## Theory of Operation

### I. Power Control

The control board draws a general 13.8V dc power supply, which is converted through U1, a 3-terminal regulator, to 8.0V dc for the receiver and transmitter.

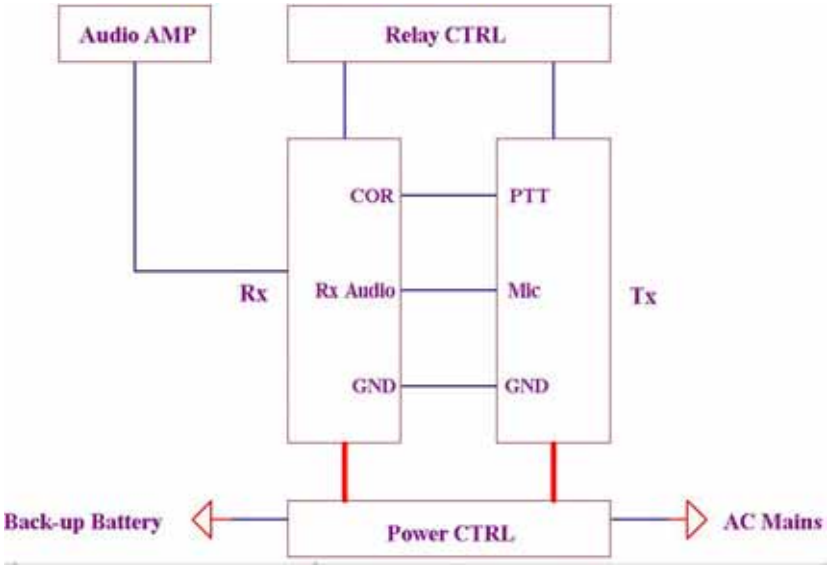


Fig. 1 Power Supply Block Diagram

### II. Relay Control

When a valid signal is detected, the COR goes low and trigger PTT of the transmitter. At the same time, the audio output from discriminator is routed to MIC input of the transmitter. The potentiometer VR3 is used to adjust the receive audio output to the proper level for transmit audio deviation.

### III. Float Charging Function

The TR-50 provides selectable AC (100-240V ac) power supply. Normally users can equip battery back-up system connected to the external DC jack with floating charge function in the mean time. This provides auto-revert to DC battery once the AC mains fails.

### IV. Fan Control

This repeater provides three options of cooling fan control: PTT controlled, temperature controlled and continuous operation. The power supply of the fan is controlled through a 5V voltage detector, HT7050A. When the input is above 5V, the output is high-Z; when lower than 5V, the output goes low.

**V. AF Amplification**

The receive audio is routed to another AF amplifier NJM386M, which is convenient for the users to monitor the activities of current channel.

**VI. Definition for control ports**

The definition of all the pins goes as follows:

1. J3

| | | |
|---|---|---|
| 1pin——NC | | |
| 2pin——TLED- | | |
| 3pin——MIC+ | | Transmitter |
| 4pin——PTT | | |
| 5pin——TLED+ | | |
| 6pin——RLED+ | | |
| 7pin——SP+ | | |
| 8pin——RLED- | | Receiver |
| 9pin——Rx AF | | |
| 10pin——COR | | |

2. J6

| | |
|---|---|
| 1pin——ETxD | |
| 2pin——ERxD | Transmitter |
| 3pin——ATxD | |
| 4pin——ARxD | Receiver |

3. RJ45 EXT

| |
|---|
| 1pin——ARxD |
| 2pin——MIC |
| 3pin——ATxD |
| 4pin——ERxD |
| 5pin——GND |
| 6pin——ETxD |
| 7pin——EXT PTT |
| 8pin——SB+（8V） |