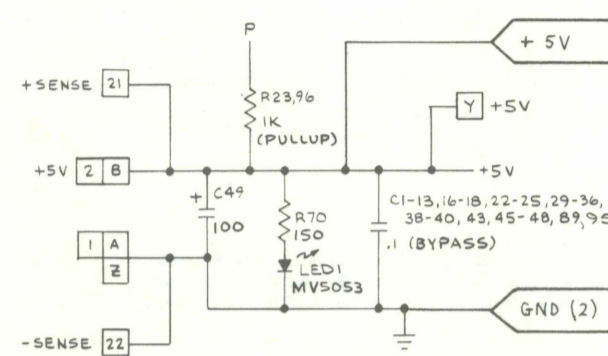
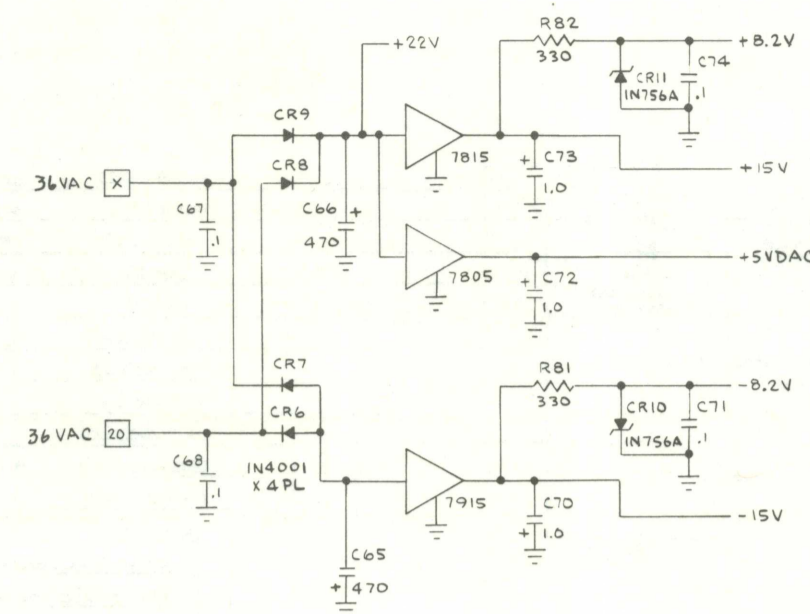


**POWER INPUT**



This circuitry consists of the PCB inputs and outputs for the +5 VDC logic power and 36 VAC input to the on board regulators. The +5 VDC inputs and outputs are discussed on the Sheet 1, Side A of this schematic set.

The 36 VAC inputs are received by two full wave rectifiers. Diodes CR6 and CR7 rectify the negative cycle of the input and the 7915 regulates the voltage at -15 VDC. Diodes CR8 and CR9 rectify the positive pulse of the 36 VAC input and the 7815 regulates the voltage at +15 VDC. The 7805 regulates an additional 15 VDC for the DACs. Zener diode CR11 supplies the +8.2 VDC for the sample and hold circuit. The +22V (unregulated) is used to power operational amplifier R7 in the audio output.

**VIDEO OUTPUT**

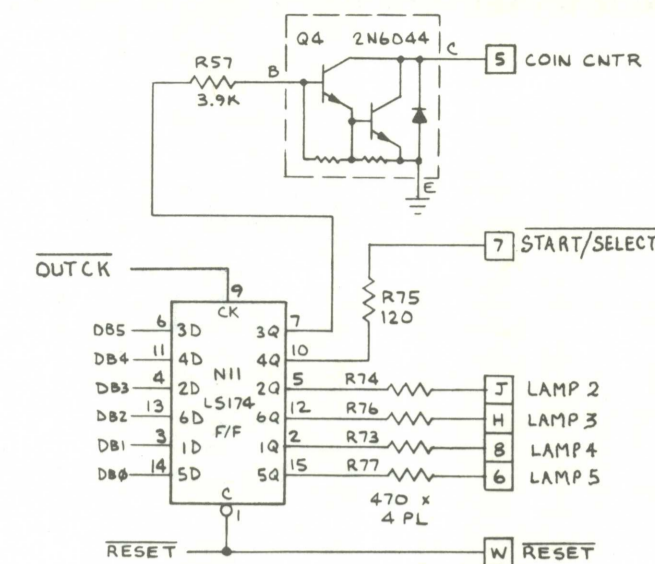
**Self-Test Diagnostics**

At the end of the self-test procedure, the microcomputer may be put into the Diagnostic Step mode. The diagnostics may be used for adjusting the monitor's centering position, linearity, brightness, and contrast. This is done by momentarily grounding the pin 10 input to the game PCB. Each time the pin 10 is grounded, the diagnostics step to the next test. There are a total of four steps. After the fourth step, the microcomputer returns to the self-test. The table below is a procedure for using the diagnostics.

Technician Instruction	Monitor Display	Suggested Use of Test	Waveforms of Test
Place game in self-test mode. At the end of the self-test sequence, momentarily ground pin 10 once.		Helps isolate failures in vector generator. Used to adjust X and Y outputs for equal output for line of 45 degrees on monitor.	
Momentarily ground pin 10 once.		Use for adjusting linearity on monitor.	
Momentarily ground pin 10 once.		Checks vector generator's capability to write alphanumeric.	
Momentarily ground pin 10 once.		Adjust brightness and contrast of monitor.	

**LAMP, LED, AND COIN COUNTER OUTPUT**

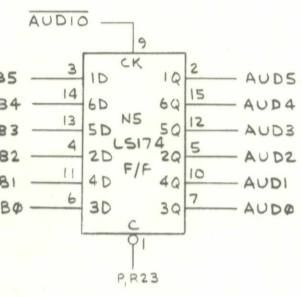
This circuit consists of coin counter driver Q4 and data latch N11, clocked by the microcomputer's address decoder. When the input to Q4 is high, the collector goes low grounding the return of the coin counter in the coin door. When START/SELECT is clocked low, it grounds the START and SELECT lines in the control panel. When LAMP2, LAMP3, LAMP4, or LAMP5 is clocked high the appropriate lamp driver transistor is biased into conduction lighting the lamp. LAMP2 is TRAINING MISSION, LAMP3 is CADET MISSION, LAMP4 is PRIME MISSION, and LAMP5 is the COMMAND MISSION lamp.



+5V OUT

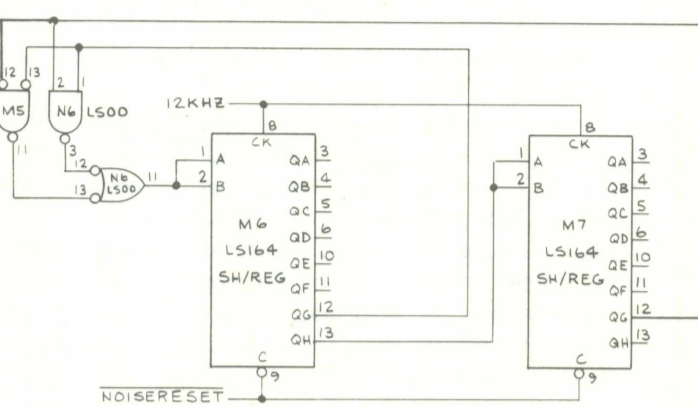
LED RETURN

**AUDIO OUTPUT**



There are four sounds generated in the Lunar Lander game: thrust, explosion, 3 KHz and 6 KHz. All audio control lines are altered by the microcomputer when AUDIO, from the address decoder, is low. The enabled audio depends on the state of AUD0 thru AUD5.

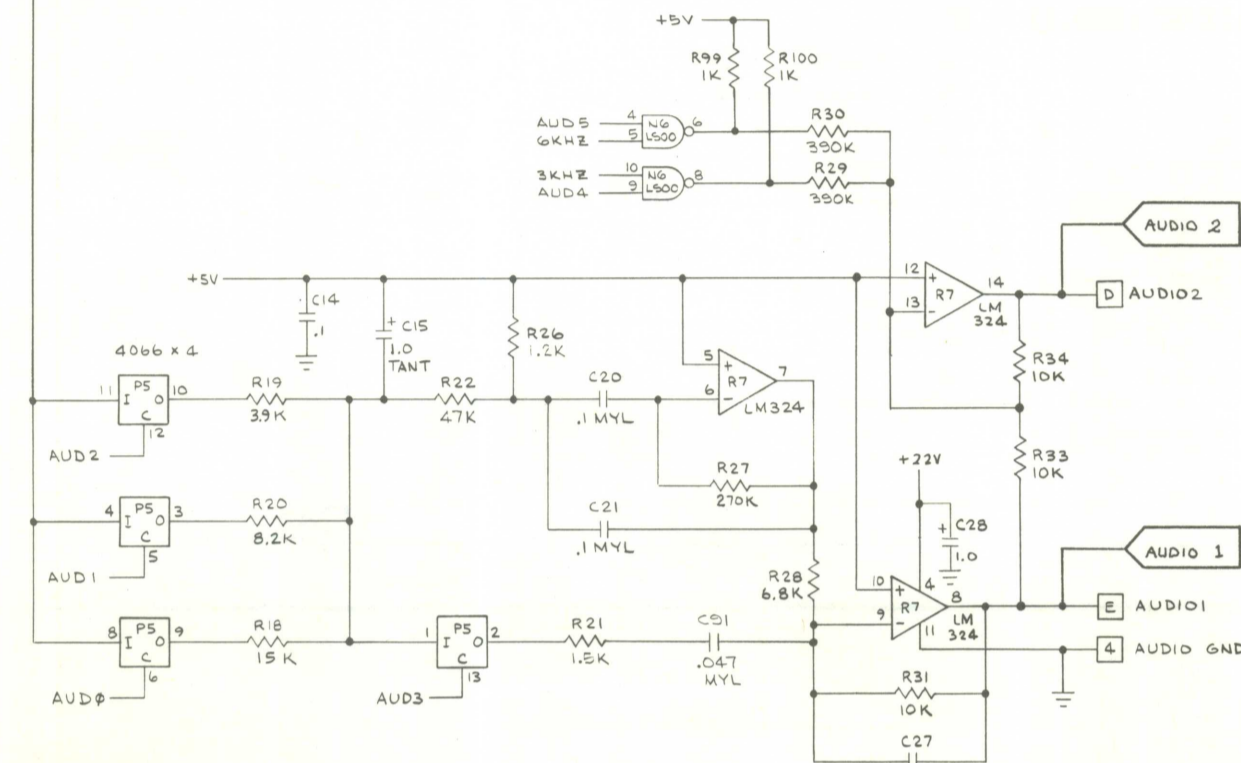
Thrust and explosion audio signals are both developed by random noise from noise generator M6 and M7. The resistive and capacitive network connected to the pin 6 input of operational amplifier R7 is a low pass filter that filters out the high frequencies for the thrust audio. The pins 8 and 14 outputs of op amp R7 develop two equal amplitude, opposite phase signals for the thrust and explosion signals only. Pin 14 of R7 is the output for the 3 KHz and 6 KHz signals.



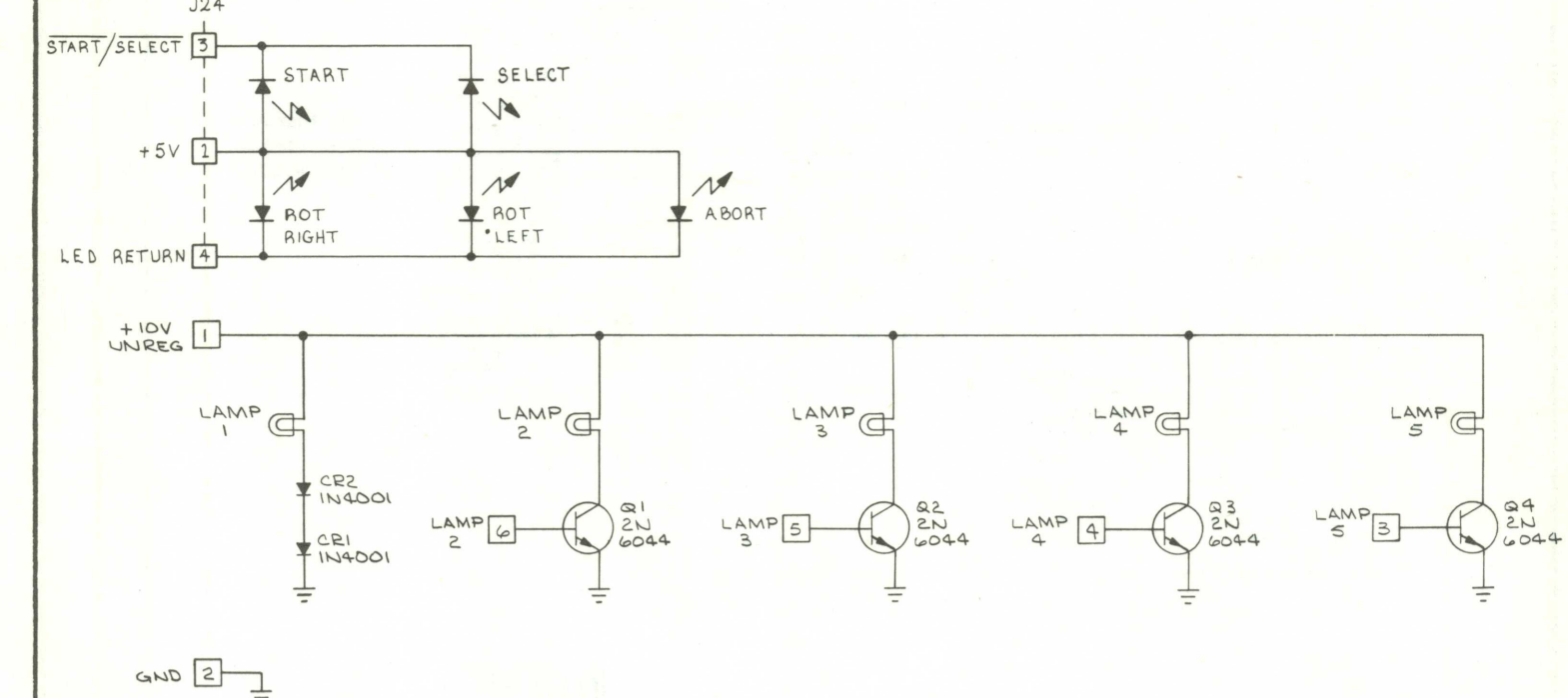
Thrust passes through analog switches P5 when AUD0 and/or AUD1, and/or AUD2 is high. When AUD0 is high, the thrust is at its lowest volume. When AUD0 thru AUD2 are all high, the thrust audio is at its highest volume.

The explosion audio is enabled by AUD3. The volume of this signal is determined by the state of AUD0 thru AUD2.

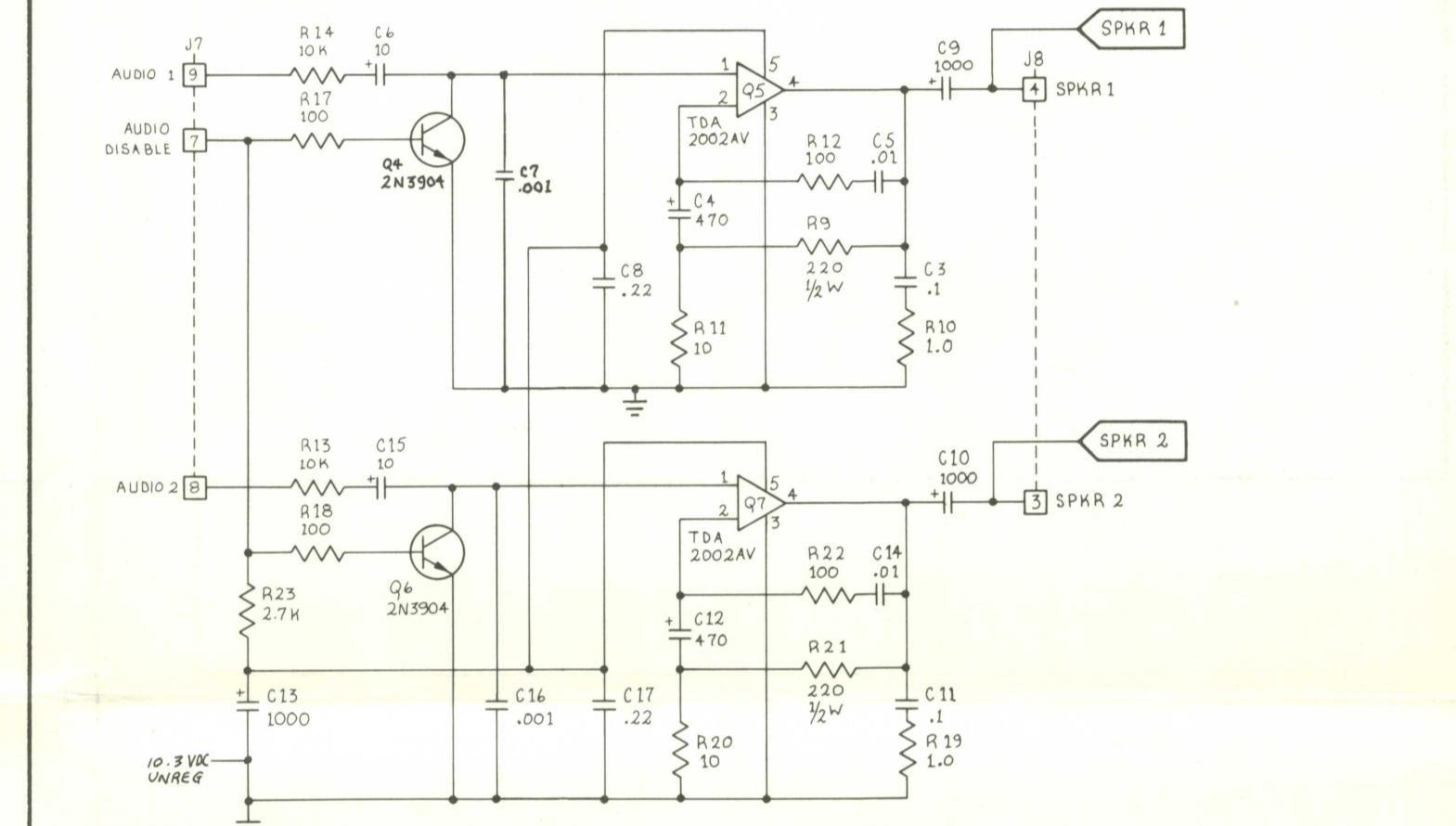
The 3 KHz audio and 6 KHz audio are enabled by AUD4 and AUD5 respectively. The 3 KHz signal is used as an audio warning of low fuel and indicator of proper ROM and RAM operation during Self-Test. The 6 KHz signal is used as the coin door SLAM audio and during Self-Test to indicate proper operation of control panel and coin door switch inputs and improper operation of ROM and RAM.



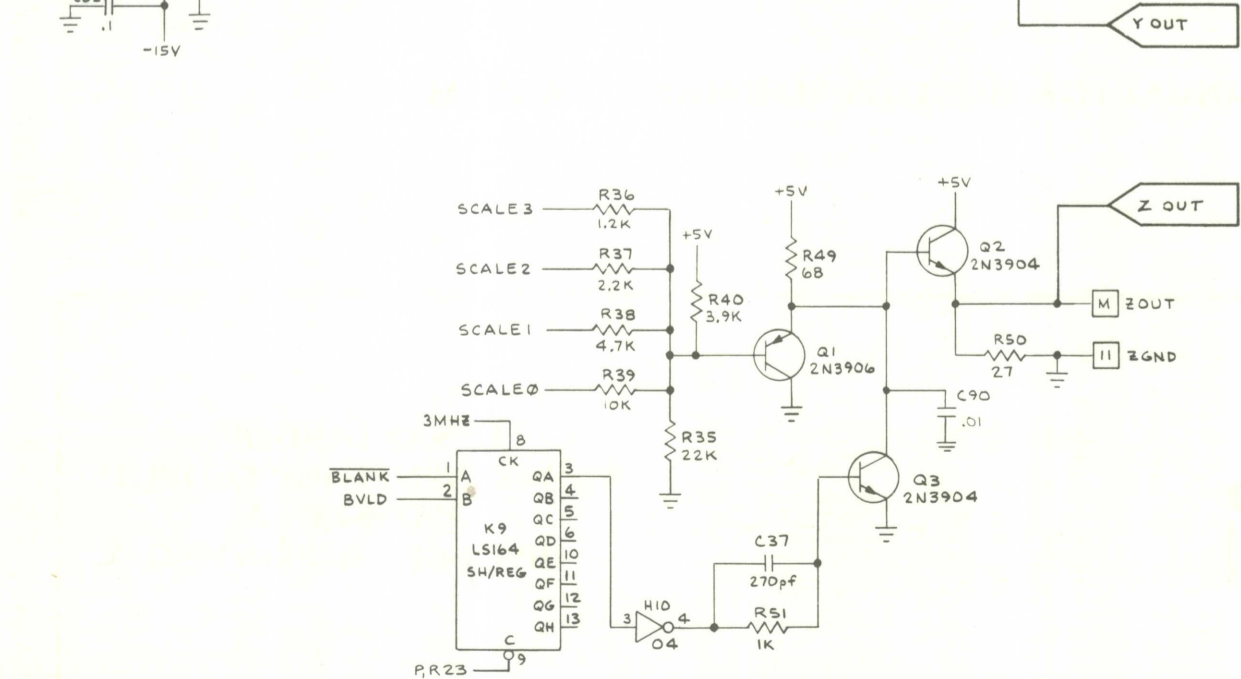
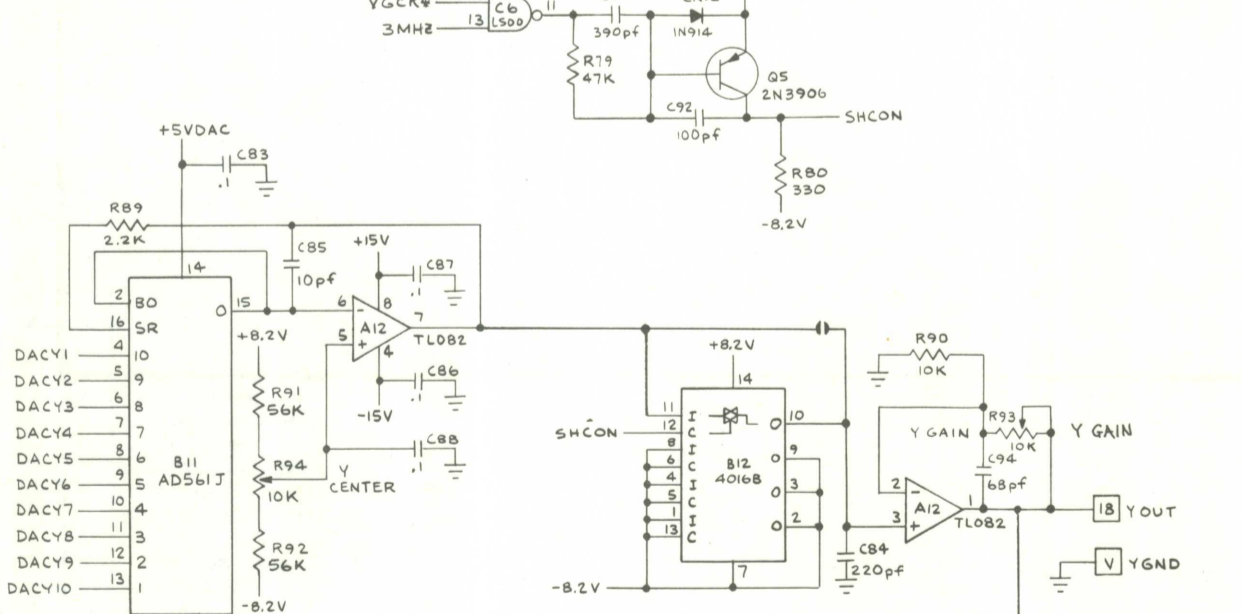
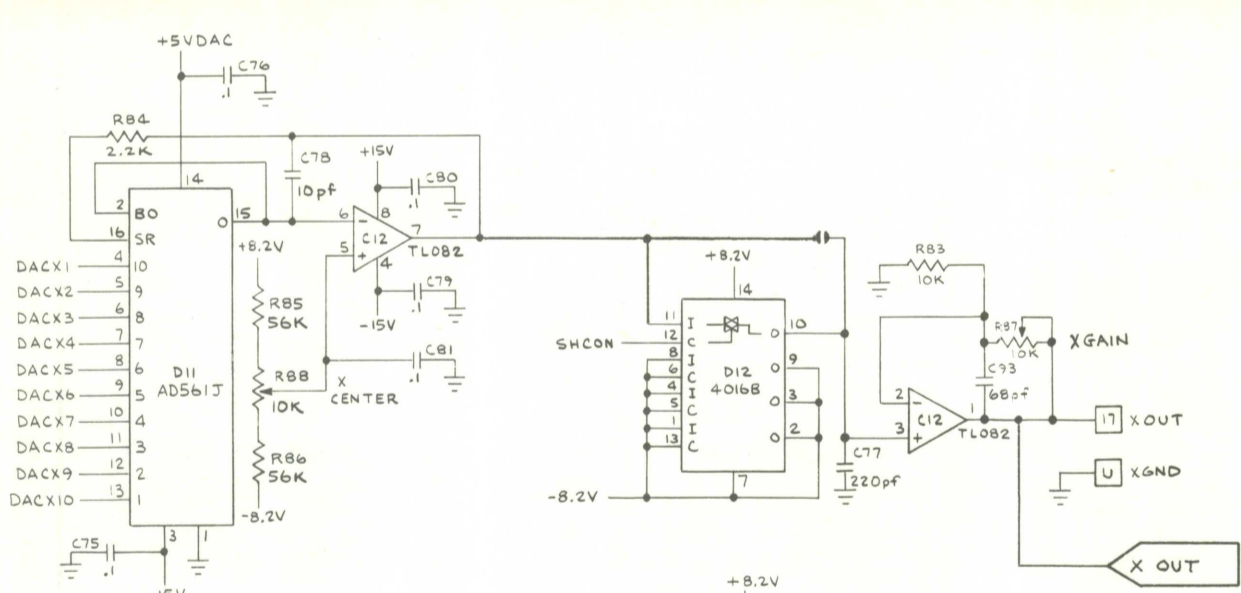
**PART OF CONTROL PANEL**



**PART OF REGULATOR/AUDIO PCB**



NOTE: AUDIO AMPLIFIER IS PART OF REGULATOR/AUDIO PCB AND IS REPEATED ON SHEET 1, SIDE A.



**SEE MONITOR MANUAL FOR MONITOR SCHEMATIC DIAGRAM**