Vickey Xia

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EDUCATION

BE (Hons) Computer Systems Engineering, University of Auckland; 2024 – 2027

- GPA: 8.06 / 9
- 2024 Dean's Honour list
- Modules: Object-Oriented Programming; Electronics; Data Structures and Algorithms; Computer Systems Design; Digital Systems Design (ongoing); Operating Systems (ongoing)

Saint Kentigern College, Auckland; 2017 – 2023

- IB HL subjects: Maths AA (6), Physics (6), Chemistry (5)

SKILLS AND INTERESTS

- **Coding Skills:** C, C++, Java, Python, MATLAB, R.
- **Software Tools:** KiCad / Altium, LTspice / Cadence(PSpice), Git / GitHub, Autodesk (Inventor and AutoCAD).
- **Hardware:** Soldering (SMT and THT), Oscilloscope and Digital Multimeter.
- **Languages:** English (native), Mandarin (native), Cantonese (native)
- **Interests:** Hardware modification, Badminton and Chess

Projects

Bluetooth DAC/AMP (Ongoing)

Modules: STM32WBA55CG, C, CMSIS-RTOS, BLE Audio, KiCad, Signal Processing, LTspice / PSpice.

Designing a battery-powered **Bluetooth LE 32-bit Digital-to-Analog audio converter**. A **STM32WBA55CG** is used as the microcontroller, programmed in **C**, with a custom BLE application controlling input DAC signals (I2S), OLED screen (I2C), rotary encoder, and buttons. A custom **4-layer PCB** is designed in **KiCad**, featuring QFN and TSSOP packaged chips. Simulated and verified battery power supply design and amplifier with **SPICE-Based** simulation. Status: Tested and verified prototype PCB for the DAC and amplifier circuit using an **Oscilloscope**.

Ferrous Fellow (2 weeks)

Modules: RP2040, C++, C, AI/ML, Python.

A two-week team project creating a toy robot using an **RP2040** microcontroller programmed in **C++**. **TensorFlow Lite** and **OpenCV** were used for speech and facial recognition, and emotions were analysed through the **OpenAI API**, which then recommended music. Mainly responsible for implementing TensorFlow, **I2C** for OLED screen, **UART** for communication with host device, **ADC** for microphone and **PWM** for servo motor control in the MCU. Also worked on adjusting the host device program to ensure proper communication with the MCU.

Custom Numeric Keypad

Modules: RP2040, C, KiCad, Autodesk.

Designed a keypad with a **custom PCB** and 3D printed case. A 2-layer PCB was designed using **KiCad**, featuring an **RP2040** MCU, hotswap sockets for switches and a rotary encoder. Firmware written in **C** utilising the QMK library. The case was designed using **Autodesk Inventor** and **AutoCAD**.

LedRTOS

Modules: RTOS, STM32, C, Assembly

Built from scratch a Real Time Operating System (**RTOS**) using C and Assembly. Implements **scheduling** of LED blinks through **priority-based** preemptive scheduling with static priorities.

Gameboy / Chip8 Emulator

Modules: Hardware Emulation, C++, SDL2.

A **C++** project that emulates the hardware of a Game Boy and Chip-8 system. The behaviour of an **8-bit CISC** microprocessor (Sharp SM83) is emulated for the Game Boy. **SDL2** was used for graphics and the input system.