

# Film-Tech

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## 3.0 KT-22 Stereophonizer

### 3.1 Introduction

The KT-22 Stereo Synthesizer makes any mono print sound like stereo. Innovative circuitry, based on psychoacoustic principles, enables the KT-22 to establish solid left, center, and right channels from conventionally recorded Academy mono prints. The KT-22 may be used with SVA (Dolby) prints, for which it provides synthesized three-channel sound. Using a comb-filtering technique, the KT-22 adds directional information to a mono track, so dialogue seems to come from the actor's location on the screen, and music gains the spaciousness of multi-channel sound.

### 3.2 Front and Rear Panels

Refer to Figure 3.1. Front Panel of the KT-22.

1. Bypass Button. Press this button to remove the KT-22 from the signal path. When the bypass is engaged, the KT-22's inputs are hard wired directly to the corresponding outputs. The LED above the button illuminates when the unit is in this mode. If the KT-22 is used with an existing stereo system, engaging the hard-wired bypass allows the original stereo program to play.

2. Operate Button. Press this button to activate the KT-22's stereo synthesizer circuitry. When the operate button is engaged, the KT-22's center input is processed and fed to the left, center, and right outputs. The left and right inputs are disconnected in this mode. The LED above the button illuminates when the unit is in the operate mode.

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Note: When a mono sound system is converted to stereo by pushing the operate button, the sound level in the theatre rises slightly because of the additional channels of power amplification and loudspeakers. Lower the master fader if necessary.

Indication of AC Power. There is no specific power indicator but either the bypass or operate LEDs will be illuminated when the AC power is on.

Refer to Figure 3.2. Rear Panel of the KT-22.

1. Barrier Strips. Refer to Section 3.4.3 for connection information.
2. Accessory Connector. This jack provides DC voltage to power other units. Refer to Figure 3.5 and Section 3.4.3.

Not Shown: On units with an "A" after the serial number, a center channel output level control and an auxiliary connector are also included.

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### 3.3 Specifications

Input Impedance (center)	10 kilohms actual input impedance, bridges 600-ohm sources. Input transformer for ground isolation.
Input Level	-20 dBm (78 mV) to +10 dBm (2.45 V) nominal. +28 dBm (18.2 V) maximum.
Equivalent Input Noise	-65 dB below 1 V, A weighted.
Output Impedance	80 ohms actual source impedance, drives nominal 600-ohm load (or any load of 150 ohms or higher impedance). Transformer for ground isolation.
Output Level	Same level as input signal. +24 dBm (12.2 V) maximum output level.
Frequency Response	20 Hz to 20 kHz <u>+1</u> dB.
THD Distortion	Less than 0.1%, 20 Hz to 20 kHz.
IM Distortion	Less than 0.15%.
Connectors	Barrier Strips.
AC Power	120 VAC, 50 or 60 Hz, 15 watts maximum.

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Consult factory for operation with other  
line voltages.

Dimensions

3 1/2" H X 19" W X 10 1/4" D.

(88.9 mm H X 483 mm W X 260 mm D.)

Rack-mount front panel.

Weight

10.5 pounds.

(4.76 kilograms.)

Kintek products are manufactured under one or more of the following  
U.S. patents: 3,681,618; 3,714,462; 3,789,143; 4,101,849; 4,097,767.  
Other patents pending.

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### 3.4 Installation

#### 3.4.1 Unpacking and Mounting

Remove the unit carefully from its shipping carton. The KT-22 was carefully inspected and tested at the factory. Contact your dealer in the event of any problems. We suggest saving the shipping carton and packing materials for safely transporting the unit in the future.

#### 3.4.2 Precautions

When locating any electronic equipment near heat sources, provide adequate clearance for ventilation. Excessive heat shortens the life of any electronic component. Avoid high humidity and water.

Mounting electronic equipment and connecting cables as far as possible from motors and large power transformers lessens the possibility of 60-Hz hum being heard in the system.

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### 3.4.3 Connections

Use 2-conductor shielded cable with foil wrapping for all wiring. For the input cable, attach the shield wire to the ground terminal of the source component. At the KT-22's output terminals, connect the shield wire to the "GND" terminals (the KT-22 becomes the source for the following component, usually an amplifier). Under certain circumstances, the shield wire may need to be attached at both ends to eliminate a hum in the system.

If an unbalanced (high-impedance) input is used, wire the ground and low terminals together at the source component. Attach the shield to the "LOW" and "GND" terminals for an unbalanced output.

With SVA (three or four-channel stereo) sound systems, use the KT-26 SVA (Dolby) Interface Unit. Refer to Section 11.0.

The KT-22 in a Mono System. Refer to Figure 3.3. When the KT-22 is used in a mono (single-channel) system, install the unit after the master fader. This arrangement insures that setting changes of the mono fader will simultaneously affect the left, center, and right outputs of the KT-22. The center output feeds the existing power amplifier and center speaker. Two additional channels of power amplification and the associated loudspeakers must be added to the system.

The KT-22 in a Stereo System. In magnetic or SVA (Dolby) 6-, 4-, or 3-channel stereo systems, install the KT-22 after the master fader. See Section 11.0 for additional information on installations with Dolby systems. If the KT-26 is not used, the left, center, and right outputs of the SVA processor feed the related inputs of the KT-22, and the KT-24 surround-sound processor is used in the "LF only" mode.

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Combined KT-21 and KT-22 Installations. Refer to Figure 3.4. An existing mono system can be improved with the installation of both the KT-21 and KT-22. Because sound track levels vary from film to film, the KT-21 is installed after the master fader where it can receive an essentially constant sound level. The KT-21's output then goes to the input of the KT-22. This arrangement insures that main fader adjustments affect all three channels simultaneously.

AC Power. The unit draws approximately 15 watts. No AC power switch is provided, but the unit can be connected to the switched AC outlet in an equipment rack or to an accessory outlet on adjacent sound equipment. Replace fuse with same size only: 1/4 amp Slow Blow (120 V).

Accessory Connector. Refer to Figure 3.5. This jack provides the necessary DC voltage to power other units.

Pin	Use	Connection in KT-30S System. TB 1/ pin -
1	+15 VDC	1
2	Ground	2
3	-15 VDC	3
4	+24 VDC	4

### 3.5 Operation

#### 3.5.1 System Alignment

Refer to Section 1.5.1 for the full alignment procedure. Check speakers for the proper operation of all drivers. Adjust projector optics, guide roller, and azimuth.

1. When the KT-21 and KT-22 are used together, set the KT-21 to the



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appropriate mode, "enhance" or one of the "decode" modes.

2. On the rear panel of the KT-21, place the input and output range switches in the "low" position. Set the output level control to maximum cw.

3. On the KT-21, make sure the "enhance" button is pushed in and the expansion control is at the minimum (left) position. Observe the LED display and adjust the input level control on the rear panel until only one red LED is lit in the high-frequency band.

4. With a pink-noise loop running and the operate button on the KT-22 pushed in, advance the master fader until there is a moderate level heard in the theatre.

5. Push the "enhance" button. On the rear panel of the KT-21, make sure the high-frequency control is at the 12 o'clock position (on units without an "A" after the serial number, leave the control at the maximum ccw position). Turn down (full ccw) the output level control.

6. Making sure one red LED is lit in the high-frequency bank of the KT-21, run the pink-noise loop and place the SPL meter in the theatre--4 feet off the floor in the center of the seating area. Adjust the output control on the back of the KT-21 for a level of 75 dBc.

7. Turn down the master fader. Stop the projector and remove the pink-noise loop.

8. Run a reel of an Academy mono print of known good quality. Do

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not use trailers, as they are usually overmodulated and distorted.

9. Set the fader for a normal listening level in the theatre. Film levels vary depending on the recording level. It is not unusual, for instance, to run trailers at a lower master-fader setting than features.

10. It is useful to listen to several films when an audience is in the theatre. If necessary, readjust the high-frequency control on the KT-21 for a better treble sound after listening to music and effects.

AFTER ALL ADJUSTMENTS HAVE BEEN MADE, USE THE RED ARROWS TO SHOW THE CORRECT SETTINGS OF EVERY CONTROL.

When all set up procedures have been completed, the sound in the auditorium should be of a high-fidelity stereo quality. The surround channel should blend with the screen channels during loud music and effects passages not containing dialogue. The surround channel should not be raised to the point where obvious and constant level changes are heard. An unnatural and distracting effect will result, especially when the surrounds are off; in addition, the screen sound may seem inadequate.

The same is true for the low-frequency transducer. The low frequencies should enhance the overall sound but not be so overpowering that the bass becomes boomy and unnatural.

Because every film sound track is equalized and mixed differently, fine-tuning adjustments have been provided for the surrounds and low-frequency transducer on the front panel of the KT-24. A few minutes during the opening credits of a feature will allow enough time for the

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adjustment of these levels to give the optimum stereo blend in the theatre.

3.6 Theory of Operation

3.6.1 Flow Chart - SEE FIG. 3.6

3.6.2 Schematic and Board Layouts

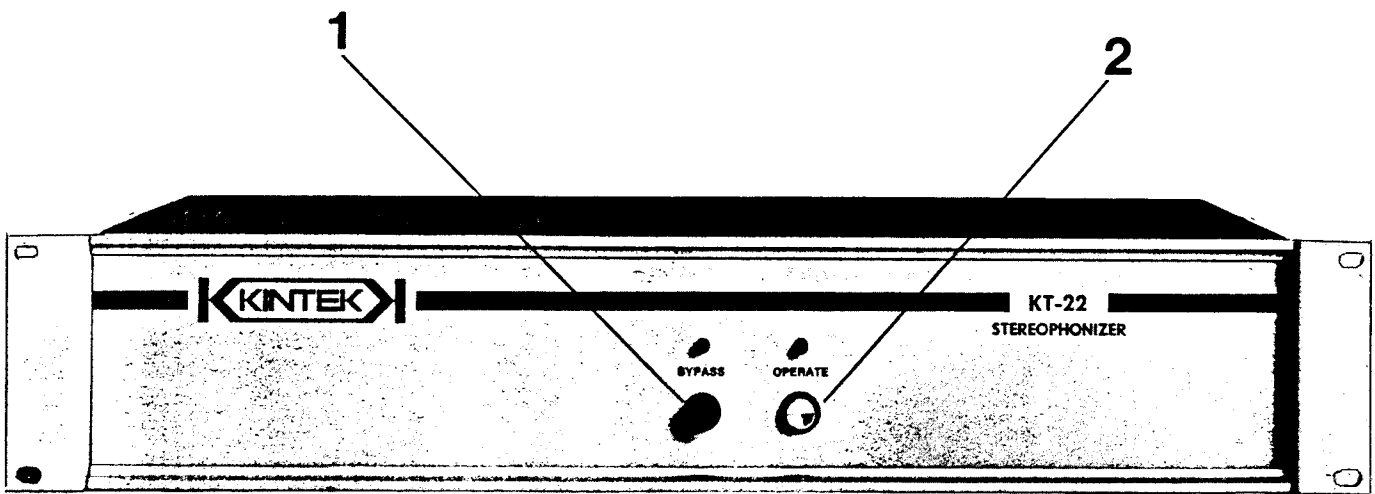


Figure 3.1. Front Panel of the KT-22.

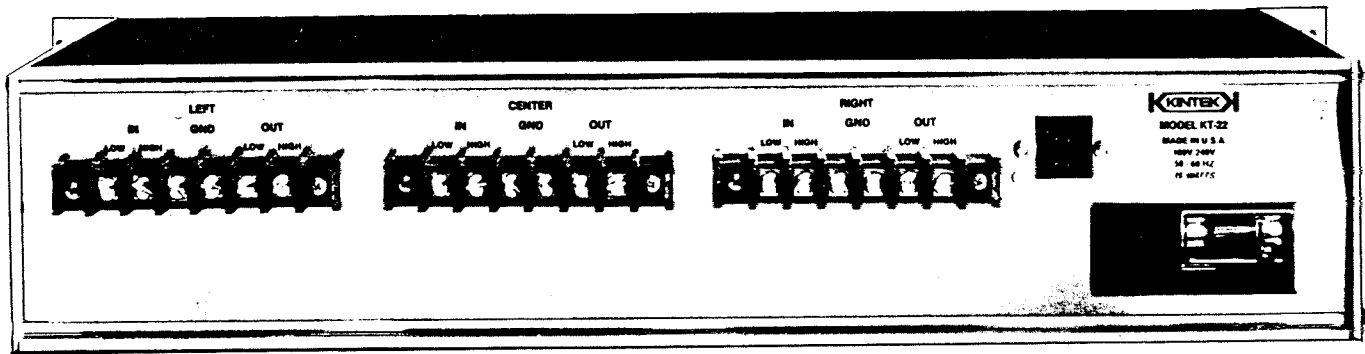


Figure 3.2. Rear Panel of the KT-22.

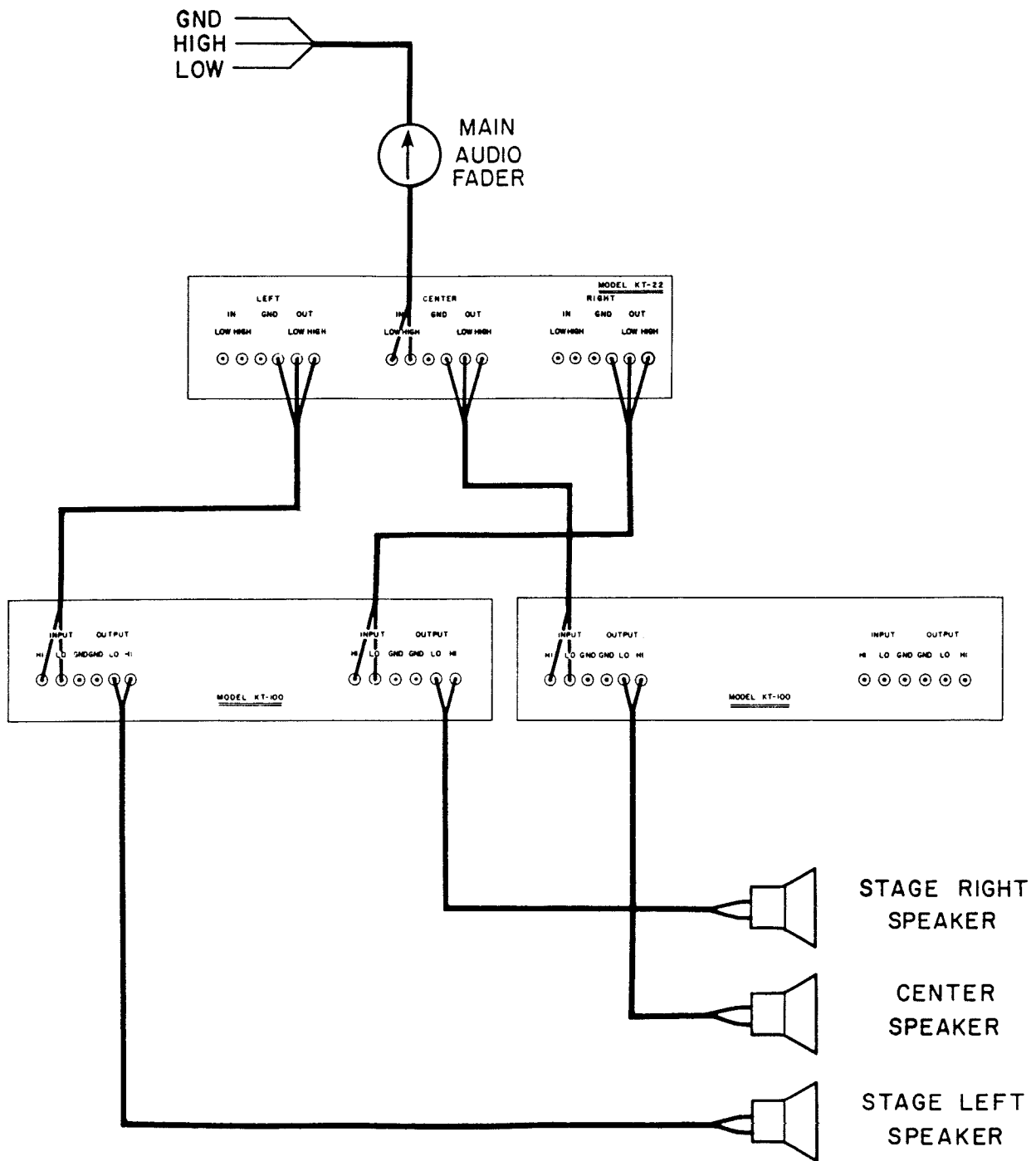


FIGURE 3.3. THE KT-22 IN A MONO SYSTEM.

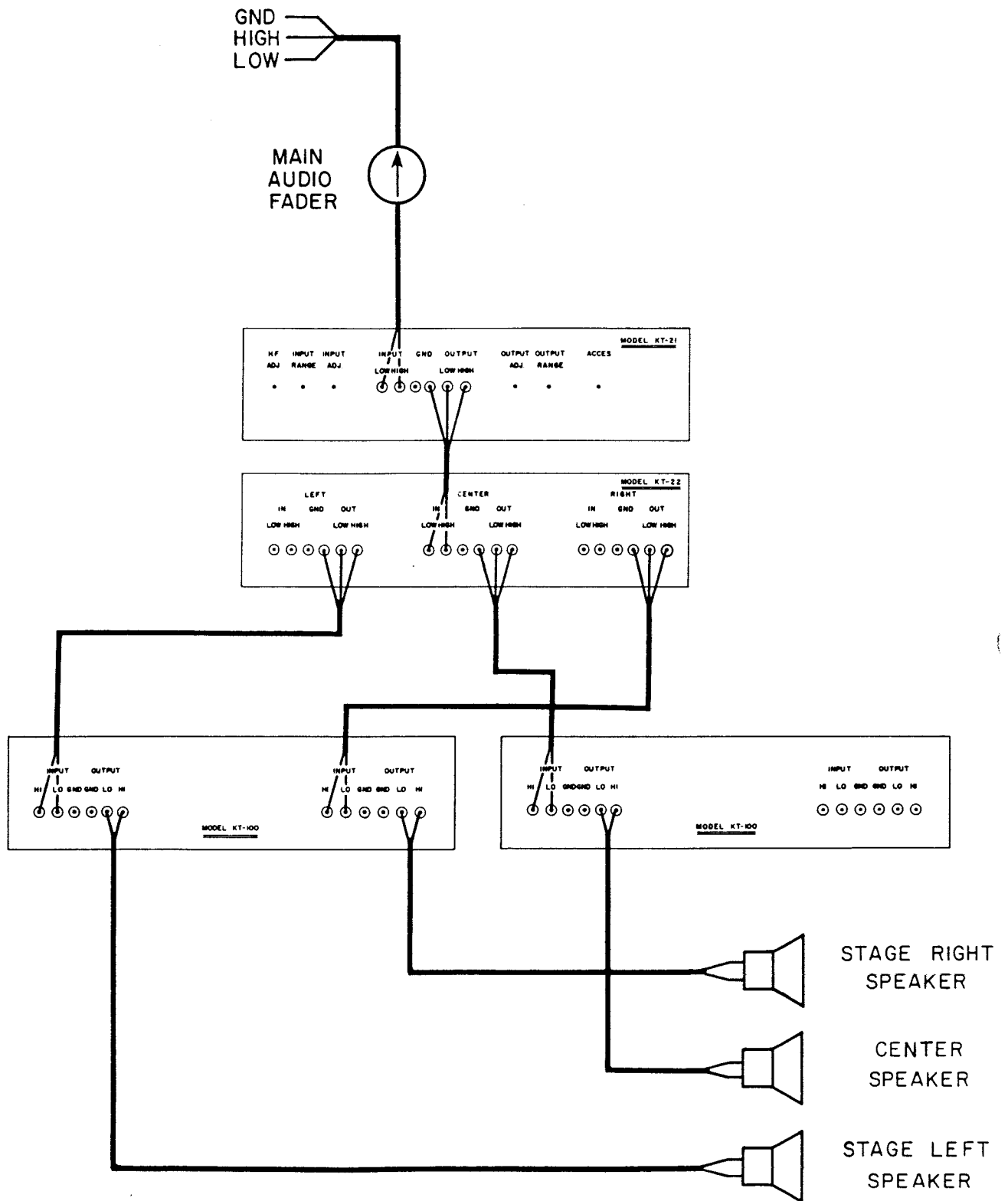


FIGURE 3.4. COMBINED KT-22 & KT-21 INSTALLATION.



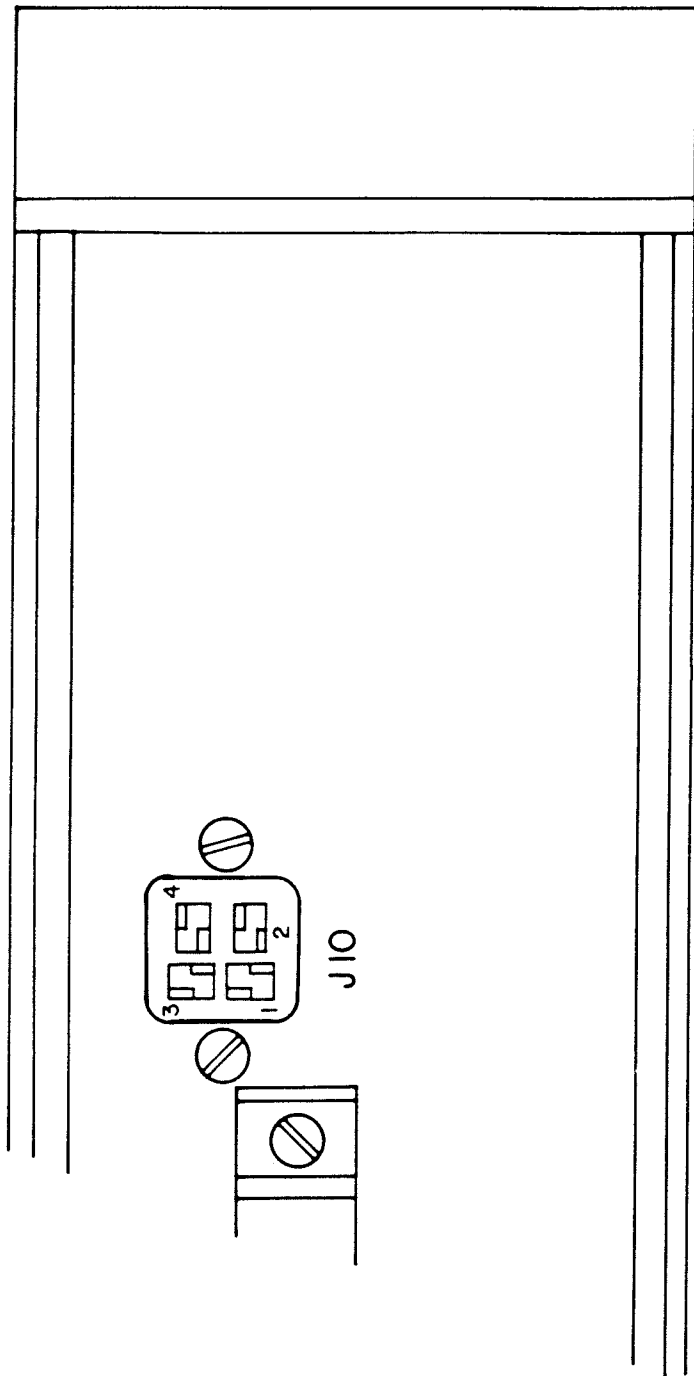


FIGURE 3.5. KT-22 ACCESSORY CONNECTOR PIN ASSIGNMENTS.

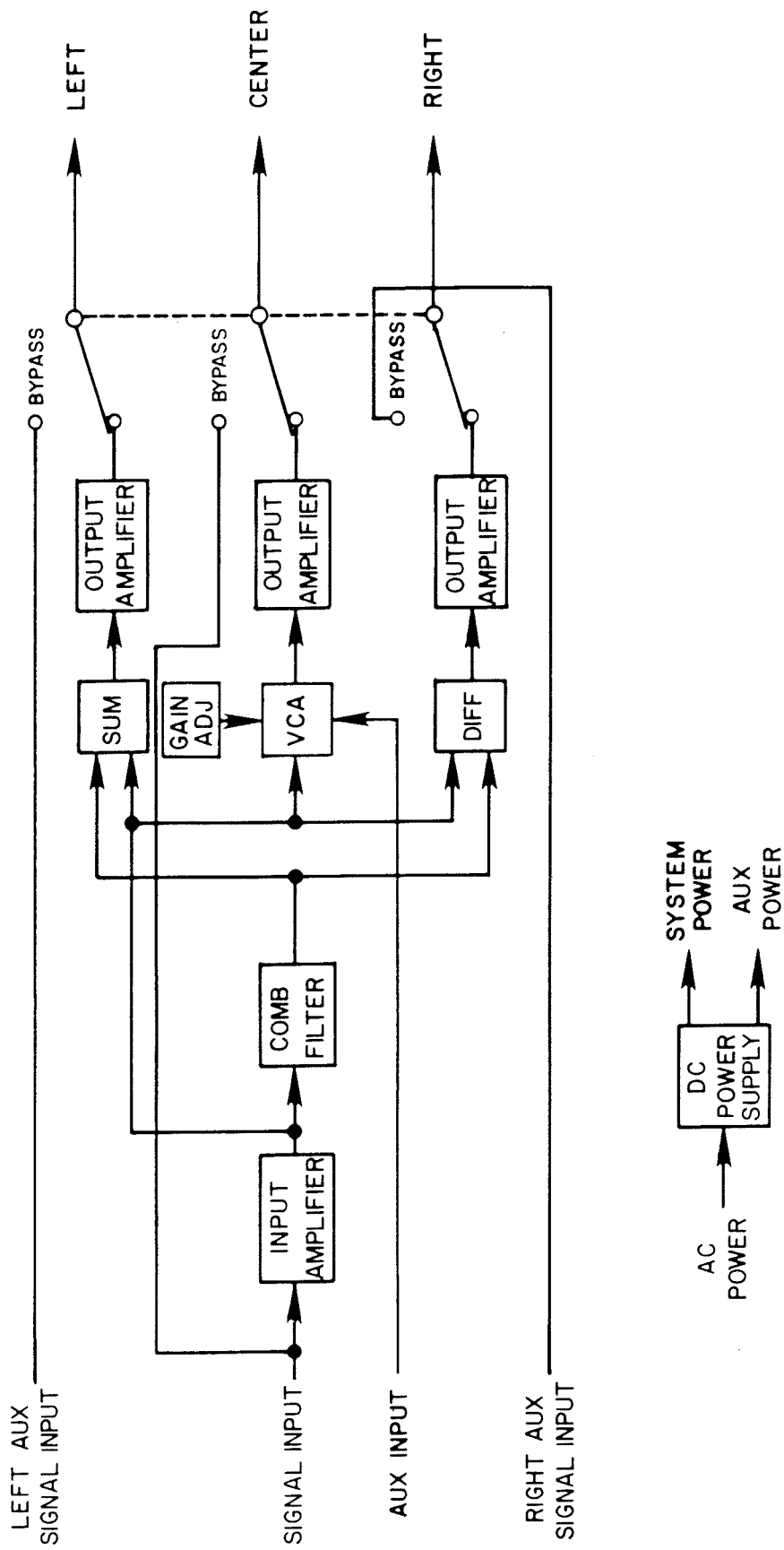


FIGURE 3.6. FLOW CHART OF THE KT-22.

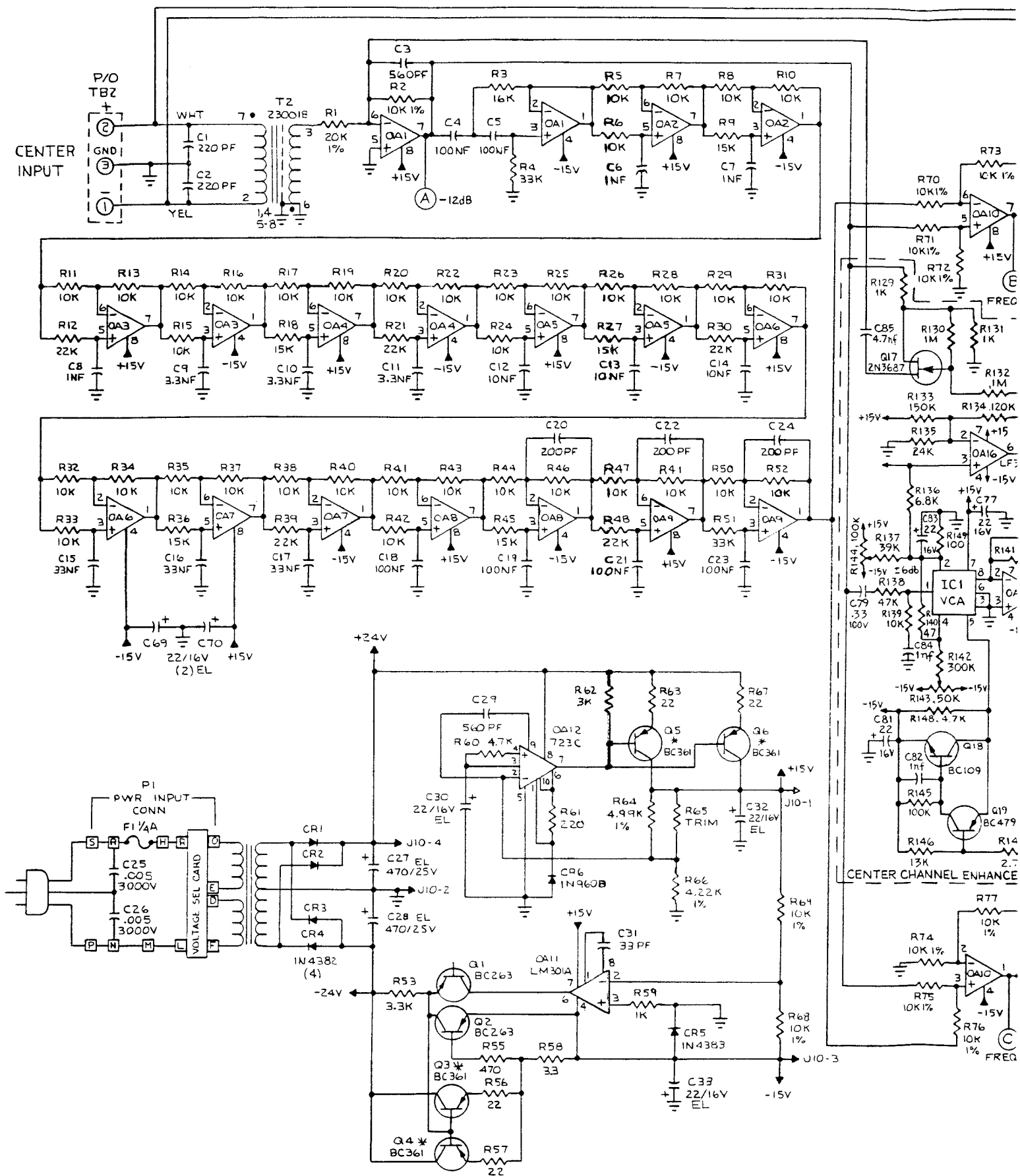
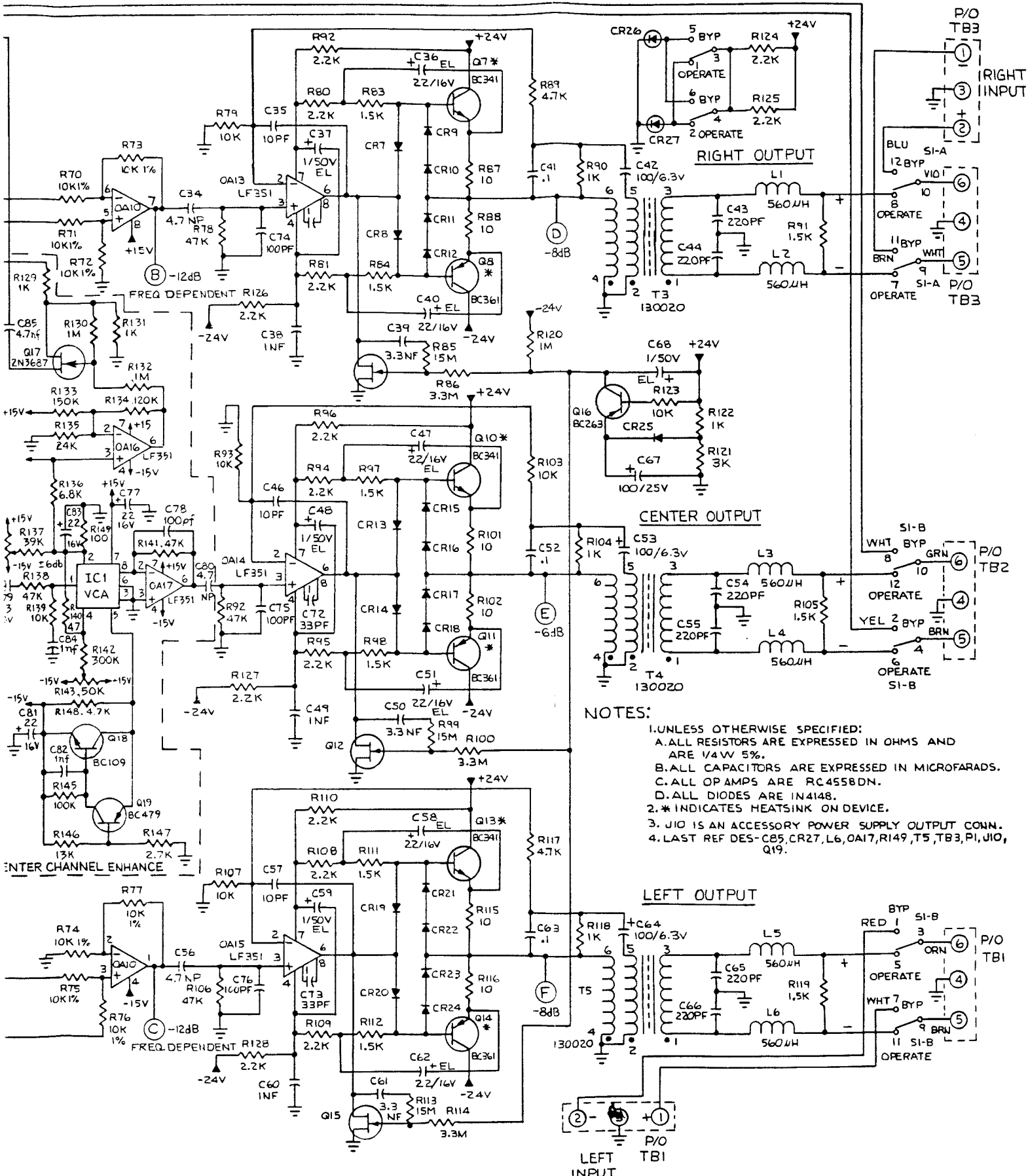


FIGURE 3.7 SCH



- NOTES:**
- UNLESS OTHERWISE SPECIFIED:
    - ALL RESISTORS ARE EXPRESSED IN OHMS AND ARE 1/4W 5%.
    - ALL CAPACITORS ARE EXPRESSED IN MICROFARADS.
    - ALL OP AMPS ARE RC4558DN.
    - ALL DIODES ARE IN4148.
  - \* INDICATES HEATSINK ON DEVICE.
  - J10 IS AN ACCESSORY POWER SUPPLY OUTPUT CONN.
  - LAST REF DES-C85, CR27, L6, OA17, R149, T5, TB3, P1, J10, Q19.

3.7 SCHEMATIC OF THE KT-22

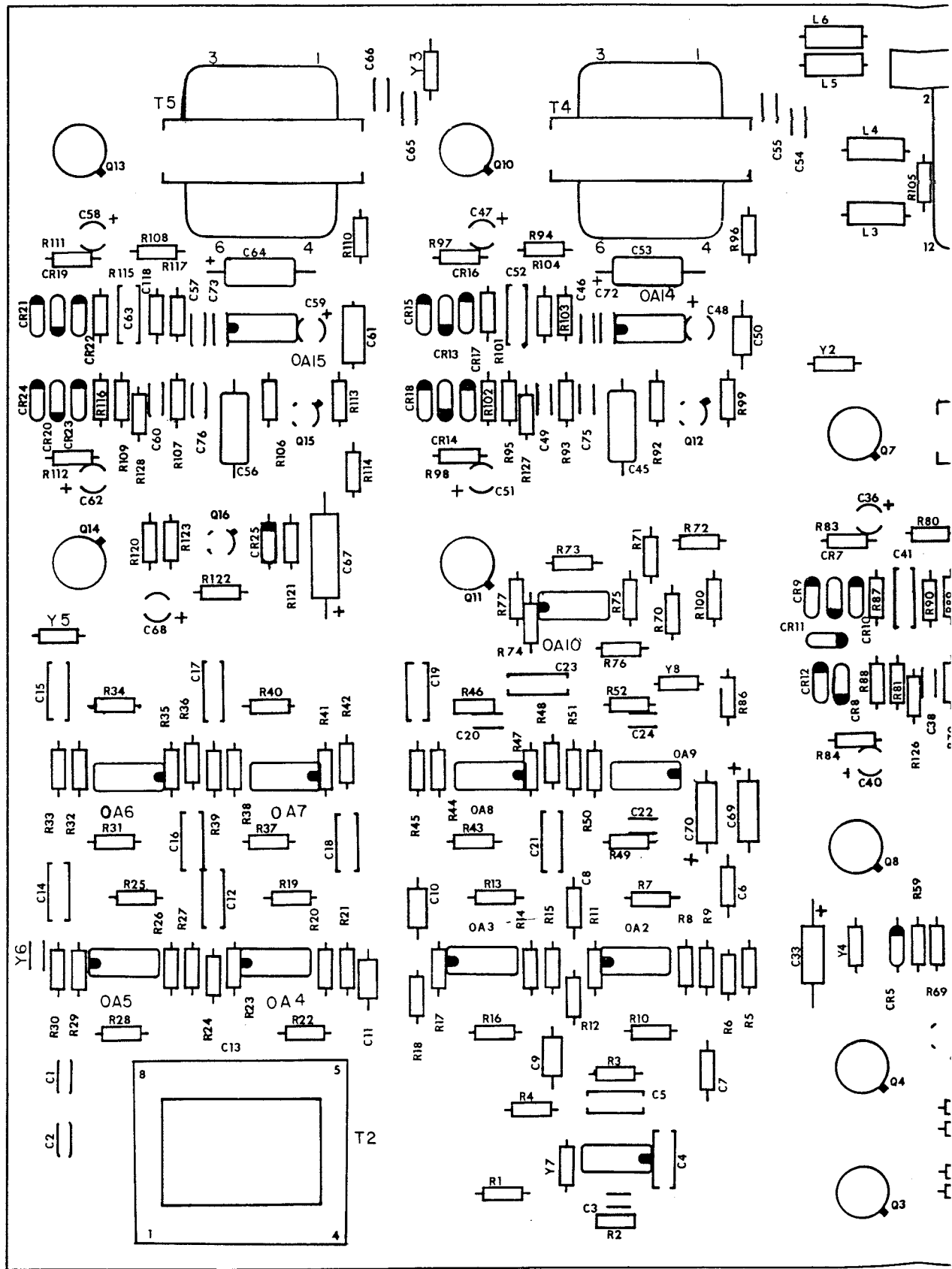


FIGURE 3.8A BOARD LAYOUT OF THE KT-

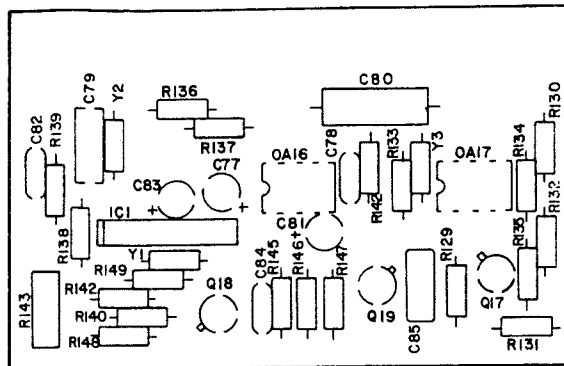
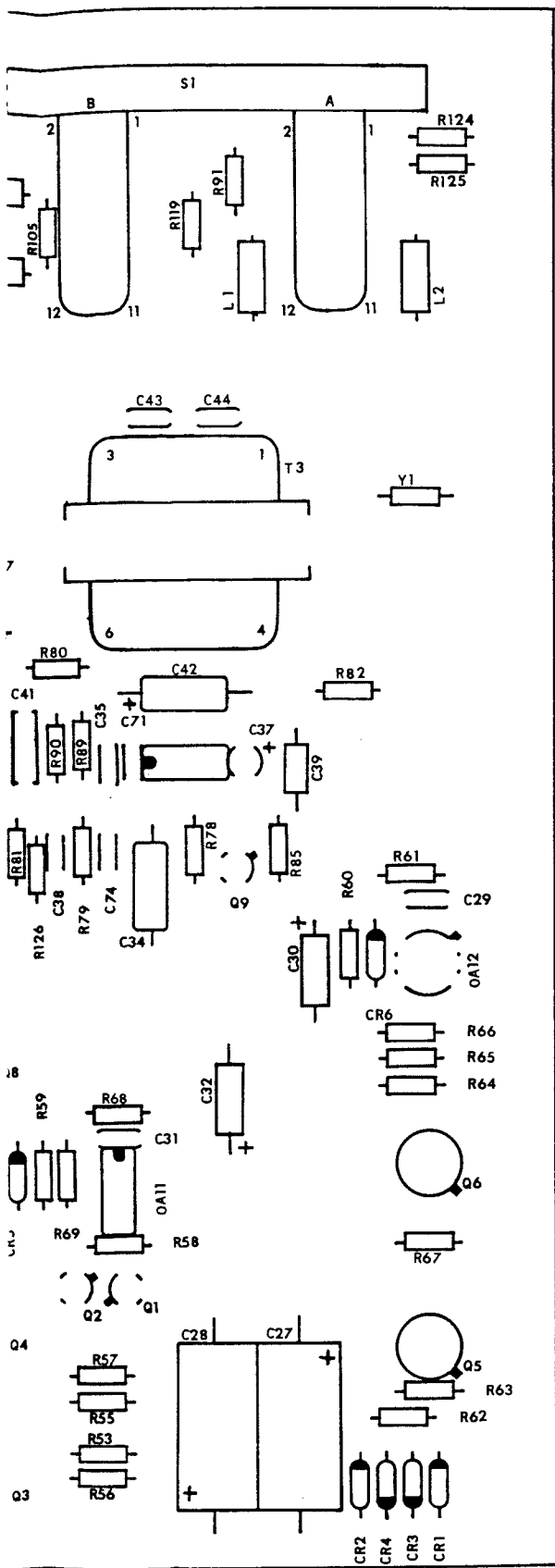


FIGURE 3.8B  
BOARD LAYOUT OF THE KT-22