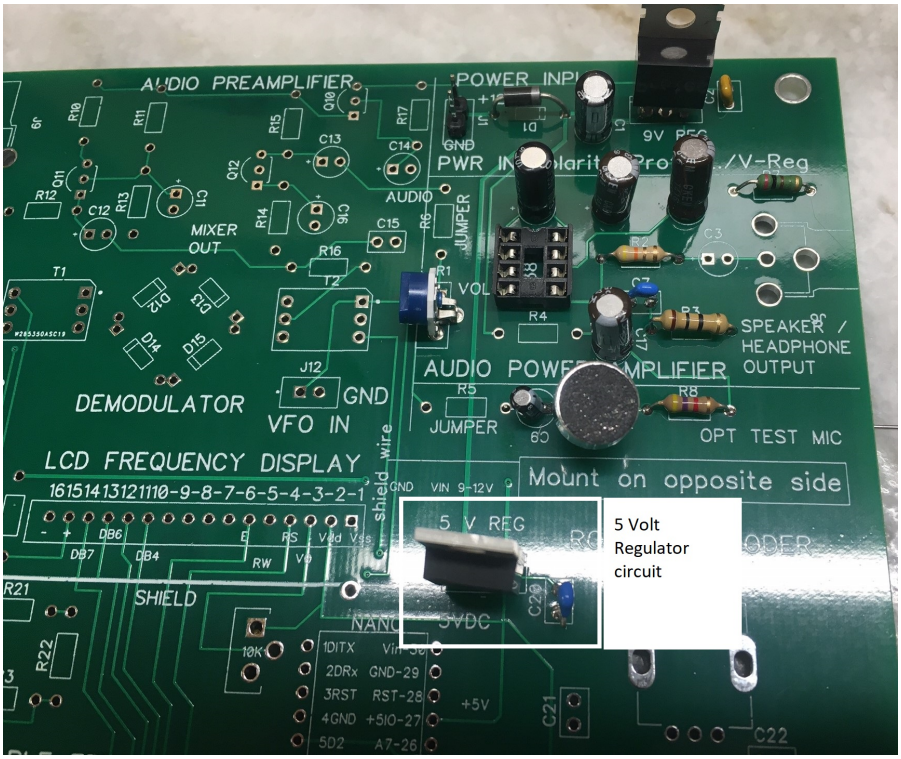
CORNERSTONE HAM RADIO FLEX CLUB
SOLDERING PART TWO -- 5VDC Regulator & Audio Power Amp

SECTIONS TO BE SOLDERED / CONSTRUCTED

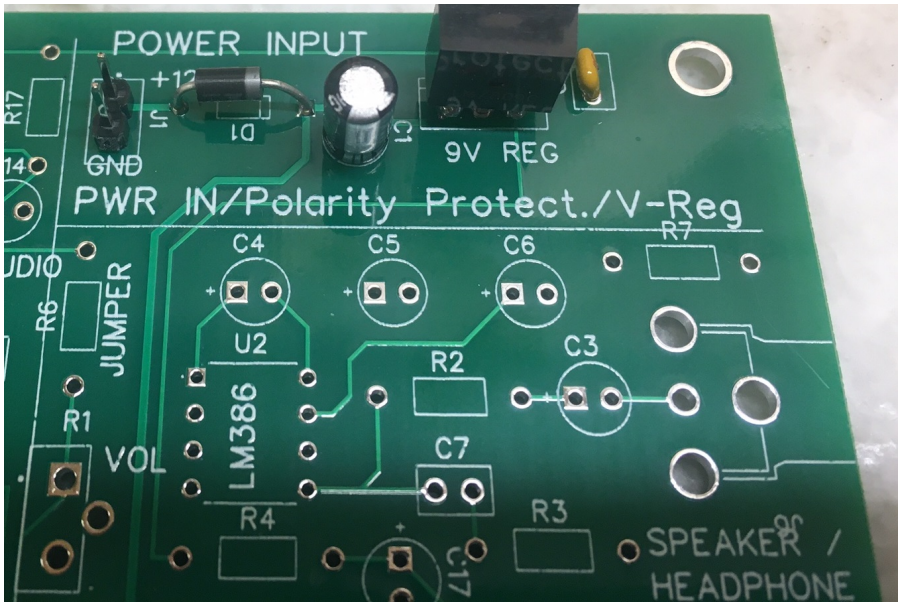
No.	Section
1	9VDC Power Supply
2	**5VDC Power Supply**
3	**Audio Power Amplifier**
4	Test Microphone
5	Audio Preamplifier
6	Wind trifilar transformers
7	Balanced (de)modulator
8	Arduino computer controlled variable frequency oscillator / display / controls



CIRCUIT:

5VDC Regulated power supply. The purpose of this section of the radio circuit is to provide a stable, regulated, 5VDC for the Arduino and Display and related circuits. It uses a regulated 3-

terminal regulator known as a LM5805. This device has its own internal protection against an output short circuit or overheating -- a really nice device for home builders! It gets its input from a trace on



the board that comes from the same input connector as the 9VDC supply.

This circuit only has two components -- the 3-terminal regulator and a small ceramic capacitor for RF bypass (filtering), which can be anything from 0.01 - 0.1 microfarads.

❑ Solder the 3 terminal 5-volt regulator LM5805 -- be CERTAIN that the metal tab matches the drawing.

❑ Solder the RF bypass capacitor C20, which can be anything from 0.01 uf to 0.1 uf depending on your parts supplies.

AUDIO POWER AMPLIFIER
LM386

The audio "power" amplifier is actually a simple low-power amplifier circuit built around a very popular audio amplifier integrated circuit (IC) the LM386. While it looks complicated, it actually just comes from the literature provided by the designers of the LM386 chip. In their promotional literature on their chip, they provide the entire circuit for a small audio amplifier capable of powering a small speaker or headphones/earphones. Most equipment designers simply follow the manufacturer's recommended circuit -- and bingo! the audio amplifier design is "done"!

See the schematic below for this amplifier.

❑ We start with an adjustable volume control, R1. For simplicity we use a small "trimmer" potentiometer for this, but wires could just as easily be inserted to go to a real panel-mounted volume control potentiometer.

❑ R7 (100 ohms) and C6 (47 or greater microfarads) work together to provide a stable DC voltage for powering the LM386, reducing audio noise or feedback on the +9V power supply line. This is to reduce internal oscillations of the amplifier. Be certain that you match the polarity of C6 properly!

❑ Solder C5 (47 microfarads) in its position, again matching the polarity on this electrolytic capacitor. It serves the same purpose, connecting to an internal portion of the LM386 and reducing audio feedback around the power supply wiring.

❑ Solder C4 (10 microfarads), with proper polarity. This capacitor is used to bypass a portion of the internal chip circuitry to raise the voltage amplification of the amplifer from 20 all the way to 200. Without this capacitor the AC voltage gain of the amplifier would be 20 (which is equal to 20*log(20) = 26 dB); with this capacitor the in place the AC voltage gain becomes 200, or 23dB

❑ C7 (0.1 microfards) and R3 (10 ohms) are an output "trap" to provide a near-dead-short from the output of the audio amplifier to ground, for unwanted very high audio frequency oscillations to keep the amplifier stable. There is no polarity to C7. Solder both these components in.

❑ R2 (4.3 ohms) is in series with the output to protect this chip from an accidental short circuit on the output. It reduces the volume we can get out of the amplifier but provides important protection for the circuit. Solder this component.

❑ C3 is a series coupling capacitor that passes the alternating current audio signal to the speaker or headphones, while blocking the average DC output voltage from the chip. Solder this component, paying careful attention to the polarity.

❑ Socket for the LM386 integrated circuit. THE NOTCH MUST GO TO THE TOP of the board.

❑ Carefully insert the LM386 integrated circuit. The marker for pin 1 or "top" of the integrated circuit MUST MATCH the notch on the socket. Have your instructor check your insertion before power is applied.

You can easily copy this circuit and use it over and over in your own projects, just like I copied it from the manufacturers' literature.