W4NC Arduino Class 1/24/2015
VFO using a DDS module

Files needed can be downloaded from http://ncbob.info/links/

Code:
• DDSVFO.zip

Libraries
• AD9850.zip - Wrapper for working with the AD9850
• IRemote.zip - Used for the IR sensor to read remotes
• Keypad.zip - Keypad library, works with any column/row keypad
• LiquidCrystal.zip - Libraries for various LCD displays

Parts
• Arduino Mega 2560
• Mini breadboard
• Keypad
• Rotary Encoder
• DDS Board AD9850
• LCD 20x4 display
• IR Diode sensor
• 2 .47uf capacitors
• Power switch
• Project Box
• Light Ply pieces for mounting boards
• Input/Output connectors (to be added by student)

Build Steps
(Note unless specified all 2560 pins are digital pins)
1. Add the libraries to the Arduino libraries folder
2. Uzip the DDSVFO.zip to the Arduino project folder
3. Connect the Mega 2560 and download the DDSVFO program to it
4. Mount the 2560 to one of the lite ply mounting boards
5. Using the jumper cables bend the pins on the LCD so they are vertical
6. Install the LCD into the project box using the spacers and 3mm bolts
7. Connect the LCD to the 2560

        LCD   Mega 2560
        GND   GND
        VCC   +5v
        SDA   SDA Pin 20
        SCL   SCL Pin 21

8. Apply power to the Mega 2560 and make sure the LCD works and displays the frequency. You might need to change the initialization command at the top of the code to match your display. Use the information here: http://arduino-info.wikispaces.com/LCD-Blue-I2C to figure out which display you have and what configurations to use.
9. Solder a .47uf capacitor between GND and CLK and GND and DT on the Rotary encoder board to debounce the outputs.

10. Connect the rotary encoder to the Mega 2560

Rotary encoder	Mega 2560
GND	GND
+	5V
SW	Analog pin 0
DT	Pin 3
CLK	Pin 2

11. Power up the 2560 and make sure that the frequency changes as you rotate the encoder, and the step value changes when you click the encoder.

12. Peel the backing off the keypad and mount it on the case with the cable going through the slot

13. Connect the Keypad to the Mega 2560 pins 41,43,45,47,49,51,53 then power up the Mega and make sure that the buttons pressed match what's displayed on the LCD. If not reverse the pins on the keypad and test again.

14. Install the DDS board on the breadboard.

15. Connecct the DDS to the Mega 2560

DDS	Mega 2560
VCC	5V
W_CLK	Pin 8
FU_UD	Pin 9
DATA	Pin 10
RESET	Pin 11
GND	GND

16. Power up the Mega 2560 and test the output of the VFO and that it matches the display.

17. Install your output connector and wire it to the DDS board.

The IR sensor can be added by connecting it to GND and 5V and then the signal to pin 31. You will need to determine how you want to mount the IR sensor in the box.

The power switch can be installed and an extra barrel jack mounted that provides power to the Mega and allows it to be turned off an on using the switch.