Nu:Tekt OD-KIT

Owner's Manual

取扱説明書

EJ 1

KORG INC. 4015-2 Yanokuchi, Inagi-City, Tokyo 206-0812 JAPAN

www.korg.com

This kit is intended for those who have experience building electronic kits and who have a basic understanding of soldering and electronic parts.
If you make a mistake during assembly, connected devices may be damaged, or the electronic parts in this kit may be damaged or become hot.
After assembling this kit and before turning on the power, make sure to check for any mistakes in mounting or imperfect solder points.

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Precautions

Location

Using the unit in the following locations can result in a malfunction.
- In direct sunlight
- Locations of extreme temperature or humidity
- Excessively dusty or dirty locations
- Locations of excessive vibration
- Close to magnetic fields

Power supply

Please connect the designated AC adapter to an AC outlet of the correct voltage. Do not connect it to an AC outlet of voltage other than that for which your unit is intended.

Handling

To avoid breakage, do not apply excessive force to the switches or controls.

Care

If the exterior becomes dirty, wipe it with a clean, dry cloth. Do not use liquid cleaners such as benzene or thinner, or cleaning compounds or flammable polishes.

Keep this manual

After reading this manual, please keep it for later reference.

Keeping foreign matter out of your equipment

Never set any container with liquid in it near this equipment. If liquid gets into the equipment, it could cause a breakdown, fire, or electrical shock.
Be careful not to let metal objects get into the equipment. If something does slip into the equipment, unplug the AC adapter from the wall outlet. Then contact your nearest Korg dealer or the store where the equipment was purchased.

Notice regarding disposal (EU only)

If this symbol is shown on the product, manual, battery, or package, you must dispose of it in the correct manner to avoid harm to human health or damage to the environment. Contact your local administrative body for details on the correct disposal method. If the battery contains heavy metals in excess of the regulated amount, a chemical symbol is displayed below the symbol on the battery or battery package.

IMPORTANT NOTICE TO CONSUMERS

This product has been manufactured according to strict specifications and voltage requirements that are applicable in the country in which it is intended that this product should be used. If you have purchased this product via the internet, through mail order, and/or via a telephone sale, you must verify that this product is intended to be used in the country in which you reside.
WARNING: Use of this product in any country other than that for which it is intended could be dangerous and could invalidate the manufacturer's or distributor's warranty. Please also retain your receipt as proof of purchase otherwise your product may be disqualified from the manufacturer's or distributor's warranty.
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Cautions Before Assembly

Be careful of injury when handling parts
Use caution not to injure yourself due to the protruding parts when handling the circuit board. Use cotton work gloves to protect your hands when working. Also, be sure to wash your hands thoroughly after working.

Tighten screws and nuts at a perpendicular angle
Tightening screws and nuts that are inserted diagonally may damage the threads, making it impossible to tighten them again. Be sure to tighten screws so that they are inserted perpendicular to the surface.
Use caution, as applying too much torque and tightening the screws too tightly may damage the parts.

Do not injure yourself or scratch the surface with the tools.
When using tools to tighten screws and nuts, make sure not to injure yourself, such as by getting your fingers pinched. Work carefully to avoid scratching the case or circuit board with the tools.
Provide a sufficiently large work space to complete the assembly procedure, and prepare work mats so parts will not be scratched.

Avoid losing the screws and nuts
Handle the screws and nuts with caution, to avoid losing them. Do not use other screws or nuts aside from the ones included with this kit, and do not use the screws and nuts included with this kit for any other purpose.

Tools to prepare

You will need the following tools in order to assemble this kit.
Note: You will also need a battery, solder, glue, adhesive tape and so on. These items are not included, so please obtain them separately.

- **Soldering iron**
- **Nippers, needle-nose pliers, tweezers**
- **Phillips head screwdriver (No. 2), precision flathead screwdriver (2.4 mm)**
  Use a screwdriver that matches the size of the screw. Using the wrong size of screwdriver may damage the screw or make it impossible to tighten.
- **Spanner, wrench (two-sided, 10 mm/11 mm/14 mm wide)**
- **Tester**

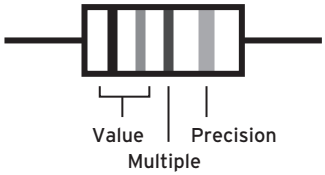
Checking the parts

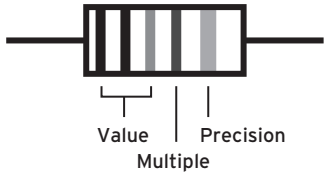
Before assembly, make sure that all parts are on hand.
Contact us at www.nutekt.org if any parts are missing or damaged.

Caution when painting the case
Make sure not to get any paint on the areas on the case that come into contact with the volume controls.
The case and volume controls should conduct electricity.

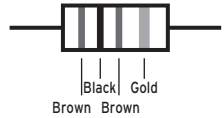
Parts and materials

Resistance color code chart





Example



Value	**Brown Black**	**10**
Multiple	**Brown**	**x10**
Precision	**Gold**	**±5%**
Resistance	**100Ω±5%**	

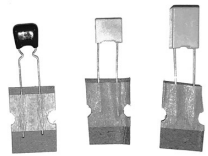
Color	Brown	Red	Orange	Yellow	Green	Blue	Purple	Gray	White	Black	Gold	Silver
Value	1	2	3	4	5	6	7	8	9	0	--	--
Multiple	x10	$x10^2$	$x10^3$	$x10^4$	$x10^5$	$x10^6$	$x10^7$	$x10^8$	$x10^9$	x1	x0.1	x0.01
Precision	±1%	±2%	±0.05%	--	±0.5%	±0.25%	±0.1%	--	--	--	±5%	±10%

Reading the capacitor values

- **When the value "103" is shown**
  $10 \times 10^3 = 10000$ pF = **0.01 µF**
- **When the value "222" is shown**
  $22 \times 10^2 = 2200$ pF = **0.0022 µF**

List of the capacitor shapes

Ceramic capacitor



Film capacitor

Thank you for purchasing the Nu:Tekt OD-KIT. To help you get the most out of your new instrument, please read this manual carefully.

Main features

- The Nu:Tekt OD-KIT is a kit used to assemble effectors that use the Nutube.
- You can select the parts to solder and create one of three different effectors, each with a different kind of distortion.
  First, decide on the kind of effector you wish to make.
  CLEAN (CL): A clean boost sound with only a small amount of distortion.
  OVERDRIVE (OD): An all-purpose overdrive sound, with a characteristic crunch and a suitable amount of distortion.
  DISTORTION (DS): A sound that offers harder distortion.
- This kit includes a SHAPE knob, which allows you to easily change the distortion waveform.
- You can switch the Nutube to either Single or Double mode, to select the tonal character you like.
- The operational amplifier uses an IC socket, and thus can be easily replaced.
- A machined aluminum die-cast case is included.
- If you are concerned about whether you can assemble this kit or whether you might make a mistake, refer to the video explanations available on the Web, or use our assembly service support (chargeable).

About Nutube

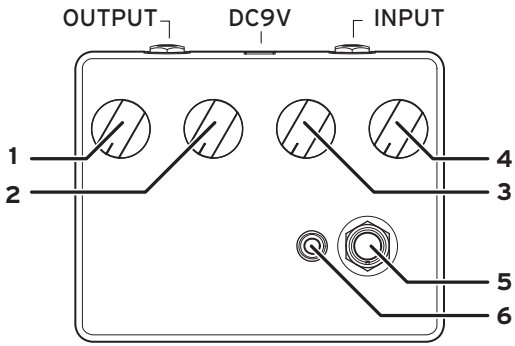
Nutube is a new vacuum tube developed by KORG INC. and Noritake Itron Corporation and that utilizes technology from vacuum fluorescent displays. As with conventional vacuum tubes, the Nutube is constructed with an anode, grid and filament, and operates as a complete triode tube. Furthermore, it generates the response and same rich harmonic characteristics of conventional vacuum tubes.

If a strong impact is applied to this unit, noise at the high-frequency range may be output. This is due to the structure of the Nutube; it is not a malfunction.

What is “Nu:Tekt”?

Nu:Tekt is an dedicated brand for kits, marketed by electronic musical instrument manufacturer Korg. Nu:Tekt offers sales and service for a unique brand of kits beginning with the new “Nutube” vacuum tube as well as musical instruments and audio devices, made possible through Korg’s experience as a musical instrument manufacturer.
Nu:Tekt web site: www.nutekt.org

Part Names and Functions



1. VOLUME knob: Adjusts the overall volume.
2. TONE knob: Turn this knob clockwise for a sharper sound, and counter-clockwise for a more full-bodied sound.
3. SHAPE knob: By changing the anode resistance value of the Nutube, the distortion waveform will change, letting you enjoy harmonic and distortion changes.

Tip: With a DISTORTION circuit, it may seem that the volume is decreasing when you turn the SHAPE knob to the right. However, this is a normal characteristic of the TONE circuit.

4. GAIN knob: Used to adjust the amount of distortion.

Tip: Flipping the slide switch on the main circuit board to Double will give you a two-series circuit, adding gain and volume.

5. EFFECT ON/OFF switch: Switches the effector on/off.
6. EFFECT ON/OFF LED: The indicator lights when the effector is on.

Specifications

· **Vacuum tube:** Nutube 6P1
· **Connectors and jacks:** INPUT jack (monaural phone jack), OUTPUT jack (monaural phone jack), DC 9V jack (⊕-●-⊖)
· **Power:** 9V alkaline battery (6LF22/6LR61) (sold separately), or DC 9V ⊕-●-⊖ AC adapter (sold separately)
· **Battery life:** Approx. 18 hr. (in Single mode, using an alkaline battery); approx. 10 hr. (in Double mode, using an alkaline battery)
· **Current consumption:** 28 mA (Single), 46 mA (Double)
· **Dimensions (W x D x H):** 120 x 96 x 55 mm /4.72" x 3.78" x 2.17"
· **Weight:** 340 g / 12 oz.(without batteries)
· **Included items:** Owner's Manual
· **Optional accessories:** KORG AC adapter KA181 (DC 9V⊕-●-⊖)

* Specifications and appearance are subject to change without notice for improvement.

List of mounted parts

CL: CLEAN
OD: OVERDRIVE
DS: DISTORTION

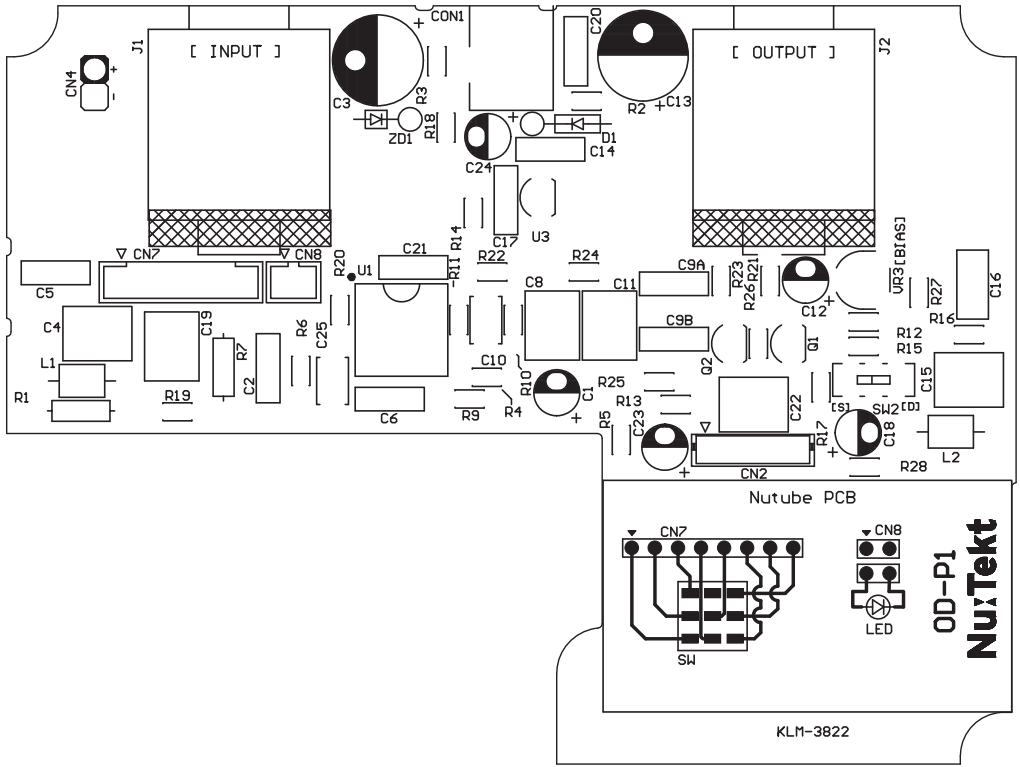
Part number	Circuit number	Part name	Model	Rating	Quantity
1	**U3**	3-terminal regulator		LP2950L−3.3V	1
2	**U1**	Operational amplifier		NJM072D	1
3	**U1S**	Operational amplifier socket		6pin Socket	1
4	**Q1, Q2**	J-FET		2SK303L	2
5	**D1**	Schottky barrier diode		1S30 (R-1)	1
6	**ZD1**	Zener diode		GDZJ4. 7C	1
7	**C2**	Film capacitor	**CL**	0.1μF	1
			OD	0.01μF	1
			DS	0.01μF	1
8	**C19**	Film capacitor	**CL**	OPEN	1
			OD	OPEN	1
			DS	1μF	1
9	**C8**	Film capacitor	**CL**	1μF	1
			OD	0.047μF	1
			DS	0.047μF	1
10	**C9A**	Film capacitor		0.0022μF	1
11	**C9B**	Film capacitor	**CL**	OPEN	1
			OD	OPEN	1
			DS	0.01μF	1
12	**C16**	Film capacitor	**CL**	OPEN	1
			OD	0.22μF	1
			DS	0.0082μF	1
13	**C10, C25**	Ceramic capacitor		100PF B	2
14	**C5**	Film capacitor		0.01μF	1
15	**C14, C17, C20, C21**	Ceramic capacitor		0.1μF	4
16	**C6**	Film capacitor		0.1μF	1
17	**C4, C11, C15, C22**	Film capacitor		1μF	4
18	**C24**	Electrolytic capacitor		47μF/16V	1
19	**C1, C12, C18, C23**	Electrolytic capacitor		100μF/16V	4
20	**C3, C13**	Electrolytic capacitor		330μF/25V	2
21	**R19**	Resistor	**CL**	OPEN	1
			OD	OPEN	1
			DS	4.7KΩ	1
22	**R20**	Resistor	**CL**	0Ω	1
			OD	0Ω	1
			DS	15kΩ	1
23	**R21**	Resistor	**CL**	OPEN	1
			OD	OPEN	1
			DS	0Ω	1
24	**R22**	Resistor	**CL**	OPEN	1
			OD	OPEN	1
			DS	0Ω	1
25	**R23**	Resistor	**CL**	0Ω	1
			OD	0Ω	1
			DS	OPEN	1
26	**R24**	Resistor	**CL**	0Ω	1
			OD	0Ω	1
			DS	OPEN	1

27	**R16**	Resistor	**CL**	10kΩ	1
			OD	240Ω	1
			DS	15kΩ	1
28	**R2**	Resistor		10Ω	1
29	**R3**	Resistor		100Ω	1
30	**R17, R28**	Resistor		150Ω	2
31	**R18**	Resistor		1kΩ	1
32	**R15, R27**	Resistor		2.4kΩ	2
33	**R10**	Resistor		4.7kΩ	1
34	**R12**	Resistor		6.8kΩ	1
35	**R4, R5, R6**	Resistor		10kΩ	3
36	**R13, R25**	Resistor		33kΩ	2
37	**R9**	Resistor		51kΩ	1
38	**R11, R14, R26**	Resistor		100kΩ	3
39	**R1, R7**	Resistor		2MΩ	2
40	**L1, L2**	Inductor		BL01RN1A2A2B	2
41	**CN8**	Connectors		B2B—PH—K—S	1
42	**CN7**	Connectors		B8B—PH—K—S	1
43	**CN1, CN2**	Connectors		B8B—ZR—3. 4	2
44	**CON1**	DC jack		PJ30KM0BB140—69B	1
45	**J1, J2**	Phone jack		LJB0664—6	2
46	**SW2**	Slide switch		MS—22D10	1
47	**V1**	Nutube (vacuum tube)		Nutube 6P1	1
48	**VR1, VR5**	Volume control		10K A	2
49	**VR2**	Volume control		100K A	1
50	**VR3**	Trimmer Potentiometer		10K B	1
51	**VR4**	Volume control		500K B	1

52		Harness A		Harnesses (8), black	1
53		Harness B		Harnesses (8), tri-colored	1
54		Harness C		Harnesses (2), red and white	1
55		Battery snap			1
56		Nutube rubber		Rubber, 32 x 16 x 1t	1
57		Circuit board cushion		PORON 45 x 14 x 4t	1

Note: The quantities of parts shown on this list are the number of parts actually used. The kit may contain some extra parts that are not used.

Mounting Diagram



Mounting the Circuit Board

Building the main circuit board

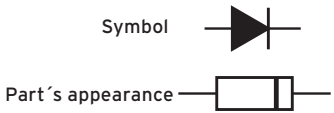
Starting from the shorter parts, attach and solder the parts while referring to the list of mounted parts and the mounting diagram. Be careful not to get the parts mixed up. The jacks and volume controls are soldered on last. You might find it easy to work by following the steps below.

Soldering the parts

1. **Solder the resistors (21–39).**
   The position and fixed number of parts will vary, depending on the variation you decided to build (CLEAN, OVERDRIVE or DISTORTION). Install the parts according to the model you will be building, while checking the "List of mounted parts" on page 7.

	R19	R20	R21	R22	R23	R24	R16
CLEAN	OPEN	0	OPEN	OPEN	0	0	10K
OVERDRIVE	OPEN	0	OPEN	OPEN	0	0	240
DISTORTION	4.7K	15K	0	0	OPEN	OPEN	15K

2. **Solder the diodes (5, 6).**
   The diodes have polarities, so make sure to mount them in the right direction.



3. **Solder the inductor (40).**
4. **Solder the operational amplifier socket (3).**
   Be sure to install the part in the correct direction.
5. **Install the operational amplifier (2) in the socket.**
   Install the pin #1 of the operational amplifier (shown with a mark) so that it lines up with the dot on the circuit board. Be sure to mount the part in the correct direction.
6. **Solder the J-FET (4).**
   Be sure to mount the parts in the correct direction.
7. **Solder the connectors (41–43).**
   Be sure to mount the parts in the correct direction.
   If the symbols do not match those shown on the circuit board, the connector is facing the wrong way.
8. **Solder the slide switch (46).**
9. **Solder the trimmer potentiometer (50).**
10. **Solder the capacitors (7–20).**
    Mount the parts beginning with the shorter ceramic capacitors, and then the film capacitor, and finally the electrolytic capacitor.
    The electrolytic capacitors have polarities, so make sure to mount them in the right direction.
    The position and fixed number of parts will vary, depending on the variation you decided to build. Install the parts according to the model you will be building.

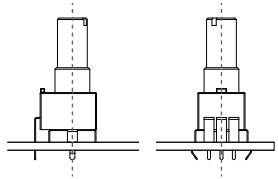
	C2	C19	C8	C9B	C16
CLEAN	0.1uF	OPEN	1uF	OPEN	OPEN
OVERDRIVE	0.01uF	OPEN	0.047uF	OPEN	0.22uF
DISTORTION	0.01uF	1uF	0.047uF	0.01uF	0.0082uF

11. **Solder the 3-terminal regulator (1).**
Be sure to mount the part in the correct direction.

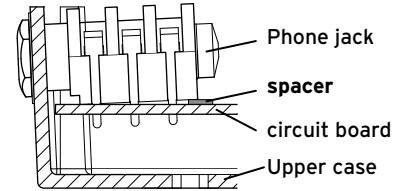
12. **Solder the DC jack (44).**
Solder the DC jack carefully so that it is flush with the circuit board without being slanted.

13. **Solder the volume controls (48, 49, 51).**
Turn the circuit board upside-down to mount and solder the volume controls.
Solder the volume controls carefully so that they are flush with the circuit board without being slanted.

Tip: It may be difficult to solder the volume controls if you have installed the phone jacks first.

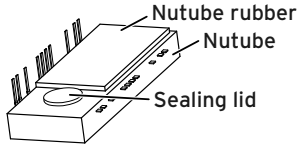


14. **Turn the circuit board over once more, and then install the phone jacks (45).**
The spacers on the circuit board are necessary to correctly align the angles of the jacks and the housing, so do not remove them. Attach the jacks so that they are flush with the spacer and circuit board.



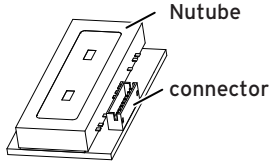
Building the Nutube circuit board unit

1. **Attach the Nutube rubber (56) to the back side of the Nutube, as shown in the diagram.**
   When attaching the Nutube rubber, make sure that it does not touch the sealing lid of the Nutube.

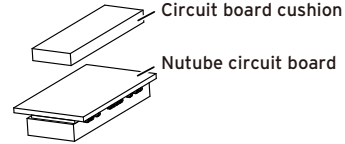


2. **Solder the Nutube (47) onto the side of the Nutube circuit board with the screen-printed surface.**
   After making sure that all of the Nutube pins have been inserted into the holes on the circuit board, peel off the release paper on the Nutube rubber. Mount the rubber so that it is flush with the Nutube circuit board, and then solder.

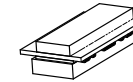
3. **Solder the connectors.**



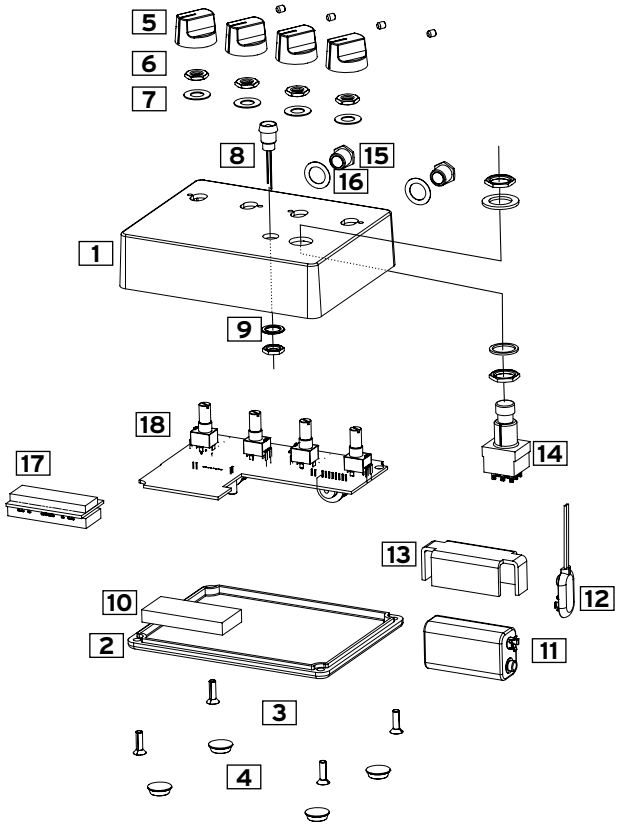
4. **Attach the circuit board cushion (57) onto the back side of the Nutube circuit board.**



Nutube circuit board as-built drawing



Parts List

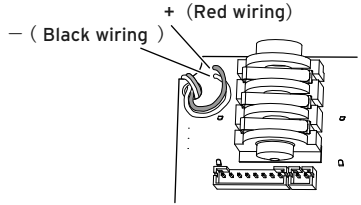


1	Upper case	HAMMOND 1590BB aluminum
2	Lower case	HAMMOND 1590BB aluminum
3	Case screws	HAMMOND 1590BB parts included
4	Rubber feet	Transparent rubber
5	Volume knobs	Includes set screws
6	Volume nuts	
7	Volume washers	
8	LED holder	Metal plating
	End cap	Included with LED holder
	LEDs	9008-TN22-A
9	Washers	Included with LED holder
	Nuts	Included with LED holder
10	Nutube bottom cushion	CR sponge 48 x 22 x 7t
11	Battery (sold separately)	9V alkaline battery (6LF22/6LR61)
12	Battery snap	
13	Battery cushion	
14	Foot switch	3PDT
15	Jack nut	
16	Jack washer	
17	Nutube circuit board unit	Parts for assembly on page 11
18	Main circuit board	Parts for assembly on pages 9 and 10

Note: The following parts are included but not used in assembly.
- Parts included with phone jack: Plastic washers (black) (2), fiber washers (2)
- Parts included with foot switch: Internal tooth lock washer (1)

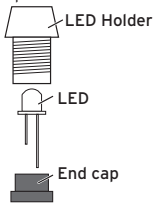
Assembly

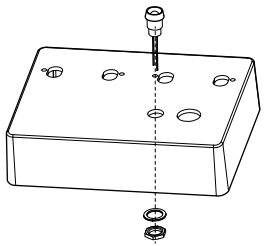
1. **Attach the battery snap [12].**
   Wrap the wires through the holes on the circuit board and then solder. Mounting the battery snap in this way will make it more difficult to pull and break the wires when exchanging the battery. Run the battery snap side through the hole so that it goes below the main circuit board.



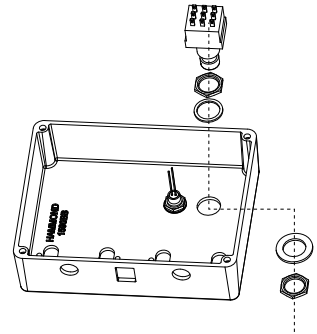
2. **Mount the LED on the upper case [1], and solder the harness (54).**
   Insert the LED holder [8] into the LED, and snap the end cap on. Attach the washer and nut from the rear side of the upper case. Solder the longer LED lead to the red harness wire, and the shorter lead to the white wire.

Tip: If the end cap is loose and falls off, use adhesive tape or glue to fix it in place.

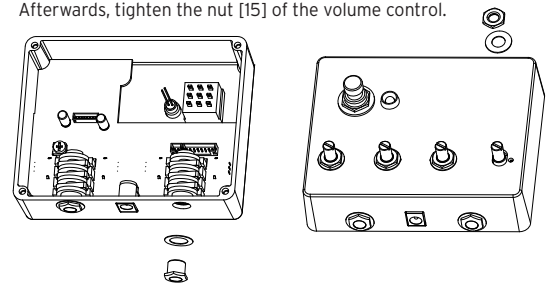




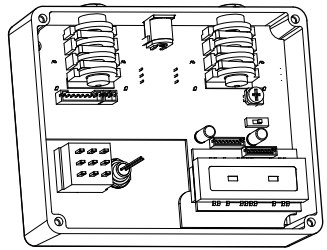
3. **Attach the foot switch [14] to the upper case [1].**
   Attach the foot switch so that it is as level as possible with the upper case, and fix it in place with the washer and nut included with the foot switch.



4. **Mount the main circuit board [18] into the upper case.**
   Installing the main circuit board into the upper case, attach the jack washer [16] and temporarily tighten the nut [15].
   Attach the washers [7] to the volume controls, and tighten the nuts [6]. Afterwards, tighten the nut [15] of the volume control.

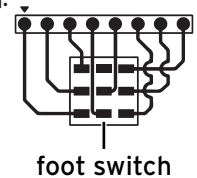


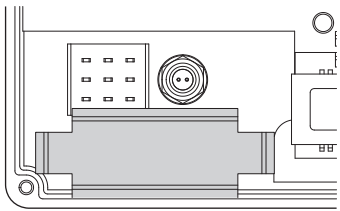
5. **Mount the Nutube circuit board unit [17].**
Peel off the release paper on the double-sided tape of the circuit board cushion (57) that was attached to the Nutube circuit board unit [17], and mount the circuit board unit.



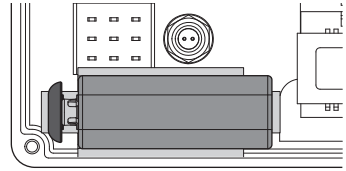
The Nutube circuit board cushion is susceptible to heat, and will melt if your soldering iron touches it. Mount the circuit board after you have finished all of the soldering work.

6. **Connect the Nutube circuit board and the main circuit board with harness A (52).**
7. **Solder harness B (53) to the foot switch [14].**
Solder in order, while referring to the wiring diagram.
8. **Connect the foot switch and the main circuit board with harness B (53).**
9. **Connect the LED and the main circuit board with harness C (54).**
10. **Attach the battery cushion [14] into the battery space.**





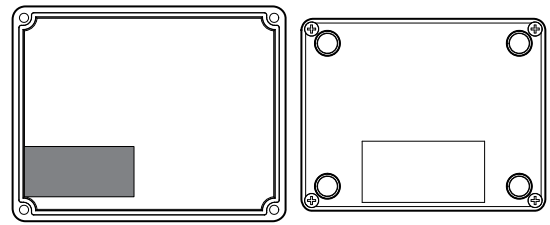
11. **Connect the battery and fit it into the battery space.**



Batteries are not included. You will need to purchase a commercially available 9V alkaline battery (6LF22/6LR61).

12. **Close the lower case [2], and secure it with the screws.**
After attaching the Nutube bottom cushion [11] onto the inside of the lower case, close the lower case and secure it with the case screws [3] in four places.

Take care not to pinch the harness or other parts when closing the case.



13. **Attach the rubber feet [4] onto the lower case.**
Attach the rubber feet and rating label onto the lower case.
14. **Attach the volume knobs [5].**
Mount the volume knobs onto their spindles.

Operation Check

After you have assembled all of the parts, make sure that no parts are remaining. Starting from the beginning, follow each step while referring to the assembly instructions, to make sure that the unit has been properly assembled.
Before turning on the power, make sure to check the following.

- Are the parts mounted in the correct place?
- Are the parts mounted in the correct direction?
- Did you leave any bridges or other imperfections when soldering?
- Is the power line free from short circuits?

When you have successfully finished assembling the unit, test its operation while reading "Part Names and Functions" on page 6.
If you have found any problems with assembly or operation, use the troubleshooting steps below.

Troubleshooting

Some parts are left over.

- The kit may contain some extra parts that are not used, such as resistors or capacitors.

There aren't enough parts.

- If you have lost some parts, contact us at www.nutekt.org.
- Also, contact us at www.nutekt.org if any parts were missing or damaged before you started to assemble the unit.

I can't assemble the unit, because I broke a part.

- Please contact us at www.nutekt.org.

The unit makes an abnormal sound when I tilted it or shook it after assembly.

- A loose screw or other part might be left inside the unit. Open the lower case and check the inside.

The volume controls or jacks are loose.

- Make sure that the nuts are fastened tightly. Remove the knobs from the volume controls and retighten the nuts.

Adjusting and setting the main circuit board

The trimmer potentiometer on the main circuit board adjusts the Nutube bias voltage. Normally, adjust this so that it produces maximum volume.

1. **Connect a battery or AC adapter**
   When using batteries to power this unit, connect a cable to the input jack.
2. **Turn the SHAPE knob all the way down.**
3. **Adjust the trimmer potentiometer on the main circuit board.**
   Flip the slide switch on the main circuit board to the single side, and turn the trimmer potentiometer so that the Nutube is the brightest. Flip the slide switch to the Double side to confirm that the Nutube lights both ways. Note that the brightness of the Nutube may look different from left to right.

Tip: The sound quality will change depending on the bias voltage settings. Adjust the settings according to the sound that you like.

Tip: Flipping the slide switch on the main circuit board to Double will give you a two-series circuit, adding gain and volume.

Tip: More power will be consumed when the slide switch is set to Double, which means shorter battery life.