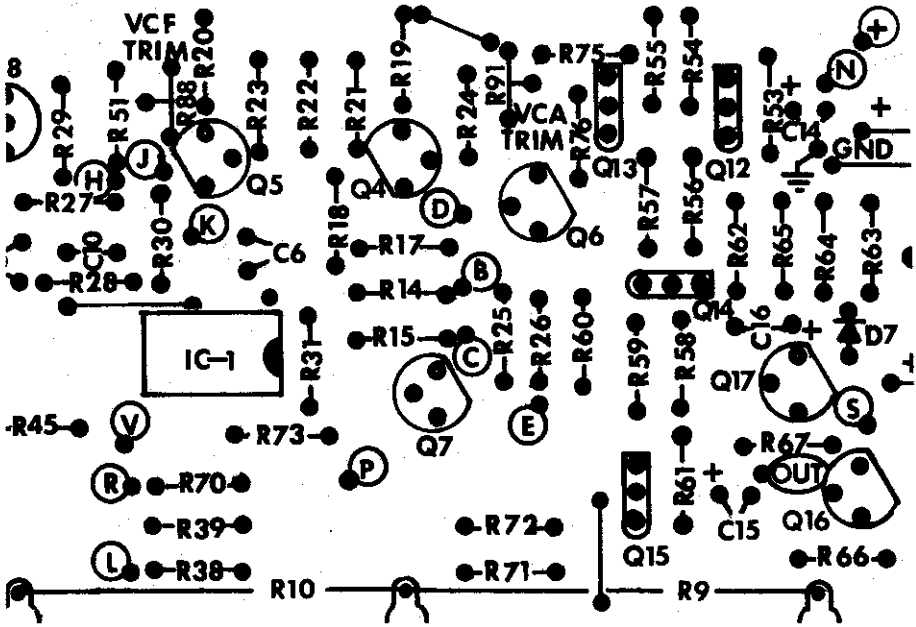
PAIA
ELECTRONICS, INC.

3740

GNOME

MICRO - SYNTHESIZER

ASSEMBLY INSTRUCTIONS



SOLDERING

Use care when mounting all components. Use only rosin core solder (acid core solder is never used in electronics work). A proper solder joint has just enough solder to cover the round soldering pad and about 1/16 inch of the lead passing through it. There are two improper connections to beware of: Using too little solder will sometimes result in a connection which appears to be soldered but actually there is a layer of flux insulating the component lead from the solder bead. This situation can be cured by re-heating the joint and applying more solder.

It is unnecessary to solder the copper other than at the points of component connection. If too much solder is used, there is the danger that a conducting bridge of excess solder will flow between adjacent circuit board conductors forming a short circuit. Unintentional solder bridges can be cleaned off by holding the board up-side down and flowing the excess solder off onto a clean, hot soldering iron.

IMPORTANT: Select a soldering iron with a small tip and a power rating not more than 35 watts. Soldering guns are completely unacceptable for assembling transistorized equipment because the large magnetic field they generate can damage solid state components.

CIRCUIT BOARD ASSEMBLY

( ) Prepare for assembly by thoroughly cleaning the conductor side of the circuit board with a scouring cleanser. Rinse the board with clear water and dry completely.

Solder each of the fixed resistors in place following the parts placement designators printed on the circuit board and parts placement diagram figure 2. Note that the fixed resistors are non-polarized and may be mounted with either of their two leads in either of the holes provided. Cinch the resistors in place prior to soldering by putting their leads through the holes and pushing them firmly against the board; on the conductor side of the board bend the leads outward to about a 45° angle. Clip off each lead flush with the solder joint as the joint is made. Save the lead clippings for use as jumpers in later steps.

Notice that not all components are mounted on the printed circuit board. Many parts will be mounted along with the controls in later steps.

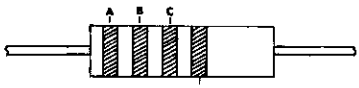


Figure 1 - Resistor Color Code silver or gold disregard this band

DESIGNATION		VALUE	COLOR CODE A-B-C
( )	R3	1 meg ohm	brown-black-green
( )	R4	330K	orange-orange-yellow
( )	R5	47K	yellow-violet-orange
( )	R6	1800 ohms	brown-grey-red
( )	R7	10 ohm	brown-black-black
( )	R8	470	yellow-violet-brown
( )	R11	10K	brown-black-orange
( )	R14	1 meg ohm	brown-black-green
( )	R15	100K	brown-black-yellow
( )	R17	6800 ohms	blue-grey-red
( )	R18	68K	blue-grey-orange
( )	R19	15K	brown-green-orange
( )	R20	6800 ohms	blue-grey-red
( )	R21	100K	brown-black-yellow
( )	R22	2700	red-violet-red
( )	R23	100K	brown-black-yellow
( )	R24	100K	brown-black-yellow
( )	R25	33K	orange-orange-orange
( )	R26	15K	brown-green-orange
( )	R27	6800	blue-grey-red
( )	R28	1 meg	brown-black-green
( )	R29	100 ohm	brown-black-brown
( )	R30	150K	brown-green-yellow
( )	R31	1 meg ohm	brown-black-green
( )	R37	1 meg ohm	brown-black-green

	DESIGNATION	VALUE	COLOR CODE A-B-C
( )	R38	33K	orange-orange-orange
( )	R39	470K	yellow-violet-yellow
( )	R42	4700 ohms	yellow-violet-red
( )	R43	22K	red-red-orange
( )	R44	100K	brown-black-yellow
( )	R45	100K	brown-black-yellow
( )	R46	2.2 meg ohm	red-red-green
( )	R47	3.9 meg ohm	orange-white-green
( )	R48	1 meg ohm	brown-black-green
( )	R51	47K	yellow-violet-orange
( )	R53	1K	brown-black-red
( )	R54	33K	orange-orange-orange
( )	R55	33K	orange-orange-orange
( )	R56	100 ohm	brown-black-brown
( )	R57	100 ohm	brown-black-brown
( )	R58	15K	brown-green-orange
( )	R59	100K	brown-black-yellow
( )	R60	150K	brown-green-yellow
( )	R61	10K	brown-black-orange
( )	R62	220K	red-red-yellow
( )	R63	1 meg ohm	brown-black-green
( )	R64	1 meg ohm	brown-black-green
( )	R65	680K	blue-grey-yellow
( )	R66	4700 ohms	yellow-violet-red
( )	R67	33K	orange-orange-orange
( )	R70	470K	yellow-violet-yellow
( )	R71	100K	brown-black-yellow
( )	R72	1 meg ohm	brown-black-green
( )	R73	33K	orange-orange-orange
( )	R75	33K	orange-orange-orange
( )	R76	1K	brown-black-red

( ) There are four wire jumpers to be installed on the circuit board. Using the excess resistor leads clipped during resistor installation, form and install these jumpers at the positions shown in figure 2 and indicated by the solid lines on the circuit board parts placement graphics.

Install the ceramic disk capacitors. The ceramic disks without exception have their value marked on the body of the part.

	DESIGNATION	VALUE
( )	C6	470 pf.
( )	C9	.001 mfd.
( )	C10	.001 mfd.

Figure 3A Ceramic Disk Capacitors

Up to this point all components have been non-polarized and either lead could be placed in either of the holes provided without affecting the operation of the unit. Electrolytic capacitors are polarized and must be mounted so that the "+" lead of the capacitor goes through the "+" hole in the circuit board. In the event that the "-" lead rather than the "+" lead is marked it is to go through the unmarked hole in the circuit board.

Note that the operating voltage (v.) specified for a capacitor is the minimum acceptable rating. Capacitors supplied with specific kits may have a higher voltage rating than that specified and may be used despite this difference. For instance, a 100 mfd. 25v. capacitor may be used in place of a 100 mfd. 10 v. capacitor without affecting the operation of the circuit.

Mount the following electrolytic capacitors and solder them in place. The values, voltage rating and polarization are marked on the body of the part.

DESIGNATION		VALUE
( )	C2	2.2 mfd. 6v.
( )	C3	5 mfd. 10v.
( )	C12	2.2 mfd. 10v.
( )	C14	2.2 mfd. 10v.
( )	C15	2.2 mfd. 10v.
( )	C16	2.2 mfd. 10v.
( )	C18	220 mfd. 15v.
( )	C19	220 mfd. 10v.

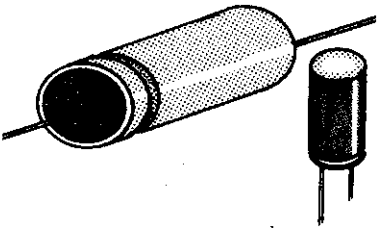


Figure 3B Electrolytic Capacitors

Install the transistors. Orient the transistors as shown in the parts placement diagram figure 1 and parts placement designators shown on the printed circuit board. All semi-conductors are heat sensitive and may be damaged if allowed to get too hot while soldering. To be on the safe side heat sink each transistor lead during the soldering operation by grasping it with a pair of needle nose pliers at a point between the circuit board and the body of the transistor. Note that the 2N3391 transistors are identified by white color coding.

Note that the middle lead of one of the transistors has been cut short. This transistor has been selected for its noise generating characteristics and is intended for use as Q1. Install this transistor.

( )	Q1	Noise transistor.

DESIGNATION		TYPE NO.
( )	Q2	2N3391 (see text)
( )	Q4	2N5129
( )	Q5	2N5129
( )	Q6	2N5139
( )	Q7	2N5129
( )	Q8	MPF-102
( )	Q9	2N5129
( )	Q10	2N5129
( )	Q11	2N5139
( )	Q12	2N3391 (see text)
( )	Q13	2N3391 (see text)
( )	Q14	2N2712
( )	Q15	2N2712
( )	Q16	2N5129
( )	Q17	2N5139

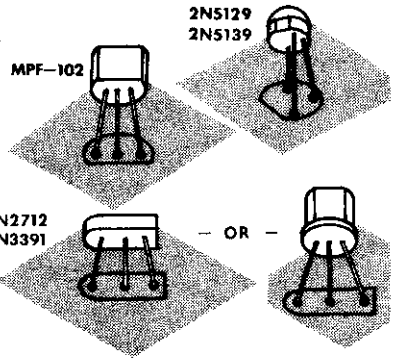


Figure 4 Transistors

Install the diodes. Note that these parts are polarized and must be properly oriented in order to operate properly. Polarization of the diodes is indicated by a colored band on one end of the case. Install as shown in figure 1. The physical appearance of the device is related to the schematic symbol used on the circuit board parts placement designators in the drawing below.

( )	D1	1N914
( )	D2	1N914
( )	D3	1N914
( )	D7	1N914
( )	D11	1N914

( ) Install 50K trimmer potentiometer R83 and solder in place. (see figure 6A)

( ) Install 50K trimmer potentiometer R88 and solder in place.

( ) Install 50K trimmer potentiometer R91 and solder in place.

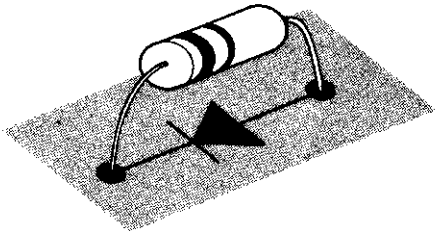


Figure 5 Diodes

Mount the integrated circuit. Note that the orientation of the integrated circuit is keyed by a notch at one end of the case which aligns with the semi-circular key on the designator printed on the circuit board. The orientation notch may be replaced with a circular recess in some of these parts. Use particular care when installing this part, like any other semi-conductor it is heat sensitive and should not be exposed to extraordinarily high soldering temperatures. Make sure that the orientation is correct before soldering, once the unit is in place it cannot be removed without destroying it. See figure 6B.

DESIGNATION		TYPE NO.
( )	IC-1	LM3900 – CA3401E Quad current differencing amp.

THIS COMPLETES ASSEMBLY OF THE GNOME CIRCUIT BOARD. TEMPORARILY PUT THE BOARD ASIDE AND PROCEED TO MOUNTING OF THE CONTROLS ON THE TOP PORTION OF THE CASE.

Place the top portion of the case face down on a soft rag or towel to prevent marring of the front panel. During the following assembly steps always work over this towel.

THESE STEPS MUST BE FOLLOWED IN SEQUENCE FOR EASIEST ASSEMBLY.

Note that single pole double throw (SPDT) switches are used in the next four steps (see figure 7A).

( ) Using two 4-40 X 1/4 inch screws, 2 lock washers and two 4-40 nuts as shown in figure 8, install single pole, double throw slide switch S8 in the position shown in figure 9. Tighten all hardware.

( ) In a similar manner mount the single pole double throw slide switch S6

( ) In a similar manner mount the single pole double throw slide switch S2

( ) In a similar manner mount single pole double throw slide switch S3
Note the solder lug mounted under the nut at the left end of this switch. See figure 9.

IN THE NEXT TWO STEPS DOUBLE POLE DOUBLE THROW (DPDT) SWITCHES ARE USED (see fig. 7B).

( ) In a similar manner mount DPDT slide switch S5 as shown in figure 9.

( ) Using two 4-40 X 1/4 inch screws, two lock washers and two 4-40 nuts mount DPDT slide switch S4 and the two 9 lug terminal strips TS-1 and TS-2 as shown in figure 9. While tightening the screws make sure that both terminal strips remain parallel to one another along lines perpendicular to front and rear edges of the case top.

( ) Gently bend the tops of both TS-1 and TS-2 toward the slide switches until the terminal strips form about a 60^{0} angle with respect to the chassis. Make sure that the lugs of the terminal strips are no closer than 1/4 inch to the nearest lugs of the slide switches.

( ) The DPDT power switch must be slightly modified to provide clearance for the push-button switch S1 which will be mounted in a later step. Solder resistor lead clippings between the middle and right hand lugs of each pole of this switch, clip the middle lugs off flush with the solder joint as shown in detail figure 11.

( ) Using two 4-40 X 1/4 inch screws, two lock washers and two 4-40 nuts mount the DPDT slide switch S7 in the space provided on the front lip of the case. Make sure that the lugs connected to the center lugs are to the right as shown in detail figure 12.

In the following steps the potentiometers will be mounted. In each case use two of the 3/8 inch nuts provided, one behind the panel as a spacer and the second on the front side of the panel to secure the potentiometer. Adjust the rear nut so that none of the threaded shaft of the control is exposed when the front nut is tightened down. This will allow the control knobs which will be mounted in later steps to seat as closely as possible to the panel. Orient as illustrated.

In each case it is critical that the potentiometer be oriented precisely as illustrated in figure 9 and that the mounting hardware be completely tightened as each control is installed.

	DESIGNATION	VALUE
( )	R77	5K
( )	R78	500K
( )	R79	500K
( )	R80	500K
( )	R81	5K
( )	R82	5K
( )	R84	5K
( )	R85	500K
( )	R86	500K
( )	R87	500K
( )	R89	500K
( )	R90	500K

( ) Using the nut provided, mount miniature phone jack J1 in the hole provided on the right side of the rear apron of the case. Orient as illustrated.

( ) Mount the black pin jack J2 in the position shown in figure 9. Fasten in place with the tinnerman nut provided as shown in detail figure 13. Press the nut firmly in place.

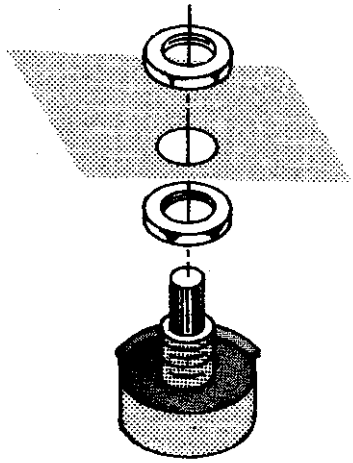


Figure 10 - potentiometers

AT THIS POINT all major hardware items and controls with the exception of pushbutton S1 are installed. Note the numbering of the terminals of potentiometers, slide switches and terminal strips shown in figure 9. Further assembly instructions will rely heavily on these designations.

Some of the following steps will involve connections between the controls, switches and other tie points using the insulated wire provided. Rotate the wire colors using first one color, then a second, then a third, etc. This will assist in tracing the wiring should it be necessary and will also assure that you have enough different colors left over to make the complicated connections from the controls to the circuit board in later steps. Unless otherwise noted the statement "prepare a ___ inch length of wire" means to cut that length of wire then strip 1/4 inch of insulation from each end. "Tinning" both ends of the wire by melting a small amount of solder into the exposed strands will make the wires easier to handle.

BEGIN WIRING THE CONTROLS. Refer to figure 14.

( ) Cut a 1 - 3/4 inch length of insulated wire and strip 1/4 inch of insulation from each end. Connect one end of this wire to lug #1 of R81 and the other end to lug #1 of R82. Solder the connection at R81 only.

( ) As above prepare a 3-1/4 inch length of insulated wire and connect one end to lug #5 of TS-2. DO NOT SOLDER.

( ) The other end of the above wire goes to lug #1 of R82. DO NOT SOLDER.

( ) Prepare a 2 - 1/2 inch length of insulated wire and connect one end to lug #1 of R77. Solder this connection.

( ) Connect the other end of the above wire to lug #3 of R78. DO NOT SOLDER.

( ) Prepare a 2 - 1/4 inch length of insulated wire and connect one end to lug #3 of R78. DO NOT SOLDER.

( ) Connect the other end of the above wire to lug #3 of S2. DO NOT SOLDER.

( ) Clip one lead of a 330K resistor (orange-orange-yellow) off to a length of 3/8 inch. Clip the second lead to a length of 3/4 inch. Bend these two leads so that they are parallel to one another and perpendicular to the resistor body.

( ) Put the longer lead of this resistor (R12) through lug #1 of R78 and bend it around so that it also passes through lug #2 of R78. Solder at lug #2 of R78 only.

( ) Connect the short lead of R12 to lug #3 of R78 and solder the three wires at this point.

( ) Prepare a 2 inch length of insulated wire. Connect this wire between lug #1 of R84 (solder this connection) and lug #1 of R87, DO NOT SOLDER.

( ) Prepare a 3-1/4 inch length of insulated wire. Connect this wire between lug #1 of R87 (solder two wires) and lug #5 of TS-1. Solder this connection.

( ) Cut two 5/8 inch lengths of insulation and slip one of each of the leads of a 10K ohm resistor (brown-black-orange). Cut the resistor leads so that 1/4 inch of wire projects beyond the end of the tubing.

( ) Connect this resistor (R69) between lug #1 of R90 and lug #7 of TS-1. Solder the connection at R90 only.

( ) Cut both leads of a 2200 ohm resistor (red-red-red) to a length of 1 inch. Install this resistor (R68) between lug #3 of R89 and lug #9 of TS-1. Solder the connection at R89 only.

( ) Cut two 1/2 inch lengths of insulation and slip one over each end of a 10K ohm resistor (brown-black-orange). Clip the resistor leads so that 1/4 inch extends beyond the end of the insulation.

( ) Connect the above resistor (R40) between lug #3 of R85 and lug #6 of TS-1. It is acceptable that the resistor pass over R85. Solder the connection at R85 only.

( ) Cut two 5/8 inch lengths of insulation and slip one over each lead of a 10K ohm resistor (brown-black-orange). Clip the resistor leads so that 1/4 inch extends beyond the end of the insulation.

( ) Connect the above resistor (R41) between lug #1 of R86 and lug #3 of TS-1. It is acceptable that the resistor pass over R87. Solder the connection at R86 only.

( ) Bend the leads of a 1N914 diode parallel and cut both leads to a length of 1/2 inch. Install this diode (D9) between lugs #7 and #8 of TS-1. Observe that the colored band must be on the end of the diode connected to TS-1 lug #7. Carefully solder the two wires at TS-1 lug #7 only.

( ) As above, install D8 between lugs #8 and #9 of TS-1. Note that the colored band is on the end of the diode connected to lug #8 of TS-1. Carefully solder the two wires at TS-1 lug #9 only.

( ) As above, install D5 between lugs #3 and #4 of TS-1. Note that the colored band is on the end of the diode connected to lug #3 of TS-1. Carefully solder the two wires at lug #3 of TS-1 only.

( ) Cut both leads of a 1N914 diode off to a length of 5/8 inch. Install this diode (D4) between lugs #4 and #6 of TS-1. Note that the colored band is on the end of the diode connected to lug #4 of TS-1. Make sure that the diode is installed so that neither of its leads will short against lug #5 of TS-1. Solder the two wires connected to lug #6 of TS-1 only.

( ) Cut a 1/2 inch length of insulation and slip it over the lead coming from the banded end of a 1N914 diode. Cut this lead so that 1/4 inch extends beyond the end of the insulation. Cut the other lead of this diode to a length of 1/2 inch.

( ) Install this diode (D10) between lug #3 of S6 and lug #8 of TS-1. Note that the lead coming from the banded end of the diode attaches to lug #3 of S6. Solder the connection at S6 only.

( ) Cut both leads of a 6800 ohm resistor (blue-grey-red) off to a length of 5/8 inches. Connect this resistor (R74) between lug #2 of S6 and lug #7 of TS-2. DO NOT SOLDER either connection.

( ) Cut both leads of a .005 mfd. ceramic disk capacitor to a length of 3/8 inch. Connect this capacitor (C17) between lugs #1 and #2 of S6. Solder the two wires connected to lug #2 of S6 only.

( ) Prepare a 2-1/2 inch length of insulated wire. Connect one end of this wire to lug #3 of S5. Solder this connection.

( ) Connect the other end of the above wire to lug #1 of S4. Solder this connection. Dress this wire down between S4 and S5.

( ) Prepare a 2 inch length of insulated wire. Connect one end of this wire to lug #4 of S4. Solder this connection.

( ) Connect the other end of the above wire to lug #5 of S5. Solder this connection. Dress this wire down so that it will not be in the way of future connections.

( ) Cut two 1 inch lengths of hollow plastic insulation and slip one over each lead of a 6800 ohm resistor (blue-grey-red). Clip the resistor leads so that only 1/4 inch projects beyond the insulation.

( ) Connect one lead of this resistor (R52) to lug #4 of S5 and the other lead to TS-1 lug #2. Solder the connection at S5 only. Arrange the resistor leads so that they are clear of all other soldering lugs.

( ) Cut one lead of a .005 mfd. ceramic disk capacitor to a length of 3/8 inch while leaving the second lead at its full length. Connect the short lead of this capacitor (C13) to lug #1 of S5. DO NOT SOLDER.

( ) The second lead of this capacitor goes up to lug #5 of S4, through it and back to lug #2 of S5. Twist the body of the capacitor so that it is "standing on edge" between S4 and S5 before soldering the connections at lug #5 of S4 and lug #2 of S5. Clip off the excess lead at lug #2 of S5.

( ) Cut both leads of a 1N914 diode off to a length of 1/2 inch. Connect the lead coming from the banded end of the diode (D6) to lug #2 of S4. Solder this connection.

( ) Connect the unbanded end of D6 to lug #4 of TS-1. DO NOT SOLDER.

( ) Strip 1/4 inch of insulation from each end of a 1-1/4 inch length of insulated wire. Connect one end of this wire to lug #6 of S5. Solder this connection.

( ) Connect the free end of the above wire to lug #6 of S4. DO NOT SOLDER.

( ) Clip both leads of a 6800 ohm resistor (blue-grey-red) to a length of 3/8 inch. Connect this resistor (R50) between lug #7 of TS-2 and lug #6 of S4. Solder the two wires at S4 only.

( ) Clip both leads of a 10K ohm resistor (brown-black-orange) to a length of 1/2 inch before bending both leads so they are perpendicular to the body of the resistor and parallel to one another.

( ) Connect the above resistor (R34) between lugs #3 and #4 of TS-2. DO NOT SOLDER either of these connections.

( ) Cut both leads of a 10K ohm resistor (brown-black-orange) to a length of 3/4 inch.

( ) Connect the above resistor (R36) between lugs #1 and #3 of TS-2. DO NOT SOLDER either of these connections.

( ) Prepare (3) three 2.2 mfd. 10v. electrolytic capacitors for installation by cutting 3/4 inch lengths of the hollow plastic insulation provided and slipping one piece of insulation over each of the negative (-) leads of each of these three capacitors. The negative lead will be the shorter of the two capacitor leads.

( ) Cut three 1 inch lengths of the insulation and slip one of these over each of the long positive (+) leads of the capacitors.

( ) Connect the short negative lead of one of these capacitors to the center lug (lug #2) of R32. Solder this connection.

( ) Connect the longer (+) lead of this capacitor (C8) to lug #8 of TS-2. DO NOT SOLDER this connection.

( ) Connect the shorter (-) lead of the second of these three capacitors to lug #2 of R81. SOLDER THIS CONNECTION.

( ) Connect the longer (+) lead of this capacitor (C7) to lug #4 of TS-2. SOLDER two wires at this lug.

( ) Cut two 7/8 inch pieces of hollow plastic tubing and slip one piece over each of the leads of a 47K ohm resistor (yellow-violet-orange). Cut both leads so that 1/4 inch extends beyond the end of the tubing.

( ) Connect the above resistor (R35) between lugs #3 and #8 of TS-2. Solder the two wires at lug #8. DO NOT SOLDER the connection at lug #3.

( ) Connect the longer (+) lead of the third 2.2 mfd.capacitor to lug #2 of R77. Solder this connection.

( ) Connect the shorter (-) lead of this capacitor (C4) to lug #1 of TS-2. Solder the two wires at this lug.

( ) Cut both leads of a 1800 ohm resistor (brown-grey-red) to a length of 1/2 inch. Connect one lead of this resistor (R33) to lug #3 of TS-2. DO NOT SOLDER.

( ) The second lead of this resistor connects to lug #3 of S8. SOLDER this connection.

( ) Cut both leads of a 15K resistor (brown-green-orange) to a length of 5/8 inch. Connect one lead of this resistor (R32) to lug #2 of TS-2. DO NOT SOLDER.

( ) The second lead of this resistor connects to lug #1 of S8. Solder this connection.

( ) Prepare a 2-1/4 inch length of insulated wire. Connect one end of this wire to lug #3 of R84. Solder this connection.

( ) Connect the other end of this wire to lug #1 of TS-1. DO NOT SOLDER.

( ) Cut both leads of a 33 mfd. 10v. electrolytic capacitor to a length of 3/4 inch. Connect the negative (-) lead of this capacitor to lug #1 of TS-1. Solder the two wires at this lug.

( ) Connect the positive (+) lead of the above capacitor (C11) to lug #2 of TS-2. DO NOT SOLDER.

( ) Prepare a 2-1/2 inch length of insulated wire and connect one end to lug #1 of R82. Solder three wires at this lug.

( ) Connect the free end of the above wire to lug #1 of R79. DO NOT SOLDER.

( ) Prepare a 2-1/4 inch length of insulated wire and connect one end to lug #1 of S2. Solder this connection.

( ) Connect the free end of the above wire to lug #1 of S3. DO NOT SOLDER.

( ) Prepare a 3-1/2 inch length of insulated wire and connect one end to lug #3 of R79. Solder this connection.

( ) Connect the free end of the above wire to lug #2 of S2. Solder this connection.

( ) Cut both leads of a 2.2 meg ohm resistor (red-red-green) to a length of 1/2 inch. Connect one end of this resistor (R49) to the ground lug at the end of S3. DO NOT SOLDER.

( ) Connect the other end of the above resistor to lug #2 of S3. DO NOT SOLDER.

( ) Cut both leads of a .1 mfd. mylar capacitor to a length of 1/2 inch. Connect one end of this capacitor (C5) to the ground lug at the end of S3. DO NOT SOLDER.

( ) Connect the free lead of the above capacitor to lug #1 of S3. DO NOT SOLDER

( ) Prepare a 3-3/4 inch length of insulated wire and connect one end to lug #1 of S7. DO NOT SOLDER.

( ) Connect the free end of the above wire to lug #3 of S2. DO NOT SOLDER.

( ) Cut a 1-1/2 inch piece of the bare wire provided and carefully solder it to the emitter (#1) lead of the remaining 2N2712 transistor. Note that the two leads should not be twisted together but rather should be simply soldered side by side.

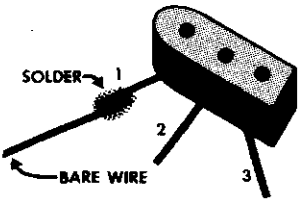
( ) Cut a 1-1/2 inch piece of hollow plastic insulation and slip it completely over the extended emitter lead of transistor Q3 from the above step.

( ) Connect the extended emitter (#1) lead of Q3 to lug #2 of R80. DO NOT SOLDER.

( ) Connect the collector (#2) lead of Q3 to lug #1 of S7. While heat sinking this transistor lead, carefully solder the two wires connected to this switch lug.

( ) Connect the base (#3) lead of Q3 to lug #2 of R79. While heat sinking this transistor lead, carefully solder this connection.

( ) Cut both leads of a 33K ohm (orange-orange-orange) resistor to a length of 3/8 inch. Connect this resistor (R13) between lug #2 of R80 (do not solder) and the ground lug at the end of S3. Solder the 3 wires at this ground lug.



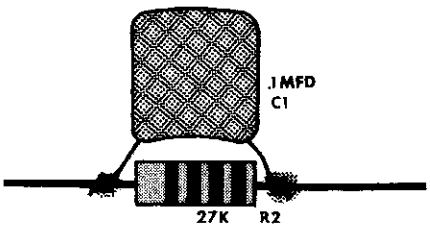
( ) Cut both leads of a 2.2 meg (red-red-green) resistor to a length of 3/8 inch. Bend the leads perpendicular to the body of the resistor and parallel to one another.

( ) Connect the above resistor (R16) between lugs #1 and #2 of R80. Solder the three wires at lug #2 but do not solder the connection at lug #1.

IN THE FOLLOWING STEPS REFER TO FIGURE 15.

( ) Mount the Single Pole Single Throw pushbutton S1 in the front panel "Trigger" hole. Orient as illustrated.

( ) Wrap the leads of a .1 mfd. mylar capacitor around the leads of a 27K (red-violet-orange) resistor. Only two or three turns of the capacitor lead are required and they should be as close to the body of the resistor as possible. Solder the capacitor leads to the resistor leads and clip off the excess capacitor lead.



( ) Cut the resistor leads to a length of 1/2 inch and connect this resistor-capacitor combination (R_2, C_1) between lug #1 of S1 (DO NOT SOLDER) and lug #1 of R79. Solder the two wires connected to this lug.

( ) Prepare a 4-1/2 inch piece of insulated wire and connect it between lug #7 of TS-2 (DO NOT SOLDER) and lug #1 of S1 (solder two wires).

( ) Prepare a 5-1/2 inch length of insulated wire and connect it between the terminal on the rear of pin jack J2 (solder) and lug #7 of TS-2 (solder four wires). This wire can be routed under and between R85 and R86 and under the end of TS-1 to reach TS-2.

( ) Without cutting its leads, connect a 10K resistor (brown-black-orange) R1 between lug #3 of S2 (DO NOT SOLDER) and lug #2 of S1 (solder this connection).

In the following steps wires will be connected to the front panel controls which in later steps will be connected to points on the circuit board. Refer to figure 15. These wires will be installed in four groups with each of the groups bundled together before progressing to the next group. Since the point of origin of these wires will need to be determined when they are attached to the circuit board use as many different colors in each group as possible.

( ) Cut an 9-1/2 inch length of insulated wire. Strip 1/2 inch of insulation from one end of this wire and twist and tin the exposed strands. Pass this wire through lugs #1 and #2 of R89. and lugs #3 and #2 of R90. Solder these connections. Strip 1/4 inch of insulation from the free end

( ) In a similar manner, prepare a 9 inch length of wire and connect to lugs #2 and #3 of R86 and lugs #1 and #2 of R85. Strip 1/4 inch of insulation from the free end.

Prepare the wires used in the following steps by cutting to the specified length and stripping 1/4 inch of insulation from each end. Twist and tin the exposed strands at each end of the wire before making the indicated connection.

( ) an 8-1/2 inch length to lug #4 of TS-1. Solder the 4 wires at this lug.

( ) a 7 inch length to lug #2 of R84. Solder this connection.

( ) a 6-1/2 inch length to lug #3 of R87. Solder this connection.

( ) a 5-1/2 inch length to lug #2 of R87. Solder this connection.

( ) a 6-1/2 inch length to lug #2 of TS-1. Solder both wires at this connection.

( ) Prepare one end of the length of RG-174/U coaxial cable provided by stripping away 3/4 inch of the outer insulating jacket, be careful not to damage the braided shield beneath this outer insulation. Push back the exposed braid and at a point near the end of the outer insulation use a pencil or other pointed object to form a small hole. Reach through this hole and pull out the separately insulated inner conductor. Clip off 1/4 inch from the end of the insulated inner conductor and remove 1/4 inch of insulation before twisting and tinning the strands of the inner conductor. Pull the braid taut to collapse it. (see figure 16)

( ) Slip the 1/2 inch length of large diameter tubing provided over the shield braid and connect the shield to lug #5 of TS-2. DO NOT SOLDER THIS CONNECTION.

( ) Connect the inner conductor to lug #3 of TS-2 and solder the five wires at this point.

Group together the 7 wires and single length of co-ax installed in the above steps and wrap with a wire tie. To hold the wire tie in place, include the wire connecting lug #1 of R84 to lug #1 of R87 in in the bundle. Proceed with wiring as above.

( ) a 7-1/2 inch length to lug #3 of R82. Solder this connection.

( ) a 7-1/2 inch length to lug #3 of R81. Solder this connection.

( ) a 7 inch length to lug #1 of R80. Solder the two wires at this connection.

( ) an 8 inch length to lug #3 of R80. Solder this connection.

( ) an 8 inch length to lug #1 of R78. Solder the two wires at this connection.

Group together the 5 wires installed above and wrap with a wire tie. To hold the wire tie in place, include the wire connecting lug #1 of R77 to lug #3 of R78 in the bundle.

( ) An 8-1/4 inch length to lug #3 of R77. Solder this connection.

( ) a 10 inch length to lug #8 of TS-1. Solder the four wires at this connection. Solder with care, the three diodes at this junction are heat sensitive.

( ) a 6 inch length to lug #2 of TS-2. Solder the three wires at this connection.

( ) a 9-1/2 inch length to lug #2 of S3. Solder the two wires at this connection.

( ) a 9 inch length to lug #1 of S5. Solder the two wires at this connection.

( ) a 7-1/2 inch length to lug #2 of S8. Solder this connection.

( ) a 9-1/2 inch length to lug #1 of S6. Solder the two wires at this point.

Group together the 7 wires installed above and wrap with a wire tie. To hold the wire tie in place, include the resistor lead connected to lug #2 of TS-2 in the bundle.

( ) A 9 inch length to lug #3 of S7. Solder this connection.

( ) a 9 inch length to lug #6 of S7. Solder this connection.

( ) a 7 inch length to lug #4 of S7. Solder this connection.

( ) a 6 inch length to lug #3 of S2. Solder the four wires at this connection.

( ) An 8-1/2 inch length to lug #5 of TS-2. Solder the three wires at this point.

( ) Prepare a 6-1/2 inch length of insulated wire and connect one end to lug #2 of J1. Solder this connection.

Group together the 6 wires installed above and wrap with a wire tie. To hold the wire tie in place, include the wire connecting lug #3 of R78 to lug #3 of S2 in the bundle.

THE WIRES THAT WILL IN LATER STEPS CONNECT TO THE CIRCUIT BOARD ARE NOW IN 4 GROUPS WHICH WILL IN THE FUTURE BE REFERED TO AS BUNDLES 1 (closest to R84) THROUGH 4 (closest to J1).

( ) Install the small rubber grommet in the hole in the front lip of the case directly in front of R90. A small screw driver will be helpful in pushing the grommet through the hole.

( ) Strip 1/4 inch from one end of the length of flexible test lead wire and twist and tin the exposed wire strands. Feed this wire through the grommet mounted in the above step and connect to lug #1 of S3. Solder the three wires connected to this lug.

THIS COMPLETES PRELIMINARY ASSEMBLY OF THE FRONT PANEL CONTROLS. Put the front panel aside and return to work on the circuit board.

The linear strip controller will be mounted within the next few steps and preparation must be made at this time to assure proper electrical contact between the circuit board pads and the ends of the strip.

( ) Completely tin the large rectangular pads in the lower left and right corners of the circuit board by melting a little solder onto the tip of a hot soldering iron and then rubbing the pad briskly with the broadest side of the hot iron. As you rub, solder will adhere to the copper. Keep rubbing and adding small amounts of Solder until the pads are completely covered with a smooth film of solder. Excess solder may be removed by allowing to cool for a moment before being flowed onto the hot tip of the soldering iron. Shake excess solder from the iron with a "flicking" motion of the wrist.

( ) Using acetone or lighter fluid and a clean rag, remove any traces of rosin from the pads just tinned. Also clean the area across the lower edge of the circuit board between these pads to assure that there will be no oily film to interfere with the bond of the adhesive between the vinyl controller strip and the circuit board.

( ) Unroll the double sided tape provided and apply to the circuit board as shown in figure 17. Align the edge of the tape with the copper line extending between the rectangular pads on the circuit board. NOTE: the double sided tape must completely cover this copper line so that the line does not contact the vinyl strip which will be installed in the following steps.

( ) Using a razor blade or sharp knife, trim the ends of the tape so that there is a 1/8 inch gap between the tape and the inside edges of the rectangular pads on the circuit board.

( ) Using lighter fluid and a clean rag thoroughly clean both sides of the vinyl strip.

( ) Remove the protective backing from the top surface of the tape and press the vinyl strip down firmly onto the sticky surface of the tape. Make sure that the vinyl strip is aligned as in figure 17, and that the peaks of the sawtooth on the vinyl strip coincide with the bottom edge of the 1/8 inch holes in the circuit board. Save the protective backing from the tape for use in later steps.

( ) When properly adhered, the double-sided tape exposed between the "teeth" of the vinyl strip may be cut away with a razor blade or sharp knife. Be careful not to cut the vinyl.

( ) Secure the three "peaks" of the teeth in the vinyl as shown in figure 18. Slip one of the washers supplied over a 4-40 X 1/4 inch machine screw then pass this screw through the hole in the circuit board so that the washer clamps down the vinyl. On the component side of the circuit board slip a solder lug over the screw and secure with a lock washer and a 4-40 nut. Note that the solder lug should be pointing toward the rear edge of the board.

TURN THE CIRCUIT BOARD OVER TO INSTALL RESISTORS R9 AND R10.

( ) Cut both leads of a 1K ohm resistor (brown-black-red) to a length of 1-1/8 inches measured from the body of the part.

( ) Install this resistor between the right hand and middle solder lugs as shown by the circuit board designator R9. Solder the connection at the right hand lug only.

( ) Cut both leads of a 2. 2K ohm resistor (red-red-red) to a length of 1-1/8 inches as measured from the body of the part.

( ) Install this resistor between the left hand and middle solder lugs as shown by the designation R10 on the circuit board. Solder the left hand lug and the two resistors connected to the middle lug.

THE PREVIOUSLY BUNDLED WIRES FROM THE FRONT PANEL CONTROLS WILL NOW BE CONNECTED TO THE LETTERED POINTS ON THE CIRCUIT BOARD.

Proper orientation of the circuit board with respect to the front panel is essential while these interconnections are being made. Lay the front panel face down on the work surface with the short lip that mounts the power switch S7 facing you. While making the connections have the circuit board standing on edge with the controller strip down and the component side of the board facing the case (see figure 19). This will assure that in a later step the circuit board can be "folded" into the case with minimum difficulty. Double check both point of origin and circuit board connection point as each wire is installed. Solder each circuit board connection at each step.

FROM BUNDLE #1 (closest to R84) MAKE THE FOLLOWING CONNECTIONS TO THE CIRCUIT BOARD.

	FROM	TO
( )	Lug #2 of R84	circuit board point "J".
( )	Lug #2 of R87	circuit board point "G".
( )	Lug #3 of R87	circuit board point "U".
( )	Lug #2 of TS-1	circuit board point "W".
( )	Lug #4 of TS-1	circuit board point "M".
( )	Lugs #2 and #3 of R85 and R86	circuit board point "V".
( )	Lugs #2 and #3 of R89 and R90	circuit board point "R".

( ) At the free end of the length of co-ax originating at TS-2, strip away 3/4 inch of both the black outer insulation and the inner braided shield. Make sure that all of the braided shield is cut off even with outer insulating jacket so that there is no possibility of this shield shorting against components on the circuit board. Strip 1/4 inch of insulation from the inner conductor.

( ) Connect the center conductor of the co-ax prepared above to circuit board point "H" and solder in place. Note that the shield of this co-ax makes no connection to the circuit board.

CONTINUE MAKING CIRCUIT BOARD CONNECTIONS WITH THE WIRES IN BUNDLE #2 (closest to S8).

	FROM	TO
( )	Lug #2 of S8	circuit board point "N".
( )	Lug #8 of TS-1	circuit board point "S".
( )	Lug #1 of S5	circuit board point "L".
( )	Lug #1 of S6	circuit board point "P".
( )	Lug #3 of R77	circuit board point "A".
( )	Lug #2 of S3	circuit board point "F".

CONTINUE MAKING CIRCUIT BOARD CONNECTIONS WITH THE WIRES IN BUNDLE #3 (closest to R77).

	FROM	TO
( )	Lug #2 of TS-2	circuit board point "K".
( )	Lug #3 of R80	circuit board point "B".
( )	Lug #1 of R80	circuit board point "C".
( )	Lug #3 of R81	circuit board point "D".
( )	Lug #3 of R82	circuit board point "E".
( )	Lug #1 of R78	circuit board point "T".

CONTINUE MAKING CIRCUIT BOARD CONNECTIONS WITH THE WIRES IN BUNDLE #4 (closest to S2).

	FROM	TO
( )	Lug #5 of TS-2	circuit board point "Gnd"
( )	Lug #3 of S7	circuit board point "X".
( )	Lug #6 of S7	circuit board point "Y".
( )	Lug #3 of S2	circuit board point "++".
( )	Lug #2 of J1	circuit board point "OUT".
( )	Lug #4 of S7	circuit board point "+".

( ) Locate the two 9 volt battery snaps and twist together the exposed strands of the black lead of one of the snaps and the red lead of the other. Connect these leads to the remaining hole at circuit board point "Y" and solder in place.

( ) Connect and solder the free red battery snap lead to the remaining hole at circuit board point "X".

( ) Connect and solder the free black battery snap lead to circuit board point "Z".

THIS COMPLETES ELECTRICAL ASSEMBLY OF THE GNOME.

Before completing mechanical assembly of the case we will go through a check-out and calibration procedure to assure that the instrument is working properly. During this check-out procedure we recommend that the Gnome be arranged with the front panel face-up in front of the circuit board which is component side up. This position allows access to the front panel controls as well as to the three circuit board mounted trimmer adjustments. Make doubly sure that the circuit board is not resting on a conductive surface or on wire scraps that could short conductors on the circuit board.

TESTING AND CALIBRATION

There are only three internal adjustments that will need to be made to the Gnome. These adjustments are; balance on the Voltage Controlled Amplifier (VCA), bias on the Voltage Controlled Filter (VCF) and TRIM for the VCF. The rest of this procedure will be involved with testing the various sections of the Gnome to verify their proper operation.

Snap a pair of heavy duty 9 volt transistor radio batteries (Eveready #1222 or equivalent) into the battery connectors and use a jumper cable to make the connection between the rear panel output jack of the Gnome and the musical instrument or hi-fi amplifier that you intend using. On most hi-fi amplifiers either the "aux." or "Mag. phono" inputs are appropriate.

In designating front panel controls we will use the following conventions: the symbolic groupings will be written in all capitol letters. For example, CONTROLLER, TRIGGER, NOISE, VCO, VCF, VCA. Specific controls within these groupings will always start with a capitol letter, as for example, CONTROLLER Range refers to the knob within the CONTROLLER box which is labeled Range. Settings of the controls will be in all lower case letters so that "CONTROLLER Range min." means to rotate the Range control within the CONTROLLER box fully counter clockwise to the "min." setting.

Before beginning calibration set the controls as follows:

CONTROLLER SECTION - Range min., VCO switch off (opposite direction of arrow is in all cases considered to be off), VCF switch off.

NOISE SECTION - min.

VCO SECTION - Skew fully clockwise (CW), Range min., Triangle () min., Square wave () min.

VCF SECTION - In-out switch to out, Repeat off, Sustain off, Range min., Freq. /Q. fully CCW, Attack min., Decay min.

VCA SECTION - Sustain off, Attack min., Decay min.

Turn the external amplifier that you are using on and select the proper input channel. Turn the Gnome on by sliding the front-lip mounted power switch to the right (away from the nearest edge).

TESTING THE VCA

Rapidly and repeatedly press the TRIGGER button. You should hear a "thump" from the amplifier that indicates that the Gnome's VCA is probably working but needs to be balanced. Again repeatedly press the TRIGGER button while adjusting the circuit board mounted VCA TRIM control. At some point in the rotation of the control the "thump" will be minimized. This is the proper setting for this control.

TESTING THE NOISE SOURCE

Turn the VCA sustain on and set the NOISE control to max. Now press the TRIGGER BUTTON, you should hear a burst of white noise (hissing similar to inter-station FM radio static) that stays on as long as the TRIGGER button is held down. This indicates that both the noise source and VCA are working properly.

TESTING THE VCA FUNCTION GENERATOR

Rotate the VCA Attack to max. and Decay to max. and press the TRIGGER button. The noise that you hear should take a little more than a second to build up to a peak volume and then remain at that volume as long as the TRIGGER button is held down. Releasing the TRIGGER button should allow the noise to die away slowly, taking on the order of a second to turn off completely. Turn

the VCA Sustain switch off and once again press the TRIGGER button. Observe that now, even though the TRIGGER button is held down, the noise builds to a peak and then immediately begins to die away. Press the TRIGGER button and release it before the entire attack and decay cycle is completed. Observe that as soon as the TRIGGER button is released the sound goes off. This is an automatic "muting" function that is operative any time the VCA Sustain switch is off. Successful completion of this sequence shows the VCA function generator to be operating properly. We will now test the operation of the Voltage Controlled Oscillator.

TESTING THE VCO

Return the NOISE control to min. and advance the VCO Square wave control to max. Return the VCA Sustain switch to its on position and the VCA Attack and Decay controls to min. Press and hold the TRIGGER button while advancing the VCO Range control toward max. During the first 30^{O} or so of the rotation of the VCO Range control you should hear nothing. After about 30^{O} of rotation you should hear a low pitched tone from the amplifier and as the control is advanced further the tone should rise in pitch. Return the VCO Square wave control to min. and advance the Triangle control to max. Press and hold the TRIGGER button while once again rotating the VCO Range control. Once again you should hear a tone that increases in pitch as the VCO Range control goes from min. to max. This tone should be considerably more "mellow" than the square wave control but the frequency range should be the same and you should have the same "dead zone" at the min. end of the rotation of the Range control. Leave the VCO Range control at some intermediate position so that a steady tone in coming from the amplifier and rotate the Skew control in a counter clockwise (CCW) direction from the triangle symbol toward the ramp () symbol. The frequency will increase slightly as the Skew control is rotated but it should not vary more than a couple of semi-tones from the pitch at the ends of the rotation. Notice that with the Skew control set toward the ramp symbol the tone is considerably "sharper" than the triangle wave tone. Take the Triangle control to min. and Square wave to max. and verify that the resultant tone is the sharpest of all. Successful completion of this sequence verifies the proper operation of the Voltage Controlled Oscillator. We will now test and align the Voltage Controlled Filter

TESTING THE VCF

Return the VCO Square wave control to min. and Range to min. Slide the VCF out-in switch to in and advance the noise control to max. Set the filter sustain switch to on. Set the VCF Bias trimmer (R83) fully counter-clockwise as viewed from the rear edge of the circuit board (opposite the direction of the arrow) and rotate the adjusting disk of the VCF Trim trimmer (R88) fully toward you as you look at the circuit board from the rear (opposite direction of arrow). Make sure that the VCF Range control is set to min. and press and hold the TRIGGER button. While listening to the noise, rotate the adjusting disk of the VCF Trim trimmer (R88) in the direction of the arrow. You should hear the apparent pitch of the noise increase as the pass-band of the filter sweeps upwards in frequency. Set the VCF Trim trimmer to the point at which the pitch of the noise just begins to increase.

Rotate the VCF Range control to max. and observe that the pitch of the noise once again increases. Now rotate the adjusting disk of the VCF Bias trimmer (R83) in a clockwise direction as viewed from the back of the board (in the direction of the arrow) and observe that at some point the pitch of the noise begins to decrease. Leave the VCF Bias trimmer set at the point at which the pitch of the noise just begins to decrease.

Return the VCF Range control to min. and once again advance the VCF Trim trimmer in the direction of the arrow until the point is reached at which the pitch of the noise just begins to increase.

TESTING THE VCF FUNCTION GENERATOR

Set the VCF Range Control to about half of its rotation and the noise control to max. Slide the VCF Repeat switch on and press and hold the TRIGGER button. This setting of the VCF Function Generator controls (Sustain on, Repeat on) causes the function generator to trigger itself producing a cyclic sweep of the filter. In this case the sound produced should be a "swishing" as the filter sweeps up and down over the frequency content of the noise. Observe that the "depth" of this effect increases as the VCF Range control is rotated from min. to max.

NOTE: At this maximum reptition rate (VCF Attack and Decay both min.) there will probably be some "thumping" from the Gnome. This transfer of the control voltage into the audio channel can be eliminated by reducing the setting of the VCF Range control or by slowing the Attack and/or Decay of the VCF function generator.

Observe that as the Freq. /Q. control is rotated in a clockwise direction the overall pitch of the noise increases.

Return the VCF Freq. /Q. control to its fully CCW position and Range to max. While holding down the TRIGGER button advance the VCF Attack to max. and observe that the pitch of the noise slowly builds up to a peak and then quickly resets and that this effect occurs cyclicly. Return the VCF Attack to min. and advance the Decay to max. Observe that now the pitch of the noise goes to a high value and then slowly slides back down scale until again it resets to the high level. Set the VCF Attack to max. and observe that the filter slowly sweeps up and down scale. NOTE: the VCF Range control is designed to have greater effect than is actually needed. If, during this last test, the pitch of the noise seems to increase to a plateau and then hold momentarily before sliding back down scale it indicates that the Range switch is too far advanced. Back off on this control slightly and note that the "plateau" is no longer present. Successful completion of this test sequence indicates that both the filter and function generator are operating properly. We will now test the triggering functions associated with the VCF.

Set the VCF controls as follows: Range max., Q/Freq. CCW, In-out to in, Repeat off, Sustain off, Attack min., Decay max. Press and hold the TRIGGER button. You should hear the noise apparently starting at a high pitch and decaying back to a low pitch, it should not repeat but rather should simply stay at the low pitch until the TRIGGER button is released and pressed again. Set Attack to max. and Decay to min. Pressing the TRIGGER button should produce noise that increases in pitch over a period of a second or so followed by a rapid step back to low pitch. Once again, this pattern should not repeat until the TRIGGER button is released and pressed again. Set Decay to max. and observe that the pitch of the noise slowly sweeps up and back down each time the TRIGGER button is pressed. Set the VCA Decay control to max., VCF Decay to min. and slide the VCF Sustain switch to its on position. Press and hold the TRIGGER button. Observe that the pitch of the noise always sweeps up to a high level and remains there until the TRIGGER is released.

SUCCESSFUL COMPLETION OF THESE TEST SEQUENCES INDICATE THAT THE GNOME IS WORKING PROPERLY. Remove the batteries from the battery snaps and prepare for final assembly.

FINAL ASSEMBLY

( ) Strip 1/4 inch of insulation from the test lead protruding from the hole in the front lip of the upper case and twist and tin the exposed wire strands.

( ) Install the tip plug on the end of the wire prepared above by unscrewing the plastic insulating jacket and slipping it, unthreaded end first, over the wire. Use the broad side of a soldering iron to heat the shoulder at the rear of the metal tip (be careful not to fill the screw threads with solder) while feeding solder into the hole. When a small amount of solder has melted inside the plug, insert the wire and remove the soldering iron.

( ) Install the knobs by rotating all control shafts fully counter-clockwise before pushing on the knobs. Align the pointers on the knobs so that they all indicate the 7:00 O'clock position of an imaginary clock face. Make sure the alignment is correct before pushing the knobs fully in place.

In its final assembled form the circuit board of the Gnome is mounted "up-side down" in the case; that is, the component side of the board is facing down into the case bottom while the conductor side is facing up into the controls in the top half of the case. At this time carefully check the conductor side of the board and make sure that all component leads and inter-connection wires are clipped off as closely to the surface of the board as possible - excessively long leads may touch connection points in the top half of the case causing short circuits.

Examine the wood-ends supplied. Observe that the cross-cut down the center of each piece is slightly off center and that the rabbet cuts along the bottom and rear edges are narrower than those on the front and top edges. See figure 20.

Arrange the assembled Gnome components such that the circuit board is closest to you conductor side up with the case top behind (see figure 21).. In this position the circuit board is oriented as it will be when the unit is fully assembled. Make sure the ends of the vinyl control strip are wrapped around the edges of the circuit board and trial fit the wood ends to the edges of the board. The pressure of the wood-ends on the vinyl strip is the only force that causes electrical contact between the vinyl strip and the tinned pads on the board so there must be a snug fit at this point. If there is any play here "shim" the strip by wrapping small pieces of the double sided tape's protective backing (saved from previous steps) over the outside of the strip. Use as many pieces of paper as are required to produce a snug fit. When satisfied with the fit remove the wood-ends and trim the paper shims so that they will not be seen when the unit is completely assembled (note that none of the component side of the board will be visible when the unit is complete - the shims

need to be trimmed on the conductor side only). Re-install the end panels and note that approximately 1/16 inch of the front edge of the circuit board should be allowed to protrude beyond the front end of the groove that supports the circuit board (see figure 22).

Slip the nylon "U" extrusion supplied over the raw edge of the front lip of the case top before lifting the top and putting it in place as shown in figure 22.. There is a 3/8 inch gap between the rear edge of the circuit board and the back of the case top which allows for the passage of the inter-connection wires. Make sure that none of these wires are pinched between the case. top and the wood-ends. Fasten the case-top in place with 4 each #4 wood screws, two on the top and two on the rear of the case. Use a pointed object to punch starter holes for these screws.

Cut the strip of adhesive backed foam supplied into two equal length strips. Remove the backing fron the first strip and apply it to the middle of the shorter front lip of the case bottom as shown in figure 23. Remove the backing from the second length of foam and apply it to the case bottom parallel to the first strip as shown.

With the partially assembled Gnome upside down, situate the batteries on the front edge of the circuit board directly in front of R9 and R10.

Fasten the case bottom panel in place with 4 each #4 wood screws. (see figure 24) Note that each wood screw also mounts a rubber foot. Make sure that the short lip of the bottom panel is tight against the front edges of the wood ends and that the protruding portion of the circuit board is supported by this lip.

THIS COMPLETES ASSEMBLY OF THE PAIA 3740 GNOME MICRO-SYNTHESIZER.