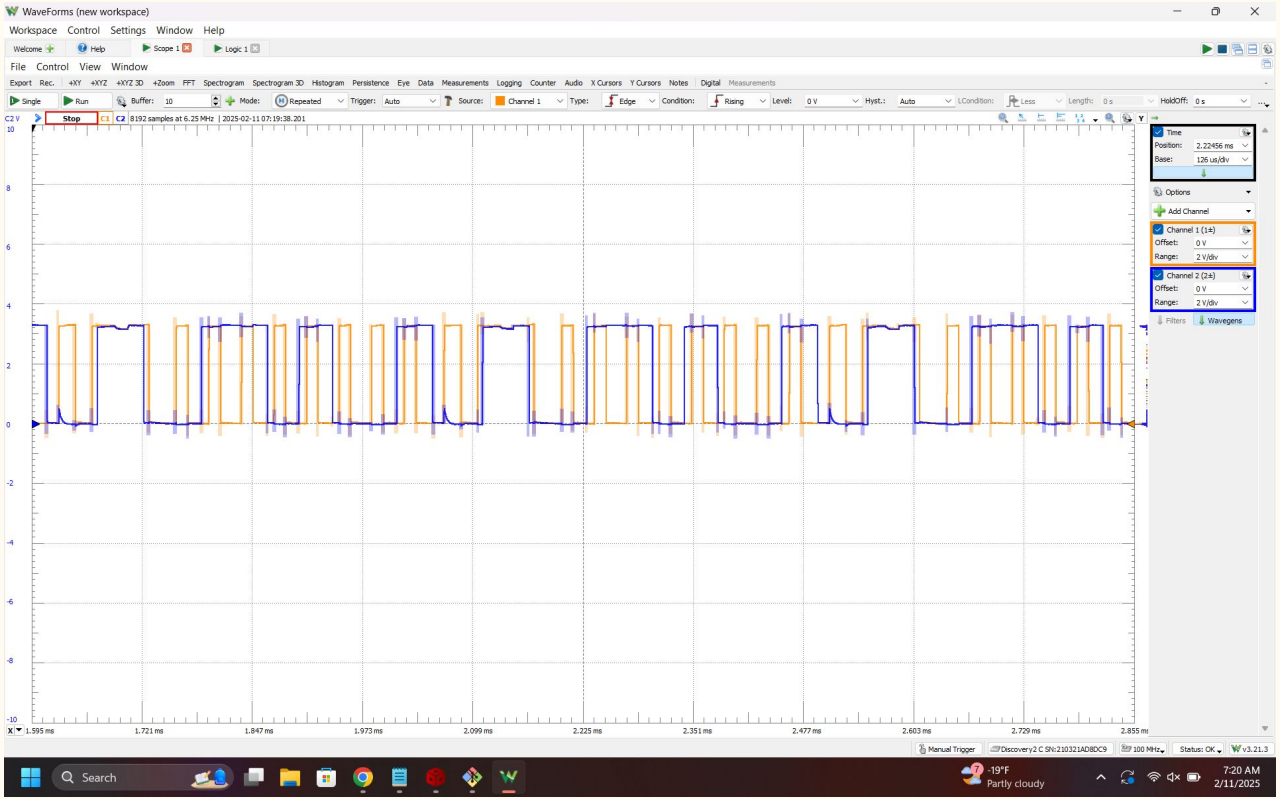
Bit-Banging I^2C

An introduction to creating serial transmission protocols

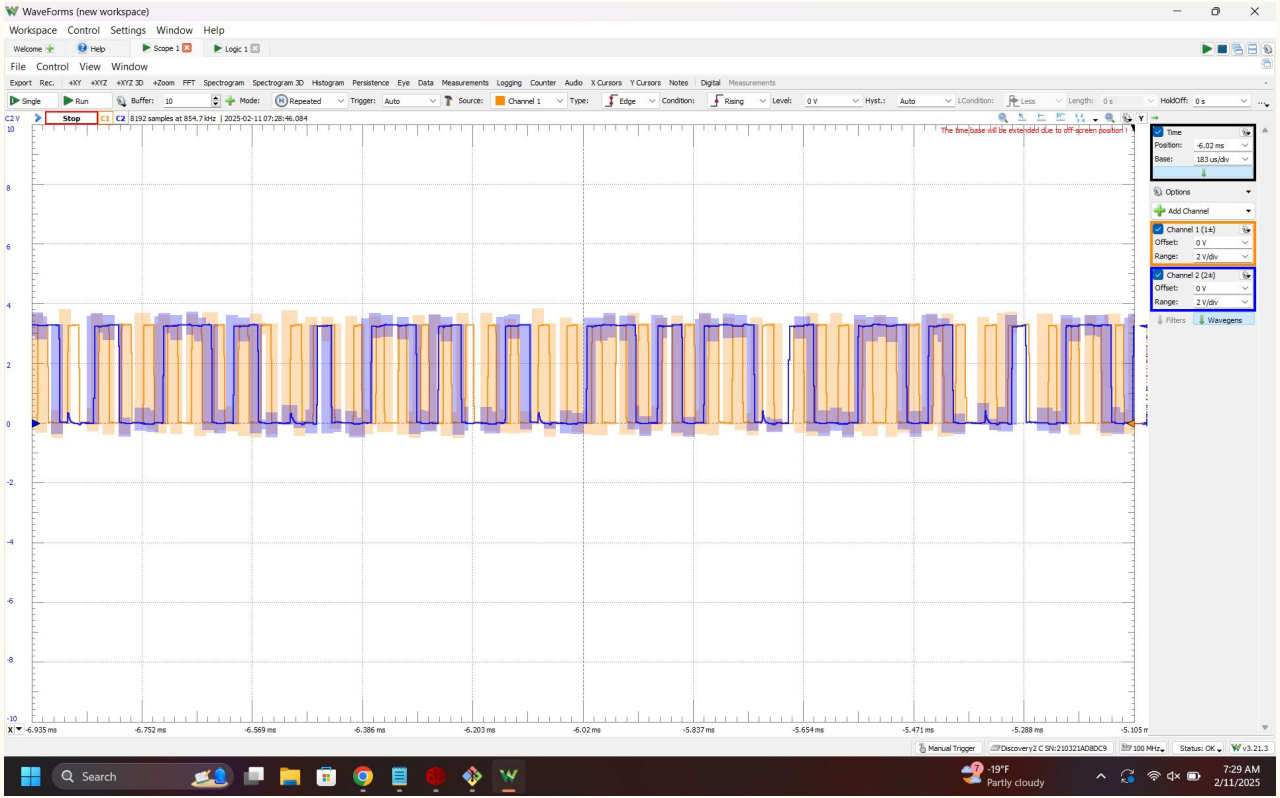
Goal

- The aim of this project was to read a real time clock (RTC) using a serial transmission protocol known as inter-integrated circuit, or I^2C.
- While an I^2C module exists on the MSP430, here we manually created the protocol ourselves.
- This involved two channels, one as a clock (SCL) and one for the data transmitted (SDA). The manner in which these channels are HI or LO with respect to each other is what allows I^2C to start, stop, and transmit data.

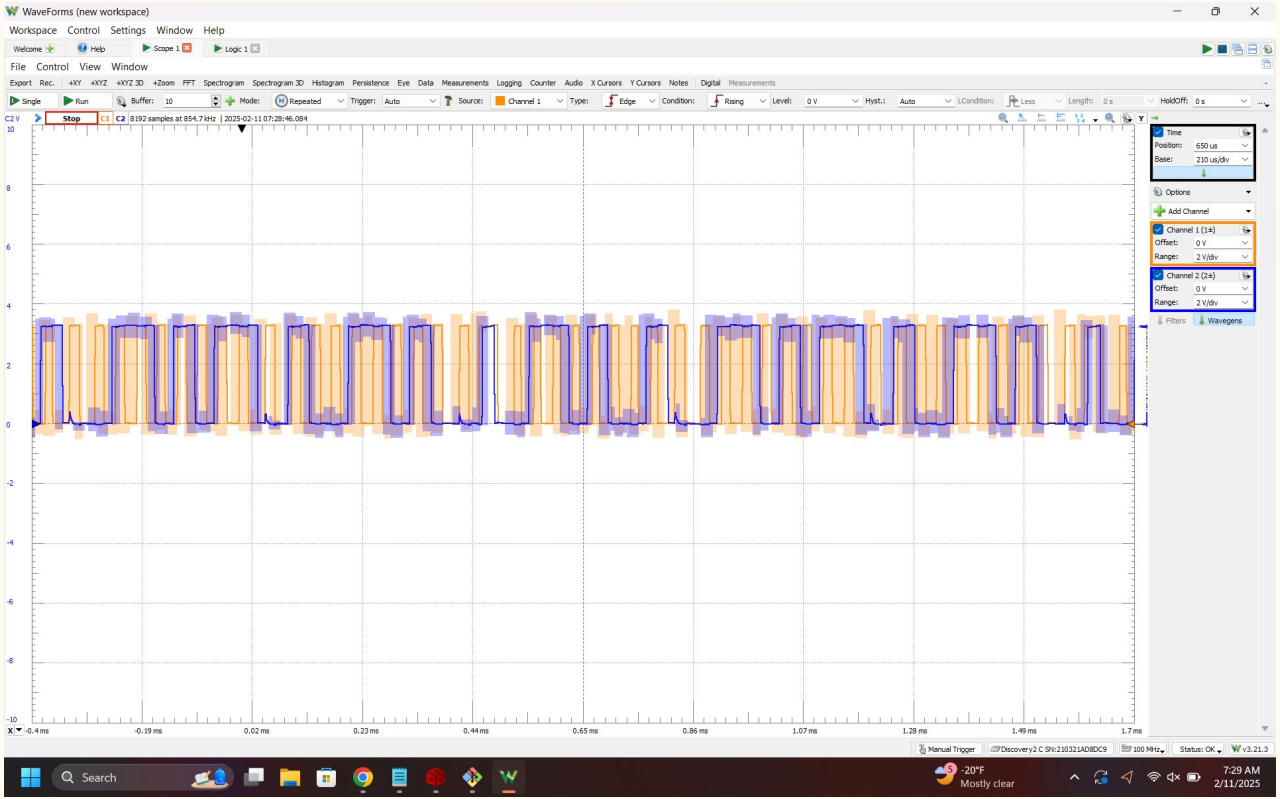
Start-bit, Address+W/R bit, stop-bit:



Full transmission (start, address, data, stop):



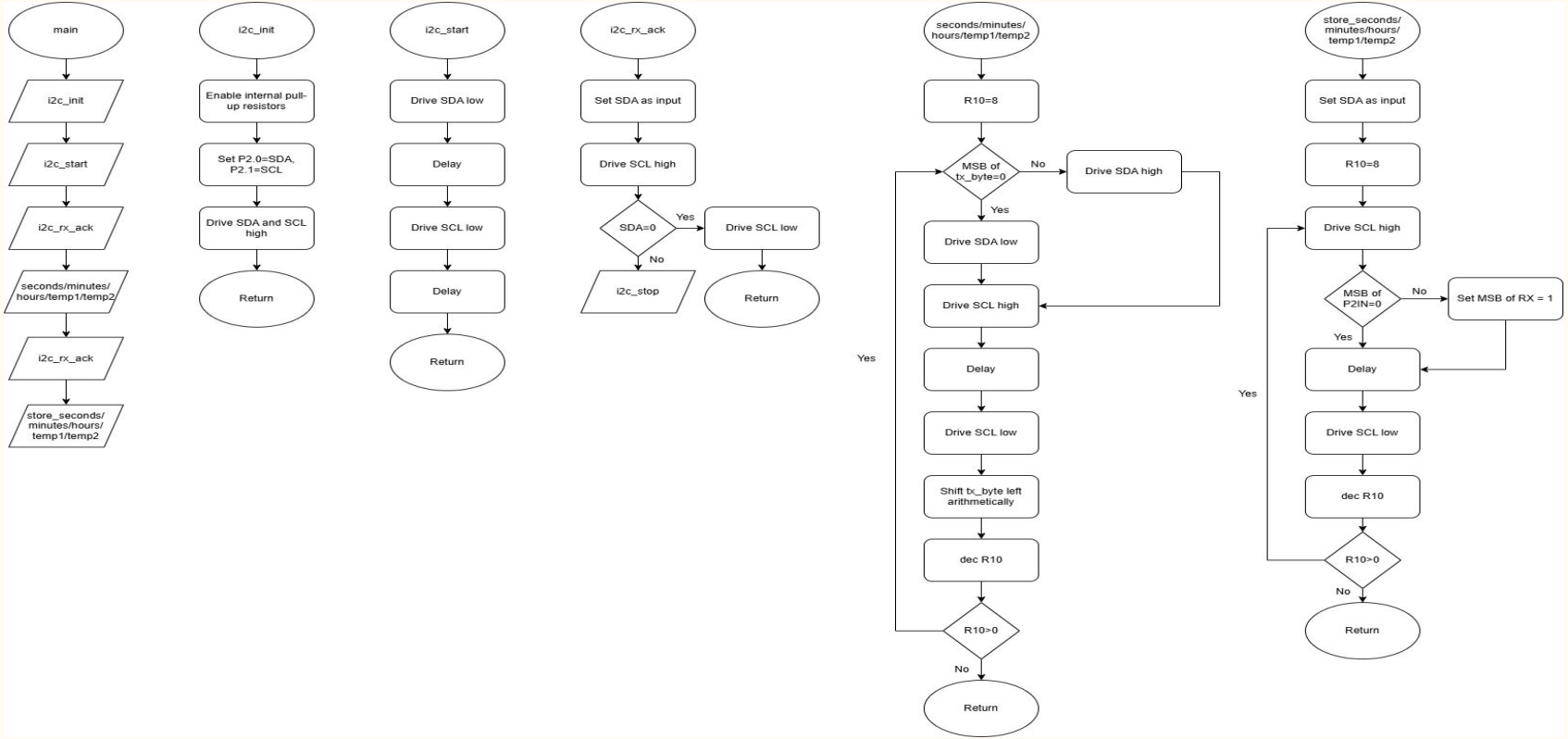
Transmission of several bytes:



Division of Labor

- We both contributed about 50/50
- Kellen programmed the start and stop subroutines, as well as the ACK and NAK protocols
- Dominick programmed the subroutines to receive and store data, and worked on the hardware/breadboard side
- Both debugged and worked on the whole program

Flowchart of Complete RTC Transmission



Circuit Diagram