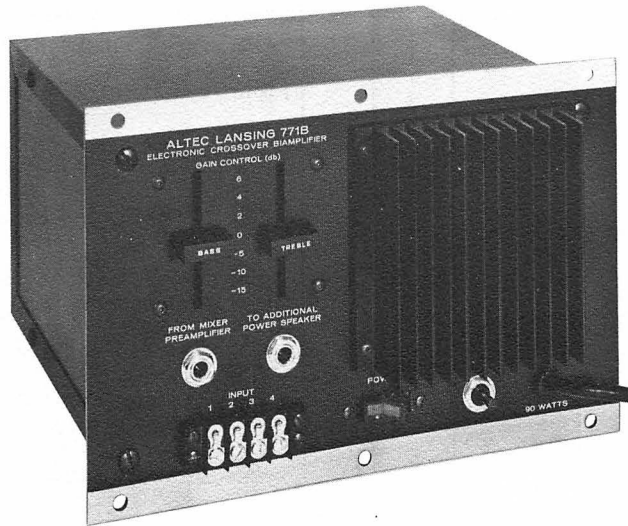


ALTEC®

771B AND 771BX ELECTRONIC CROSSOVER BIAMPLIFIERS

OPERATING INSTRUCTIONS



ALTEC 771B and 771BX Electronic Crossover Biampifiers improve power handling and reduce distortion without requiring a high-power amplifier and separate crossover network.

FEATURES:

Electronic Crossover with
Separate Power Amplifiers

These ALTEC biampifiers include electronic crossover circuitry and separate low-frequency (LF) and high-frequency (HF) amplifiers in a single, compact package that can be mounted directly in the speaker enclosure. The electronic crossover circuit divides the input signal into separate bass and treble channels. A 60-watt LF amplifier drives the bass speaker and a 30-watt HF amplifier drives the horn-loaded compression driver.

Heavy LF Demands Do Not
Affect HF Performance

Extreme LF power demand does not affect HF reproduction because separate amplifiers drive the LF and HF speakers.

Full Amplifier Power and
Efficiency

The electronic crossover is placed ahead of the dual power amplifiers so that full biampifier output is distributed to the speakers.

Versatile Input Connections

Standard input connections are direct coupled. Transformer isolation of the input is accomplished with an optional plug-in transformer. Input interconnection phono jacks (771B only) permit connecting up to 20 biampifiers into a single sound system.

Fail-Safe Protection for Output
Transistors

ALTEC's Active Dissipation Sensing Circuit provides fail-safe protection for the output transistors. The action of the sensing circuit is immediate and effective at all frequencies within the passband of the biampifier, limiting only that portion of the program material that would damage or degrade the performance of the output transistors.

Export Model

The ALTEC 771BX Biampifier (export model) is similar to the 771B, except that voltage selection and fusing is provided for primary power. The jack for connecting two or more biampifiers into multiple systems is not provided.

Specifications and components subject to change without notice. Overall performance will be maintained or improved.

ALTEC®

1515 S. Manchester Ave., Anaheim, Calif. 92803

42-02-042741-01

Litho in USA CP-472-2.5K

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SPECIFICATIONS

Type:	Bi-amplifier with electronic crossover
Gain (with Full Boost) — Bass Amplifier:	52 dB with 15356 Line Matching Transformer 66 dB with 15095 Line Matching Transformer
Treble Amplifier:	49 dB with 15356 Line Matching Transformer 63 dB with 15095 Line Matching Transformer
Input Sensitivity (for Rated Output with Full Boost):	0.5V rms direct 0.5V rms with 15356 Line Matching Transformer (high-level balanced-line matched input) 0.1V rms with 15095 Line Matching Transformer (high-level balanced-line matched input)
Power Output — Bass Amplifier: Treble Amplifier:	60 watts at less than 0.5% THD 30 watts at less than 0.5% THD
Total Harmonic Distortion (THD):	Less than 0.5% at rated power, 20 Hz to 20 kHz
IM Distortion:	Unmeasurable by normal IHF method
Crossover Frequency:	500, 800 or 1500 Hz with -12 dB/octave slope
Frequency Response:	±1 dB from 20 Hz to 20 kHz (normalized composite output)
Input Impedance:	80,000 ohms direct 600 ohms with 15356 or 15095 transformer
Load Impedance:	8 ohms nominal for each amplifier
Damping Factor:	25
Noise Level:	80 dB below rated output
Controls:	1 BASS GAIN CONTROL, continuously variable, +6 dB to -15 dB 1 TREBLE GAIN CONTROL, continuously variable, +6 dB to -15 dB

Controls (Cont'd):	1 ELECTRONIC CROSSOVER FREQUENCY switch, 500 Hz/800 Hz/1500 Hz 1 POWER switch 1 PRESS TO RESET pushbutton (circuit breaker). Model 771B only. 1 VOLTAGE SELECT switch. Model 771BX only.
Power Requirements:	120V, 50/60 Hz, 90 watts. Model 771BX only. Selectable 95 V to 240V, 50/60 Hz, 90 watts. Model 771BX only.
Dimensions — Overall: Panel Cutout:	6-1/2" H x 9-7/8" W x 9" D 5-1/2" H x 9-1/2" W
Weight:	16 pounds
Color:	Black
Accessories:	ALTEC 15095 Line Matching Transformer (high-level balanced-line matched input) ALTEC 15356 Line Matching Transformer (high-level balanced-line matched input)

NOTE
Accessories MUST BE ORDERED SEPARATELY.

INSTALLATION HARDWARE SUPPLIED

- 6 - screws, 8-32" x 1-1/4"
- 6 - 'T' nuts, 8-32"
- 1 - Cable, 25 feet with phone plugs
- 4 - Speaker connecting wires with push-on connectors

OPERATION

CONTROLS

All normal operating controls and input jacks are located on the front panel (see Figure 1). Descriptions and functions of controls and connections are listed in Table 1.

NORMAL CONTROL SETTINGS

Recommended initial settings of the BASS and TREBLE GAIN CONTROLS are at 0 dB. Adjust sound-system volume at mixer/amplifier or other input device, then use the BASS and TREBLE GAIN CONTROLS to boost or attenuate the low and high frequencies for desired results.

VENTILATION

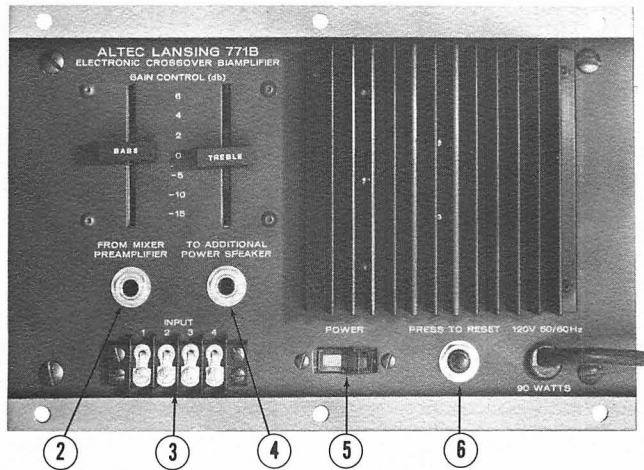
Air must circulate freely past the front panel of the bi-amplifier for best performance. When moving or positioning the speaker enclosure containing the bi-amplifier, be sure free circulation of air past the heat-dissipating vanes is not restricted by curtains, furniture, walls or other equipment. Allow at least two inches of space in front of the vanes.

USING INPUT TERMINAL BOARD

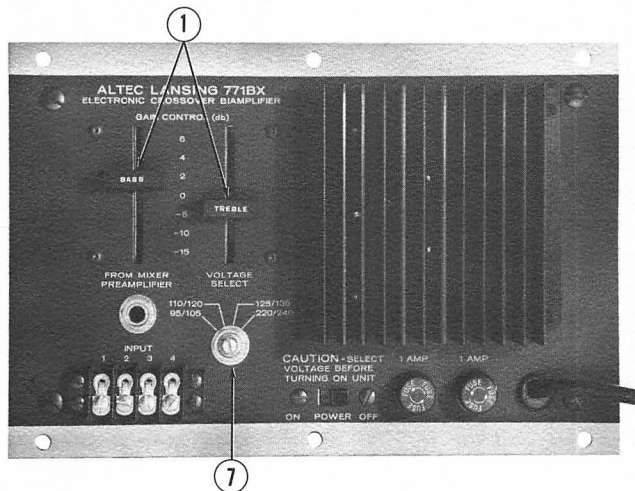
The INPUT terminal board (see Table 1 and Figure 1) permits either direct coupling or transformer isolation of the input. For direct coupling, connect the input leads (shielded conductor recommended) to terminals 1 and 2; terminal 2 is ground. For transformer-isolated

Table 1. Operating Controls and Features

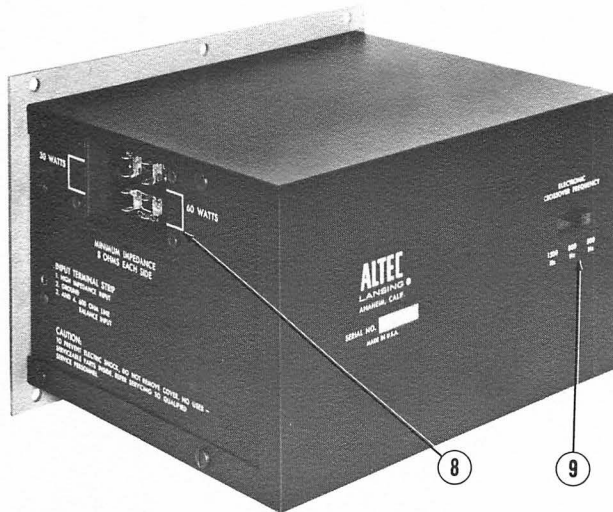
Item	Name	Function/Description
1	BASS and TREBLE GAIN CONTROL potentiometers	Provide separate control of bass and treble portions of input signal. Each control is continuously variable from +6 to -15 dB. Raise controls for gain, lower controls for attenuation. Controls are linear, slide-type potentiometer.
2	FROM MIXER PREAMPLIFIER jack	Connects (direct coupling) input signal from mixer, preamplifier or other input device. Model 771B can accept an input signal from another 771B (or 771A).
3	INPUT terminal board	Provides alternate direct coupling of input signal. Transformer isolation of input signal may be obtained when an optional ALTEC plug-in transformer accessory is used.
4	TO ADDITIONAL POWER SPEAKER jack	Connects another 771B in parallel to enlarge the sound system.
5	POWER switch	Applies primary power. Pilot light in switch (771B only) is lit when power is on.
6	PRESS TO RESET pushbutton	Restores primary power if protective circuit breaker is open (771B only). If circuit breaker opens repeatedly, cause should be corrected before resetting.
7	VOLTAGE SELECT switch	Must be set to appropriate voltage range before turning on amplifier (771BX only). Selects proper transformer primary configuration for line voltages of 95 to 240V, 50/60 Hz.
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p>CAUTION</p> <p>Turning switch with primary power applied to amplifier may damage or burn out switch.</p> </div>		
8	30 WATTS - 60 WATTS speaker terminals	Connect HF and LF speakers. Terminals accept push-on connectors without soldering.
9	ELECTRONIC CROSSOVER FREQUENCY switch	Selects 500, 800 or 1500 Hz crossover frequency according to optimum requirements of speaker system.



Model 771B



Model 771BX



Side and Rear View

Figure 1. Controls and Features

coupling, connect the input leads to terminals 3 and 4. Transformer-isolated coupling also requires installation of a plug-in ALTEC transformer accessory.

OPTIONAL PLUG-IN INPUT TRANSFORMER ACCESSORIES

The ALTEC 15356 and 15095 Line Matching Transformers provide a high-level balanced input capability for the biampifier. The 15356 has a 0.5V rms input sensitivity for full rated biampifier output. Input sensitivity with the 15095 is 0.1V rms for full rated output.

NOTE

THE ALTEC 15356 AND 15095 TRANSFORMERS ARE NOT CUSTOMER SERVICEABLE COMPONENTS AND THEREFORE MUST BE INSTALLED BY AN ALTEC QUALIFIED SERVICE REPRESENTATIVE.

CONNECTING 771Bs IN MULTIPLE SYSTEMS

Each 771B is provided with an interconnecting cable to combine an additional 771B into the sound system. Up to 20 of the 771Bs may be connected into a single sound system in this manner. Speaker hook up and parallel multiple-system interconnections are shown in Figure 2. The input signal cable is plugged into the FROM MIXER PREAMPLIFIER jack. The next 771B is connected in parallel by plugging the provided interconnecting cable into the TO ADDITIONAL POWER SPEAKER jack on the first 771B and into the FROM PREAMPLIFIER jack on the second 771B. Continue this interconnection method to combine as many 771Bs as required (up to 20 units).

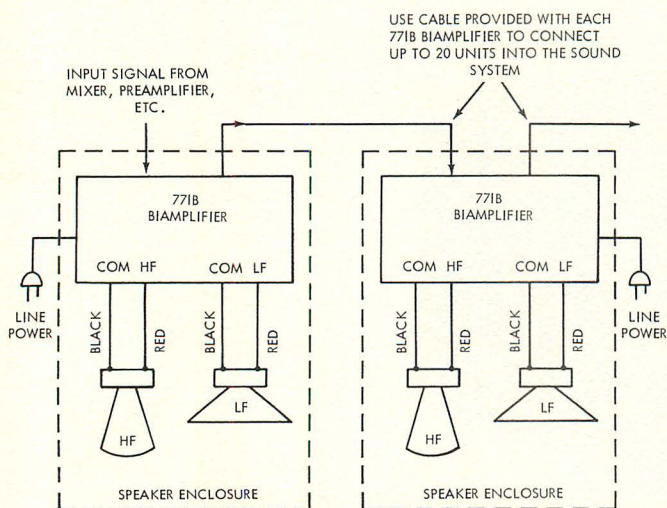


Figure 2. Speaker Hookup and 771B Interconnections

INSTALLATION

The 771B and 771BX are designed to be installed at a convenient location in the speaker enclosure. If installation is made in an existing speaker system, the passive crossover network already present in the system must be removed because the biampifier contains an electronic crossover circuit.

If the biampifier is to be installed in an enclosure not previously prepared for its installation, complete all steps of the following procedure. If the biampifier is to be installed in an ALTEC enclosure specifically prepared for it, complete only Steps 5, 6 and 7 of the installation procedure.

- Step 1. Cut rectangular hole 5-1/2" high by 9-1/2" wide in enclosure at desired location. Note required depth to accommodate biampifier is 9".
- Step 2. Insert biampifier in cutout and mark center points for each of six holes to be drilled for securing hardware. Remove biampifier.
- Step 3. Use 7/32" (0.218") to drill and bore holes, located in Step 2, to accept shaft of 8-32" 'T' nuts supplied with biampifier. Remove debris from enclosure and edges of holes.
- Step 4. Insert six 'T' nuts in mounting holes from inner side of enclosure. Gently hammer each in place until 'T' nut faces are flush with enclosure surface.
- Step 5. Install supplied speaker wires on speakers and biampifier speaker terminals (see Figure 2). Note that minimum speaker impedance is eight ohms.
- Step 6. Verify that ELECTRONIC CROSSOVER FREQUENCY switch is set to appropriate 500, 800 or 1500 Hz position, as required by speaker system.
- Step 7. Insert biampifier in cutout and secure it to 'T' nuts with six (6) 8-32" x 1-1/4" screws (supplied).

SERVICE AND MAINTENANCE INSTRUCTIONS

This service information is for the use of authorized warranty stations (dealers) only. Service must be performed by an ALTEC Qualified Service Representative.

NOTICE

REPAIR PERFORMED BY OTHER THAN AUTHORIZED WARRANTY STATIONS (DEALERS) OR OTHER QUALIFIED PERSONNEL SHALL VOID THE WARRANTY PERIOD OF THIS UNIT. TO AVOID LOSS OF WARRANTY, SEE YOUR NEAREST ALTEC AUTHORIZED DEALER OR CALL ALTEC CUSTOMER SERVICE DIRECTLY AT (714) 774-2900, OR WRITE:

**Customer Service
ALTEC
1515 South Manchester Avenue
Anaheim, California 92803**

ACCESS

Remove the eight screws securing the cover to the chassis. Carefully slide cover off, flexing it slightly to clear the screws that attach the speaker terminal bracket.

Installing Plug-In Input Transformer Accessories

Verify line power is turned off, then remove chassis cover. Carefully plug the accessory input transformer into the octal socket (J3) in the chassis (see Figure 3), then replace chassis cover and secure with eight screws previously removed.

Power Driver Bias Adjustment

Adjustment of the power driver bias control(s) may be required when replacing a power transistor or power driver printed circuit board (PCB). One bias adjusting control is located on each power driver PCB; R12 on the HF power driver PCB and R13 on the LF power driver PCB (see Figures 3 and 9). These controls set the bias for proper crossover between negative and positive signal components of power transistors Q1 and Q2 (HF); Q3 and Q4 (LF) (see Figures 3 and 5). Improper adjustment of these controls results in distortion at the crossover frequency. To adjust either R12 or R13, use the following procedure:

1. Verify line power is turned off, then remove chassis cover.

2. If adjusting R12, set a dc VTVM to scale that will conveniently read 20 mV and connect its positive (+) lead to Q1 emitter and its negative (-) lead to Q2 collector (see Figure 4, Motorola MJE).
3. If adjusting R13, set a dc VTVM to scale that will conveniently read 20 mV and connect its positive (+) lead to Q3 emitter and its negative (-) lead to Q4 collector (see Figure 4, Motorola MJE).
4. Turn on line power to biampifier.
5. Observe VTVM; it should read approximately 17.5 mV.
6. Adjust bias control (R12 or R13), as necessary (see Figure 3). Clockwise adjustment increases voltage, counterclockwise adjustment decreases voltage.
7. Allow stabilization 15 to 30 minutes for drift check. If dc voltage reading changes more than ± 15 mV, readjust bias control for 17.5 mV.
8. Turn off line power, disconnect VTVM, replace chassis cover and secure with eight screws previously removed.

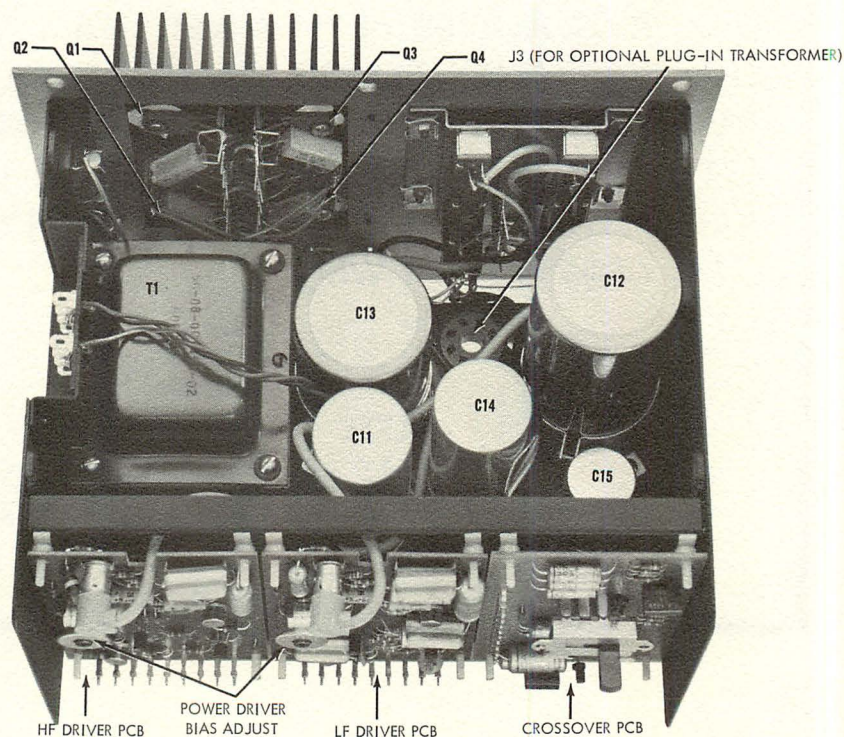


Figure 3. Biampifier Interior

PCB Replacement

A crossover PCB and two power driver PCBs are located within the chassis (see Figures 3 and 6). Use the following procedure to replace a failed PCB with a new or repaired PCB.

1. Verify line power is turned off, then remove chassis cover.
2. If a power driver PCB is being replaced, carefully remove cable connector from jack on PCB.
3. Carefully remove PCB from standoffs, loosening evenly at each corner.

CAUTION

Do not warp, bend or twist the board or conductor may fracture.

4. Carefully press new or repaired PCB into place on standoffs. Press corners in place evenly until plastic fasteners lock PCB in position.
5. If a power driver PCB is replaced, carefully press cable connector, previously removed, onto jack on PCB. Verify that power driver bias adjustment is correct and readjust if necessary. Refer to Power Driver Bias Adjustment procedure.
6. Replace chassis cover and secure with eight screws previously removed.

RECOMMENDED SERVICE TECHNIQUES

If systematic troubleshooting shows need for parts replacement, observe the following precautions.

Transistor Orientation

Solid-state components are packaged in various case sizes and types with various lead orientations (see Figure 4). Before removing a solid-state component from tie points or from a PCB, sketch the lead orientation with respect to the tie points or PCB.

Form the leads of the new component to conform with the leads of the part being replaced to aid in making proper connections.

Before removing small transistors, note position of index tab with respect to the PCB or socket. Cut the leads of the new transistor to the required length and insert them into the PCB or socket properly indexed.

Replacing Power Transistors

Be sure the following conditions exist when replacing power transistors.

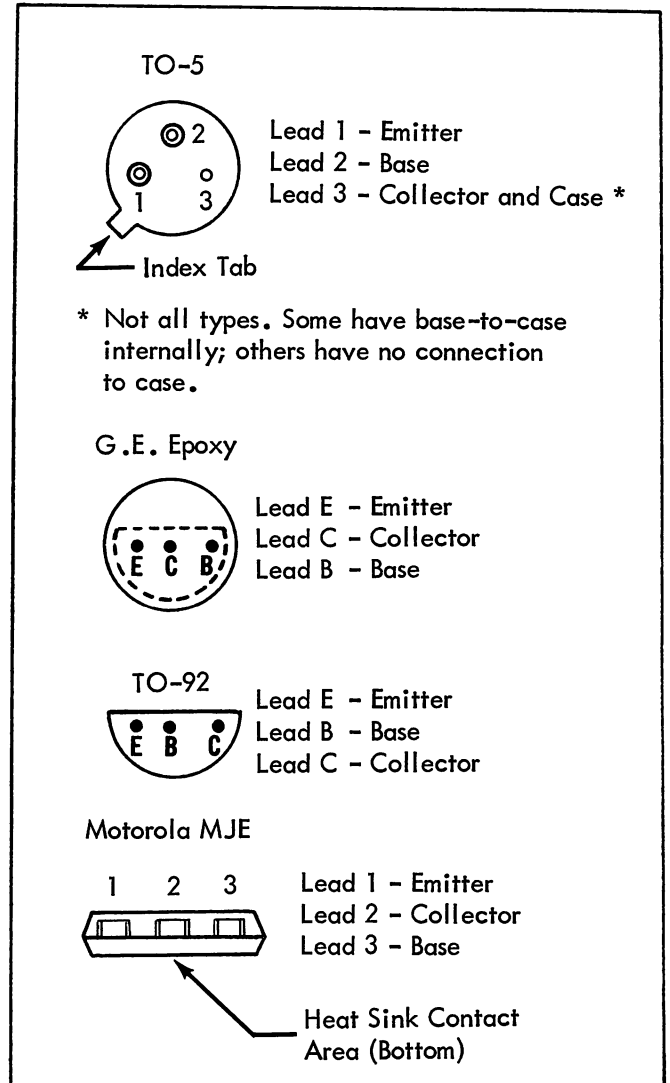


Figure 4. Typical Solid-State Component Configurations

1. The mica insulator is not damaged. If damaged, use new insulator.
2. No grit or metal particles are between replacement transistor and heat sink.
3. Both side of mica insulator are covered with silicone grease or fluid.
4. Mounting screws are tight (see Figure 5).

CAUTION

Install concave washer on power transistor with concave surface DOWN; otherwise, power transistor may fracture.

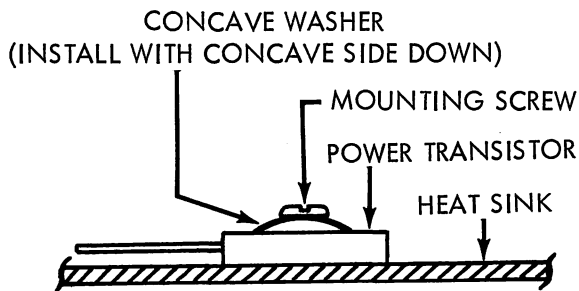


Figure 5. Power Transistor Installation

Testing Transistors

Transistors should be checked with a transistor tester. If a tester is not available, use the following procedure for testing transistors with an ohmmeter.

- Step 1. Remove suspected transistor from circuit (see Replacing PCB Components).
- Step 2. Connect ohmmeter leads to base and emitter. Read on lowest ohms scale. Reverse leads and read again. Normal readings should be at least 10 times greater in one direction than in the other.
- Step 3. Connect ohmmeter leads to base and collector and repeat Step 2. Ohmmeter readings should be similar to those obtained in Step 2.
- Step 4. If Steps 2 and 3 show normal function, connect ohmmeter leads to collector and emitter. Read on lowest ohms scale. Reverse leads and read again. If reading is low and virtually unchanged when ohmmeter leads are reversed, the transistor has a short circuit between collector and emitter.

Replacing PCB Components

The main chassis schematic for the 771B is shown in Figure 6 and the main chassis schematic for the 771BX is shown in Figure 7. Component locations on the PCBs are shown in Figures 8, 10 and 12. PCB schematics are shown in Figures 9, 11 and 13. Before removing PCB components for testing or replacement, read and heed the following instructions.

1. Solid-state components and PCBs may be damaged by excessive heat. Use a small soldering iron with a 1/8-inch diameter chisel tip. Use small-diameter, 60/40 rosin-cored solder.
2. Remove components by placing soldering iron on component lead on conductor side of PCB and pull out lead. Avoid overheating the conductor.

CAUTION

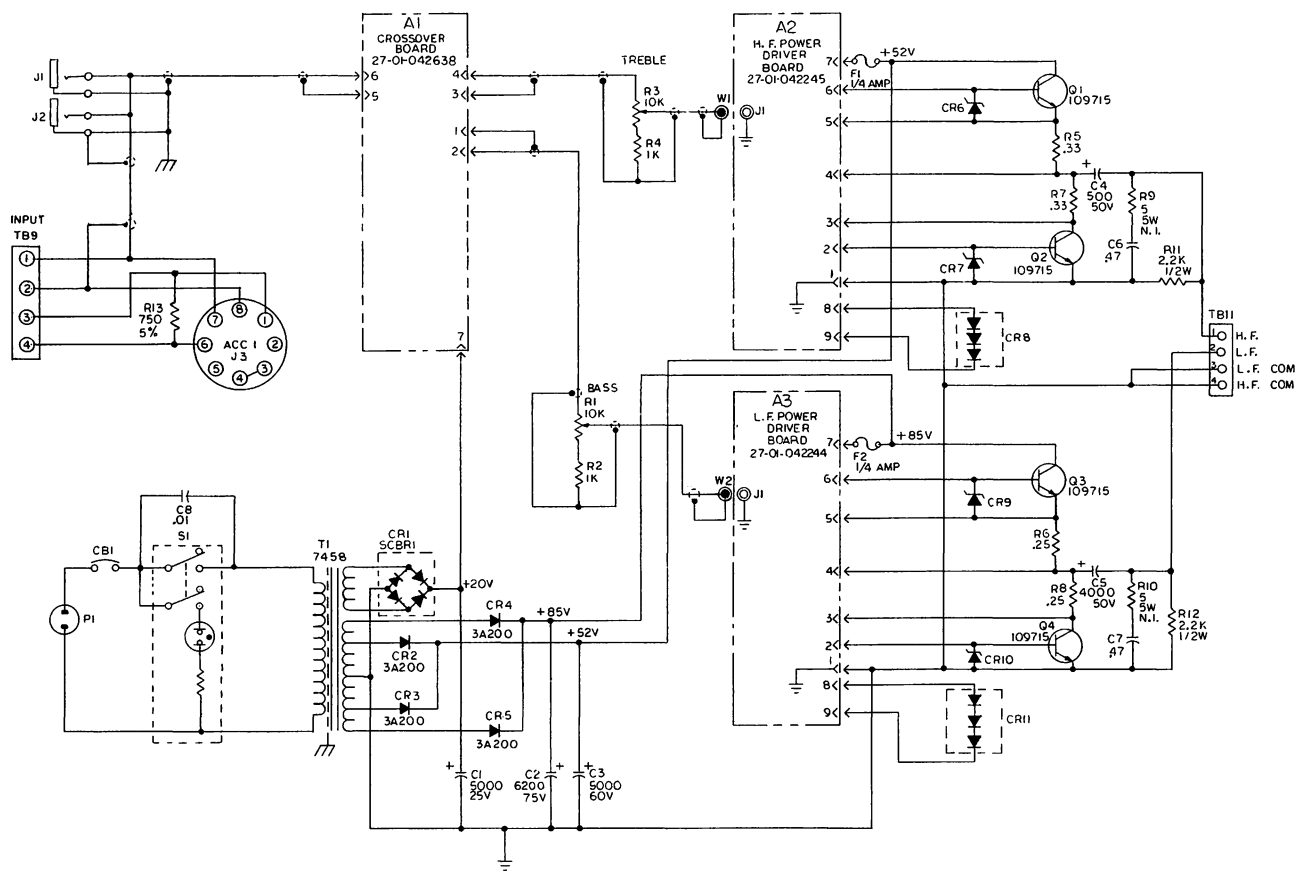
The conductor on the PCB is a metal surface plated with solder and laminated to the board. Too much pressure or overheating may lift the conductor from the board.

3. If component is faulty or damaged, clip leads close to component and then unsolder leads from board. Withdraw leads from component side.
4. Clear solder from circuit board holes before inserting leads of new component. Heat solder remaining in hole, remove iron and quickly insert a pointed nonmetallic object, such as a toothpick from conductor side.
5. Shape new component leads and clip to proper length. Lead shape should provide stress relief for component. Insert leads in holes, observing same polarity or orientation of removed component. Apply heat and solder on conductor side.

Repairing Fractured or Damaged PCB Conductor

If a conductor is fractured, damaged or lifted from the circuit board, a recommended method of repair is to solder a section of good conducting wire along the damaged area and seal with epoxy.

REVISIONS					
REV	DESCRIPTION	DATE	BY	CHKD	ENGR
1	REL FOR PEOD	12/1/59			



HIGHEST REFERENCE DESIGNATION USED					
R12	CB	CR11	Q4	T1	
S1	A3	P3	F2		
REFERENCE DESIGNATIONS NOT USED					

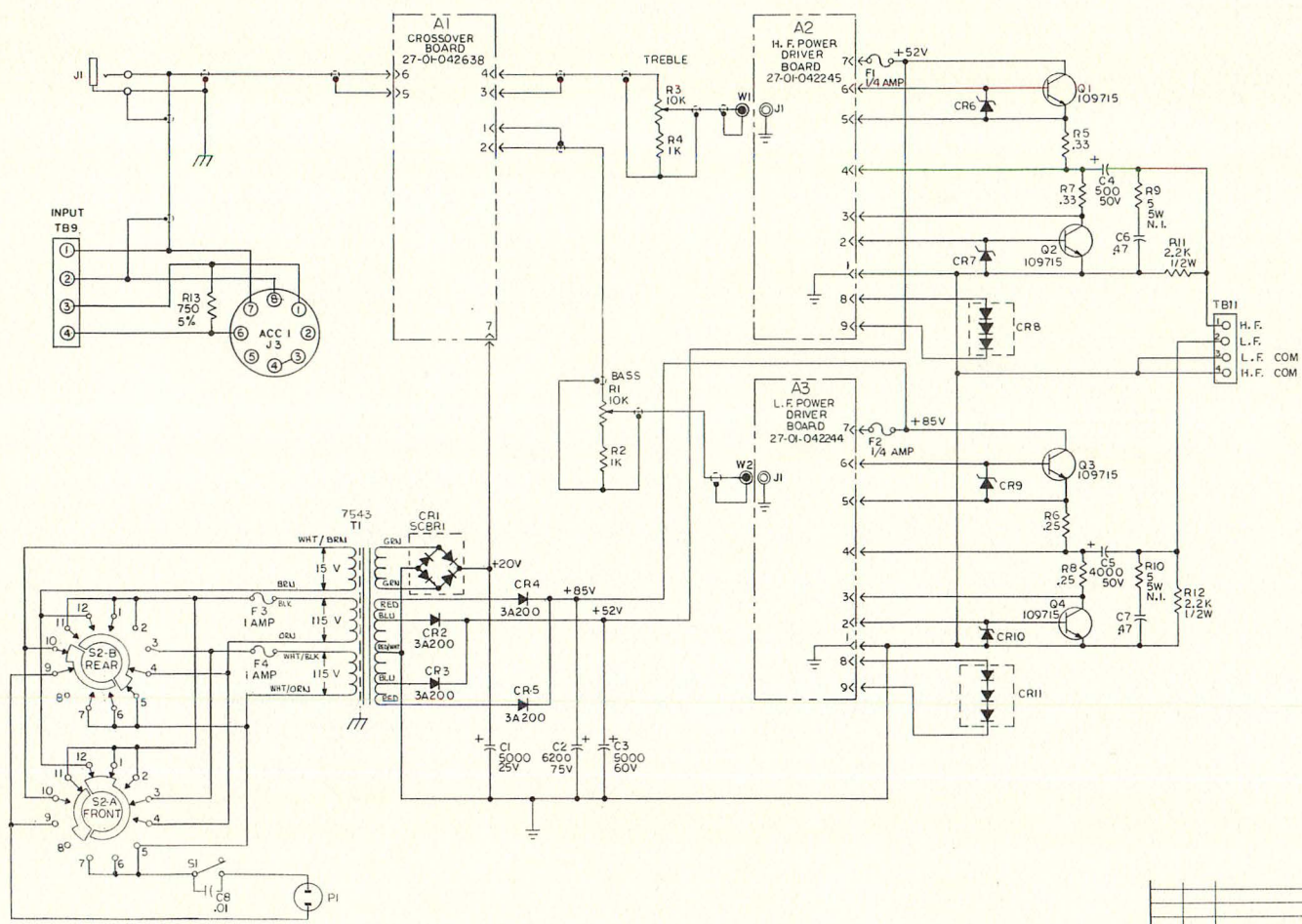
2. CAPACITORS ARE GIVEN IN MICRO-FARADS
 1. RESISTOR VALUES ARE GIVEN IN OHMS 1/4W ± 10%
 NOTES: UNLESS OTHERWISE INDICATED.

ITEM NO.	QTY	PART NUMBER	DESCRIPTION	MATERIAL	NOTE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES UNLESS OTHERWISE SPECIFIED	ORIGINAL DATE OF DRAWING 6-8-71 DR. BY: [Signature] ENGR. [Signature] 771B NEXT ASST. USED ON APPLICATION	SCHMATIC, BI-AMPLIFIER	 A Division of SICO Corp., Anaheim, California 3D212-1
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Figure 6. Schematic (3D212-1), 771B Electronic Crossover Bi-amplifier

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	CHK
01	REL FOR PROD			



HIGHEST REFERENCE DESIGNATION USED				
R12	C8	CR11	Q4	T1
S2	A3	P3	F4	
REFERENCE DESIGNATIONS NOT USED				

- 3 SWITCH S2 SHOWN IN 95/105 POSITION; ROTATION CW
 - 2. CAPACITORS ARE GIVEN IN MICRO-FARADS
 - 1. RESISTOR VALUES ARE GIVEN IN OHMS 1/4W ± 10%
- NOTES: UNLESS OTHERWISE INDICATED.

ITEM NO.	QTY	REQD	PART NUMBER	DESCRIPTION	MATERIAL	NOTE
SCHEMATIC, 771BX BIAMPLIFIER						
ALTEC A Division of GCP Inc. Anaheim, California						
DRAWN BY: <i>[Signature]</i>			DATE: 20 JAN 72			
CHECKED BY: <i>[Signature]</i>			APPR: <i>[Signature]</i>			
NEXT ASST: 771BX			USED ON: <i>[Blank]</i>			
APPLICATION: <i>[Blank]</i>			SCALE: <i>[Blank]</i>		CODE: <i>[Blank]</i>	

Figure 7. Schematic (3D228-1), 771BX Electronic Crossover Biamplifier

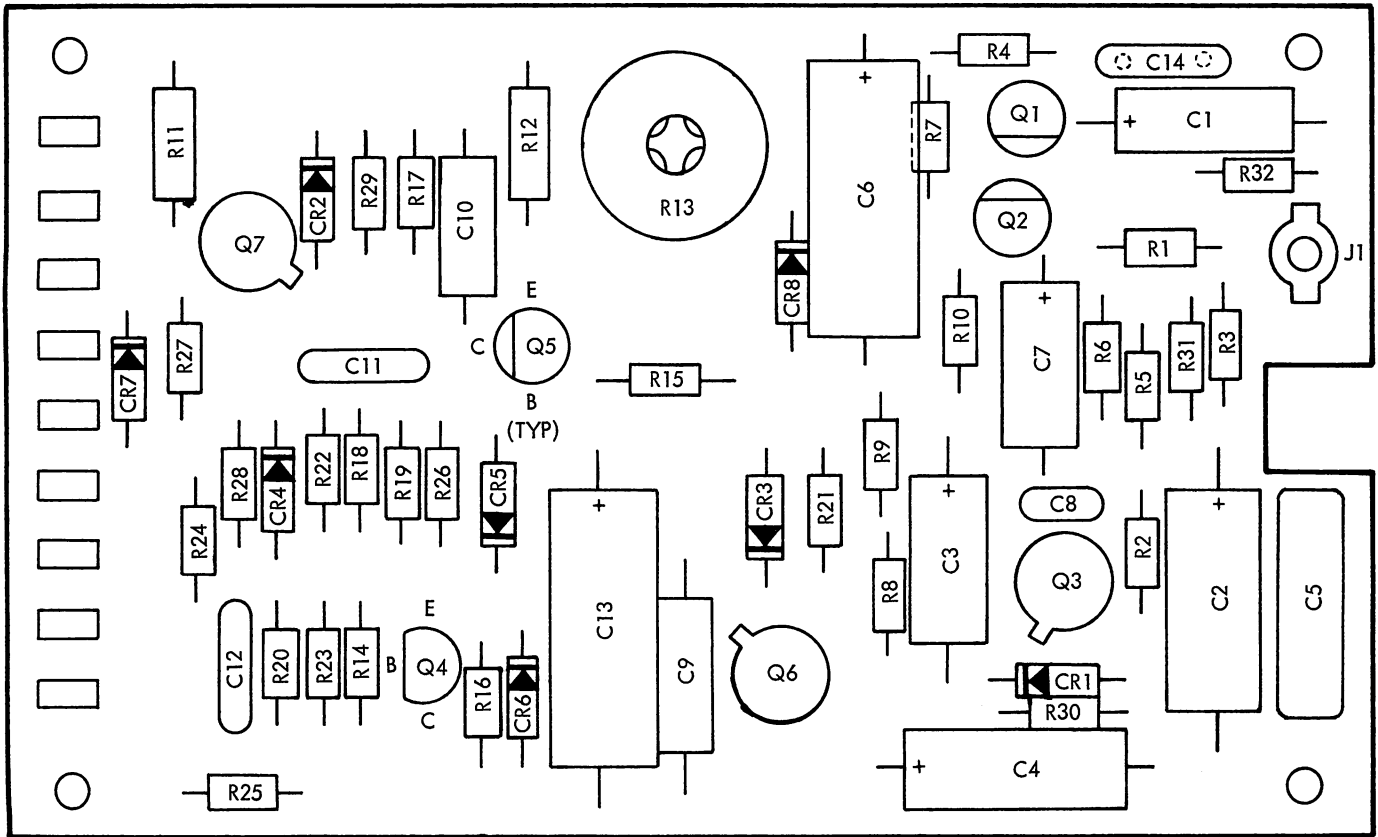


Figure 8. Electronic Part Locations (2C573-4), LF Power Driver PCB Assembly

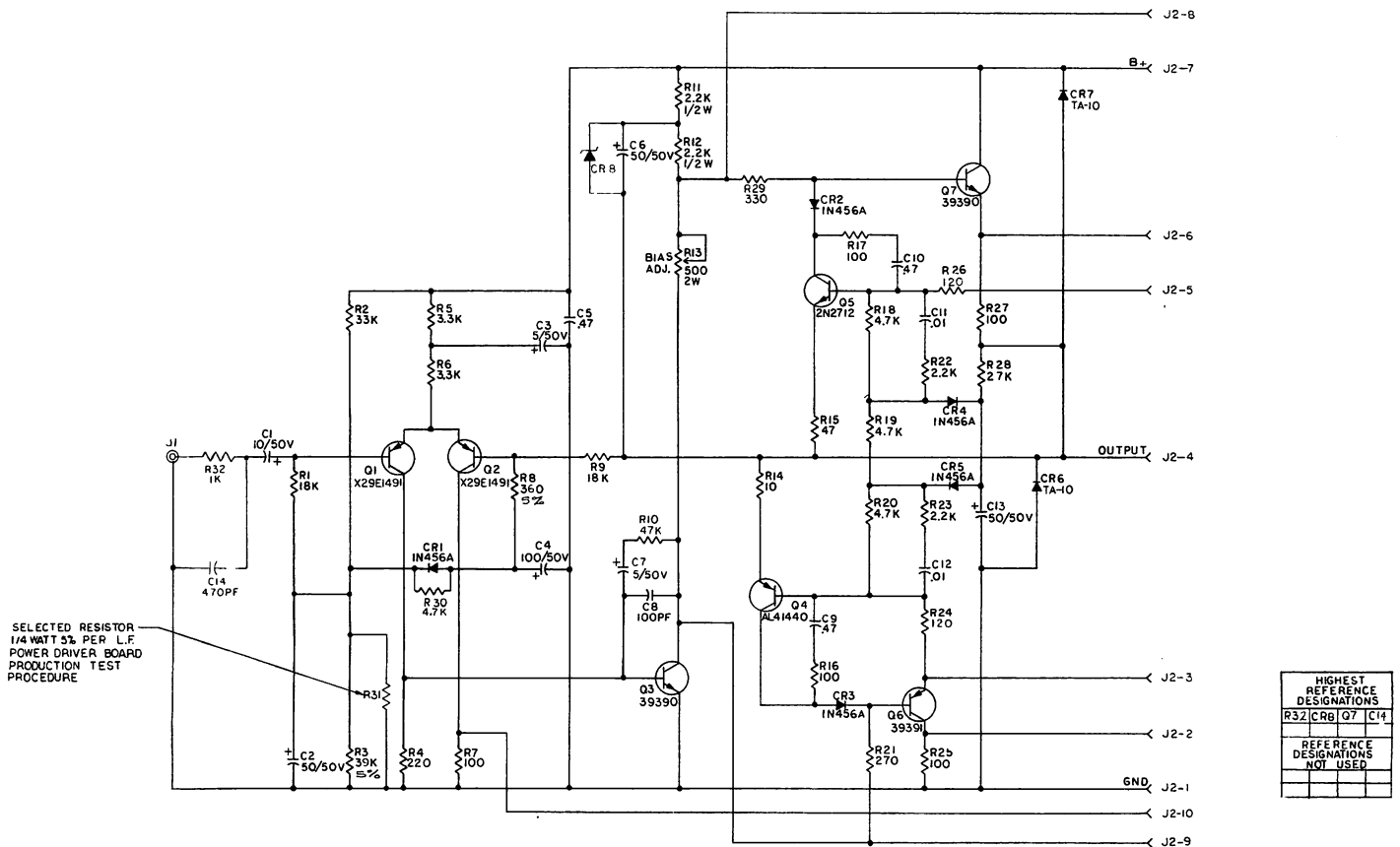


Figure 9. Schematic (2D544-7), LF Power Driver PCB Assembly

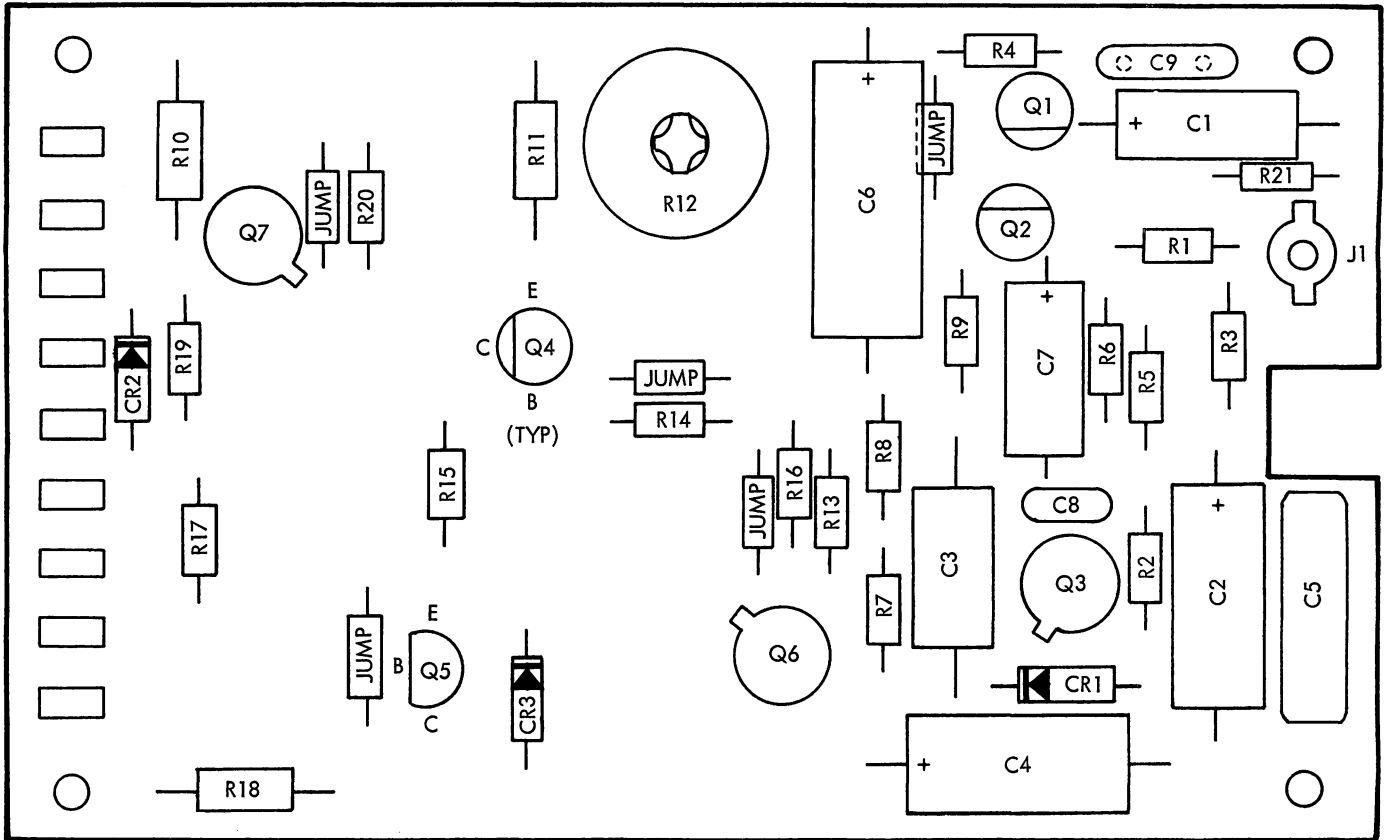


Figure 10. Electronic Part Locations (2C572-3), HF Power Driver PCB Assembly

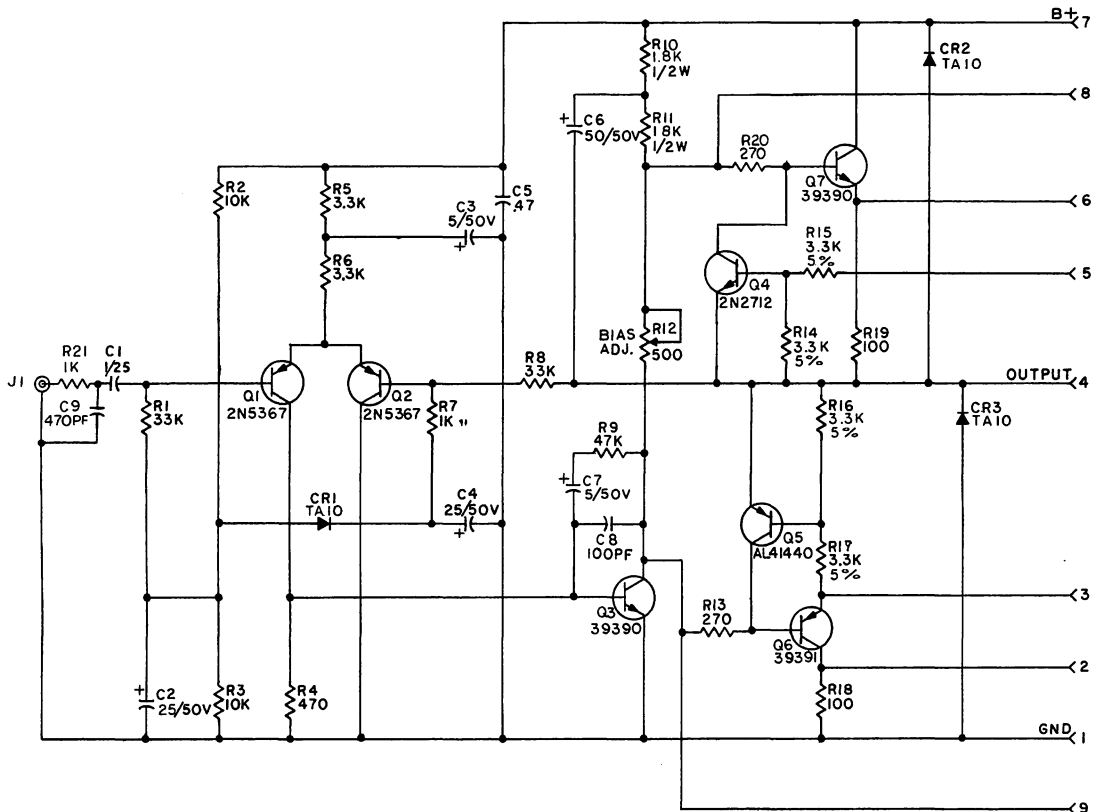


Figure 11. Schematic (2D545-4), HF Power Driver PCB Assembly

HIGHEST REF DESIGNATIONS USED			
C8	CR3	J1	R20
REFERENCE DESIGNATIONS NOT USED			

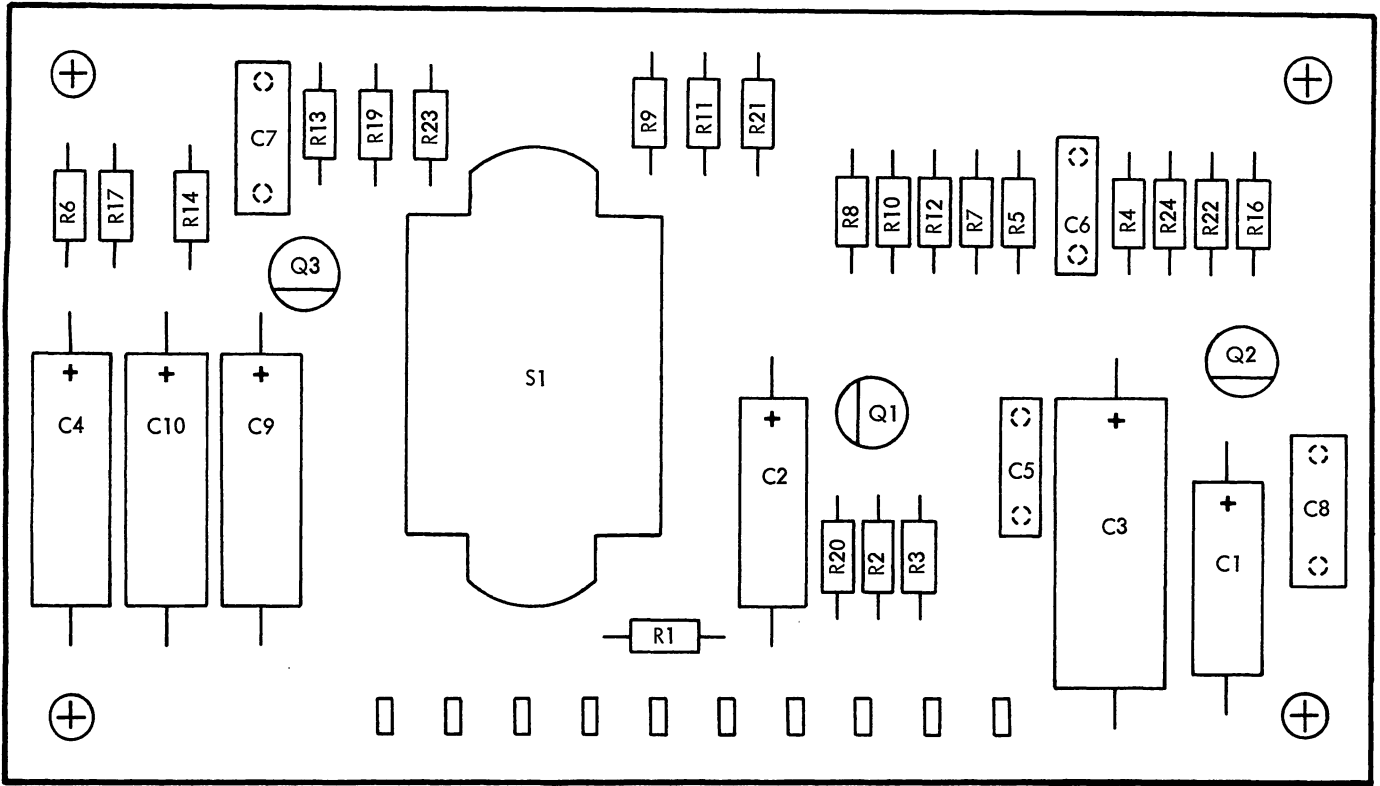
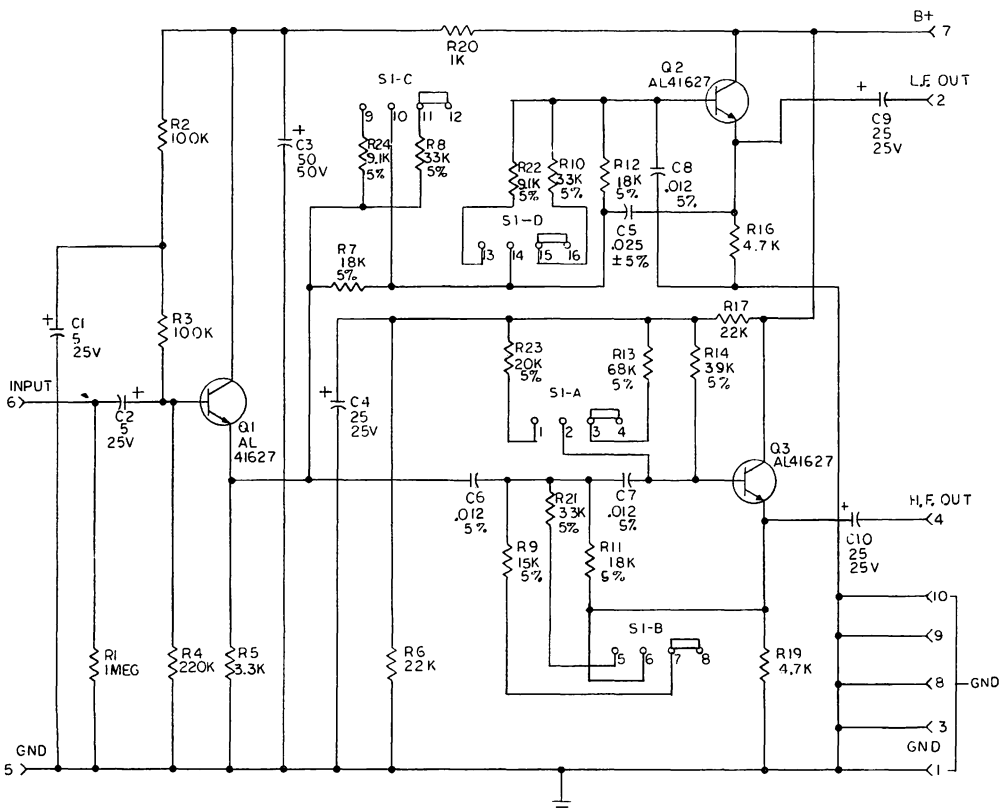


Figure 12. Electronic Part Locations (3C065-1), Crossover PCB Assembly



HIGHEST REFERENCE DESIGNATOR USED			
R24	C10	Q3	S1
REFERENCE DESIGNATION NOT USED			
R15	R18		

Figure 13. Schematic (3C066-2), Crossover PCB Assembly

PARTS LIST

771B/771BX MAIN CHASSIS

Reference Designator	Ordering Number	Name and Description
A1	27-01-042638-01	PCB assembly, cross-over
A2	27-01-042245-01	PC B assembly, HF power driver
A3	27-01-042244-01	PC B assembly, LF power driver
C1	15-01-100296-01	Cap., 5000 μ F, 25V
C2	15-01-107511-01	Cap., 6200 μ F, 75V
C3	15-01-100298-01	Cap., 5000 μ F, 60V
C4	15-01-100279-01	Cap., 500 μ F, 50V
C5	15-01-114352-01	Cap., 4000 μ F, 50V
C6,7	15-06-102605-01	Cap., 0.47 μ F \pm 10%, 100V
C8	15-02-100089-01	Cap., 0.01 μ F \pm 20%, 4000V
CB1 (771B only)	51-03-109809-02	Circuit breaker, 2.2A hold, 3.25A trip
CR1	48-02-108577-01	Diode bridge rectifier, 1.5A, 100 PIV
CR2,3,4,5	48-02-107467-01	Diode, rectifier, 1N5402, 200V, 3A
CR6,7,9,10	48-01-109275-01	Diode, Zener, 1N746, 3.3V \pm 10%, 400 mW
CR8,11	48-01-107429-01	Diode, stabistor, 3-pellet
F1,2	51-04-100462-01	Fuse, 1/4A, 3AG, 250V
F3,4 (771BX only)	51-04-100464-01	Fuse, 1A, 3AG
J1	21-01-114347-01	Jack
J2 (771B only)	21-01-114347-01	Jack

Reference Designator	Ordering Number	Name and Description
J3	21-02-100973-01	Socket, octal
Q1,2,3,4	48-03-109715-02	Transistor
R1,3	47-06-042269-02	Pot., 10K Ω , B taper
R2,4	47-01-102163-01	Res., 1K Ω \pm 10%, 1/4W
R5,7	47-02-107434-01	Res., 0.33 Ω \pm 10%, 3W
R6,8	47-02-108238-01	Res., 0.25 Ω \pm 10%, 3W
R9,10	47-02-112166-01	Res., 5 Ω \pm 10%, 5W
R11,12	47-01-102359-01	Res., 2.2K Ω \pm 10%, 1/2W
(771BX only)		
R13 (771BX only)	47-01-102075-01	Res., 750 Ω \pm 5%, 1/4W
S1 (771B only)	51-02-113986-01	Switch assembly, DPDT, w/pilot lamp
S1 (771BX only)	51-02-113535-01	Switch, SPDT, slide
S2 (771BX only)	51-01-042617-01	Switch, 2-gang, rotary
T1 (771B only)	56-08-007458-01	Transformer, power
T1 (771BX only)	56-08-007543-01	Transformer, power
TB9	21-04-101038-01	Terminal board, 4-terminal, input
TB11	21-04-030799-01	Terminal board, 4-terminal, speakers
W1,2	60-09-042284-02	Cable assembly

PARTS LIST (continued)

LF POWER DRIVER PCB ASSEMBLY

Reference Designator	Ordering Number	Name and Description
C1	15-01-107452-01	Cap., 10 μ F, 50V
C2,6,13	15-01-100241-01	Cap., 50 μ F, 50V
C3,7	15-01-110771-01	Cap., 5 μ F, 50V
C4	15-01-107500-01	Cap., 100 μ F, 50V
C5,9,10	15-06-108173-01	Cap., 0.47 μ F \pm 20%, 100V
C8	15-02-107454-01	Cap., 100 pF \pm 10%, 100V
C11,12	15-02-100307-01	Cap., 0.01 μ F, \pm 20%, 100V
C14	15-02-100302-01	Cap., 470 pF \pm 10%, 100V
CR1,2,3,4,5	48-01-107017-01	Diode, 1N456A, 25V, 100 mA
CR6,7	48-01-102592-01	Diode
CR8	48-01-110786-01	Diode, Zener, 23V \pm 5%, 2W
J1	21-01-109731-01	Jack, phono
Q1,2	48-03-110773-01	Transistor, PNP, 50V
Q3,7	48-03-107447-02	Transistor, 2N5320, NPN, 10W, 75V
Q4	48-03-041440-01	Transistor, PNP
Q5	48-03-101098-01	Transistor, NPN
Q6	48-03-107448-02	Transistor, 2N5322, PNP, 10W, 75V
R1,9	47-01-102178-01	Res., 18K Ω \pm 10%, 1/4W
R2	47-01-102181-01	Res., 33K Ω \pm 10%, 1/4W
R3	47-01-102116-01	Res., 39K Ω \pm 5%, 1/4W
R4	47-01-102155-01	Res., 220 Ω \pm 10%, 1/4W

Reference Designator	Ordering Number	Name and Description
R5,6	47-01-102169-01	Res., 3.3K Ω \pm 10%, 1/4W
R7,16,17,25,27	47-01-102151-01	Res., 100 Ω \pm 10%, 1/4W
R8	47-01-102067-01	Res., 360 Ω \pm 5%, 1/4W
R10	47-01-102183-01	Res., 47K Ω \pm 10%, 1/4W
R11,12	47-01-102359-01	Res., 2.2K Ω \pm 10%, 1/2W
R13	47-05-107504-01	Pot., 500 Ω \pm 20%, 2W
R14	47-01-102140-01	Res., 10 Ω \pm 10%, 1/4W
R15	47-01-102147-01	Res., 47 Ω \pm 10%, 1/4W
R18,19,20,30	47-01-102171-01	Res., 4.7K Ω \pm 10%, 1/4W
R21	47-01-102156-01	Res., 270 Ω \pm 10%, 1/4W
R22,23	47-01-102167-01	Res., 2.2K Ω \pm 10%, 1/4W
R24,26	47-01-102152-01	Res., 120 Ω \pm 10%, 1/4W
R29	47-01-102157-01	Res., 330 Ω \pm 10%, 1/4W
R31	47-01-000001-01	Res., values specially selected in test, \pm 5%, 1/4W
R32	47-01-102163-01	Res., 1K Ω \pm 10%, 1/4W

PARTS LIST (continued)

HF POWER DRIVER PCB ASSEMBLY

Reference Designator	Ordering Number	Name and Description
C1	15-06-100311-01	Cap., 0.1 μ F \pm 20%, 250V
C2,4	15-01-107501-01	Cap., 25 μ F, 50V
C3,7	15-01-110771-01	Cap., 5 μ F, 50V
C5	15-06-108173-01	Cap., 0.47 μ F \pm 20%, 100V
C6	15-01-100241-01	Cap., 50 μ F 50V
C8	15-02-107454-01	Cap., 100 pF \pm 10%, 100V
C9	15-02-100302-01	Cap., 470 pF \pm 10%, 100V
CR1,2,3	48-01-102592-01	Diode
J1	21-01-109731-01	Jack, phono
Q1,2	48-03-108557-02	Transistor, 2N5367, PNP, 0.36W, 40V
Q3,7	48-03-107447-02	Transistor, 2N5320, NPN, 10W, 75V
Q4	48-03-101098-01	Transistor
Q5	48-03-041440-01	Transistor
Q6	48-03-107448-02	Transistor, 2N5322, PNP, 10W, 75V

Reference Designator	Ordering Number	Name and Description
R1,8	47-01-102181-01	Res., 33K Ω \pm 10%, 1/4W
R2,3,14,16	47-01-102175-01	Res., 10K Ω \pm 10%, 1/4W
R4	47-01-102159-01	Res., 470 Ω \pm 10%, 1/4W
R5,6,15,17	47-01-102169-01	Res., 3.3K Ω \pm 10%, 1/4W
R7,21	47-01-102163-01	Res., 1K Ω \pm 10%, 1/4W
R9	47-01-102183-01	Res., 47K Ω \pm 10%, 1/4W
R10,11	47-01-102359-01	Res., 2.2K Ω \pm 10%, 1/2W
R12	47-05-107504-01	Pot., 500 Ω \pm 20%, 2W
R13,20	47-01-102156-01	Res., 270 Ω \pm 10%, 1/4W
R18,19	47-01-102151-01	Res., 100 Ω \pm 10%, 1/4W

PARTS LIST (continued)

CROSSOVER PCB ASSEMBLY

Reference Designator	Ordering Number	Name and Description
C1,2	15-01-108543-01	Cap., 5 μ F, 25V
C3	15-01-100241-01	Cap., 50 μ F, 50V
C4,9,10	15-01-107495-01	Cap., 25 μ F \pm 10%, 25V
C5	15-06-051240-02	Cap., 0.025 μ F \pm 5%, 100V
C6,7,8	15-06-109091-01	Cap., 0.012 μ F \pm 5%, 100V
Q1,2,3	48-03-041627-01	Transistor
R1	47-01-100482-01	Res., 1M Ω \pm 10%, 1/4W
R2,3	47-01-102187-01	Res., 100 K Ω \pm 10%, 1/4W
R4	47-01-102191-01	Res., 220K Ω \pm 10%, 1/4W
R5	47-01-102169-01	Res., 3.3K Ω \pm 10%, 1/4W
R6,17	47-01-102179-01	Res., 22K Ω \pm 10%, 1/4W

Reference Designator	Ordering Number	Name and Description
R7,11,12	47-01-102108-01	Res., 18K Ω \pm 5%, 1/4W
R8,10,21	47-01-102114-01	Res., 33K Ω \pm 5%, 1/4W
R9	47-01-102106-01	Res., 15K Ω \pm 5%, 1/4W
R13	47-01-102123-01	Res., 68K Ω \pm 5%, 1/4W
R14	47-01-102116-01	Res., 39K Ω \pm 5%, 1/4W
R16,19	47-01-102094-01	Res., 4.7K Ω \pm 5%, 1/4W
R20	47-01-102163-01	Res., 1K Ω \pm 10%, 1/4W
R22,24	47-01-102101-01	Res., 9.1K Ω \pm 5%, 1/4W
R23	47-01-102109-01	Res., 20K Ω \pm 5%, 1/4W
S1	57-02-042698-01	Switch, slide, 4P3T