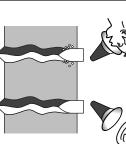
New Edison-style

Cup Phonograph Mit

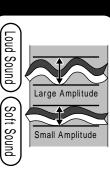
Why can we record and replay voices?

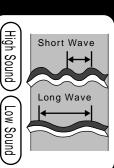


Your voice vibrates the air minutely when it gets into the horn. Then the vibration is conducted to the needle and is translated into a wavy movement of the needle and carves a groove on the cup.

Recording (Replay) and the sound is produced from the horn.

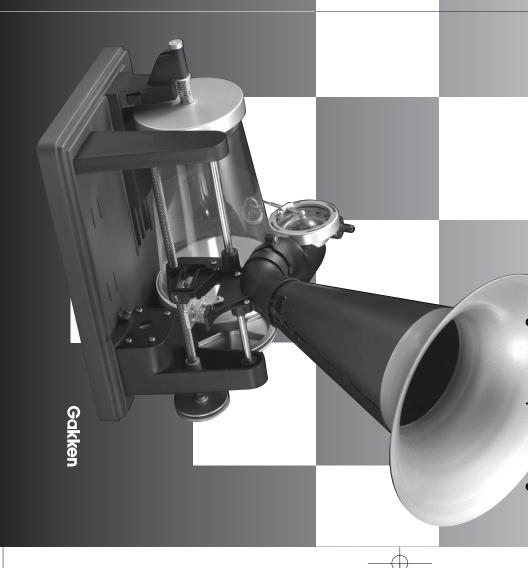
The difference in the tones reflects the difference in the shapes of the waves.





大人の科学。Otona no Kagaku
The Sophisticated Science Kit for Adults
New Edison-Style
Cup Phonograph Kit

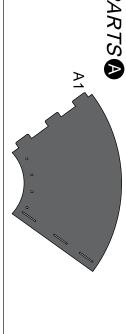
Instructions for Assembling and Operating



Parts list New Edison-style

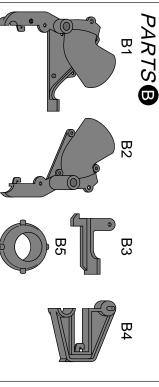
PARTS PARTS





PARTS B

B1 / elbow B2 / elbow B3 / guide stopper B4 / guide part B5 / ball joint



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PARTS •

C1 / arm C2 / arm C3 / pickup

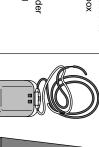
PARTS 6 <u>ი</u> C2

C3

D1 / motor D2 / rubber absorber D3 / rubber absorber D4 / motor box D5 / cover D6 / pulley D7 / pulley D8 / cup holder D9 / bearing

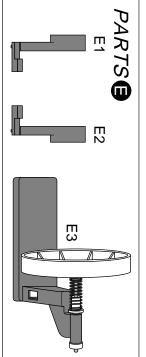
PARTS **①**

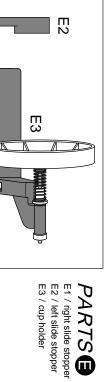




(D₄ D5 © D9

Cup Phonograph Kit





PARTS

F4

PARTS 🖪

卫

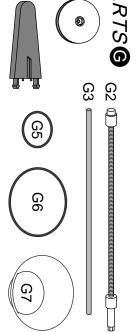
□.[

F2 F2

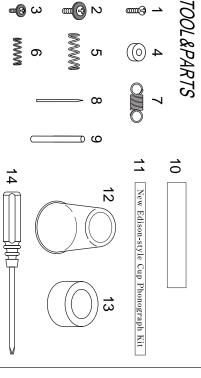
F2 / positive terminal F3 / negative terminal F1 / base panel

with spring
F4 / slide base
F5 / switch

F5



G4	G1 ()	PARTS G
(S)	G3	
G6		
G7		



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S

(E)

4 🔘

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PARTS **G**

G1 / pulley
G2 / screw shaft
G3 / shaft
G4 / shaft holder
G5 / small belt
G6 / large belt (2)
G7 / funnel

TOOL&PARTS

- 1 / screw (6mm)
- 2 / large screw with collar
 3 / small screw with collar
 4 / weight (3)
- 5 / large spring 6 / small spring 7 / spring
- 8 / needle
- 11 / sticker 9 / sewing needle adapter10 / both side adhesive tape

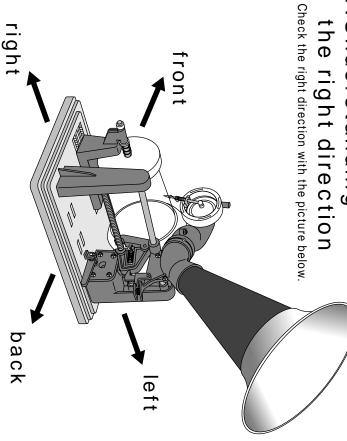
12 / cup 13 / styrene foam 14 / screwdriver

(cross-headed tip)

ω

Before Assembling the Kit

1.Understanding the right direction



of heat, explosions or leaks. The following precautions should be taken:

Do not use rechargeable batteries, such as nickel cadmium batteries.

consult a doctor. When liquid stick to skin or clothes, wash it up with water immediately.

If liquid leaked from batteries gets in an eye, rinse it well in a lot of water immediately and Ensure that the positive and negative terminals on the batteries are facing the right way.

Remove batteries after an experiment.

Two size AA batteries are required. Improper use of the batteries may cause the generation

functionally. Improper use may cause injury.

To avoid the risk of suffocation, use caution not to swallow small parts.

Remove batteries after using the kit and keep away from babies and children

Use caution when handling some metallic parts that are made thin and sharp

Use caution when handling a needle. Improper use may cause injury.

CAUTION Please read the following instructions before using this kit.

2. How to Use Supplied Tools

screwdriver (cross-headed tip)

body (black)/ horn (gold)/: ABS bearing (white): POM

small bags (transparent): polyethylene _ cup (transparent): polyethylene terephthalate When disposing of the kit, please follow the recycling regulations in your area.

use any materials that have become damaged or deformed while in use

Instructions and cautions in this booklet should always be followed for safety. Do not Please read the assembly instructions and cautions carefully before using the kit.

Keep this kit away from babies and children.

Vinyl chloride resin is used for the covers of the lead wires.

a screw. The screwdriver can be used to tighten

that create helix when driven in. The screws are self-tapping screws

How to use the screwdriver (cross-headed tip)

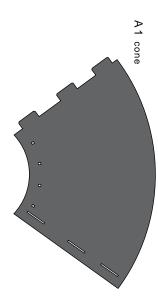
3.Things you will need

Two AA alkaline batteries, Scotch tape, scissors

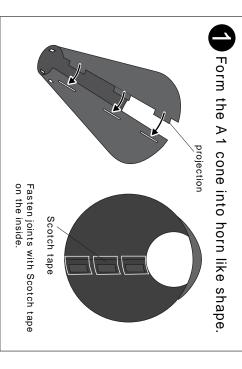
Please note that shapes and length of materials may appear slightly different from pictures and illustrations in this booklet.

Parts to be used PARTS Assembling the Horn

Figure – 2



and put three Figure — Fasten with Scotch projections into three Roll up the A1 cone tape on the inside. horn like shape. holes to make into

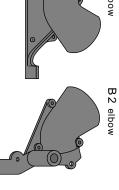


2 Assembling the guide part

Parts to be used

PARTS

There may be more screws than actually used for spare.



B3 guide stopper

B5 ball join

large spring

Four 6mm screws

stopper to the B1 elbow. Attach the B3 guide the guide stopper How to attach B3 guide stopper 2 Attach the B3 guide stopper. B1 elbow

B3 guide stopper

the figure above. as the arrow shows in stopper, push it down To attach the B3 guide

in the Figure — 1 Figure – 😵 fasten temporarily and the B2 elbow and between the B1 elbow Put the A1 cone assembled B3 guide stopper

with a 6mm screw.

3 Attach the A1 cone. screw(6mm) hole in the cone seam of the cone A1 cone

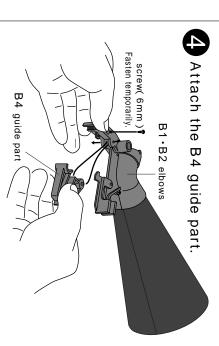
Put the projections of elbows in the four holes in the cone when attaching the cone to the B1 and B2 elbows. Set the seam of the cone toward the guide stopper.

— projection of the elbow

B2 elbow

guide part and fasten Make space between Figure — 4 temporarily. with a 6mm screw and thrust the B4 temporarily fastened elbows that are the B1 and the B2

spring



assembled in Figure-4 spring between B1 B2 Figure – 6 elbows and B4 guide part Stretch and set the

guide part spring to the guide part How to attach the spring

Figure — 🔞

put the ball joint in. 6mm screws. Tighten Open between the B1 and temporarily in Figure - 8 the screws fastened Then fasten with two the B2 elbows a little and

Figure –

between B1, B2 elbows and can catch the B4 guide part the B3 guide stopper and Put the large spring in see if the B3 guide stopper

B4 guide part stopper can work. make sure the stopper guide ВЗ large spring

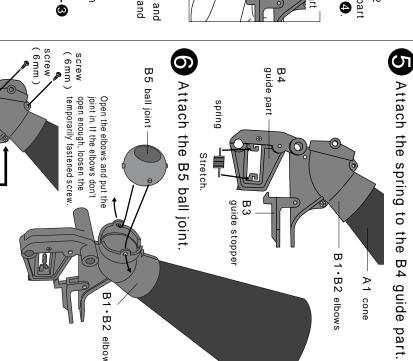
Figure – **9**

Turn this ring to fasten the needle.

Attach the C3 pickup to

the parts assembled in

Figure – 3.



6mm screws.

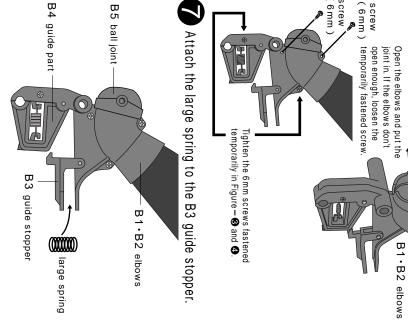
How to assemble the pickup part

in this order.

indication of the needle

comes apart, assemble In case the pickup C2 arms and fasten with between the C1 and the assembled in Figure — 🕜 Put the ball joint part

Figure — 3



3 Assembling the arm parts

Parts to be used PARTS C C1 arm C2 arm

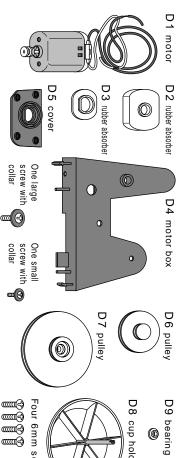
There may be more screws than actually used for spare. C3 pickup Two 6mm screws

Attach the C3 pickup. Attach the arms. Pay attention t the position of the notch. C1 arm screw(6mm) C2 arm C1·C2 arms screw(6mm) B5 ball joint C3 pickup the part assembled in Figure — 🗨

9

Insert completely.) may be hard to push. push the pickup in. (It position of the notch and Pay attention to the

Parts to be used PARTS $oldsymbol{ t D}$ There may be more screws than actually used for spare.



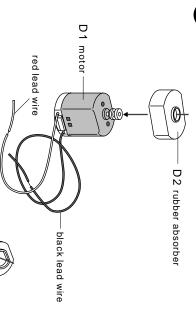
D8 cup holder

Four 6mm screws

motor box with four

absorber on the D1 Figure— (1)
Put the D2 rubber

Assemble the motor.



Set the motor into the D4 motor box. D3 rubber absorber

Figure — 🍎

Set the D1 motor in the

D3 rubber absorber on. D4 motor box and put the

cross section of the motor —

rubber absorber

D2

D4 motor box —

motor

the motor assembled in Figure—

to the D4 motor box Figure – 🚯 Attach the D6 pulley with the large screw

with collar.

black lead wires as shown in the right Figure – 🔞 Wire the red and the

D4 motor box

Figure — 🚯 the assembled D4 Attach the D5 cover to coming from the motor **2** Wiring.

Attach the D5 D4 motor box. cover to the D4 motor box screw(6mm) 🦉 screw(6mm) D5 cover screw(6mm) screw (6mm)

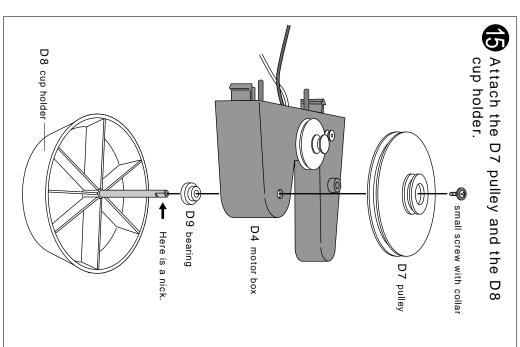
Attach the D6 pulley. large screw with collar D4 motor box D6 pulley - D5 cover

10

D3 rubber absorber

into the D4 motor box and then insert them to the D8 cup holder Attach the D9 bearing Put the D7 pulley on

position of the nick of the D8 cup holder so collar. the small screw with these and fasten with that it fits in the D7 Pay attention to the



between the E1 right

and the E2 left slide

stoppers.

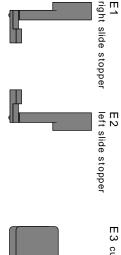
Figure — 🕡

pulley when inserting

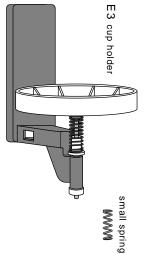
5 Assembling the cup holder

Parts to be used

PARTS



2



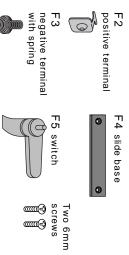
stoppers to the E3 cup and the E2 left slide Figure — 🌀 Attach the E1 right

Put the small spring in Attach the Attach the E1 right and the E2 left slide stoppers. E3 cup holder E2 left slide stopper — E1 right slide stopper small spring. E3 cup holder The projections come inside.

6 Attaching parts to the base pane

base panel Parts to be used 0 0 PARTS □.□

There may be more screws than actually used for spare



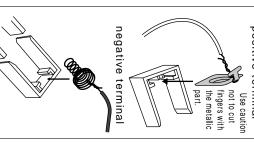
 $\vec{\omega}$

assembled in Figure – 🚯 on the F1 base panel. Set the motor box

Figure – 📵 Turn the base panel over.

positive terminal to the red black lead wire and the F2 Attach the F3 negative them to the base panel. lead wire, and then attach terminal with spring to the

terminals and lead wires positive terminal How to attach the



on the F1 base panel. Set the cup holder assembled in Figure-Figure — 🗐 (Push it in pressing

on both sides.) down the slide buttons

the motor box assembled in Figure— F2
positive terminal — (19) Attach terminals. Set the cup **8** Set the motor box. Connect to the red lead wire. holder. the motor box assembled in — Figure— 6 wires. attach the lead Pay attention where to ↑ the base. F3 negative terminal
Connect to the
black lead wire. Push here in until the hook catches wires through the hole in the first. Put the lead the cup holder assembled in Figure — 🕡 F1 base panel F1 base panel slide button

Figure – 🐒

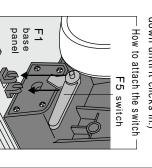
base with two 6mm screws. again and attach the F4 slide Turn the F1 base panel over

base panel cross section of the base panel with the slide base F4 slide base

Figure – 💯

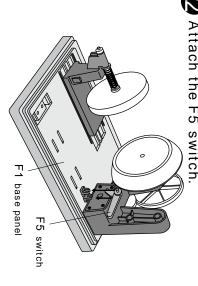
E3 cup holder

down until it clicks in.) the F1 base panel. (Press Attach the F5 switch to

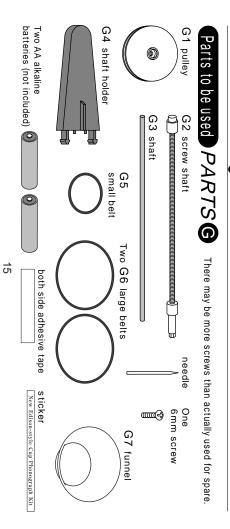


21) Fasten the cup holder with the F4 base panel slide base. (Don't screw too tight.) screw(6mm) screw(6mm) F4 slide base (Pay attention to the sides.
The groove is on the back side.)
Check that it slides smoothly.

Attach the F5 switch.



Attaching Shafts to the 口 Base Panel



4

F1 base panel

Figure – 😵

the G2 screw shaft to the Figure – 🚯 with a 6mm Attach the G1 pulley and turn when screwing. Hold the G1 pulley not to motor box assembled in

Figure — 💯

in Figure – 🚯 . Attach the G3 shaft to the motor box assembled Then put the G3 shaft

assembled in Figure — 🧐 in the guide stopper and the G2 screw shaft locked condition. through the pickup arm

Figure – 😵 the shafts with the G4 After the pickup arm was attached, fasten

shaft holder to the F3

base panel.

Attach the pickup arm. Attach G2 screw shaft. G2 screw shaft the motor box assembled in Figure — 🚯 G1 pulley

D7 pulley

the D6 pulley and the

G6 large belt

pulley

the motor and the D6

G1 pulley

the D7 pulley and the

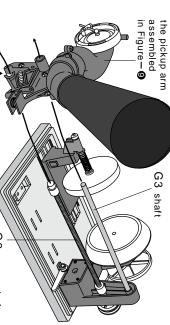
G6 large belt

in the right figure.

G5 small belt

Set the belts as shown

Figure – 🗞



G2 screw shaft

Lock the guide stopper and open this part and then put the G2 screw shaft through.

Fasten shafts with the G4 shaft holder G4 shaft holder in Figure— 🧐 the pickup arm assembled ____ G2 screw shaft F3 base panel G3 shaft

> Figure — 🐠 Put new batteries in

of the motor. and check the motion

Figure – 😵 funnel. pieces and stick to the Cut the both side four places of the G7 adhesive tape in four

> Set the belts. G5 small belt G1 pulley D6 pulley motor G6 large belt - D7 pulley to the positions where the belts are attached! Pay attention

Put the batteries in the right way. Put two alkaline AA batteries. (Not included)

28 Stick both side adhesive tapes to the G7 funnel. both side adhesive tape with scissors. Cut in four pieces G7 funnel both side adhesive tape

17

16

the both side adhesive tapes and Peel off the separating sheets of Attach the needle and then put attach the G7 funnel to the cone. the sticker on the base panel. How to attach the needle

Insert the needle deeply in the needle hole of the pickup hanging the needle holding spring. Insert the needle. needle holding spring pickup needle

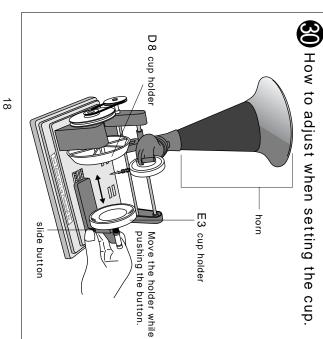
needle **–** here. Attach the funnel to the cone and the Attach the horn is complete. pickup arm G7 funnelon the base panel Put the attached sticker both side adhesive tape

8 Recording

Figure – 🔞

shown in the figure. When setting a cup, push the slide button to move the holder as

increase the stability. If the cup is very soft, put the styrene foam in to _ In case of using _a cup not in this kit styrene foam



Slide the E3 cup holder Figure — 🕙

Gakken

against the cup and First, press the holder cogs of the gear. then pull back by two to fix a cup.

How tight a cup should be fixed

Figure – 😵

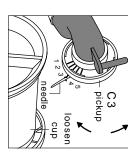
Pull back by two cogs.

needle as shown in the figure Adjust the angle of the

First, set it at " 3 ". angle of the needle. C3 pickup and change the Loosen the outer ring of the

slide button

for the scales. tighten See the figure blow _How to adjust the angle of the needle C3



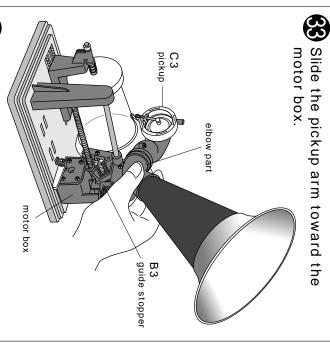
When the stopper B4 guide part

> Set a cup. D8 cup holder E3 cup holder

Adjust the angle of C3 pickup the needle. B3 guide stopper B4 guide part

Figure — 😵

the elbow part. the motor box holding stopper lightly. Slide the pickup arm toward Push up the B3 guide



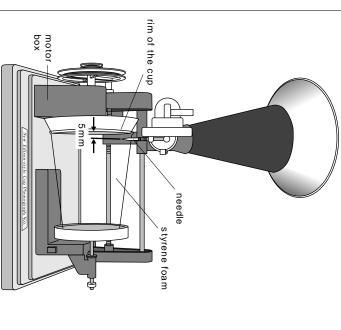
34) Check the point where the needle tip is placed.

comes to the position

Check if the needle

the figure.

is placed as shown in rim of the cup when it 5mm apart from the Figure — 🚱



_ In case of using a cup __ not in this kit

Use the part without grooves.

Figure — 🚳

stopper holding the B4 G2 screw shaft.) guide part touches to the needle quietly. (The B4 guide part and place the stopper to undo the Pinch the B3 guide start turning the cup. Turn on the switch and

When putting down the needle, it starts moving flowingly toward the bottom of the cup. How the needle moves the bottom of the cup

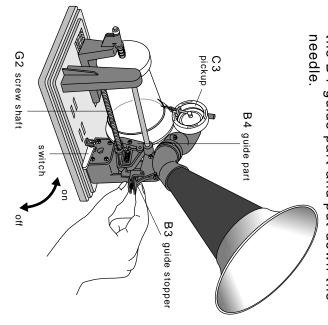
Figure – 😘

Gakken

to the pickup arm. Attach three weights

35 Attach three weights. three weights projection of — the pickup arm

Turn on the switch. Pinch the B3 stopper to undo the stopper holding the B4 guide part and put down the



20

Figure — 📆

in as clear voice as possible possible to the horn (till it Record a message or a song almost touches the horn.) Bring your mouth as close as the cup in the kit is about 50 The recording capacity of

start recording again, the go successfully.) grooves and replay may not needle may make two once turn off the switch and during the recording. (If you Do not turn off the switch

Figure – 😵

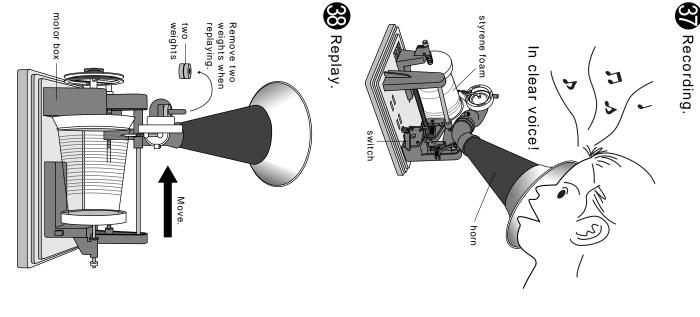
Set the guide stopper and slide Remove two weights before (to the position shown in the the horn toward the motor box replay and leave one weight only

Turn on the switch.

Release the stopper and place recorded groove on the cup the needle quietly on the point

5 m 1 the bottom of the cup

How the needle moves weights





biggest angle and level 5 is the becomes deeper and the smaller angle bigger, the groove angle.) When you make the needle. (Level 3 is the normal loud, change the angle of the or replay, or when noise is too smallest angle.) the shallower. (Level 1 is the When it isn't possible to record

Figure – 🌑

to change a needle, insert a phonograph. In case you need as a needle for this A sewing needle can be used shown in the figure. the sewing needle adapter as sewing needle after attaching

needle must be 0.84mm in diameter and 45.5mm in length. The size of a replacement

sound quality deteriorates or the the needle is necessary in case recording normally more than thirty times, but the change of A needle can be used for

39 How to adjust the angle of the needle. such cases as follows: Make a bigger angle in The sound is too small

replay.) using a cup not in the kit) The cup is soft. (In case

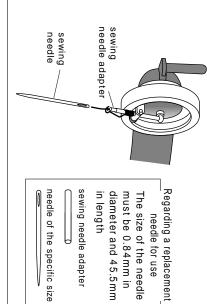
(Or it isn't possible to

such cases as follows: Make a smaller angle in The noise is too loud.

The cup is hard. (In case using a cup not in the kit)

To improve the sound Make smaller angle 4 5 Make bigger angle The needle can be fixed by turning this ring.

40 How to use a sewing needle.



frouble Shooting New Edison-style Cup Phonograph Kit

Q1: The needle doesn't start carving a groove when turning on the switch.

starts moving, and then record. (If it just will not start, check the direction of batteries.) A1:Wait for a while. After a moment, the needle will start moving. Make sure the needle

Q2: When recording, the cup doesn't turn though the D8 cup holder turns.

A2: See Figure—31 in p.19 and adjust the E3 cup holder.

Q3: The needle doesn't trace a groove when replaying.

the needle. Then, see Figure—35 in p.21 and Figure—37 in p.22 for recording minding the number of the weights and the volume of voice. A3 : The groove might be too shallow. See Figure—39 in p.23 and adjust the angle of

toward the bottom of the cup. When putting down the needle, it starts moving flowingly