Instructions for Assembling and Operating

Parts in the Kit

- small screw (7)
- large screw (1)
- screw with collar (4)

Things you will need

Phillips screwdriver (#1) 4 new size AA alkaline or manganese batteries
※ Do not use nickel batteries, oxyride batteries, or rechargeable batteries such as nickel cadmium batteries to avoid the risk of dissolution of parts or ignition in case of a short circuit and other mistakes.

Note for screwing

The screws in the kit are the type of screws that carve a slot in the plastic when driven in. A #1 Phillips screwdriver is the right size to use. When screwing, press a screwdriver to a screw vertically and turn firmly. The right proportion of the power is 70% for press and 30% for turn. A precision screwdriver is difficult to turn, so use a small screwdriver that has a grip with a diameter of about 2cm.

CAUTION

Please read the following instructions before assembling this kit
- Use caution when handling some pointed parts. Improper use may cause injury.
- To avoid the risk of suffocation, use caution not to swallow small parts such as screws.
- The point of the antenna is shaped like a hook. Use caution not to scratch your fingers with it and be injured. Also, use caution not to prick eyes with it.

Four size AA batteries are required. Improper use of the batteries may cause the generation of heat, explosions or leaks. The following precautions should be taken:
- Do not use rechargeable batteries such as nickel cadmium batteries, cadmium batteries, or oxyride batteries to avoid the risk of dissolution of parts or ignition in case of the short circuit and other mistakes.
- Ensure that the positive and negative terminals on the batteries are facing the right way.
- If liquid that leaked from batteries gets in an eye, rinse it well in a lot of water immediately and consult a doctor. When liquid stick to skin or clothes, wash it up with water immediately.
- Remove batteries after an experiment.
- Please read the assembly instructions and cautions carefully before using the kit.
- Instructions and cautions in this booklet should always be followed for safety. Do not use any materials that have become damaged or deformed while in use.
- Remove batteries after using the kit and keep these away from babies and children.

The plastic materials used in this kit
- body (rear upper lower), battery box lid, legs: ABS (red)
- antenna holder A and B, switch lever, tuning stick: POM (black)
- circuit board: phenol resin
- Vinyl chloride resin is used for the covers of the lead wires.

The metallic materials used in this kit
- antenna: stainless steel
- screw, metal contact: iron
The Structure of the Theremin mini

The theremin is an electronic instrument which makes sound by drone of two frequencies.

Assembling the Body

1. Attach the legs.
   
   Put legs into the lower body and fix with small screws.
   
   ※ For easy handling, stick a screw to the magnetized tip of the driver.

   How to magnetize the driver:
   
   A strong magnet is used in the speaker. Rub the tip of the driver against the magnet at the back of the speaker a couple of times to the same direction, and the tip of the driver is magnetized to stick the screws. Let's try!
   
   ※ Be careful of the wires of the speaker since it comes off easily. Use caution not to touch the transparent cone since it is dented easily.

2. Install the circuit board.

   1. Set the circuit board into the lower body and fix with small screws.
   
   ※ The wires of the speaker come off easily. Pay attention not to pull too much.
   
   ※ Take the connector out of this part.

   2. Insert the connector of the battery box into the circuit board.
   
   ※ See the figure carefully and pay attention to the direction of the circuit.

   ※ Pay attention to the direction and insert completely.
3. Fit the speaker in the back body and fix with screws with collar.

4. Fix the antenna and the metal contact to the lower body with a screw with collar.

3. Attaching the upper

1. Attach the antenna holders to the antenna.
   ※Press and snap them in.

2. ① Put the antenna through the hole in the upper body. ② Put the antenna holder in. ③ Slide the back body in the groove of the upper body.
   ※Hold the antenna holder with these projections.

※Pay attention not to be injured with the hook at the tip of the antenna.

※Either side of the antenna holder can come to the outer side.

Complete!
Tuning

1. What is tuning?

A theremin is easily influenced by the circumstance including the player. So every time before playing a theremin, the player needs to tune the theremin for himself. Concretely speaking, tuning means to set the zero point that is, the condition that sound of the theremin becomes lower and lower to be soundless, to the normal position. The ideal zero point is the position about 20cm away from the antenna like the figure below but it is playable if the point goes forward about

![Diagram of tuning process]

- **Turn the volumes to tune**

  A theremin produces sound by the resonance of two frequencies. The two volumes on the body are to change each one of two frequencies. Turn the volumes with the tuning stick.

  ![Diagram of tuning stick usage]

- **Hint on turning the tuning stick**

  At the last stage of the fine tuning, don't really move the stick but just put power to the direction. Such subtlety is needed to fine tune.

  ![Diagram of fine tuning]

2. Tuning

1. Pull out the switch lever from the body. It beeps. (Don’t mind if it doesn't beep.)

   ![Theremin schematic]

   There are two sound levels, large and small.

   ![Sound level diagram]

   **Tip:** When the beep stops, reverse the volume a little and stop with the small beep sound. Pay attention not to reverse too far.

2. Turn the left volume with the tip of the tuning stick to tune. Don’t move your left hand since it plays an important role in tuning.

   ![Tip for tuning]

   **Tip:** When you turn the left volume from right to left, the sound changes from high, to low, to soundless, to low, to high.

   ![Volume adjustment diagram]

3. Turn large the left volume to right and left with the tuning stick and make sure the sound becomes high and low. Also make sure there is a soundless part.

   ![Volume adjustment diagram]

   **Tip:** When the beep stops, reverse the volume a little. Stop at the point where the sound beeps faintly.

   ![Volume adjustment diagram]

4. Turn the left volume to the rightmost and then turn to the left little by little. The sound becomes lower as shown in the right figure below. When it becomes soundless, reverse the volume a little. Stop at the point where the sound beeps faintly.

   ![Volume adjustment diagram]

   **Tip:** When the beep stops, reverse the volume a little and stop with the small beep sound. Pay attention not to reverse too far.

   ![Volume adjustment diagram]

3. Put in the hole firmly.

4. Otona no Kagaku

- **Tuning is very fine work. Be patient to tune!**

   ![Tuning checklist]

   - If the sound is too large, cover the holes of the speaker with some adhesive tape or tissue to adjust.
   - If there are no soundless parts, turn the right volume a little to right or left. Then turn the left volume again to make sure if there is a soundless part. If there are no soundless places yet, turn the right volume larger.
   - Put your forefinger on the uppermost place of the leg. Tuning stick
   - Put your forefinger on the uppermost place of the leg.
Let's Try to Play!
Move your right hand and play C, D, E, F, G, A, B, C with your left hand fixed.

The sound is continuous and it changes when the hand moves even if it is only 1 mm move. Look for the scales patiently and carefully.

Swing the antenna and enjoy making vibrato sound.
Swing the antenna while playing. Then the sound becomes unstable and sounds like vibrato.

Twang twang!

Tuning is finished!
Keep your left hand at the position where the tuning is finished.

If the sound doesn't stop though you bring your hand away, turn the left volume to the left a little bit and redo from 5. Use caution not to turn the volume too much.
Q: My theremin doesn't make sound.
A: Check the assembly process.
   Is the switch lever attached to the right place?
   Are the antenna and wires attached correctly?
   Is the connector of the battery box set in the circuit completely?

A: Check the cone of the speaker.
The transparent part of the speaker oscillates to make sound.
If it is pushed with fingers and dented, it may not make clear sound.

A: Check if the batteries are new.
If the batteries are dead, change these with new batteries. Be careful of
the direction of the batteries.
A theremin consumes batteries as long as the switch is on even if it
doesn't make sound. Turn off the switch when not in use and remove
batteries.

A: Check the wires of the speaker
If the wires come off of the speaker, solder these up.

Q: I can't tune it well.
A: Tuning needs fine adjustment.
   Turn the tuning stick more slightly. See Hint on turning the tuning stick
   at the lower left of the p.4 and tune patiently.

Q: The zero point doesn't become stable after
tuning.
A: Check if there is something moving around the
theremin.
If something that conducts electricity is moving around the theremin, the
sound changes. Keep these things at a distance while tuning.

A: A theremin is easily influenced by temperature and
humidity.
Leave the theremin a few minutes after switching on until it becomes
stable, and then start tuning one more time.