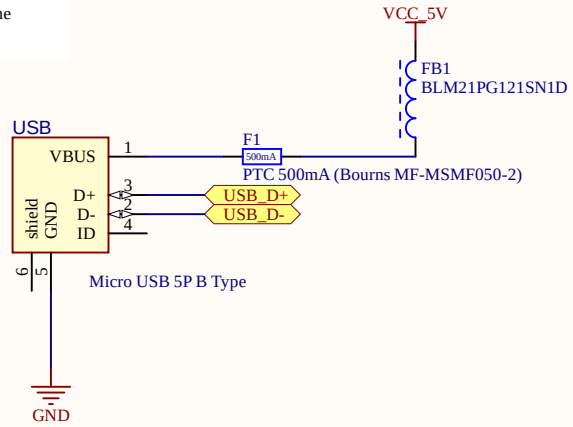
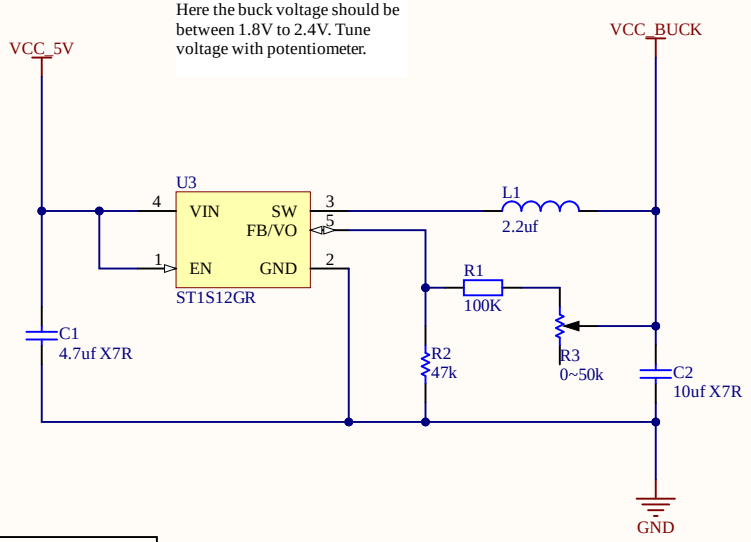
Micro USB Power Supply 5V

The device draws no more than 200mA from the micro usb.
This port is connected to the USB to UART chip for programming the microcontroller.



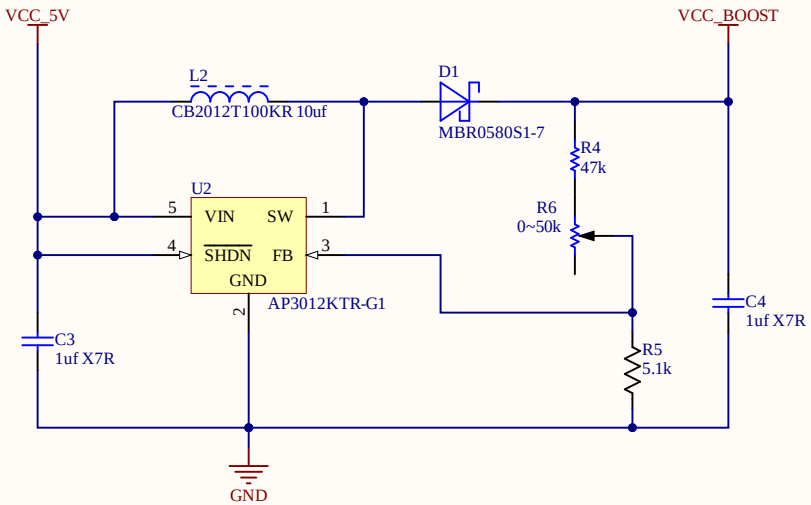
Buck Converter 1.8 ~ 2.4V

VO = 0.6 [1 + (R1 +R3)/ R2]
Here the buck voltage should be between 1.8V to 2.4V. Tune voltage with potentiometer.



Boost Converter 9.2 ~ 24V

VO=1.25*[1+(R4+R6)/R2]
Here the boost voltage should be between 9.2 to 24V. Tune voltage with potentiometer.

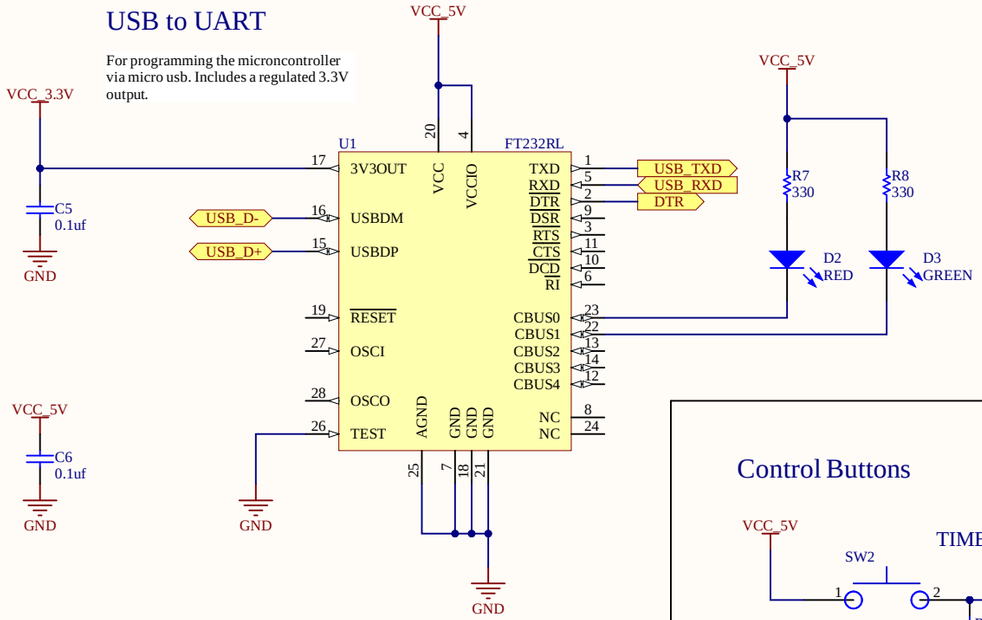


VFD CLOCK POWER MODULE

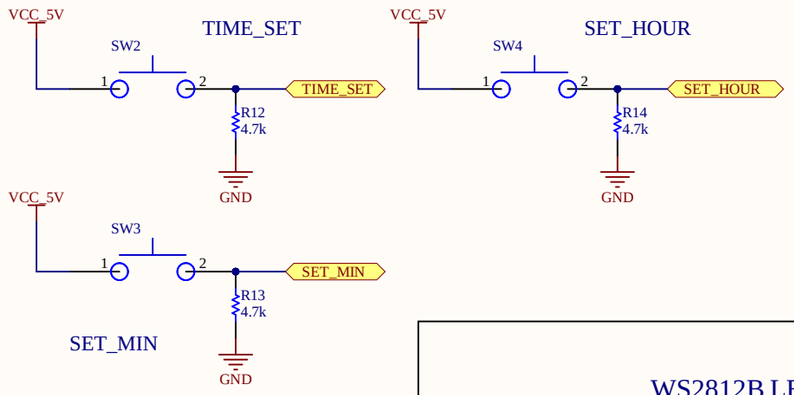
Title		
Size: A4	Number	Revision
Date: 8/21/2021		Sheet of
File: PowerModule.SchDoc		Drawn By:

USB to UART

For programming the microncontroller via micro usb. Includes a regulated 3.3V output.

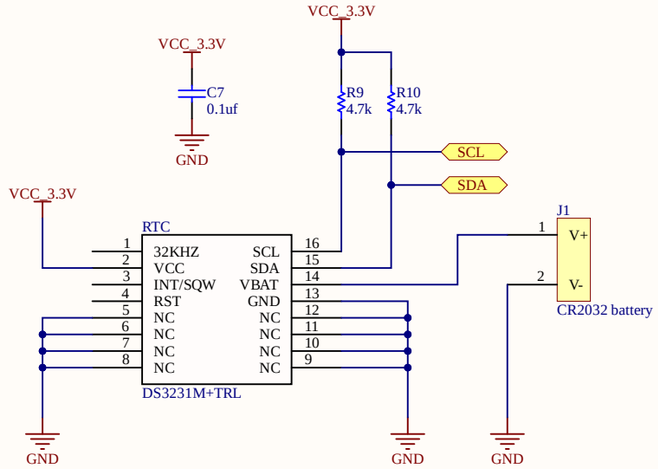


Control Buttons



Real Time Clock

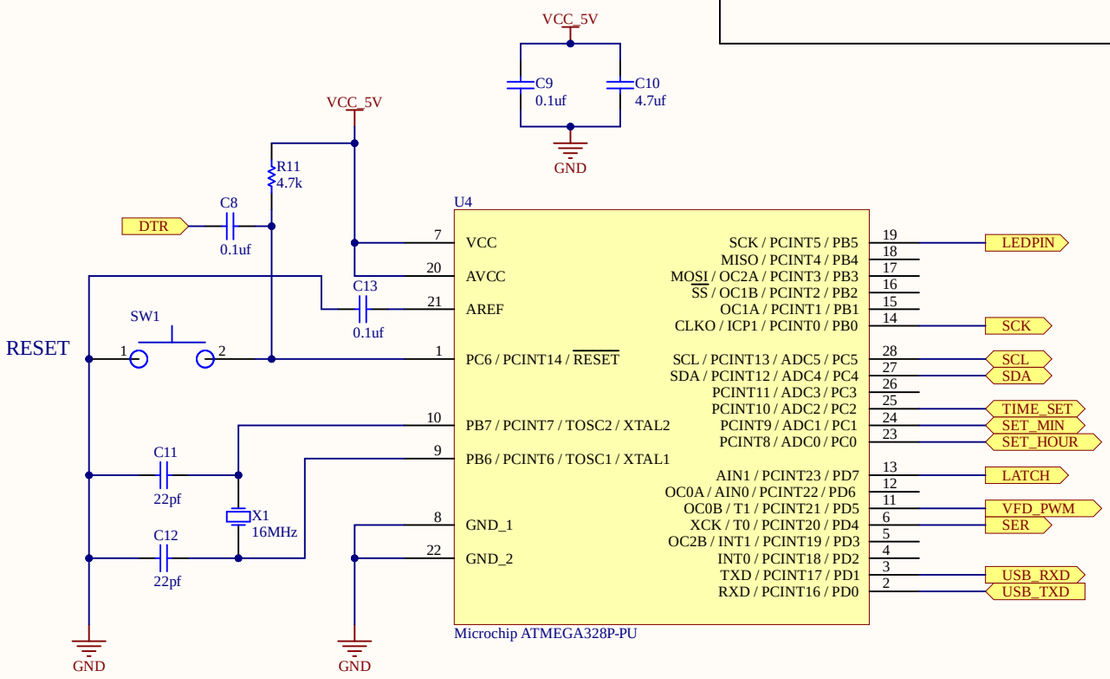
Real time clock with CR2032 backup battery.



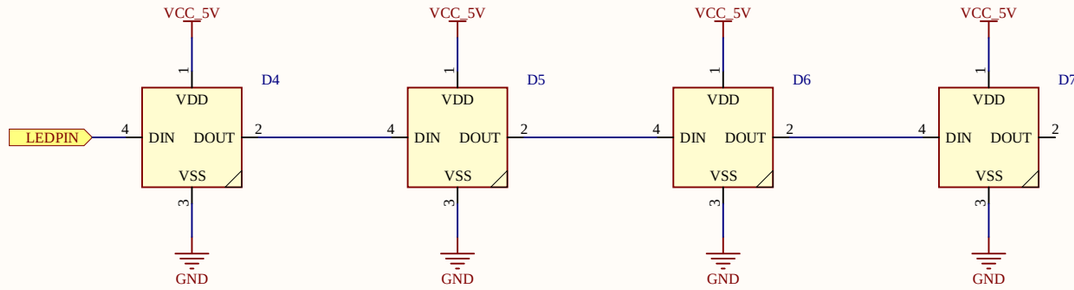
VFD CLOCK MICROCONTROLER MODULE

Microcontroller

ATmega328p arduino compatible mcu.
To bootload it with Arduino externally before soldering it, a 10k pull-up resistor, two 18-2pF ceramic capacitor, and a 16Mhz crystal is needed.



WS2812B LED Array



LED Array Buffers

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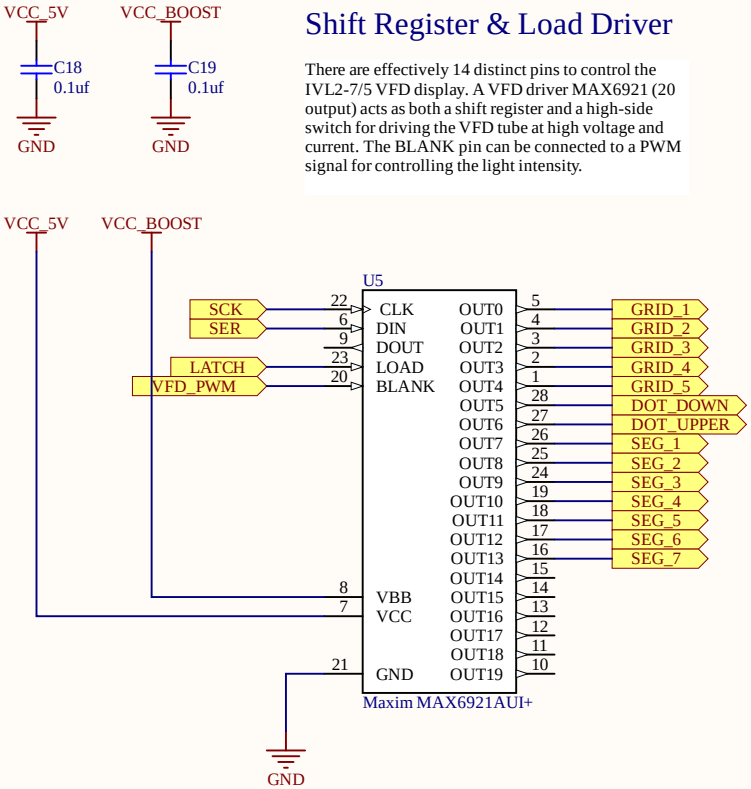
Size: A3	Number	Revision
Date: 8/21/2021		Sheet of
File: Microcontroller.SchDoc		Drawn By:

VFD CLOCK CLOCK DISPLAY MODULE

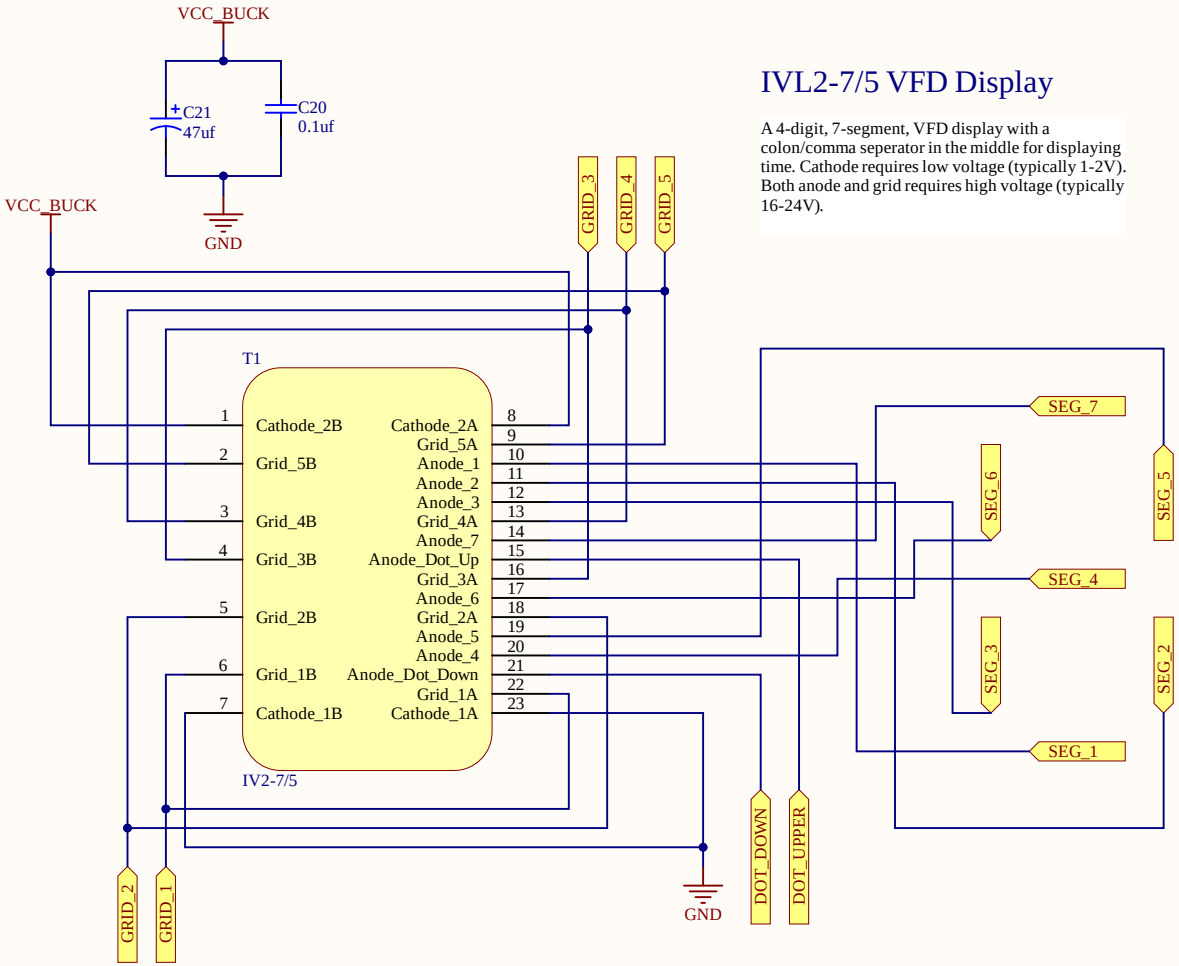
Shift Register & Load Driver

There are effectively 14 distinct pins to control the IVL2-7/5 VFD display. A VFD driver MAX6921 (20 output) acts as both a shift register and a high-side switch for driving the VFD tube at high voltage and current. The BLANK pin can be connected to a PWM signal for controlling the light intensity.



IVL2-7/5 VFD Display

A 4-digit, 7-segment, VFD display with a colon/comma seperator in the middle for displaying time. Cathode requires low voltage (typically 1-2V). Both anode and grid requires high voltage (typically 16-24V).



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File: ClockDisplay.SchDoc		Drawn By: