ASSEMBLY MANUAL

CITATION I

STEREOPHONIC PREAMPLIFIER CONTROL CENTER

harman kardon

INTRODUCTION

This new Citation I Stereo Preamplifier Kit represents the culmination of extensive research and experimentation in the technique of kit design. It is meant to satisfy the aspirations of those who insist on nothing short of perfection itself. The keynote is unparalleled performance and no compromise has been made in the design of this magnificent instrument.

This instruction manual has been written in simple, nontechnical language and if you will take the time to read it thoroughly before starting the actual construction of this kit, your work will be easier and far more accurate. Additional information may be obtained by carefully studying the large fold-out diagrams supplied with this manual. These may be attached to the wall opposite your workbench for easy reference.

After studying the manual, work slowly and carefully. After every ten or fifteen steps, go back over your work to check for possible errors. This will insure proper construction and will afford you the feeling of satisfaction upon completing an amplifier that performs perfectly the first time it is connected.

KEEP THIS INSTRUCTION MANUAL AVAILABLE AT ALL TIMES. IT CONTAINS INDISPENSABLE TECHNICAL AND SERVICE INFORMATION.

When construction has been completed and preliminary tests performed as directed, refer to the Operation and Installation Manual for final test instructions.

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UNPACKING

Set aside ample room on your workbench to unpack the contents of this kit. Open the carton carefully and place all of the components on your workbench, separating them into their respective categories. Handle all parts with care, for they may become damaged through carelessness. Check the contents of the carton and folds of the packing material before discarding it to be sure that all parts have been removed.

After all of the parts have been unpacked, check them against the master parts list in this manual to make certain all parts are present and are correct as to type and value. Whenever possible, the values are stamped on the outside of the parts to facilitate identification.

To help us expedite delivery to you, it may occasionally be necessary for us to make minor part substitutions. Before these substitutions are made, they are thoroughly checked to be certain that the replacement is equal to or superior to the original component in every respect. For example, a 50 volt capacitor may be substituted for a 25 volt unit. In some instances, a 5% tolerance component may be substituted for a 10% unit. This would provide a component with closer tolerances than required. In every case, these substitutions will not affect the performance of the unit.

PLEASE NOTIFY YOUR DEALER IMMEDIATELY IF A SHORTAGE OR ERRONEOUS PART IS DISCOVERED.

In the event of visible shipping damage, notify your dealer at once. If the kit was shipped to you, notify the transportation company without delay. Harman-Kardon will cooperate with you in such instances, but please note that only you can recover from the carrier for damages incurred during shipping.

WARRANTY OF HARMAN-KARDON CITATION KITS

Harman-Kardon guarantees all parts supplied with Harman-Kardon Citation Kits to be free from defects in material and workmanship when put to normal use and service for a period of one year following the original date of purchase with the exception of tubes which are under the manufacturers 90 day warranty. This guaranty is specifically limited to the following conditions:

(1) To validate the warranty, the warranty card accompanying each kit must be filled out completely and returned to the factory immediately following the date of purchase.

(2) Harman-Kardon reserves the right to substitute replacement parts for any which may be found defective.

(3) The warranty is effective only as to parts which are defective at the time of sale or become defective as the result of normal operation during the one year period following the date of sale.

(4) This warranty is limited to those parts which are returned to the factory transportation prepaid, and in the judgment of Harman-Kardon are found defective under the terms of this warranty.

(5) This warranty is specifically void as to any parts in which *acid core solder or paste fluxes* have been used.

This warranty is in lieu of all other warranties, express or implied, and all other obligations on the part of Harman-Kardon. Harman-Kardon neither assumes nor authorizes any one else to assume for it any other liability in connection with the sale of this kit.

Harman-Kardon does not assume liability for damages or injuries incurred during the construction or operation of this kit.

SERVICE POLICY

Harman-Kardon has established a special consumer service division to answer all questions pertinent to the assembly, testing, or installation of this kit. Our superbly equipped factory service department is at your disposal in the event you require assistance to obtain the specified performance from your preamplifier. For information relating to your Harman-Kardon preamplifier, please address all correspondence to:

HARMAN-KARDON, INC.
CITATION KIT DIVISION
PLAINVIEW, L. I., N. Y.

If your problem cannot be resolved through your own efforts and after you have received factory authorization (refer to warranty contract) pack the unit carefully and return via Railway Express, PREPAID, to the address listed above. Pack the preamplifier in a large, rugged container, preferably of wood, using a substantial quantity of padding such as excelsior, shredded paper, or crumpled newspaper. Attach a tag to the unit indicating your name and address and specific problem. Mentioning the other components in your installation may be of value.

Harman-Kardon will inspect and service your preamplifier at a minimum service charge of $15 plus the cost of parts and tubes, provided the preamplifier has been constructed and completed in accordance with the instructions in this manual.

PLEASE NOTE THIS SERVICE APPLIES ONLY TO FULLY COMPLETED INSTRUMENTS. WE WILL NOT ACCEPT INCOMPLETE KITS OR THOSE THAT HAVE BEEN MODIFIED IN DESIGN. PREAMPLIFIERS SHOWING EVIDENCE OF ACID CORE SOLDER OR PASTE FLUX WILL SIMILARLY BE REFUSED.

GENERAL CONSTRUCTION INFORMATION

Tools Required:

Only standard tools are required for the proper assembly of this kit. The most important and frequently used tool will be the soldering iron. It should therefore be a good one. A pencil type iron between 50 and 80 watts or a solder gun up to 100 watts is recommended. You will also require a long-nose pliers, diagonal cutters, screwdriver, sharp knife, solder (rosin core only), and an adjustable wrench or "gas" pliers. An ohmmeter could be of value but is not essential.

Soldering Technique:

Good solder connections are essential for the proper operation of this instrument. An improperly soldered connection or a "cold" solder joint can cause considerable difficulty and is extremely hard to locate. If you have little or no experience with soldering, it is suggested you read the following section carefully before proceeding with the construction of the kit. Practice your soldering on an old terminal strip or tube socket until you are certain you can attain a workable degree of skill. Soldering is not difficult. Merely observe the following rules and precautions.

1. USE ONLY ROSIN CORE (NON-CORROSIVE) SOLDER! The solder you purchase should be clearly labeled for radio and television use. The usual composition is 60% tin and 40% lead indicated on the package label as 60/40. Do not use so-called non-corrosive paste. This compound is highly corrosive when heated and will destroy the insulation value of non-conductors and will quickly lead to erratic or degraded performance. It has been our experience that the following solders offer the best results.

   Alpha, Centri-core energized rosin 60/40 alloy .062 dia.
   Bow, AE 16 rosin core 60/40 alloy .062 dia.
   Kester, "44" rosin core 60/40 alloy.
   Kester, "Rosin Five" core 60/40 alloy.
   Multi-Core, Solder #13 SWG (5 core) Flux 364 (rosin) 60/40 alloy.

2. Use a high quality soldering iron in the 50- 80 watt range. You may choose either the standard diamond or chisel tip. Always keep the tip clean and properly tinned in accordance with the manufacturer's instructions.

3. All terminals and leads must be free from dirt, wax, and corrosion, for solder will not adhere to dirty surfaces. Carefully scrape all terminals and leads which are not clean before applying solder.

4. Solder alone cannot be relied upon for strength. A good mechanical connection must always be made before applying solder. For convenience it is suggested all stranded hookup wire be tinned with solder before connecting and crimping. Tinning the leads on resistors and condensers is not always necessary, but is often advisable for it helps the solder adhere more readily to the connection.

5. To solder properly, apply the soldering iron to the joint until the joint heats sufficiently to melt the solder. Apply the solder to the joint and hold the iron on the connection until the solder flows freely around and into the connection. Merely melting drops of solder onto the connection is not satisfactory and will result in faulty connections.

6. The general appearance of a connection can indicate if it is properly made. A "cold" solder joint presents a dull and pitted or grainy appearance. A good solder connection should have a bright and smooth appearance. When in doubt as to the condition of a connection, it may be tested by moving the leads slightly to determine if they are loose. Always apply fresh solder when correcting a loose or "cold" solder connection. As a rule, simply reheating the defective joint will not properly do the job.

7. When using your soldering iron, avoid applying excessive heat, as this can result in damage to certain components. When soldering a joint having a small component connected to it, the part may be protected from excessive heat produced by the iron by grasping the lead between the joint and the component with a long-nose pliers. The pliers will then conduct most of the heat away from the component, preventing overheating and damage.

8. Do not use excessive solder when making a connection. Use only enough solder to cover all leads and to insure a tight connection. Excessive solder may result in the formation of shorts between adjacent terminals, particularly on tube sockets add switch terminals.

9. The step-by-step instructions tell you when to solder and when not to solder a connection. When the letters "NS" appear after or during a step, simply wrap or crimp the lead to the terminal and proceed to the next step. When all connections have been completed to this terminal, the solder designation "S" will follow.

ASSEMBLY PROCEDURE

These instructions are presented in a simple, step by step sequence to make assembly and wiring of the Citation kit as easy as possible. Please take the time to read each step carefully before actually performing the work. A space is provided to check off each operation as it is done and will be helpful in preventing omissions or errors. After every 10 or 15 steps, stop and check your work to insure accuracy.

Note that in the pictorials, each component is identified by a code designation and in addition, each terminal has also been assigned a number. When the instructions read, "100K ohm ½ watt resistor (brown-black-yellow-silver from LUG #1 (S) to LUG #5 (NS)", it means that the resistor is connected between terminals 1 and 35 on the terminal board. The abbreviation (S) indicates that the connection should be soldered. The abbreviation (NS) indicates that more than one component is connected to the same terminal and should not be soldered in this operation.

When wire lengths are specified, measure the length with a ruler, so that the finished wiring will be neat. The solid wire provided in this kit requires no pre-tinning. The stranded wire (transformer leads, etc. should be twisted and tinned after stripping.

When the instructions say white/black wire, it means a white wire with a black tracer. When the instructions say black/white wire, it means a black wire with a white tracer.

The preamplifier is assembled and wired in several separate sub-assemblies. As each sub-assembly is completed, it should be checked and put aside for later use. In this way, any errors can be corrected before the construction of the kit has progressed to the final assembly.

The pictorials will facilitate the location assembly, and wiring of the various component parts and should be referred to at all times. It is suggested that the manual be read and the pictorials studied before starting construction of your preamplifier.

The card on which the resistors and small condensers are mounted may serve as a convenient holder during construction. Remove the tape by peeling it free from the resistor leads, holding the body of the resistors down to prevent them from being pulled out of the holder. Bend the card on the scored line until it forms a right angle and then use a small piece of tape from the lacing tape roll to hold it in shape.

The card now serves as a pyramid base with the resistor leads pointing upward. This will facilitate identification and selection of the components as the work progresses.

Most resistors, some condensers and all of the wires are identified by color coding. If you have difficulty in identifying by color, it is suggested that you have a friend write the colors adjacent to the resistors on the resistor card. A convenient code may be used, such as GN for green, GY for grey, BL for blue, BK for black, etc. For example, a 100K ohm resistor, color coded brown-black-yellow-silver, would have the symbols BN-BK-Y-S written next to it.

ASSEMBLY AND WIRING INSTRUCTIONS

CHANNEL A TERMINAL BOARD WIRING

Refer to Pictorial I, Figure A.

Using bare wire, make the following connections to the bottom section of the terminal lugs. All wires should be wrapped one complete turn around the lug and then crimped to insure a mechanically secure connection. As you perform each operation, put a check mark in the "DONE" columns.

Done	Checked	From	To
( )	( )	Lug # 3 (NS)	Lug # 4 (NS)
( )	( )	Lug # 14 (NS)	Lug # 15 (S)
( )	( )	Lug # 25 (S)	Lug # 26 (NS)
( )	( )	Lug # 37 (S)	Lug # 53 (NS)
( )	( )	Lug # 44 (NS)	Lug # 56 (S)
( )	( )	Lug # 70 (NS)	Lug # 71 (S)

This completes the bare jumper wiring of the terminal board. It is strongly suggested that you inspect your work thus far, putting a check mark in the "CHECKED" column. It is easy to inspect now! It will be difficult or impractical later.

Cut the following wires to the lengths specified. Strip ½″ of insulation from each end. Connect to the bottom section of the lugs, wrapping tightly one complete turn. Crimp and clip any excess bare ends.

Done	Checked	Color	Length	From	To
( )	( )	Red	3″	Lug # 1 (NS)	Lug # 22 (NS)
( )	( )	Red	2¼″	Lug # 22 (S)	Lug # 7 (NS)
( )	( )	Red	2¼″	Lug # 7 (NS)	Lug # 9 (NS)
( )	( )	Red	2¾″	Lug # 9 (S)	Lug # 12 (S)
( )	( )	White	2½″	Lug # 6 (NS)	Lug # 8 (S)
( )	( )	Yellow	2½″	Lug # 11 (NS)	Lug # 29 (S)
( )	( )	Black	3″	Lug # 4 (NS)	Lug # 46 (NS)
( )	( )	Black	2½″	Lug # 46 (NS)	Lug # 57 (NS)
( )	( )	Black	2½″	Lug # 46 (NS)	Lug # 63 (NS)
( )	( )	Black	2½″	Lug # 63 (NS)	Lug # 49 (NS)
( )	( )	Black	2½″	Lug # 49 (NS)	Lug # 51 (NS)
( )	( )	Black	3″	Lug # 16 (S)	Lug # 52 (NS)
( )	( )	Black	1¾″	Lug # 52 (NS)	Lug # 51 (NS)
( )	( )	Black	2½″	Lug # 52 (NS)	Lug # 54 (NS)
( )	( )	Black	1¾″	Lug # 54 (NS)	Lug # 55 (NS)
( )	( )	Green	3″	Lug # 58 (NS)	Lug # 62 (NS)
( )	( )	Blue	2¾″	Lug # 43 (S)	Lug # 59 (NS)
( )	( )	Gray	2″	Lug # 47 (NS)	Lug # 64 (S)
( )	( )	Yellow	3¾″	Lug # 13 (NS)	Lug # 69 (S)
( )	( )	Yellow	4¾″	Lug # 13 (NS)	Lug # 20 (S)

Cut a green shielded wire 4″ long. Strip ¾″ of outer insulation from each end. On one end, twist the strands of the shield together and tin the end. Strip the inner conductor of ½″ of insulation and tin. Connect to the bottom section of the terminal lugs, as follows. Connect the inner conductor to Lug #72 (NS) and the shield to Lug #73 (NS). Clip off the strands of the shield on the other end, close to the insulation. Strip the inner conductor ⅜″ of insulation and tin. Connect to Lug #18 (NS).

Before going further, inspect the foregoing group of operations for correctness and neatness, putting check marks in the ″CHECKED″ column. A little time spent now may eliminate much more trouble-shooting time later.

Refer to Pictorial 1, Figure B.

Cut the following wires to the lengths specified. Strip one end ½″ of insulation, the other end ¼″ of insulation. Connect the ½″ end to the bottom section of the lug. Wrap tightly and clip off any excess bare ends. Dress the wire down close to the board and between the lugs as shown in Pictorial I, Figure B. For convenience in handling, as each wire is dressed, the free end extending past the edge of the board may be heat up in back of the board to hold it in place temporarily.

Done	Checked	Color	Length	Connect To
( )	( )	Green	4¾″	Lug # 5 (S)
( )	( )	Green	4¼″	Lug # 24 (NS)
( )	( )	Green	3½″	Lug # 31 (NS)
( )	( )	Green	2½″	Lug # 72 (S)
( )	( )	Blue	4¼″	Lug # 23 (NS)
( )	( )	Blue	4½″	Lug # 28 (NS)
( )	( )	Blue	4½″	Lug # 32 (S)
( )	( )	Blue	3¾″	Lug # 36 (S)
( )	( )	Blue	3¾″	Lug # 41 (S)
( )	( )	White/Blue	4½″	Lug # 30 (S)
( )	( )	White/Blue	4½″	Lug # 34 (NS)
( )	( )	White/Blue	4¼″	Lug # 39 (NS)
( )	( )	White/Blue	1¾″	Lug # 59 (S)

Inspect the above operations before proceeding.

( )	( )	White/Yellow	3¾″	Lug # 35 (NS)
( )	( )	White/Yellow	4″	Lug # 40 (NS)
( )	( )	White/Yellow	2″	Lug # 60 (NS)
( )	( )	Yellow	4½″	Lug # 42 (NS)
( )	( )	Yellow	2¼″	Lug # 61 (S)
( )	( )	Yellow	2″	Lug # 66 (NS)
( )	( )	Yellow	2″	Lug # 68 (NS)
( )	( )	Yellow	2½″	Lug # 73 (NS)
( )	( )	White/Green	2¾″	Lug # 45 (NS)
( )	( )	White/Green	1¾″	Lug # 70 (S)
( )	( )	White/Green	1¾″	Lug # 75 (S)
( )	( )	White/Black	4½″	Lug # 55 (NS)

Recheck this group, as previously discussed.

COMPONENTS

Refer to Pictorial 1, Figure C.

Resistors will be identified by the four color bands on the body of the resistor. The .1 mfd. tubular condensers will be identified by the five color bands on the body of the condensers. Center the components between the lugs. Cut the excess wire close to the lugs.

Connect the following components to the bottom section of the lugs. Wrap and crimp to insure a tight connection.

Done	Checked	
( )	( )	68 K ohm 1 watt 10% resistor (blue, gray, orange, silver) between Lug #1 (S) and Lug #23 (S).
( )	( )	240 K ohm ½ watt 10% resistor (red, yellow, yellow, silver) between Lug #2 (S) and Lug #24 (S).
( )	( )	1 meg ohm ½ watt 10% resistor (brown, black, green, silver) between Lug #4 (S) and Lug #26 (S).
( )	( )	680 K ohm ½ watt 10% resistor (blue, gray, yellow, silver) between Lug #6 (S) and Lug #27 (NS).
( )	( )	68 K ohm 1 watt 10% resistor (blue, gray, orange, silver) between Lug #7 (S) and Lug #28 (S).
( )	( )	220 K ohm ½ watt 10% resistor (red, red, yellow, silver) between Lug #10 (S) and Lug #31 (NS).
( )	( )	.1 mfd 200 volt tubular condenser (brown, black, yellow, white, red) between Lug #11 (S) and Lug #49 (NS).
( )	( )	180 K ohm ½ watt 10% resistor (brown, gray, yellow, silver) between Lug #13 (S) and Lug #33 (NS).
( )	( )	47 K ohm 1 watt 10% resistor (yellow, purple, orange, silver) between Lug #14 (S) and Lug #34 (S).
( )	( )	2.4K ohm ½ watt 5% resistor (red, yellow, red, gold) between Lug #17 (S) and Lug #38 (NS).
( )	( )	62 K ohm ½ watt 5% resistor (blue, red, orange, gold) between Lug #18 (S) and Lug #38 (S).
( )	( )	47 K ohm 1 watt 10% resistor (yellow, purple, orange, silver) between Lug #19 (S) and Lug #39 (S).
( )	( )	560 K ohm ½ watt 10% resistor (green, blue, yellow, silver) between Lug #31 (S) and Lug #49 (NS).
( )	( )	560 ohm 1 watt 5% resistor (green, blue, brown gold) between Lug #35 (S) and Lug #51 (S).
( )	( )	560 ohm 1 watt 5% resistor (green, blue, brown, gold) between Lug #40 (S) and Lug #54 (S).
( )	( )	1.62 K ohm precision resistor (value marked on body of resistor) between Lug #42 (S) and Lug #55 (NS).
( )	( )	1 meg ohm ½ watt 10% resistor (brown, black, green, silver) between Lug #44 (S) and Lug #57 (NS).
( )	( )	220 K ohm ½ watt 10% resistor (red, red, yellow, silver) between Lug #45 (S) and Lug #58 (S).
( )	( )	430 ohm ½ watt 5% resistor (yellow, orange, brown, gold) between Lug #46 (S) and Lug #60 (S).
( )	( )	1 meg ohm ½ watt 10% resistor (brown, black, green, silver) between Lug #47 (S) and Lug #63 (S).
( )	( )	.05 mfd 100 volt condenser (value marked on body of condenser) between Lug #27 (S) and Lug #62 (S). Caution: Handle condenser leads with care when mounting.
( )	( )	.05 mfd 100 volt condenser (value marked on body of condenser) between Lug #48 (S) and Lug #65 (S). Caution: Handle condenser leads with care when mounting.
( )	( )	430 ohm ½ watt 5% resistor (yellow, orange, brown, gold) between Lug #49 (S) and Lug #66 (S).

Done Checked

( ) ( ) 68 K ohm ½ watt 10% resistor (blue, gray, orange, silver) between Lug #33 (S) and Lug #68 (S).

( ) ( ) 1.62K ohm precision resistor (value marked on body of resistor) between Lug #52 (S) and Lug #73 (S).

( ) ( ) .47 mfd 10 volt disc condenser (value marked on body of condenser) between Lug #53 (S) and Lug #74 (S).

( ) ( ) 470 K ohm ½ watt 10% resistor (yellow, purple, yellow, silver) between Lug #55 (NS) and Lug #76 (NS).

( ) ( ) 1 Meg ohm ½ watt 10% resistor (brown, black, green, silver) between Lug #55 (S) and Lug #77 (S).

This is a good point to stop and inspect previous operations.

Connect the following components to the top section of the lugs:

Done Checked

( ) ( ) 270 K ohm ½ watt 10% resistor (red, purple, yellow, silver) between Lug #8 (S) and Lug #29 (S).

( ) ( ) 100 K ohm ½ watt 10% resistor (brown, black, yellow, silver) between Lug #9 (S) and Lug #30 (NS).

( ) ( ) 68 K ohm 1 watt 10% resistor (blue, gray, orange, silver) between Lug #12 (S) and Lug #32 (NS).

( ) ( ) 6.8 mmf disc condenser (value marked on body of condenser) between Lug #13 (S) and Lug #33 (NS).

( ) ( ) 215 K ohm precision resistor (value marked on body of resistor) between Lug #15 (S) and Lug #36 (NS).

( ) ( ) 215 K ohm precision resistor (value marked on body of resistor) between Lug #19 (NS) and Lug #41 (NS).

( ) ( ) 240 K ohm ½ watt 10% resistor (red, yellow, yellow, silver) between Lug #24 (S) and Lug #44 (S).

( ) ( ) 390 K ohm ½ watt 10% resistor (orange, white, yellow, silver) between Lug #25 (NS) and Lug #45 (NS).

( ) ( ) 68 K ohm 1 watt 10% resistor (blue, gray, orange, silver) between Lug #22 (S) and Lug #43 (S).

( ) ( ) 2.2 meg ohm ½ watt 10% resistor (red, red, green, silver) between Lug #37 (S) and Lug #52 (NS).

( ) ( ) 160 K ohm ½ watt 5% resistor (brown, blue, yellow, gold) between Lug #38 (S) and Lug #53 (S).

( ) ( ) 430 ohm ½ watt 5% resistor (yellow, orange, brown, gold) between Lug #46 (S) and Lug #61 (S).

( ) ( ) 560K ohm ½ watt 10% resistor (green, blue, yellow, silver) between Lug #51 (NS) and Lug #70 (S).

( ) ( ) 560K ohm ½ watt 10% resistor (green, blue, yellow, silver) between Lug #54 (NS) and Lug #75 (NS).

( ) ( ) 15 mmf disc condenser (value marked on body of condenser) between Lug #10 (NS) and Lug #31 (NS).

( ) ( ) .05 mfd 50 volt disc condenser (value marked on body of condenser) between Lug #35 (S) and Lug #51 (S).

Done Checked

( ) ( ) .05 mfd 50 volt disc condenser (value marked on body of condenser) between Lug #40 (S) and Lug #54 (S).

( ) ( ) .001 mfd disc condenser (value marked on body of condenser) between Lug #42 (S) and Lug #55 (NS).

( ) ( ) 4.7 mmf disc condenser (value marked on body of condenser) between Lug #45 (S) and Lug #58 (S).

( ) ( ) .05 mfd 50 volt disc condenser (value marked on body of condenser) between Lug #47 (NS) and Lug #63 (NS).

( ) ( ) .05 mfd 50 volt disc condenser (value marked on body of condenser) between Lug #49 (NS) and Lug #66 (S).

( ) ( ) .2 mfd 100 volt condenser (value marked on body of condenser) between Lug #33 (S) and Lug #68 (S). Caution: Handle condenser leads with care when mounting.

( ) ( ) .001 mfd disc condenser (value marked on body of condenser) between Lug #52 (S) and Lug #73 (S).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black. yellow, black, yellow) between Lug #23 (S) and Lug #56 (NS).

( ) ( ) .l mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #26 (S) and Lug #59 (S).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #28 (S) and Lug #62 (S).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #30 (S) and Lug #64 (NS).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #32 (S) and Lug #67 (NS).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #34 (S) and Lug #69 (S).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #36 (S) and Lug #71 (S).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #39 (S) and Lug #74 (NS).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #41 (S) and Lug #75 (S).

This completes the assembly of Channel A terminal board. Inspect your work carefully and check against pictorial and copy. Put this assembly aside for later use.

CHANNEL B TERMINAL BOARD WIRING

Refer to Pictorial I, Figure D.

Using bare wire, make the following connections to the bottom section of the terminal lugs. All wires should be wrapped one complete turn around the lug and then crimped to insure a mechanically secure connection.

Done	Checked	From	To
( )	( )	Lug # 6 (S)	Lug # 7 (NS)
( )	( )	Lug #17 (NS)	Lug # 18 (NS)
( )	( )	Lug #39 (NS)	Lug # 40 (S)
( )	( )	Lug #28 (S)	Lug # 46 (NS)
( )	( )	Lug #62 (S)	Lug # 63 (NS)
( )	( )	Lug #55 (S)	Lug # 77 (S)

Inspect the above operations, putting check marks in the "CHECKED" column.

Cut the following wires to the length specified. Strip each end ½″ of insulation. Connect to the bottom section of the lugs, wrapping tightly one complete turn. Clip off any excess bare ends.

Done	Checked	Color	Length	From	To
( )	( )	Black	1¾″	Lug #44 (NS)	Lug #45 (NS)
( )	( )	Black	2½″	Lug #45 (NS)	Lug #47 (NS)
( )	( )	Black	1¾″	Lug #47 (NS)	Lug #48 (NS)
( )	( )	Black	3″	Lug # 5 (S)	Lug #47 (NS)
( )	( )	Black	2½″	Lug #48 (NS)	Lug #50 (NS)
( )	( )	Black	2½″	Lug #50 (NS)	Lug #70 (NS)
( )	( )	Black	2½″	Lug #70 (NS)	Lug #53 (NS)
( )	( )	Black	3″	Lug #17 (NS)	Lug #53 (NS)
( )	( )	Black	2½″	Lug #53 (NS)	Lug #76 (NS)
( )	( )	Red	2¾″	Lug # 9 (S)	Lug #12 (NS)
( )	( )	Red	2¼″	Lug #12 (S)	Lug #14 (NS)
( )	( )	Red	2¼″	Lug #14 (NS)	Lug #21 (NS)
( )	( )	Red	3″	Lug #21 (S)	Lug #20 (NS)
( )	( )	White	2½″	Lug #13 (S)	Lug #15 (NS)
( )	( )	Green	3″	Lug #71 (NS)	Lug #75 (NS)
( )	( )	Yellow	2½″	Lug #10 (NS)	Lug #36 (S)
( )	( )	Yellow	4¾″	Lug # 1 (S)	Lug # 8 (NS)
( )	( )	Yellow	3¾″	Lug # 8 (NS)	Lug #64 (S)
( )	( )	Gray	2″	Lug #52 (NS)	Lug #69 (S)
( )	( )	Blue	2¾″	Lug #43 (S)	Lug #74 (NS)

Cut a green shielded wire 4″ long. Strip ¾″ of outer insulation from each end. On one end twist the strands of the shield together and tin the end. Strip the inner conductor of ½″ of insulation and tin. Connect the inner conductor to Lug #61 (NS) and the shield to Lug #60 (NS). Cut off the strands of the shield on the other end, close to the insulation. Strip the inner conductor ⅜″ of insulation and tin. Connect to Lug #3 (NS).

This is a good point to stop and inspect the previous operations.

Refer to Pictorial I, Figure E.

Cut the following wires to the length specified. Strip one end ½″ of insulation, the other end ¼″ of insulation. Connect the ½″ end to the bottom section of the lug. Dress the wire down close to the board and between the lugs as shown in the Pictorial I, Figure E. For convenience in handling, as each wire is dressed, the free end extending past the edge of the board may be bent up in back of the board to hold it in place temporarily.

Done	Checked	Color	Length	Connect To
( )	( )	White/Yellow	3¾″	Lug # 23 (NS)
( )	( )	White/Yellow	1¾″	Lug # 60 (NS)
( )	( )	White/Yellow	2½″	Lug # 65 (NS)
( )	( )	White/Yellow	2″	Lug # 67 (NS)
( )	( )	White/Yellow	2¼″	Lug # 72 (S)
( )	( )	White/Blue	4½″	Lug # 24 (S)
( )	( )	White/Blue	3¾″	Lug # 29 (S)
( )	( )	White/Blue	4¼″	Lug # 33 (S)
( )	( )	White/Blue	4¼″	Lug # 37 (NS)
( )	( )	White/Blue	3¾″	Lug # 42 (NS)
( )	( )	Yellow	4″	Lug # 25 (NS)
( )	( )	Yellow	4″	Lug # 30 (NS)

Inspect the above operations before proceeding.

( )	( )	Yellow	2″	Lug # 73 (NS)
( )	( )	Blue	4¼″	Lug # 26 (NS)
( )	( )	Blue	3¾″	Lug # 31 (NS)
( )	( )	Blue	4¼″	Lug # 35 (S)
( )	( )	Blue	2″	Lug # 74 (S)
( )	( )	White/Green	3½″	Lug # 34 (NS)
( )	( )	White/Green	5″	Lug # 16 (S)
( )	( )	White/Green	4½″	Lug # 41 (NS)
( )	( )	White/Green	1¾″	Lug # 61 (S)
( )	( )	Green	3½″	Lug # 54 (NS)
( )	( )	Green	1¾″	Lug # 58 (S)
( )	( )	Green	1¾″	Lug # 63 (S)
( )	( )	White/Black	10″	Lug # 76 (NS)
( )	( )	Black/White	5″	Lug # 44 (NS)

Inspect the above operations, dressing the wires neatly.

COMPONENTS

Refer to Pictorial I, Figure F.

Connect the following components to the bottom section of the lugs. Center the components between the lugs and bend the leads one full turn around the lugs. Cut off the excess wire close to the lugs.

Done	Checked	
( )	( )	47K ohm 1 watt 10% resistor (yellow, purple, orange, silver) between Lug #2 (S) and Lug #26 (S).
( )	( )	62K ohm ½ watt 5% resistor (blue, red, orange, gold) between Lug #3 (S) and Lug #27 (NS).
( )	( )	2.4K ohm ½ watt 5% resistor (red, yellow, red, gold) between Lug #4 (S) and Lug #27 (S).
( )	( )	47K ohm 1 watt 10% resistor (yellow, purple, orange, silver) between Lug #7 (S) and Lug #31 (S).

Done Checked

( ) ( ) 180 K ohm ½ watt 10% resistor (brown, gray, yellow, silver) between Lug #8 (S) and Lug #32 (NS).
( ) ( ) 220K ohm ½ watt 10% resistor (red, red, yellow, silver) between Lug #11 (S) and Lug #34 (NS).
( ) ( ) .1 mfd 200 volt tubular condenser (brown, black, yellow, white, red) between Lug #10 (S) and Lug #50 (NS).
( ) ( ) 68K ohm 1 watt 10% resistor (blue, gray, orange, silver) between Lug #14 (S) and Lug #37 (S).
( ) ( ) 680K ohm ½ watt 10% resistor (blue, gray, yellow, silver) between Lug #15 (S) and Lug #38 (NS).
( ) ( ) 1 meg ohm ½ watt 10%, resistor (brown, black, green, silver) between Lug #17 (S) and Lug #39 (S).
( ) ( ) 47K ohm ½ watt 10%, resistor (yellow, purple, orange, silver) between Lug #19 (S) and Lug #41 (S).
( ) ( ) 68K ohm 1 watt 10% resistor (blue, gray, orange, silver) between Lug #20 (S) and Lug #42 (S).
( ) ( ) 1.62K ohm precision resistor (value marked on body of resistor) between Lug #23 (S) and Lug #44 (NS),
( ) ( ) 560 ohm 1 watt 5%, resistor (green, blue, brown, gold) between Lug #25 (S) and Lug #45 (S).
( ) ( ) 560 ohm 1 watt 5%, resistor (green, blue, brown, gold) between Lug #30 (S) and Lug #48 (S).
( ) ( ) 560K ohm ½ watt 10% resistor (green, blue, yellow, silver) between Lug #34 (S) and Lug #50 (NS).
( ) ( ) .05 mfd 100 volt condenser (value marked on body of condenser) between Lug #38 (S) and Lug #71 (S). Caution: Handle condenser leads with care when mounting.
( ) ( ) 1 meg ohm ½ watt 10% resistor (brown, black, green, silver) between Lug #44 (NS) and Lug #56 (S).
( ) ( ) 470K ohm ½ watt 10%, resistor (yellow, purple, yellow, silver) between Lug #44 (S) and Lug #57 (NS).
( ) ( ) .47 mfd 10 volt disc condenser (value marked on body of condenser) between Lug #46 (S) and Lug #59 (S).
( ) ( ) 1.62K ohm precision resistor (value marked on body of resistor) between Lug #47 (S) and Lug #60 (S).
( ) ( ) 68K ohm ½ watt 10% resistor (blue, gray, orange, silver) between Lug #32 (S) and Lug #65 (S).
( ) ( ) 430 ohm ½ watt 5% resistor (yellow, orange, brown, gold) between Lug #50 (S) and Lug #67 (S).
( ) ( ) .05 mfd 100 volt condenser (value marked on body of condenser) between Lug #51 (S) and Lug #68 (S). Caution: Handle condenser leads with care when mounting.
( ) ( ) 1 meg ohm ½ watt 10% resistor (brown, black, green, silver) between Lug #52 (S) and Lug #70 (S).
( ) ( ) 430 ohm ½ watt 5%, resistor (yellow, orange, brown, gold) between Lug #53 (S) and Lug #73 (S).
( ) ( ) 220K ohm ½ watt 10% resistor (red, red, yellow, silver) between Lug #54 (S) and Lug #75 (S).

Inspect the above operations, step by step, before proceeding.

Connect the following components to the top section of the lugs:

( ) ( ) 215K ohm precision resistor (value marked on body of resistor) between Lug #2 (S) and Lug #24 (NS).
( ) ( ) 215K ohm precision resistor (value marked on body of resistor) between Lug #6 (S) and Lug #29 (NS).

Done Checked

( ) ( ) .2 mfd 100 volt condenser (value marked on body of condenser) between Lug #32 (NS) and Lug #65 (S). Caution: Handle condenser leads with care when mounting.

( ) ( ) 68K ohm 1 watt 10% resistor (blue, gray, orange, silver) between Lug #9 (S) and Lug #33 (NS).

( ) ( ) 100K ohm ½ watt 10% resistor (brown, black, yellow, silver) between Lug #12 (S) and Lug #35 (NS).

( ) ( ) 270K ohm ½ watt 10% resistor (red, purple, yellow, silver) between Lug #13 (S) and Lug #36 (S).

( ) ( ) 160K ohm ½ watt 5%, resistor (brown, blue, yellow, gold) between Lug #27 (S) and Lug #46 (S).

( ) ( ) 2.2 meg ohm ½ watt 10% resistor (red, red, green, silver) between Lug #28 (S) and Lug #47 (NS).

( ) ( ) 68K ohm 1 watt 10% resistor (blue, gray, orange, silver) between Lug #21 (S) and Lug #43 (S).

( ) ( ) 390K ohm 1 watt 10% resistor (orange, white, yellow, silver) between Lug #40 (NS) and Lug #54 (NS).

( ) ( ) 470K ohm ½ watt 10% resistor (yellow, purple, yellow, silver) between Lug #41 (S) and Lug #55 (S).

( ) ( ) 560K ohm ½ watt 10% resistor (green, blue, yellow, silver) between Lug #45 (NS) and Lug #58 (NS).

( ) ( ) 560K ohm ½ watt 10% resistor (green, blue, yellow, silver) between Lug #48 (NS) and Lug #63 (S).

( ) ( ) 430 ohm ½ watt 5% resistor (yellow, orange, brown, gold) between Lug #53 (S) and Lug #72 (S).

( ) ( ) 15 mmf disc condenser (value marked on body of condenser) between Lug #11 (NS) and Lug #34 (NS).

( ) ( ) .001 mfd disc condenser (value marked on body of condenser) between Lug #23 (S) and Lug #44 (NS).

( ) ( ) .05 mfd 50 volt disc condenser (value marked on body of condenser) between Lug #25 (S) and Lug #45 (S).

( ) ( ) .05 mfd 50 volt disc condenser (value marked on body of condenser) between Lug #30 (S) and Lug #48 (S).

( ) ( ) .001 mfd disc condenser (value marked on body of condenser) between Lug #47 (S) and Lug #60 (S).

( ) ( ) 6.8 mmf disc condenser (value marked on body of condenser) between Lug #8 (S) and Lug #32 (S).

( ) ( ) .05 mfd 50 volt disc condenser (value marked on body of condenser) between Lug #50 (NS) and Lug #67 (S).

( ) ( ) .05 mfd 50 volt disc condenser (value marked on body of condenser) between Lug #52 (NS) and Lug #70 (NS).

( ) ( ) 4.7 mmf disc condenser (value marked on body of condenser) between Lug #54 (S) and Lug #75 (S).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #24 (S) and Lug #58 (S).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #26 (S) and Lug #59 (NS).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #29 (S) and Lug #62 (S).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #31 (S) and Lug #64 (S).

Done Checked

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #33 (S) and Lug #66 (NS).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #35 (S) and Lug #69 (NS).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #37 (S) and Lug #71 (S).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #39 (S) and Lug #74 (S).

( ) ( ) .1 mfd 400 volt tubular condenser (brown, black, yellow, black, yellow) between Lug #42 (S) and Lug #77 (NS).

A thorough inspection now will save time later! Review these steps carefully.

TERMINAL BOARD-SHIELD ASSEMBLY

Refer to Pictorial 2.

Straighten all of the wires previously bent back behind the two terminal boards.

Done Checked

( ) ( ) Mount the Channel A board loosely to the mounting posts, lugs facing upward. The arrow on the board and the arrow on the mounting post should point in the same direction. Use four #6-32 x 1/4″ screws and four #6 lockwashers under the heads of the screws.

( ) ( ) Insert a rubber grommet (thick walled with small hole) in each of the two holes in the center portion of the metal shield. Place the shield on the mounting posts as indicated.

( ) ( ) Mount the Channel B board over the metal shield to the mounting posts. (Arrows should point in the same direction). Use four #6-32 x 3/8″ screws and four #6 lockwashers under the heads of the screws. Leave all screws fairly loose to facilitate later installation of this sub-assembly.

This completes the wiring and assembly of the boards. Reinspect the entire assembly, looking particularly for stray wire clippings, lumps of solder and burned wires. Put the assembly aside for later use.

POWER SUPPLY ASSEMBLY

Refer to Pictorial 3, Figure A.

Parts used—small black bakelite board with six clips mounted on board.

2—SD91 diodes (marked SD91) or (66-3282) or (3566)

4—SD93 diodes (marked SD93) or (66-3288) or (4115)

Caution: Handle diodes with care. Avoid sharp bends in the diode leads.

Done Checked

( ) ( ) Insert the SD91 diodes into positions CR5 and CR6.

( ) ( ) Insert the SD93 or 66-3288 diodes into positions CR1, CR2, CR3, and CR4.

( ) ( ) Connect the cathode wire of CR5 to Lug #1 (NS).

( ) ( ) Connect the anode wire of CR5 and the anode wire of CR6 together as shown in Connecting Detail. Cut off excess wire (NS).

( ) ( ) Cut a black wire 7″ long, strip 1/4″ of insulation from each end. Connect one end to the junction of CR5 and CR6 (S). Leave the other end free.

Done Checked

( ) ( ) Connect the cathode wire of CR6 to Lug #3 (NS).
( ) ( ) Connect the cathode wire of CR2 to Lug #2 (NS).
( ) ( ) Connect the anode wire of CR2 and the cathode wire of CR1 together as shown in Connecting Detail. Cut off the excess wire (S).
( ) ( ) Connect the anode wire of CR1 to Lug #4 (NS).
( ) ( ) Connect the cathode wire of CR3 to Lug #4 (NS).
( ) ( ) Connect the cathode wire of CR4 and the anode wire of CR3 together as shown in Connecting Detail. Cut off excess wire (S) .
( ) ( ) Leave the anode wire of CR4 free.

Refer to Pictorial 3, Figure B.

Mount the following components to the Power Supply Bracket using #6-32 x 3/8" screws, #6-32 nuts, #6 lockwashers under all nuts. Insert screws from the outside of the bracket.

Done Checked

( ) ( ) 3 large electrolytic insulating wafers (mounted on outside of bracket) and TS2 lug strip (mounted on wiring side of bracket).
( ) ( ) Small electrolytic insulating wafer (mounted on outside of bracket). Observe orientation.
( ) ( ) TS 1 and TS3 lug strips (mounted on wiring side of bracket).
( ) ( ) Silicon diode holder (mounted on wiring side of bracket). Observe orientation.
( ) ( ) CHI choke (mounted to side flange. Insert screws from inside of bracket.
( ) ( ) Install the rubber grommet (thin walled, large hole).

Mount the following electrolytic condensers by twisting the mounting tabs 1/4 turn. Note correct orientation by referring to Pictorial 3, Figure B.

Done Checked

( ) ( ) 1500 mfd 35 volt, at C106.
( ) ( ) 80 mfd 250 volt, at C103.
( ) ( ) 40, 40, 40 mfd 450 volt, at C105.
( ) ( ) 40 mfd 450 volt, 80 mfd 250 volt, at C104.

WIRING

Refer to Pictorial 3, Figure C.

Done Checked

( ) ( ) Connect the black wire from the junction of CR5 and CR6 to terminal B of C106 (S).
( ) ( ) Cut a red wire 4" long. Strip each end 3/8" of insulation. Connect one end to diode holder Lug #2 (S). Connect the other end to terminal A of C103 (NS).
( ) ( ) Cut a red wire 3" long. Strip each end 3/8" of insulation. Connect one end to terminal A of C104 (NS). Connect the other end to terminal B of C103 (S).
( ) ( ) Twist the wires of the choke together.
( ) ( ) Connect one wire to terminal A of C103 (S).
( ) ( ) Connect the other wire to terminal B of C104 (NS).
( ) ( ) Connect the anode wire of CR4 to TS 1 Lug A (NS).
( ) ( ) Cut a black wire 1 1/2" long. Strip each end of insulation. Connect one end to TS1 Lug A (NS). Connect the other end to terminal C of C104 (NS).
( ) ( ) Connect a 10K tubular condenser (brown, black, orange, black, yellow from diode holder, Lug #4 (NS) to TSI Lug A (S). Dress the body of the condenser down between the clips on the diode holder as shown in the Pictorial.

Done	Checked	
( )	( )	Connect a 47K ohm 2 watt 10% resistor (yellow, purple, orange, silver) between C105 terminal C (NS) and C105 terminal B (NS).
( )	( )	Connect a 10K ohm 2 watt 10% resistor (brown, black, orange, silver) between terminal B of C105 (NS) and terminal A of C105 (NS).
( )	( )	Connect a 2.2K ohm 4 watt 20% resistor (value marked on body of resistor) between terminal B of C104 (S) and terminal A of C105 (NS).

This completes the assembly and preliminary wiring of the power supply. Inspect it carefully, and put aside for later installation in chassis.

CHASSIS ASSEMBLY

Refer to Pictorial 4, Figure A.

The following components are to be mounted from the inside of the chassis. Screws are inserted from the outside of the chassis.

Note that most components may be mounted facing in several directions. For example, each tube socket has two possible mounting positions, one rotated 180° from the other. Since only one position is correct, be sure to observe the orientation indicated on the pictorial.

Done	Checked	
( )	( )	Mount five (4-jack) phono socket strips in positions A, B, C, D, and E. Insert black insulating strip between socket and chassis. Use #6-32 x 3/8″ screws, #6-32 hex nuts, #6 lockwashers under the nuts. Observe orientation.
( )	( )	Mount the one (1-jack) phono socket strip in position F. Insert black insulating strip between socket and chassis. Use #6-32 x 3/8″ screws, #6-32 hex nuts, #6 lockwashers under the nuts. Observe orientation.
( )	( )	Mount the four AC; power outlets in positions CO1, CO2, CO3, and CO4. Use #6-32 x 3/8″ screws, #6-32 hex nuts, #6 lockwashers under the nuts.
( )	( )	Mount the fuse holder (from the outside of the chassis) in position F1. Use rubber washer, lock washer and hex nut supplied.
( )	( )	Mount the nine tube sockets from the outside of the chassis as shown. Observe orientation. Use #4 40 x 3/8″ screws, #4-40 hex nuts, #4 lockwashers under the nuts and a solder lug under nut at V6 socket.

This completes the assembly of the chassis. Inspect particularly for proper orientation.

CHASSIS WIRING

Refer to Pictorial 4, Figure B.

Cut the following wires to the lengths specified. Strip each end 1/4″ of insulation and connect to the points indicated.

Done	Checked	Color	Length	From	To
( )	( )	Black	3″	V1 Pin #4 (NS)	V6 Pin #4 (NS)
( )	( )	Black	3 1/2″	V1 Pin #4 (S)	V2 Pin #4 (NS)
( )	( )	Black	3″	V2 Pin #4 (S)	V7 Pin #4 (S)
( )	( )	Black	3″	V3 Pin #4 (S)	V8 Pin #4 (S)
( )	( )	Black	3″	V4 Pin #4 (S)	V9 Pin #4 (S)
( )	( )	Brown	3 1/2″	V1 Pin #5 (S)	V2 Pin #5 (NS)
( )	( )	Brown	3 1/2″	V2 Pin #5 (S)	V3 Pin #5 (NS)
( )	( )	Brown	3 1/2″	V3 Pin #5 (S)	V4 Pin #5 (NS)
( )	( )	Brown	2 1/2″	V4 Pin #5 (S)	V5 Pin #5 (NS)

Done	Checked	Color	Length	From	To
( )	( )	White	3½″	V6 Pin #5 (S)	V7 Pin #5 (NS)
( )	( )	White	3½″	V7 Pin #5 (S)	V8 Pin #5 (NS)
( )	( )	White	3½″	V8 Pin #5 (S)	V9 Pin #5 (NS)
( )	( )	Black	11½″	V5 Pin #4 (S)	Leave other end free
( )	( )	Brown	10″	V5 Pin #5 (S)	Leave other end free
( )	( )	White	7¾″	V9 Pin #5 (S)	Leave other end free
( )	( )	White/Black	11¼″	V6 Pin #4 and solder lug (NS)	Leave other end free

Refer to Pictorial 4, Figure C.

Done Checked

( ) ( ) Notice the metal tabs at each side of the phono sockets. Tin the tabs on the side shown in the pictorial. Place a bare wire so that it makes contact with each of the tabs as shown. Solder at all points of contact. Clip off excess wire.

( ) ( ) Repeat this procedure on all of the 5 (4-jack) phono socket strips as shown.

Using bare wire, make the following connections.

( ) ( ) J17L (NS) to J18L (S)

( ) ( ) J19L (NS) to J20L (S)

( ) ( ) Cut a black/white wire 9″ long. Strip ¼″ of insulation from each end. Connect one end to J18G (S). Leave the other end free.

( ) ( ) Connect a 56K ohm ½ watt 10% resistor (green, blue, orange, silver) from J3L (NS) to J4G (S).

( ) ( ) Connect a 100 mmf disc condenser (value marked on body of condenser) from J4L (S) to J3L (NS).

( ) ( ) Connect a 56K ohm ½ watt 10% resistor (green, blue, orange, silver) from J2L (NS) to J2G (NS).

( ) ( ) Connect a 56K ohm ½ watt 10% resistor (green, blue, orange, silver) from J6L (NS) to J5G (S).

( ) ( ) Connect a 100 mmf disc condenser (value marked on body of condenser) from J5L (S) to J6L (NS).

( ) ( ) Connect a 56K ohm ½ watt 10% resistor (green, blue, orange, silver) from J7L (NS) to J7G (NS).

Check the above operations before going further!

( ) ( ) Cut a piece of heavy bare wire 2⅝″ long. Bend each end ¼″ as shown in Bending Detail. Insert between CO4 Lug A (NS) and CO1 Lug A (NS). Bend Lug A on CO2 and Lug A on CO3 over the wire and solder both.

( ) ( ) Cut a piece of heavy bare wire 1¼″ long. Bend each end ¼″ as shown. Insert between Lug B on CO1 (S) and Lug B on CO2 (NS).

( ) ( ) Cut a piece of black wire (heavy insulation) 2½″ long. Strip each end ¼″ of insulation and tin the ends. Connect one end to Lug B on CO3 (NS). Connect the other end to Lug B on F1 (NS).

CAUTION: Check the above 3 steps carefully as proper soldering at these points is very important.

( ) ( ) Slip a 1¼″ piece of sleeving over lead "A" of the 2 x .01 disc capacitor (3 lead unit with value marked on body) and connect this lead to CO2 Lug B (NS). Slip ½″ of sleeving over the center lead and connect one to CO4 Lug B (NS). Slip 1¼″ of sleeving over the remaining lead and connect to CO3 Lug B (S). Dress the body of the capacitor against the convenience outlets as shown in the pictorial.

( ) ( ) Mount the terminal board assembly to the chassis, bending the wires carefully out of the way. Use #6-32 x ⅝″ screws, #6 lockwashers under the heads of the screws. After tightening these screws, tighten the screws that fasten the individual boards to the mounting posts. NOTE: The arrow on the Channel B board should point to the V1 tube socket.

Refer to Pictorial 5, Figure A.

The following instructions are for the wiring of Channel A board to the tube sockets.

In the succeeding operations, the wire can be easily hooked through the tube-socket pins as follows: Grasp the wire with long-nose pliers, poke the stripped end through the hole in the pin, and while holding it firmly in that position with one hand, use the eraser end of a pencil to bend the stripped end up over the pin.

Done **Checked**

( ) ( ) Connect the Blue wire from Lug #23 to Pin #6 on V5 (S), passing it under the boards.
( ) ( ) Connect the Green wire from Lug #24 to Pin #7 on V5 (S), passing it under the boards.
( ) ( ) Connect a 430 ohm ½ watt 5% Resistor (Yellow, Orange, Brown, Gold) between Lug #57 (NS) and Pin #8 on V5 (S), passing it under the boards.
( ) ( ) Connect the White/Yellow wire from Lug #60 to Pin #8 on V9 (S).
( ) ( ) Connect the White/Green wire from Lug #45 to Pin #7 on V9 (S).
( ) ( ) Connect the White/Blue wire from Lug #59 to Pin #6 on V9 (S).
( ) ( ) Connect the Blue wire from Lug #28 to Pin #1 on V9 (S).
( ) ( ) Connect the Green wire from Lug #5 to Pin #2 on V9 (S).
( ) ( ) Connect the Yellow wire from Lug #61 to Pin #3 on V9 (S).

This completes the wiring of Tube Socket V9. Check all Pins to make certain that all connections are soldered. Note that Pin #9 on all Tube Sockets is not used.

( ) ( ) Connect a 1K ohm ½ watt 10% resistor (brown, black, red, silver) from Lug #63 (S) to Pin #8 on V8 (S).
( ) ( ) Connect a 100K ohm ½ watt 10% resistor (brown, black, yellow, silver) from Lug #65 (S) to Pin #7 on V8 (NS). Dress across the tube socket.
( ) ( ) Connect a 4.7 meg ohm ½ watt 10% resistor (yellow, purple, green, silver) between Lug #64 (S) and Pin #7 on V8 (S).
( ) ( ) Connect the White/Blue wire from Lug #30 to Pin #6 on V8 (S).
( ) ( ) Connect the Blue wire from Lug #32 to Pin #1 on V8 (S).
( ) ( ) Connect the Green wire from Lug #31 to Pin #2 on V8 (S).
( ) ( ) Connect the Yellow wire from Lug #66 to Pin #3 on V8 (S).

This completes the wiring of Tube Socket V8. Check all Pins to make certain that all connections are soldered.

( ) ( ) Connect the White/Yellow wire from Lug #35 to Pin #8 on V7 (S).
( ) ( ) Connect the White/Green wire from Lug #70 to Pin #7 on V7 (S). Dress over the tube socket.
( ) ( ) Connect the White/Blue wire from Lug #34 to Pin #6 on V7 (S).
( ) ( ) Connect the Blue wire from Lug #36 to Pin #1 on V7 (S).
( ) ( ) Connect the Green wire from Lug #72 to Pin #2 on V7 (S).
( ) ( ) Connect the Yellow wire from Lug #73 to Pin #3 on V7 (NS).
( ) ( ) Connect the Yellow wire from Lug #68 to Pin #3 on V7 (S).

This completes the wiring of Tube Socket V7. Check all Pins to make certain that all connections are soldered.

( ) ( ) Connect the White/Blue wire from Lug #39 to Pin #6 on V6 (S).
( ) ( ) Connect the White/Black wire from Lug #55 to Solder Lug at Pin #4 on V6 (NS). Dress close to chassis.
( ) ( ) Connect the White/Yellow wire from Lug #40 to Pin #8 on V6 (S).
( ) ( ) Connect the White/Green wire from Lug #75 to Pin #7 on V6 (S). Dress over the tube socket.
( ) ( ) Connect the Blue wire from Lug #41 to Pin #1 on V6 (S).
( ) ( ) Connect a 10K ohm ½ watt 10% resistor (brown, black, orange, silver) between the bottom section of Lug #76 (S) and Pin #2 on V6 (S).
( ) ( ) Connect the Yellow wire from Lug #42 to Pin #3 on V6 (NS).

Done Checked

( ) ( ) Connect a 180K ohm ½ watt 10% resistor (brown, gray, yellow, silver) between Lug #74 (S) and Pin #3 on V6 (S).

( ) ( ) Connect a .47 mfd 10 volt disc condenser (value marked on body of condenser) between Lug #76 (S) and Lug #77 (NS).

This completes the wiring of Tube Socket V6. Check all Pins to make certain that all connections are soldered. Refer to Pictorial 5, Figure B.

The following instructions are for the wiring of Channel B Board to Tube Sockets.

Done Checked

( ) ( ) Connect the Black/White wire from Lug #44 to Solder Lug at Pin #4 on V6 (S) passing it under the boards. Dress close to chassis.

( ) ( ) Connect the White/Yellow wire from Lug #23 to Pin #3 on V1 (NS).

( ) ( ) Connect a 180K ohm ½ watt 10% resistor (brown, gray, yellow, silver) between Lug #59 (S) and Pin #3 on V1 (S). Dress close to the board and to the rear of the Tube Socket.

( ) ( ) Connect the White/Blue wire from Lug #24 to Pin #1 on V1 (S).

( ) ( ) Connect a 10K ohm ½ watt 10% resistor (brown, black, orange, silver) between the bottom section of Lug #57 (S) and Pin #2 on V1 (S).

( ) ( ) Connect the Blue wire from Lug #26 to Pin #6 on V1 (S).

( ) ( ) Connect the Green wire from Lug #58 to Pin #7 on V1 (S).

( ) ( ) Connect the Yellow wire from Lug #25 to Pin #8 on V1 (S.)

( ) ( ) Connect a .47 mfd 10 volt disc condenser (value marked on body of condenser) between Lug #56 (NS) and Lug #57 (S).

This completes the wiring of Tube Socket V1. Check all Pins to make certain that all connections are soldered.

( ) ( ) Connect the White/Yellow wire from Lug #60 to Pin #3 on V2 (NS).

( ) ( ) Connect the White/Yellow wire from Lug #65 to Pin #3 on V2 (S).

( ) ( ) Connect the White/Green wire from Lug #61 to Pin #2 on V2 (S).

( ) ( ) Connect the White/Blue wire from Lug #29 to Pin #1 on V2 (S). Dress across the socket.

( ) ( ) Connect the Blue wire from Lug #31 to Pin #6 on V2 (S).

( ) ( ) Connect the Green wire from Lug #63 to Pin #7 on V2 (S).

( ) ( ) Connect the Yellow wire from Lug #30 to Pin #8 on V2 (S).

This completes the wiring of Tube Socket V2. Check all Pins to make certain that all connections are soldered.

( ) ( ) Connect the White/Yellow wire from Lug #67 to Pin #3 on V3 (S).

( ) ( ) Connect the White/Green wire from Lug #34 to Pin #2 on V3 (S), dress across the tube socket.

( ) ( ) Connect the White/Blue wire from Lug #33 to Pin #1 on V3 (S).

( ) ( ) Connect the Blue wire from Lug #35 to Pin #6 on V3 (S).

( ) ( ) Connect a 100K ohm ½ watt 10% resistor (brown, black, yellow, silver) from Lug #68 (S) to Pin #7 on V3 (NS).

( ) ( ) Connect a 4.7 meg ohm 10% resistor (yellow, purple, green, silver) between Lug #69 (S) and Pin #7 on V3 (S).

( ) ( ) Connect a 1K ohm ½ watt 10% resistor (brown, black, red, silver) from Lug #70 (S) to Pin #8 on V3 (S).

This completes the wiring of Tube Socket V3. Check all pins to make certain that all connections are soldered.

( ) ( ) Connect the White/Yellow wire from Lug #72 to Pin #3 on V4 (S).

( ) ( ) Connect the White/Blue wire from Lug #37 to Pin #1 on V4 (S).

( ) ( ) Connect the Blue wire from Lug #74 to Pin #6 on V4 (S).

( ) ( ) Connect the Green wire from Lug #54 to Pin #7 on V4 (S).

( ) ( ) Connect the Yellow wire from Lug #73 to Pin #8 on V4 (S).

( ) ( ) Connect the White/Green wire from Lug #16 to pin #2 on V4 (S). Dress over top of tube socket.

This completes the wiring of Tube Socket V4. Check all Pins to make certain that all connections are soldered.

Done Checked

( ) ( ) Connect the White/Green wire from Lug #41 to Pin #2 on V5 (S).
( ) ( ) Connect the White/Blue wire from Lug #42 to Pin #1 on V5 (S).
( ) ( ) Connect a 430 ohm 1/2 watt 5% resistor (yellow, orange, brown, gold) between the bottom section of Lug #76 (S) and Pin #3 on V5 (S).

This completes the wiring of Tube Socket V5. Check all Pins to make certain that all connections are soldered.

Refer to Pictorial 5, Figure C.

Done Checked

( ) ( ) Strip the insulation from the two lengths of small black flexible tubing as shown in the Pictorial. Use a sharp knife or razor blade and cut around the tubing at the points indicated. Slit between the two points and peel off the black insulation. Mount one on each side of the metal shield. Bend the lugs over the tubing, and solder the lugs to the tubing.
( ) ( ) Cut a Green/White shielded wire 14 3/4" long. Strip 3/4" of outer insulation from one end. Twist the strands of the shield together and tin the end. Strip the inner conductor 3/8" of insulation. Connect the inner conductor to Lug #17 (S) on Channel A board. Connect the shield to Lug #16 (S). Dress along the Channel A board between the flexible tubing and the board. Tape to the flexible tubing at the arrow end of the board. Strip 3/4" of outer insulation from the other end. Twist the strands of the shield together and tin the end. Strip the inner conductor 1/4" of insulation and tin. Leave this end free.
( ) ( ) Cut a White/Green shielded wire 12" long. Prepare as above. Connect the inner conductor to Lug #4 (S) on Channel B board, connect the shield to Lug #5 (S). Dress along the Channel B board between the flexible tubing and the board. Tape to the flexible tubing near Lug #20 on Channel B board. Strip 3/4" of outer insulation from the other end. Twist the strands of the shield together and tin the end. Strip the inner conductor 1/4" of insulation and tin. Leave this end free.

Cut the following wires to the lengths specified. Strip 3/8" of insulation from each end. Connect one end to the lugs on the Channel A Board. Leave the other end free.

Done	Checked	Color	Length	Connect To
( )	( )	Gray	17 3/4"	Lug #19 (NS)
( )	( )	Purple	15 1/2"	Lug #14 (NS)
( )	( )	Red	11 1/2"	Lug #1 (S)

( ) ( ) Dress this group of wires neatly along the top of the terminal boards between the two flexible tubings towards the arrow end of the Channel A board. Tape together at the mounting post. Dress down along the mounting post to the chassis. Bend along the chassis in the direction shown. Dress the Brown, the White, the Black, the White/Black filament wires and the White/Black wire from Lug #76 on the Channel B board with this group. Tape as shown.

Cut the following wires 2 1/2" long. Strip 1/2" of insulation from each end. Connect from Channel B board to Channel A board, top section of lugs.

Done Checked

( ) ( ) Gray from Lug #2 (S) on Channel B to Lug #19 (S) on Channel A.
( ) ( ) Purple from Lug #7 (S) on Channel B to Lug #14 (S) on Channel A.
( ) ( ) Red from Lug #14 (S) on Channel B to Lug #7 (S) on Channel A.

Done Checked

( ) ( ) Cut a White/Blue wire 11″ long. Feed through the Channel B flexible tubing. Leave 1½″ extending at the arrow end of the board. Strip ½″ of insulation from this end. Connect to Lug #3 (S) on Channel B board. Strip ¼″ of insulation from other end. Leave this end free.

( ) ( ) Cut a White/Green wire 10″ long. Feed through the Channel A flexible tubing. Leave 1½″ of wire extending at Lug #20 end of the Channel A board. Strip ½″ of insulation from this end. Connect to Lug #18 (S) on Channel A board. Strip ¼″ of insulation from other end. Leave this end free.

This completes the preliminary wiring and assembly of the boards.

A general reinspection of the workmanship of this assembly would be worthwhile. Put the chassis aside for later use.

Refer to Pictorial 6.

The following operations are to prepare the various switches prior to assembling them to the front panel. Handle the switches carefully, so as not to dislocate the terminals or crack the phenolic wafers. As each subassembly is completed, store it carefully for later use.

Notice the position of the locking tab indicated in the pictorial and orient switch accordingly. Cut the following wires to the lengths specified. Strip ¼″ of insulation from one end. Connect this end to the switch. Strip ½″ of insulation from the other end. Leave this end free.

BASS SWITCH (S5) WIRING

Refer to Pictorial 6, Figure A.

Done	Checked	Color	Length	Connect To
( )	( )	Green	10″	Wafer #1 Lug #4 (S)
( )	( )	White/Black	2¾″	Wafer #2 Lug #5 (S)
( )	( )	White/Black	6¾″	Wafer #2 Lug #13 (S)
( )	( )	White/Brown	9¾″	Wafer #2 Lug #15 (S)

BASS SWITCH (S7) WIRING

( )	( )	Green	11″	Wafer #1 Lug #4 (S)
( )	( )	Black/White	2¾″	Wafer #2 Lug #5 (S)
( )	( )	Black/White	8″	Wafer #2 Lug #13 (S)
( )	( )	Brown /White	11½″	Wafer #2 Lug #15 (S)

TREBLE SWITCH (S4) WIRING

( )	( )	Bare wire	1½″	Wafer #1 Lug #5 (S)
( )	( )	White/Green	7½″	Wafer #1 Lug #11 (S)
( )	( )	White/Orange	7½″	Wafer #2 Lug #5 (S)

TREBLE SWITCH (S6) WIRING

( )	( )	Bare wire	1½″	Wafer #1 Lug #5 (S)
( )	( )	Green/White	7¼″	Wafer #1 Lug #11 (S)
( )	( )	Orange/White	7″	Wafer #2 Lug #5 (S)

ROLLOFF SWITCH (S9) WIRING

Refer to Pictorial 6, Figure B.

( )	( )	White/Black	2″	Wafer #1 Lug #1 (S)
( )	( )	Black/White	2¾″	Wafer #1 Lug #12 (S)

LOW CUT SWITCH (S10) WIRING

( )	( )	White/Black	6½″	Wafer #1 Lug #1 (S)
( )	( )	White/Gray	6″	Wafer #1 Lug #4 (NS)
( )	( )	White/Purple	5″	Wafer #1 Lug #4 (S)

Done	Checked	Color	Length	Connect To
( )	( )	Blue/White	10″	Wafer #1 Lug #10 (S)
( )	( )	Green/White	9″	Wafer #1 Lug #14 (S)
( )	( )	White/Blue	6¼″	Wafer #2 Lug #4 (S)
( )	( )	White/Green	4¼″	Wafer #2 Lug #6 (S)
( )	( )	Black/White	9¾″	Wafer #2 Lug #8 (S)
( )	( )	Gray/White	8½″	Wafer #2 Lug #13 (S)
( )	( )	Purple/White	5½″	Wafer #2 Lug #15 (S)

This completes the preliminary wiring of these switches. Before going further, check the previous operations.

MODE SWITCH (S2) WIRING

Done Checked

( ) ( ) Connect a bare wire from Lug #1 (S) to Lug #3 (NS) on Wafer #1.

( ) ( ) Connect a bare wire from Lug #1 (S) to Lug #2 (NS) on Wafer #2.

( ) ( ) Connect a bare wire from Lug #4 (S) on Wafer #1 to Lug #4 (S) on Wafer #2.

( ) ( ) Connect a bare wire from Lug #6 (S) on Wafer #1 to Lug #6 (NS) on Wafer #2.

( ) ( ) Cut each lead of a 47K ohm ½ watt 10% resistor (yellow, purple, orange, silver) 1″ long. Connect one end to Lug #2 (S) on Wafer #2. Leave the other end free.

( ) ( ) Cut one lead of a 47K ohm ½ watt 10% resistor (yellow, purple, orange, silver) ¾″ long. Connect to Lug #3 (S) on Wafer #1. Cut the other lead to 1″. Leave this end free.

( ) ( ) Cut a Green/White wire 4″ long. Strip ¼″ of insulation from each end. Connect one end to Lug #7 (S) on Wafer #1. Leave the other end free.

( ) ( ) Cut a White/Green wire 3¾″ long. Strip ¼″ of insulation from each end. Connect one end to Lug #6 (S) on Wafer #2. Leave the other end free.

( ) ( ) Cut a White/Yellow wire 6¾″ long. Strip ¼″ of insulation from each end. Connect one end to Lug #5 (S) on Wafer #1. Leave the other end free.

( ) ( ) Cut a Yellow wire 7″ long. Strip ¼″ of insulation from one end. Connect to Lug #5 (S) on Wafer #2. Strip ½″ of insulation from the other end. Leave this end free.

( ) ( ) Cut a Black/White wire 2½″ long. Strip ¼″ of insulation from each end. Connect one end to Lug #2 (S) on Wafer #1. Leave the other end free.

( ) ( ) Cut a White/Black wire 2½″ long. Strip ¼″ of insulation from each encl. Connect one end to Lug #3 (S) on Wafer #2. Leave the other end free.

This completes the wiring of the mode switch. Check again, then put aside for later use.

FUNCTION SWITCH (S1) WIRING

Refer to Pictorial 6, Figure C.

Done Checked

( ) ( ) Connect a bare wire between Lug #3 (NS) and Lug #4 (S) on Wafer #3.

( ) ( ) Connect a bare wire between Lug #1 (NS) and Lug #2 (S) on Wafer #4.

( ) ( ) Cut a Black/White wire 2¾″ long. Strip ¼″ of insulation from each end. Connect one end to Wafer #1 Lug #1 (NS). Leave the other end free.

( ) ( ) Prepare a Green shielded wire 11″ long. Strip 1¾″ of outer insulation from one end. Twist the strands of the shield together and tin the end. Strip the inner conductor ¼″ of insulation and tin. Connect the inner conductor to Wafer #1 Lug #5 (S). Slip ¾″ of sleeving over the shield and connect to Wafer #1 Lug #1 (S). Strip 1″ of outer insulation from the other end. Twist the strands of the shield together and tin the end. Strip the inner conductor ½″ of insulation and tin. Leave this end free.

Done Checked

( ) ( ) Prepare an Orange shielded wire 14″ long. Strip 1¾″ of outer insulation from one end. Twist the strands of the shield together and tin the end. Cut off ½″ of the inner conductor, strip ¼″ of insulation and tin. Connect the inner conductor to Wafer #1 Lug #4 (S). Leave the shield and the other end free.

( ) ( ) Prepare a Blue shielded wire 14¼″ long. Strip 1½″ of outer insulation from one end. Twist the strands of the shield together and tin the end. Cut off ¾″ of the inner conductor, strip ¼″ of insulation and tin. Connect the inner conductor to Wafer #1 Lug #3 (S). Leave the shield and the other end free.

( ) ( ) Prepare a Red shielded wire 13½″ long. Strip 2″ of outer insulation from one end. Twist the strands of the shield together and tin the end. Cut off 1¼″ of the inner conductor, strip ¼″ of insulation and tin. Connect the inner conductor to Wafer #1 Lug #2 (S). Leave the shield and the other end free.

( ) ( ) Cut a White/Black wire 2″ long. Strip ¼″ of insulation from each end. Connect one end to Wafer #2 Lug 1 (NS). Leave the other end free

( ) ( ) Prepare a White/Green shielded wire 13″ long. Strip 1″ of outer insulation from one end. Twist the strands to the shield together and tin the end. Strip the inner conductor ¼″ of insulation and tin. Connect the inner conductor to Wafer #2 Lug #5 (S). Slip ¾″ of sleeving over the shield and connect to Wafer #2 Lug #1 (S). Strip 1″ of outer insulation from the other end. Twist the strands of the shield together and tin the end. Strip the inner conductor ½″ of insulation and tin. Leave this end free.

( ) ( ) Prepare a White/Orange shielded wire 15¼″ long. Strip 1″ of outer insulation from one encl. Twist the strands of the shield together and tin the end. Strip the inner conductor ¼″ of insulation and tin. Connect the inner conductor to Wafer #2 Lug #4 (S). Leave the shield and the other end free.

( ) ( ) Prepare a Blue/Green shielded wire 15¾″ long. Strip 1¼″ of outer insulation from one end. Twist the strands of the shield together and tin the end. Cut off of the inner conductor, Strip ¼″ of insulation and tin. Connect the inner conductor to Wafer #2 Lug #3 (S). Leave the shield and the other end free.

( ) ( ) Prepare a Red/Green shielded wire 15″ long. Strip 1½″ of outer insulation from one end. Twist the strands of the shield together and tin the end. Cut off ¾″ of the inner conductor, strip ¼″ of insulation and tin. Connect the inner conductor to Wafer #2 Lug #2 (S). Leave the shield and the other end free.

( ) ( ) Cut the following wires to the lengths specified. Strip ¼″ of insulation from each end. Connect one end to the points indicated. Leave the other end free.

Done	Checked	Color	Length	Connect To
( )	( )	Brown	7¼″	Wafer #3 Lug #1 (NS)
( )	( )	Brown/White	17″	Wafer #3 Lug #1 (S)
( )	( )	Black	5¾″	Wafer #3 Lug #2 (NS)
( )	( )	Black/White	15¼″	Wafer #3 Lug #2 (NS)
( )	( )	Orange/White	15¼″	Wafer #3 Lug #5 (S)
( )	( )	Gray/White	14¾″	Wafer #3 Lug #7 (S)

Done Checked

( ) ( ) Prepare a Green/White shielded wire 7¼″ long. Strip 1″ of outer insulation from one end. Twist the strands of the shield together and tin the end. Strip ¼″ of insulation from the inner conductor and tin. Connect the inner conductor to Wafer #3 Lug #6 (NS). Slip ¾″ of sleeving over the shield and connect to Wafer #3 Lug #2 (S). Strip ½″ of outer insulation from the other end. Cut off the strands of the shield close to the insulation. Strip the inner conductor ¼″ of insulation. Leave this end free.

Done Checked

( ) ( ) Prepare a Green/White shielded wire 15″ long. Strip 3/4″ of insulation from one end. Cut off the strands of the shield close to the insulation. Strip the inner conductor 1/4″ of insulation and tin. Connect the inner conductor to Wafer #3 Lug #6 (S). Strip 1″ of outer insulation from the other end. Twist the strands of the shield together and tin the end. Strip 1/4″ of insulation from the inner conductor and tin. Leave this end free.

( ) ( ) Group together the Orange/White, Gray/White, Brown/White and Black/White wires with the long Green/White shielded wire from Wafer #3. Tape as shown.

( ) ( ) Group together the Brown, Black and short Green/White shielded wire from Wafer #3. Tape as shown.

( ) ( ) Cut the following wires to the lengths specified. Strip 1/4″ of insulation from each end. Connect one end to the points indicated. Leave the other end free.

Done	Checked	Color	Length	Connect To
( )	( )	White/Orange	12 1/4″	Wafer #4 Lug #3 (S)
( )	( )	White/Gray	11 1/2″	Wafer #4 Lug #5 (S)
( )	( )	Brown	9 1/2″	Wafer #4 Lug #6 (NS)
( )	( )	White/Brown	13 1/2″	Wafer #4 Lug #6 (S)
( )	( )	Black	5″	Wafer #4 Lug #7 (NS)
( )	( )	White/Black	12 1/4″	Wafer #4 Lug #7 (NS)

( ) ( ) Prepare a Green shielded wire 7 3/4″ long. Strip 1″ of outer insulation from one end. Twist the strands of the shield together and tin the end. Strip the inner conductor 1/4″ and tin. Connect the inner conductor to Wafer #4 Lug #4 (NS). Slip 3/4″ of sleeving over the shield and connect to Wafer #4 Lug #7 (S). Strip 1/2″ of outer insulation from the other end. Cut the strands of the shield close to the insulation. Strip the inner conductor 1/4″ of insulation and tin. Leave this end free.

( ) ( ) Prepare a Green shielded wire 11 1/2″ long. Strip 3/4″ of outer insulation from one end. Cut off the strands of the shield close to the insulation. Strip the inner conductor 1/4″ of insulation and tin. Connect the inner conductor to Wafer #4 Lug #4 (S). Strip 1″ of outer insulation from the other end. Twist the strands of the shield together and tin the end. Strip the inner conductor 1/4″ of insulation and tin. Leave this end free.

( ) ( ) Cut one lead on a .47 MFD 10 volt disc condenser (value marked on body of condenser) to 1 1/4″, slip 1″ of sleeving over the lead. Connect to Wafer #3 Lug #3 (S). Leave the other end free.

( ) ( ) Cut one lead on a .47 MFD 10 volt disc condenser (value marked on body of condenser) to 3/4″, slip 1/2″ of sleeving over the lead. Connect to Wafer #4 Lug #1 (S). Leave the other end free.

( ) ( ) Group together the White/Orange, White/Gray, Brown, White/Brown, Black, White/Black, and the two Green shielded wires from Wafer #4. Tape as shown in the pictorial. Inspect and put aside for later use.

FRONT PANEL

Refer to Pictorial 7, Figure B.

Done Checked

( ) ( ) Install four slide switches at positions S11, S12, S13, and S14. Use #4-40 x 3/8″ screws, #4-40 nuts, and #4 lockwashers under nuts. Mount switches from front of panel.

( ) ( ) Insert small rubber grommet in hole M.

( ) ( ) Install AC switch (S3) at position S3, inserting from rear of panel. Use a 3/8″ lockwasher under 3/8″ nut. Rotate switch so that locking tab falls into small hole in panel before tightening nut.

( ) ( ) Insert the #1815 bulb into the pilot light socket. Slip the cardboard tube over the bulb and socket, using a twisting motion to force the tube over the white wire.

( ) ( ) Install the pilot lamp subassembly at position E on front of panel. Use #6-32 x 3/8″ screw, #6-32 nut, and #6 lockwasher under nut. Insert screw from front of panel. Twist the wires and pass through grommet M.

Refer to Pictorial 7, Figure A.

Done Checked

( ) ( ) Cut 1/2″ of insulation off one end of the large black flexible metal tubing. (Use a sharp knife, cut around 1/2″ mark, slit from this mark to edge of tubing and peel off insulation.)

Cut the following heavy insulated wires to the lengths specified. Strip 1/4″ of insulation from one end and tin the end.

		Color	Length
( )	( )	Blue	25 3/4″
( )	( )	Tan	27 3/4″
( )	( )	Black	27 1/2″

Group these wires together and pass through the flexible tubing as shown in Pictorial VII, Figure A. Insert small fiber insulating bushings into each end of tubing around wires. Insert bared end of tubing into hole L. Insert the other end through hole K about 1″. Dress as shown in Pictorial VII, Figure B.

( ) ( ) Install two large plastic clamps over the tubing and pilot lamp wires at positions A and B. Use #6-32 x 3/8″ screws, #6 flatwashers under screwhead, #6-32 nuts, #6 lockwashers under the nuts.

Refer to Pictorial 7, Figure C. Disregard any numbers on the switch itself when making the following 3 connections.

( ) ( ) Strip the Tan wire 1/4″ of insulation, tin, and connect to Lug #2 on S3 (S).

( ) ( ) Strip the Blue wire 1/4″ of insulation, tin and connect to Lug #1 on S3 (S).

( ) ( ) Strip the Black wire 3/4″ of insulation, tin the end and connect through Lug #4 (S) to Lug #3 (S) on S3.

Refer to Pictorial 8, Figure A.

( ) ( ) Mount lug strips TS4, TS5, and TS6. Use #6-32 - 3/8″ screws, #6-32 nuts, #6 lockwasher under nuts. Insert screws from front of panel.

( ) ( ) Mount the tubular threaded spacer at the position shown. Use #6-32 x 3/8″ screw, #6 lockwasher under screw head.

( ) ( ) Mount loudness control R1. Use 3/8″ lockwasher under 3/8″ nut. Rotate control so that locking tab falls into small hole in panel before tightening nut.

( ) ( ) Mount balance control R2. Use 3/8″ lockwasher under 3/8″ nut. Rotate control so that locking tab falls into small hole in panel before tightening nut.

Reinspect the above operations to insure that the correct parts have been assembled.

Cut the following wires to the lengths specified. Strip 1/4″ of insulation from each end. Dress as shown in the pictorial.

		Color	Length	From	To
( )	( )	Black/White	4 1/2″	R1A Lug #3 (NS)	R2A Lug #1 (NS)
( )	( )	Black/White	4 1/2″	R1A Lug #3 (S)	TS5 Lug #1 (NS)
( )	( )	Green/White	5 1/2″	R1A Lug #1 (S)	R2A Lug #2 (S)
( )	( )	Green/White	4 1/4″	R1A Lug #4 (S)	S11A Lug #3 (NS)
( )	( )	White/Black	4 1/4″	R1B Lug #3 (NS) (Dress over the control.)	R2B Lug #3 (NS)
( )	( )	White/Black	2 3/4″	R1B Lug #3 (S)	TS5 Lug #2 (NS)
( )	( )	White/Green	4 3/4″	R1B Lug #1 (S) (Dress over the control.)	R2B Lug #2 (S)
( )	( )	White/Green	3 1/2″	R1B Lug #4 (S)	S11B Lug #3 (NS)

( ) ( ) Connect a 100K ohm 1/2 watt 10% resistor (brown, black, yellow, silver) from R1A Lug #5 (S) to TS 5 Lug #1 (NS).

( ) ( ) Connect a 100K ohm 1/2 watt 10% resistor (brown, black, yellow, silver) from R1B Lug #5 (S) to TS5 Lug #2 (NS).

Done Checked

( ) ( ) Connect a 27K ohm ½ watt 10% resistor (red, purple, orange, silver) from S11A Lug #2 (NS) to TS 5 Lug #1 (NS).

( ) ( ) Connect a .01 disc condenser (value marked on body of condenser) from S11A Lug #3 (S) to S11A Lug #2 (S). Stand straight up.

( ) ( ) Connect a 27K ohm ½ watt 10% resistor (red, purple, orange, silver) from S11B Lug #2 (NS) to TS5 Lug #2 (NS).

( ) ( ) Connect a .01 disc condenser (value marked on body of condenser) from S11B Lug #2 (S) to S11B Lug #3 (S). Stand straight up.

( ) ( ) Connect a short insulated wire from S13A Lug #3 (S) to S13B Lug #1 (NS).

( ) ( ) Connect a short insulated wire from S13A Lug #1 (S) to S13B Lug #3 (NS).

( ) ( ) Connect a short insulated wire from S13B Lug #2 (S) to S14A Lug #3 (NS).

( ) ( ) Connect a 470K ohm ½ watt 10% resistor (yellow, purple, yellow, silver) from S13A Lug #2 (NS) to TS6 Lug #1 (NS).

( ) ( ) Connect a 470K ohm ½ watt 10% resistor (yellow, purple, yellow, silver) from S14A Lug #2 (NS) to TS6 Lug #1 (NS).

Cut the following shielded wires to the lengths specified. Strip ½″ of outer insulation from one end. Clip off the strands of the shield close to the insulation. Strip ¼″ of insulation from the inner conductor and tin. Connect to the points indicated. Strip 1″ of outer insulation from the other end. Twist the strands of the shield together and tin the end. Strip ½″ of insulation from the inner conductor and tin. Leave this end free.

Done	Checked	Color	Length	Connect To
( )	( )	White/Orange	13″	S13A Lug #2 (S)
( )	( )	Green	6¼″	S13B Lug #3 (S)
( )	( )	White/Green	6½″	S13B Lug #1 (S)
( )	( )	Red	6¼″	S14A Lug #3 (S)
( )	( )	Orange	13½″	S14A Lug #2 (S)
( )	( )	Blue	10¾″	S14A Lug #1 (S)

Refer to Pictorial 8, Figure B.

( ) ( ) Install the mode switch at position S2, inserting from rear of panel. Use ⅜″ lockwasher under ⅜″ nut. Rotate switch so that locking tab falls into small hole in panel before tightening nut.

( ) ( ) Connect the Green/White wire from Wafer #1 to R2A Lug #3 (S).

( ) ( ) Connect the White/Green wire from Wafer #2 to R2B Lug #1 (S). Dress over the control.

( ) ( ) Connect the Black/White wire from Wafer #1 to TS5 Lug #1 (NS).

( ) ( ) Connect the White/Black wire from Wafer #2 to TS5 Lug #2 (NS).

( ) ( ) Connect the 47K ohm ½ watt 10% resistor from Wafer #1 to S12A Lug #2 (S).

( ) ( ) Connect the 47K ohm ½ watt 10% resistor from Wafer #2 to S12B Lug #2 (S). Make certain that the wires from these resistors do not touch each other or any other pins on the switch.

( ) ( ) Install blend control at position R3, inserting from rear of panel. Use ⅜″ lockwasher under ⅜″ nut. Rotate control so that locking tab falls into small hole in panel before tightening nut.

( ) ( ) Connect a 220K ohm ½ watt 10% resistor (red, red, yellow, silver) between Lug #1 (NS) and Lug #3 (NS) on R3A.

( ) ( ) Cut a Green wire 3½″ long. Strip ¼″ of insulation from each end. Connect one end to R3A Lug #1 (S). Connect the other end to TS6 Lug #1 (S) .

( ) ( ) Cut a White wire 4″ long. Strip ¼″ of insulation from one end. Connect to R3A Lug #2 (S). Strip ½″ of insulation from the other end. Leave this end free.

( ) ( ) Cut a Black wire 4″ long. Strip ¼″ of insulation from one end. Connect to R3A Lug #3 (S). Strip ½″ of insulation from the other end. Leave this end free.

Done Checked

( ) ( ) Connect the White/Yellow wire from Wafer #1 S2 mode switch to R3B Lug #1 (S). Dress in the direction shown close to the panel.

( ) ( ) Connect the Yellow wire from Wafer #2 S2 mode switch to R3B Lugs #2 (S) and #3 (S). Dress above the panel.

( ) ( ) Install the S4 treble switch at position S4 and the S5 bass switch at position S5, inserting from rear of panel. Use 3/8″ lockwasher under 3/8″ nut. Rotate switch so that locking tab falls into small hole in panel before tightening nut.

( ) ( ) Connect the bare wire from S4 Wafer #1 to S5 Wafer #1 Lug #2 (S).

( ) ( ) Connect the short White/Black wire from Wafer #2 on S5 to S4 Wafer #2 Lug #6 (S).

( ) ( ) Install the power switch shield at the position shown. Use #6-32 x 3/8″ screws, #6 lockwashers under #6-32 nuts. Dress all shielded wires from slide switches over the power shield.

( ) ( ) Install the S6 treble switch at position S6 and the S7 bass switch at position S7, inserting from rear of panel. Use 3/8″ lockwasher under 3/8″ nut. Rotate switch so that locking tab falls into small hole in panel before tightening nut.

( ) ( ) Connect the bare wire from S6 Wafer #1 to S7 Wafer #1 Lug #2 (S).

( ) ( ) Connect the short Black/White wire from S7 Wafer #2 to S6 Wafer #2 Lug #6 (S).

Refer to Pictorial 8, Figure C.

( ) ( ) Install the turnover switch at position S8 and the rolloff switch at position S9, inserting from rear of panel. Use 3/8″ lockwasher under 3/8″ nut. Rotate switch so that locking tab falls into small hole in panel before tightening nut.

( ) ( ) Connect the White/Black wire from S9 Wafer #1 to S8 Wafer #2 Lug #15 (S).

( ) ( ) Connect the Black /White wire from S9 Wafer #1 to S8 Wafer #2 Lug #16 (S).

( ) ( ) Install the low-cut switch at position S10, inserting from rear of panel. Use 3/8″ lockwasher under 3/8″ nut. Rotate switch so that locking tab falls into small hole in panel before tightening nut.

( ) ( ) Connect the White/Purple wire from Wafer #1 to S5 Wafer #2 Lug #8 (S).

( ) ( ) Connect the Purple/White wire from Wafer #2 to S7 Wafer #2 Lug #8 (S).

Refer to Pictorial 8, Figure D.

( ) ( ) Group together and tape the Green, Red, Blue, Orange and White/Orange shielded wires from the slide switches.

( ) ( ) Group together and tape the White/Gray, White/Blue, and the White/Black wires from S10. Leave the White/Green wire free.

( ) ( ) Group together and tape the Blue/White, Gray/White and Black/White wires from S10. Leave the Green/White wire free.

( ) ( ) Twist together the Black/White and Brown/White wires from S7 Wafer #2. Group these two wires together with the Green wire from S7 Wafer #1, the Orange/White wire from S6 Wafer #2 and the Green/White wire from S6 Wafer #1. Tape at the two points shown.

( ) ( ) Twist the White/Black and the White/Brown wires together from S5 Wafer #2. Group these two wires together with the Green wire from Wafer #1, the White/Orange wire from S4 Wafer #2 and the White/Green wire from S4 Wafer #1. Tape at the two points shown.

Refer to Pictorial 8, Figure E.

( ) ( ) Install the function switch at position S1, inserting from rear of panel. Use 3/8″ lockwasher under 3/8″ nut. Rotate switch so that locking tab falls into small hole in panel before tightening nut.

( ) ( ) Slip 1″ of sleeving over the shield of the Orange wire and connect to TS4 Lug #1 (NS).

( ) ( ) Slip 1 1/4″ of sleeving over the shield of the Blue wire and connect to TS4 Lug #1 (NS).

( ) ( ) Slip 1 3/4″ of sleeving over the shield of the Red wire and connect to TS4 Lug #1 (NS). Tape this group of wires as shown.

( ) ( ) Connect the Black/White wire from Wafer #1 to TS4 Lug #1 (S).

Done Checked

( ) ( ) Slip 3/4″ of sleeving over the shield of the White/Orange wire and connect to TS4 Lug #2 (NS).
( ) ( ) Slip 1″ of sleeving over the shield of the Blue/Green wire and connect to TS4 Lug #2 (NS).
( ) ( ) Slip 1 1/4″ of sleeving over the shield of the Red /Green wire and connect to TS4 Lug #2 (NS).
( ) ( ) Tape this group of wires as shown.
( ) ( ) Connect the White/Black wire from Wafer #2 to TS4 Lug #2 (S).

Refer to Pictorial 9.

( ) ( ) Install three speed nuts on the right flange of the front panel as shown.
( ) ( ) Install two speed nuts on the right hand side rail as shown.
( ) ( ) Install the right hand side rail to the front panel. Make certain that the two metal tabs on the panel fall into the two slots in the side rail before tightening the screws. Use #6-32 x 3/8″ screws.

Refer to Pictorial 8, Figure E.

NOTE: The following instructions are for cabling of the wires from the function switch. Dress these wires parallel to each other. Make sure that no wires cross over each other. This will make a neat and professional looking cable and it will be much easier to install cable clamps.

( ) ( ) Group together the long Green, Orange, Blue and Red shielded wires from Wafer #1 with the White/Orange, Blue/Green, Red/Green and White/Green shielded wires from Wafer #2 and the Orange/White, Brown /White, Gray/White, and Black/White wires from Wafer #3. Install a medium size plastic cable clamp over these wires and mount at position P. Use #6-32 x 3/8″ screw, #6 flatwasher (against clamp), and #6 lockwasher under #6-32 nut.
( ) ( ) Wrap tape around the wires approximately 3″ away from the clamp. At this point break out the Green shielded wire and the White/Green shielded wire as shown.
( ) ( ) Install a medium size plastic cable clamp at position R. Use #6-32 x 3/8″ screw, #6 flatwasher (against clamp), #6 lockwasher under #6-32 nut.
( ) ( ) Install a small size cable clamp over the group of wires from Wafer #4 of the function switch. Use a #6 lockwasher under a #6-32 x 3/8″ screw, #6 flatwasher on both sides of the cable clamp. Screw into the tubular threaded spacer.
( ) ( ) Connect the Black wire from this group to R2B Lug #3 (S).
( ) ( ) Dress the short Green shielded wire from this group along the panel and down into the slide switch channel. Connect to S12B Lug #1 (S).
( ) ( ) Dress the Brown wire from this group in the same direction. Connect to S12B Lug #3 (S).
( ) ( ) Dress the Black wire from Wafer #3 close to the panel and connect to R2A Lug #1 (S).
( ) ( ) Dress the Green/White shielded wire from Wafer #3 close to the panel and down into the slide switch channel. Connect to S12A Lug #1 (S).
( ) ( ) Dress the Brown wire from Wafer #3 in the same direction and connect to S12A Lug #3 (S).
( ) ( ) Cut a Green/White wire 6 3/4″ long. Strip 1/4″ of insulation from one end. Connect to R1A Lug #2 (S). Strip 1/2″ of insulation from the other end. Leave this end free.
( ) ( ) Cut a White/Green wire 6″ long. Strip 1/4″ of insulation from one end. Connect to R1B Lug #2 (S). Strip 1/2″ of insulation from the other end. Leave this end free.
( ) ( ) Cut a White/Black wire 5 3/4″ long. Strip 1/4″ of insulation from one end. Connect to TS5 Lug #2 (S). Strip the other end 1/2″ of insulation. Leave this end free.
( ) ( ) Cut a Black/White wire 7″ long. Strip one end 1/4″ of insulation. Connect to TS5 Lug #1 (S). Strip 1/2″ of insulation from the other end. Leave this end free.

This completes the preliminary wiring of the front panel. Check for correct wiring and make sure that all connections are soldered.

Refer to Pictorial 9.

Parts used— Front Panel Assembly
Left Hand Side Rail
Main Chassis

Done Checked

( ) ( ) Install five speed nuts on the bottom and left flange of the front panel in the positions shown.
( ) ( ) Install two speed nuts on the left hand side rail as shown.
( ) ( ) Install four speed nuts on the main chassis. (One on each side, two on top flange.)
( ) ( ) Mount the left hand side rail to the front panel. Make sure that the two metal tabs on the front panel fall into the two slots in the side rail before tightening the screws. Use #6-32 x 3/8" screws.
( ) ( ) Install the metal cable clamp over the bared section of the flexible metal tubing as shown. Use #6 lockwasher under a #6-32 nut. Solder metal clamp to bared section of metal tubing. Make sure that the solder flows freely between the tubing and the clamp.
( ) ( ) Mount the complete assembly to the main chassis. Use #6-32 x 3/8" screws. Check for proper assembly.

Refer to Pictorial 10.

( ) ( ) Cut a Blue/Green shielded wire 8 3/4" long. Strip 3/4" of outer insulation from one end, twist the strands of the shield together and tin the end. Strip the inner conductor 1/2" of insulation and tin. Connect to Channel B board, the inner conductor to Lug #77 (S), the shield to Lug #76 (S). Pass under the board. Strip 1" of outer insulation from the other end. Twist the strands of the shield together and tin the end. Strip the inner conductor 1/4" of insulation and tin. Leave this end free.
( ) ( ) Insert the Orange, White/Orange and Blue shielded wires from the slide switches into a 5 1/2" piece of black hardwall sleeving.
( ) ( ) Install a small size plastic cable clamp over the Blue/ Green, Orange, White/Orange, and Black/ White wire from J18G. Mount clamp at position G. Use #6-32 x 3/8" screw, #6 flatwasher against clamp, #6 lockwasher under #6-32 nut. Tape as shown.
( ) ( ) Connect the shield of the Blue/Green shielded wire to J21G (S). Connect the inner conductor to J21L (S).
( ) ( ) Connect the shield of the Blue shielded wire from the slide switch to Lug #57 (S) on Channel A board. Connect the inner conductor to Lug #56 (S),
( ) ( ) Connect the shield of the Orange shielded wire from the slide switch to J19G (S). Connect the inner conductor to J19L (S).
( ) ( ) Connect the shield of the White/Orange shielded wire from the slide switch to J17G (S). Connect the inner conductor to J17L (S). Tape as shown.
( ) ( ) Insert the group of wires from Wafer #4 of the function switch into a 5 3/4" piece of black hardwall sleeving.
( ) ( ) Install a small size plastic cable clamp over the wires and mount clamp at position K. Use #6-32 x 3/8" screw, #6 flatwasher against clamp, #6 lockwasher under #6-32 nut.
( ) ( ) Connect the White/Gray wire to J16L (S).
( ) ( ) Connect the White/Black wire to J16G (S).
( ) ( ) Connect the inner conductor of the Green shielded wire to J15L (S). Connect the shield to J15G (S).
( ) ( ) Connect the White/Orange wire to J14L (S).
( ) ( ) Connect the White/Brown wire to J13L (S). Tape as shown.

The following instructions are for the group of wires from the function switch, which are dressed along the right hand side rail.

( ) ( ) Dress the Orange, Red and Blue shielded wires along the side rail toward the rear of the chassis.
( ) ( ) Group together the remaining unshielded wires and bend sharply at the cable clamp.
( ) ( ) Individually, bend the Blue/Green, the Red/Green, the White/Orange and the Green/White shielded wires at the clamp and dress to the rear of the unshielded wires.
( ) ( ) Tape at the bend, and again at the edge of the 2nd strip of phono jacks, making certain that the shielded wires remain to the rear.

Done Checked

( ) ( ) Bend sharply, at this point, the three shielded wires. Tape the remaining unshielded wires near the edge of the third strip of phono jacks. Bend the wires at this tape point.

( ) ( ) Connect the shield of the Red shielded wire to J1G (S). Connect the inner conductor to J1L (S).

( ) ( ) Connect the shield of the Orange shielded wire to J2G (S). Connect the inner conductor to J2L (S).

( ) ( ) Connect the shield of the Blue shielded wire to J3G (S). Connect the inner conductor to J3L (S).

( ) ( ) Connect the shield of the Red/Green shielded wire to J8G (S). Connect the inner conductor to J8L (S).

( ) ( ) Connect the shield of the White/Orange shielded wire to J7G (S). Connect the inner conductor to J7L (S).

( ) ( ) Connect the shield of the Blue/Green shielded wire to J6G (S). Connect the inner conductor to J6L (S).

( ) ( ) Connect the Gray/White wire to J9L (S).

( ) ( ) Connect the Black/White wire to J9G (S).

( ) ( ) Connect the inner conductor of the Green/White shielded wire to J10L (S).

( ) ( ) Connect the shield to J10G (S).

( ) ( ) Connect the Orange/White wire to J11L (S).

( ) ( ) Connect the Brown/White wire to J12L (S).

( ) ( ) Connect the shield of the Green shielded wire, which breaks out of the cable at the right hand side rail, to Lug #55 (S). Connect the inner conductor to Lug #77 (S).

( ) ( ) Dress the Green shielded wire from the slide switch above the board as shown. Connect the inner conductor to Lug #25 (S). Connect the shield to the bottom section of Lug #3 (S).

( ) ( ) Dress the Red shielded wire from the slide switch above the board as shown. Connect the inner conductor to Lug #2 (S). Connect the shield to Lug #3 (S).

( ) ( ) Tape the Red and Green shielded wires together near Lug #6.

Reinspect the above operations for correctness and neatness.

Refer to Pictorial 6, Figure B, rolloff switch. (Use for Lug reference only.)

( ) ( ) Connect the White/Green wire from the Channel A flexible tubing to Lug #7 (S) on Wafer #2 of the S9 rolloff switch.

( ) ( ) Connect the White/Blue wire from the Channel B flexible tubing to Lug #12 (S) on Wafer #2 of the S9 rolloff switch.

Refer to Pictorial 6, Figure B, turnover switch.

( ) ( ) Slip ½″ of sleeving over the shield of the Green/White shielded wire from the Channel A board. Connect to Lug #2 (S) on Wafer #2 of the S8 turnover switch. Connect the inner conductor to Lug #1 (S) on Wafer #1 of the S8 turnover switch. Dress under the body of the switch.

( ) ( ) Repeat the same procedure for the White/Green shielded wire from the Channel B board. Connect the shield to Lug #1 (S) on Wafer #2 of the S8 turnover switch. Connect the inner conductor to Lug #1 (S) on Wafer #3 of the S8 turnover switch. Dress over the body of the switch.

The following instructions are for the wiring of the front panel to the channel A board.

Refer to Pictorial 11, Figure A.

( ) ( ) Connect the Green/White wire from R1A to Lug #10 (S).

( ) ( ) Connect the Black/White wire from TS5 to Lug #49 (NS).

( ) ( ) Connect the free end of the .47 condenser from the function switch Wafer #3 to Lug #20 (S).

The following instructions are far the group of wires from the S6 treble switch and the S7 bass switch.

( ) ( ) Dress this group approximately 1″ away from the switches and approximately 1″ above the board.

( ) ( ) Connect the Black/White wire to Lug #4 (S).

Done Checked

( ) ( ) Connect the Green/White wire to Lug #5 (S).
( ) ( ) Connect the Orange/White wire to Lug #6 (S).
( ) ( ) Connect the Brown/White wire to Lug #11 (S). Dress under black hardwall tubing.
( ) ( ) Connect the Green wire to Lug #47 (S). Dress under black hardwall tubing.
( ) ( ) Tape at the two points shown in the Pictorial.

The following instructions are for the Blue/White, Green/White, Gray/White and Black/White wires from the S10 low cut switch.

Dress this group of wires to the edge of the board and to a height just above the lugs between Lugs #3 and #4. Put a sharp bend in the wires and tape at this bend. Dress under the group of shielded wires and bend sharply again between Lugs #11 and #12. Tape again at this bend.

( ) ( ) Connect the Green/White wire to Lug #31 (S).
( ) ( ) Connect the Black/White wire to Lug #49 (S).
( ) ( ) Connect the Gray/White wire to Lug #48 (S).
( ) ( ) Connect the Blue/White wire to Lug #67 (S).
( ) ( ) Tape these wires together with the other Black/White wire which is connected to Lug #49.

This completes the wiring of the Channel A board.

Refer to Pictorial 11, Figure B.

The following instructions are for the wiring of the front panel to the Channel B board.

( ) ( ) Twist together the Black and the White wires from R3. Connect the White wire to Lug #19 (S). Connect the Black wire to the bottom section of Lug #18 (S) .
( ) ( ) Connect the White/Green wire from R1B to Lug #11 (S). Dress along the black flexible tubing.
( ) ( ) Connect the White/Black wire from TS5 to Lug #50 (NS).
( ) ( ) Connect the shield of the White/Green shielded wire from the slide switch to Lug #18 (S). Connect the inner conductor to Lug #40 (S). Dress as shown.
( ) ( ) Connect the free end of the .47 condenser from the function switch Wafer #4 to Lug #1 (S).
( ) ( ) Dress the group of wires from the S10 low-cut switch parallel to the terminal board. Tape at a point opposite Lug #10. Bend sharply at this point and dress above the board.
( ) ( ) Connect the White/Green wire to Lug #34 (S).
( ) ( ) Connect the White/Black wire to Lug #50 (S).
( ) ( ) Connect the White/Blue wire to Lug #66 (S).
( ) ( ) Connect the White/Gray wire to Lug #51 (S).

Dress this group of wires with the White/Black wire from Lug #50 about 1˝ above the board. Tape together between Lug #10 and Lug #34, tape again between Lug #34 and Lug #50.

The following instructions are for the group of wires from the S4 treble switch and the S5 bass switch.

( ) ( ) Dress this group of wires straight up. Tape together at a point just opposite the Channel B lugs. Bend the wires sharply at the tape point.
( ) ( ) Connect the White/Green wire to Lug #16 (S).
( ) ( ) Connect the White/Black wire to Lug #17 (S).
( ) ( ) Connect the White/Orange wire to Lug #15 (S).
( ) ( ) Connect the White/Brown wire to Lug #10 (S).
( ) ( ) Connect the Green wire to Lug #52 (S).

Take this group of wires together with the White/Green shielded wire from Lug #40 and tape above Lug #21. Dress about 1˝ above the board.

( ) ( ) Connect the shield of the White/Green shielded wire from the group of wires that runs along the right hand side rail to Lug #44 (S). Connect the inner conductor to Lug #56 (S).

Reinspect the previous operations particularly for lead dress, soldered connections, and correct wiring.

Refer to Pictorial 12, Figure A.

Done Checked

( ) ( ) Install the power transformer at the position shown. Separate the wires into 3 groups.
( ) ( ) Group #1—Two Green wires and the White/Green wire. Dress to the outside of the transformer stud nearest to the J21 phono socket.
( ) ( ) Group #2—Two Black wires. Dress to the center of the transformer studs towards the AC power outlets.
( ) ( ) Group #3—Two Red wires. Dress to the outside of the transformer stud nearest to the side rail.
( ) ( ) Insert the group of wires from the main chassis through the grommet in the power supply bracket. Be sure to insert the Black/White wire from phono jack J18G in this group.
( ) ( ) Mount the power supply bracket to the 4 transformer studs. Use #8 flatwashers, #8 lockwashers and #8-32 nuts. (The main chassis should be between the power transformer and the power supply bracket.)

Refer to Pictorial 12, Figure B.

( ) ( ) Dress the transformer wires to the points indicated. When measuring the wires leave enough slack in them to be able to dress them neatly. Strip each wire 3/8" of insulation and tin.
( ) ( ) Red to Lug #4 on the diode holder (S).
( ) ( ) Red to C104A (S).
( ) ( ) White/Green to C106A (NS). (Dress through grommet hole and under the choke wires.)
( ) ( ) Green to TS3 Lug A (NS).
( ) ( ) Green to TS3 Lug B (NS).
( ) ( ) Black to F1 Lug A (S).
( ) ( ) Black to CO1 Lug A (S).
( ) ( ) Connect a 3.3 ohm 2 watt 10% resistor (orange, orange, gold, silver) from Lug #3 on the diode holder (S) to TS3 Lug A (S).
( ) ( ) Connect a 3.3 ohm 2 watt 10% resistor (orange, orange, gold, silver) from Lug #1 on the diode holder (S) to TS3 Lug B (S).
( ) ( ) Connect the long White/Black wire (from the Grommet Hole) to C105 Lug D (S). This wire comes from Lug #76 on the channel B board.
( ) ( ) Connect the short White/Black and the Black/White wires (from grommet hole) to C104 Lug #C (S). The short White/Black wire comes from Pin #4, V6. The Black/White wire comes from phono socket J18G.
( ) ( ) Connect the Black wire (from the grommet hole) to TS2 Lug A (NS). (Dress under the choke wires.)
( ) ( ) Connect the White wire (from the grommet hole) to C106 Lug A (NS).
( ) ( ) Connect the Brown wire (from the grommet hole) to C106 Lug C (S).
( ) ( ) Connect the Red wire (from the grommet hole) to C105 Lug A (S).
( ) ( ) Connect the Gray wire (from the grommet hole) to C105 Lug C (S).
( ) ( ) Connect the Purple wire (from the grommet hole) to C105 Lug B (S).
( ) ( ) Twist the pilot light wires from the front panel. Dress along the side rail to the power supply bracket.
( ) ( ) Connect the Black wire to TS2 Lug A (S).
( ) ( ) Connect the White wire to C106 Lug A (S).
( ) ( ) Twist the AC wires from the flexible metal tubing. Run along the side rail inside of the power supply bracket.
( ) ( ) Connect the Blue wire to F1 Lug B (S).
( ) ( ) Connect the Black wire to CO4 Lug B (NS).
( ) ( ) Connect the Tan wire to CO2 Lug B (S).

Tape together with the Red transformer wire which is connected to C104.

Done Checked

( ) ( ) Insert the AC power line cord into hole H.
( ) ( ) Connect the Black wire to CO4 Lug B (S).
( ) ( ) Connect the White wire to CO4 Lug A (S).

This completes the wiring of the unit.

Check the last operation for unsoldered joints and correct wiring.

Refer to Pictorial 13.

Done Checked

( ) ( ) Mount the three escutcheon front plates loosely to the escutcheon back plate. Use #6 flat washers against the back plate. Follow with #6 lockwashers under #6-32 nuts on the inner studs only. Tighten these nuts after the hexagon spacers are in place.
( ) ( ) Screw the hexagon-shaped spacers to the four outside studs.
( ) ( ) Mount the long, clear plastic knob onto the AC switch shaft. Insert the felt washer over this knob.
( ) ( ) Mount the escutcheon assembly to the chassis using #6-32 x 3/8" screws and #6 lockwashers.
( ) ( ) Install knobs as shown in Pictorial. If knobs are loose on controls, insert a screwdriver into slot of shaft and spread apart slightly until the knob fits properly.

FINAL INSPECTION

Done Checked

( ) ( ) Visually inspect all connections and wiring, comparing against the master charts and manual.
( ) ( ) Install 1 Amp fuse in fuse holder.
( ) ( ) Install 12AX7/ECC83 tubes (V1, V2, V6, V7).
( ) ( ) Install 12AT7/ECC81 tubes (V3, V4, V5, V8, V9).
( ) ( ) Install tube shields over each tube.
( ) ( ) If an ohmmeter is available check all points in the resistance chart.

A WORD OF CAUTION. OPERATING VOLTAGES IN THIS UNIT ARE AS HIGH AS 450 VOLTS AND ARE DANGEROUS. ONCE THE PREAMPLIFIER IS TURNED ON, BE EXTREMELY CAUTIOUS WHEN TAKING READINGS OR MAKING MEASUREMENTS.

( ) ( ) Insert the A.C. line cord into a 117 volt 60 cycle source. The tube filaments should light. Allow the preamplifier to warm up for approximately one minute.

IN THE EVENT OF DIFFICULTY

1. Recheck all wiring beginning with the first step. Use a colored pencil to trace the leads on the pictorial as you recheck the step-by-step instructions and actual wiring.
2. Check the A.C. primary fuse. Improper wiring may cause overloading and will blow the fuse. Replace only with the same value supplied with the kit (1 Amp, 3 AG).
3. Check the tubes to see if they light.
4. Have someone with electronic experience review your wiring for he may find an error that is elusive to you.
5. Check all voltages and resistances. Variations in line voltages and components may cause as much as a 20% difference from the reading listed in the table. Using a 1000 ohm per-volt instrument may further lower the readings and it is advisable to use a VTVM if it is available.
6. If your voltage readings do not correspond to the voltage table, critically inspect that portion of the circuit where the readings fail to correspond.

7. Check all resistors and condensers with an ohmmeter where the improper operating voltages are noted.
8. If you cannot find the difficulty write to Harman-Kardon, Inc. Citation Kit Division, Plainview, L. I., New York and give all symptoms, voltage and resistance readings and describe your difficulty in detail. State model and serial number. You will receive our prompt reply to help solve your problem.
9. Our factory service department is at your disposal in the event you cannot resolve this problem by yourself. Please write us before shipping your preamplifier for we may be able to advise you of a local warranty station equipped to assist you to obtain the specified performance from your preamplifier.

INSTALLING BOTTOM PLATE AND TOP COVER

Refer to Pictorial 13.

Done	Checked	
( )	( )	Install the 4 nut retainers to the bottom plate.
( )	( )	Mount the 4 plastic feet to the bottom plate. Use #6-32 x 5/8″ screws.
( )	( )	Mount the bottom plate to the chassis. Use #6 x 1/4″ sheet metal screws.
( )	( )	Mount the cover plate to the chassis. Use #6-32 x 3/8″ screws.

SCHEMATIC DIAGRAM

VOLTAGE AND RESISTANCE CHARTS

For your convenience, the schematic diagram for the Citation I is supplied as a separate insert in the Operation Manual. On this insert will also be found the complete voltage and resistance charts for this unit. Always refer to these charts when taking the readings.

OPERATION MANUAL

For complete information on installing and operating the Citation I, now turn to the separate Operation Manual which has been supplied. If is extremely important for you to read this manual thoroughly before attempting to install or operate this unit.

CITATION I
REPLACEMENT PARTS LIST

Part Number	Parts Per Kit	Description
		METAL PARTS
P3283718	1	Chassis
P3283721	1	Chassis Side Rail, Right Hand
P3283722	1	Chassis Side Rail, Left Hand
P3284128	1	Power Supply Bracket
P3283724	1	Chassis Front Panel
P3283725	1	Front End Cover
P3283726	1	Bottom Plate
P3283727	1	Terminal Board Shield (with 6 solder lugs ZCOM3990 riveted in place)
P3284025	1	Power Shield
B3283729	1	Escutcheon Back Plate
B3283731	1	Escutcheon Front Plate, Left Hand Top
B3283732	1	Escutcheon Front Plate, Left Hand Bottom
B3283734	1	Escutcheon Front Plate, Right Hand
P3283740	2	Mounting Posts, Terminal Boards (rubber stamped)
		TRANSFORMERS, CHOKE
FT3283735	1	Power Transformer
FC3283956	1	Choke
		COMPONENTS, SMALL PARTS, ETC.
B3284132	1	Terminal Board, Channel A
B3284130	1	Terminal Board, Channel B
STCOM3823	1	Diode Mounting Block
RV3285193	1	Loudness Control (R1)
ER3284122	1	Function Switch (S1)
ER3284119	1	Mode Switch (S2)
ER3284118	1	Rolloff Switch (S9)
FR3284117	1	Turnover Switch (S8)
ER3283709	2	Bass Switch (S5), (S7)
ER3283710	2	Treble Switch (S4), (S6)
RV3283746	1	Blend Control (R3)
RV3284133	1	Balance Control (R2)
ER3283764	1	Power Switch (S3)
ESCOM3902	4	Slide Switch, Tan
ER3283938	1	Rumble Switch (S10)
STCOM4036	9	9 Pin Tube Socket
STCOM3453	9	Tube Shield
STCOM3954	5	Phono Socket, 4 Jack
STCOM3898	5	Phono Socket Insulator, 4 Jack
STCOM3749	1	Phono Socket, Single
STCOM3897	1	Phono Socket Insulator, Single
HC24625	4	A.C. Receptacle
HCCOM3750	1	Fuse Holder (with nut, lock & rubber washers)
ZCOM3006	1	Fuse, 1.0 Amp - 3AG

Part Number	Parts Per Kit	Description
WCOM3678	1	Line Cord
HC3283805	1	Pilot Light Socket
KB1071741	1	Pilot Light Lamp (#1815)
ZCOM2219	1	Pilot Light Shield
STCOM 2702	3	Insulator, Large, Capacitor Mounting
Z1021702	1	Insulator, Small, Capacitor Mounting
ZCOM3716	1	Tape
STCOM2559	1	Grommet, Power Supply Bracket
STCOM3767	2	Grommet, Terminal Board Shield
STCOM3975	1	Grommet, Chassis Front Panel
STCOM3656	2	Fiber Bushing
VN3283766	4	Hex Standoff-Escutcheon Mounting
VN3273680	1	Round Standoff
HLCOM2732	3	1 Lug Strip
HLCOM3930	3	2 Lug Strip
STCOM3942	3	Small Plastic Clamp
STCOM3944	2	Medium Plastic Clamp
STCOM3966	2	Large Plastic Clamp
STCOM3945	1	Metal Cable Clamp
P3283800	1	Knob, Clear, Power Switch
STCOM3934	1	Felt Washer
P3283801	5	Knob, Gold Bar
P3283798	6	Knob, 15/16 Dia. - Gold Insert
P3283799	1	Knob, 1-5/32 Dia. - Gold Insert
STCOM2480	4	Plastic Foot
		TUBES, DIODES
12AX7	4	Tube
12AT7	5	Tube
ZCOM3566	2	Silicon Diode maybe marked either SD91 (66-3282) (3566)
Z3284115	4	Silicon Diode maybe marked either SD93 (66-3288) (4115)
		MOUNTING HARDWARE
KM440-6SN	26	#4-40 x 3/8 LG BHMS (binding head machine screw)
KL4-SN	26	#4 Internal Tooth Lockwasher
KN440-SN	26	#4-40 Hex Nut
KM632-4SB	4	#6-32 x 1/4 LG BHMS (binding head machine screw)
KM632-6SC	85	#6-32 x 3/8 LG BHMS (binding head machine screw)
KM632-10SC	7	#6-32 x 5/8 LG BHMS (binding head machine screw)
KP6-4SC	6	#6 x 1/4 LG BHSMS (binding head sheet metal screw)
KL6-SC	79	#6 Internal Tooth Lockwasher
KN632-SC	63	#6-32 Hex Nut
STCOM3763	4	#6-32 Nut Retainer
STCOM3762	16	#6-32 Speed Nut
KL8-SB	4	#8 Internal Tooth Lockwasher
KW8-SB	4	#8 x 3/8 OD Flat Washer
KN832-SB	4	#8-32 Hex Nut
KL18-SC	13	#3/8 Internal Tooth Lockwasher
KN1832-SC	13	#3/8-32 Hex Nut

Part Number	Parts Per Kit	Description
		SHIELDS, HARDWALL TUBING
ZCOM3989	2	Black Flexible Metal Shields 8″ Long
ZCOM3967	1	Black Flexible Metal Shield 14″ Long
STCOM3795	13″	5/16″ Black Hardwall Tubing
		ELECTROLYTIC CAPACITORS
JE3283785	1	1500 mfd/35 volts
JE3283786	1	40-40-40 mfd/450 volts
JE3284144	1	80 mfd/250 volts, 40 mfd/450 volts
JE3283788	1	80 mfd/250 volts
		MOLDED TUBULAR CAPACITORS
JP4-.1	18	.1 mfd/400 volts
JP2-.1	2	.1 mfd/200 volts
JP4-.01	1	.01 mfd/400 volts
		DUREZ COATED MYLAR CAPACITORS
JM1-.05	4	.05 mfd/100 volts
JM1-.2	2	.2 mfd/100 volt
		DISC CAPACITORS
JCST311	6	.47 mfd/10 volts
JCST306	2	6.8 mmfd ±l0%
JCST270	4	.001 mfd ±10%
JCST305	8	.05 mfd/50 volts
JCST268	2	100 mmfd ±10%
JCST303	2	4.7 mmfd ±10%
JCST299	2	0.01 mfd ±20%
JCST312	2	15 mmfd ±10%
JCST263	1	2 × .01 mfd ±20%
		RESISTORS
RA431-.5	8	430 ohms, ±5%, ½ watt (yellow, orange, brown, gold)
RA102-1	2	1K ohms, ±10% ½ watt (brown, black, red, silver)
RA242-.5	2	2.4K ohms, ±5%, ½ watt (red, yellow, red, gold)
RA103-1	2	10K ohms, ±10% ½ watt (brown, black, orange, silver)
RA273-1	2	27K ohms, ±10%, ½ watt (red, violet, orange, silver)
RA473-1	3	47K ohms, ±10%, ½ watt (yellow, violet, orange, silver)
RA563-1	4	56K ohms, ±10%, ½ watt (green, blue, orange, silver)
RA623-.5	2	62K ohms, ±5%, ½ watt (blue, red, orange, gold)
RA683-1	2	68K ohms, ±10%, ½ watt (blue, gray, orange, silver)
RA 104-1	6	100K ohms, ±10%, ½ watt (brown, black, yellow, silver)
RA 164-.5	2	160K ohms, ±5%, ½ watt (brown, blue, yellow, gold)
RA184-1	4	180K ohms, ±10%, ½ watt (brown, gray, yellow, silver)
RA224-1	5	220K ohms, ±10%, ½ watt (red, red, yellow, silver)
RA244-.5	2	240K ohms ± 5%, ½ watt (red, yellow, yellow, gold)
RA274-1	2	270K ohms, ±10%, ½ watt (red, violet, yellow, silver)
RA 394-1	2	390K ohms, ±10%, ½ watt (orange, white, yellow, silver)
RA474-1	5	470K ohms, ±10%,½ watt (yellow, violet, yellow, silver)
RA564-1	6	560K ohms, ±10%, ½ watt (green, blue, yellow, silver)
RA684-1	2	680K ohms, ±10%, ½ watt (blue, gray, yellow, silver)
RA105-1	7	1 meg ohms, ±10%, ½ watt (brown, black, green, silver)
RA225-1	2	2.2 meg ohms, ±10%, ½ watt (red, red, green, silver)
RA475-1	2	4.7 meg ohms, ±10%, ½ watt (yellow, violet, green, silver)
RB561-.5	4	560 ohms, ±5%, 1 watt (green, blue, brown, gold)
RB473-1	4	47K ohms, ±10%, 1 watt (yellow, violet, orange, silver)
RB683-1	8	68K ohms, ±10%, 1 watt, (blue, gray, orange, silver)

Part Number	Parts Per Kit	Description
RC33-1	2	3.3 ohms, ±10%, 2 watt (orange, orange, gold, silver)
RWCOM4038	1	2.2K ohms, ±20%, 4 watt (value marked on body)
RC103-1	1	10K ohms, ±10%, 2 watt (brown, black, orange, silver)
RC473-1	1	47K ohms, ±10%, 2 watt (yellow, violet, orange, silver)
RS3283920	4	1.62K ohms, ±5%, 1/2 watt (value marked on body)
RS3283922	4	215K ohms, ±5%, 1/2 watt (value marked on body)
		MISCELLANEOUS
L3283754	1	Instruction Book
L3284034	1	Operation Manual
		Z811689 hardware bag contains following.
KA632-14SC	4	#6-32 x 7/8 Lg. Sl Hex Hd Machine Screw
KW6-SC	4	#6 x 3/8 OD x 1/32 Thick Flat Washer
HP18671	4	Phono Plug (short circuited)

The following is an enumeration of the components which have been prewired at the factory to a number of switches supplied with this kit.

		DUREZ COATED MYLAR CAPACITORS
JM1-.05	6	.05 mfd/100 volts
JM1-.03	4	.03 mfd/100 volts
JM1-.02	2	.02 mfd/100 volts
JM1-.0075	2	.0075 mfd/100 volts
		SILVER MICA CAPACITORS
JQST 100	4	220 mmfd ±5%
JQST 101	4	330 mmfd ±5%
JQST 102	2	470 mmfd ±5%
JQST 103	2	100 mmfd ±10%
JQST 111	6	150 mmfd ±10%
JQST 104	2	220 mmfd ±10%
JQST 105	4	330 mmfd ±10%
JQST 109	2	47 mmfd ±10%
JQST 110	2	22 mmfd ±10%
		DISC CAPACITORS
JCST 303	2	4.7 mmfd ±10%
JCST 308	2	.003 mfd RMC Stable
		RESISTORS
RA162-.5	2	1.6K ohms, ±5%, 1/2 watt (brown, blue, red, gold)
RA243-.5	2	24K ohms, ±5%, 1/2 watt (red, yellow, orange, gold)
RA333-1	2	33K ohms, ±10%, 1/2 watt (orange, orange, orange, silver)
RA563-.5	2	56K ohms, ±5%, 1/2 watt (green, blue, orange, gold)
RA683-1	4	68K ohms, ±10%, 1/2 watt (blue, gray, orange, silver)
RA104-1	2	100K ohms, ±10%, 1/2 watt (brown, black, yellow, silver)
RA104-5	2	100K ohms, ±5%, 1/2 watt (brown, black, yellow, gold)
RA154-1	4	150K ohms, ±10%, 1/2 watt (brown, green, yellow, silver)
RA224-1	2	220K ohms, ±10%, 1/2 watt (red, red, yellow, silver)
RA274-.5	2	270K ohms, ±5%, 1/2 watt (red, violet, yellow, gold)
RA274-1	4	270K ohms, ±10%, 1/2 watt (red, violet, yellow, silver)
RA334-1	2	330K ohms, ±10%, 1/2 watt (orange, orange, yellow, silver)
RA474-1	4	470K ohms, ±10%, 1/2 watt (yellow, violet, yellow, silver)
RA684-1	2	680K ohms, ±10%, 1/2 watt (blue, grey, yellow, silver)
RA106-1	18	10 megohms, ±10%, 1/2 watt (brown, black, blue, silver)