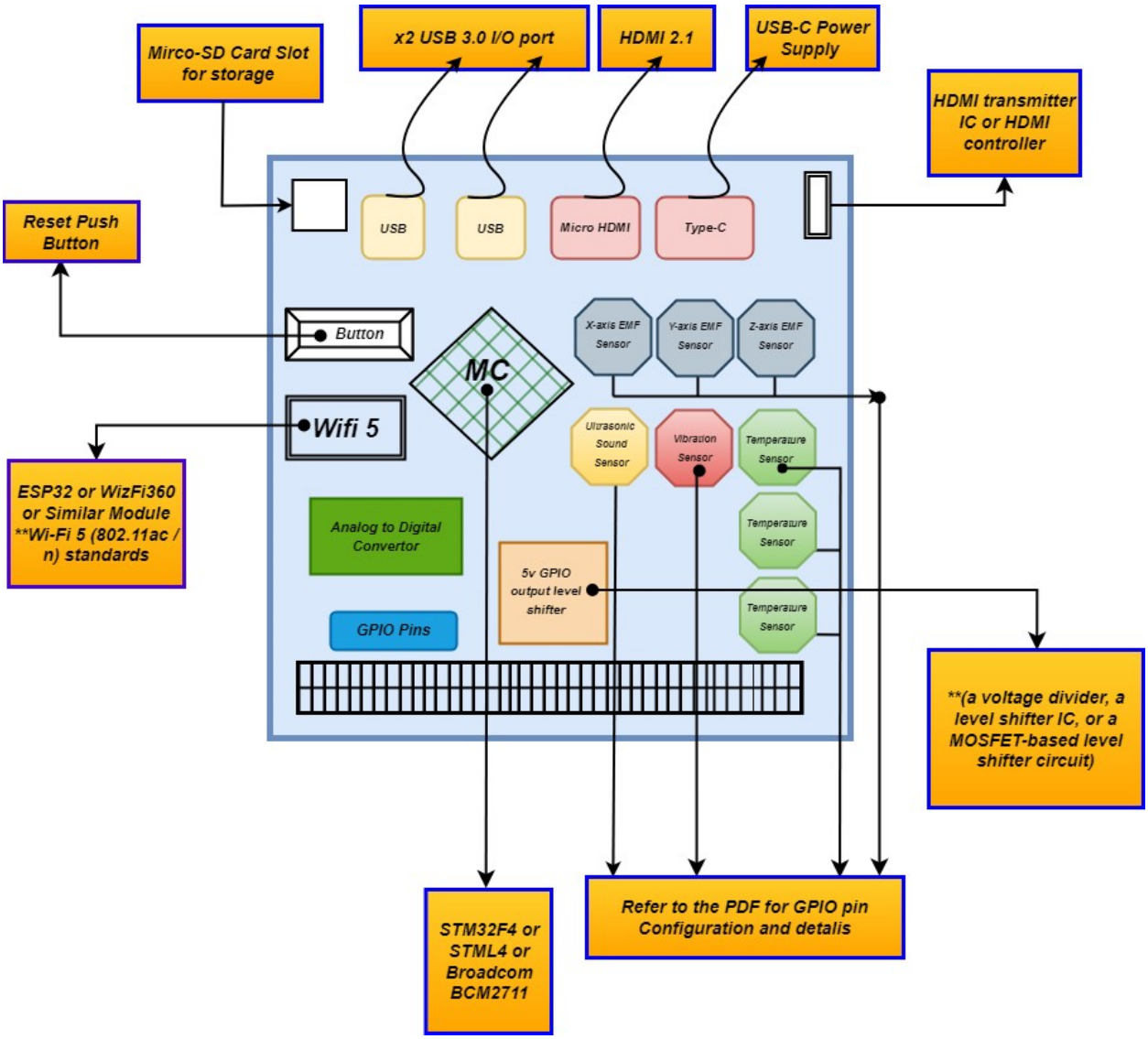
The Entire proposed system on a SoC Architecture Block Diagram



SOC Details along with sensors' configurations

System-on-Chip (SoC) Details and Sensor Configurations:

I/O Ports and Connectivity:

- USB 3.0 (x2) ports:
    - Convenient connectivity for peripherals and fast data exchange.
    - Dual Bus Architecture: Separate data paths for simultaneous bi-directional data transfers, improving efficiency.
- USB Type-C (x1) port:
    - Dedicated power supply port compatible with USB Type-C standards.
- Micro HDMI 2.1 (x1) port:
    - Support for portable displays.
- Wi-Fi 5 (802.11ac) or (802.11n) standards:
    - Enables low latency data transmission using ESP32, WizFi360, or similar modules.

Micro-Processor:

- SOC options:
    - STM32F4
    - STM32L4
    - Broadcom BCM2711 SOC

Sensors:

1. Temperature Sensor:
    - MAX6675k thermocouple module for accurate temperature readings. Readings taken in degree Celsius(°C).
2. Vibration Sensor:
    - MPU6050 GY-521 3-axis accelerometer and gyro sensor for vibration detection. Readings accepted in mms-1
3. EMF Sensor:
    - Linear Magnetic HAL Sensor x3 for measuring electromagnetic fields (EMF). Readings taken in Gauss (the sensor must be capable to detect EMF changes up to 16 Gauss)

4. Ultrasonic Sound Sensor:
    - Captures device acoustics at frequencies > 20kHz. Readings accepted in decibel (dB)

These SOC details, sensor configurations, and connectivity options ensure efficient data processing, precise measurements, and reliable connectivity for optimal system performance.

GPIO Pin Configuration *with respect to Raspberry Pi 4 Model B:

Sensors	GPIO Pin No.				
MAX 6675K	GND (9)	VCC (1)	SCK(23)	CS (24)	SO (21)
MPU6050GY521	VCC (4)	GND (34)	SCL (5)	SDA (3)	-
Magnetic HAL	GPIO27	with the assistance of ADC *ADS1115 module			

***Note:**

- **The entire system must be capable to withstand a surrounding temperature about 100°C to 150°C.**
- **The device will be mounted on the industrial machine and thus there must be a circuit designed to keep the system free from any environment magnetic interferences that may be emitted by the industrial motor.**