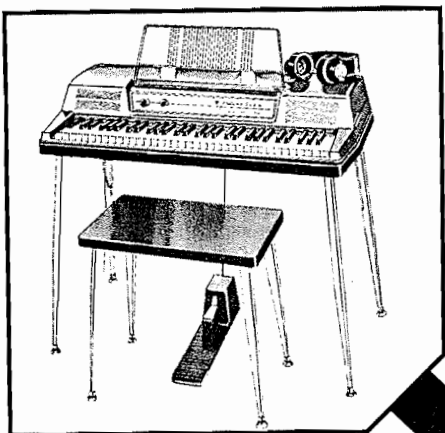


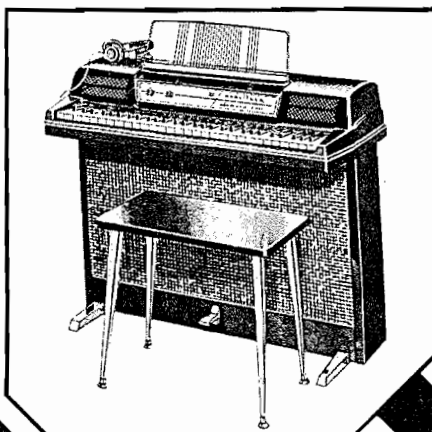
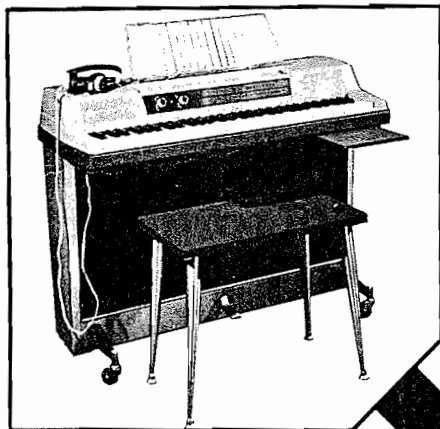
# Electronic Pianos

SERIES 200 AND 200A

## Service Manual



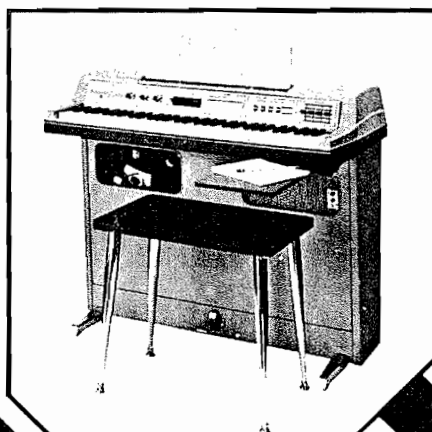
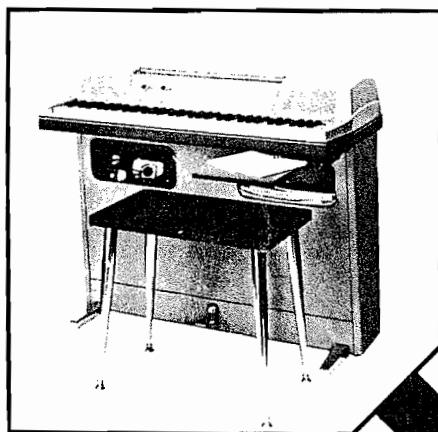
Model 200 200A & 200B



Model 203

Model 203 & 210A

Model 214, 214V, 214A, 214VA & 215VA



Model 270

Model 206 & 206A

Model 207, 207V, 207A & 207VA

Manufactured by The Wurlitzer Company - Dekalb, Illinois 60115

# SECTION I

## WURLITZER ELECTRONIC PIANOS

MODELS 200, 203, 203W, 205V, 206, 207, 207V, 214, 214V & 215V

### SPECIFICATIONS AND DESCRIPTION

#### MODEL 200, 200A (PROFESSIONAL PORTABLE)

Keyboard Range:	64 Notes, A-13 thru C-76
Height (From Floor to Top of Keys With Legs):	28 5/8"
Height of Case (Less Legs):	7 1/8"
Height (From Floor to Top of Case, Not Including Music Panel):	33"
Overall Width:	40"
Overall Depth:	18 9/16"
Weight: (Less Legs and Pedal)	56 lbs.

Legs: Removable chrome plated steel legs, two of which have leveling glides.

#### MODELS 203, 203W, 206, 205V, 206, 207, 207V, 214, 214V, 215V & 270

The Models 203 and 203W are home consoles. For Group Piano Instruction, the Model 206 is the student console and the Models 205V, 207 and 207V are teacher's consoles. The Models 214, 214V and 215V are classroom consoles. The Models 207V and 214V have the switches, wiring and plugs installed for use with the Model 208 Key/Note Visualizer. The Models 205V and 215V are similarly equipped to operate the V-500 Key/Note Visualizer. The Model 270 is a butterfly grand using similar internal assemblies as the Model 200.

Keyboard Range:	64 Notes, A-13 thru C-76
Height (From Floor to Top of Keys):	28 5/8"
Height (From Floor to Top of Keys) Model 270:	27 1/4"
Overall Height (Not Including Music Panel or Casters):	32 7/8"
Overall Height (Not Including Music Panel) Model 270:	34"
Overall Width:	40"
Overall Width Model 270:	41"
Overall Depth:	18 9/16"
Overall Depth Model 270:	37 1/2"
Weight Model 270:	Approx. 150 lbs.
Weight (With Legs & Lyre) Model 270:	160 lbs.

**Vintage Vibe**  
**9 Everment Rd.**  
**Wharton, NJ 07885**  
**917-880-9763**  
**www.vintagevibe.com**

NOTE: The Following Information Applies to All Models Except as Noted.

**BENCH:**

Wood bench with removable chrome plated steel legs, two of which have leveling glides.

**KEYBOARD:**

Sugar Pine keyboard, naturals are covered with white Iplex plastic, sharp tops are black molded plastic.

**ACTION:**

Wurlitzer manufactured action, employing conventional action parts such as whips, butts, flies (jacks), dampers, etc. **Regulates Like a Conventional Piano Action.**

**HAMMERS:**

Three ply maple covered with mothproofed felt.

**TONE SOURCE:**

Hammers strike steel tone producing elements, causing them to vibrate in a polarized electrostatic field.

**SPEAKERS:**

Following is listed the various models showing the description and number of speakers used in these instruments:

Model 200 - Two 4" x 8" oval.

Model 203 - Two 4" x 8" oval plus two 8" round **or** four 8" round.

Model 203W - Four 8" round.

Model 205V - Two 8" round.

Model 206 - Two 4" x 8" oval or two 8" round.

Model 207 - One 6" x 9" oval **or** one 8" round **or** two 8" round.

Model 207V - Two 8" round.

Model 214, 214V & 215V - Four 8" round.

Model 270 - Two 8" round.

(Refer to schematic diagram for matching output impedance to speaker impedance).

**POWER REQUIREMENTS:**

ALL MODELS - 40 watts; operated from 117-volt 60 Hertz A.C. Three wire center grounded A.C. cord standard.

**TOP (ALL FOUR MODELS):**

ABS (Acrylonitrile-Butadiene-Styrene) molded plastic top, hinged at the back. Secured to the keybed with three (3) screws thru the keyslip.

Model 270 has a finished all wood case (walnut).

**PEDAL SUSTAIN:**

Lifts dampers, permitting tone to sustain as in a conventional piano. (Detachable on Model 200 portable, built in on console models).

**OPTIONAL EQUIPMENT:**

**Model 206** - Bench is optional, as well as the special A.C. cable, Model 8315, permitting a 206 to be taken out of a lab installation and used as a separate or individual piano.

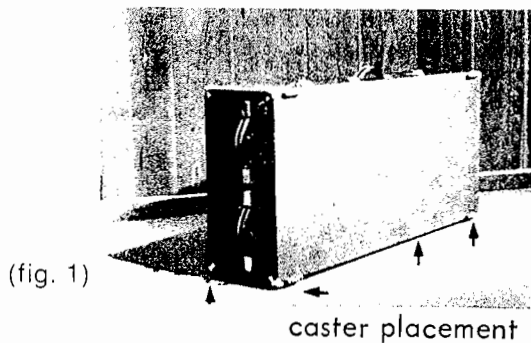
**Models 200 and 203** - Bench and headphones are optional.

**CARRYING CASE (FOR MODEL 200 PORTABLE):**

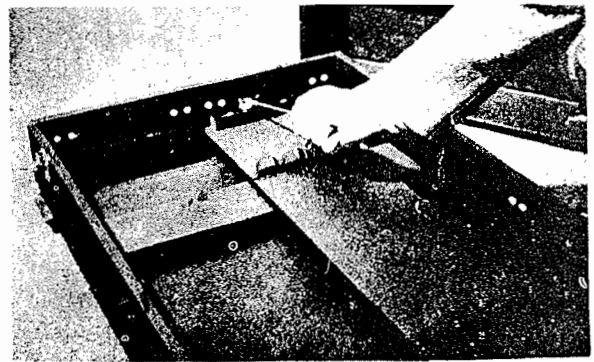
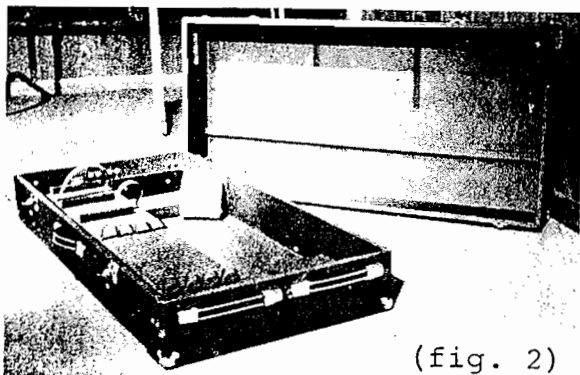
A heavy duty carrying case, Model 233A is available thru the Sales Department. See pages 6A and 6B for photos and instructions for use.

**CARRYING CASE - MODEL 233A  
for  
WURLITZER ELECTRONIC PIANO - MODEL 200**

- A. Remove the case from the shipping carton (fig. 1). To open, lay case flat on floor and unlatch the four locks. (Note: the locks are placed in different positions on each side of the case to avoid improper closing.)

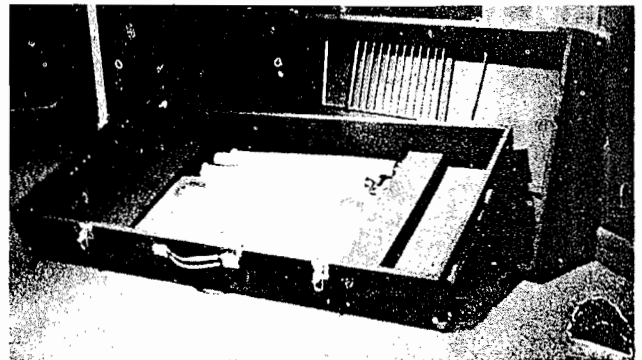


- B. Inside the case is a box containing four 1½" chrome casters to be attached on the bottom or end of the case, as you see fit. These casters are designed primarily for use indoors on floors or carpet; if the case is to be moved on sidewalks or on any rough ground, it is suggested that you purchase 2" (or larger) rubber casters.
- C. Inside the case you will find a covered board with elastic straps designed to hold the piano legs and the expression pedal (fig. 2). During initial shipment of the empty case, this board is secured by two metal clamps located at each end. Using a Phillips screwdriver, remove these clamps (fig. 3) and dispose of them. Now take the board out of the case.



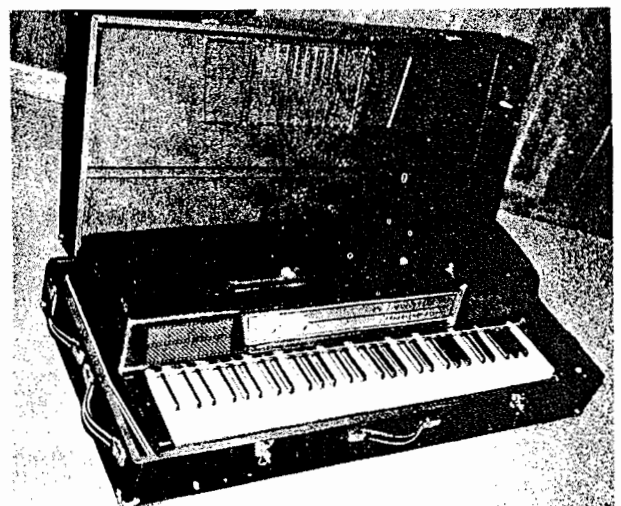
(fig. 3)

- D. Place the piano bench in the bottom of the case (fig. 4) with the bench legs alternated alongside. Slip the music panel under the elastic straps in the top as shown . . . be sure the rack lies in flat with screw arms facing you.



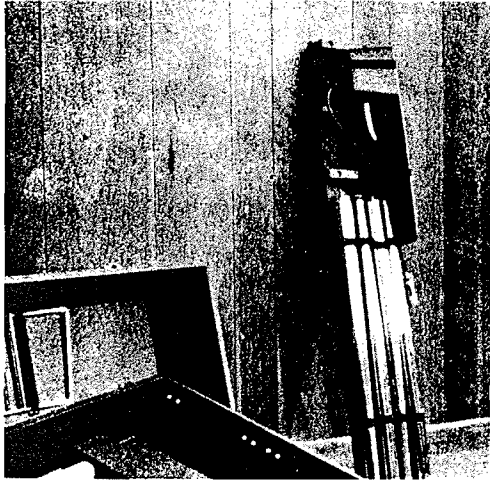
(fig. 4)

- E. Place the Electronic Piano over the bench parts in the carrying case with keyed toward the front handle (fig. 5).



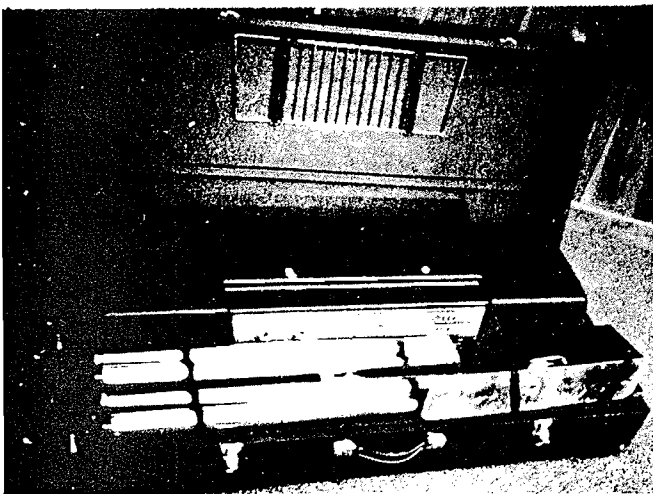
(fig. 5)

- F. Alternate the piano legs through the elastic straps on the board (fig. 6). Then, place the expression pedal into position through the straps provided.



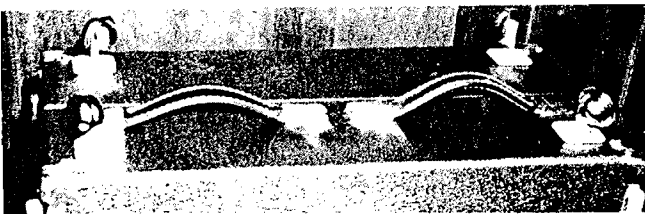
(fig. 6)

- G. Finally, place the assembly with the piano legs and pedal over the keyboard of the E.P. (fig. 7). The board will rest on the piano arm, not on the keys. Close the case.

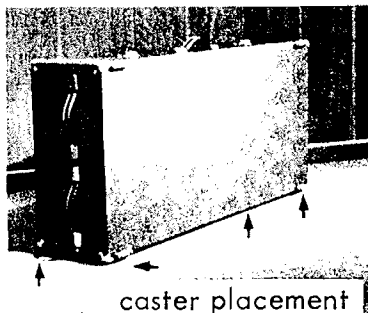


(fig. 7)

- H. Fig. 8 shows ways to install the casters on the end of the case for upright mobility or on the bottom.



(fig. 8)



**PREPARATION OF THE PIANO FOR SERVICING  
(SEE FIG. 1 & 2 Page 4)**

Unplug the piano from AC outlet. To remove the top assembly, remove the three (3) Phillips head screws that hold the keyslip down to the keybed, take out the two (2) screws that hold the music panel in place, remove the control knobs. (It may be necessary to pull the front of the top slightly forward to clear the shafts which hold the control knobs). Unplug the plastic speaker plug, located at the left hand corner on the top of the chassis assembly. Lift the keyslip portion until nearly vertical and unhook the three hinges at the back side of the top.

If the service needed is to correct a problem with the amplifier, the printed circuit board can now be removed and turned over for checking without unsoldering the leads at each end.

If the service required is regarding the keys or action, the entire chassis assembly should be removed as follows:

NOTE: If any of the four models have a screw that fastens the heat sink on the printed circuit board to the reed bar, remove the screw and discard it.

**MODEL 200 AND 200A (PORTABLE):  
(SEE FIG. 1 & 2 Page 4)**

1. Unplug the input cable at the bass end of the printed circuit board. (SEE FIG. 2 Page 4.)
2. Loosen the six screws that hold the shield to the reed bars and remove the shield by lifting straight up.
3. Unplug the white plastic plug behind the speaker plug, located on the left side of the chassis assembly. (SEE FIG. 2 Page 4.)
4. Remove the two screws at each end of the chassis that secure it to the mounting blocks. (Note: The screw located on the left hand side and toward the action bracket is larger than the other screws and has a washer located under the chassis.)
5. Remove the Pre Amp Board located at the top center of the reed bar, by loosening the two (2) 1/4" hex head screws. (200A only)
6. Lift up the entire chassis assembly, being careful not to damage the two phone jacks mounted on a bracket at the bass end.
7. Replace the front mounting screw and washer in bass action bracket. The keys and action are now exposed for any necessary regulation.

**MODELS 203, 203W and 214 (HOME CONSOLES):**

Follow the same procedure as for the Model 200 for steps (1) thru (7).

If there is a square white plastic nine-pin plug and socket located above the printed circuit board, unplug and remove the chassis assembly.

**If there is no plug at this location**, remove the three screws that hold the round mounting plates for the headphone sockets at each end of the keybed. Also remove all cable clamps used to dress the wires leading to these jacks.

Remove the lower front panel by removing the four wood screws across the top of the panel. Unplug or unsolder all cables going to the lower front panel.

#### MODEL 206 (STUDENT CONSOLE):

Follow steps (1) thru (7) as described for the Model 200. If there is a square white plastic nine-pin plug and socket located above the printed circuit board, unplug it and remove the entire chassis assembly.

**If there is no plug at this location**, remove the three screws that hold the round mounting plate for the auxiliary headphone socket at the bass end of the keybed and the cable clamp that dresses the wires leading to this socket. The chassis assembly can then be removed.

#### MODEL 207 (TEACHER'S CONSOLE):

Follow steps **one**, **three** and **four** as described for the Model 200. Disconnect the thirty-six pin plug and socket located near the treble end of the chassis. Disconnect all the nine-pin plugs and sockets on the chassis assembly. The entire chassis assembly can now be removed.

The five or six screws on the shield over the reed bars can now be loosened and the shield removed.

### REGULATING PROCEDURE

In the keys and action of the Wurlitzer electronic piano there are approximately 3,200 parts made mostly of wood, metal and felt. These materials are specially selected and manufactured for use in piano keys and actions, but the normal wear from playing the piano, packing of the felts, and changing atmospheric conditions will probably necessitate some periodic re-regulation of the instrument.

The following pages outline the procedure for complete regulation of the Wurlitzer electronic piano. Before proceeding with a complete regulation, however, the instrument should be analyzed to determine the extent of regulation required.

#### 1. KEYBOARD INSPECTION (SEE FIG. 2, Page 8):

First, check the felt punchings on both the balance and front pin lines and the felt on the keybed at the back of the keys. Replace these felts if they are moth-eaten or packed excessively.

Next, inspect the entire keyboard for free movement of each key at both the balance and front pin lines. Check both natural and sharp keys by lifting them about 1/4" and dropping. If the keys do not drop back, they are tight in either the balance rail bushing or the balance rail hole.

Check the balance rail bushing first by moving the key from side to side. There should be a slight movement of the key at that point. Check the balance rail hole by moving the key forward and backward. There should be a slight chug (movement). Check the front rail bushing by pushing the key all the way down and moving it from side to side. There should be a slight movement.

#### 2. EASE KEYS

When a piano keyboard is found to be sticking or sluggish, the cause is often due to the felt swelling either at the balance key bushing or at the front key bushing, or both. Even if just one or two keys are sticking, it is advisable to check the entire keyboard. Key easing is done by using a pair of key **easing pliers** which can be obtained from any reputable tuners supply house. (SEE FIG. A) Easing is executed by inserting one lip of the pliers into the opening in the key and positioning the other lip of the pliers on the outside of the key, and squeezing firmly but carefully. Wood and felt are thereby compressed to obtain a proper clearance at the pin.

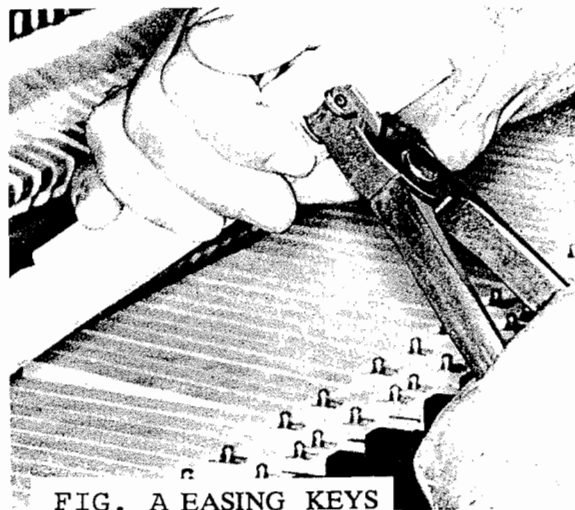
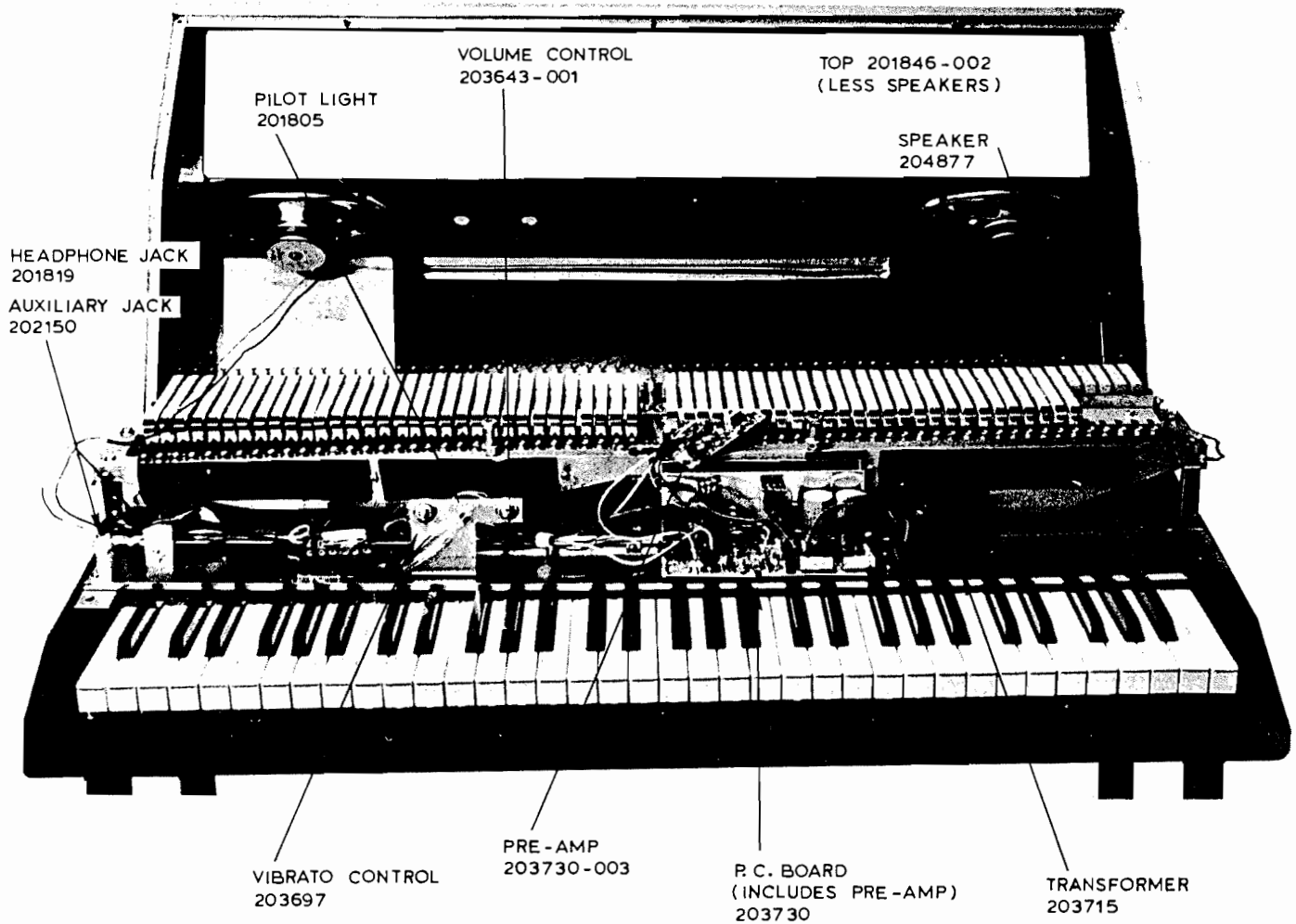
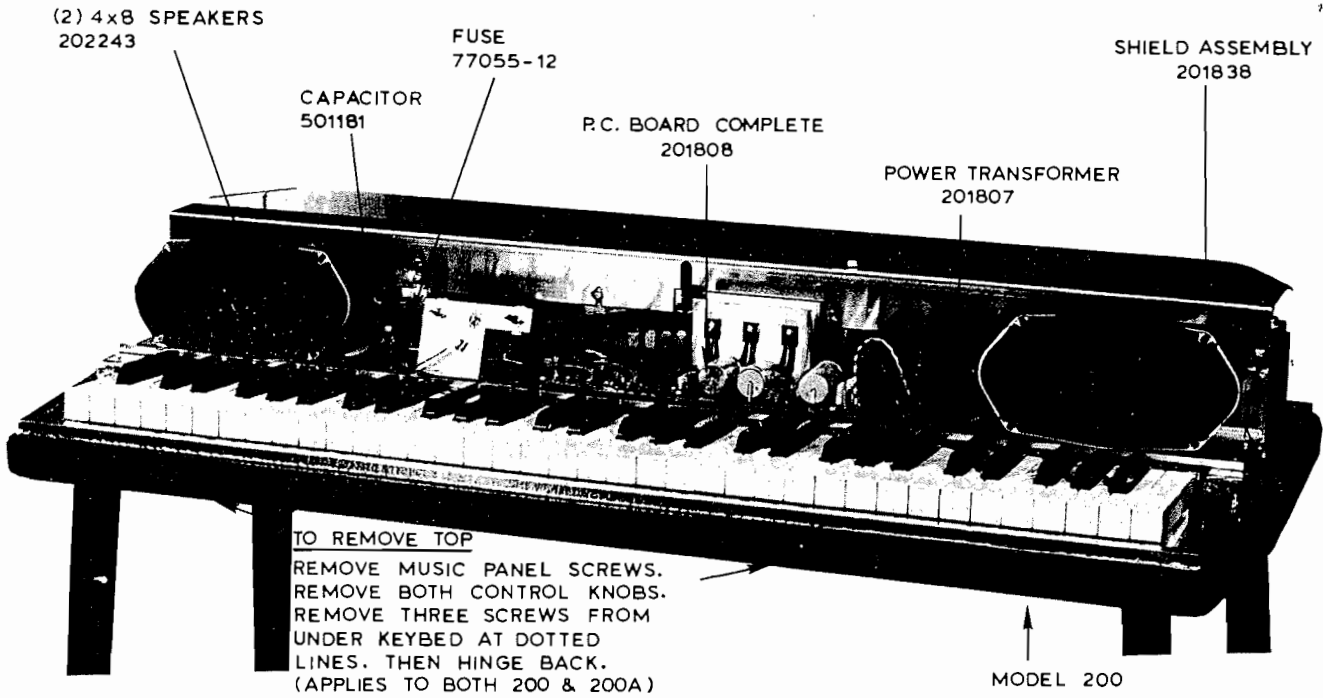


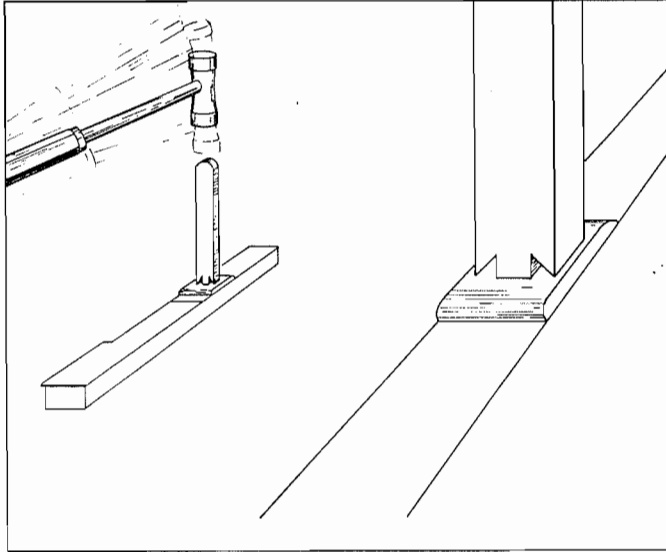
FIG. A EASING KEYS

When easing keys, caution should be exercised so keys are not over-eased. Over-eased balance pin bushings will cause the keys to tip, and over-eased front pin bushings will cause excessive side play, and in extreme cases, adjacent keys touching at the fronts. Over-eased keys will become noisy and will not stay properly spaced.

Sometimes sticking keys may be due to the hole at the bottom of the key (at balance point) swelling and tightening around the balance pin. The clearance should not be excessive but the key should drop freely over the pin. If the balance rail hole is tight it can be enlarged by inserting the smooth shank, not the cutting edge, of a #21 drill (.159" dia.) into the hole. This will give you the ideal size hole with less danger of making the hole too large.

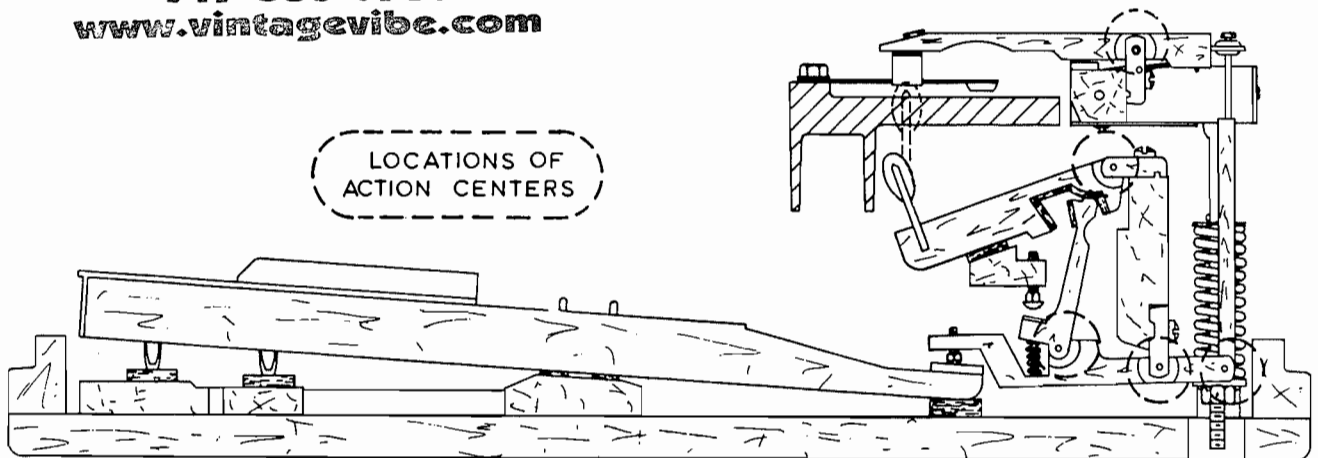


Noisy or loose keys can be tightened with a **key bushing tightener**. Insert the tool into the key bushing and tap lightly with a small hammer. This tool may be used on the balance rail key bushing or the front rail key bushing. A key bushing tightener can be obtained from any reputable tuners' supply house. (SEE FIG. B)



**FIG. B**  
**KEY BUSHING TIGHTENER**

**Vintage Vibe**  
**9 Everment Rd.**  
**Wharton, NJ 07885**  
**917-880-9763**  
**www.vintagevibe.com**



**FIG. C**  
**TREATING ACTION CENTERS**

### 3. **INSPECT ACTION FOR FREE CENTERS**

First, check the butt centers by raising the butts from the hammer regulating rail and allowing them to fall abruptly, observing the movement of the butts. If the butt centers are free, the butts will fall back to the rail without any hesitation.

Whip centers are checked by depressing the full sustaining pedal to remove all damper spring tension from the whip assembly. Fully depress each key and release it slowly. If the key does not completely return, or if it returns very slowly, the whip centers are probably sluggish. Keys must, of course, be properly eased before this inspection is performed.

If the action centers are sluggish, treat the action centers according to the procedure which follows.

### 4. **TREATING ACTION CENTERS**

If the action centers become sluggish they must be treated to restore the proper amount of freedom. If treatment is necessary, all action centers should be treated.

The treating solution consists of eight (8) parts of V. M. & P Naphtha and one (1) part of silicone liquid. V. M. & P Naphtha can be purchased at most paint stores. **Damper flange** centers, **hammer butt** centers, **fly** centers, **whip** centers and **damper sticker** centers are possible points of sluggishness and all should be treated.

Apply silicone solution freely at these points, making sure the action centers are completely wet. Application of the silicone solution can be made with a small plastic squeeze bottle with nozzle. (SEE FIG. C).



The response to the silicone solution treatment should be immediately apparent. CAUTION should be used when applying. Key covers can be damaged or reeds may go out of tune if spilled on. The silicone solution should be applied before regulation for best results, if needed. Silicone and applicator kit is available from DeKalb, Illinois Service Department.

Never re-pin a sluggish or tight action with a center pin that is smaller in diameter than the original center pin. The pin will be tight in the felt bushings and become loose in the wood. The wood will become the action center. This type of repair will not last long and will create a "rubbery" feel to the keyboard.

**5. INSPECT ACTION**

- A. Tighten all screws. (Does not include Regulating Screws).
- B. Check the damper levers for squeaks. Use a soft lead pencil to apply graphite to the teflon groove located under the damper lever spring to eliminate any squeak. (SEE FIG. D).
- C. Check the action completely for any broken parts, loose flanges, moth-eaten or loose felts, etc., and repair or replace as necessary.
- D. With a sand paper file, reface the hammers if necessary. Also, the hammer felt may be softened to remove a "clicking" sound by applying a solution of 75% methol alcohol (methanol) and 25% water. Apply the solution to the crown of the hammers using a plastic squeeze bottle with nozzle, until the solution soaks into the felt. Allow forty-five minutes drying time. This will "puff" up the felt fibers of the hammers and will help restore hammer crown. (SEE FIG. D). Reed bars must be removed to perform the above service.

**6. SET KEY HEIGHT**

The proper key height is 2" measured from the keybed to the underside of the projecting lip on the front of the natural keys. The key height is adjusted by adding or removing hard paper shims between the balance rail of the key frame and the keybed. (SEE FIG. D).

**7. SQUARE AND LEVEL**

After the keys have been set to the proper height, the keys are then squared to a straightedge by lightly tapping the tops of the balance rail pins toward the bass or treble as required. This may be done by using a screw driver or a small hammer.

The natural keys are leveled to the proper height above the keybed. The sharp keys are then leveled to the natural keys so the wood surface just in back of the sharp cap is even with the wood surface of the natural key. (SEE FIG. E).

**8. SPACE KEYS**

Keys are spaced with a forked key spacing tool by bending the front rail pin toward the bass or treble as necessary. (SEE FIG. F). The natural keys are adjusted so the spaces between the keys are uniform. The sharp keys are then spaced so they are centered between the adjacent natural keys.

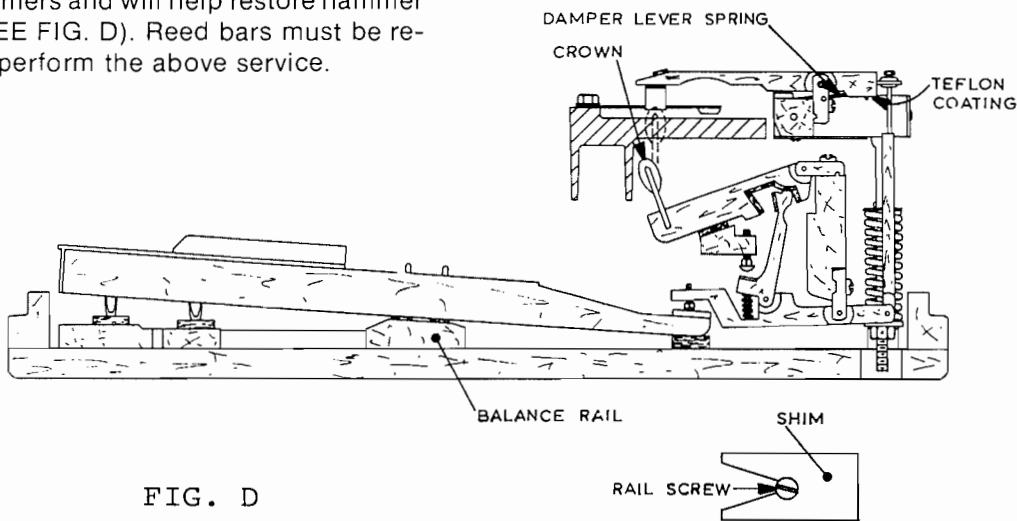


FIG. D

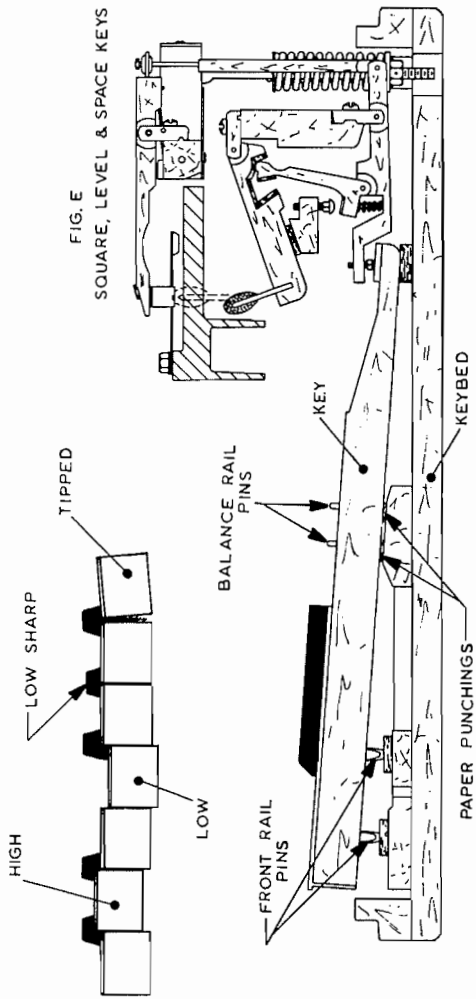


FIG. E

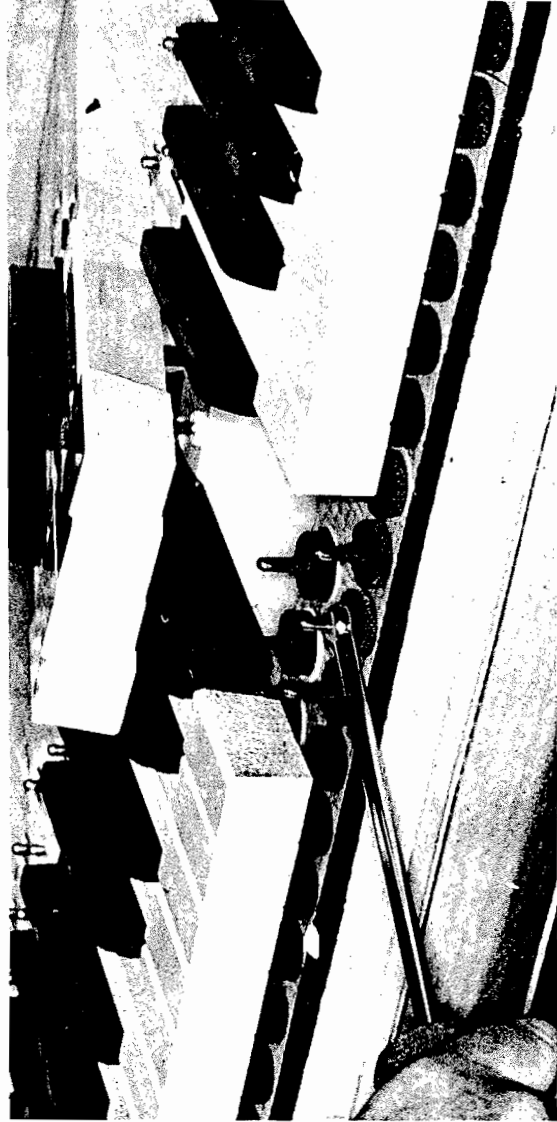


FIG. F

**Vintage Vibe**  
**9 Everment Rd.**  
**Wharton, NJ 07885**  
**917-880-9763**  
**www.vintagevibe.com**

W. H. ...

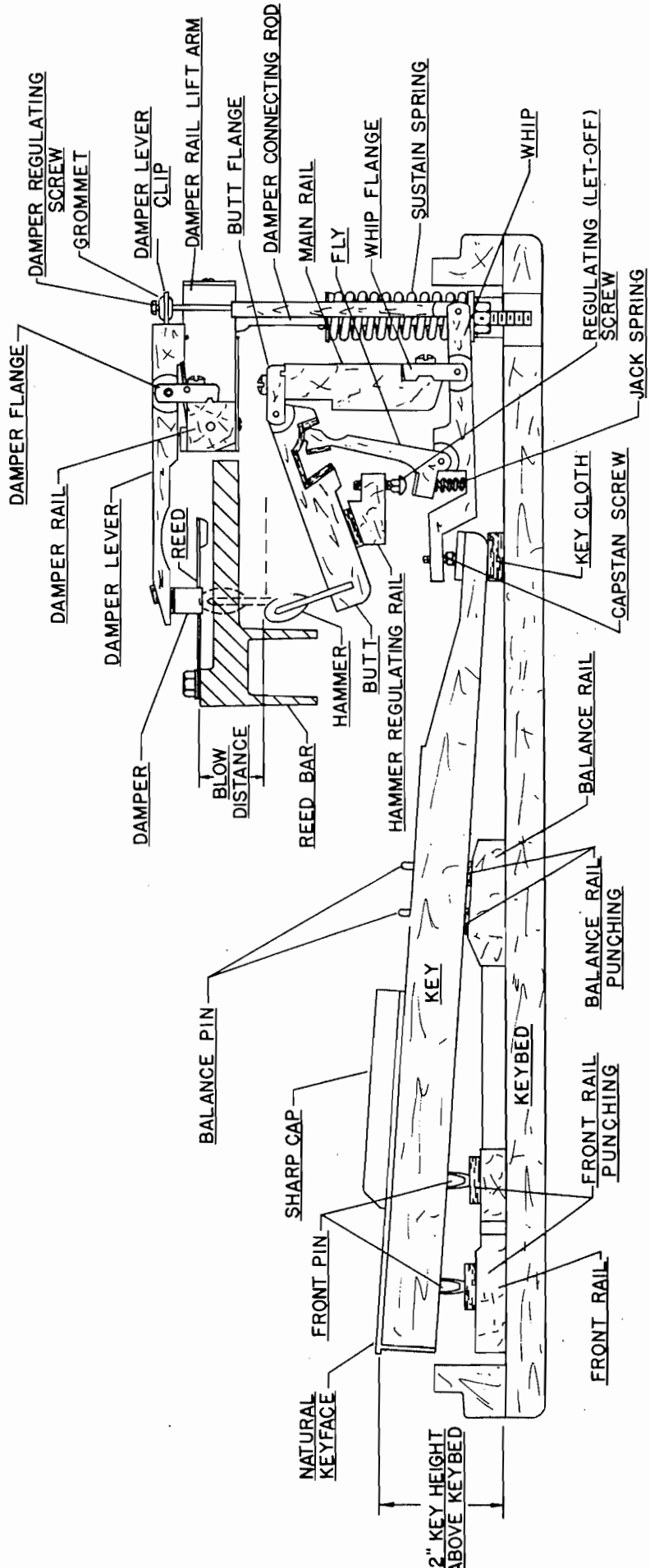


FIG. 2

As the keys are spaced, "brush" forward on the keys with the palm of the hand so the keys fall in their natural position. (SEE FIG. G.) **A Word of Caution:** After the keys are spaced, check the backs of the keys to make certain adjacent keys are not touching each other. It may be necessary to sand some keys slightly to insure the proper clearance between them.



FIG. G

**9 STRIKING POINT**

The striking point is properly set at the factory and should require little or no adjustment in the field. If it is necessary to put in a new hammer or to reset a strike point, heating the glue line with a soldering iron will soften the glue to the point where it can be either moved for a new strike point or taken out to replace the hammer. (SEE FIG. H.)

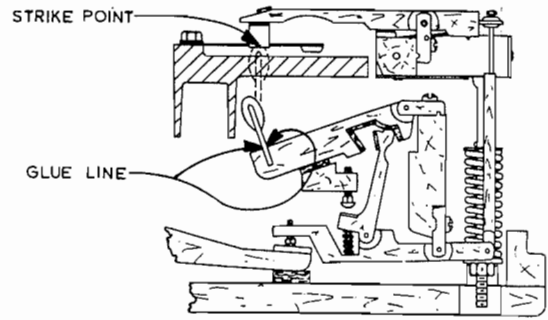


FIG. H

**10. HAMMER BLOW DISTANCE**

The hammer blow distance is factory-set and normally will not require adjustment, providing the hammers are down on the hammer regulating rail.

The correct blow distance is  $1 \frac{5}{64}$ " measured from the tip of the hammer to the under surface of the reed. (SEE PAGE 10, FIG. 2.)

**11. ADJUST LOST MOTION**

**A SMALL AMOUNT OF LOST MOTION** should be put into the key and action of the electronic piano to make sure the jack will always return under the hammer butt on a slow return of the key. The lost motion is a  $1/32$ " gap between the tip of the fly and the hammer butt covering. To adjust the lost motion, turn the capstan screw, with a capstan wrench. (SEE FIG. I). Counter clockwise adds lost motion. Clockwise to decrease lost motion.

As you depress the key, watch the front of the whip and front of hammer butt to see movement of whip before hammer butt moves. (SEE FIG. I).

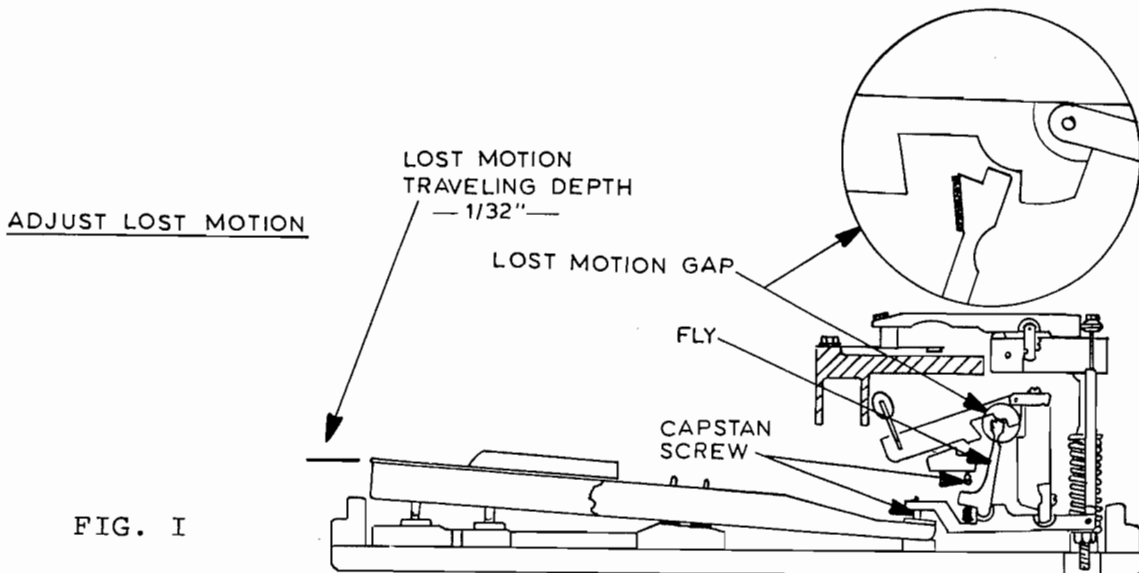


FIG. I

## 12. ADJUST LET-OFF

LET-OFF refers to the distance between the top of the hammer and the bottom of the reed at the point where the fly will escape the hammer butt. The present specifications for the let-off distance is 1/8" (plus or minus 1/32").

Setting the let-off is, perhaps, the most critical operation in regulating the Electronic Piano Action. Insuring that the let-off is consistent throughout an entire keyboard helps to avoid problems like loud-and-soft notes (uneven scale) and an uneven touch from note to note.

Generally, adjusting let-off requires one tool - a capstan screw wrench, which can be obtained from any reputable tuners' supply house.

To sight and measure the let-off distance, depress a piano key slowly and firmly. (SEE FIG. J). From the point where the hammer peaks-out (before falling), to the bottom of the reeds measures the Let-Off.

To adjust let-off, turn the regulating (let-off) screw with the capstan wrench. Raise the screw (counter clock-wise turns) to decrease the amount of let-off; thus allowing the hammer to get closer to the reed. Lower the screw (clock-wise turns) to increase the amount of let-off. (SEE FIG. J).

## SPECIAL NOTE:

Electronic pianos that receive hard use and/or abuse are often subject to a greater degree of reed breakage (very often by professional and/or rock band musicians). It is possible to decrease the number of breaking reeds by increasing the Let-Off distance from 1/8" to 1/4". If this is done, be sure to inform the customer that the instrument will play softer than before and that it would be necessary for them to slightly increase their amplification. (SEE FIG. J).

## 13. KEY DIP AND BACK CHECKING

Before doing this operation be sure lost motion and let-off operations have been completed.

The blow distance on all electronic pianos is pre-set at the factory and is not adjustable. (SEE FIG. K).

The back check (see insert) is also a fixed dimension but can be set to the proper position by adjusting the key dip.

If the key dip is shallow, the fly or jack which also acts as a catcher will not make contact with the back check and the hammer will bobble. This can be adjusted by shimming up the balance rail. (SEE FIG. K).

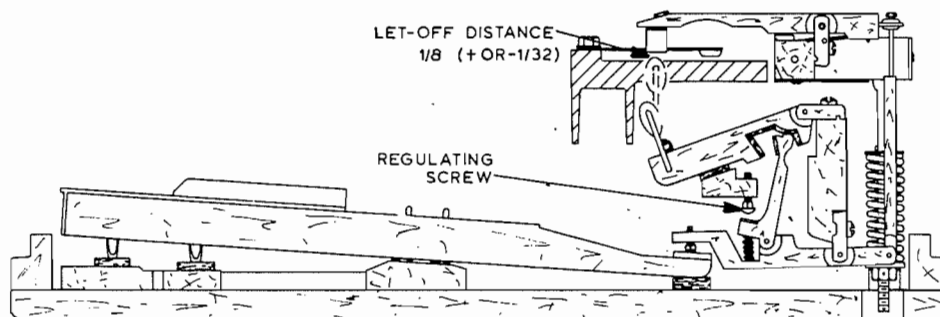


FIG. J

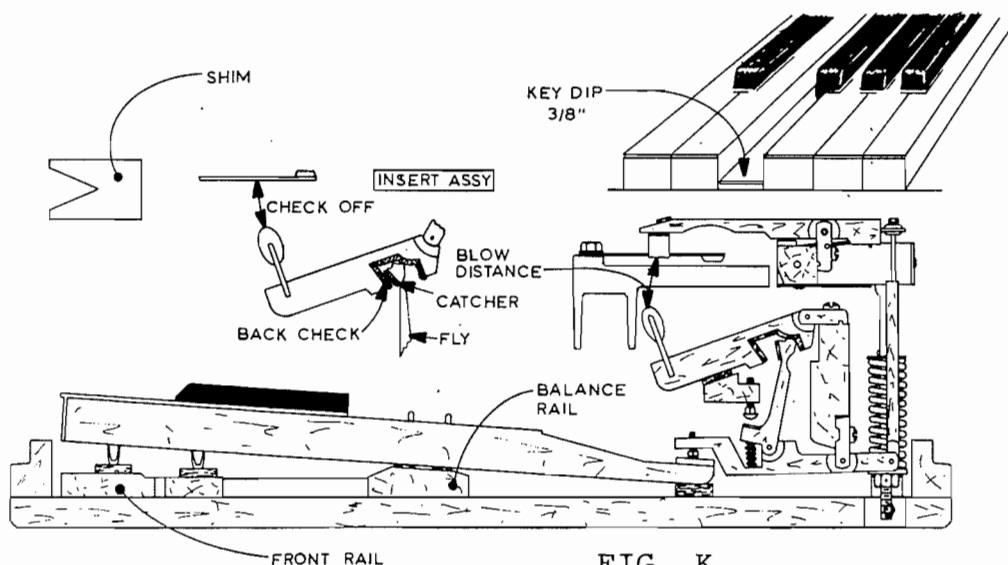


FIG. K

**KEY DIP** is the total travel measured at the front of the key.

If the key dip is too deep, the catcher will make contact with the back check too soon and the hammer will either block or check off too close to the reed. The hammer should check off between  $3/8$ " and  $1/2$ " from the reed.

If a few individual naturals or sharps are checking off too close to the reed a paper punching can be added under the felts at the front rail to obtain proper back checking.

#### 14. DAMPER SUSTAIN ADJUSTMENT

The  $7/16$ " nut on the bottom of the damper connecting rod, shown in FIG. L, is a stop to limit the upward movement of the damper connecting rod. This nut should be adjusted so that a space no more than  $1/32$ " exists between the bottom of the damper levers and the felt on the damper rail. (SEE FIG. L). This will insure proper damping of the reeds.

The following conditions are characteristic of an improperly adjusted **damper connecting rod nut**: (SEE FIG. L).

##### A. Nut Too Low

If the nut is set too low a greater space remains between the damper rail and damper lever, and as the sustaining pedal is depressed to rotate the damper rail, all of the dampers may not lift off the reeds. This results in a "dull" tone of extremely short duration.

##### B. Nut Too High

When the nut is adjusted too high there will be sufficient space between the damper rail and the damper levers, and some of the dampers may be held off the reeds. This results in failure to dampen some reeds.

The adjustment of the damper connecting rod nut must be performed before proceeding with the regulation of the individual dampers.

#### 15. DAMPER LEVELING

When the damper connecting rod nut has been properly adjusted, the dampers themselves should be inspected for uniform lift.

Depress the full sustaining pedal and observe the lift of the dampers. If some of the dampers are "slow", that is, they lift off the reeds somewhat later than the majority of the dampers, they must be adjusted by **gluing a thin paper shim** on the bottom surface of the damper lever where it contacts the felt on the top of the damper rail. (SEE FIG. L).

The shim compensates for uneven wear or packing of the damper rail felt and provides a uniform damper lift.

#### 16. DAMPER REGULATION

The dampers are adjusted by turning the **damper regulating screws** which pass through the neoprene grommets at the back of the damper levers. (SEE FIG. L). The dampers are properly regulated when a gap of approximately  $.035$ " exists between the top of the grommet and the bottom of the screw head. The damper regulating screw has a slotted hexagonal head, and either a screwdriver or a  $7/32$ " (nut driver) may be used to adjust this screw.

#### 17. PEDAL INSTRUCTIONS

To attach the sustain pedal to the Model 200 portable piano, thread the knurled cable nut inside the aluminum housing onto the damper connecting rod through the hole in the bottom of the instrument. Turn until it bottoms against the nut on the rod. There should be a very small amount (about  $1/32$ " to  $1/16$ ") lost motion in the pedal before it starts pushing harder and lifting the dampers. This assures that the pedal is not holding some dampers off the reeds. To adjust

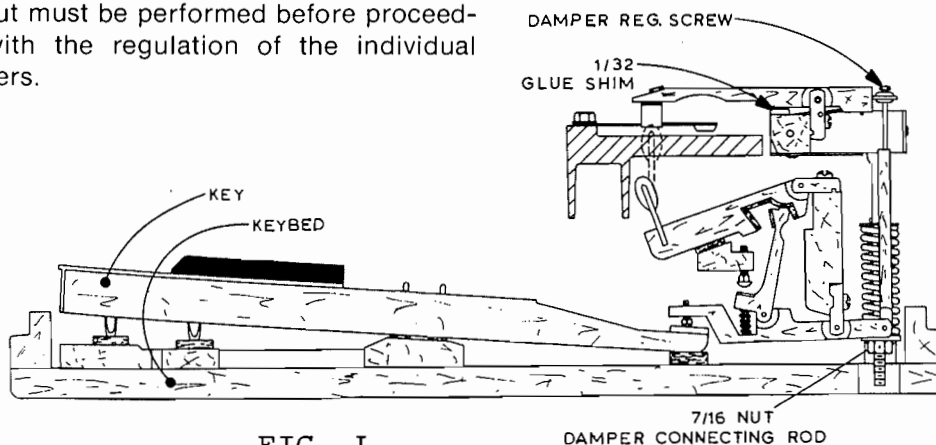


FIG. L

the pedal, loosen the two round head Phillips head screws that secure the top of the cable to the aluminum housing. Pull down on the cable to remove lost motion or push up to get more lost motion. The pedals are set at the factory and generally will not need adjustment unless the cable has slipped through the clamp. Some pedals have two (2) Allen head set screws that clamp the cable as it enters the bottom of the housing. However, the adjustment is the same.

On all console model electronic pianos, the pedal is built in, but the adjustment is the same as covered on the 200 portable. A cable clamp is located about eight (8) inches below the knurled nut. (SEE FIG. M).

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 9 Everment Rd.  
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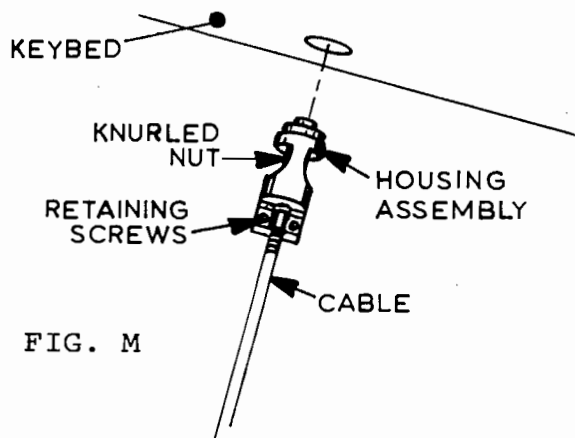


FIG. M

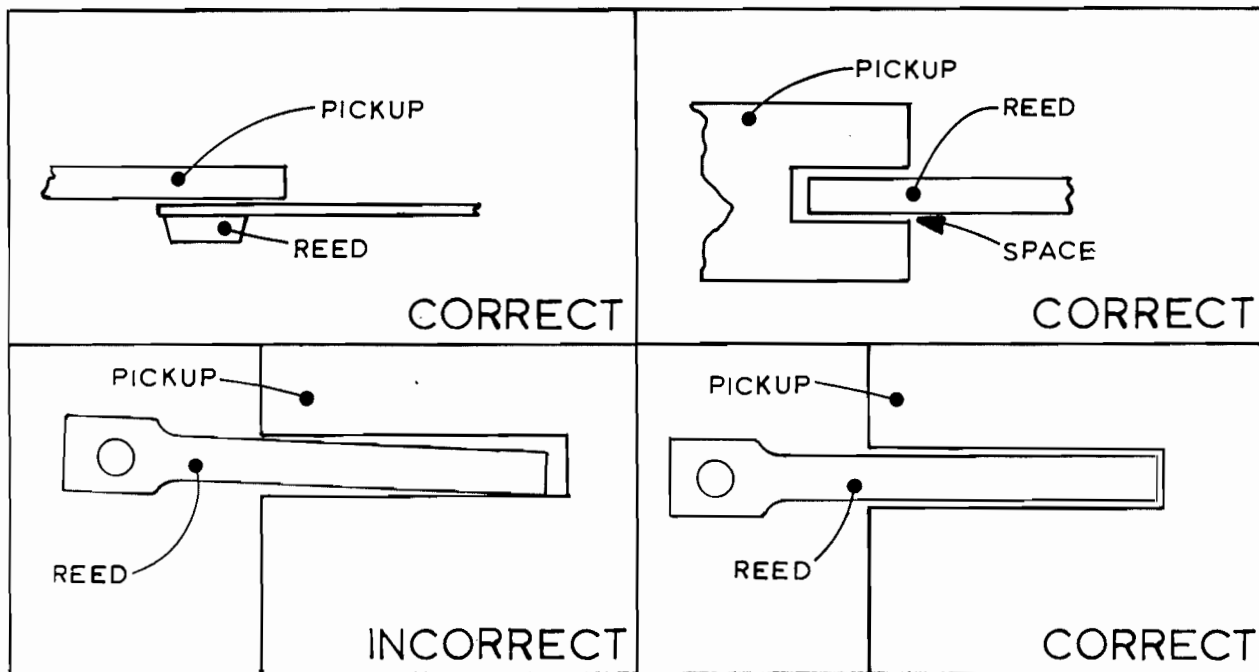
**NOTE:** PEDAL SHOULD BE ADJUSTED TO LIFT THE DAMPERS TO THE SAME HEIGHT, THE DAMPERS ARE LIFTED WHEN A SINGLE NOTE IS STRUCK.

18. **VOICING**

This is the most important aspect of the entire action regulation procedure. This insures the tonality, volume, and ring time of the individual notes are uniform and consistent. Loud notes, soft notes, and notes that have a piercing tone, will be eliminated.

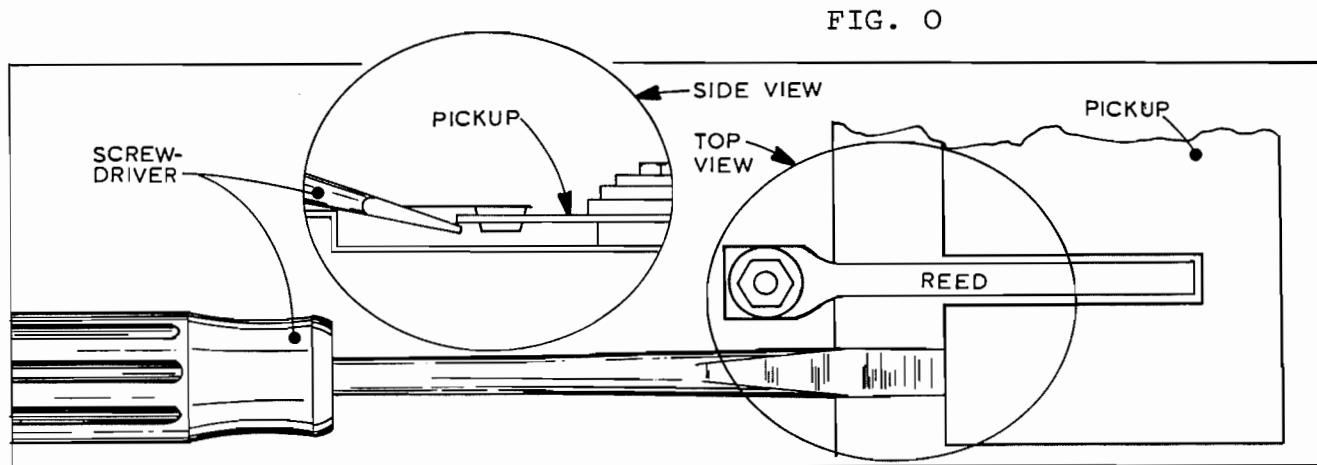
Voicing is accomplished by adjusting the pickup (SEE FIG. N) so the flat surface of the steel reed and the face of the pickup are in the same plane. The same procedure is used in the bass with the lead down and the treble with the lead up. **Positioning** of the reed in this manner is very important especially on the smaller reeds.

FIG. N



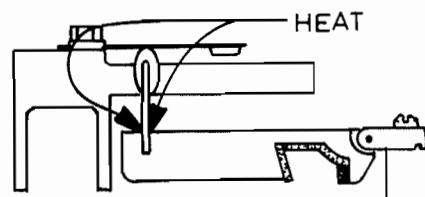
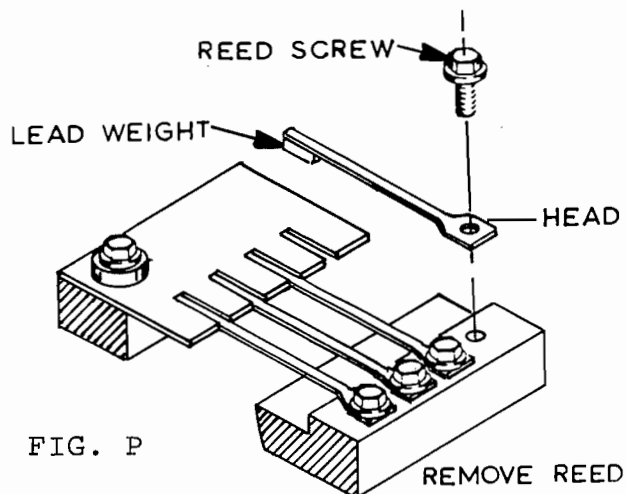
When a reed at rest is positioned inside the pickup, a very strong undesirable harmonic will be generated. Reeds should be positioned as close to the center as possible (SEE FIG. N). An automotive feeler gauge makes a good tool for checking the clearance on each side of the reed to be sure it is centered in the pickup. Unequal **spacing** makes a reed too close to one side of the pickup and will give an undesirable loud tone.

Voicing can be accomplished, in part, by changing the relative position of the pickup to the reed (SEE FIG. O). Moving the pickup up or down adjacent to the reed will change tone characteristics of each note. Be careful not to bend the pickups up or down excessively or frequently since this will weaken it.



For notes that have a **short ring time**. Remove the reed (SEE FIG. P) to check a note with a **short ring time**. The base of the reed or the part under the reed screw should be inspected on both sides of the reed for any foreign material. The reed can be cleaned by holding a very fine grit emory paper on a flat surface and polishing both sides of the head until metal shows through. This is also an electrical ground. If you lose the ground, you will lose the volume. Any foreign material on the head of the reed will dampen the oscillation. If this does not cure the ring time, the reed should be replaced.

Changing the strike point of the hammer to get a better sound should only be attempted after the preceding steps have been undertaken. It is possible to improve the tone and sustain of a reed by being certain that the strike point is correct. First, loosen the reed bar screws. This will allow the reed bar to be moved backward and forward. From this you can determine which way the hammer needs to be moved. To move the hammer, take a soldering iron and heat at the base of the hammer stem where it meets the butt assembly. (SEE FIG. Q). Thermal glue is used here. After glue is soft, the hammer stem can be moved forward or backward to the appropriate location.





## 19. TUNING THE ELECTRONIC PIANO REED

The REED is the tone element of the Wurlitzer Electronic Piano. Its tuning position in the instrument and how this position relates to the pick-ups are essential to the tonal quality of the piano.

**INSTALLING NEW REEDS** — The reed's retaining hole is slightly larger than the diameter of the reed screw. When putting a new reed in place for tuning, be sure that the reed is as far "BACK" as it will go. (SEE FIG. R). Additionally, before beginning to tune, insure that the reed screw is tight. **NOTE:** the reed screw washer is dish shaped. This washer should **not** be flattened. Tightening the screw after the reed has been brought up to pitch will cause it to go sharp (and lead will need to be added to the tip and the reed retuned).

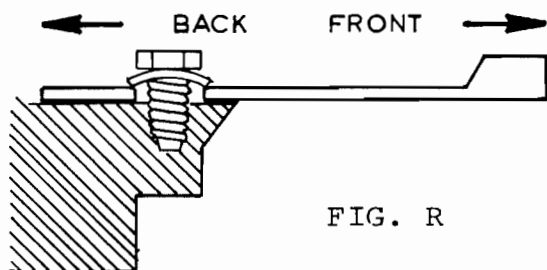


FIG. R

Tuning is accomplished by removing the lead from the reed tip (by filing or scraping a small amount at a time). Continue to remove the excess lead until arriving at the proper pitch. If the reed is flat, the pitch can be raised by removing lead from the tip. If the reed is sharp, the pitch can be lowered by adding lead to the tip or moving the reed as far forward as possible.

While removing the excess lead, it is very important to maintain the PYRAMID shape of the tip. (SEE FIG. S.) Remove lead from the tip by filing or scraping a small amount at a time. Try to remove the lead evenly so the weight remaining on the tip will be evenly distributed. (SEE FIG. S.) A lop-sided tip can affect the motion of the reed as it vibrates.

When tuning a new reed, removing too much lead will cause the pitch to be sharp (too high). Moving the reed to the "FRONT" will drop the pitch (from 2 to 5 cents) and permit fine tuning without having to add additional lead to the tip.

If moving the reed to the "FRONT" does not sufficiently lower the pitch, remove the reed, add lead to the tip by using a soldering iron and rosin core solder. A low heat is best, so a small drop of solder can be added without melting the lead to make it flat, and then fine tune the reed by filing it to remove the excess.

When tuning new reeds, pitch tolerances should be kept to within 5 cents (-2 to +3). The tuning process is often made easier with the use of a strobe-type tuner.

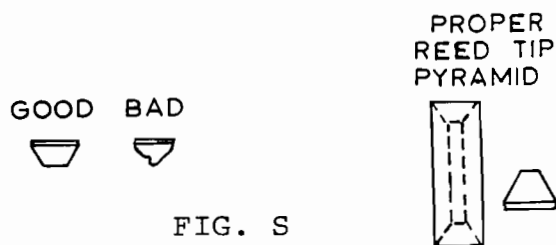


FIG. S

## 20. REMOVING ACTION PARTS

It is **not** necessary to remove the action from the piano to replace a **butt assembly** or a **damper lever**.

It is necessary to remove the action to replace a **whip assembly**.

### A. Butt Assembly (SEE FIG. 2, PAGE 8)

Disconnect the damper regulating screw from the related damper lever and one on each side of it by pulling the grommets out of the wire clips. Remove the butt flange screw with a slim screwdriver between the backs of the damper levers (or remove the related damper lever for better accessibility), rotate the back side of the butt between the main rail and the damper rail and pull out.

### B. Damper Assembly (SEE FIG. 2, PAGE 8)

Disconnect the damper regulating screw from the damper lever by pulling the grommet out of the wire clip. Remove the damper flange screw and lift the damper lever up and out of the action.

### C. Action Removal

1. Unplug the 2 or 3 wire A.C. plug located at the bass end.
2. Remove the metal shield over the reed bars.
3. Remove the four screws that secure the extreme bass and treble ends of the entire metal amplifier chassis assembly to the mounting blocks.
4. Remove ground screws on chassis.
5. Unplug the input cable from the printed circuit board on 200 only. For 200A, use a 1/4" nut driver and two screws that hold the Pre Amp assembly board located between the reed bars.
6. Lift the chassis and pull it forward approximately one inch and remove.

10. To remove the **AMPLIFIER P.C. BOARD & MOUNTING PLATE ASSEMBLY**, disconnect the two molex connectors on the left and right ends of the amplifier chassis. See Fig. 14, page 20. Then remove the left and right screws located on the underside of the mounting plate assembly. See Fig. 15, page 20. Lower and remove the assembly.

NOTE: If amplifier servicing only, remove two flat head screws located on the underside, rear of piano. See Fig. 14.

NOTE: See regular texts for action regulation-or electronic servicing.



FIG. 1

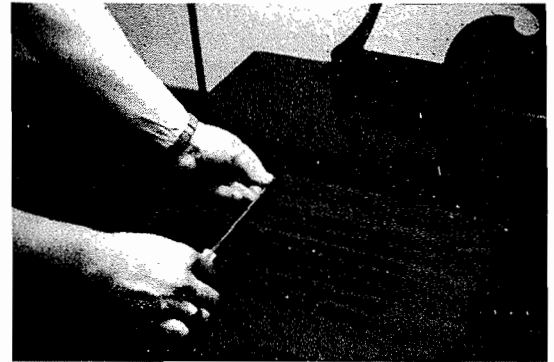


FIG. 2



FIG. 3



FIG. 4



FIG. 5



FIG. 6



FIG. 9

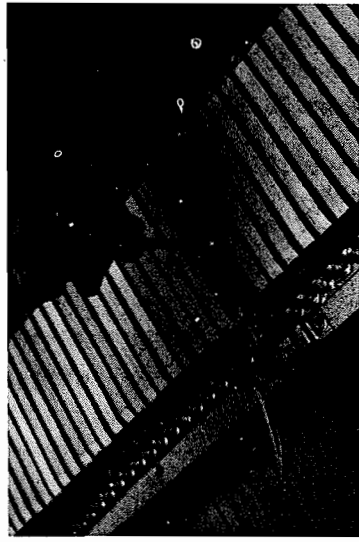


FIG. 12

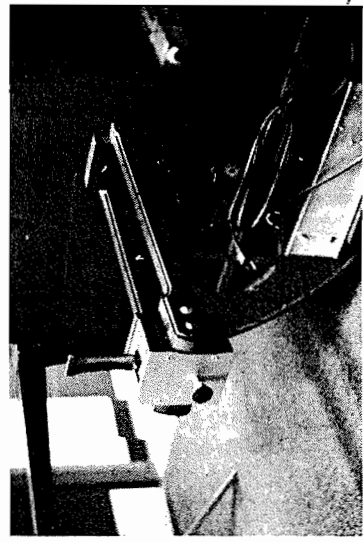


FIG. 15

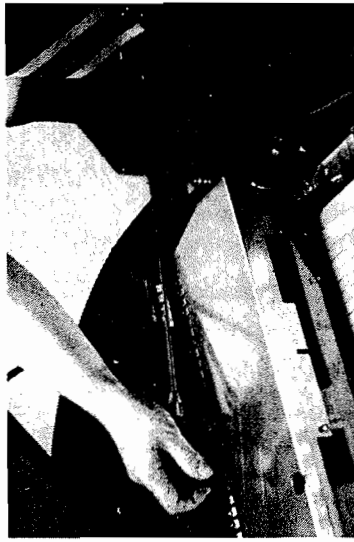


FIG. 8

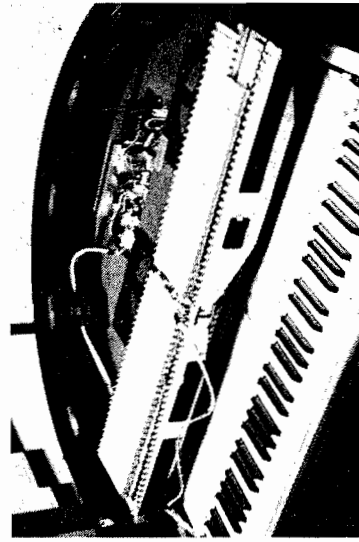


FIG. 11

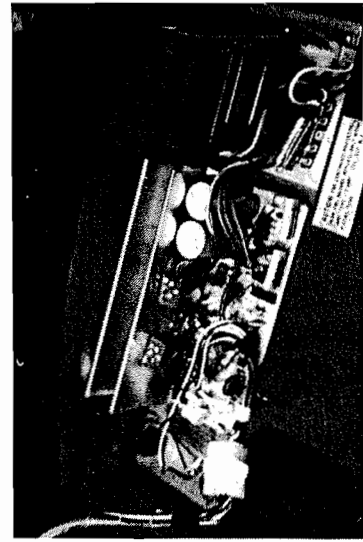


FIG. 14



FIG. 7

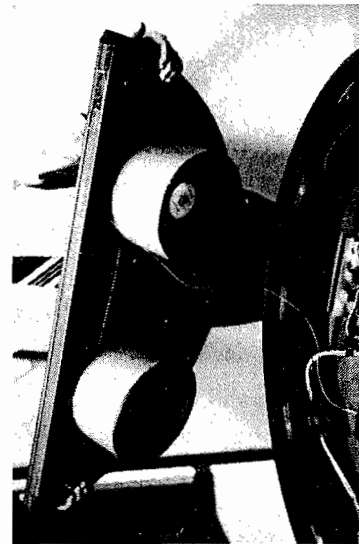


FIG. 10

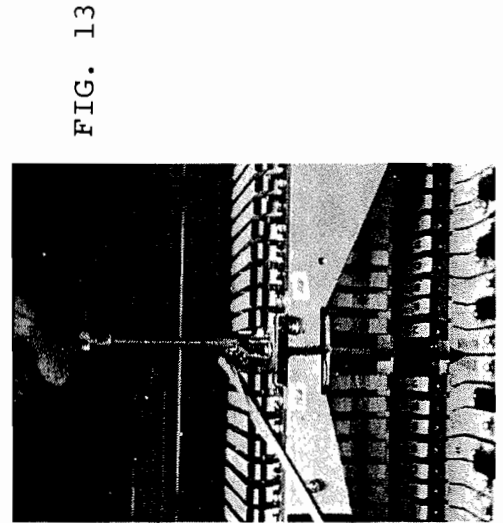
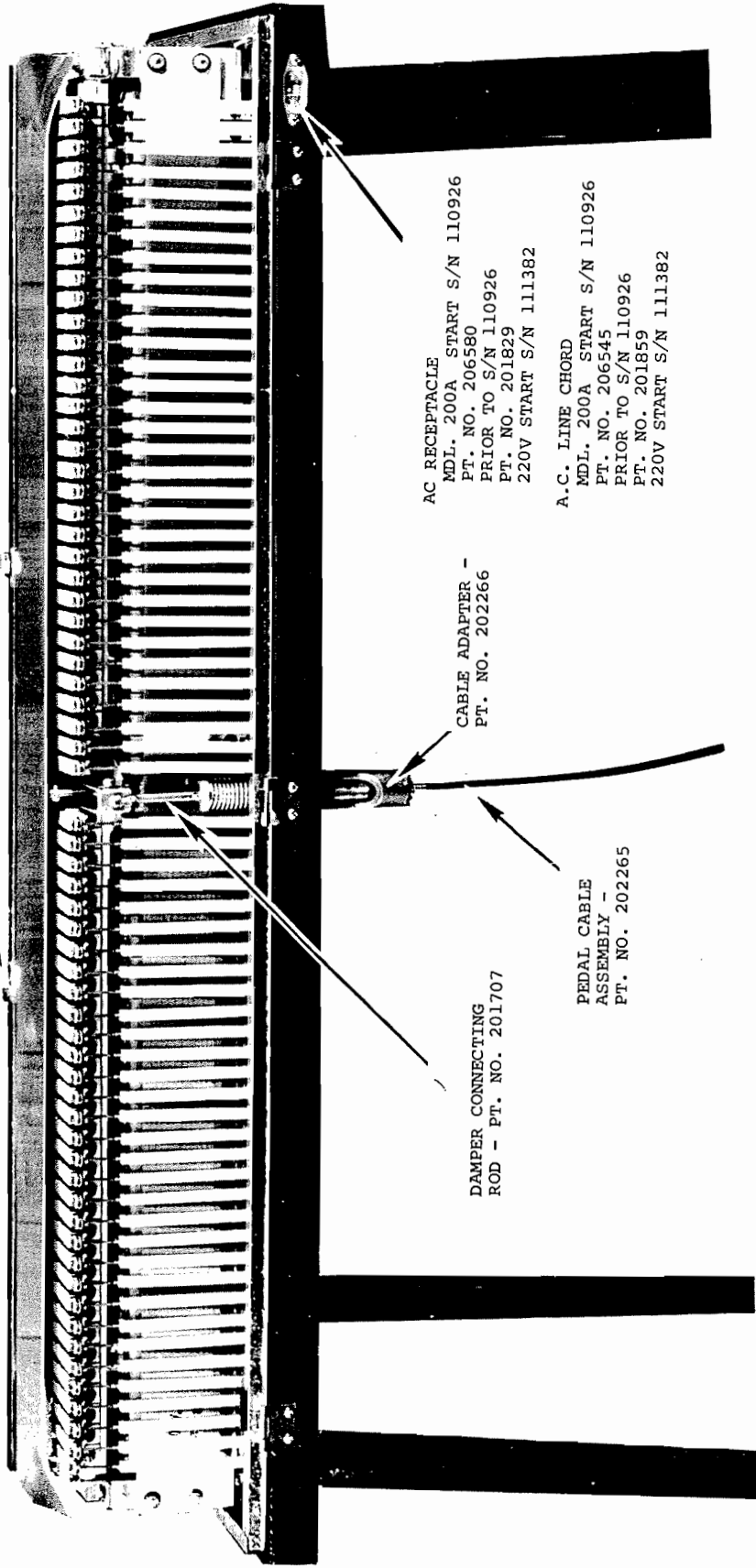


FIG. 13

MUSIC PANEL MOUNTING  
BOLTS - PT. NO. 201842



DAMPER CONNECTING  
ROD - PT. NO. 201707

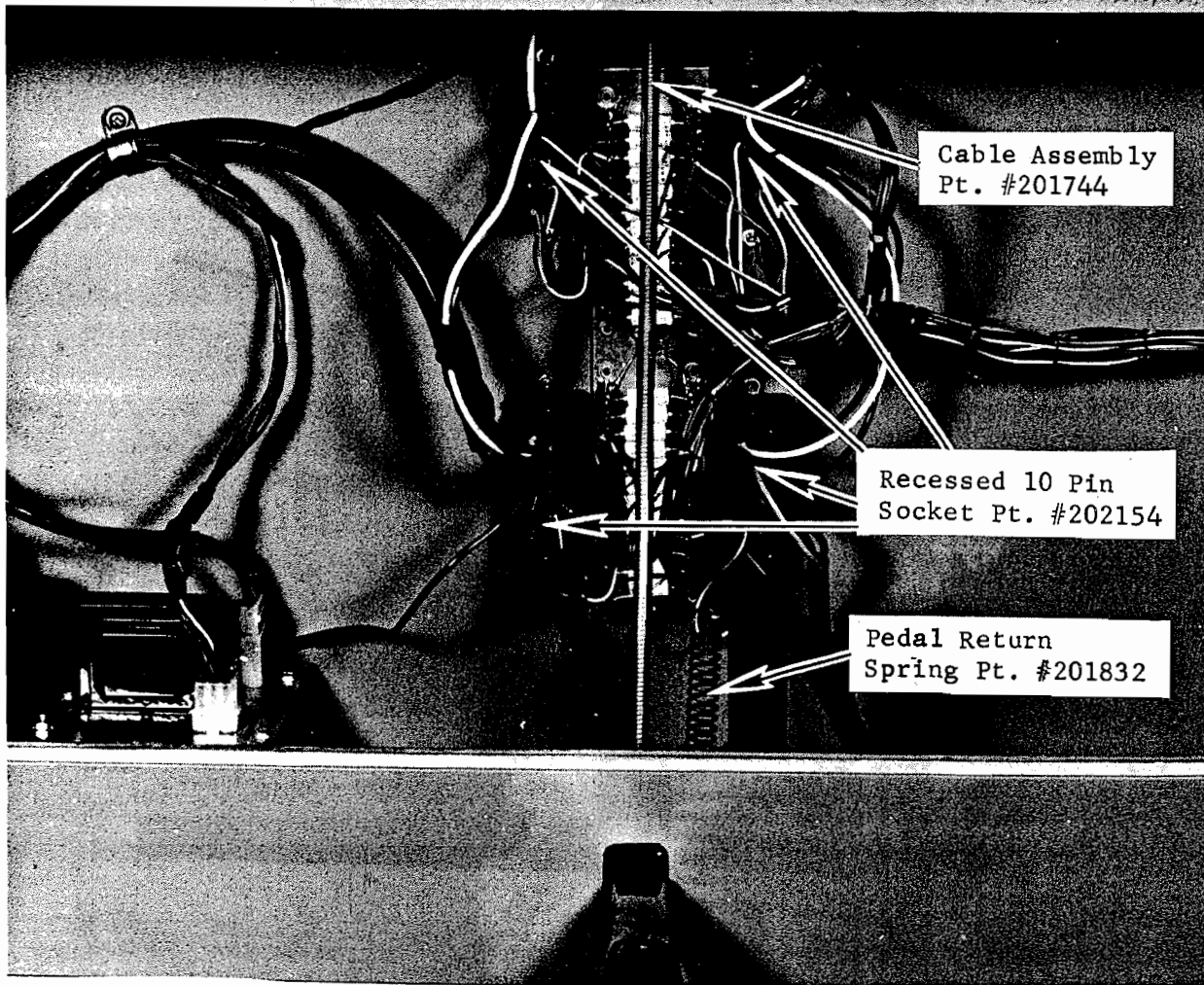
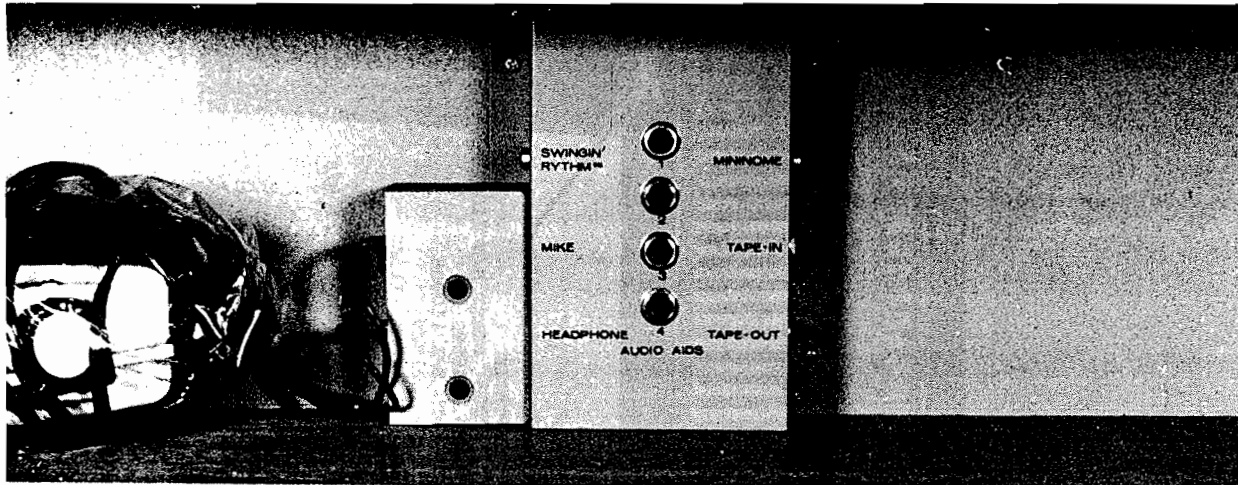
PEDAL CABLE  
ASSEMBLY -  
PT. NO. 202265

CABLE ADAPTER -  
PT. NO. 202266

AC RECEPTACLE  
MDL. 200A START S/N 110926  
PT. NO. 206580  
PRIOR TO S/N 110926  
PT. NO. 201829  
220V START S/N 111382

A.C. LINE CHORD  
MDL. 200A START S/N 110926  
PT. NO. 206545  
PRIOR TO S/N 110926  
PT. NO. 201859  
220V START S/N 111382

MODEL 200



MODEL 207 with Lower Front Panel Removed. Note New Junction Box.

## DESCRIPTION OF THE 207 TEACHER'S CONSOLE

Four groups of from one to six Model 206 student pianos in a group can be connected to a Model 207 Teacher's Console Piano. Each Model 206 student piano in a group is connected to the next student piano by an external jumper cable assembly. Each group of student pianos is connected to the Teacher's Console with a master cable. (SEE FIG. 5, PAGE 24).

The Model 8309 cable assembly is made up of the master cable and five jumper cable assemblies. Line voltage (117 VAC) is applied to the 207, (SEE FIG. 5, PAGE 24) and supplies power to the system through the master cable and jumper cables. There is a shielded high impedance common line for ensemble. This ensemble line collects the output of each 206 student piano for group communications. In addition, there are six low impedance lines for self. Self permits communication between student and teacher for private practice.

Twenty-four possible self line connections are available at the 207 console. One or more of these self connections can be selected for use by combinations of the "group" switch bank and the "piano" switch bank. Each 206 has its own power amplifier output and headphone coupled to its own self line. The 207 power amplifier output and headphone are switched through the "group" switch bank and the "piano" switch bank to a self line. The 206 power amplifier drives the 207 headphone, and the 207 power amplifier drives the 206 headphone. (Refer to schematics #11-0783A and 11-1137) (202821 and 202822).

A separate ensemble line from each group is connected to the Teacher's Console. The collected 206 ensemble signals on the ensemble line, and output signal from the Teacher's Console amplifier drive a corresponding group ensemble pre-amp, (TR-32, TR-33, TR-34 and TR-35). By use of one of the lighted ensemble selector tabs, the output from any of the four group ensemble pre-amps can be switched off, switched to a corresponding ensemble driver amplifier (TR-4, TR-11, TR-18 and TR-25), or switched to a mixed position, combining the outputs of more than one group ensemble pre-amps. The output from the ensemble driver amplifier drives six transistors with a common input. The output from each one of the six transistors is coupled back to an individual self line. The self lines are then returned back to the 206 headphones.

The teacher can monitor an output from any one of the four Group Pre-amps by actuating one of the group switch bank tabs. This signal is then coupled to the 207 headphone driver amplifier. The output of this 207 headphone driver amplifier is then coupled to the 207 headphone output jacks.

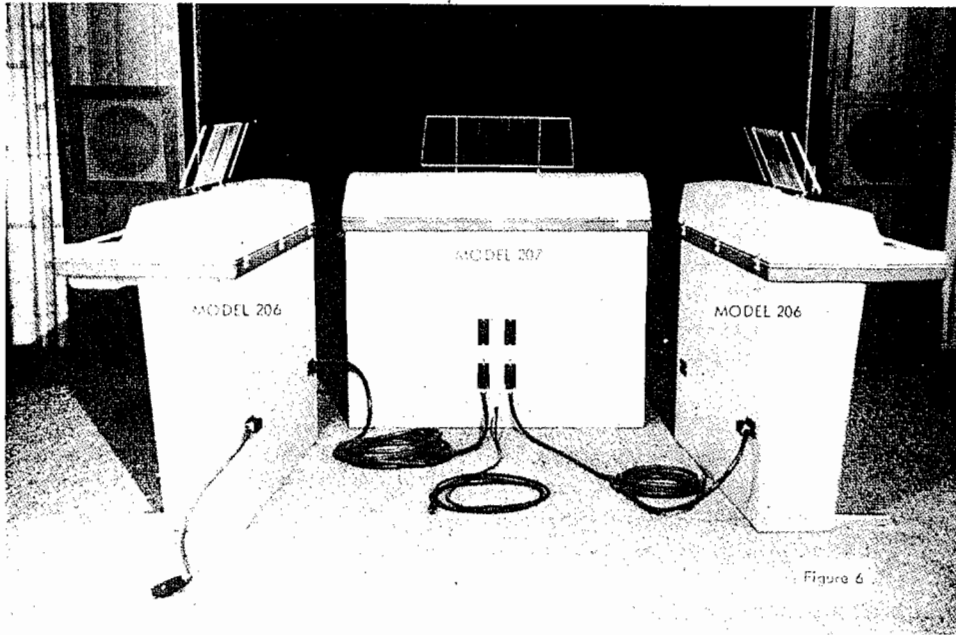
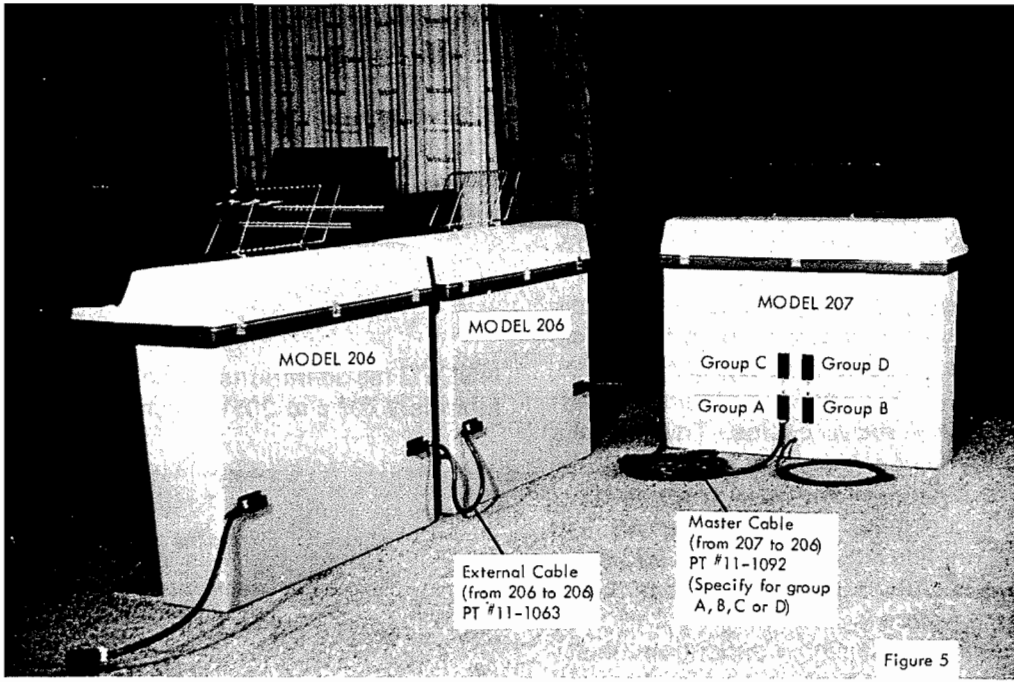
The Group Call Switch decreases the 206 output drive level and increases the 207 output drive level. These modified levels of drive are then applied to the circuitry for the particular mode of operation, self or

ensemble. The Group Call override allows the 207 Teacher's Console output to dominate the closed circuit communications.

An output from the 206 ceramic mic is applied directly to the 206 power amplifier mic input terminals. In the 207, a dynamic mic output is applied to a mic pre-amp circuit which is applied directly to the 207 power amplifier mic input terminals.

NOTE: This operations description also applies to the Models 207V and 205V teacher's console.

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Knobs 207 (only)  
Pt. #202140

Teacher's Headset  
and Microphone.  
Pt. #202181

Power Supply  
Pt. #202158 (Fuses  
under power supply).

Foot (Same on 206).  
Pt. #202079

Power Transformer.  
Pt. #201807

Communication Center  
Power Transformer.  
Pt. #202162

MODEL 207

2 8" Speakers.  
Pt. #202172

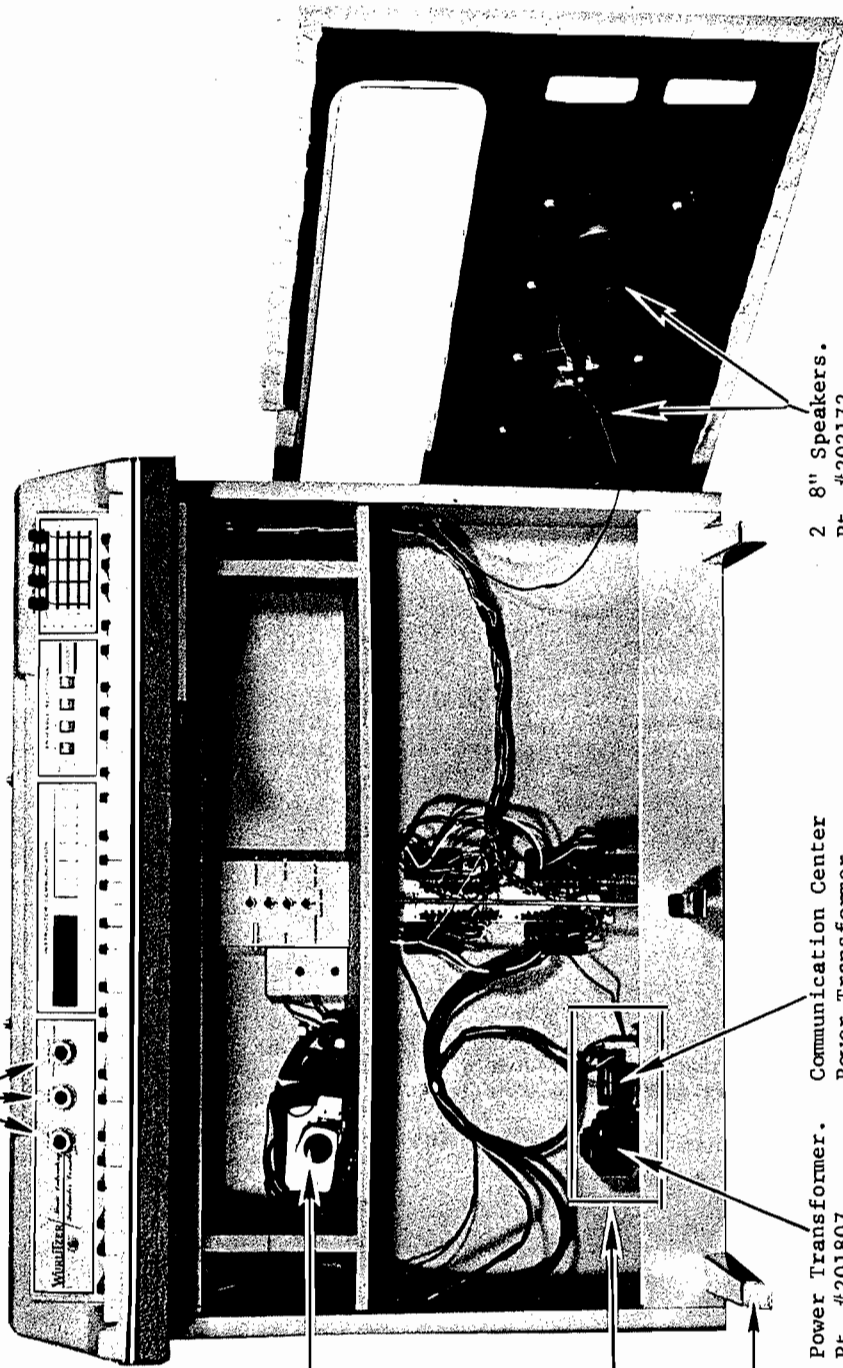


FIGURE 7



## 207 CHECK OUT PROCEDURES

The instructions in paragraphs three, four and five are for checking "A" group. They will also apply to groups "B", "C" and "D" in paragraphs eight thru fifteen.

To check a 207, at least two 206's are needed. (SEE FIG. 5 & 6, PAGE 24).

1. Connect groups to 207.
  - A) One group on connector "A".
  - B) One group on connector "B".
2. Start position.
  - A) **206**
    - a) Volume, maximum.
    - b) Self position. (Ensemble-self speaker sw)
  - B) **207**
    - a) Piano volume, maximum.
    - b) Mic volume, maximum.
    - c) Instruct switch (phone position).
    - d) Black tabs up.
    - e) White tabs up.
    - f) Red tab up.
    - g) Lighted tabs - yellow (center).
    - h) Audio Aids up (top).
3. First Check (Self)
  - A) **207**
    - a) Black tab "A" down.
    - b) White tab "1" down.
  - B) **206** - "A" group set to #1 position. (piano select switch).
  - C) Two-way communication should be heard.
  - D) Check remaining 207 piano tabs and student selector switch position (2 thru 6).
  - E) Two-way communication on all **like** settings. No communication on **unlike** settings.

### NOTE: **BAD COMMUNICATION ON "LIKE" SETTINGS**

1. If the teacher cannot hear her 207, it has a wiring problem between the power amplifier and the headphone. (Refer to Schematic Part #11-1137) (202822)
2. If the student cannot hear his own 206, it has a wiring problem between the power amplifier and the headphone. (Refer to Schematic Part #11-0783A) (202821)
3. If the students and teacher can hear their own piano but cannot hear each other, there is a wiring problem between the 207 switching and the 206 switching.

## COMMUNICATION ON "UNLIKE" SETTINGS

1. This is commonly called "cross talk". This can be caused by improper or no audio ground anywhere in the system. Check piano select switch (SEE FIG. 8, PAGE 30) making sure it is selected to the respective piano. Check for shorted leads.
4. Second Check (Ensemble)
  - A) **207**
    - a) Black tab "A" down.
    - b) White tabs up.
    - c) Lighted tab group "A" up (red).
  - B) **206** - "A" Group.
    - a) Ensemble position (self-speaker switch)
    - b) Slowly rotate piano select switch from #6 thru #1 position.
    - c) Two-way communication should be heard on all positions.

### NOTE: 2A

If the teacher cannot hear her piano, there is a problem between her power amplifier and her headphone amplifier or between her headphone and the associated amplifier (TR-2, TR-3 Schematic Part #11-1139) (202520), which could also be defective. If the teacher cannot hear the student, the problem lies between the student's piano and its associated switching and the teacher's console and its switching mechanism.

If the teacher can hear the student's piano but the student cannot here his own piano or the teacher's, the problem lies in the teacher's switching or the associated Group ensemble amplifiers and/or headphone amplifiers located on the communication center circuit board.

- C) **207**
  - a) Red tab down. (Group Call)
  - b) Very little or no communication from 206 to 207.
  - c) Communication from 207 to 206.

### NOTE: 2B

A malfunction found in this check indicates the problem lies in the vicinity of the "group-call" switch. Check TR-4 thru TR-10.

5. Third Check (Ensemble-Mix)
  - A) **207**
    - a) Black tab "A" down.
    - b) Lighted tab group "A" down (green).
    - c) Lighted tab group "B" down (green).

- B) **206** (Ensemble Self-speaker sw)
  - a) Group "A" piano in ensemble position.
  - b) Group "B" piano in ensemble position.
  - c) Play on piano group "A".
  - d) Listen to piano group "B".
  - e) Piano "A" should be heard in "B's" headphones.

NOTE: 3

If piano "A" cannot be heard in "B's" head-phone, the lighted ensemble select switch "A" or "B" has misaligned contact, or a jumper wire connecting the two switches has a bad connection. This is assuming that the piano in group "B" has no malfunctions.

- 6. Change cable from 207 receptacle "A" to receptacle "C".
- 7. Repeat Steps 2 thru 5. Use corresponding Groups B-C.
- 8. Change cable from 207 receptacle "B" to receptacle "D". Repeat Steps 2 thru 5. Use corresponding Groups C-D.

NOTE: Refer to comments on third check, paragraph 5. Repeat Steps 2 thru 4. Use corresponding Group D.

- 9. Check (Audio Aid) 207. (SEE FIG. 9, PAGE 31).
  - A) Black tab "D" up.
  - B) Black tab "A" down.
  - C) White tab "1" down.
  - D) Audio Aid lever group "A" to position #1.
  - E) Audio Aid (tape player, radio, sig. generator, etc.) connected to Audio Aid #1 jack.
  - F) Audio Aid should be heard in teacher's phones.
  - G) Black tab "A" up.
  - H) Black tab "B" down.
  - I) Audio Aid lever "B" to position #1.
  - J) Audio Aid lever group "A" off.
  - K) Audio Aid should be heard in teacher's phone.
  - L) Repeat for "C" and "D".
  - M) Repeat for Audio Aid 2 thru 4.

NOTE: If an audio aid cannot be heard by the teacher in any of the positions stated above, the trouble will lie in either the audio aid jack or between this and the lighted switches.

### MISCELLANEOUS

The 36 conductor plug at the treble end of the chassis on the Model 207 should be carefully checked and cleaned, inspected for broken or shorted wires, and be sure it is well seated and locked in position.

Make sure all external cable heads are well seated in their receptacles.

If a lab has all ensembles and audio aids inoperative, check the communication center power supply for proper voltages, located on bottom of piano.

Some Model 207's have 6.3 volts on the indicator lamps while others have 4.8 volts. A resistor 2.2 ohm 2 watt was added to drop the voltage from 6.3V to 4.8 V, which gives added life to bulb.

### REPLACING PLASTIC POWER TRANSISTORS

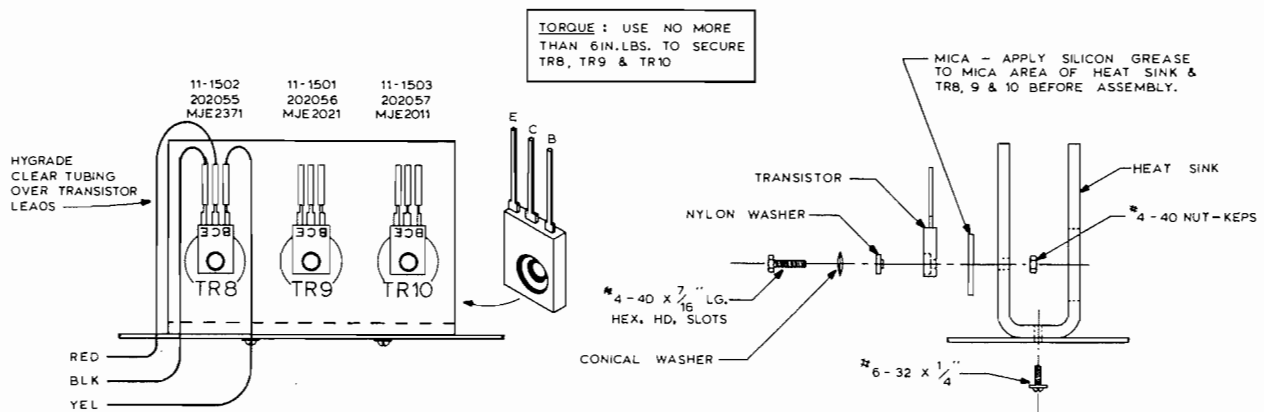
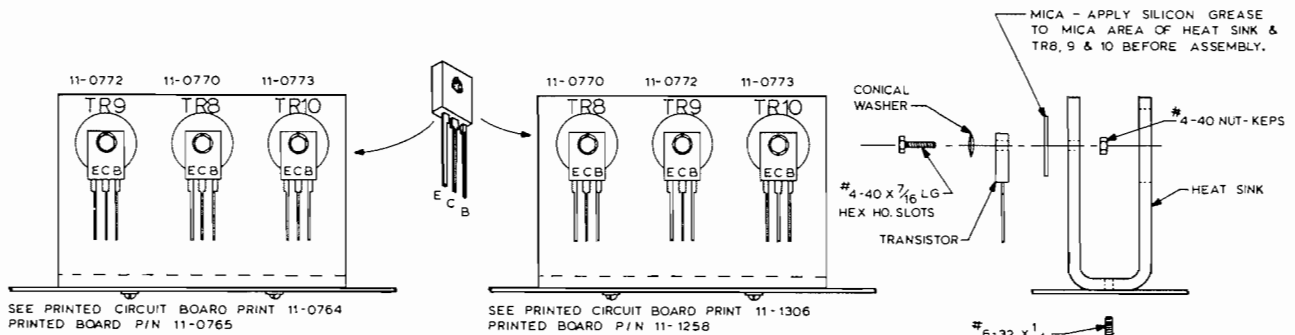
1. Remove defective transistor.
2. Clean off old compound with solvent from:
  - A) Screw,
  - B) Face of heat sink,
  - C) Transistor mounting hole in heat sink,
  - D) Be sure the heat sink has no burrs that could puncture the mica.
3. Bend center lead of new transistor.
  - A) Use two (2) long nose pliers.
  - B) Grip transistor leads.
  - C) Bend center lead.
  - D) Grip center lead.
  - E) Bend center lead.
4. Use new heat sink compound:
  - A) On face of heat sink,
  - B) On back (copper side) of new transistor.
5. Using a **new** mica washer and a new conic washer, stack and secure parts as shown.
6. Tighten screw with about six inch lbs. of torque (hand tight).
7. Now solder leads to p.c. board.

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**917-880-9763**  
**www.vintagevibe.com**

YOU WILL NOTE THERE HAS BEEN A CHANGE OF PART NUMBERS AND TRANSISTORS WHICH MAY TEND TO BE CONFUSING UPON REPLACEMENT. BELOW IS A LISTING OF PARTS, PART NUMBERS AND THEIR REPLACEMENTS. IN ADDITION, PLEASE NOTE LOCATION OF TRANSISTORS BEFORE REPLACEMENT.

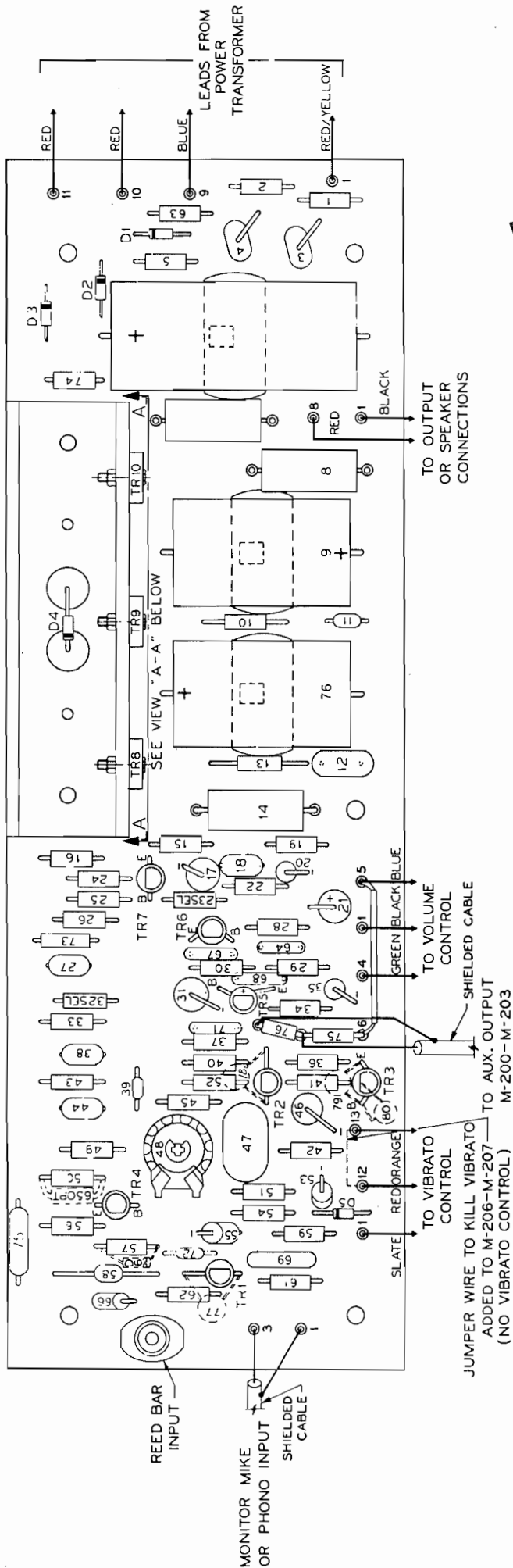
NEW PART NUMBERS MODEL & STARTING SERIAL NUMBERS	"OLD" PART NUMBER MODEL & STARTING SERIAL NUMBERS	MANUFACTURER'S EQUIVALENT	"OLD PART NUMBERS MODELS AND APPROX. STARTING SERIAL NO.	MANUFACTURER'S EQUIVALENT
200-73257 203-73414 214-73397	200-58050 203-56403 203W-56491 206-57144 207-55921 214-57776		200-55900 203-55256 206-56501 207-54029 214-57777	
TR-1 202051 TR-2 202052 TR-3 202073 TR-4 202053 TR-5 202073 TR-6 202073 TR-7 202054 TR-8 202055 TR-9 202056 TR-10 202057	11-0778 11-0778 11-0778 11-0775 11-0778 11-0778 11-0774 11-0770 11-0772 11-0773	2N2926 2N2926 2N2926 2N5306 2N2926 2N2926 2N3859A 2N4919 2N5191 2N5194	11-1667* 11-1668* 11-0778 11-0775 11-0778 11-0778 11-0774 11-1502* 11-1501* 11-1503* (*CHANGED)	2N6008 2N5998 2N2924 2N5306 2N2924 2N2924 2N3859A MJE2371 MJE2021 MJE2011
<u>ITEM</u>	<u>NEW PART NUMBERS</u>			
D-1, D-2, D-3, D-4	202050	11-0769 11-0771	GE-A13, 1N4005 GE-A13, 1N4005	11-1500 (11-0769)
D-5, D-6	202049	11-0781	1N4148	11-0781

SEE PAGE 37 FOR TRANSISTOR LEAD CONFIGURATION.

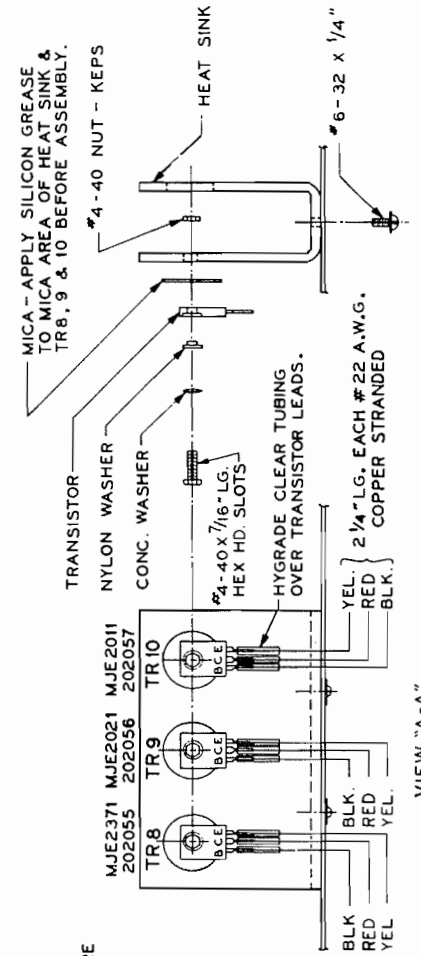


INSTRUCTIONS FOR CHANGING THE ELECTRONIC PIANO AMPLIFIER

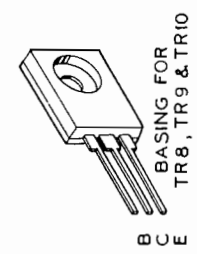
THE PRINTED CIRCUIT BOARD DIAGRAM WILL HELP TO IDENTIFY COLOR CODING OF WIRES  
 THIS DIAGRAM WILL ALSO SERVE AS AN AID TO REPLACEMENT OF THE OUTPUT TRANSISTORS.



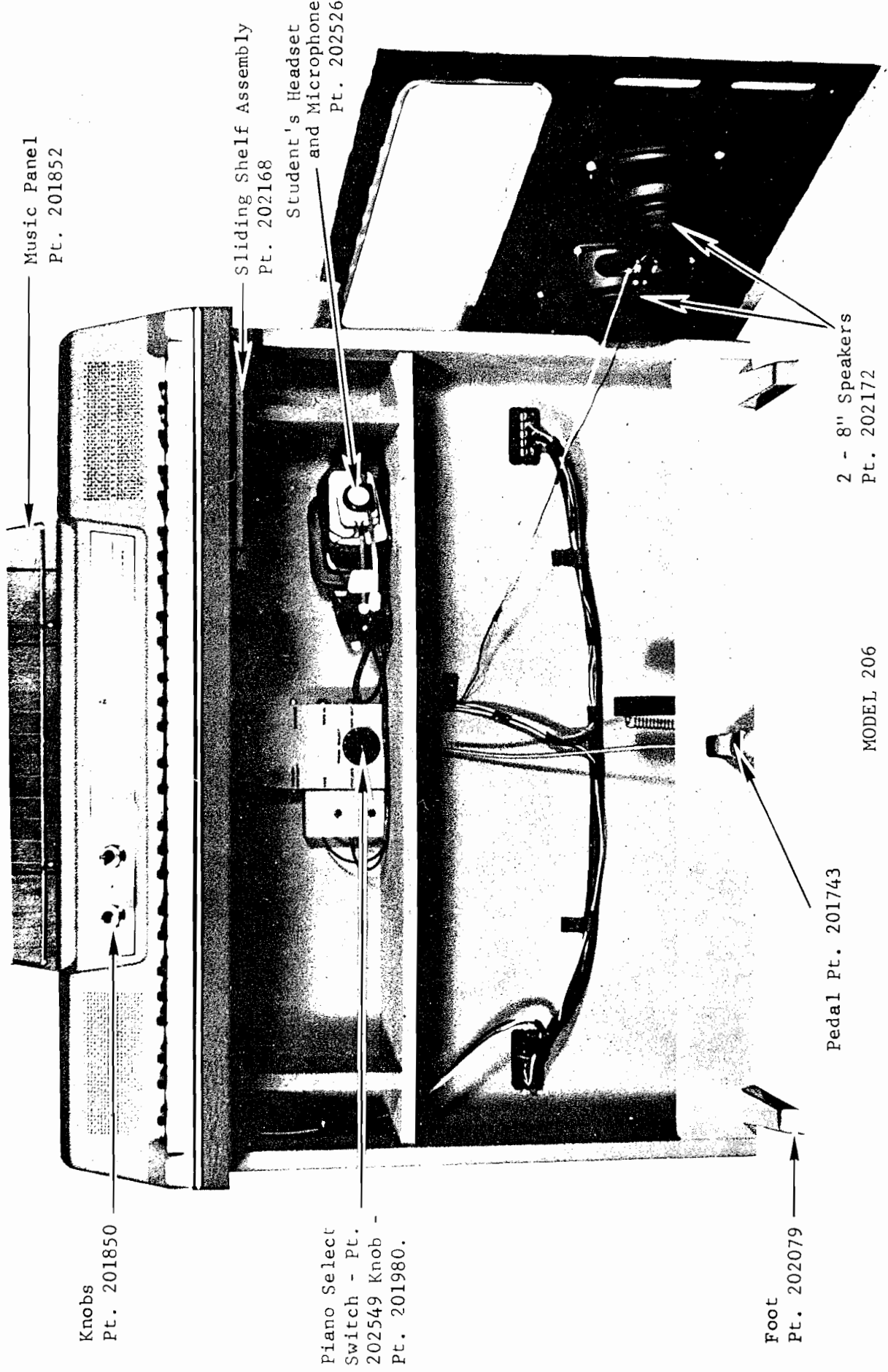
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 Wharton, NJ 07885  
 917-880-9763  
 www.vintagevibe.com



TORQUE - USE NO MORE THAN 6 IN. LBS. TO SECURE TR8, TR9 & TR10



VIEW "A-A"  
 TRANSISTOR INSTALLATION TO HEAT SINK



Music Panel  
Pt. 201852

Sliding Shelf Assembly  
Pt. 202168

Student's Headset  
and Microphone  
Pt. 202526

2 - 8" Speakers  
Pt. 202172

MODEL 206

Pedal Pt. 201743

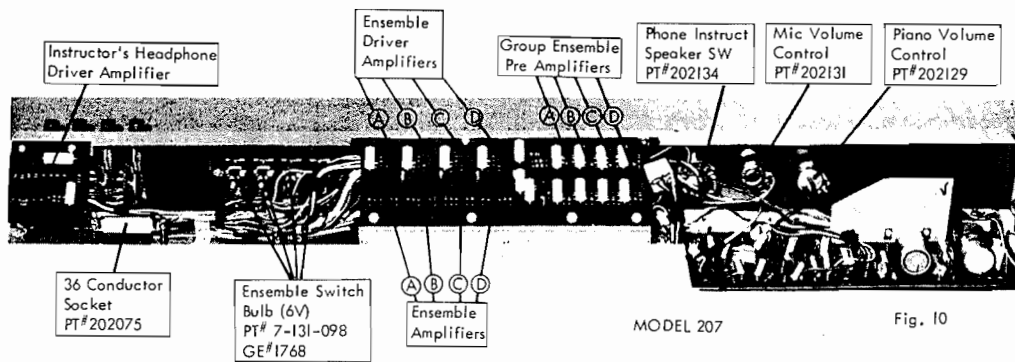
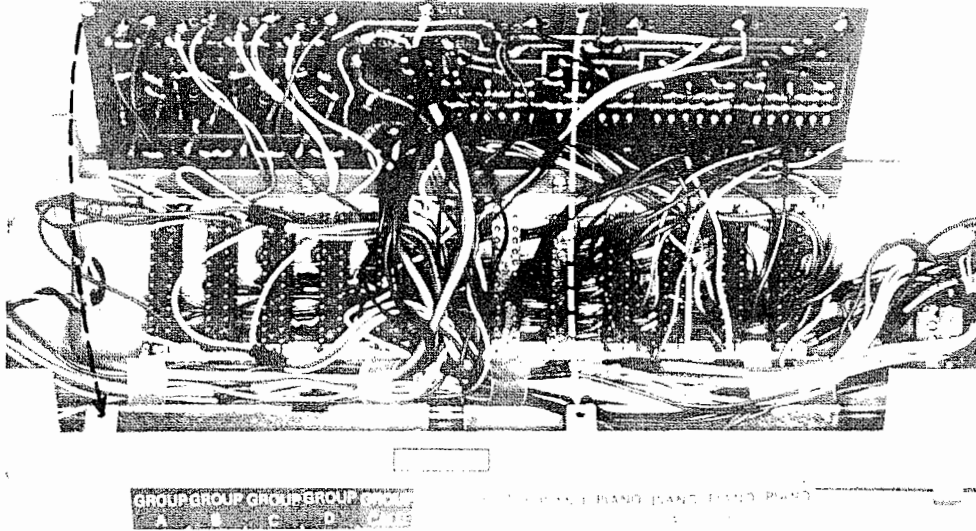
Knobs  
Pt. 201850

Piano Select  
Switch - Pt.  
202549 Knob -  
Pt. 201980.

Foot  
Pt. 202079

FIGURE 8

To service Communication Center PC Board remove the screws at arrows and hinge back as shown.



## MODELS 206 AND 207

### TROUBLE SHOOTING CHART

Following is a complete check out procedure with trouble shooting hints.

NOTE: Useful service tools for making these checks are:

1. A 2000 ohm headphone with a 5 MFD, 35 volt (or greater) capacitor in series for D.C. blocking.

A small tape recorder with programmed music or a small transistor radio. These should have an appropriate patch cord to connect the tape recorder or radio in a phone jack or phono jack.

The headphone assembly will be used as a signal tracer. The tape recorder or radio will be a second "helper" providing an audio signal from a second piano. The signal from the sound source will be inserted into the microphone input. This will simulate a person playing the piano for signal tracing purposes.

For trouble shooting of 207 teacher's lab console and 206 student pianos, see 207 check out procedures starting on Page 26.

NOTE: The following complaints could happen on all six models. These are followed by a section strictly applicable to 206's and a 207 in a lab installation.

#### Complaint: Piano Dead - No Sound.

Make sure AC power is available at wall outlet.

- Cause: 1. No AC power (Pilot light will not light).
- Correction: 1.1 Check wall outlet for 120 V.A.C.  
1.2 Check the line fuse in the piano.  
1.3 Defective line cord and/or connectors.
- Cause: 2. Defective transistor.
- Correction: 2.1 Check all transistor voltages (collector-base-emitter).
- Cause: 3. Shorted filter or open diodes in power supply.
- Correction: 3.1 Check for low voltage and high voltage and replace shorted filter.

- 3.2 Check diode for resistive front to back ratio.

- Cause: 4. Cracked printed circuit.
- Correction: 4.1 Solder cracks in printed circuit.

- Cause: 5. Defective transformer.
- Correction: 5.1 Replace transformer.

- Cause: 6. Reed shorted against pickup.
- Correction: 6.1 With volume turned down, strike all keys several times with palm of hand. This will shake loose any foreign matter between the reed and the pick-up. Check to be sure reeds are centered in pick-up slots.

- Cause: 7. Input Transistor (shorted or open).
- Correction: 7.1 Replace TR-1.

#### Complaint: Distorted Tone.

Symptom: Raspy or harsh tone.

- Cause: 1. Blown fuse on printed circuit board.
- Correction: 1.1 Replace only the blown fuse on the circuit board with a short piece of wire. (Fuse has been eliminated on later models).

- Cause: 2. Voltage regulation bad (higher or lower than 15.5 volts  $\pm$  10%)
- Correction: 2.1 Replace TR-5 and/or TR-6 (voltage regulator transistors).

- Cause: 3. Final transistors (#11-0772, 11-0773) (202056, 202057) and driver transistor (#11-0770) (202055) defective.

- Correction: 3.1 Replace all three transistors and check D-4 and R-10. Replace if defective.

**Note:** After removing all three transistors from the P.C. board and heat sink, follow procedure found on Pages 27 and 28.

- Cause: 4. Weak input transistor TR-1 (#11-0778, green or yellow dot only) (202051)

- Correction: 4.1 Replace TR-1.

#### Complaint: Excessive "Hiss" in Amplifier.

- Cause: 1. Voltage regulator oscillating.
- Correction: 1.1 Place a .01 MFD. capacitor from the collector of TR-5 to ground.

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- Cause: 2. Transistor TR-2 and TR-3 noisy.  
 Correction: 2.1 Change capacitor #18 which is a .1 MFD.
- Cause: 3. Transistor TR-1 noisy.  
 Correction: 3.1 Place a 470 PF capacitor from the base to the collector of TR-1.

**Complaint: R. F. Interference (Radio, T.V., Etc.)**

- Correction: 1. Place a 750 PFD capacitor from the base of TR-1 to ground.  
 2. Place a 750 PFD capacitor from the base of TR-2 to ground.  
 3. Place a 750 PFD capacitor from the base of TR-3 to ground.  
 4. Make sure all grounds and shielded cables are properly connected.

**Complaint: Excessive Hum or Buzz.**

- Cause: 1. Reed bar input cable not fully inserted into socket on P.C. board.  
 Correction: 1.1 Insert plug fully.
- Cause: 2. A.C. power wires too close to amplifier input.  
 Correction: 2.1 Redress A.C. cabling for minimum A.C. hum.
- Cause: 3. Filter capacitor in both low voltage and polarizing voltage power supplies broken loose from printed circuit board through vibration.  
 Correction: 3.1 Resolder joints and/or cracked printed circuit.
- Cause: 4. Neon pilot light wires dressed too close to input of amplifier or volume control wires.  
 Correction: 4.1 Redress all cables or wires away from pilot light assembly.
- Cause: 5. Light dimmer control in a room can cause noise in A.C. power lines.  
 Correction: 5.1 Turn lights to full brightness. Put a .01 MFD. bypass capacitor rated at 3000 volts between the ground post of the A.C. line and either one of the two 'hot' leads. One side will increase the hum, the other will remove it.

**Complaint: Excessive Hum That Normal Grounding Does Not Eliminate.**

- Cause: 1. Some water pipe and electrical grounds are located so far from the actual grounding point, they end up

being above ground, electrically, and lose their effectiveness.

- Correction: 1.1 Find a suitable ground as near the installation as possible and connect the lab ground system to it.

**\* TRY GROUND LIFT**

**Complaint: Vibrato "On" All the Time When Piano is Turned On.**

- Symptom: 1. Vibrato on a Model 206 or 207 (no vibrato normally on these two models).  
 2. On all models, if vibrato cannot be turned off.

- Cause: 1. Shorting wire from pin #1 and #12 on printed circuit board improperly soldered or missing (206 and 207 only).

- Correction: 1.1 Properly solder or add a jumper wire from pin #1 to pin #12 on the printed circuit board.

- Cause: 2. Voltage regulator oscillating and going out of regulation in time with the vibrato oscillator.

- Correction: 2.1 Add a .01 MFD. capacitor from the collector of TR-5 to ground.

**Complaint: Keys "Clicking".**

- Cause: 1. Back of the sharp caps hitting the aluminum strip behind them.

- Correction: 1.1 Remove the top and unscrew the two hex headed bolts that receive the music panel screws one or two turns. Be sure to tighten lock nuts after adjusting.

**Complaint: "Cross Talk" in Lab.**

- Cause: 1. This can be caused by improper or no audio ground anywhere in the system.

- Correction: 1.1 Correct faulty audio ground.

**Complaint: A Squeak When the Sustain Pedal is Used.**

- Correction: Place a small amount of thin grease or "Lubriplate" at the point where the bottom of the damper connecting rod passes through the felt washer and rubber grommet.

**\* VINTAGE VIBE.COM Sell DC, L.E.D mod**



**Complaint: A "Click" or Noticeable "Snap" When the Sustain Pedal is Depressed.**

Correction: Squeeze the equivalent of four or five drops of an adhesive sealer such as Dow Corning's Clear Seal, or a white bathtub calking compound into the hole on top of the sustain pedal where the cable enters. (Allow three (3) hours to dry before using.) This material never hardens but gets rubbery and acts as a cushion or gasket for the steel ball on the end of the cable. The material is available at most hardware stores.

**Complaint: Sticky Keys or Sluggish Action.**

Correction: Refer to page 2, "Preparation of the Piano for Servicing" for information on how to dismantle the piano, and following this, it describes **easing keys and shrinking action centers.**

**Complaint: One or More Notes That Are Extra Loud or Harsh.**

Correction: Check to see if the reed involved is slightly off center in the pickup or electrode. If so, loosen the reed mounting screw, center reed, and retighten screw.

If the reed is centered and still too loud, bend the ends of the pickup up slightly (1/32" to 1/16"). (Do not bend the reeds, this makes them go flat in pitch).

**Complaint: "Duds" or Reeds that Ring A Very Short Time and "Die Out".**

Correction: This can generally be corrected, or at least helped, by loosening (one at a time) the four screws that mount the reed bar to the action brackets. If it can be determined which screw, when loosened, helped the most, remove the screw and place a paper front rail punching .010" to .025" thick under the reed bar at that hole and put the screw back in and tighten. It is generally a very slight twist to the reed bar when fully tightened down that causes "short ringers" or "duds".

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## SECTION II

### INDEX OF SCHEMATICS FOR SERIES 200 ELECTRONIC PIANO SERVICE MANUAL

PAGE				
39.	11-0783-S-1-E-2 Models 200	Sept. 1, 1968  203	<b>Schematic-Amplifier</b>  206	207
40.	11-0783-S-2-E-10 Models 200	Sept. 1, 1969  203	<b>Schematic-Amplifier</b>  206	207
41.	11-0764-S-2-E-9 Models 200	Sept. 1, 1969  203	<b>P.C. Board-Amplifier</b>  206	207
42.	11-1305-S-1-E-3 Models 200 207	June 1, 1971  203 214	<b>Schematic-Amplifier</b>  203W 206	206
43.	11-1306-S-1-E-1 Models 200 207	June 1, 1971  203 214	<b>P.C. Board-E.P. Amplifier</b>  203W 206	206
44.	201904-S-1-E-1 Models 200	June 1, 1973  203	<b>Electronic Piano-Amp. Schematic</b>  214	
45.	201808-S-1-E-1 Models 200	June 1, 1973  203	<b>Amplifier-Piano P.C. Board Assy.</b>  214	
46.	11-0783A Models 200	Sept. 1, 1968  206	<b>Output Signal Connections</b>  203	207
47.	11-0783A-S-2 Models 200	Sept. 1, 1969  206	<b>Output Signal Connections</b>  203	207
48.	11-1305A-S-1 Models 200 206	June 1, 1971  203W 214	<b>Output Signal Connections</b>  207 203	203
49.	202821-S-1-E-5 Models All 200 Series	June 1, 1973	<b>Wiring Diagram-Speaker System</b>	
50.	11-1136-S-2-E-6 Model 207	Sept. 1, 1969	<b>Communication Center Schematic</b>	
51.	202520-S-1-E-9 Model 207	June 1, 1973	<b>Communication Center Schematic-Complete System</b>	

52. 11-1134-S-1-E-3    Sept. 1, 1969    **Printed Circuit Board**  
Model 207
53. 11-1025-S-2-E-3    Sept. 1, 1969    **P.C. Board-Instructor's Headphone Driver**  
Model 207
54. 11-1120-S-1-E-1    Sept. 1, 1969    **D.C. Isolation Terminal**  
Model 207
55. 202158-S-1-E-8    June 1, 1973    **Chassis Assy. Complete Power Supply**  
Model 207
56. 202146-S-1-E-5    June 1, 1973    **Audio Distribution Panel Assy.**  
Model 207
57. 11-1137-S-2    Sept. 1, 1969    **Communication Center Schematic**  
Model 207  
(Overlay-communication between instructor  
and A-1 student only).
58. 11-1138-S-2    Sept. 1, 1969    **Communication Center Schematic**  
Model 207  
(Communication between instructor  
and A-6 student only).
59. 11-1139-S-2    Sept. 1, 1969    **Communication Center Schematic**  
Model 207  
(Ensemble-Group A and instructor-Group C,  
no instructor).
60. 11-1140-S-2    Sept. 1, 1969    **Communication Center Schematic**  
Model 207  
(Instructor to Group A, mix Group C and D).
61. 11-1141-S-2    Sept. 1, 1969    **Communication Center Schematic**  
Model 207  
(Instructor to Group A, Audio Aid 1 to  
Group A, Audio Aid 3 to Group C).
62. 202822-S-1-E-5    June 1, 1973    **Communication Center Schematic**  
Model 207 (Overlay - Instructor to Group A, Audio Aid 1 to Group A, Audio Aid 3 to Group C).

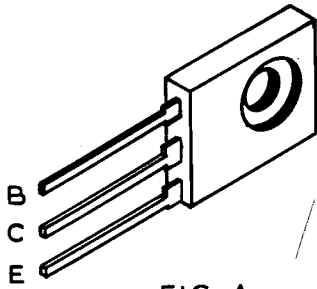


FIG. A

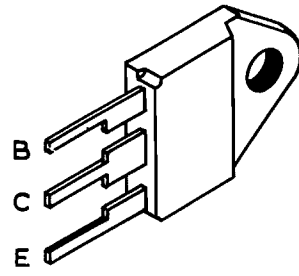


FIG. B

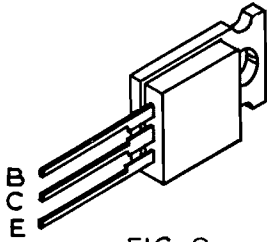


FIG. C

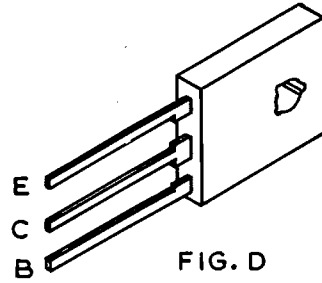


FIG. D

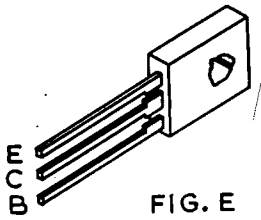


FIG. E

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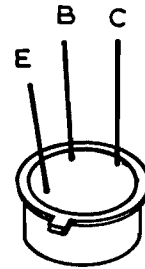


FIG. F

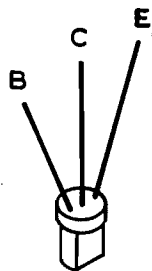


FIG. G

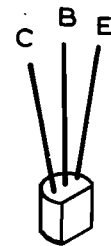


FIG. H

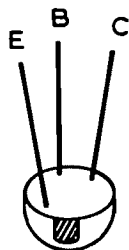
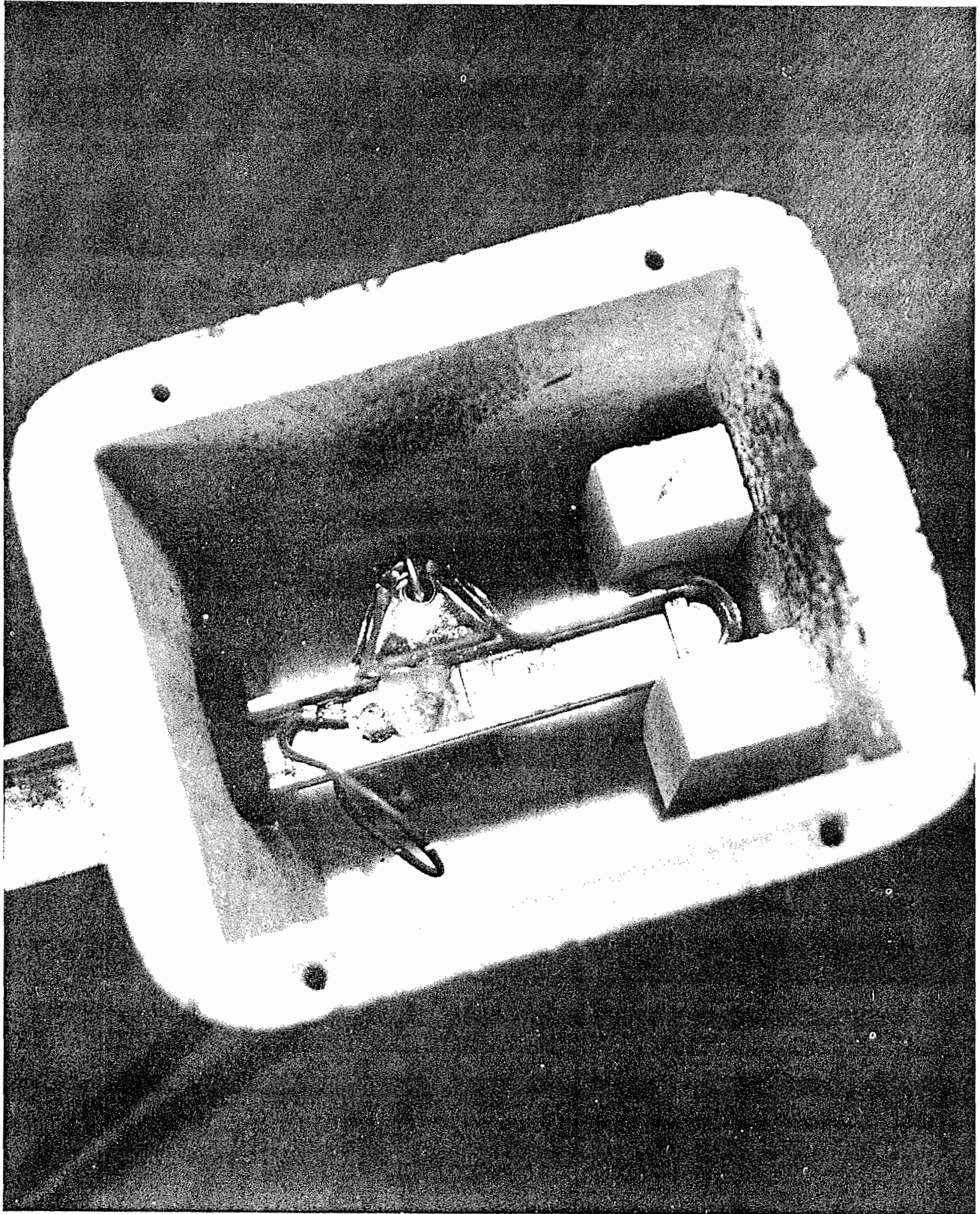


FIG. L

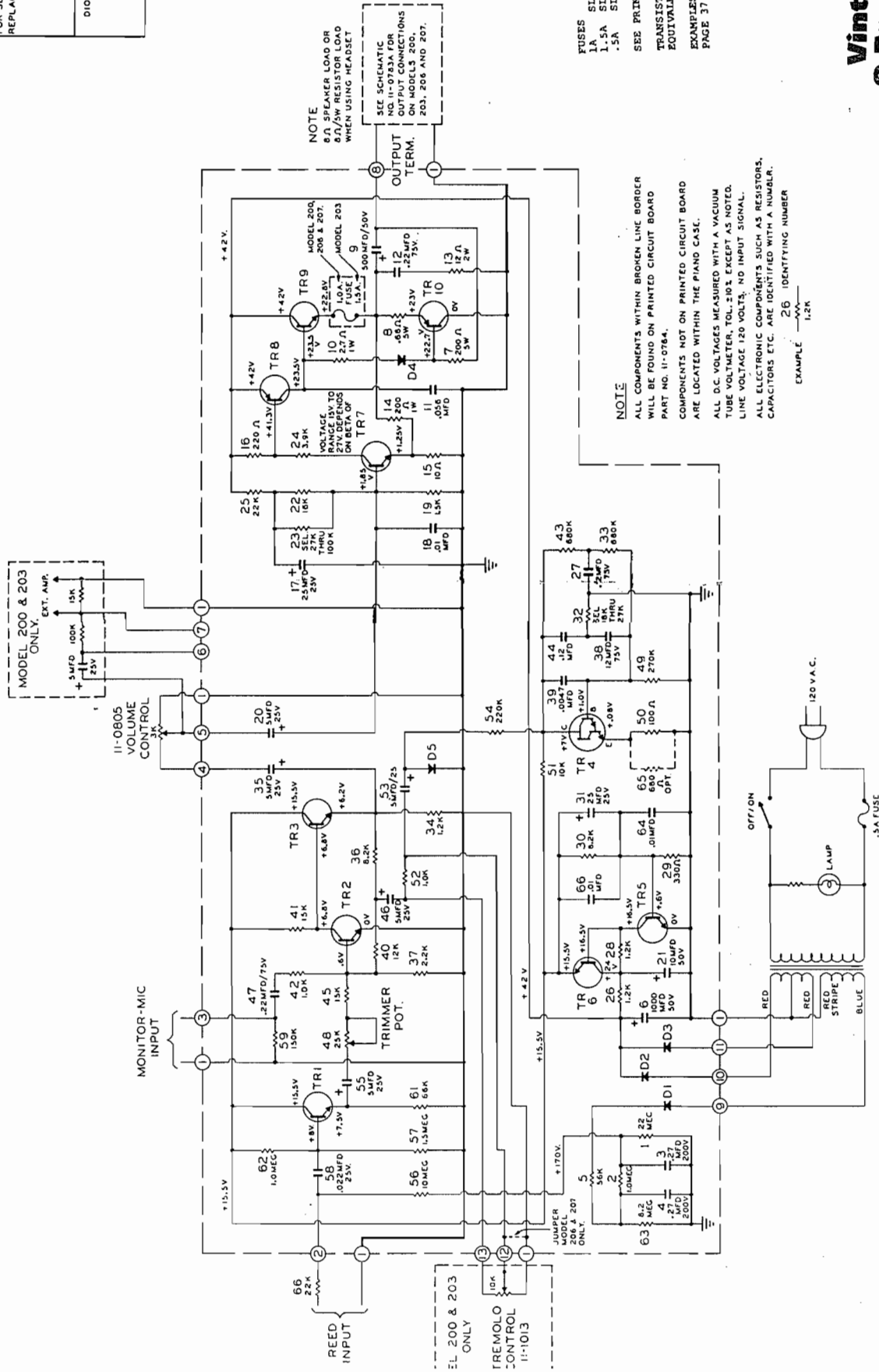


FIG. M



SCHEMATIC - ELECTRONIC PIANO AMPLIFIER  
 MODELS 200-203-206 & 207

PART	NUMBER	MULTIPLIER	PART NUMBER
TRANSISTOR	TR 1		202051
	TR 2		202052
	TR 3		202073
	TR 4		202053
	TR 5		202073
FOR SERVICE REPLACEMENT	TR 6		202073
	TR 7		202054
	TR 8		202055
	TR 9		202056
	TR 10		202057
DIODE	D 1		202050
	D 2		202050
	D 3		202050
	D 4		202060
	D 5		202049



FUSES  
 1A 510 BLO PIGTAIL 77055-17  
 1A 510 BLO PIGTAIL 77055-20  
 1.5A 510 BLO PIGTAIL 77670-B  
 .5A 510 BLO PIGTAIL 77670-B

SEE PRINTED CIRCUIT BOARD PAGE 41

TRANSISTOR PART NUMBERS AND MANUFACTURERS EQUIVALENTS PAGE 28.

EXAMPLES OF TRANSISTOR LEAD CONFIGURATION PAGE 37.

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 917-880-9763  
 www.vintagevibe.com

THE WURLITZER COMPANY - DEKALB DIVISION - DEKALB, ILLINOIS  
 MODEL - 200 - 203 - 206 - 207  
 TITLE - SCHEMATIC - AMPLIFIER  
 PART NO 11-0763-S-1-E-2  
 DATE - SEPT. 1, 1968

SCHEMATIC - ELECTRONIC PIANO AMPLIFIER  
MODELS 200-203-206 & 207

PART	NUMBER	WURLITZER PART NUMBER
TRANSISTOR	TR1	202051
	TR2	202052
	TR3	202073
SPECIFY DOT	TR4	202053
COLOR CODE	TR5	202073
FOR SERVICE	TR6	202073
REPLACEMENT	TR7	202054
	TR8	202055
	TR9	202056
	TR10	202057
DIODE	D1	202050
	D2	202050
	D3	202050
	D4	202050
	D5	202049

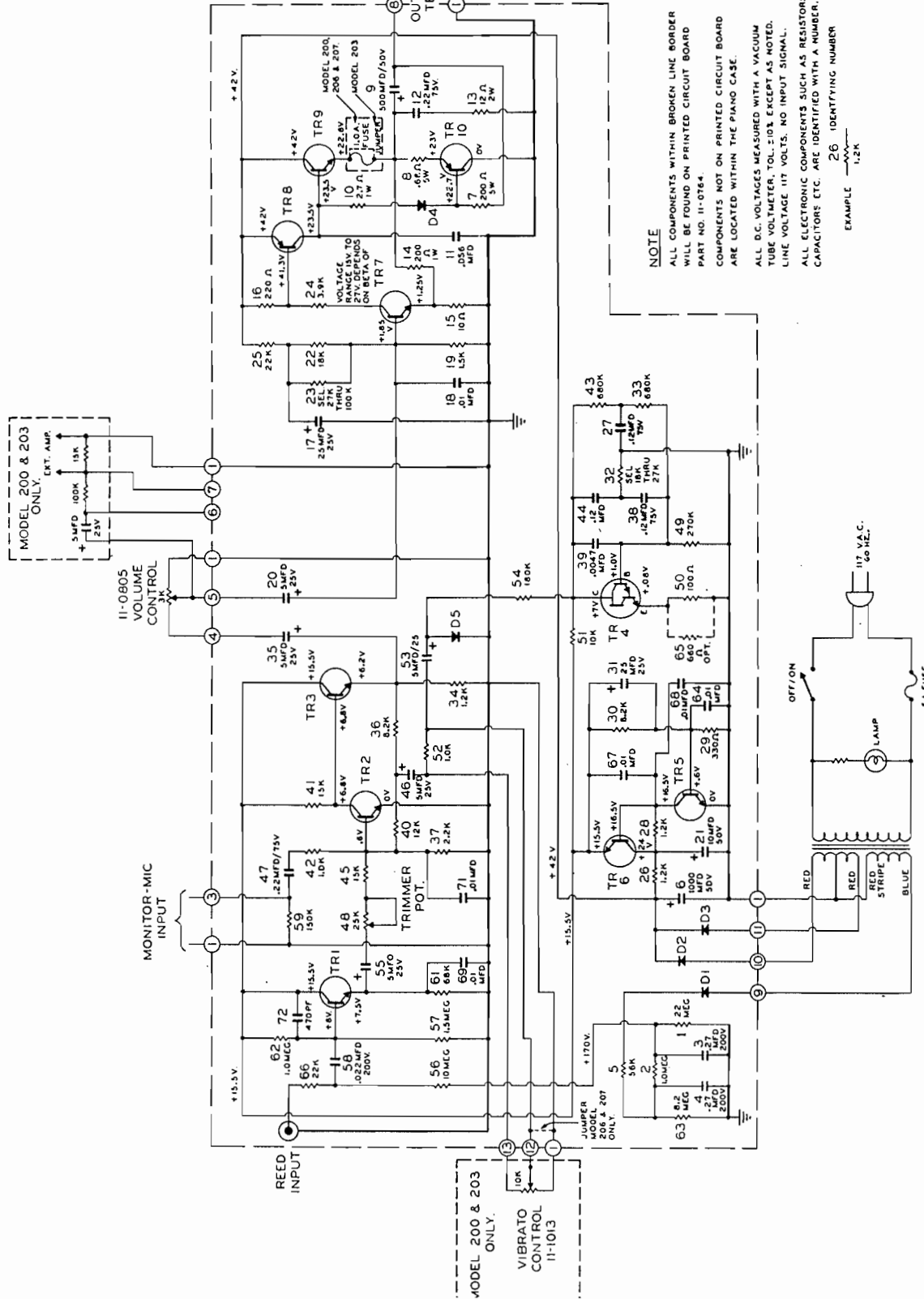
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FUSES SLO BLO PIGTAIL 77055-17  
1A SLO BLO PIGTAIL 77670-6  
.5A SLO BLO PIGTAIL 77670-6

SEE PRINTED CIRCUIT BOARD PAGE 41.

TRANSISTOR PART NUMBERS AND MANUFACTURERS EQUIVALENTS PAGE 28.

EXAMPLES OF TRANSISTOR LEAD CONFIGURATION PAGE 37.



NOTE  
8 Ω SPEAKER LOAD OR  
8 Ω / 5W RESISTOR LOAD  
WHEN USING HEADSET

SEE SCHEMATIC  
NO. 11-0761A FOR  
OUTPUT CONNECTIONS  
ON MODELS 200,  
203, 206 AND 207

NOTE  
ALL COMPONENTS WITHIN BROKEN LINE BORDER  
WILL BE FOUND ON PRINTED CIRCUIT BOARD  
PART NO. 11-0764.  
COMPONENTS NOT ON PRINTED CIRCUIT BOARD  
ARE LOCATED WITHIN THE PIANO CASE.

ALL DC VOLTAGES MEASURED WITH A VACUUM  
TUBE VOLTMETER, TOL. ±1% EXCEPT AS NOTED.  
LINE VOLTAGE 117 VOLTS, NO INPUT SIGNAL.  
ALL CAPACITIVE COMPONENTS SUCH AS RESISTORS,  
CAPACITORS ETC. ARE IDENTIFIED WITH A NUMBER.  
EXAMPLE 26 IDENTIFYING NUMBER  
1.2K

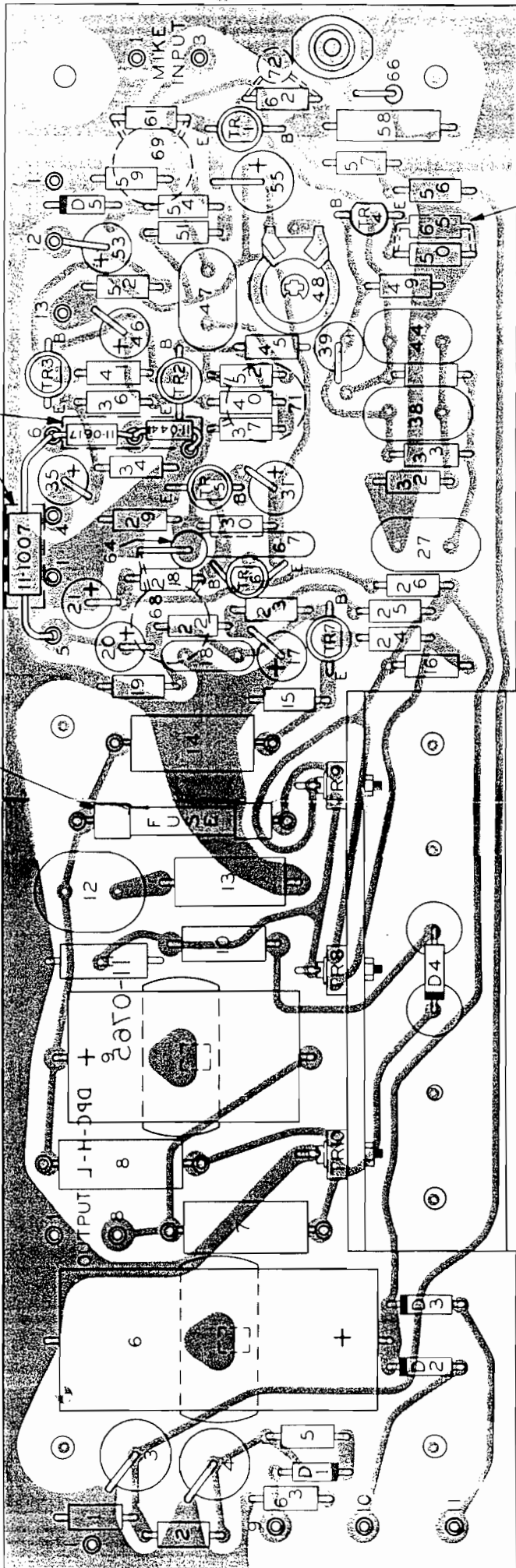
THE WURLITZER COMPANY - DEKALB DIVISION - DEKALB, ILLINOIS  
MODEL - 200 - 203 - 206 - 207  
TITLE - SCHEMATIC - AMPLIFIER  
PART NO 11-0763-S-2-E-10  
DATE - SEPT. 1, 1969

# ELECTRONIC PIANO AMPLIFIER P.C. BOARD MODELS 200-203-206 AND 207

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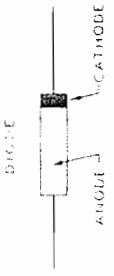
1A.- MODELS 200 206 & 207.  
JUMPER WIRE - MODEL 203 -  
ONLY.

COMPONENTS 11-1007, 11-0617 & 11-0411  
WITHIN DOTTED OUTLINES ARE USED  
ON MODELS 200 AND 203 ONLY



OPTIONAL

NOTE  
SEE SCHEMATIC PART NO 11-0783 FOR CONNECTIONS AND COMPLETE CIRCUIT.  
NUMBERS ON COMPONENTS CORRESPOND TO NUMBERS ON SCHEMATIC 11-0783.

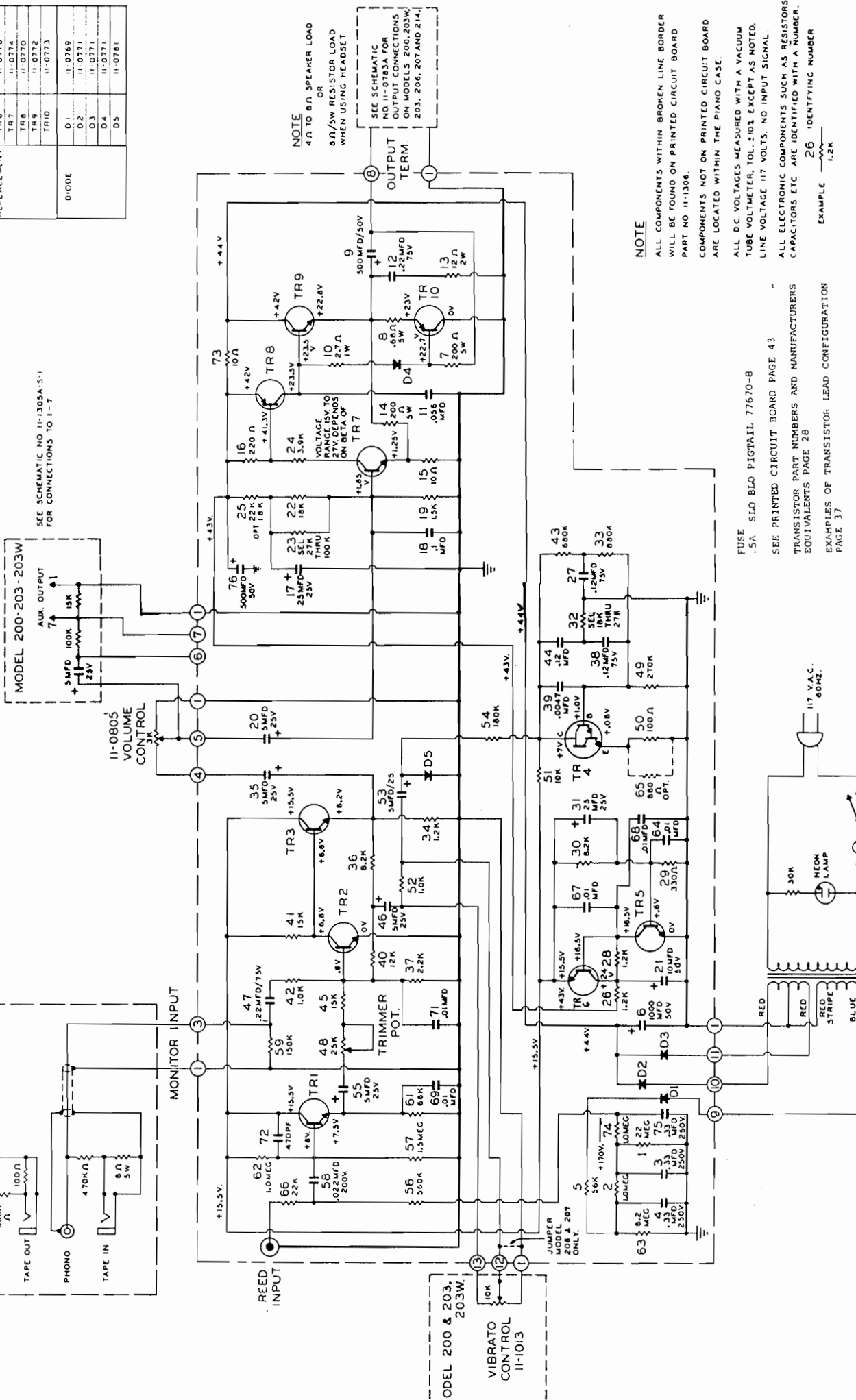


THE WURLITZER COMPANY - DEKALB DIVISION, DEKALB, ILL.  
MODEL - 200-203-206-207  
TITLE - P.C. BOARD - AMPLIFIER  
401 11-0784-5-0-0-2  
11-0784-5-0-0-2



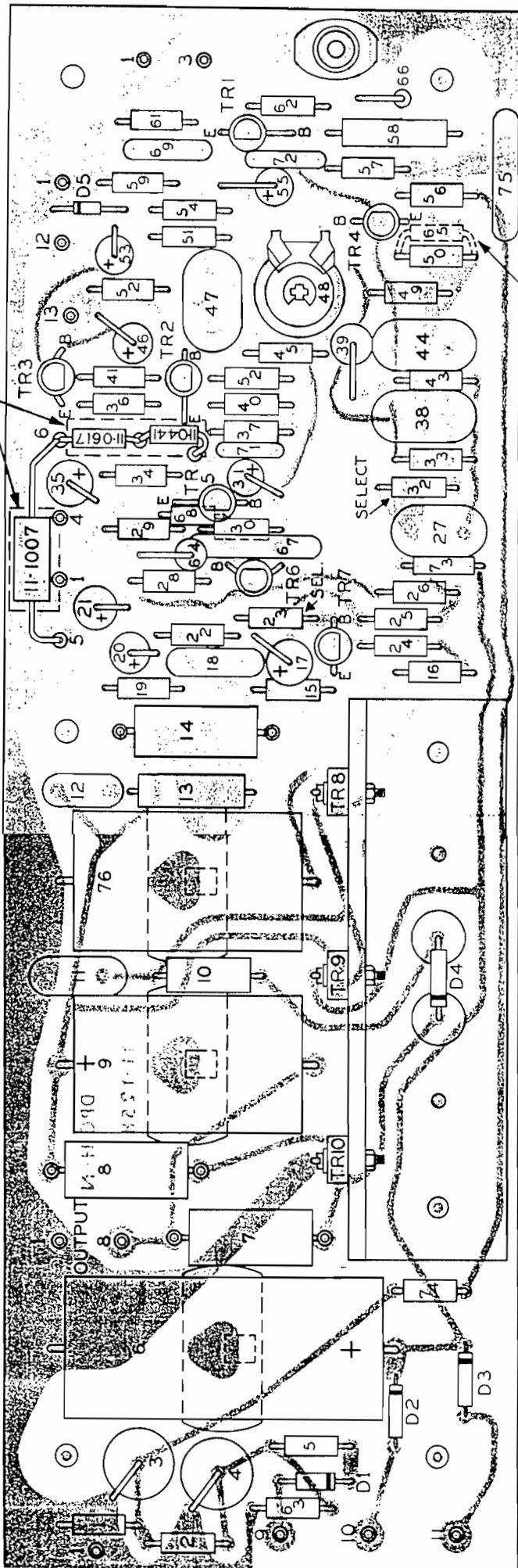
# SCHEMATIC - ELECTRONIC PIANO AMPLIFIER MODELS 200-203-203W-207-214

PART	NUMBER	WURLITZER PART NUMBER
TRANSISTOR	TR	11-0778
SPECIFY DOT	TR 2	11-0778
COLOR CODE	TR 3	11-0778
FOR SERVICE	TR 4	11-0775
REPLACEMENT	TR 5	11-0778
	TR 6	11-0778
	TR 7	11-0774
	TR 8	11-0770
	TR 9	11-0772
	TR 10	11-0773
DIODE	D1	11-0769
	D2	11-0771
	D3	11-0771
	D4	11-0771
	D5	11-0781



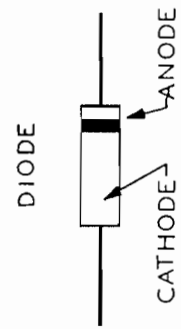
THE WURLITZER COMPANY - DEKALB DIVISION - DEKALB, ILLINOIS.  
MODEL - 200 - 203 - 203W - 206 - 207 - 214  
TITLE - SCHEMATIC - AMPLIFIER  
PART NO. 11-1305-S-1-E-3  
DATE - JUNE 1, 1971

COMPONENTS 11-1007, 11-0617 & 11-0441  
 WITHIN DOTTED LINES ARE USED ON  
 MODELS 200 AND 203 ONLY.



OPTIONAL

NOTE.  
 SEE SCHEMATIC PART NO. 11-1305 FOR CONNECTIONS AND COMPLETE CIRCUITS.  
 NUMBERS ON COMPONENTS CORRESPOND TO NUMBERS ON SCHEMATIC 11-1305.



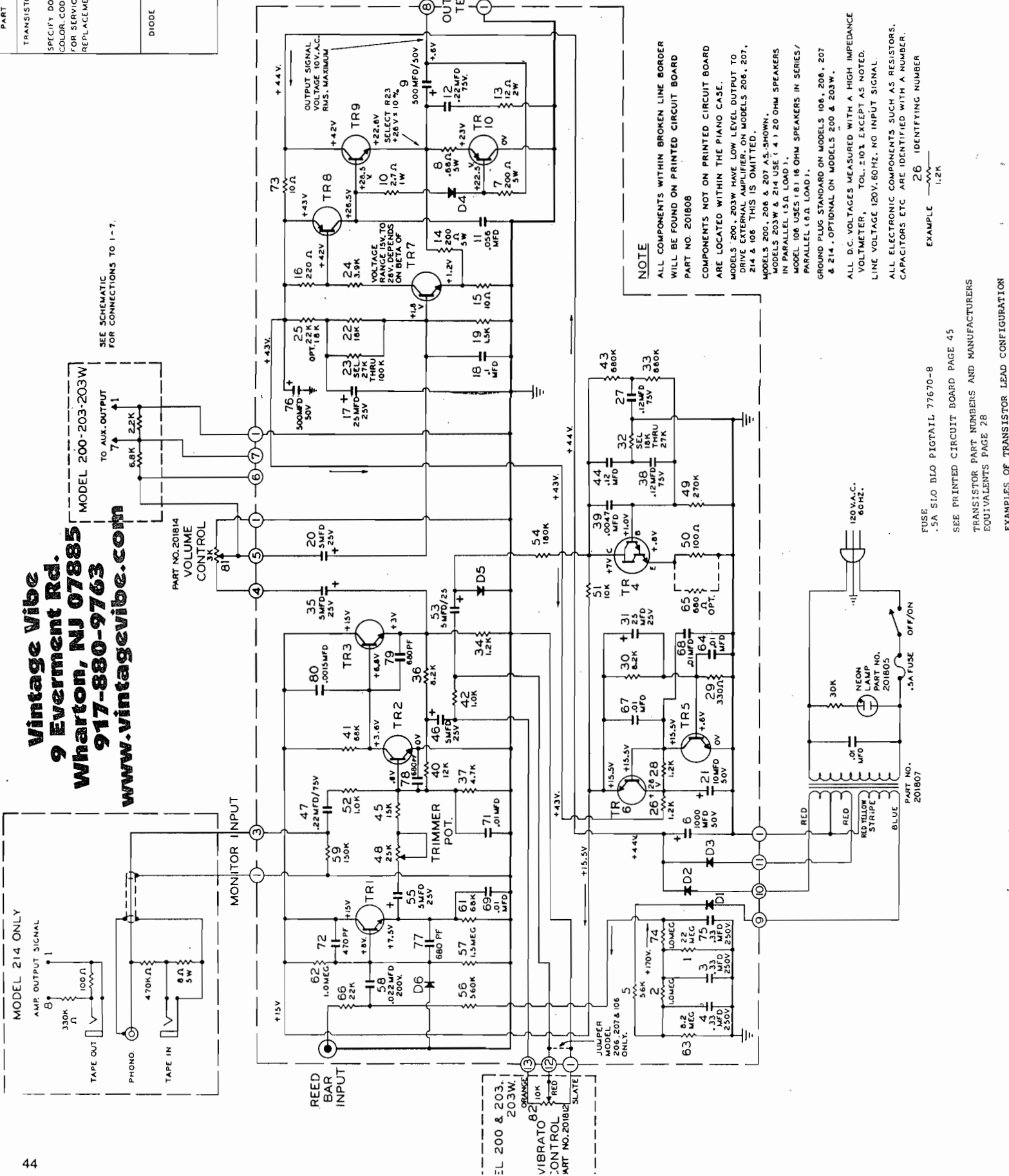
TITLE - P.C. BOARD - E.P. AMPLIFIER.  
 MODEL - 200 203 203W PART NO. 11-1306-S-1-E-1  
 DATE JUNE 1, 1971  
 THE WURLITZER COMPANY - DEKALB DIVISION - DEKALB, ILL.

**Vintage Vibe**  
**9 Everment Rd.**  
**Wharton, NJ 07885**  
**917-880-9763**  
**www.vintagevibe.com**

PART	NUMBER	WURLITZER PART NUMBER
TRANSISTOR	TR1	202051
	TR2	202052
SPECIFY DOT COLOR CODE FOR SERVICE REPLACEMENT	TR3	202073
	TR4	202053
	TR5	202073
	TR6	202073
	TR7	202054
	TR8	202055
	TR9	202056
	TR10	202057
DIODE	D1	202050
	D2	202050
	D3	202050
	D4	202050
	D5	202049
	D6	202049

MODEL 200 SERIES PART NO. 201904-S-1-E-1  
 TITLE - ELECTRONIC PIANO AMPLIFIER SCHEMATIC  
 DATE: 6-1-7  
 THE WURLITZER COMPANY - DEKALB DIVISION - DEKALB, ILL.

SEE SCHEMATIC FOR CONNECTIONS TO 1-7.

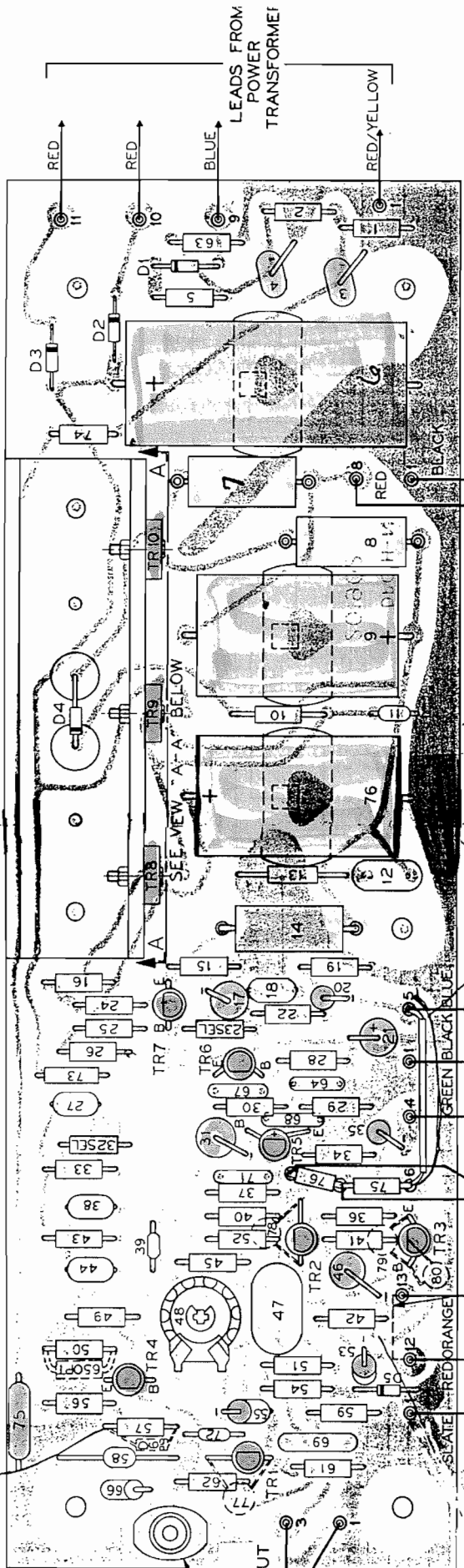


**NOTE**  
 ALL COMPONENTS WITHIN BROKEN LINE BORDER WILL BE FOUND ON PRINTED CIRCUIT BOARD PART NO. 201808  
 COMPONENTS NOT ON PRINTED CIRCUIT BOARD ARE LOCATED WITHIN THE PIANO CASE.  
 MODELS 200, 203W HAVE LOW LEVEL OUTPUT TO DRIVE EXTERNAL AMPLIFIER. ON MODELS 206, 207, 214 & 106 THIS IS OMITTED.  
 MODELS 200, 206 & 207 AS SHOWN.  
 MODELS 203W & 214 USE 1/4 1.20 OHM SPEAKERS IN PARALLEL (5.0 LOAD).  
 MODEL 106 USES (18) 16 OHM SPEAKERS IN SERIES / PARALLEL (8.0 LOAD).  
 GROUND PLUG STANDARD ON MODELS 106, 206, 207 & 214. OPTIONAL ON MODELS 200 & 203W.  
 ALL D.C. VOLTAGES MEASURED WITH A HIGH IMPEDANCE VOLTMETER, TOL. 5.0% EXCEPT AS NOTED.  
 LINE VOLTAGE 120V. 60HZ. NO INPUT SIGNAL.  
 ALL ELECTRONIC COMPONENTS SUCH AS RESISTORS, CAPACITORS ETC ARE IDENTIFIED WITH A NUMBER.

EXAMPLE  
 26 IDENTIFYING NUMBER  
 W  
 1.2K

FUSE .5A S10 BLO PIGTAIL 77670-8  
 SEE PRINTED CIRCUIT BOARD PAGE 45  
 TRANSISTOR PART NUMBERS AND MANUFACTURERS EQUIVALENTS PAGE 28  
 EXAMPLES OF TRANSISTOR LEAD CONFIGURATION

202050  
IN 4005 Diode



LEADS FROM POWER TRANSFORMER  
RED  
RED  
BLUE  
RED/YELLOW

TO OUTPUT OR SPEAKER CONNECTIONS

TO VOLUME CONTROL  
SHIELDED CABLE

TO AUX. OUTPUT  
M-200-M-203

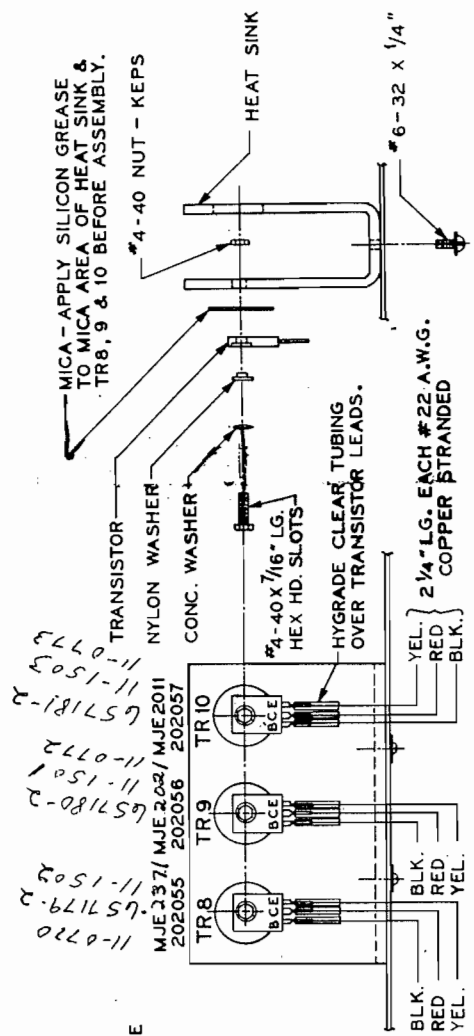
TO VIBRATO CONTROL  
SLATE (RED ORANGE)

JUMPER WIRE TO KILL VIBRATO  
ADDED TO M-206-M-207  
(NO VIBRATO CONTROL)

SEE VIEW "A-A" BELOW

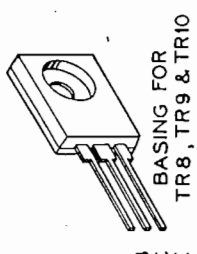
11-007 (Sp. F/25V) to be assembled at Detailer  
used on models 200 & 203 for low level output to drive external amplifier.

Vintage Vibe  
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Wharton, NJ 07885  
917-880-9763  
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NOTES -  
SEE SCHEMATIC 201904D FOR CONNECTIONS AND COMPLETE CIRCUITS.  
NUMBERS ON COMPONENTS CORRESPOND TO NUMBERS ON SCHEMATIC 201904D.  
BAND INDICATES CATHODE END OF DIODE.  
PARTS # 75 (6.8K - 1/2 W) & # 76 (2.2K 1/2 W) TO BE ASSEMBLED ON MODELS 200 & 203W FOR LOW LEVEL OUTPUT TO DRIVE EXTERNAL AMPLIFIER.

TRANSISTORS  
= Mylar Caps  
= Electrolytes  
= Power  
Resistors

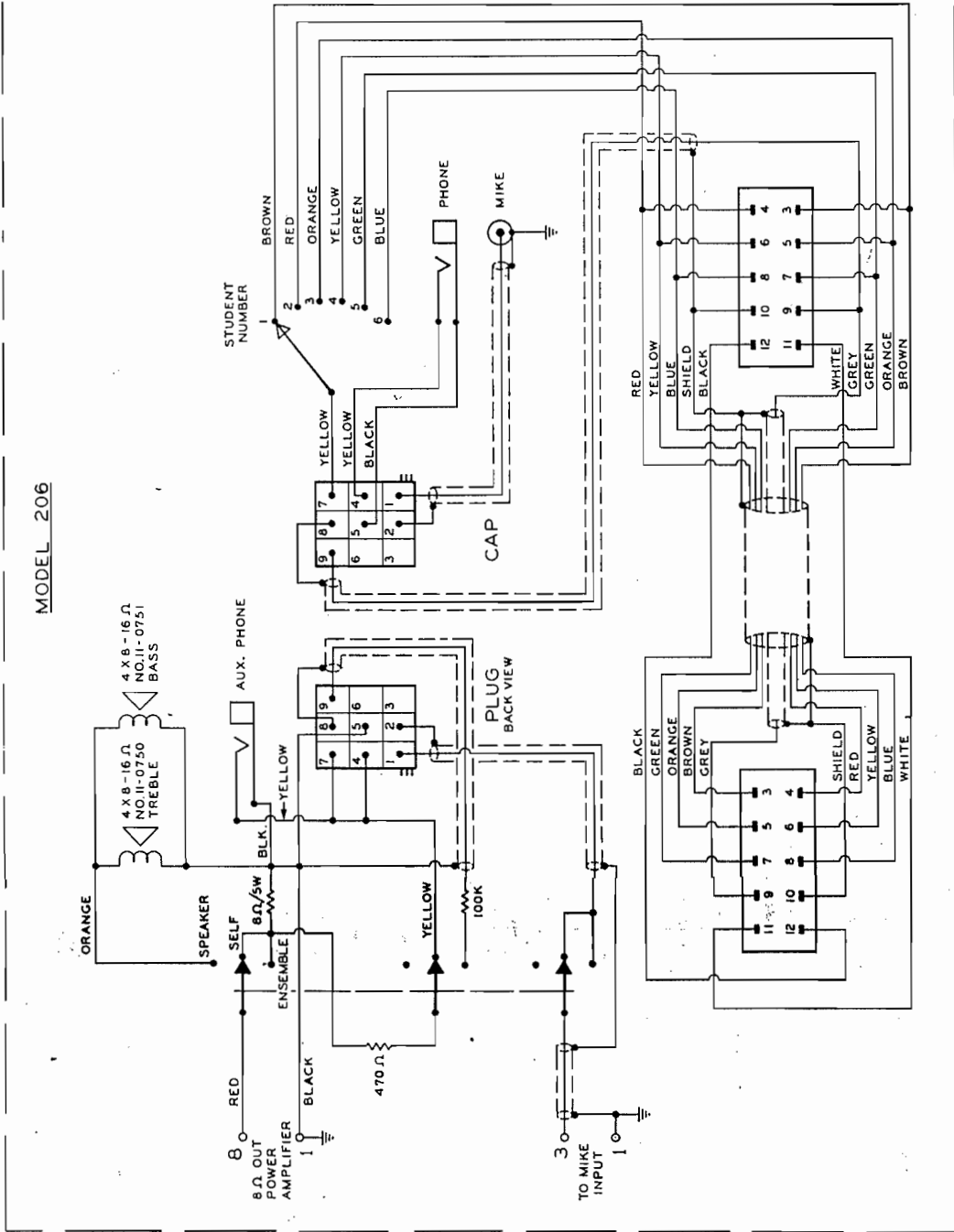
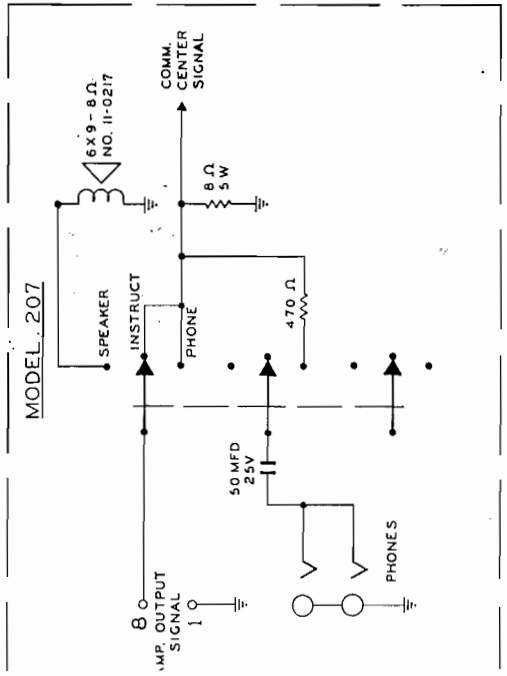
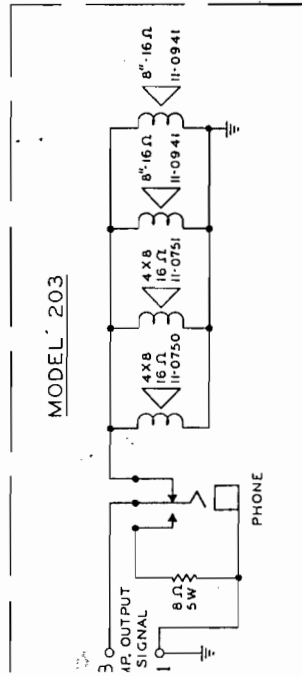
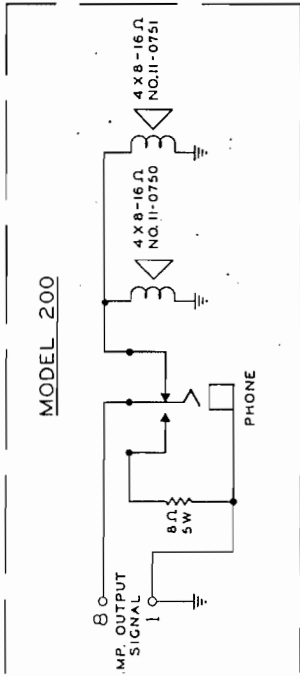


VIEW "A-A"  
TRANSISTOR INSTALLATION TO HEAT SINK  
VIEWED FROM TRANSISTOR SIDE

MODEL 200 SERIES  
TITLE: AMPLIFIER - PIANO - P.C. ASSEM.  
203  
THE WURLITZER COMPANY - DETAILS DIVISION - DECATUR, ILL.

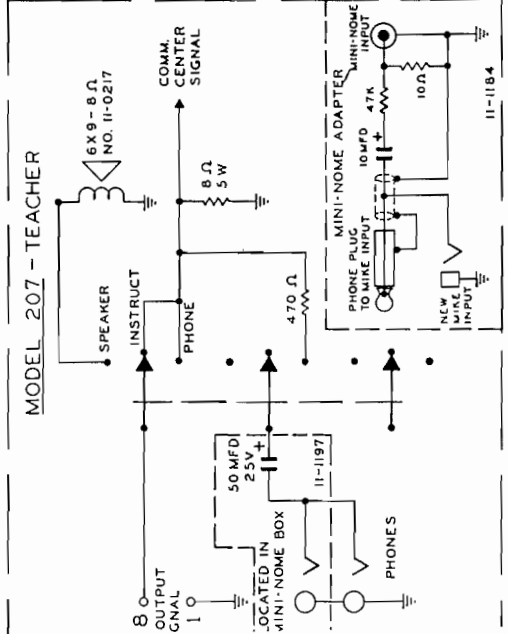
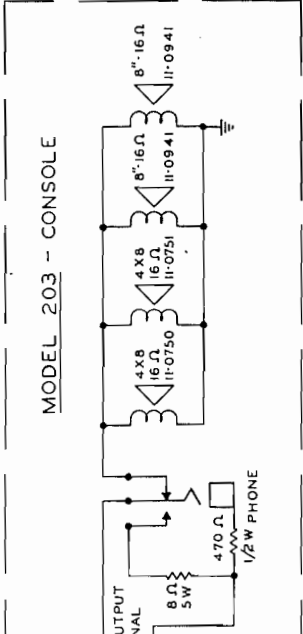
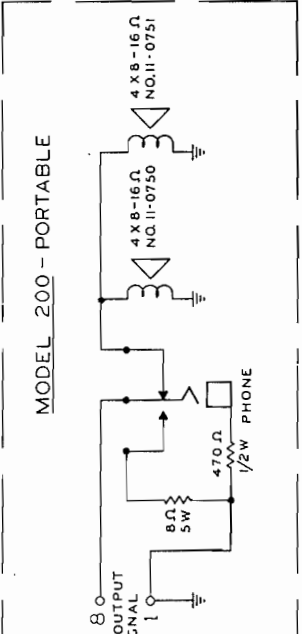
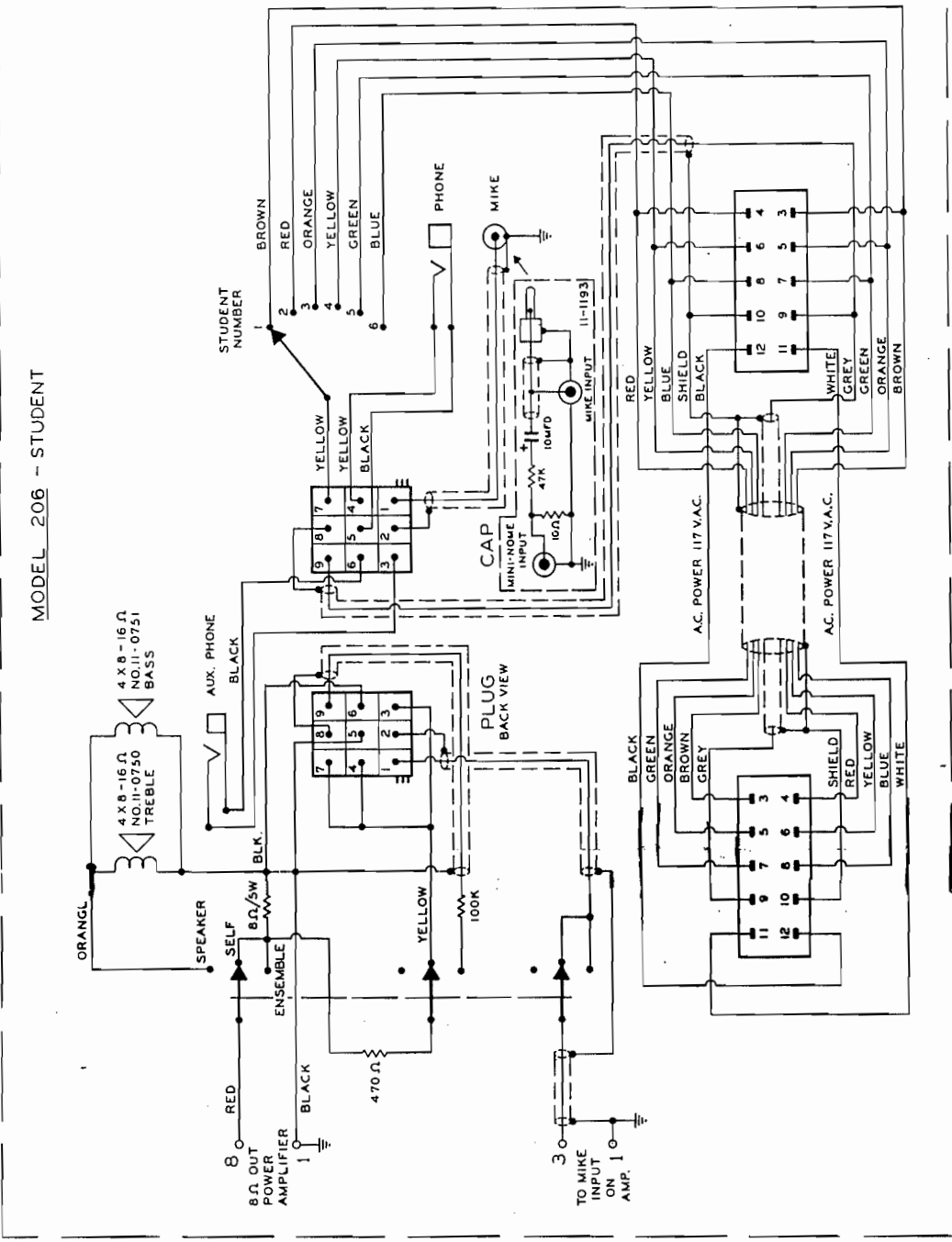
PART NO. 201904-5-1-E-1  
DATE 6-1-73  
214

Output Signal Connections  
Electronic Piano



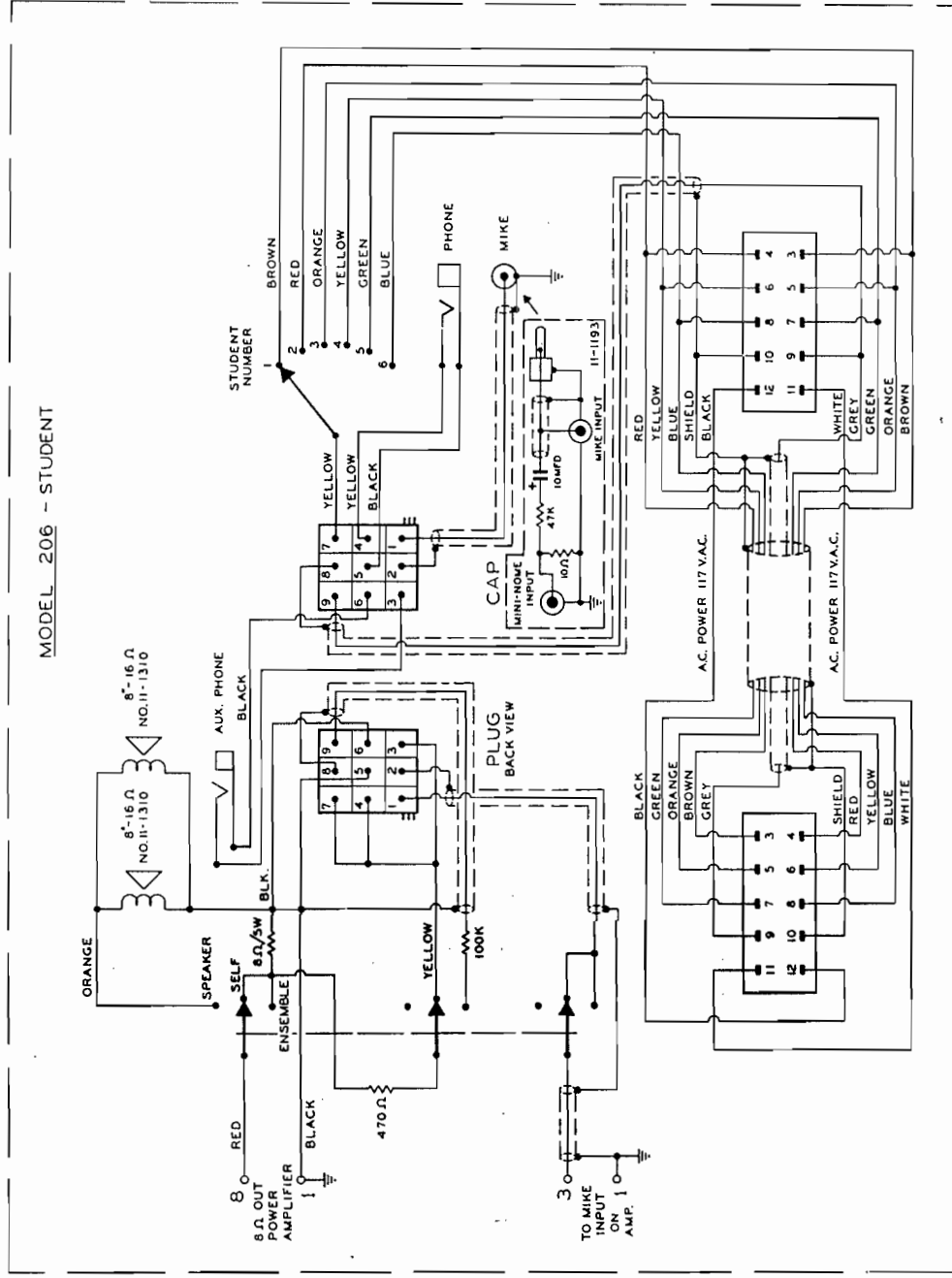
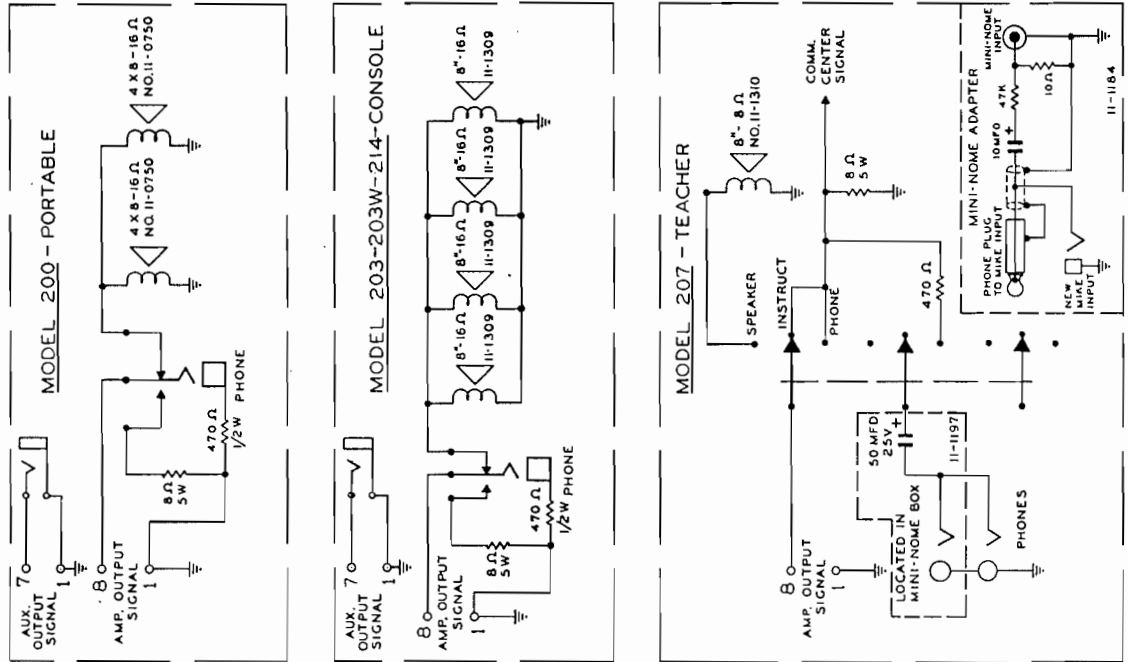
THE WURLITZER COMPANY - DEKALB DIVISION, DEKALB ILL.  
 MODEL - 200, 203, 206, 207.  
 TITLE - OUTPUT SIGNAL CONNECTIONS  
 PART NO. 11-0783A  
 DATE - SEPT. 1, 1968

# OUTPUT SIGNAL CONNECTIONS ELECTRONIC PIANO

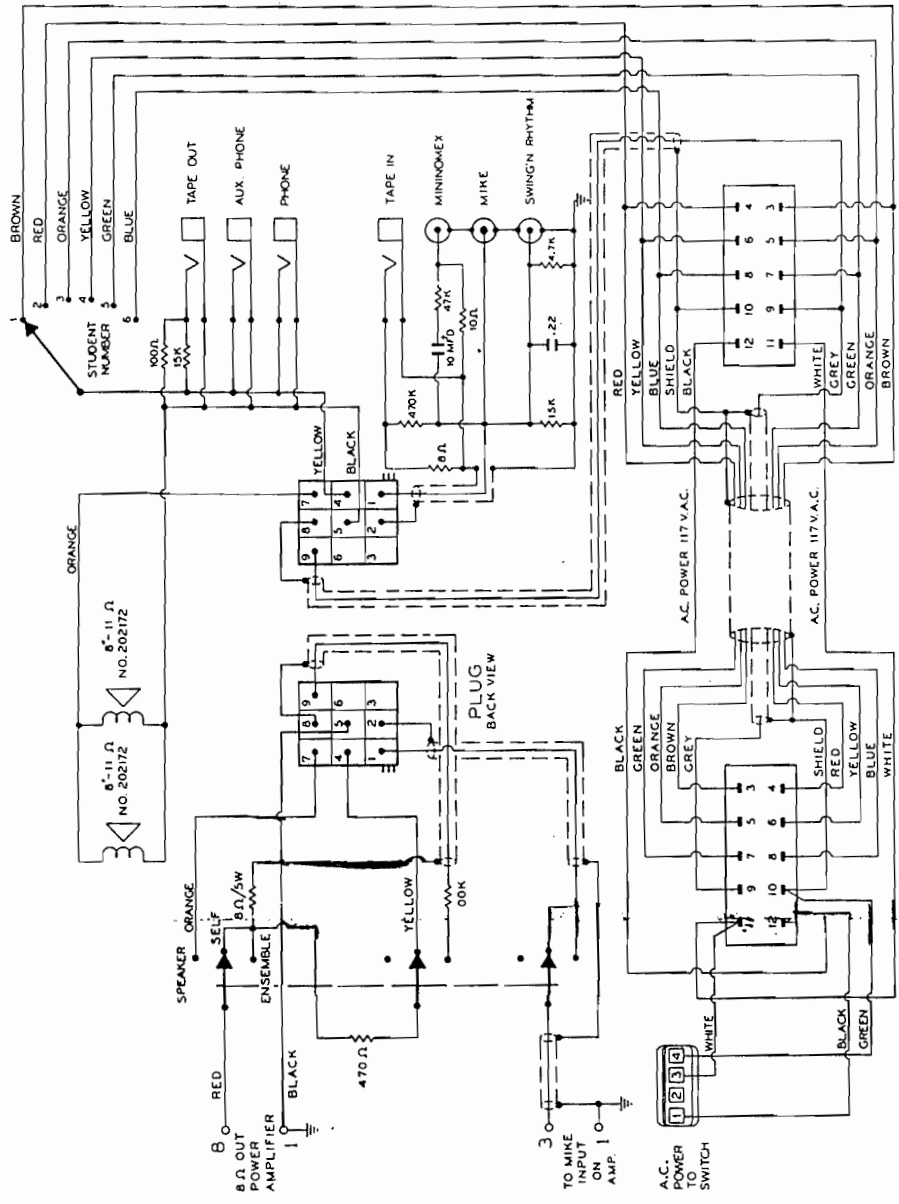
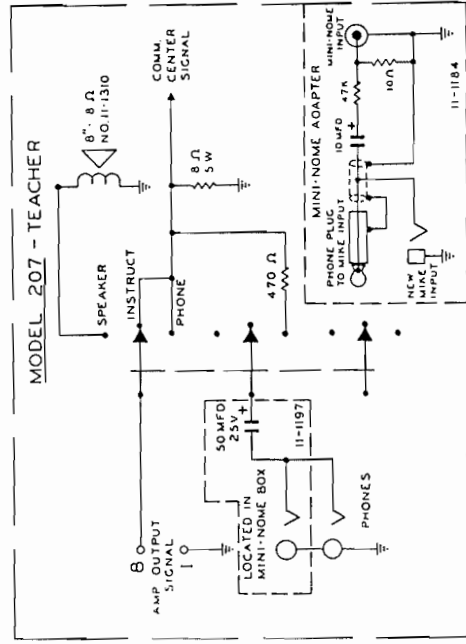
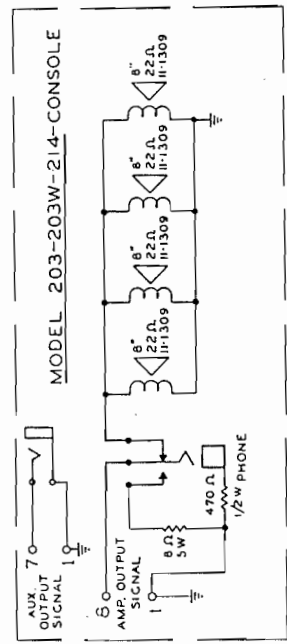
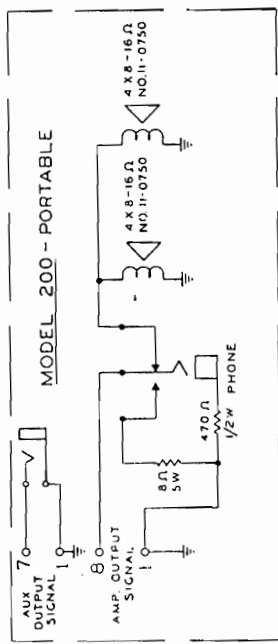


THE WURLITZER COMPANY - DEKALB DIVISION, DEKALB ILL.  
 MODEL - 200, 203, 206, 207.  
 TITLE - OUTPUT SIGNAL CONNECTIONS  
 PART NO. 11-0783A-S2  
 DATE - SEPT. 1, 1969.

# OUTPUT SIGNAL CONNECTIONS ELECTRONIC PIANO 200 SERIES



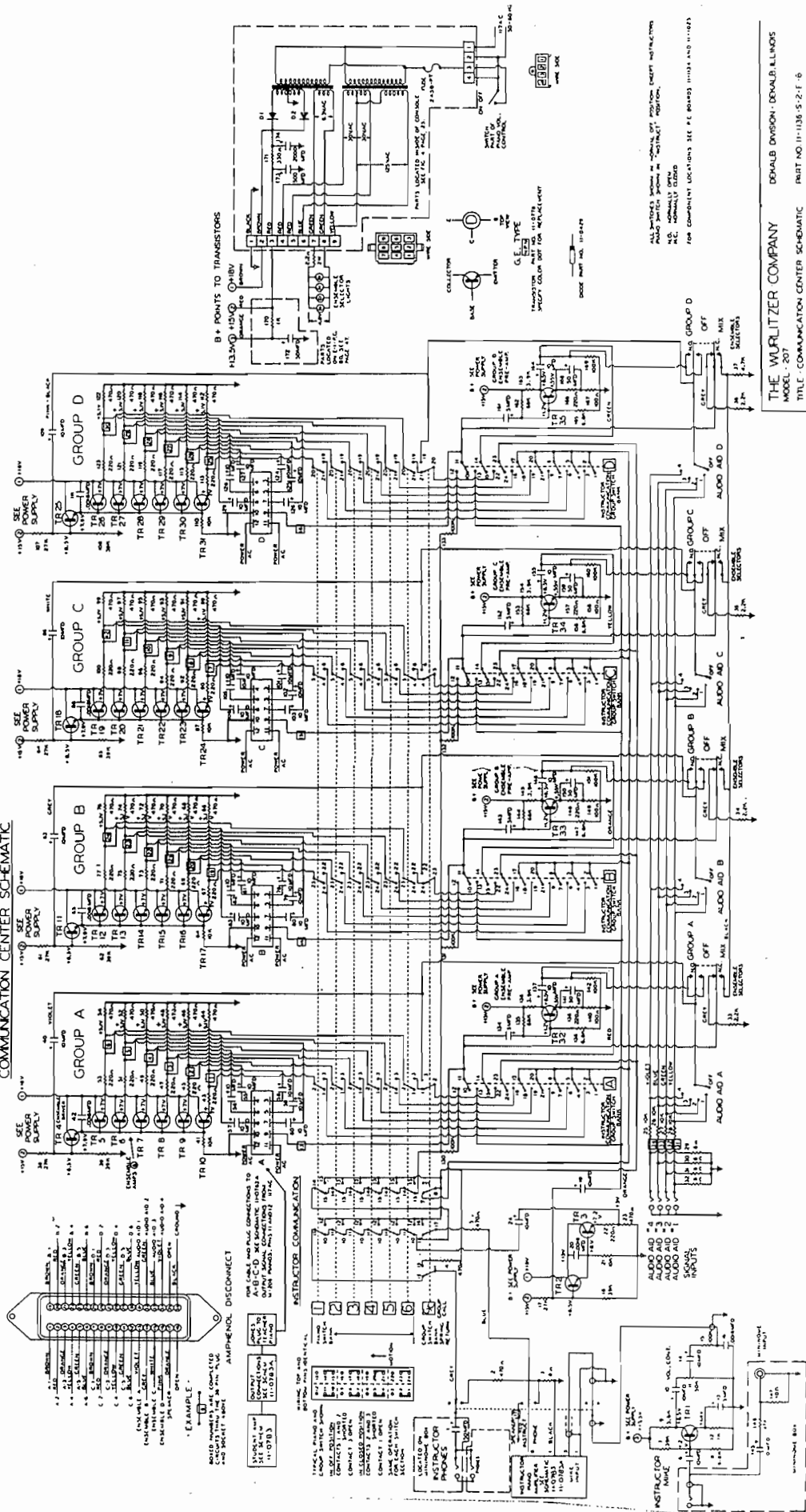
THE WURLITZER COMPANY - DEKALB DIVISION, DEKALB ILL.  
MODEL - 200, 203, 203W, 206, 207, 214.  
TITLE - OUTPUT SIGNAL CONNECTIONS  
PART NO. 11-1305A-S-1  
DATE - JUNE 1, 1971.



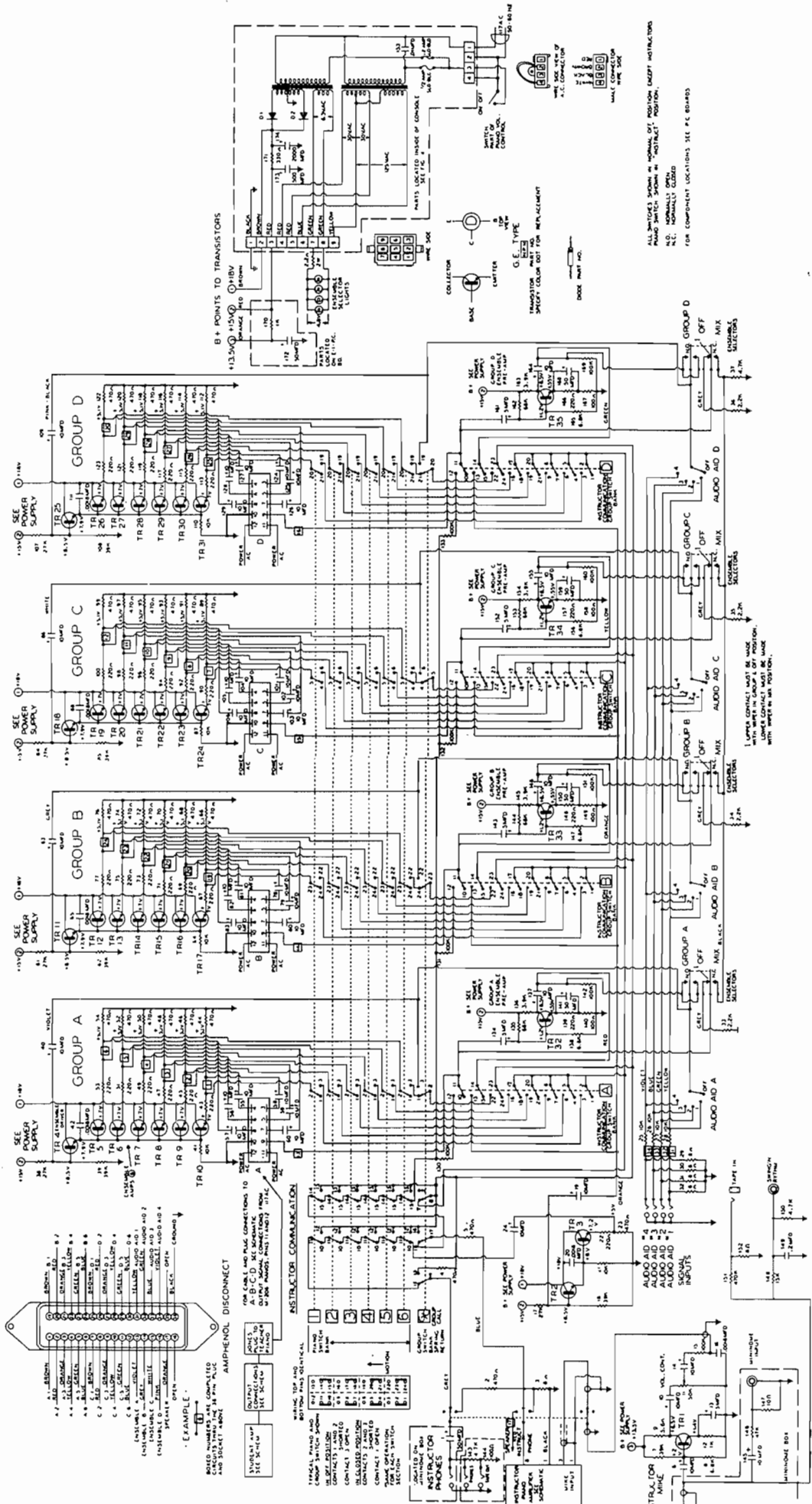
MODEL ALL 200 SERIES PART NO 202021-51-E-5  
 TITLE WIRING DIAGRAM - SPAR. SYSTEM  
 DATE 8-11-73  
 THE WURLITZER COMPANY - U.S.A. DIVISION - DEARBORN, ILL.



COMMUNICATION CENTER SCHEMATIC



THE WURLITZER COMPANY DONALD DIVISION DONALD B. ILLINOIS  
 MODEL 207 PART NO 11-103-5-2-F-6  
 TITLE: COMMUNICATION CENTER SCHEMATIC DATE: SEPT. 1, 1969

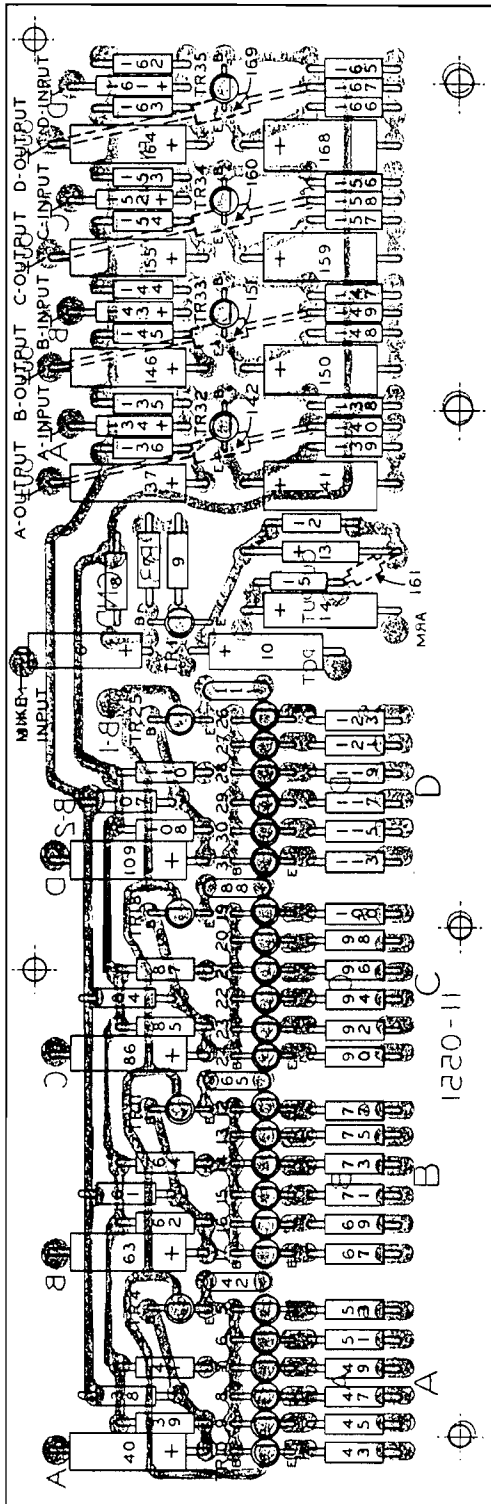


ALL SWITCHES SHOWN IN NORMAL OFF POSITION EXCEPT INSTRUCTIONS  
 PLUG SWITCH SHOWN IN "INSTRUCT" POSITION.  
 1.2. NORMALLY CLOSED  
 1.3. NORMALLY OPEN  
 1.4. NORMALLY LOCKED  
 FOR COMPONENT LOCATIONS SEE P. 4. REAR

MODEL - 207 PART NO. 35-111-11  
 TITLE - COMMUNICATION CENTER SCHEM. COMPLETE SYSTEM  
 THE WURLITZER COMPANY - DEKALB DIVISION - DEKALB, ILL.

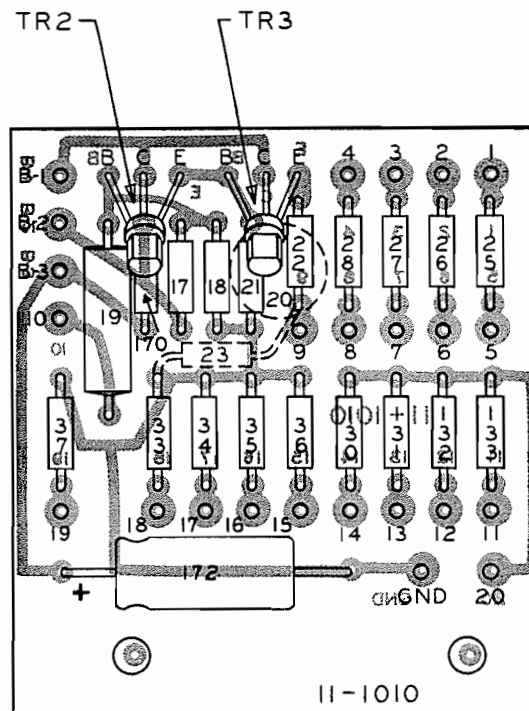
The Wurlitzer Company -Dekalb Division-Dekalb, Illinois  
 Model-207 Communication Center  
 title\_ printed circuit board  
 part number- 11-1134-S-I-E-3  
 Date- Sept. 1,1969

P.C. BOARD - COMMUNICATION CENTER



NOTE  
 FOR COMPLETE WIRING SEE SCHEMATIC NO. 11-1136.  
 DOTTED COMPONENTS ARE LOCATED ON UNDERSIDE  
 OF P.C. BOARD.

# P.C. BOARD - INSTRUCTOR'S HEADPHONE DRIVER



**NOTE:**

RESISTORS 33-34-35-36 AND 130  
131-132-133 RANDOM WIRED.

THE WURLITZER COMPANY - DEKALB DIVISION - DEKALB, ILLINOIS

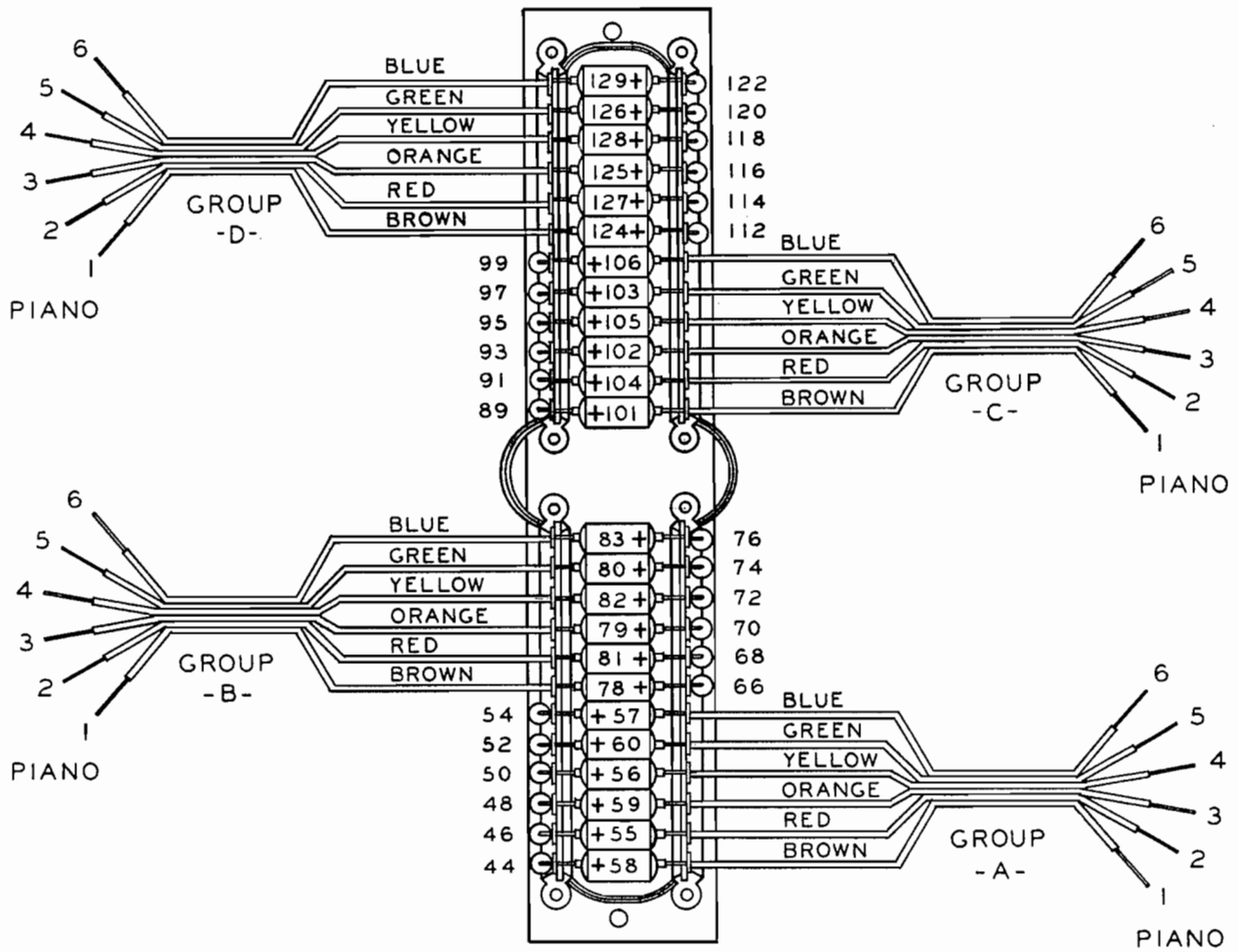
MODEL - 207

TITLE - P.C. BOARD - INSTRUCTOR'S HEADPHONE DRIVER.

PART NO. 11-1025-S-2-E-3

DATE - SEPT. 1, 1969

# D.C. ISOLATION TERMINAL



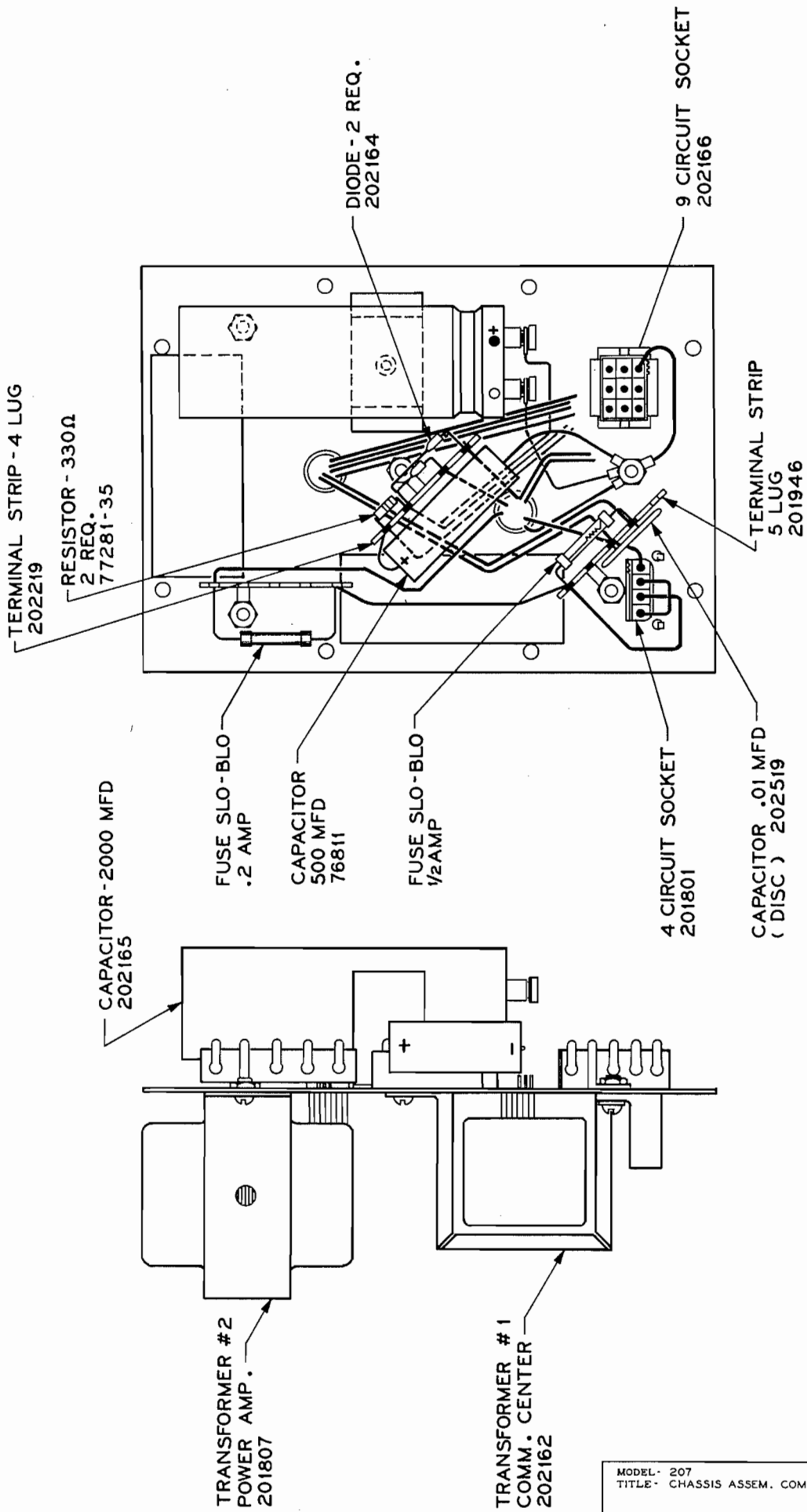
THE WURLITZER COMPANY DEKALB DIVISION-DEKALB, ILLINOIS

MODEL - 207

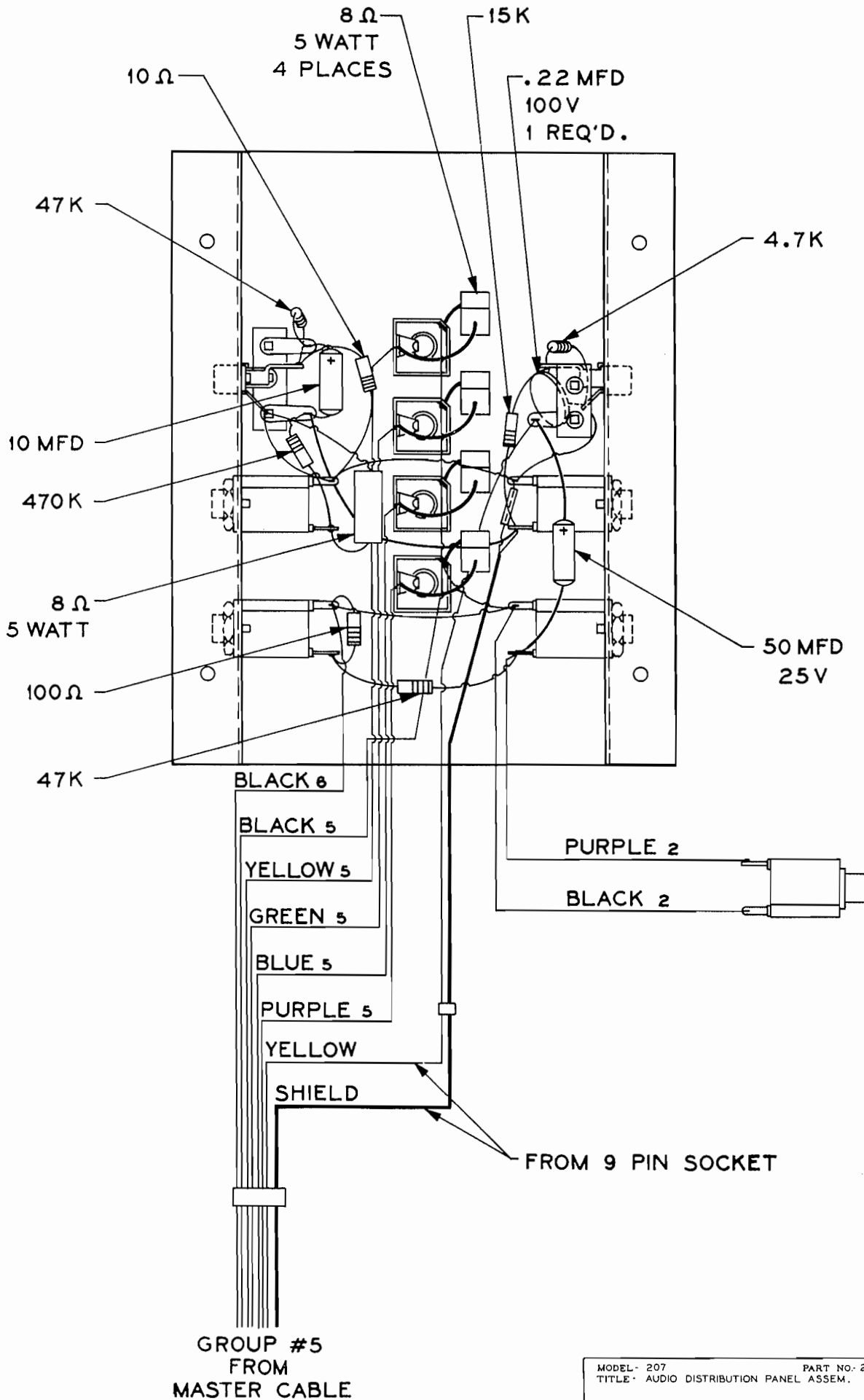
TITLE - D.C. ISOLATION TERMINAL

PART NO. 11-1120-S-1-E-1

DATE - SEPT. 1, 1969



MODEL - 207  
 TITLE - CHASSIS ASSEM. COMPLETE POWER SUPPLY  
 PART NO. 202158-S-1-E-8  
 DATE: 6-1-73  
 THE WURLITZER COMPANY - DEKALB DIVISION - DEKALB, ILL.

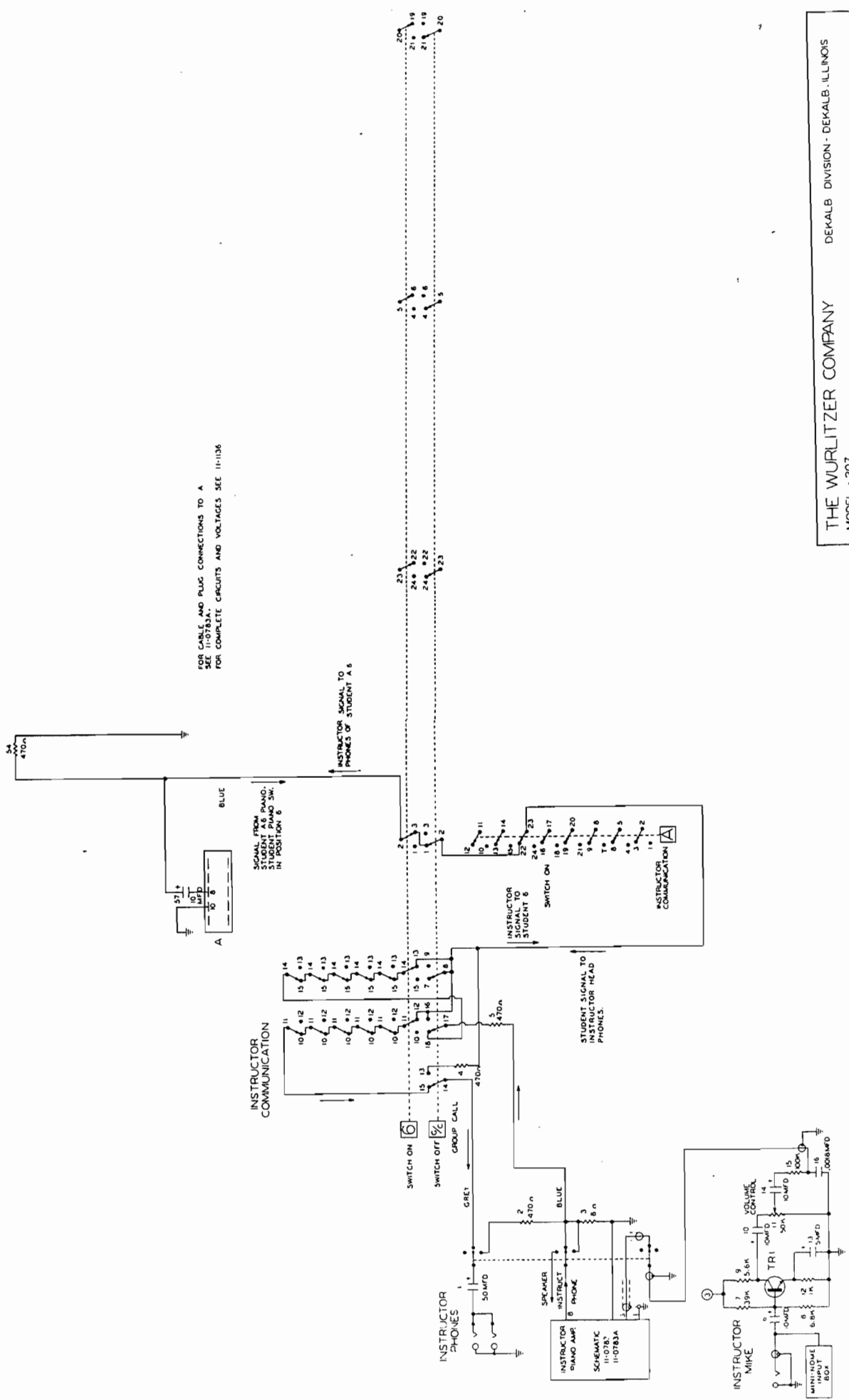


MODEL- 207                      PART NO. 202146-S-1-E-5  
 TITLE- AUDIO DISTRIBUTION PANEL ASSEM.  
 DATE- 6-1-73  
 THE WURLITZER COMPANY - DEKALB DIVISION - DEKALB, ILL



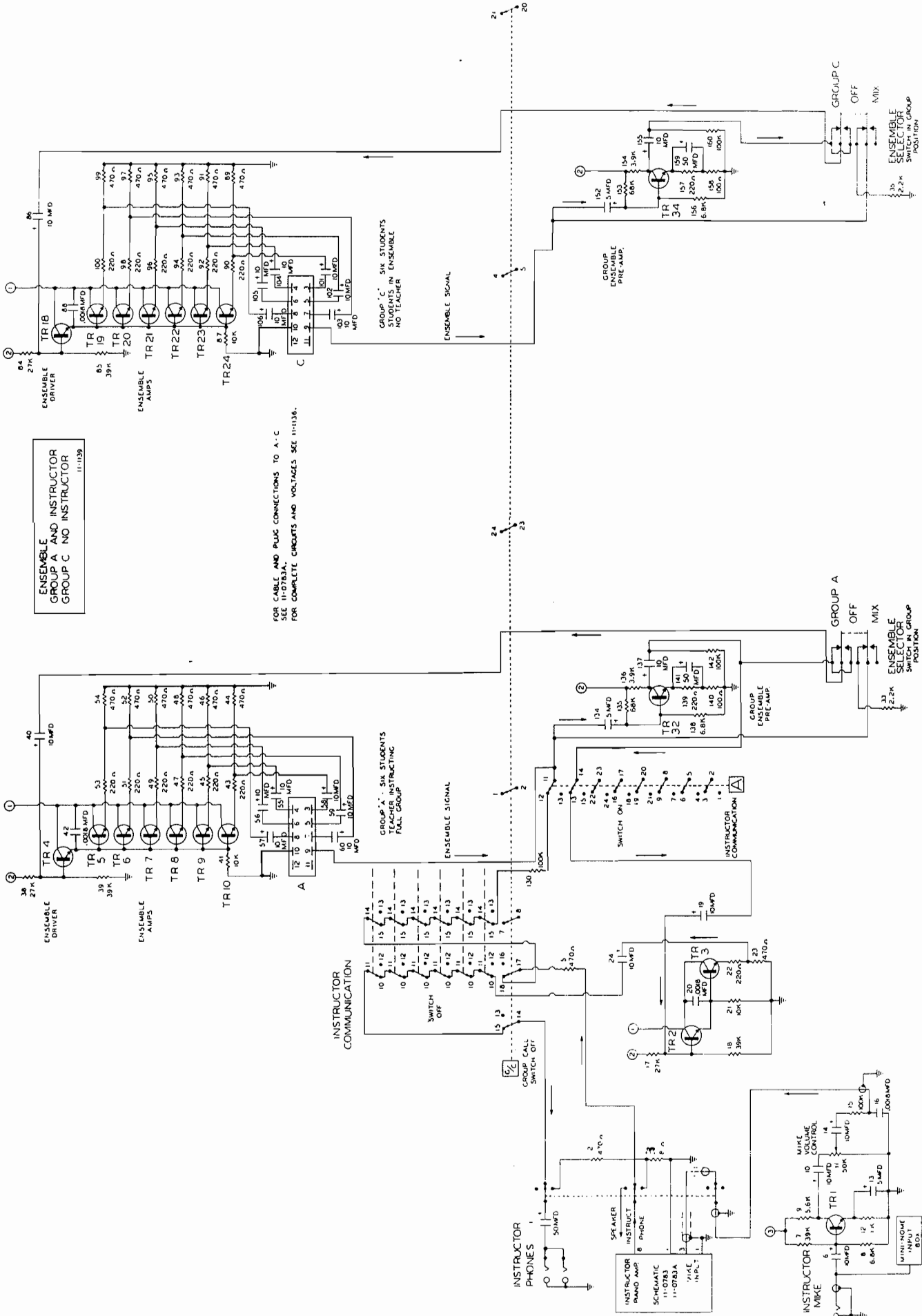


COMMUNICATION BETWEEN  
INSTRUCTOR AND A 6  
STUDENT ONLY  
11-1136



FOR CABLE AND PLUG CONNECTIONS TO A  
SEE 11-0783A.  
FOR COMPLETE CIRCUITS AND VOLTAGES SEE 11-1136

THE WURLITZER COMPANY DEKALB DIVISION - DEKALB, ILLINOIS  
MODEL - 207 PART NO. 11-1136-S-2  
TITLE - COMMUNICATION CENTER SCHEMATIC DATE - SEPT. 1, 1969

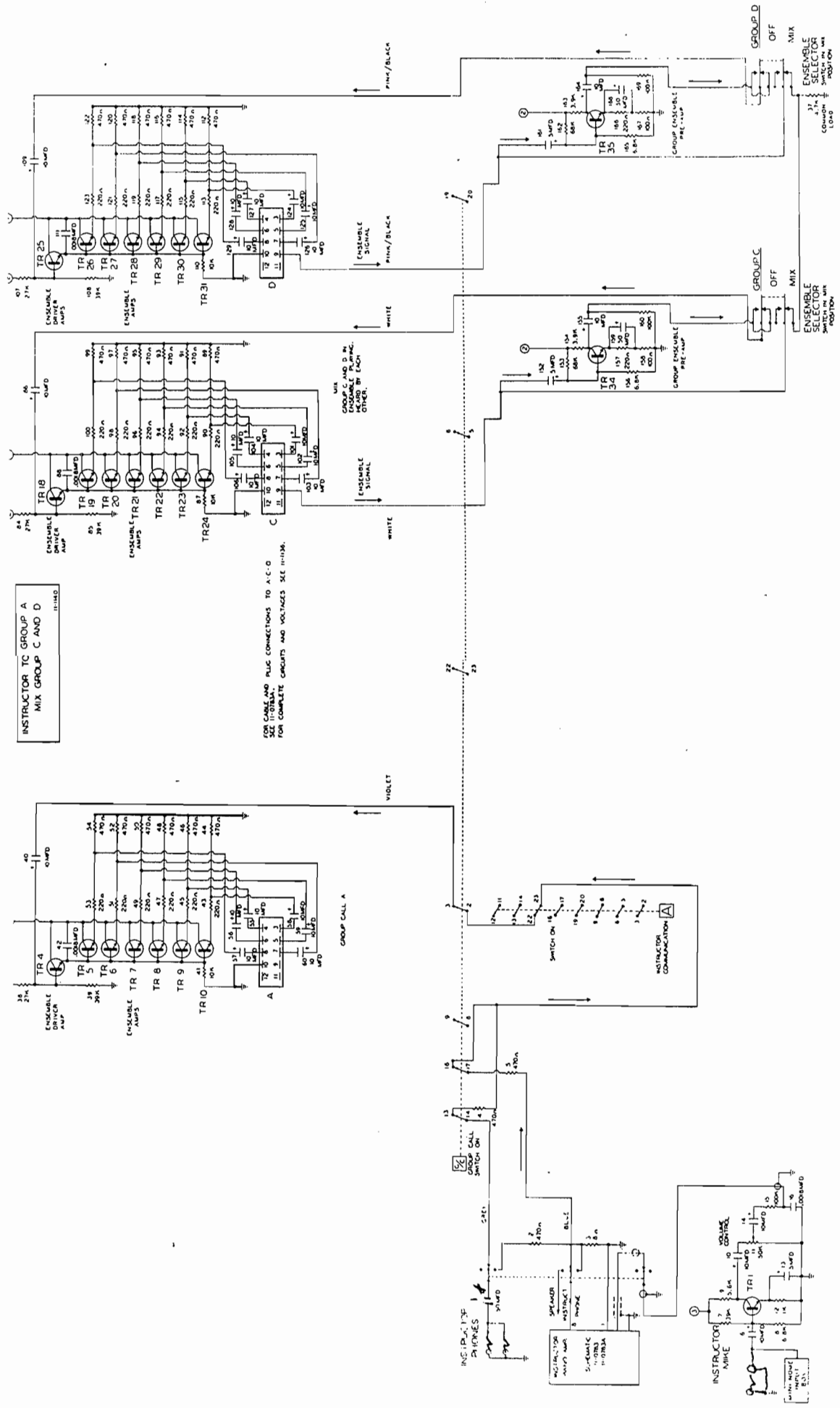


ENSEMBLE  
GROUP A AND INSTRUCTOR  
GROUP C NO INSTRUCTOR  
11-1139

FOR CABLE AND PLUG CONNECTIONS TO A-C  
SEE PART 11-1139.  
FOR COMPLETE CIRCUITS AND VOLTAGES SEE 11-11336.

INSTRUCTOR  
PHONES  
SCHEMATIC  
11-0783A  
11-0783A  
11-0783A

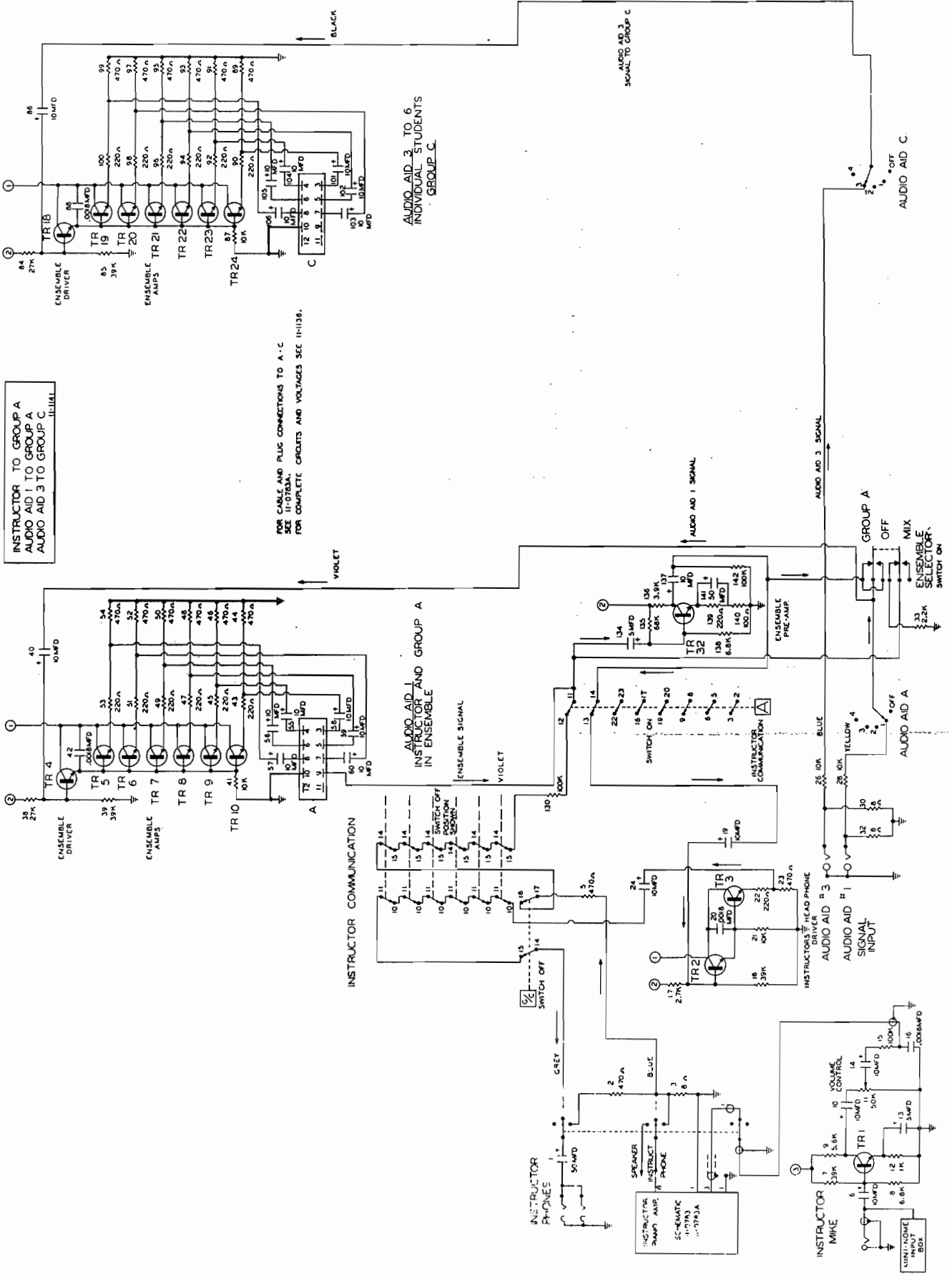
INSTRUCTOR  
MIKE  
MIKE VOLUME  
CONTROL  
11-0783A  
11-0783A  
11-0783A



INSTRUCTOR TO GROUP A  
MIX GROUP C AND D

FOR CABLE AND PLUG CONNECTIONS TO A.C. D  
SEE 11-0181A  
FOR COMPLETE CIRCUITS AND VOLTAGES SEE 11-1136.

THE WURLITZER COMPANY      DEKALB DIVISION - DEKALB, ILLINOIS  
MODEL - 207                              PART NO. 11-1140 - S-2  
TITLE - COMMUNICATION CENTER SCHEMATIC                      DATE - SEPT. 1, 1969

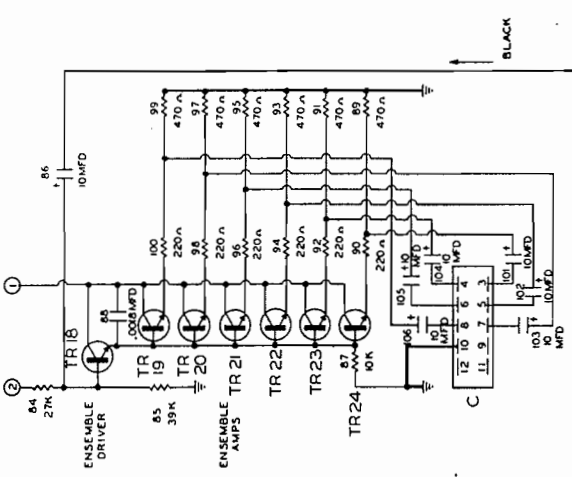


INSTRUCTOR TO GROUP A  
 AUDIO AID 1 TO GROUP A  
 AUDIO AID 3 TO GROUP C  
 ILLI

FOR CABLE AND PLUG CONNECTIONS TO A-C  
 SEE I1-0707A  
 FOR COMPLETE CIRCUITS AND VOLTAGES SEE I1-1138.

AUDIO AID 3 TO 6  
 INDIVIDUAL STUDENTS  
 GROUP C

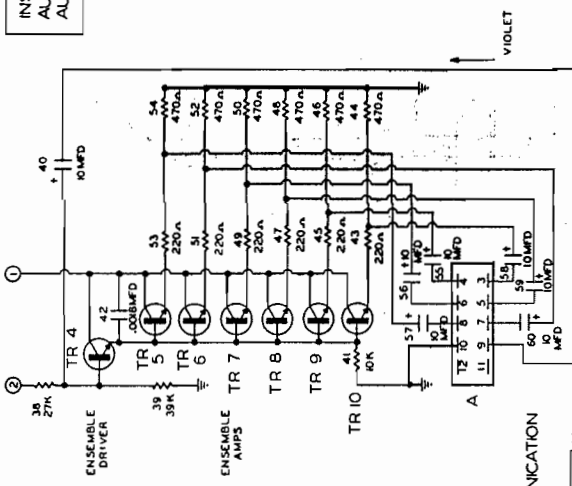
INSTRUCTOR TO GROUP A  
 AUDIO AID 1 TO GROUP A  
 AUDIO AID 3 TO GROUP C



FOR CABLE AND PLUG CONNECTIONS TO A-C  
 SEE 11-073A.  
 FOR COMPLETE CIRCUITS AND VOLTAGES SEE 11-1134.

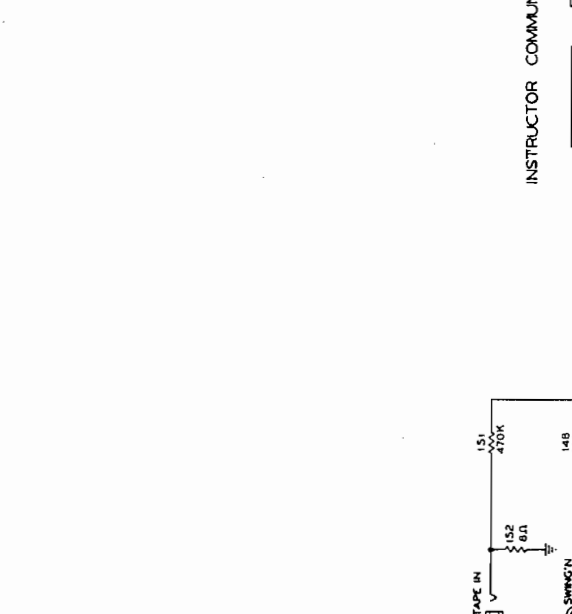
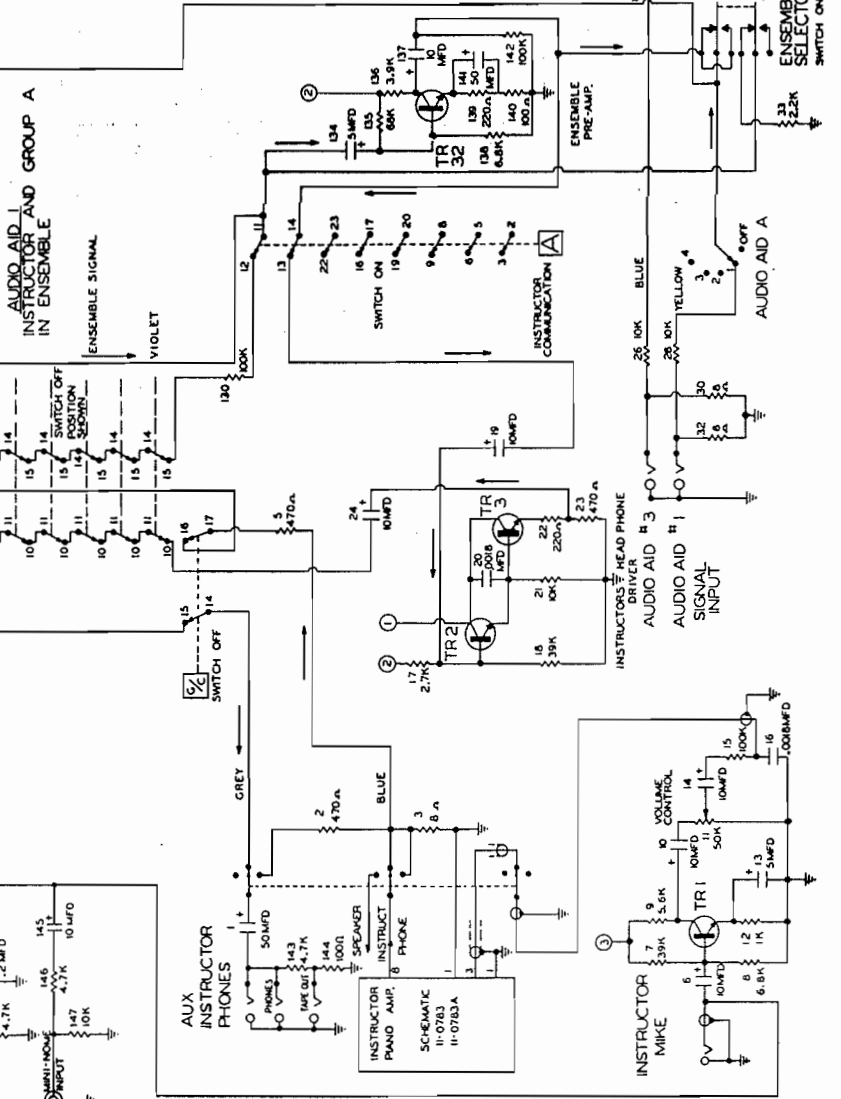
AUDIO AID 1  
 INSTRUCTOR AND GROUP A  
 IN ENSEMBLE

AUDIO AID 3 TO 6  
 INDIVIDUAL STUDENTS  
 GROUP C



INSTRUCTOR COMMUNICATION  
 INSTRUCTOR COMMUNICATION

AUX INSTRUCTOR PHONES  
 INSTRUCTOR PIANO AMP.  
 SCHEMATIC 11-0783A  
 11-0783A



INSTRUCTOR MIKE  
 VOLUME CONTROL

MODEL 207  
 COMMUNICATIONS CENTER SCHEM. OVERLAY  
 THE WURLITZER COMPANY - DEKALB DIVISION - DEKALB, ILL.  
 PART NO. 202822-3-1-E-5  
 DATE: 8-1-73

**SECTION III**  
**INDEX OF SCHEMATICS FOR**  
**SERIES 200A / B ELECTRONIC PIANOS**

CIRCUIT DESCRIPTION . . . . .	64-65-66
MODEL 200A AMPLIFIER P. C. BOARD (LATE PRODUCTION) . . . . .	67
MODEL 200A AMPLIFIER SCHEMATIC (LATE PRODUCTION) . . . . .	68
MODEL 200A AMPLIFIER P. C. BOARD (EARLY PRODUCTION) . . . . .	69
MODEL 207 COMMUNICATIONS SCHEMATIC . . . . .	70
MODEL 206A, 207 P. C. BOARD – MODEL 214A P. C. BOARD . . . . .	71-72
OUTPUT CONNECTION SCHEMATIC . . . . .	73-74
MODEL 200B SCHEMATIC . . . . .	80-81

NOTE: SCHEMATICS FOR 205 VA SAME AS 207

## AMPLIFIER — DESCRIPTION OF MODELS 200, 203, 206, 207 AND 270

The 200 Series Amplifier consists of six basic sections which are as follows: low voltage power supply, low voltage regulator, high voltage polarizing supply, pre-amp, vibrato modulator, vibrato oscillator, and power output stage. (Refer to Schematic Drawing #11-0783) (201904-S-1-E-1).

The low voltage power supply is a conventional full wave rectifier design consisting of power transformer, rectifier D-2 and D-3, and a filter capacitor C-6. The supply delivers 42 volts positive in respect to ground to both the output stage and the input of the low voltage regulator.

The voltage regulator consists of a pass transistor TR-6, a voltage sensing transistor TR-5, and associated stage resistors and capacitors. This regulator maintains a 15.5 ( $\pm 20\%$ ) positive voltage output with a minimum amount of voltage fluctuation and AC ripple.

The reed pickups, mounted on the reed bar are 160 to 170 volts DC above ground. This is a polarizing voltage used to develop a capacitive type input signal pickup. A power transformer step-up winding, D-1, R-2, R-3 and R-5, C-3 and C-4, form this high voltage polarizing supply. It is a half wave rectifier followed by a filter network and bleeder resistor. Because R-56, is in series with the output, the supply can deliver only a very small amount of current to the reed bar, minimizing shock hazard.

### INPUT AMPLIFIER

TR-1, TR-2 and TR-3 is a high impedance low level AC amplifier with a low frequency modulator input.

TR-1 is an emitter follower, matching the high impedance of the reed bar to the lower impedance of the voltage amplifier of TR-2 and TR-3. The gain of TR-2 and TR-3 is controlled via R-36 and R-40.

With an input of 60 millivolts at 1 KHz, adjust R-48 for an AC voltage of 4.75 volts at the output of the amplifier with an 8 ohm, 10 watt load and with the volume control on maximum.

### MODULATOR

TR-4 and associated components form a twin T oscillator, with R-32 selected for a vibrato frequency of 5.75 Hertz. The output of the low frequency oscillator is coupled to the AC feedback of TR-2 and TR-3 of the input amplifier via R-54, C-53, R-42 and C-46. The AC feedback is in effect shorted to ground at the tremolo rate, and thus the signal from the reed bar is amplitude modulated.

The percent modulation should be approximately 50%. This is measured with an oscilloscope;

recording the maximum peak to peak voltage and the minimum peak to peak voltage; and use the following equation:

$$\% \text{ Mod} = \frac{E_{\text{max}} - E_{\text{min}}}{E_{\text{max}} + E_{\text{min}}} = 50\%$$

### OUTPUT AMPLIFIER

The output amplifier stage comprises transistors TR-7, TR-8, TR-9 and TR-10. These transistors are directly coupled together, however, the speaker is capacitor coupled (C-9) to the output load.

The output circuit of this amplifier is a complementary pair of output transistors (TR-9 - NPN, TR-10 - PNP). TR-8 represents a Class A driver stage. The voltage drop across R-10 and D-4 provides the small amount of forward bias required for Class AB operation of the complementary pair of output transistors. The diode D-4 is to maintain the quiescent bias current at a reasonable value with variations in temperature and is thermally connected to the output transistors heatsink; and thus will track with the base emitter voltage of the output transistors. Because of the simple design, the output power is limited to approximately 10 - 15 watts. At higher power levels, TR-8 (the Class A driver) would dissipate considerable heat and the power supply would have to be upgraded.

Capacitor C-9 performs two functions. First, it blocks the positive 26 volts present at the emitters of TR-9 and TR-10 from the 8 ohm speaker load. Second, it acts as a bootstrap capacitor to provide the drive necessary to pull TR-10 into saturation. This function results from the fact that the stored DC voltage of the capacitor with reference to the emitter junctions of TR-9 and TR-10 provides a higher negative voltage than the normal collector-supply voltage to drive transistor TR-10. This higher voltage is necessary during the signal conditions that exist when TR-10 is being turned on, and its emitter voltage is approaching ground. An increase in the base voltage to a point below this level is required to drive TR-10 into saturation.

TR-7 is a voltage amplifier to drive TR-8.

Resistor R-14 provides the necessary AC and DC feedback to maintain the emitter junctions of TR-9 and TR-10 at approximately one half the supply voltage, to reduce distortion and to improve low-frequency performance.

Selectable resistor R-23 is chosen for initially setting the DC voltage at the emitter of TR-9 and TR-10 to  $+26 \pm 3$  volts.

**Vintage Vibe**  
**9 Everment Rd.**  
**Wharton, NJ 07885**  
**917-880-9763**  
**www.vintagevibe.com**

**MODELS 200A, 205VA, 206A, 207VA, 214A, 214VA &  
215VA**

**Schematic: 203720**

**ELECTRONIC PIANO AUDIO AMPLIFIER**

**1. General Description**

The basic Electronic Piano Amplifier pc. board assembly contains a 20 watt power amplifier, vibrato circuit, low level amplifier for microphone or magnetic phonograph cartridge, voltage amplifier capable of driving external auxiliary amplifiers such as used by performers, high impedance preamp for reed voltage pick-up, and all necessary power supply circuitry. It requires a power transformer, and volume, vibrato and auxiliary volume controls as auxiliary equipment.

Three assemblies are provided for, which add or delete circuit features according to the requirements of the end product. These are as follows:

203721 — Used in 214A, 214VA, and 215VA models and contain vibrato, microphone amplifier, and auxiliary output circuitry.

203722 — Used in 205VA, 206A and 207A models, and is the same as 203721 except without vibrato and auxiliary output circuitry.

203730 — Used in 200A model, and is the same as 203721 except without the microphone amplifier circuitry.

There are four d.c. voltages supplied. A bridge rectifier circuit supplies + and -24 volts for the power output stage. A 14 lead integrated circuit package provides +14.5 volts regulated for all low voltage requirements. A separate transformer winding is required for a half-wave rectifier circuit which provides 147 volts required as polarizing voltage for the reed bar pick-up.

The high impedance preamp, which is connected to the reed pick-up consists of two direct coupled small signal NPN transistors, TR-1 and TR-2. The input impedance is controlled principally by R3 in parallel with the input impedance of the transistor. A small signal diode, D1, is connected from base to ground in reverse polarity as protection against voltage transients if the pick-up is shorted to ground. Protection against radio frequency interference is provided by shunt capacitor C-1, and collector-base feedback capacitors C-3 and C-4.

The reed bar signal is modulated by inserting the vibrato voltage into the feedback loop of the high impedance preamp. A divider is formed by the feedback resistor R-10, and the light dependent resistor of LG-1. The L.D.R., in conjunction with the light emitting diode in the same package, creates a variable leg in the feedback divider and makes possible amplitude modulation of the reed bar

voltage. On models not requiring vibrato a 12K resistor, R57, is connected across terminal 1 and 2 on the preamp board.

The vibrato circuit consists of two direct-coupled transistors TR-3 and TR-4, with a band-pass feedback circuit. The circuit will oscillate at approximately 6 Hz. An adjustable control, R-17, is provided for adjusting the depth of vibrato modulation.

A low level preamp is provided for applications requiring a microphone, magnetic phonograph pick-up or similar equipment. It consists of two direct-coupled transistors, TR-5 and TR-6. A shunt disc capacitor, C20, is used to protect against direct pick-up of radio signals, and high frequency rolloff is provided with the capacitor, C21. Because the amplifier is intended to provide for general application of inputs, no particular frequency compensation is provided.

On models that require a signal to drive an auxiliary amplifier, a two transistor direct-coupled stage with feedback consisting of TR-15 and TR-16 is provided.

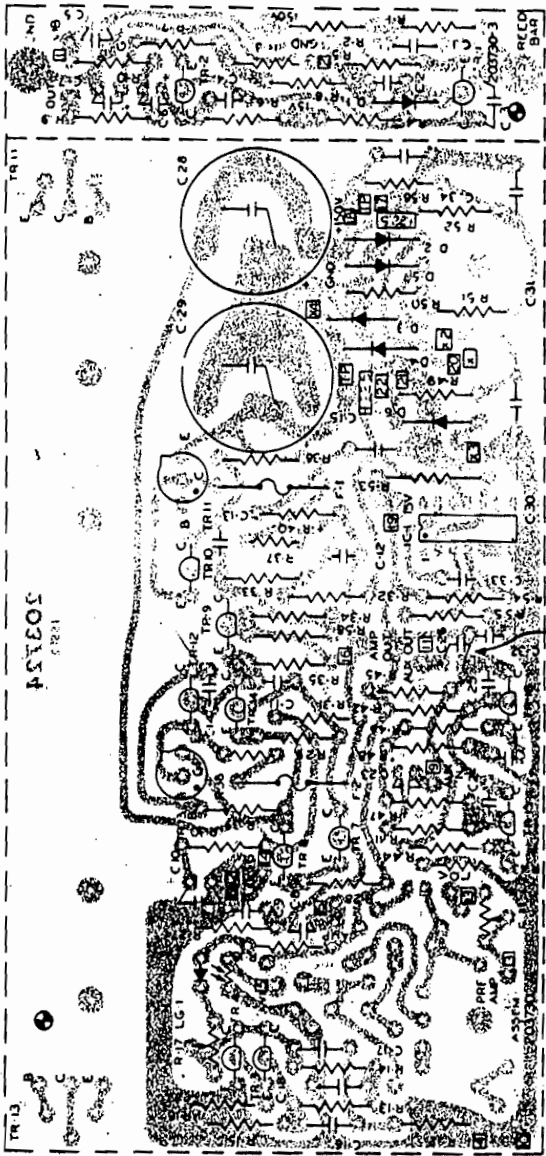
The signal input is coupled to TR-7 (one-half of the differential amplifier stage) via C-8. The other half of this stage, TR-8, monitors the final output level via R-31. Since the emitters are wired in common, the conduction of TR-8 will affect the conduction of TR-7 (positive feedback); the collector of TR-7 feeds the base of TR-11, the predriver stage.

The predriver stage signal is fed to the bases of the complimentary drivers: TR-12 driver and TR-10 driver (via TR-9 bias control). The bias circuit controls the driver and output stages so that as one of the sets of transistors begins to turn off, the other begins to turn on; eliminating crossover distortion in the final output signal (keeping the final output transistors slightly turned on, class AB).

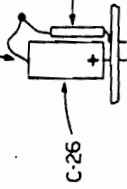
The bias control circuit, TR-9, is a constant current source; its base emitter diode junction is used as a reference voltage. If too much current passes through resistor R-35 and exceeds the threshold of the base emitter junction of TR-9 (.7V), the transistor will turn on more, reducing the excessive current through R-35, establishing the stable bias current in the driver and output stage transistors. R-38 should be tailored for approximately 10 MA output bias or 4.7 millivolts across R-37 or R-38 with the speaker disconnected. The driver stages TR-12 and TR-10 feed the final power output transistors, TR-13 and TR-11, respectively, which are wired in push-pull. The signal from the collector of TR-13, via R-38 and fuse F-2 and the signal from the collector of TR-11, via R-37 and fuse F-1, are both wired in common to form the output stage. A portion of the output is fed back to TR-8 via R-31, to provide negative feedback which increases frequency response, lowers distortion, minimizes DC offset voltage.

The audio output amplifier is of a quasi complementary design. The driver transistors provide the necessary phase inversion for the output transistors. The collector current of the driver transistor becomes



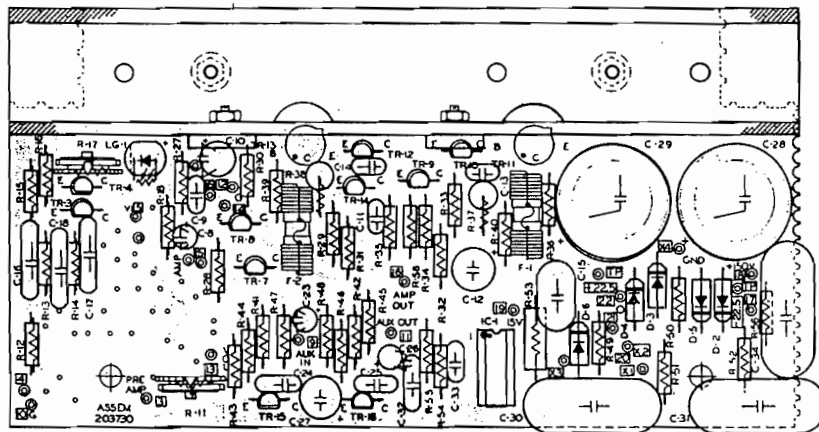
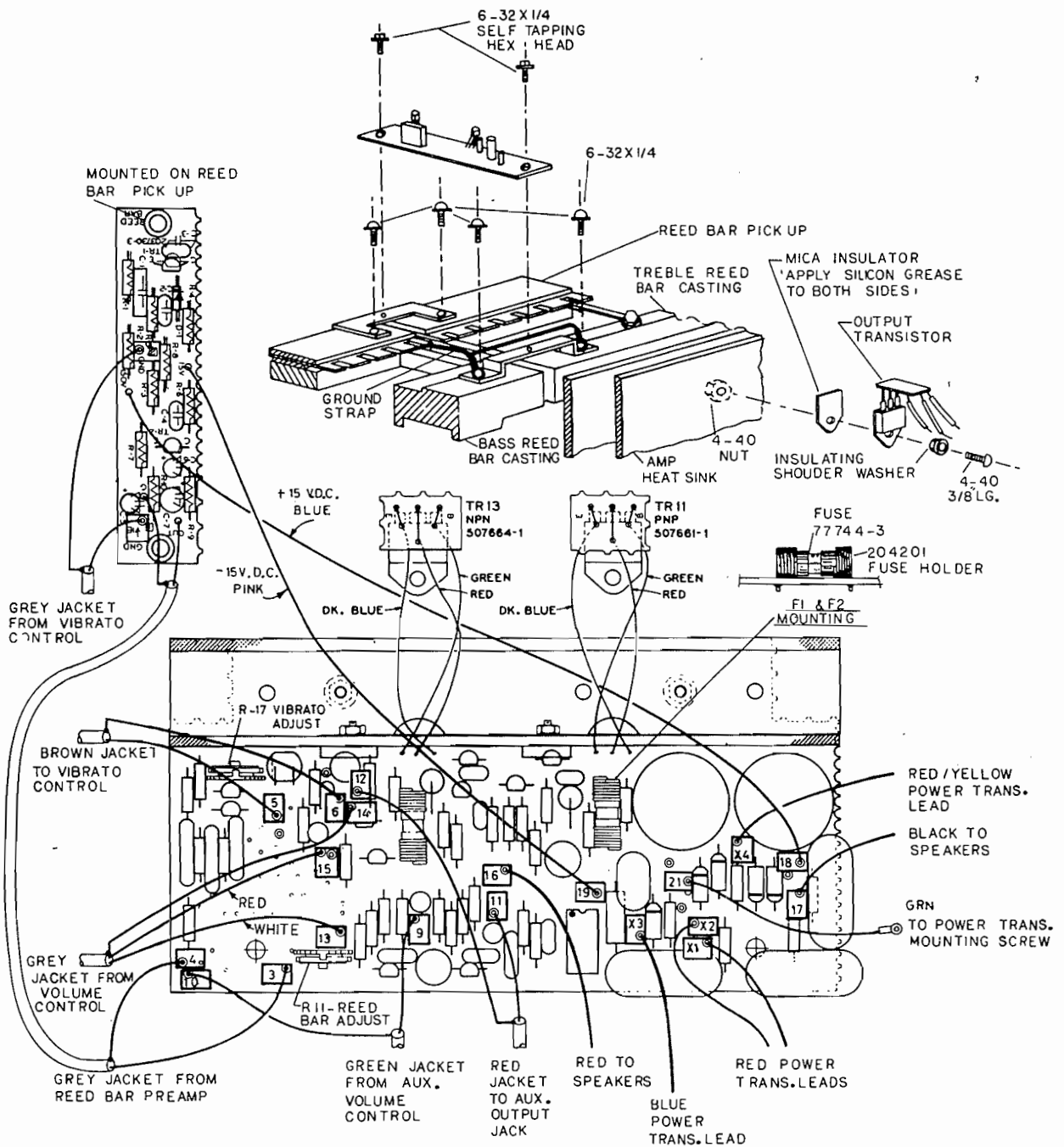


MOUNTING DETAIL

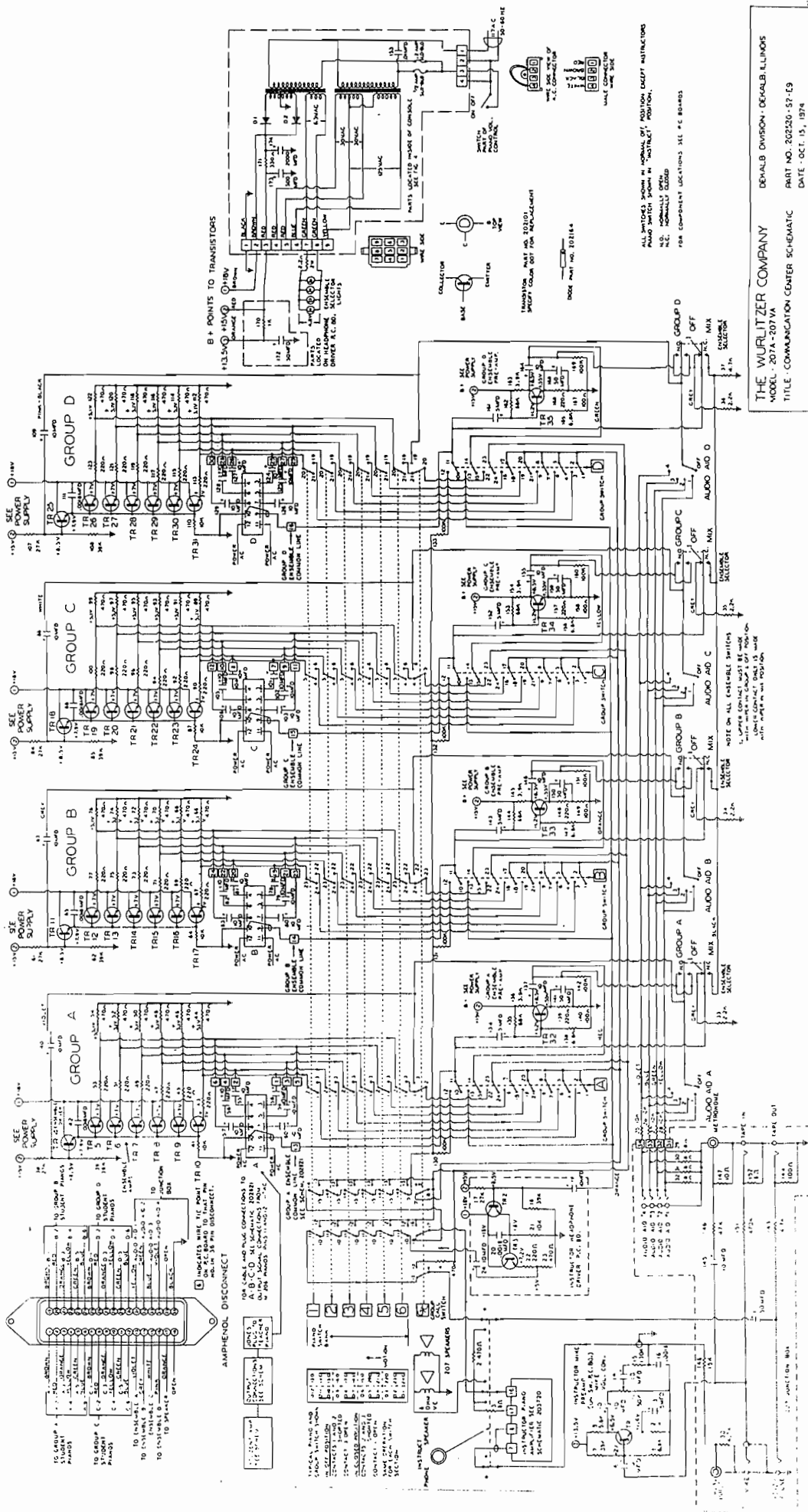




**Vintage Vibe**  
 9 Everment Rd.  
 Wharton, NJ 07885  
 917-880-9763  
 www.vintagevibe.com



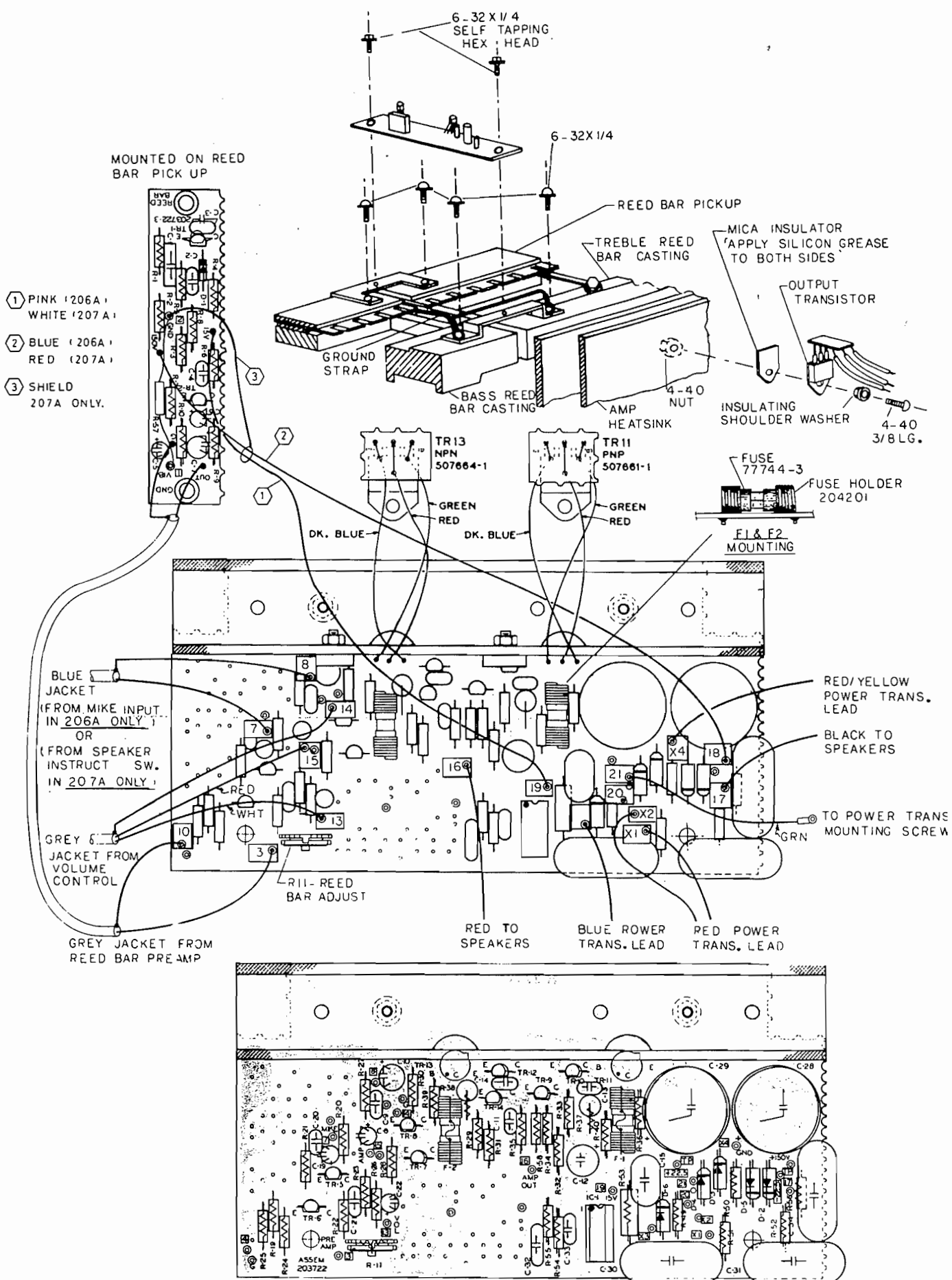
**MODEL 200A ELECTRONIC PIANO**  
 AMPLIFIER P.C. BOARD ASSEMBLY  
 PART NO. 203730-S1-E6  
 EARLY PRODUCTION



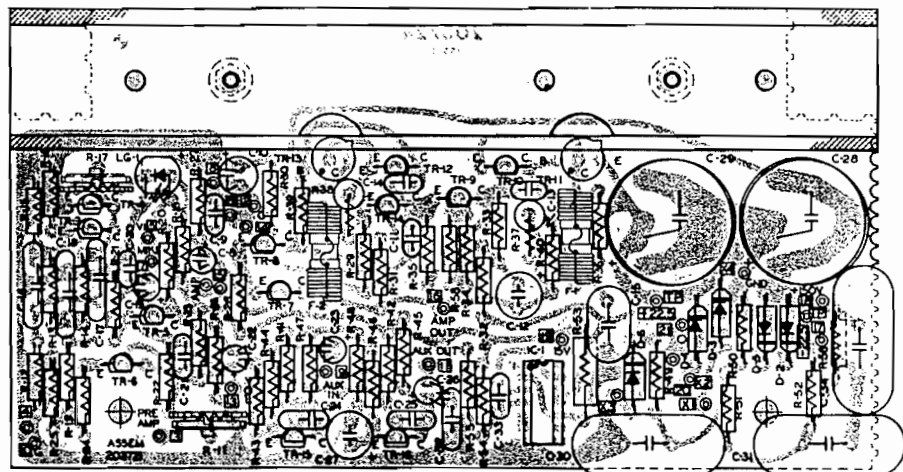
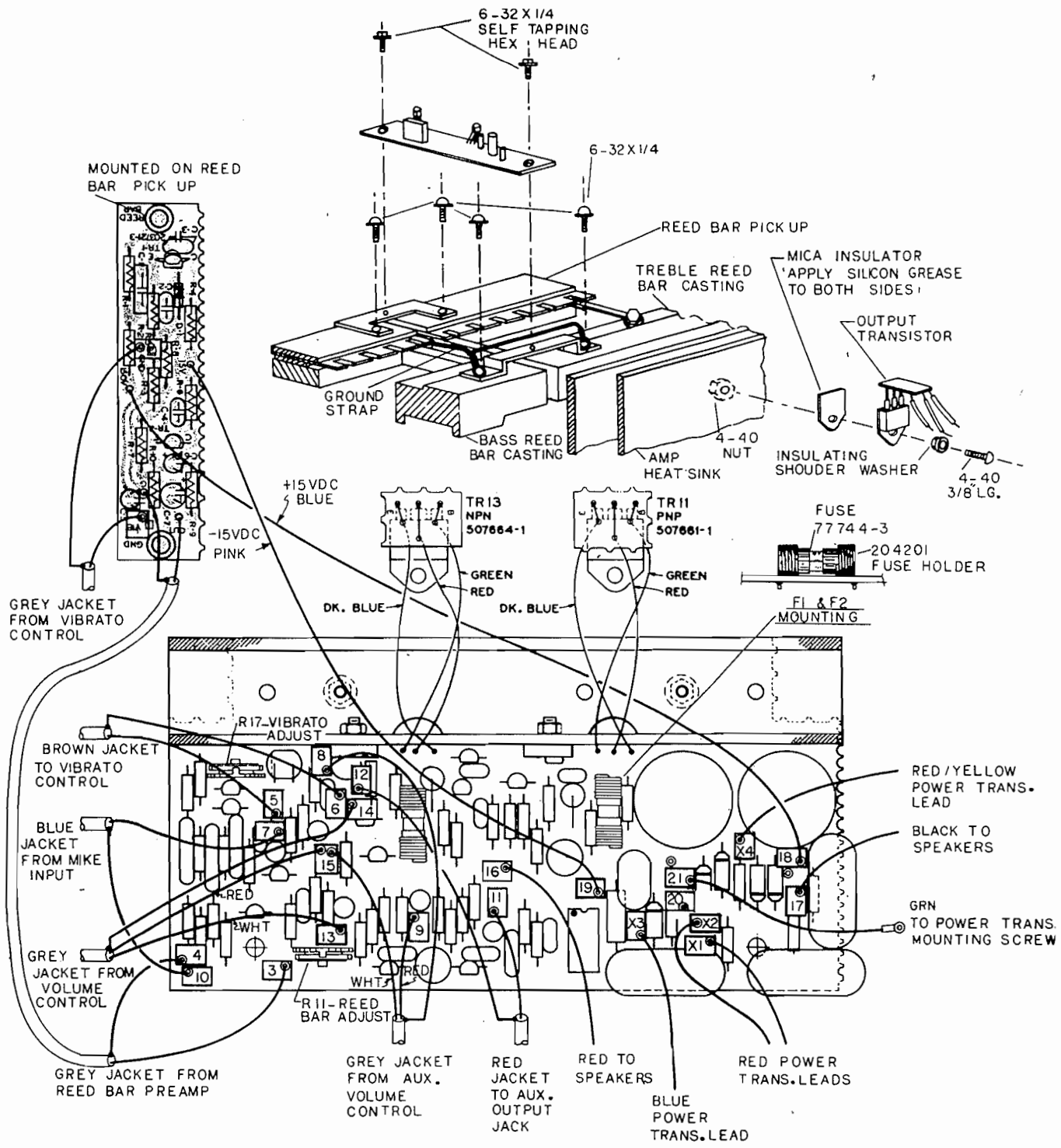
B+ POINTS TO TRANSISTORS

ALL SWITCHES SHOWN IN NORMAL OFF POSITION EXCEPT INSTRUCTIONS. AUDIO SWITCH SHOWN IN "MUSIC" POSITION. S.C. NORMALLY CLOSED FOR COMPONENT LOCATIONS SEE P.C. BOARDS.

THE WURLITZER COMPANY  
 MODEL - 207A-207VA  
 TITLE - COMMUNICATION CENTER SCHEMATIC  
 DEKALB DIVISION - DEKALB, ILLINOIS  
 PART NO. 202230-57-E9  
 DATE - OCT. 15, 1974

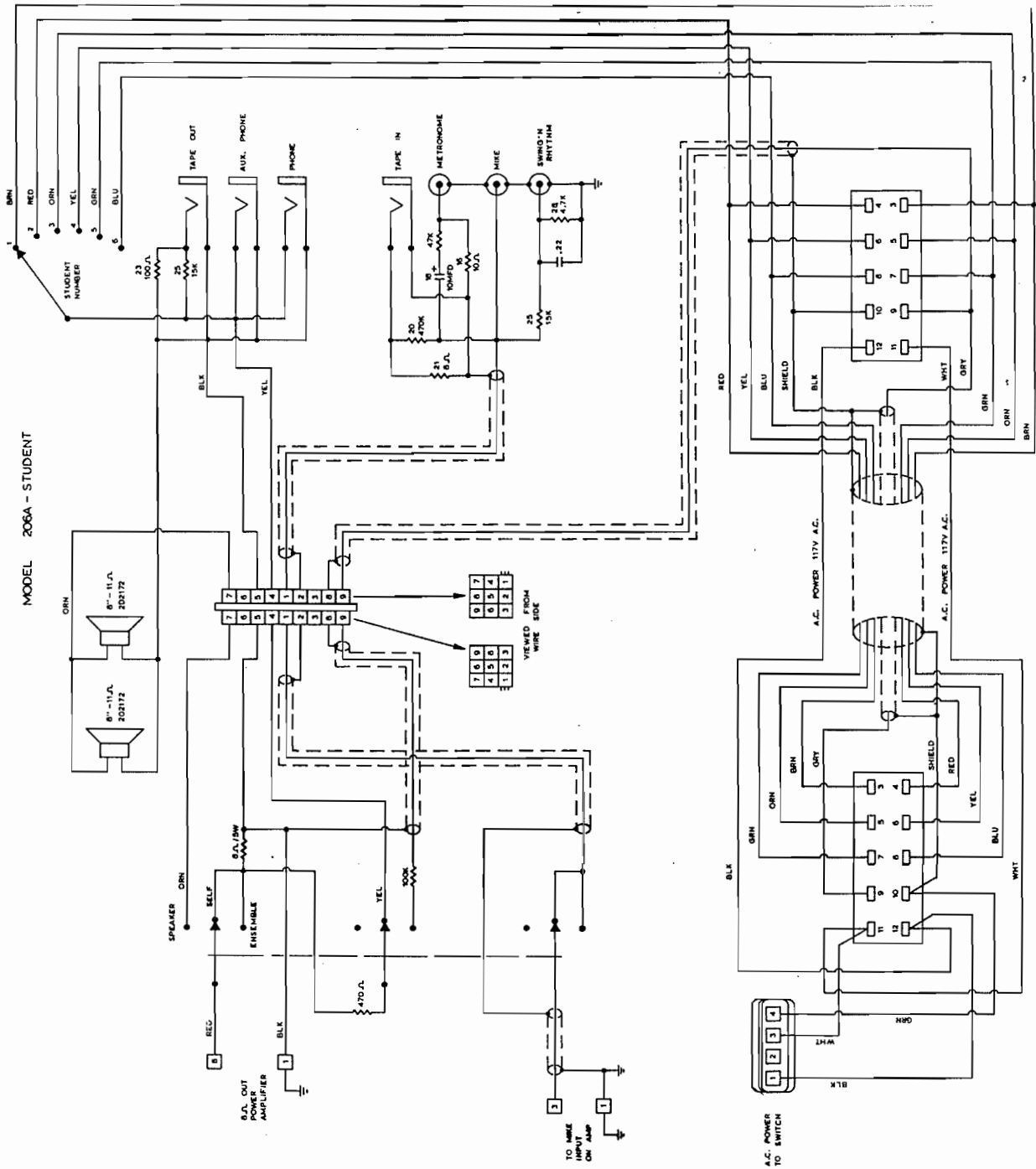


MODEL 206A , 207A ,207VA  
 ELECTRONIC PIANO  
 AMPLIFIER P.C.BOARD ASSEMBLY  
 PART NO. 203722-S1-E6



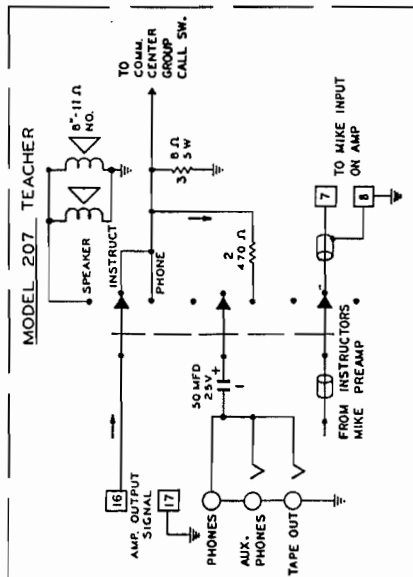
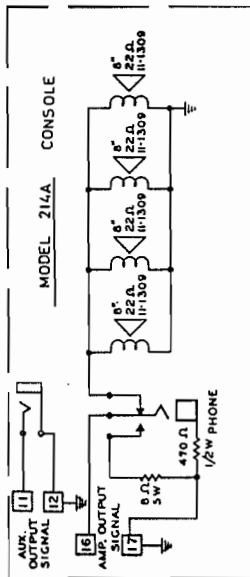
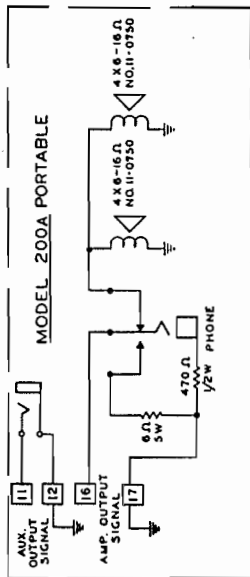
**MODEL 214A & 214VA ELECTRONIC PIANO**  
**AMPLIFIER P C BOARD ASSEMBLY**

MODEL 206A - STUDENT

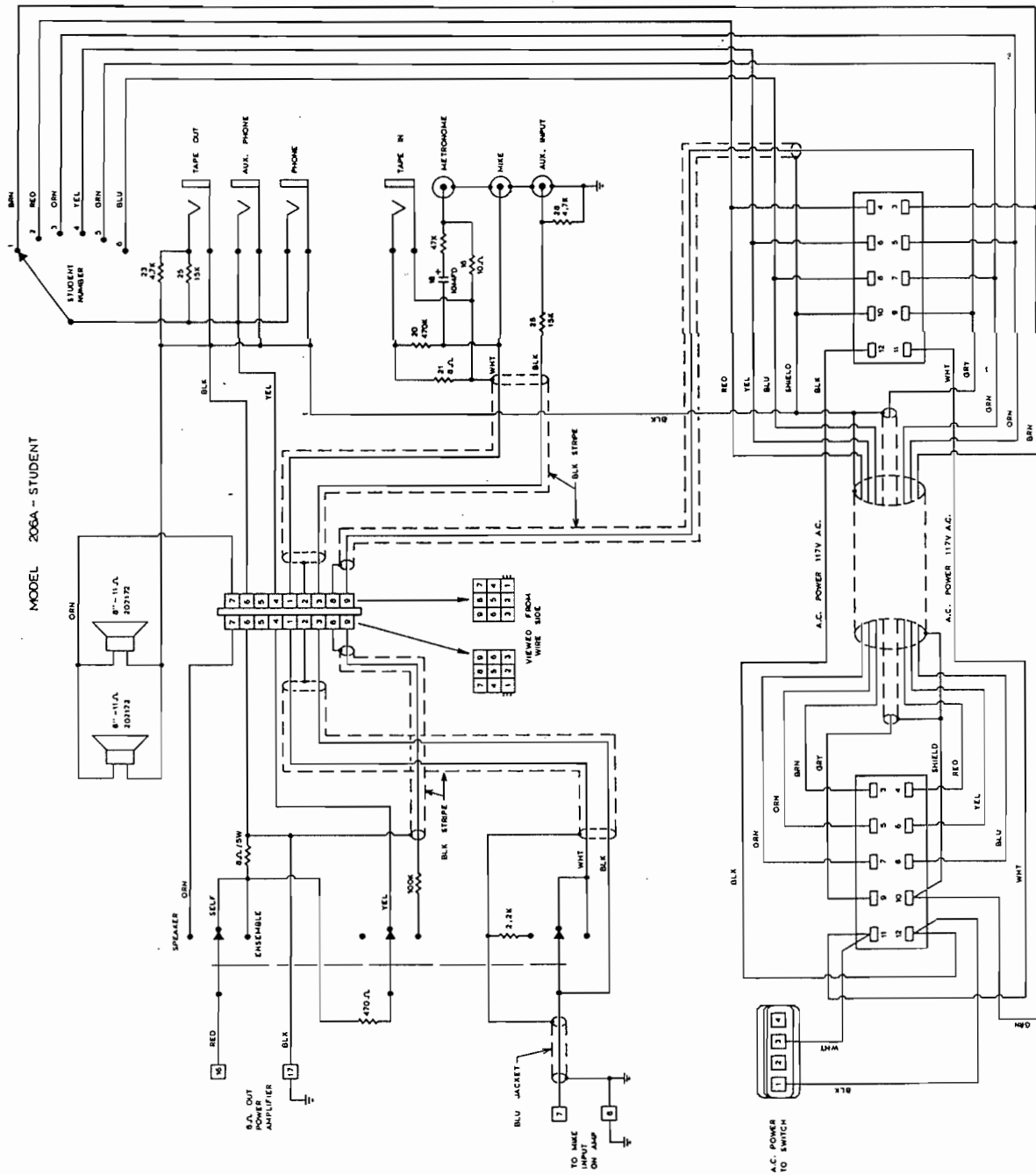


NOTE : EARLY VERSION  
MULTIPLY PART NO. BY 100  
MODEL 206A, 207, & 214A  
SEE PAGE 74

OUTPUT SIGNAL CONNECTIONS  
MULTIPLY PART NO. BY 100  
MODEL 206A, 207, & 214A  
PART NO. 208211-61-65



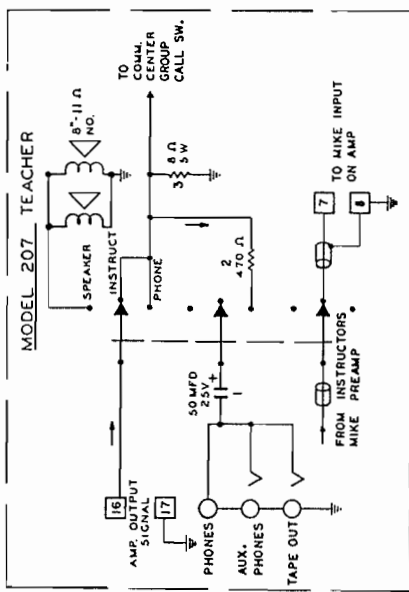
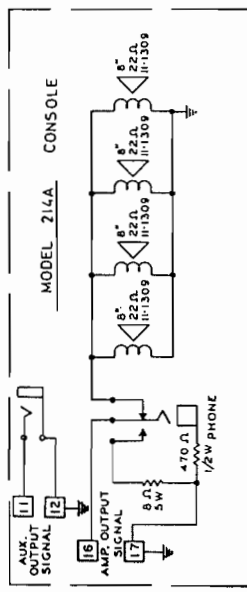
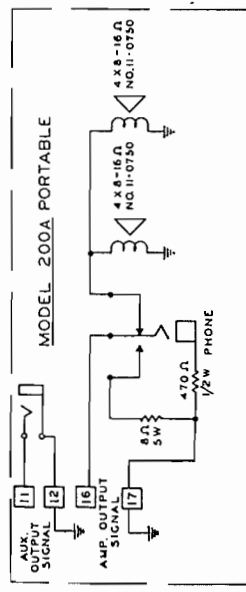
MODEL 206A - STUDENT



NOTE: LATE VERSION,  
FOR EARLY VERSION  
SEE PAGE 73

OUTPUT SIGNAL CONNECTIONS  
ELECTRONIC PHONO  
PART NO. 204432-27 & 214A  
PART NO. 204432-23

TO CHASSIS  
GROUND  
SCREW





# SERVICE PARTS LIST

## For Consumer and Professional Electronic Pianos:

### DESCRIPTION

### PARTS NO.

#### FUSES

EP 200 Speaker Fuse 1 Amp Slo blo pig tail	077055-017
EP 200A Speaker Fuse 1.5 Amp Mini Fuse	077744-002
EP 203 Speaker Fuse 1.5 Amp Slo Blo pig tail	077055-20
EP 270 Speaker Fuse 2 Amp Mini Fuse	077744-003
EP 200 - 200A - 270 0.5 Amp	077670-008

#### PARTS FOR CASE

Top EP 200 beige	201846
Top EP 200 Black	201846-002
Top EP 200A black (no speakers)	204507
Top EP 200A black (with speakers)	204507-001
Control Panel	201845
Leg plate	202235
Leg up	202249
Leg ip	202251
Leg Kit Set of 4 legs	202248
Foot for Leg	MP 909
Pedal Assembly complete	202253
Pedal Cable assembly	202265
Pedal Return Spring	201832
Pedal Spring	202264
Cable Adaptor	202266
Music Panel	201852
Music Panel Bolts	201842-001
Music Panel Screw	
Black Screw	073650-097
Black Washers	201762
A.C. Power Cable USA	206541
A.C. Power Cable Europe	206578
A.C. Power Socket USA	201829
A.C. Power Socket Europe	206580
Pilot Light	201805
Pilot Light Assembly	201804

#### PICK-UP AND REED BAR

Bass Reed Bar Assembly	201788
Treble Reed Bar Assembly	201789
Reed Screw	201890
Pick-up 1 - 20	201880
"    21 - 32	201881
"    33 - 42	201892
"    43 - 64	201893
"    Spacer 1 - 20	201878
"    Spacer 21 - 32	201879
"    Spacer 33 - 64	201891
Insulater Bushing	201884
Solder Lugs	201888
Knobs Volume and Vibrato - Control	201850

# SERVICE PARTS LIST

## For Educational Products Electronic Pianos — supplement

### DESCRIPTION

### PARTS NO.

#### P.C. BOARD COMPONENTS — earlier (non-"A" Series)

Transistor — 1, 2, 3, 5, 6	202718
Transistor — 4	202053
Transistor — 7	202054
Transistor — 8	202055
Transistor — 9	202056
Transistor — 10	202057
Diode — 1, 2, 3, 4	202050
Diode — 5, 6	202049
Resistor (2.7 ohm @ 1W)	74365-32
Resistor (.68 ohm @ 5W)	74450-2
Resistor (12 ohm @ 2W)	74502-32
Resistor (200 ohm @ 5W)	74823-2

#### P.C. BOARD COMPONENTS — 'A' Series

Transistor — 1, 2, 5, 6, 15 (NPN)	142083-3
Transistor — 7, 8 (PNP)	142128-1
Transistor — 9 (NPN)	137159-1
Transistor — 4, 10 (NPN)	203719
Transistor — 11 (PNP)	507661-1
Transistor — 12 (PNP)	203718
Transistor — 13 (NPN)	507664-1
Transistor — 14 (PNP)	203719
Diode — 1 (small signal)	142136-5
Diode — 2, 3, 4, 5	142350
Diode — 6	202050
Fuse (miniature) — F1, 2	77744-3
I.C. Voltage Regulator	142349
Reed Bar Adjustment Pot	203717-1
Linear Gate	142312
Volume Control — auxiliary output	203755
Resistor — flame proof (4.7 ohm @ 1W)	77536-251

#### NEW HEADSETS

Instructor's Headset with Microphone	204648
Student's Headset with Microphone	204649

#### HEADSETS — Telex series 1209

Headset Cord — straight (student pianos)	MP 900
Headset Cord — straight (teacher pianos)	MP 901
Headset Cord — coiled (student pianos)	MP 986
Headset Cord — straight - 30' (teacher pianos)	MP 905
Earphone Cushion	MP 902
White Plastic Tip	MP 1014
Headset Headband	MP 1015
Headset Cord Retaining Staple	MP 1037

# SERVICE PARTS LIST

## For Educational Products Electronic Pianos — supplement

### DESCRIPTION

### PARTS NO.

#### CONSOLE COMPONENTS

Pedal (gold or silver)	201743
Pedal Cable Assembly	201744
Stop Connector	201745
Pedal Spring	201832
Piano Foot (for 206 & 207 ONLY)	202079
Piano Foot (206A ONLY)	202518
Caster Leg (for 207V, 214, 214V & 215V ONLY)	201753-2
Locking Caster	201754
Music Panel (gold or silver)	201852
Speaker — 6" x 9" Chassis mounting	202243
Speaker — 6" x 9" Top mounting	204466
Speaker — 8" round (for 214 ONLY)	201756
Speaker — 8" round (for 207 & 206 ONLY)	202172
Speaker — 8" round (for ALL 'A' series models)	204582
E.P. Top — black or bronze/green (for 214, 214V & 215V)	201846
E.P. Top — 206 beige	202530
E.P. Top — 207 beige	202178
Control Plate for 214's	201906
Control Plate for 206's	202529
Rubber Grommet	201712
Bench Leg Plate	202235
Leg Kit for Bench (4 packed)	202728
Bench Leg — non adjustable	202729
Bench Leg — adjustable	202730
Leg Glide — non adjustable	MP 903
Leg Glide — adjustable	MP 904

#### CONTROL COMPONENTS

ON/OFF Volume Control (207)	202129
ON/OFF Volume Control (206 & 214)	201814
ON/OFF Volume Control (207V & 205VA)	203643-002
ON/OFF Volume Control (206A, 214A, 214VA & 215VA)	203643-001
Mike Volume Control	202131
Phones/Instruct/Speaker Control	202134
Self/Ensb/Speaker Control	202553
Vibrato Control	201812
Control Knob (for 206, 214, 214V & 215V models)	201850
Control Knob (for 207 & 205V models)	202140
Piano Select Switch	202549
Select Switch Knob	201980

#### ELECTRONIC POWER SUPPLY COMPONENTS & SUB-ASSEMBLIES

P.C. Board — Amplifier (ALL pre 'A' series)	201808
P.C. Board — Amplifier (214A, 214VA & 215VA)	203721
P.C. Board — Amplifier (206A, 207V & 205VA)	203722
Power Transformer (ALL pre 'A' series)	201807
Power Transformer (ALL 'A' series)	203716
Fuse — 1/2 Amp Slo Blo	77055-12
Fuse — 2/10 Amp Slo Blo (207V & 205V ONLY)	77055-7

# SERVICE PARTS LIST

## For Educational Products Electronic Pianos — supplement

### DESCRIPTION

### PARTS NO.

#### HEADSETS — Telex series 500

Headset Cord — straight (teacher piano)	MP 1032
Headset Cord — coiled (student pianos)	MP 1035
Earphone Cushion	MP 1029
Front Plate (for mounting of speaker)	MP 1030
Headset Speaker	MP 1031
Boom Microphone Assembly — teacher's headset	MP 1033
Boom Microphone Assembly — student's headset	MP 1036

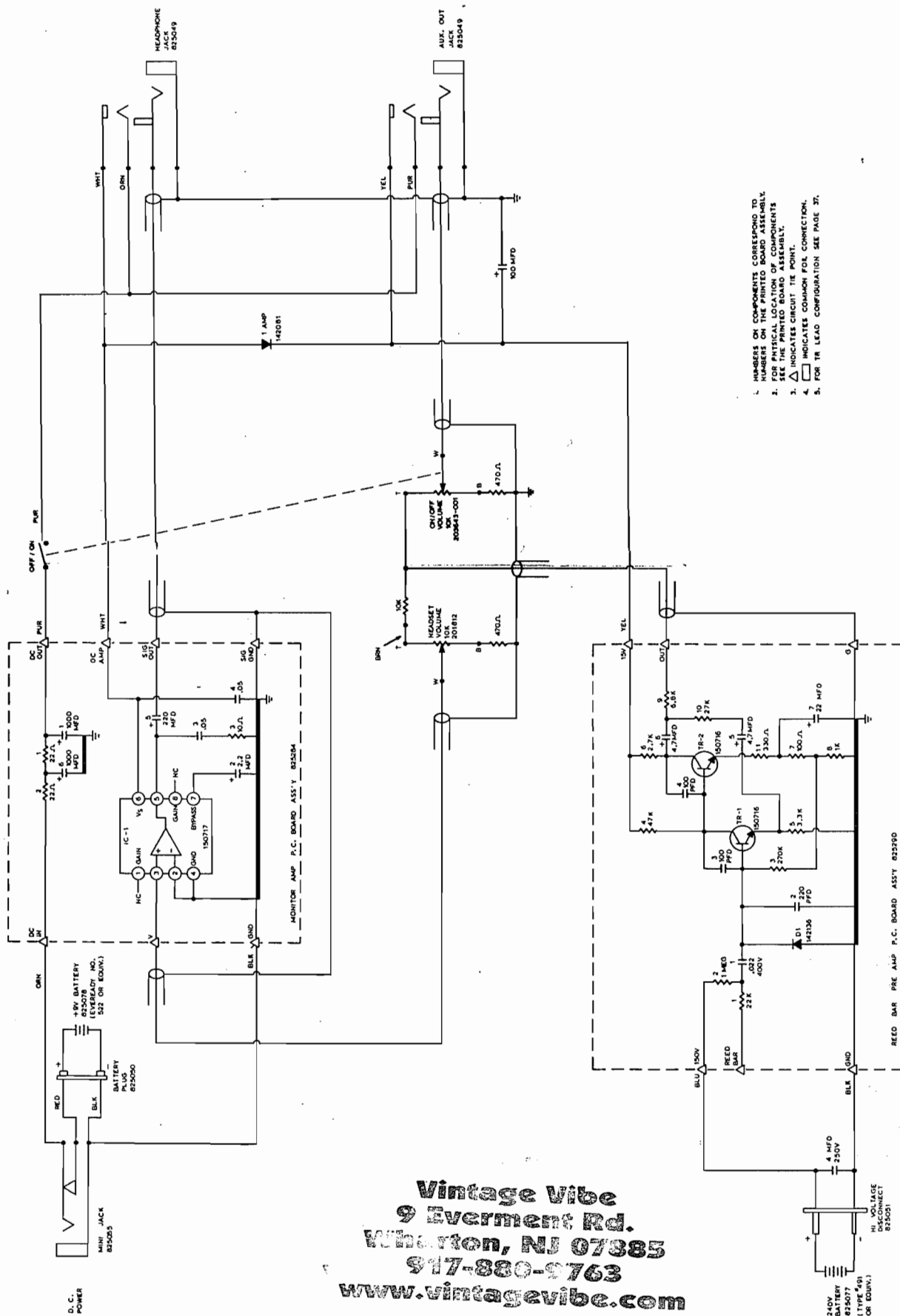
#### REBUILT HEADSETS

Teacher's Headset — 1209 series	MP 1001*
Student Headset — straight cord - 1209 series	MP 1002*
Student Headset — coiled cord - 1209 series	MP 1003*
Teacher's Headset — 500 series	MP 1061*
Student Headset — 500 series	MP 1062*

(\* - requires exchange of defective headset)

#### COMMUNICATIONS CENTER (Models 207, 207V, 207VA & 205VA)

Modular Switching P.C. Board	202111
Communications Transformer	202162
GROUP Switch Module	202122
Group Switch TABS: 'A'	202122-001
'B'	202122-002
'C'	202122-003
'D'	202122-004
'Group Call'	202122-005
INDIVIDUAL Switch Module	202120
Individual Switch TABS: '1'	202120-001
'2'	202120-002
'3'	202120-003
'4'	202120-004
'5'	202120-005
'6'	202120-006
Ensemble Selector Switch	202110
Ensemble Switch Light Bulb	202521
Audio Aids Switch	202096
Audio Aids KNOBS: '1'	202096-001
'2'	202096-002
'3'	202096-003
'4'	202096-004



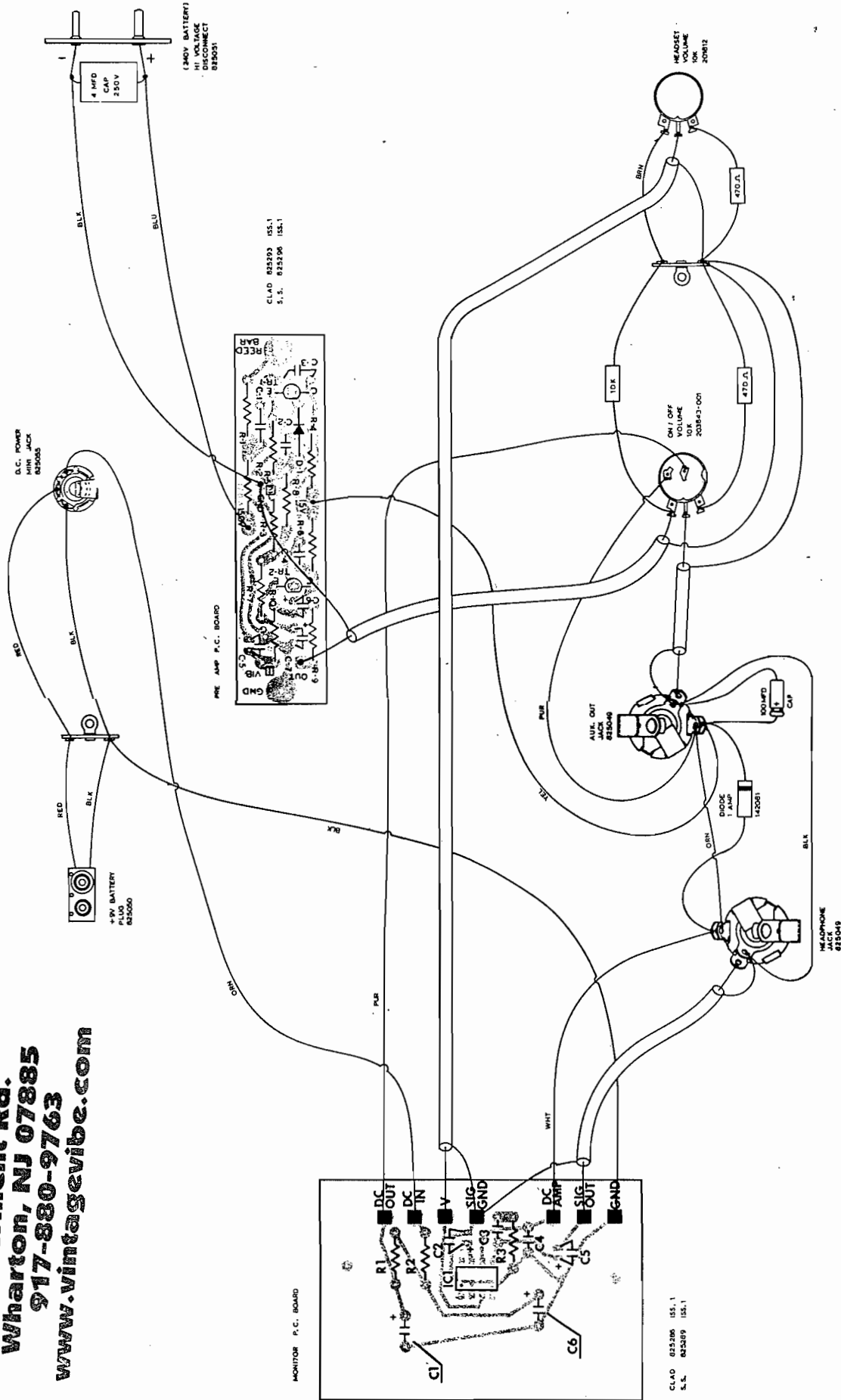
1. NUMBERS ON COMPONENTS CORRESPOND TO NUMBERS ON THE PRINTED BOARD ASSEMBLY.
2. FOR PHYSICAL LOCATION OF COMPONENTS SEE THE PRINTED BOARD ASSEMBLY.
3. □ INDICATES CIRCUIT TO BE DISCONNECTED.
4. □ INDICATES COMMON FOR CONNECTION.
5. FOR TR LEAD CONFIGURATION SEE PAGE 37.

REVISION	ISSUE	C/N	DATE	DRN	INS
DRAWN	2		1-31-81	040001	EB 69

200B  
 MONITOR & PRE AMP SCH.  
 THE WURLITZER COMPANY - De Kalb Illinois 60115  
 6-1-81  
 825298

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 9 Everment Rd.  
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REVISION	ISSUE	C/N	DATE	DRW	CHK
DRAWN	2	L-3137	02/28/81	E	EE

# WURLITZER

## Electronic Piano Notes

Your questions or comments on  
"Electronic Piano Notes" are welcome at any time.  
Issued by Wurlitzer Service Dept., DeKalb, Illinois 60115

Electronic Piano Note No. 23

April 15, 1971

### 200 SERIES AMPLIFIERS

Should a malfunction of the amplifiers be experienced, match the symptom to the items to check.

SYMPTOM	CHECK
1. Dead amplifier (Pilot light does not light)	A
2. Blows line fuse	B, C, D
3. Blows output transistors	J, L, M, N, O, P - See Note #1
4. Distortion	D, E, S
5. Low volume	E, S
6. Static	E, F, H, I, J, K, T
7. Hiss & noise (can control with volume control)	E, G, H, U
8. Hiss & noise (cannot control with volume control)	C, I, J, K, U
9. Hum	C, E, F
10. Tremolo dead	Q, R

- A. AC line fuse open
- B. Shorted rectifiers D-2, D-3
- C. C-6
- D. Shorted output transistors
- E. Cracks or poor solder joints on PC board
- F. Poor ground on input cable
- G. TR-1 (use GE style 11-0778 or 651891 yellow or green)
- H. R-40, R-36, R-45, R-66 (replace with deposited carbon)
- I. R-14, R-7, R-8
- J. C-9

- K. C-18 too close to R-14
- L. R-14 (noisy)
- M. R-10 high in value
- N. D-4
- O. Burr on heat sink puncturing mica washer
- P. Use one mica under output and driver transistors with heat sink compound on both sides
- Q. TR-4
- R. C-53, C-46, D-5
- S. Open or shorted coupling capacitors
- T. Reed striking pickup
- U. TR-5, TR-6

Note #1. Inspect C, J, L and follow P prior to turning piano on after replacement of output TR's.

**Electronic Piano 200A**

Before ordering a new AC power cord for a model 200A, check to see which type of pins is used in the receptacle of your piano. Recently, a new connector has been introduced which features rectangular shaped pins rather than the traditional, round ones. Including the description "round pins" or "square pins" on your parts order will insure the proper type of cord being sent.

Model: 200, 203, 206, 207

Subject: Failure Output Transistor

Reference: Schematic - Piano Amplifier (11-0783)

When called upon to change output transistors in the Electronic Piano, check the following items to insure they are in good functioning order. Check for the following:

C-6	1000 mfd.	50 VDC	Intermittent
C-9	500 mfd.	50 VDC	Intermittent
R-14	200 ohms	5 watt resistor	Noise
R-8	.68 ohms	5 watt resistor	Noise
R-7	200 ohms	5 watt resistor	Noise
R-10	2.7 ohms	1 watt resistor	Open

MODEL: 200 Series Electronic Pianos

SUBJECT: Connecting external amplifiers

REFERENCE: 200 Series amplifier Schematic No. 11-1305-S-1

The most satisfactory point to obtain a signal for driving any external amplifier is at the auxillary output jack. As the piano is wired, this signal is taken from point 7 (signal) and point 1 (ground). It has been noted that in some cases this circuit does not supply sufficient drive signal to the external amplifier input. In other cases a hum is introduced into the external amplifier. The following circuit has been found to correct these conditions. Change the 100K resistor between points 6 and 7 to a 6.8K and the 15K resistor between points 1 and 7 to a 2.2K. The maximum signal is approximately .5 volts peak to peak. If there is no D.C. voltage at the external amplifier input, a cleaner drive signal can be obtained by removing the 5MFD capacitor between pins 5 and 6 and replacing it with a jumper wire.

Model: 203-203W, 214

Subject: Baffle Board Wiring

If you should encounter a piano which has apparent low volume, check speaker wiring to ensure they are all in phase. The orange wires should be connected to the speaker terminal with the color dot. The black wires to the unmarked speaker terminals.