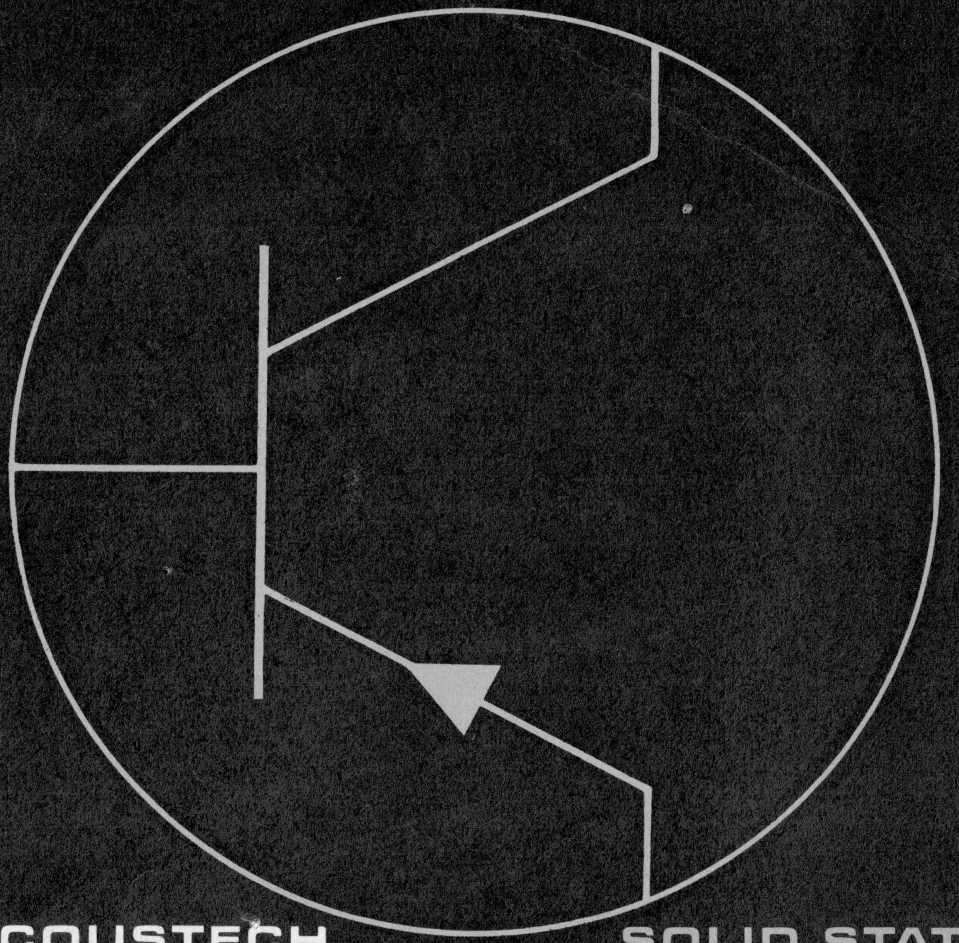
IV



ACOUSTECH SOLID STATE KIT

TWO DOLLARS

ACOUSTECH IV
SOLID STATE CONTROL CENTER KIT

The same advanced design concepts that made the Acoustech I and II, solid state amplifier and preamplifier, the most highly regarded music reproducing equipment in the world today have been applied to the problems of presenting a modestly priced do-it-yourself equivalent. You are about to assemble the results of these efforts. You will find that the actual assembly process is easy and virtually foolproof. You will discover upon completion that you have a solid state instrument that reproduces music as you would never believe possible. Both of these predictions will come to pass if you decide to read carefully this manual and follow the directions implicitly. Neither will occur if you choose to ignore these directions. As you have already demonstrated judgment and discernment by selecting this instrument for your music system, we are sure you will choose the sensible course. Read on and enjoy yourself.

WHAT DO YOU NEED TO GET STARTED

The first requirement is patience. Take your time and don't rush. Acoustech equipment is designed to work perfectly for years and years. If you don't finish it tonight, you will finish it tomorrow night. You still have a lot of listening enjoyment ahead.

Some tools are needed and most are quite common. A soldering iron is a must. Use a pencil-type iron, no more than 40 watts, and no larger than a 3/16" tip (1/8" is better). Avoid a soldering gun. They are heavy, bulky, and provide too much heat.

Also helpful would be a pair of long nose pliers, a pair of wire cutters, a ¼" spin-tite nutdriver, and a screwdriver. Enough solder is supplied to assemble the instrument and still have some left. If for any reason you run out of solder, use Ersin multicore 60/40 resin core solder (or equivalent). DO NOT USE ACID CORE SOLDER or all warranties are automatically voided.

HOW TO SOLDER

Your completed instrument will be no better than the skill you apply to soldering. Ninety percent of all problems are directly traceable to poor soldering. It is not difficult to solder properly. It is most difficult to locate poor solder joints. Unless you are really experienced, read the following simple suggestions carefully:

The purpose of the soldering process is to raise the temperature of the joint and of the solder so that the melted solder will flow over the hot joint and adhere to it. If the joint is not hot, the solder will not adhere tightly and the joint will work loose. This is known as a cold solder joint and is the major soldering problem. To heat the joint and the solder, it is necessary to transfer heat from the soldering iron. The easiest way to accomplish this is to use a clean, well-tinned iron.

Tinning an iron means to keep the tip covered with a thin layer of clean molten solder. If you have an old iron, file down the tip to the bare metal. Permit the iron to heat up and as soon as it begins to change color, apply solder to all the tip faces until a thin layer covers all sides of the tip. If you have excess solder, wipe it off with a dry rag. If a hot iron sits by for long stretches without being used, the tinning will burn off. Replace it before use. Some people keep scraps of solder in a tin dish (or lid from a tin can) and dip the iron into this bath of solder as required.

A simple mechanical connection is desirable before soldering. A single bend of the wire, which is then squeezed tightly against the terminal, will do. Do not wrap the wire around the terminal several times. If the wire is particularly heavy and a mechanical connection is not feasible, do not bother. If the joint is soldered properly you can get by without a mechanical connection. (See Fig. 1)

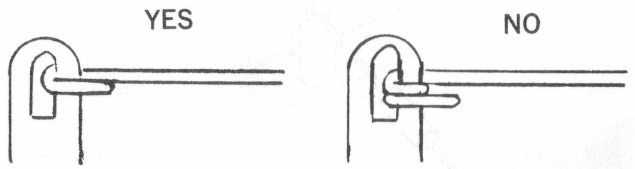


Fig. 1

Place the soldering iron tip against the joint and then place the solder so that it is in contact with the iron and the joint. As the solder starts to melt, let enough solder flow over the joint to cover it thinly. Remove the unmelted solder. Hold the iron in place for another fraction of a second and then remove it. Wait a few seconds for the solder to harden and then test the joint to be certain that it is solid. (See Fig. 2.) If more than one wire is being soldered to a terminal, make sure that each wire has its own covering of solder as well as that portion of the terminal in contact with the wire.

Some electronic components such as diodes are quite sensitive to heat, and care should be exercised to use only enough heat as is necessary to melt the solder. A device, like a paper clip, mounted on the wire between the terminal and the body of the device will help drain away the heat. Leave it on until the joint has cooled down. (See Fig. 3.)

After soldering a joint or terminal, inspect carefully to make sure the solder is not touching a nearby wire or terminal, creating a short circuit. Also check to see that the solder has not dripped down the terminal and is touching the chassis. Some terminals are meant to be electrically connected to the chassis, but most are not.

The tip of the soldering iron should be shiny and well-tinned. Wipe with a rag or a brush before using.

Careful soldering and the ability to read and follow instructions are all that is needed to complete this kit and have a perfect working instrument.

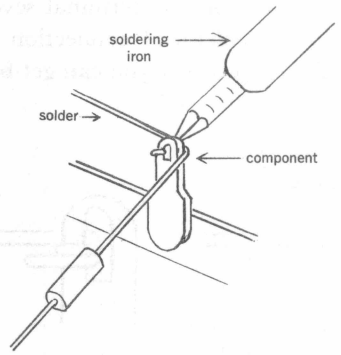


Fig. 2

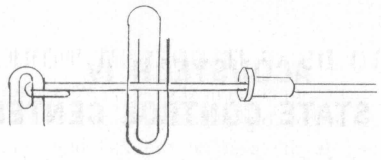


Fig. 3

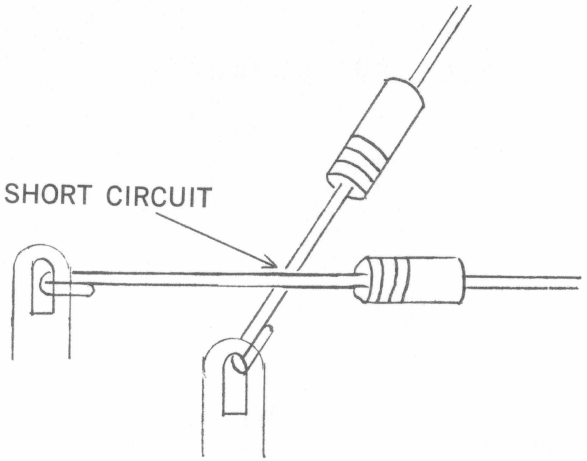
ASSEMBLY INSTRUCTIONS

The various components to be installed in the kit will be designated by code numbers, such as S-1, T-3, etc. The code numbers will be used on the pictorials and in the instructions. A terminal strip or control may have more than one connection pin. So, a description might read: connect a 2″ red wire to pin 2 of T-3. The pictorial will readily show which of the pins is pin 2.

By reading the instructions and referring to the illustrations, there is little likelihood of error. Do each operation in the order presented in the book. Once each step is completed place a check mark in the box provided. This will reduce the chances of your missing an operation. All parts and wires are to be mechanically connected only, unless the instructions specifically call for soldering. Often, one end of a wire is to be soldered and the other end is not. When soldering is called for, the instructions will specify how many wires are present at the terminal about to be soldered. For example: Connect a 2″ yellow wire to pin 2, S-2 (SOLDER 3). This means that after you connect the 2″ yellow wire to pin 2 of S-2, there will be three wires connected to this terminal pin. If you find three present, solder them to the pin. If you do not have three, you have made an error. Go back over the instructions to find and correct the mistake. This is an excellent preventative for miswiring.

Keep lead lengths from resistors or capacitors as short as possible. Position insulated wires close to chassis and dress them so they resemble the pictorials. Watch carefully for short circuits, particularly in congested areas. Make sure a bare wire heading for one terminal is not also touching a nearby terminal, causing a short. Don't be afraid to move a wire when you suspect a possible short circuit. (See Fig. 4.)

All cables and shielded wires come precut, prestripped, and identified by a number taped to each end. The conventional hook-up wire, comes in rolls. Cut off the lengths specified in the instructions and strip back about 3/8″ of the insulation at both ends. For this operation, keep a 12″ ruler handy. (See Fig. 5.)



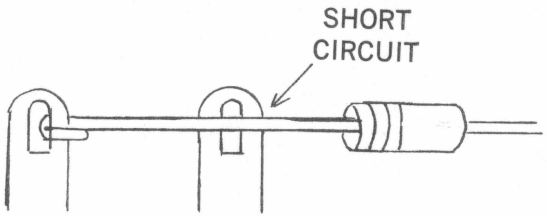


Fig. 4

UNPACKING THE KIT

Carefully remove all the parts from the shipping carton. Put the front panel aside in a safe place to avoid scratches. You will not be needing it until the end of assembly procedures. Almost all parts provided are in plastic envelopes which are identified by number. In the back of this manual you will find a complete parts list, arranged by envelope number. Before proceeding, check to see that all envelopes are included. In making the count do not remove any envelopes from the KITKLOTH or open any to count the individual parts. Merely check the envelopes themselves. If any are missing, immediately write to:

Kit Parts Department
Acoustech, Inc.
139 Main St.
Cambridge, Mass. 02142

The missing envelope will be rushed to you promptly.

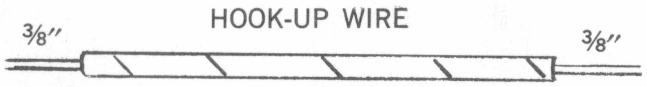


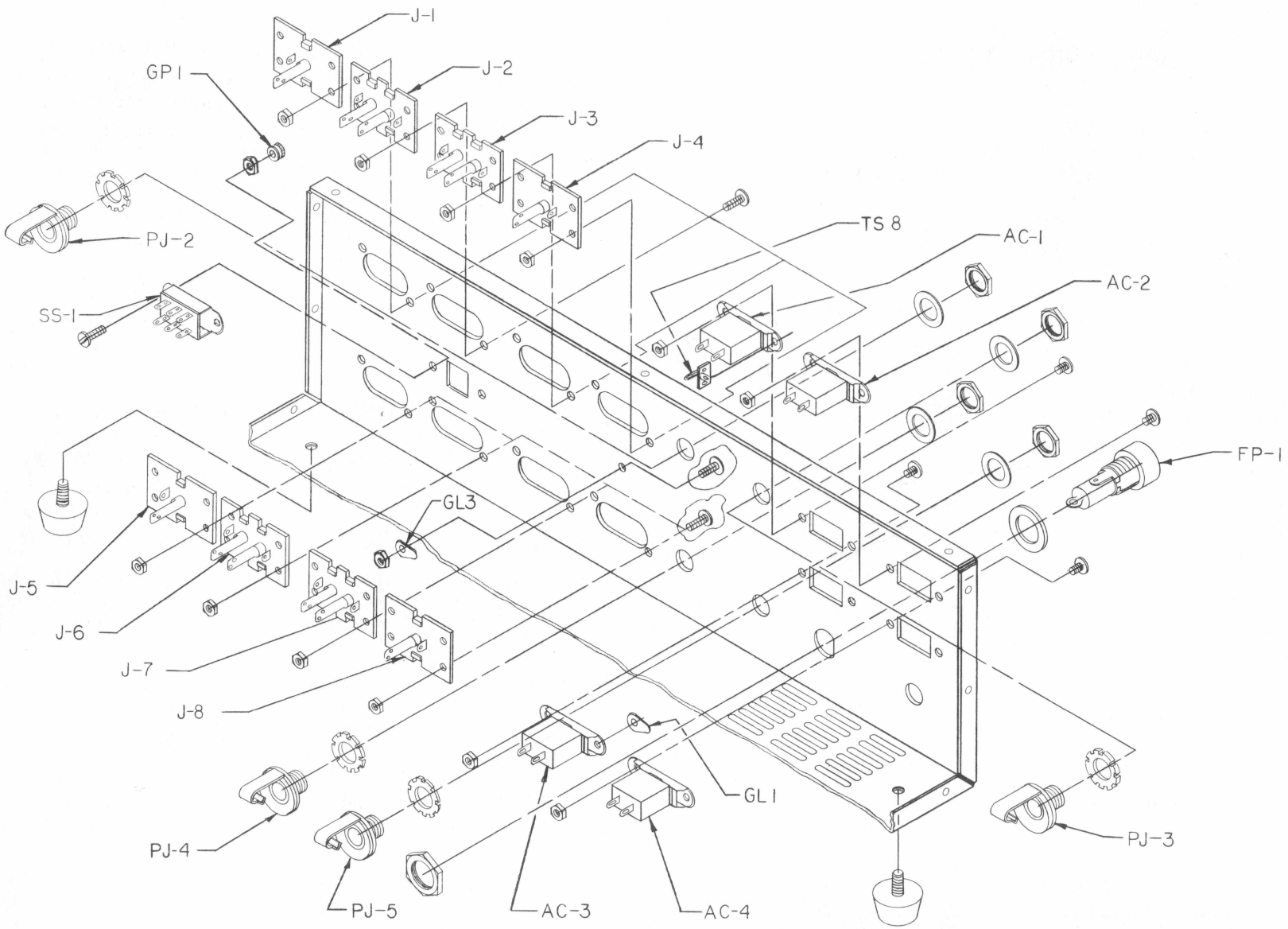
Fig. 5

USING THE KITKLOTH

The various components, hardware, and wires to be used in the assembly of your kit will be found in small envelopes pinned to the Acoustech KitKloth. Spread this cloth out on your work area. This makes an ideal surface to use for assembling the kit. All the parts are convenient. You need not fear marring or burning the surface of a table as the cloth will protect it. The cloth is fire retardent so a small blob of hot solder will have little effect on it. You can burn a hole through the cloth if you rest the tip of a hot iron on it for a few seconds. When you are finished for the evening, simply roll up the KitKloth and put it back in the box. No worries about losing or misplacing small parts.

MECHANICAL ASSEMBLY

In the next few steps you will be mounting the various terminal strips, controls, switches, phone jacks, etc. to the chassis. For these operations machine screws and nuts will be used. With minor exceptions, these will be #6-32 type machine screws and nuts and are to be found in one bag. The only difference will be in the length of the various screws used. This can be found by noting the last number given in the instructions. For example, a #6-32 x 3/8" screw means that you are to use a 3/8" long screw for the particular application.


J-1
GP 1
J-2
J-3
J-4
PJ-2
TS 8
AC-1
AC-2
SS-1
FP-1
GL3
J-5
J-6
J-7
J-8
GL 1
PJ-4
PJ-3
PJ-5
AC-3
AC-4

Drawing A

MECHANICAL ASSEMBLY

STEP A

In the following steps you will be mounting components on the rear of the chassis. Turn the chassis so the front is facing you. Refer to Drawing A throughout. All machine screws should be inserted from the outside of the chassis in order for the nuts to be mounted on the inside. In the first eight operations below the input and output jacks are going to be mounted on the rear chassis. Remove envelope 1 from the Kit Kloth and spread out the parts on the cloth. With each input jack you must use a phenolic insulator between the jack and the chassis itself. There are two types of phono jacks supplied. One has a single connector, the others are doubles. J1, J4, J5, and J8 use the singles, J2, J3, J6, and J7 are doubles. Check off each operation as you complete it.

☑ A-1. Mount J1 with two #6-32 x 3/8" (the #6-32 screws and nuts are in envelope 2) screws and nuts. The terminal pins on the back should be in identical position to that shown in Drawing A. Use appropriate phenolic insulator.

☑ A-2. Repeat for J2, J3, J4, J5, J6, J7, and J8.

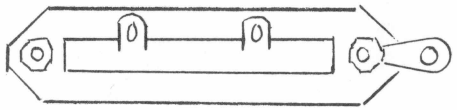


Fig. 6

☑ A-3. Mount the slide switch SS-1. Use a #6-32 x 1/4" machine screw and nut for the hole on the right (see Drawing A). For the hole on the left take a 6-32 x 5/8" machine screw, insert it *from the inside* of the chassis and tighten down with a 6-32 lockwasher and machine nut. Then place over the end of the screw the special knurled nut from envelope 1, and tighten down. This is the grounding post, GP-1.

☐ A-4. Mount one of the four identical phone jacks, PJ-2, as follows. First, place a 3/8" lockwasher (envelope 3) over the shaft of the phone jack. Next insert the shaft into the appropriate chassis opening from the inside of the preamp. Place a 3/8" flat washer and hex nut on the end of the shaft. Position the jack so that the terminal lugs on the back are as shown in the drawing.

☑ A-5. Mount PJ-3, PJ-4, and PJ-5 as in A-4.

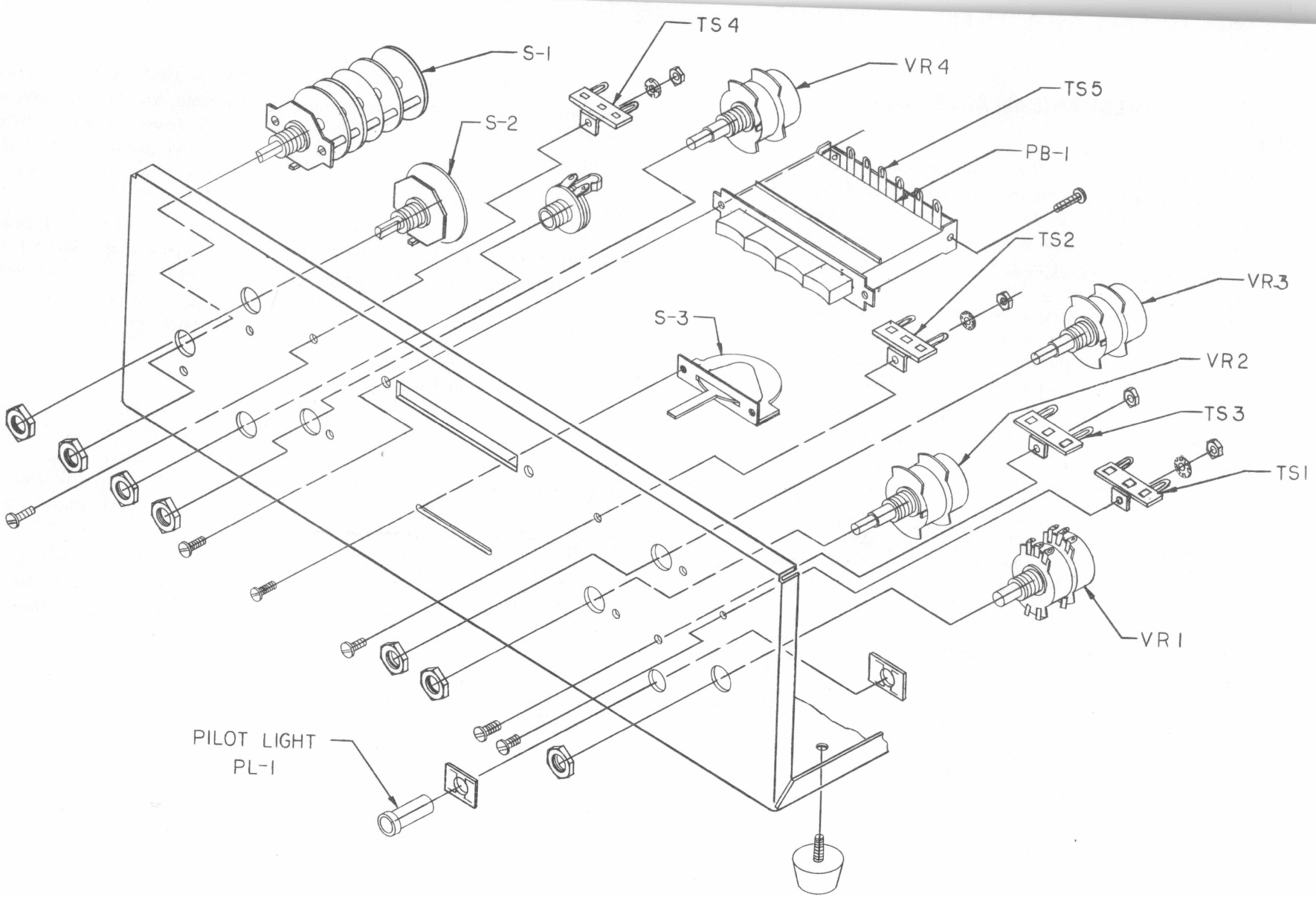
☑ A-6. Mount the fuse post, FP-1 (envelope 4). Place a large rubber washer over the post from the end of the post with the terminal lug. Slide the post through the proper opening from the outside of the chassis. The rubber washer is now between the outside of the rear chassis and the body of the fuse post. Position the post so that the side terminal lug is facing upwards. Thread on the large hex nut and tighten down.

☑ A-7. Mount one of the four identical Accessory AC outlets (from envelope 4) in AC-3 using two #6-32 x 1/4" screws and nuts. Place a terminal lug, GL-1, on one of the screws before threading on the nut. (See Fig. 6.)

☑ A-8. Mount accessory outlet AC-1 as in A-7 using a terminal strip TS-8 (from envelope 4) rather than a terminal lug.

☑ A-9. Mount accessory outlets, AC-2, and AC-4 as in A-7, but without any extra terminal lugs.

☑ A-10. Mount ground lug GL-3 in space provided with 6-32 x 1/4" screw and nut.



Drawing B

MECHANICAL ASSEMBLY

STEP B

Turn the chassis around so that the front is away from you. Use Drawing B as a guide. Check off each step as soon as you complete it. All screws should be inserted from the front of the chassis.

☐ B-1. Mount the amber colored pilot light (envelope 5) as follows: Take one of the small black metal clips and slide it on the pilot light as shown in Fig. 7. The clip makes a very tight fit. You may want to use a pair of pliers to get the clip started on the light. From the front of the chassis, slide the pilot light into the appropriate opening with the copper wire end going in first. Tilt the chassis forward so that the front of the pilot light is being pressed firmly against the Kit Kloth on your workbench. Take the other metal clip and slip it over the part of the pilot light with the two wires. The bowed part of the clip should be away from the front. Press down on the clip and push it as far as it will go.

☐ B-2. Mount the Variable Resistor (from envelope 6) (sometimes called the potentiometer) VR-1 to the chassis. VR-1 has a code number RCVD-10K engraved on the back of the control. Slide the shaft through the large opening in the chassis from the inside. Position the control so that the terminal lugs on the side of the potentiometer are as shown in Drawing B. Tighten the control down with a large ⅜" hex nut.

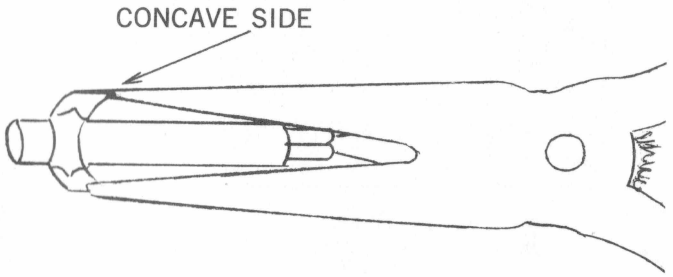


Fig. 7

☐ B-3. Mount VR-2 (code number RCVC-50K) as in B-2. Make sure the locating lug on the side of the control goes into the small chassis hole provided.

☐ B-4. Mount VR-3 (code number RCVD-250K) as in B-3.

☐ B-5. Mount VR-4 (code number RCVC-50K) as in B-3.

☐ B-6. Mount the phone jack PJ-1 (also envelope 6). As there is no locating lug on this jack, position it so that the terminal pins on the back are as shown in Drawing B. Tighten down with a ⅜" hex nut.

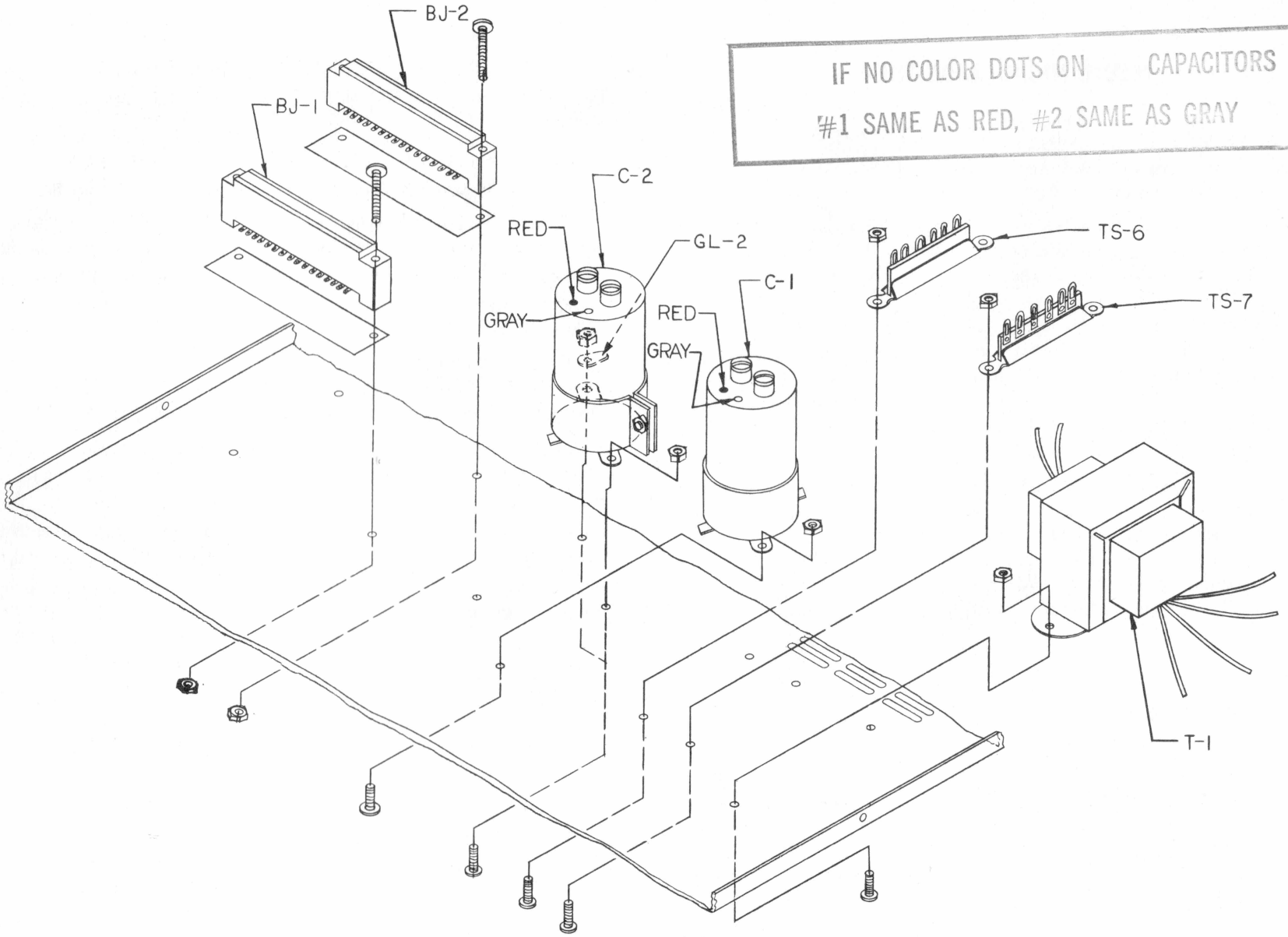
☐ B-7. Mount S-2 (SWR-45 code number) as in B-3. S-2 is in envelope 7.

☐ B-8. Mount S-3, the lever switch, using the two #6 by ¼" brass machine screws found in the same envelope. No machine nuts are needed as the holes in the switch mounting bracket are threaded.

☐ B-9. Mount one of the four terminal strips in the spot for TS-1 as shown in Drawing B. Tighten the strip down with number 6-32 x ¼" machine screws, lockwashers, and nuts.

☐ B-10. Mount TS-2, TS-3, and TS-4 terminal strips as in B-9.

The pushbutton assembly, PB-1, and the Input Selector, S-1, are going to be mounted later. They are quite large and it will be easier to work if they are not in the way.


BJ-2
BJ-1
C-2
RED
GL-2
GRAY
C-1
RED
GRAY
TS-6
TS-7
T-1
IF NO COLOR DOTS ON CAPACITORS
#1 SAME AS RED, #2 SAME AS GRAY

Drawing C

MECHANICAL ASSEMBLY

STEP C

For the following mechanical steps refer to Drawing C. All screws will be inserted from underneath the chassis and the machine nuts will be mounted on top of the chassis.

☑ C-1. Mount the rubber feet from envelope 8 in the four corners of the bottom. Four 10-32 x ½″ screws in same envelope are inserted into the rubber feet and then in turn into the chassis. Turn the chassis upside down on your Kit Kloth. Don't be afraid to apply some pressure with your screw driver as a tight fit is required. Once you see the sides of the rubber beginning to bulge slightly, stop tightening the screw. You can damage the feet by overdriving the screw.

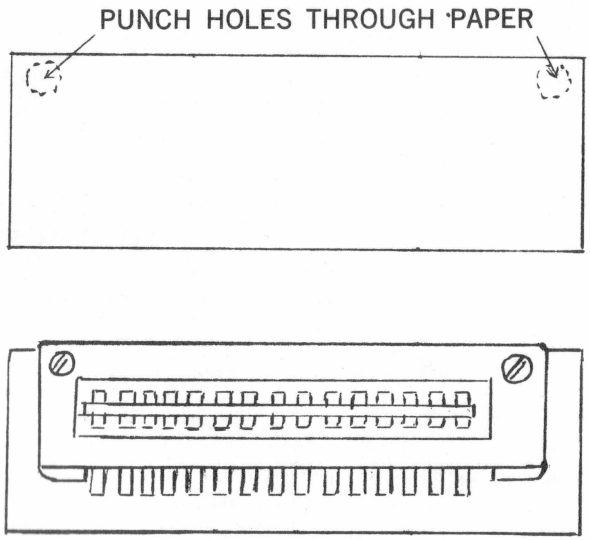


Fig. 8

☑ C-2. Place a piece of insulation paper over the mounting hole for BJ-1 as shown in Fig. 8. Punch two holes through the paper using either a sharp pencil or similar pointed device. Place one of the two identical board jacks over the paper and connect to the chassis BJ-1 with two #6-32 x ⅞″ machine screws and two #6 nuts. In this case, insert the screws *from the top* of the chassis and attach the nuts underneath. When the board jacks are connected the terminal lugs should be facing forward as in Drawing C.

☑ C-3. Mount BJ-2 as in C-2.

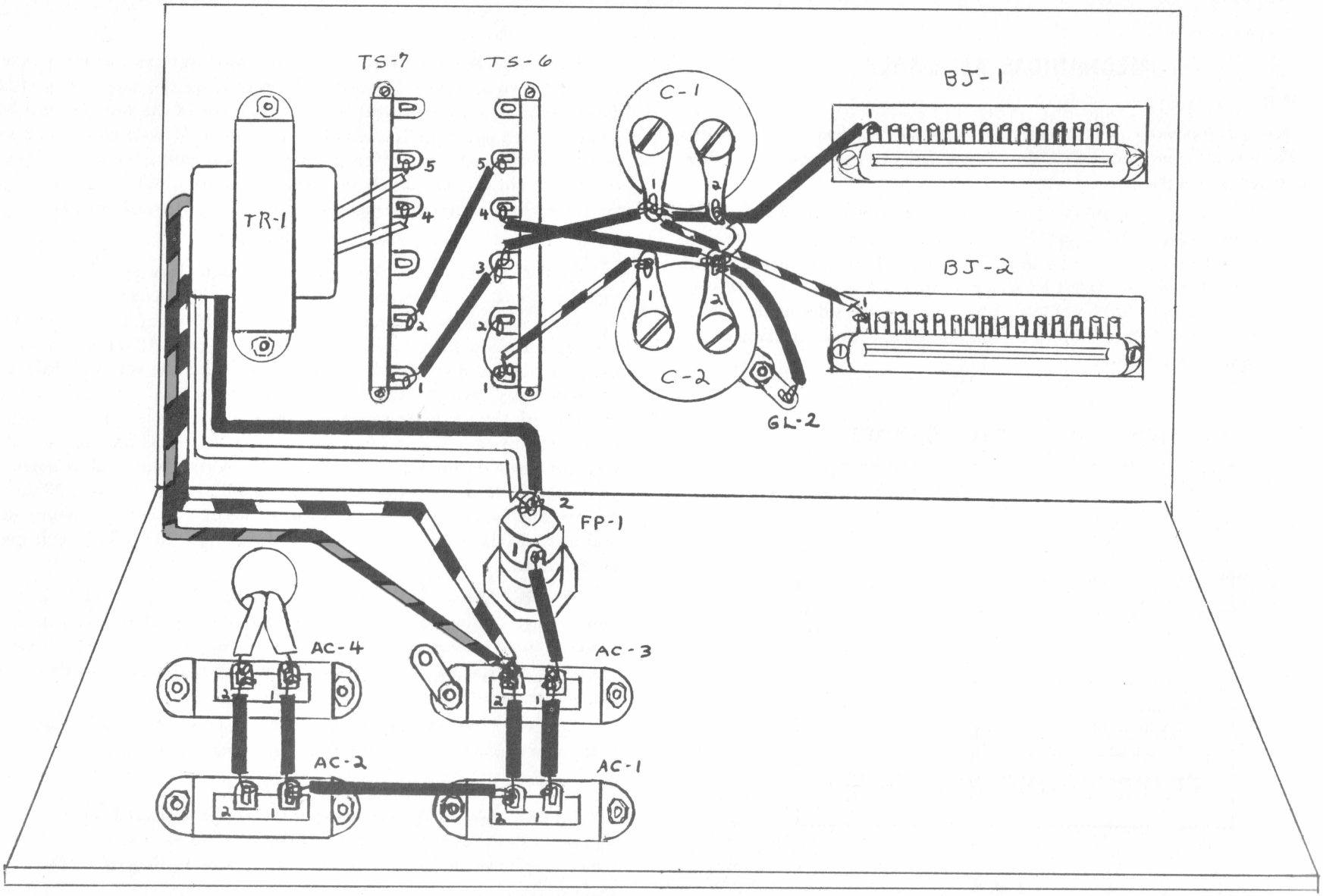
☑ C-4. Take one of the capacitor mounting brackets in envelope 10. Place a #6-32 x ¾″ machine screw through the mounting holes in the flanges on the side of the bracket. Place a machine nut on the end, but do not tighten more than two or three turns. Take C-1, the capacitor with the code number 800 mfd. — 50 VDC marked on the side and slide it into the mounting bracket. Before tightening the screw, place the mounting bracket with the capacitor inside over the two holes in the chassis designated for the mounting of C-1 as in Drawing C. Notice the position of the red and gray terminals on the top of the capacitor. Align them so they agree with Drawing C. Now you may tighten the #6-32 screw securely. Mount the bracket and capacitor to the chassis with two #6-32 x ¼″ machine screws and nuts. Make sure that the bottom of the capacitor is flush with the top of the chassis.

☑ C-5. Mount C-2, code number 600 mfd. — 75 VDC as in C-5 only add grounding lug GL-2 to the back screw as shown in Drawing C. Unscrew the connecting screws on top of both C-1 and C-2. Slide over the screw the special capacitor lugs found in envelope 10 and then replace the screws and tighten.

☑ C-7. Mount terminal strip TS-7 using two #6-32 x ¼″ screws and nuts. (Remember insert screws from underneath the chassis.)

☑ C-7. Mount terminal strip TS-6 as in C-7.

☑ C-8. Mount the power transformer TR-1 packed separately (code number TR-110K-5A) with two #6-32 x ¼″ screw and nuts. The yellow wires should be on the side of the transformer furthest from the edge of the chassis.



Drawing D

STEP D

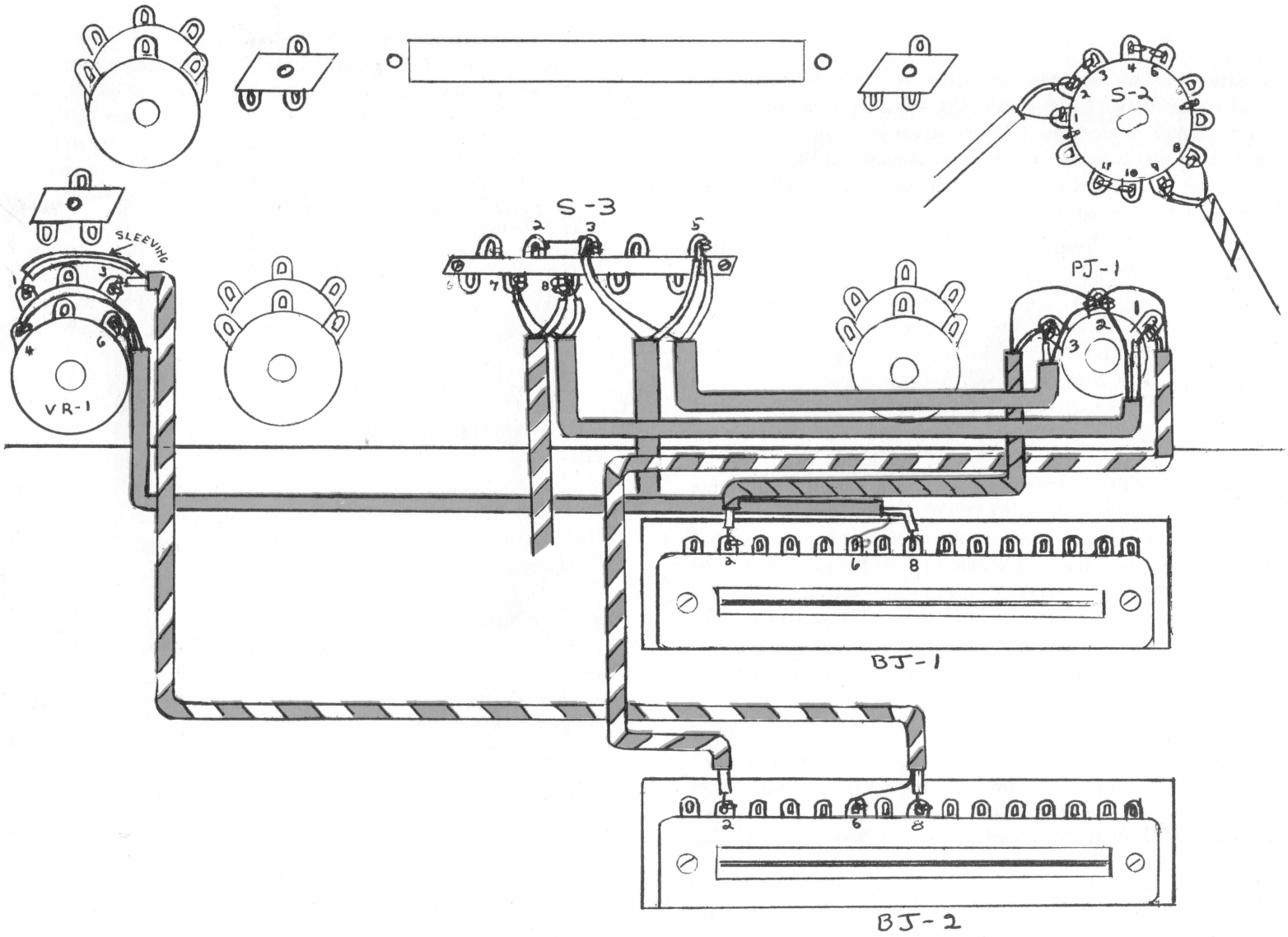
For the balance of the assembly procedure you will be connecting wires, cables, and components that comprise the electronics of the control center. There are three types of wires and cables used in the kit. One is the standard shielded cable which is provided for you already cut, stripped, and tinned. The cables will be referred to by color and number. The cables are packed in a large envelope *not* on the Kit Kloth.

Another type is regular hook-up wire. The hook-up wire comes in two diameters, one regular (#22 wire) and one heavy (#18). The heavy wire is used on all AC connections. The word "Heavy" will appear whenever this wire is called for. There are also four colors provided, red solid, black solid, black and white, and red and white. The hook-up wire comes in rolls in envelope #12. The instructions will indicate a particular length. Use your ruler to measure this length, cut off the piece with your wire cutter, and then strip back about 3/8" of insulation at each end. The third type is uninsulated wire commonly called "bus" wire. When using bus wire, pay particular attention to the path of the wire to avoid short circuits with other wires, components, the chassis itself, or other terminal pins. Length is usually not specified with bus wire. Use as little as necessary. To keep noise and hum down to inaudible levels, keep all wires and cables as close to the chassis as possible. Follow all pictorials and drawings carefully. Position wires and components exactly as shown. A little care will reward you with a quiet control center that sounds and looks professional. Cables are provided slightly longer than necessary so that you will be able to position them neatly.

Connect your soldering iron at this time. Make sure you have read thoroughly all the introductory material on soldering and on assembly techniques. The solder is in envelope 11. Check off each step as soon as you complete it. Only solder when instructions to do so are given. Put a check through each solder indication to avoid omission. Work slowly and carefully.

☑ D-1. Connect one of the yellow transformer wires to pin 4, TS-7.
☑ D-2. Connect the remaining yellow transformer wire to pin 5, TS-7.
☑ D-3. Connect the black transformer wire* to pin 2, FP-1.
☑ D-4. Connect the white transformer wire* to pin 2, FP-1 (solder 2).
☑ D-5. Connect the black/white transformer* wire to pin 2, AC-3.
☑ D-6. Connect the red/black transformer* wire to pin 2, AC-3.
☑ D-7. Connect a bus wire from pin 1, TS-6 to pin 2, TS-6.
☑ D-8. Connect a 2" black wire from pin 3, TS-6 to pin 1, TS-7.
☑ D-9. Connect a 2" black wire from pin 5, TS-6 to pin 2, TS-7.
☑ D-10. Connect a 6½" black wire from pin 4, TS-6 to pin 2, C2.
☑ D-11. Connect a 4" black wire from pin 2, C2 to GL-2.
☑ D-12. Connect a 6" black wire from pin 3, TS-6 (solder 2), to pin 1, C1.
☑ D-13. Connect a 6½" black/white wire from pin 1, TS-6 to pin 1, C2 (solder 1).
☑ D-14. Connect a 7" black/white wire from pin 1, C1 to pin 1, BJ-2 (solder 1).
☑ D-15. Connect a 7" black wire from pin 1, C1 (solder 3) to pin 1, BJ-1 (solder 1).
☑ D-16. Connect a 2" black wire from pin 2, C1 (solder 1) to pin 2, C2 (solder 3).
☑ D-17. Connect either one of the grey line cord wires to pin 1, AC-4. Connect the other one to pin 2, AC-4.
☑ D-18. Connect a 1½" black heavy wire from pin 1, AC-1 to pin 1, AC-3.
☑ D-19. Connect a 1¼" black heavy wire from pin 1, AC-3 (solder 2) to pin 1, FP-1.
☑ D-20. Connect a 1½" black heavy wire from pin 2, AC-1 to pin 2, AC-3 (solder 3).
☑ D-21. Connect a 2" black heavy wire from pin 2, AC-1 to pin 1, AC-2.
☑ D-22. Connect a 1½" black heavy wire from pin 1, AC-2 (solder 2) to pin 1, AC-4 (solder 2).
☐ D-23. Connect a 1½" black heavy wire from pin 2, AC-2 (solder 1) to pin 2, AC-4.

*If you have a 220 to 250 V line rather than conventional 110 to 125 V, see appendix, before making these connections.



Drawing E

STEP E

In this step you will be attaching wires to the various switches and controls on the front of the control center. You will also begin connecting the various colored and numbered cables. Many of these cables run from the front of the control center to the rear. At this time you will only be connecting to the front. The other end will be connected later. Carefully move the unconnected ends so they are out of your way. Watch for short circuits, especially when connecting bare bus wires. Keep all wires as close to the chassis as possible.

☐ E-1. Connect a bus wire from Pin 2, S3 (solder 1) to Pin 3, S3.

☐ E-2. Connect the insulated wire on one end of red/white cable #1 to pin 8, S3. Connect the bare uninsulated wire at this end to Pin 7, S3. The opposite end will be connected later.

☐ E-3. Connect the insulated wire at one end of red #2 cable to pin 8, S-3 (solder 2). Connect the bare wire at this end to pin 7, S-3 (solder 2). Connect the insulated wire at the opposite end to pin 1, PJ-1, and the bare wire to Pin 2, PJ-1.

☐ E-4. Connect the insulated wire at one end of red #3 cable to Pin 5, S-3. Connect the bare wire at this end to Pin 3, S-3. Connect the insulated wire at the other end to Pin 3, PJ-1, and the bare wire to Pin 2, PJ-1.

☐ E-5. Connect the insulated wire at one end of red #4 cable to Pin 5, S-3 (solder 2). Connect the bare wire at this end to Pin 3, S-3 (solder 3).

☐ E-6. Connect the insulated wire at one end of red/white #5 cable to pin 1, PJ-1 (solder 2). Connect the bare wire at the same end to Pin 2, PJ-1. Connect the insulated wire at the other end to Pin 2, BJ-2 (solder 1). Carefully trim off all the exposed bare wire at this end with your wire cutter.

*If you can't fit all the wires through the hole in terminal pin 2, just make a good mechanical connection to one of the bare wires that do pass through this hole. When you solder, solder this connection as well.

☐ E-7. Connect the insulated wire at one end of red #6 cable to Pin 3, PJ-1 (solder 2). Connect the bare wire at this end to Pin 2, PJ-1 (solder 4.)* Connect the insulated wire at the other end to Pin 2, BJ-1 (solder 1). Trim off the bare wire at this end.

As this is a stereophonic control center many of the controls are double designs to provide switching in both channels. In the next few operations you will be making connections to some of these stereo controls. To prevent confusion the word "bottom" will refer to that section of the control closest to the front panel, while the word "top" will apply to the section furthest from the front panel.

☐ E-8. Connect the insulated wire at one end of red/white #7 cable to Pin 3 (bottom), VR-1 (solder 1). Place a piece of "spaghetti" over the bare wire, connect this wire to Pin 1 (bottom) VR-1 (solder 1). Connect the insulated wire at the other end to Pin 8, BJ-2 (solder 1) and the bare wire to Pin 6, BJ-2 (solder 1).

☐ E-9. Connect the insulated wire at one end of red #8 cable to Pin 6 (top), VR-1 (solder 1). Connect the bare wire to Pin 4 (top), VR-1 (solder 1). Connect the insulated wire at the other end to Pin 8, BJ-1 (solder 1) and the bare wire to Pin 6, BJ-1 (solder 1).

☐ E-10. Connect a bus wire from Pin 2, S-2 to Pin 3, S-2 (solder 1).

☐ E-11. Connect a bus wire from Pin 4, S-2 (solder 1) to Pin 5, S-2.

☐ E-12. Connect a bus wire from Pin 10, S-2 (solder 1) to Pin 11, S-2.

☐ E-13. Connect the insulated wire at one end of red/white #9 cable to Pin 9, S-2. Connect the bare wire at this end to Pin 8, S-2.

☐ E-14. Connect the insulated wire at one end of red #10 cable to Pin 2, S-2. Connect the bare wire at this end to Pin 1, S-2.

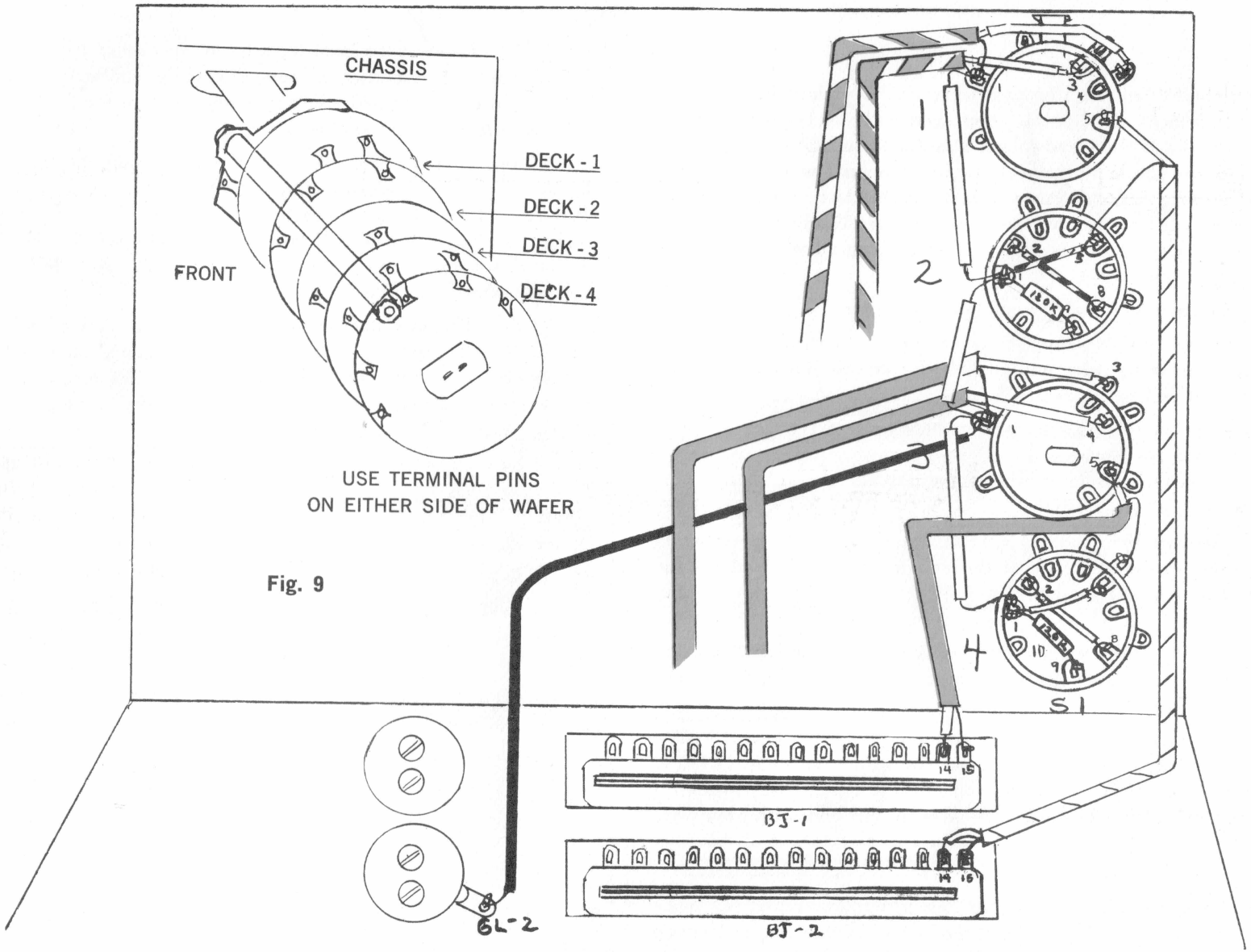


Fig. 9

Drawing F

STEP F

There are only two parts of the assembly of the control center that might be considered difficult. One is the assembly of the Input Selector Switch. S-1 (the other is the Pushbutton Assembly, PB-1.) The sure way to avoid problems is to read the instructions carefully and study the diagrams supplied. In the next few operations you will begin assembling the Input Selector.

Refer back to Drawing B. Mount the Input Selector Switch, S-1, as shown in the drawing.

The Input Selector, S-1, has four sections or decks. To avoid confusion each deck has a number. Deck 1 is closest to the front panel and Deck 4 is furthest away. Each deck has some terminal pins facing forward and some facing towards the rear.

If there is one facing forward and one towards the rear at a particular pin number, use either one, whichever is most convenient. If only one is present, then obviously you must use it. See Figure 9.

☑ F-1. Connect a 120K resistor (brown, red, yellow) from Pin 1, Deck 4, S1 to Pin 9, Deck 4, S-1.

☑ F-2. Add a ½" piece of insulation to each end of a 120K resistor (brown, red, yellow). Connect this resistor from Pin 1, Deck 2, S-1 to Pin 9, Deck 2, S-1.

☑ F-3. Connect a 1½" black wire from Pin 1, Deck 4, S-1 to Pin 5, Deck 4, S-1.

☑ F-4. Connect a 1¾" black wire from Pin 2, Deck 4, S-1 (solder 1) to Pin 8, Deck 4, S-1.

☑ F-5. Connect a 1½" tracer (black & white) wire from Pin 1, Deck 2, S-1 to Pin 5, Deck 2, S-1.

☑ F-6. Connect a 1¾" tracer (black and white) wire from Pin 2, Deck 2, S-1 (solder 1) to Pin 8, Deck 2, S-1.

☑ F-7. Cut three pieces of bus wire, each about 1" long, and three pieces of spaghetti, each about ½" long. Slide the spaghetti on to each piece of bus wire. Connect one bus wire from Pin 1, Deck 1, S-1 to Pin 1, Deck 2, S-1. Connect the second from Pin 1, Deck 2, S-1 to Pin 1, Deck 3, S-1. Connect the third from Pin 1, Deck 3, S-1 to Pin 1, Deck 4, S-1.

☑ F-8. Connect the insulated wire at one end of red/white cable #11 to Pin 5, Deck 1, S-1 (solder 1). Connect the bare wire at this end to Pin 5, Deck 2, S-1 (solder 2). Connect the insulated wire at the other end to Pin 14, BJ-2 (solder 1), and the bare wire to Pin 15, BJ-2 (solder 1).

☑ F-9. Connect the insulated wire at one end of red/white cable #12 to Pin 4, Deck 1, S-1 (solder 1). Connect the bare wire at this end to Pin 1, Deck 1, S-1. Use spaghetti over the bare wire.

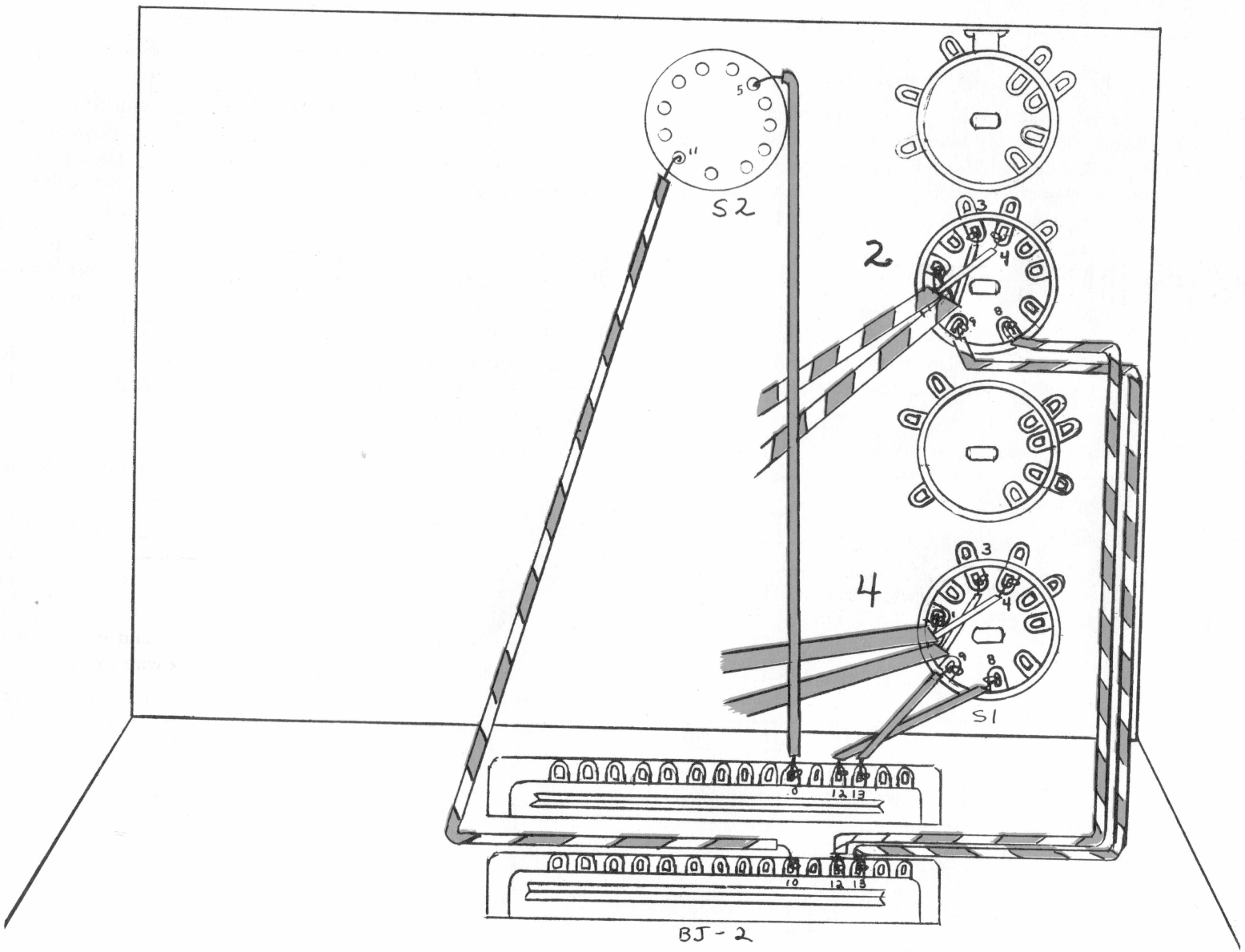
☑ F-10. Connect the insulated wire at one end of red/white cable #13 to Pin 3, Deck 1, S-1 (solder 1). Connect the bare wire at this end to Pin 1, Deck 1, S-1 (solder 3).

☑ F-11. Connect the insulated wire at one end of red cable #14 to Pin 5, Deck 3, S-1 (solder 1). Connect the bare end of this wire to Pin 5, Deck 4, S-1 (solder 2). Connect the insulated wire at the other end to Pin 14, BJ-1 (solder 1), and the bare wire to Pin 15, BJ-1 (solder 1).

☑ F-12. Connect the insulated wire at one end of red cable #15 to Pin 3, Deck 3, S-1 (solder 1). Connect the bare wire to Pin 1, Deck 3, S-1.

☑ F-13. Connect the insulated wire at one end of red cable #16 to Pin 4, Deck 3, S-1 (solder 1). Connect the bare wire to Pin 1, Deck 3, S-1. Use spaghetti over the bare wire.

☑ F-14. Connect a 10" black wire from Pin 1, Deck 3, S-1 (solder 5) to GL-2 (solder 2).



Drawing G

STEP G

Watch for short circuits. Keep wires positioned as shown. Read carefully.

☐ G-1. Connect the insulated wire at one end of red/white cable #17 to Pin 4, Deck 2, S-1 (solder 1). Connect the bare wire at this end to Pin 1, Deck 2, S-1.

☐ G-2. Connect the insulated wire at one end of red/white cable #18 to Pin 3, Deck 2, S-1 (solder 1). Connect the bare wire at this end to Pin 1, Deck 2, S-1 (solder 6).

☐ G-3. Connect the insulated wire at one end of red cable #19 to Pin 4, Deck 4, S-1 (solder 1). Connect the bare wire at this end to Pin 1, Deck 4, S-1.

☐ G-4. Connect the insulated wire at one end of red cable #20 to Pin 3, Deck 4, S-1 (solder 1). Connect the bare wire at this end to Pin 1, Deck 4, S-1 (solder 5).

☐ G-5. Connect a 7″ red/white wire from Pin 9, Deck 2, S-1 (solder 2) to Pin 13, BJ-2 (solder 1).

☐ G-6. Connect a 7″ red/white wire from Pin 8, Deck 2, S-1 (solder 2) to Pin 12, BJ-2 (solder 1).

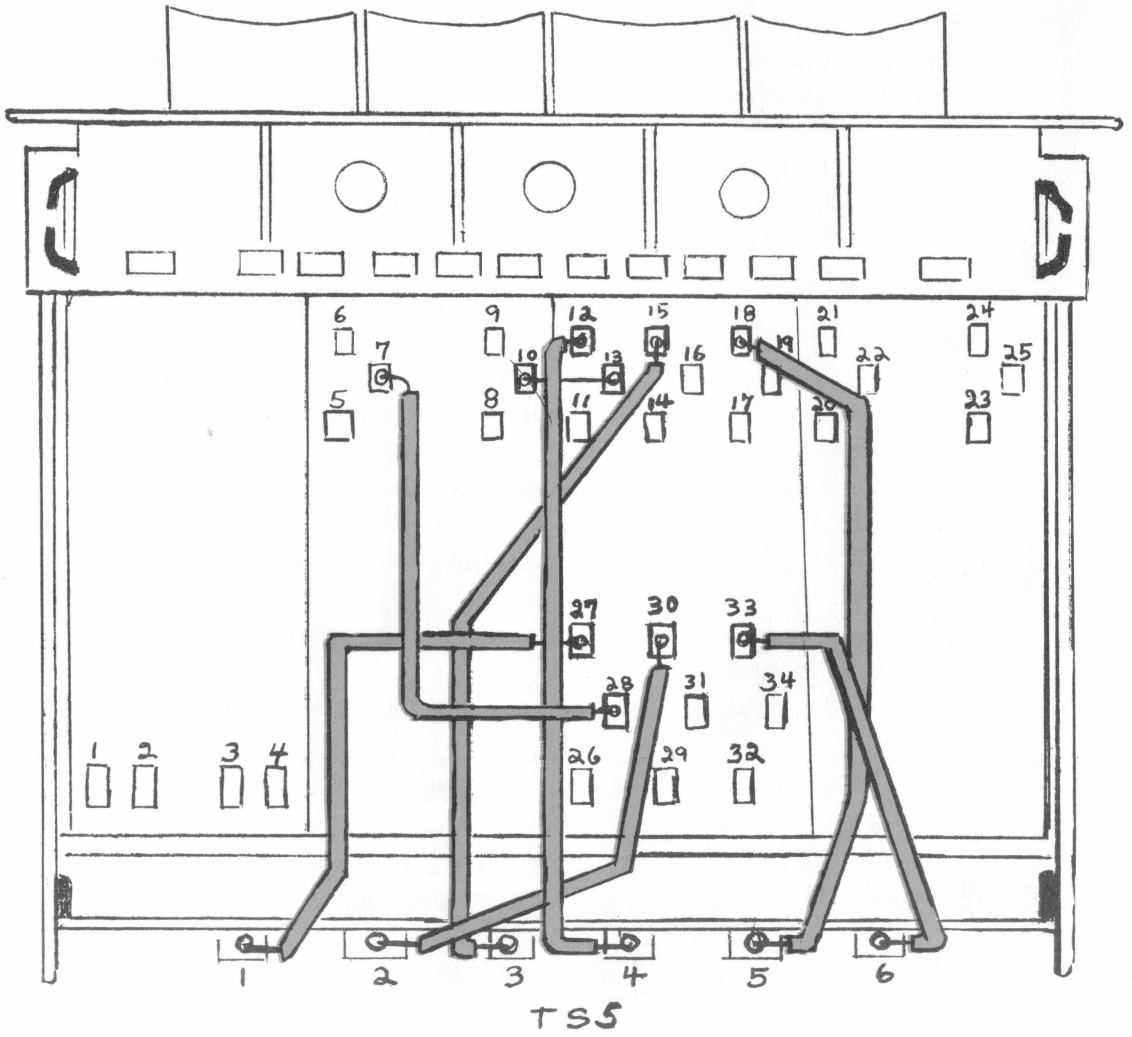
☐ G-7. Connect a 4″ red wire from Pin 9, Deck 4, S-1 (solder 2) to Pin 13, BJ-1 (solder 1).

☐ G-8. Connect a 4″ red wire from Pin 8, Deck 4, S-1 (solder 2) to Pin 12, BJ-1 (solder 1).

☐ G-9. Connect a 10″ red/white wire from Pin 11, S-2 (solder 2), to Pin 10, BJ-2 (solder 1).

☐ G-10. Connect an 8″ red wire from Pin 5, S-2 (solder 2), to Pin 10, BJ-1 (solder 1).

PB-1



Drawing H

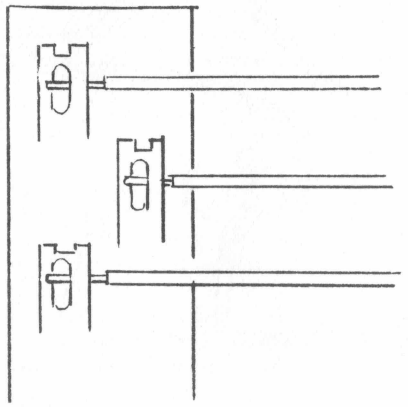


Fig. 10

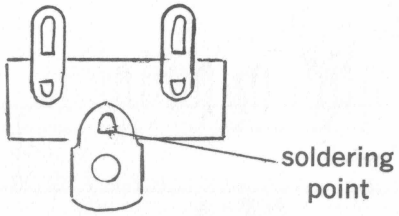


Fig. 11

STEP H

In this step you will begin work on the pushbutton assembly. This part of the assembly requires the greatest patience and care on your part. Possibility for error is greatest at this point. If you are tired, if it is late at night, take a break or a nap. Do this part when you are fresh.

Mount the pushbutton assembly to the front of the chassis as shown in Drawing B with terminal pins up. Use two 6-32 x ¼" machine screws (no nuts are needed). After the pushbutton assembly is mounted, connect the terminal strip TS-5 (from the same envelope #13), to the back of PB-1 with two 6-32 x ¼" machine screws.

The pins on the pushbutton assembly are very small and very close together. Be very careful about short circuits. When you finish soldering to these pins, you may want to bend them slightly away from each other at those places where a blob of solder on one pin threatens to touch a similar blob on another.

Make no attempt to provide mechanical joints when connecting to these pins. Simply push the wire through the hole in the pin, solder, and then trim off any excess wire. See Fig. 10.

☑ H-1. Connect a 1¼" red wire from Pin 7, PB-1 (solder 1) to Pin 28, PB-1 (solder 1).

☑ H-2. Connect a 1¾" red wire from Pin 12, PB-1 (solder 1) to Pin 4, TS-5.

☑ H-3. Connect a bus wire from Pin 10, PB-1 (solder 1) to Pin 13, PB-1 (solder 1).

☑ H-4. Connect a 1¾" red wire from Pin 27, PB-1 (solder 1) to Pin 1, TS-5.

☑ H-5. Connect a 2" red wire from Pin 30, PB-1 (solder 1) to Pin 2, TS-5.

☑ H-6. Connect a 1½" red wire from Pin 33, PB-1 (solder 1) to Pin 6, TS-5.

☑ H-7. Connect a 2" red wire from Pin 15, PB-1 (solder 1) to Pin 3, TS-5.

☑ H-8. Connect a 1¾" red wire from Pin 18, PB-1 (solder 1) to Pin 5, TS-5.