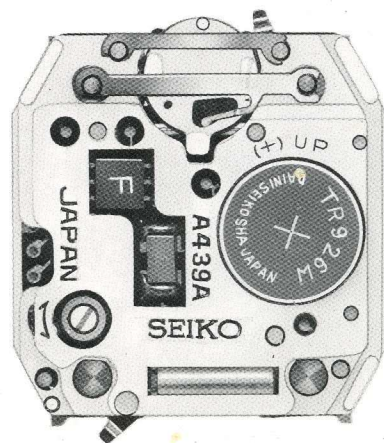


TECHNICAL GUIDE

SEIKO DIGITAL QUARTZ

CAL. A439A



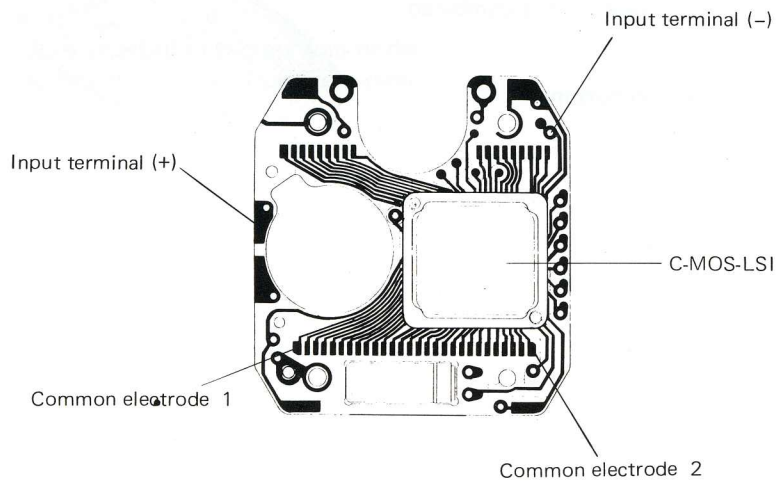
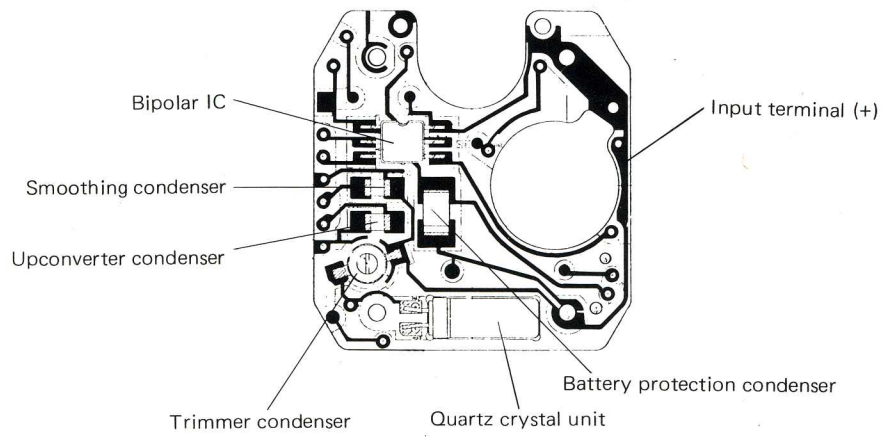
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I. SPECIFICATIONS

Item	Cal. No.	A439A
Display medium		Nematic Liquid Crystal, FEM (Field Effect Mode)
Liquid crystal driving system		Multiplex driving system
Display system		<ul style="list-style-type: none"> ● Time/calendar display Digital display system showing hour, minute, second, month, date and day of the week. "A"(A.M.)/"P" (P.M.) is displayed only when the hour digit is adjusted. ● Stopwatch display Upper row : Section lap time (elapsed time of each segment of an event) <ul style="list-style-type: none"> ● Minute, second and 1/100 second Lower row : Standard lap time (accumulated elapsed time) <ul style="list-style-type: none"> ● 20-hour digital display system showing minute, second and 1/100 second. (Minute, seconds and 1/100 seconds are displayed up to 20 minutes, and they are automatically changed to hours, minutes and seconds display after 20 minutes.) ● Alarm display Upper row : Designated alarm time. <ul style="list-style-type: none"> ● Hour, minute "A"(AM)/"P" (PM) and alarm mark. Lower row : Present time <ul style="list-style-type: none"> ● Hour, minute, second and function indicator
Additional mechanism		<ul style="list-style-type: none"> ● Time signal starts sounding every hour on the hour (When the minute and second digits indicate "00".) ● Stopwatch function ● Alarm test system ● Illuminating light ● Function change indicating sound ("peep")
Loss/gain		Loss/gain at normal temperature range Mean monthly rate: less than 15 seconds (Annual rate : less than 3 minutes)
Casing diameter		26.5 mm (between 6 o'clock and 12 o'clock side) 25.4 mm (between 3 o'clock and 9 o'clock side)
Height		5.7 mm
Operational temperature range		-10°C ~ +60°C (14°F ~ 140°F)
Regulation system		Trimmer condenser
Measuring gate by Quartz Tester		Any gate is available.
Battery		Battery life is approximately 2 years for SEIKO TR926W and 1 year for Maxell SR926W and U.C.C. 399. Voltage: 1.55 V
IC (Integrated Circuit)		C-MOS-LSI 1 unit Bipolar IC 1 unit

II. STRUCTURE OF CIRCUIT BLOCK




III. DISASSEMBLING, REASSEMBLING AND LUBRICATING

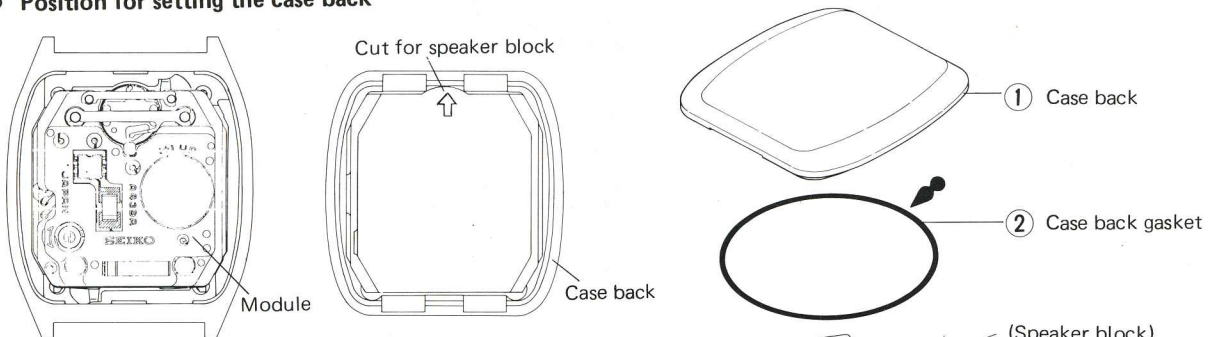
1. Disassembling, reassembling and lubricating of the case

Disassembling procedures Figs.: ① → ④

Reassembling procedures Figs.: ④ → ①

Lubricating: Silicone grease 500,000 c.s.
Normal quantity 

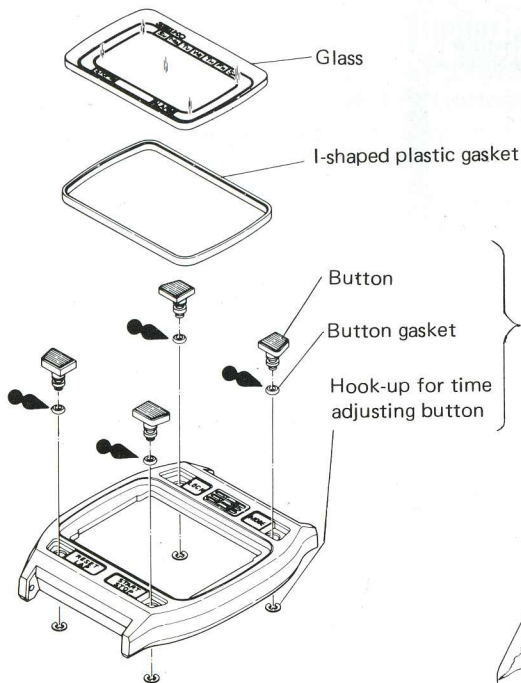
● Position for setting the case back



● Cut for speaker block (arrow-marked) is provided inside the case back as shown in the illustration above. Set the cut for speaker block to the corresponding portion of the case bezel and reassemble the case back.

● It is impossible to remove the fastening projection (plastic part) inside the case back as it is combined with the case bezel.

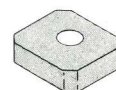
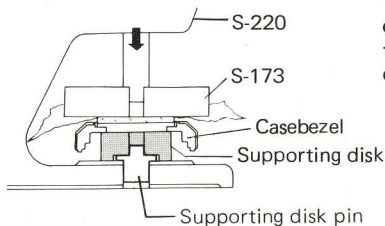
● How to disassemble the glass and buttons



It is not necessary to disassemble them except when they are required to be replaced. When they are disassembled, be sure to lubricate the button gasket.

* Be sure to use the plastic supporting disk (S-173) to reassemble the glass.

● Set the supporting disk to the supporting disk pin of S-220. Then set the case bezel properly on the supporting disk and push the glass directly by the inserting disk (S-173).



Supporting disk S-175

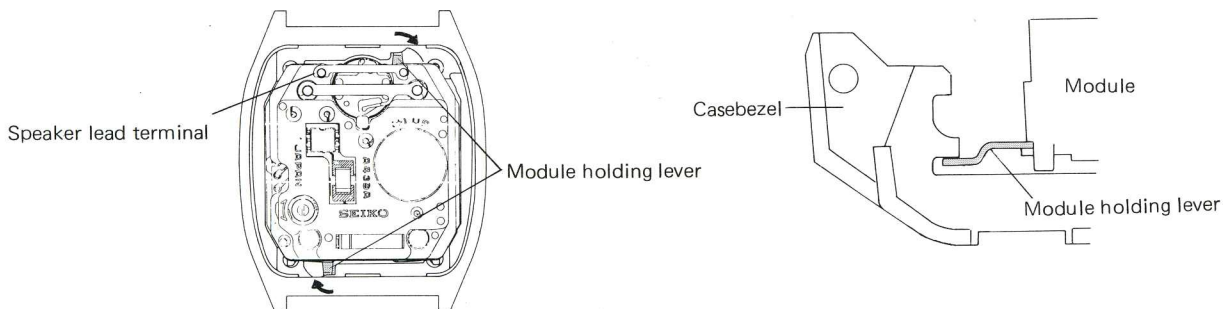
● Panel cover may be used in some models.

Remarks for disassembling and reassembling

③ Module

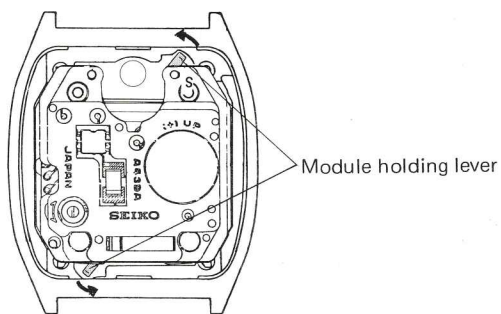
● How to disassemble the module

Turn the two module holding levers in the arrow-marked direction as shown in the illustration below and disassemble the module (with the speaker block) from the casebezel. When disassembling the module, be careful not to lose the speaker lead terminal.



● How to reassemble the module

- Put the module in the casebezel.
- Set the two module holding levers in the casebezel as shown in the illustration on the right. Turn them in the arrow-marked direction until stopping.
- Speaker block should be reassembled after setting the module in the casebezel.

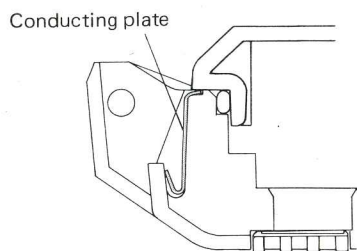


④ Casebezel

● Conducting plate

The conducting plate attached to two portions of the casebezel is to protect the circuit block from static electricity.

It is not necessary to remove the conducting plate except when it is required to be replaced. When they get out of place, be sure to set them correctly.

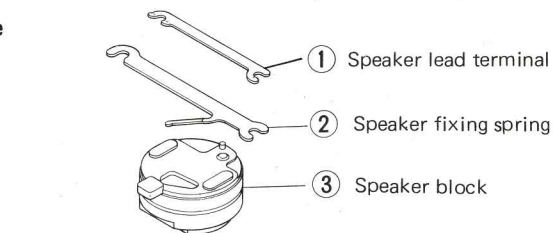


● Speaker block

The speaker block is fixed to the module by the speaker lead terminal and the speaker fixing spring.

Disassembling procedures Figs. : ① → ③

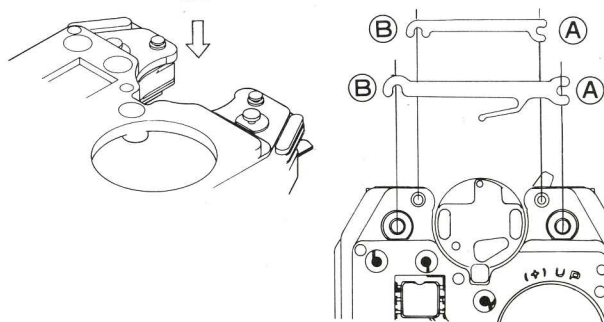
Reassembling procedures Figs. : ③ → ①



● Speaker lead terminal and speaker fixing spring

Disassembling procedure: ② → ①

Reassembling procedure : ① → ②



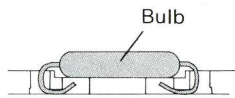
2. Disassembling and reassembling of the module

Disassembling procedures Figs.: ① → ⑩

Reassembling procedures Figs.: ⑩ → ①

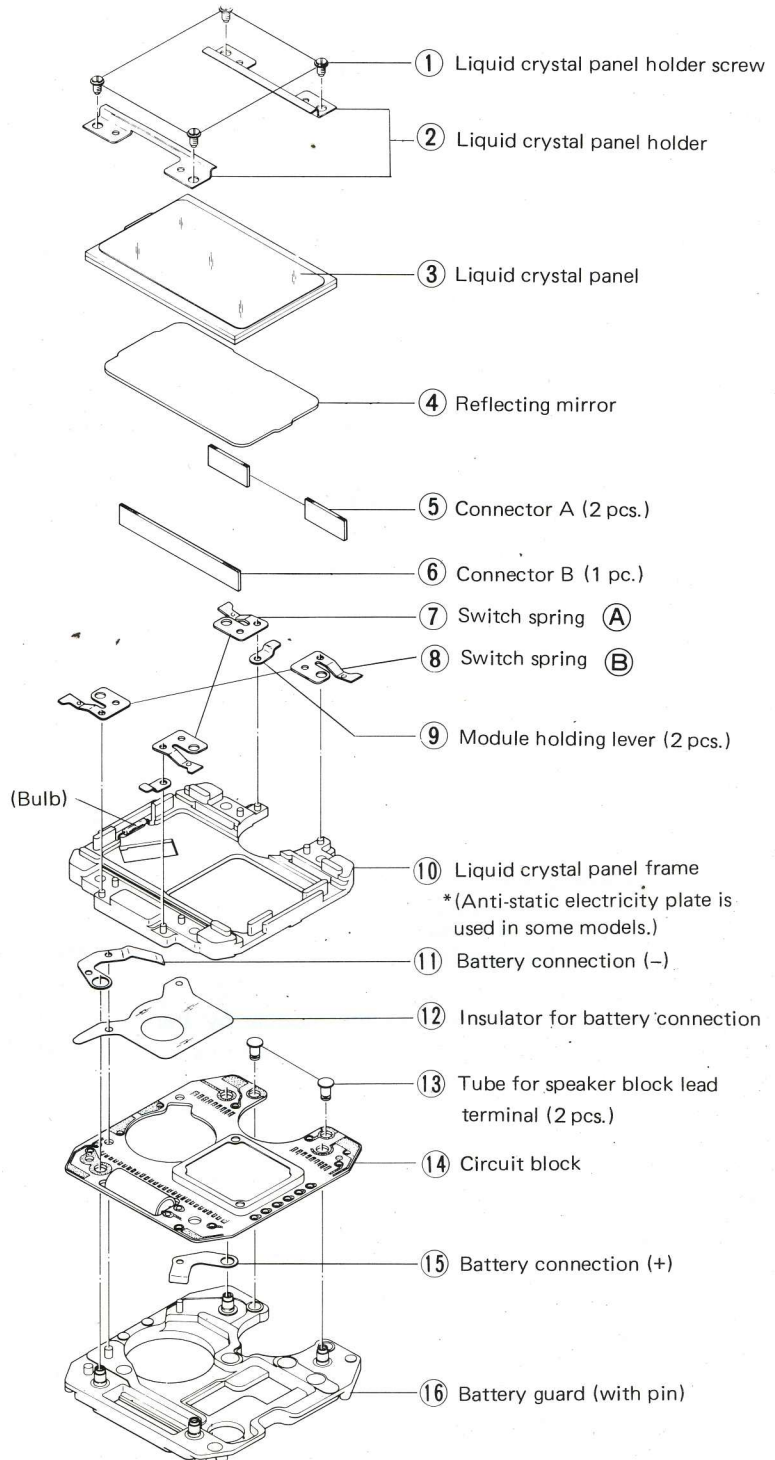
● Bulb

It is not necessary to disassemble the bulb except when it is required to be replaced. When replacing the bulb, reassemble it as shown in the illustration below.



Put the tips of the bulb lead wire in the holes of the liquid crystal panel frame.

● Be sure to reassemble the switch spring ⑦ and ⑧ in the correct direction.



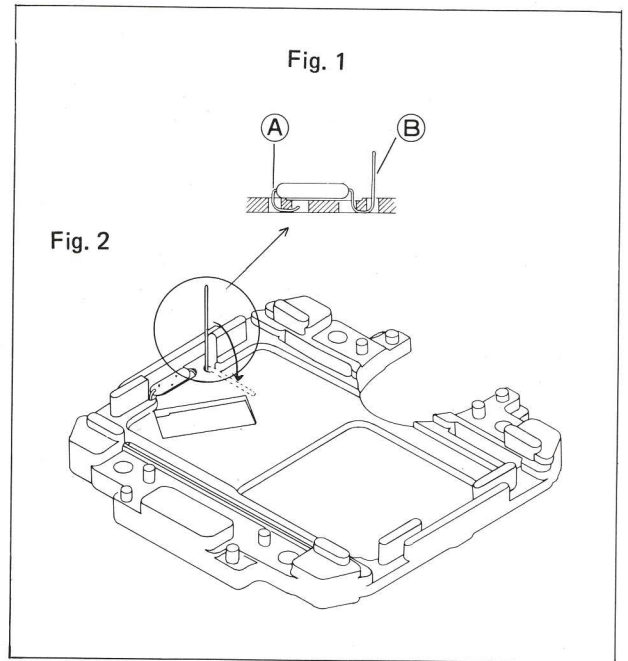
● *When the model has the anti-static electricity plate

For some models, the anti-static electricity plate is provided between the liquid crystal panel frame and the reflecting mirror to protect the circuit block from being damaged by static electricity. When handling the model with the anti-static electricity plate, follow the procedures below.

1. How to set the anti-static electricity plate

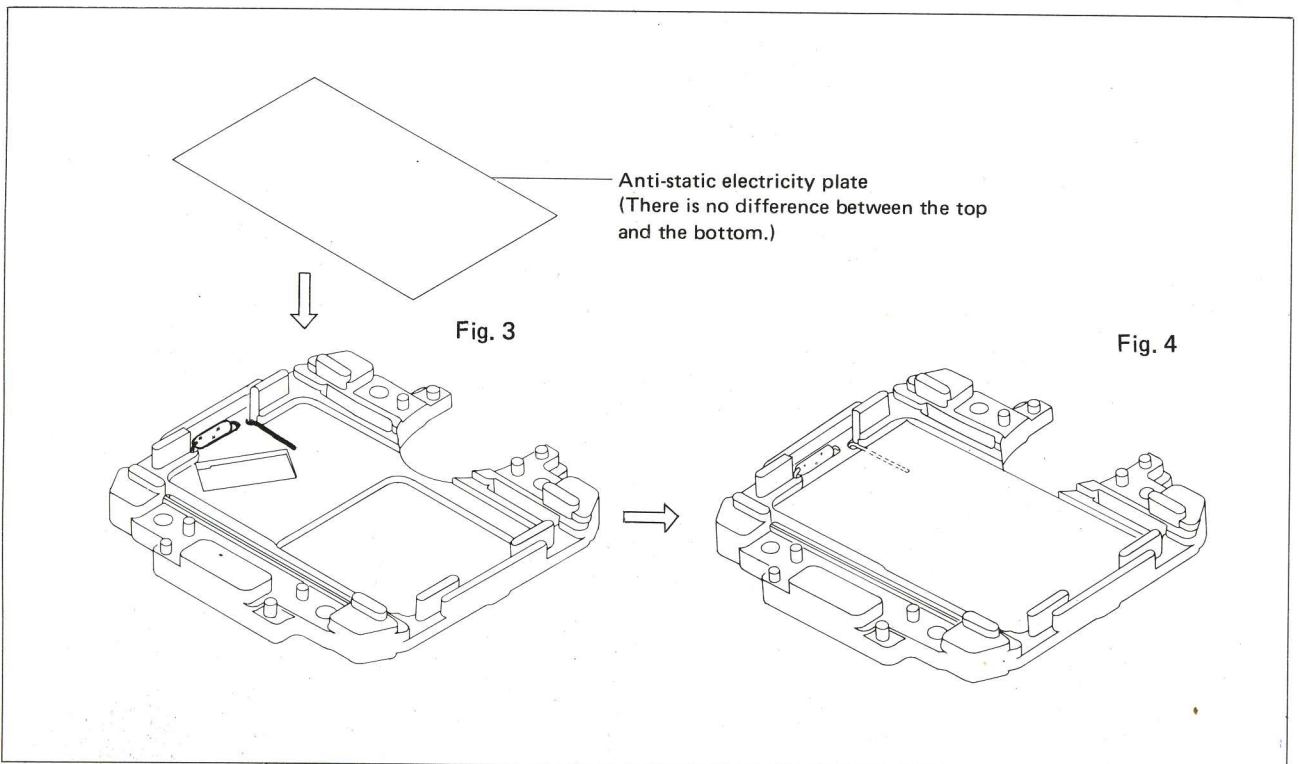
Cut the bulb lead wire (A) at the 2mm point from the liquid crystal panel frame. Bend the bulb lead wire (A) in the same manner as with the model without the anti-static electricity plate, and set it in the liquid crystal panel frame.

Pull out the bulb lead wire (B) to the bulb side after setting it in the liquid crystal panel frame. Then bend it as shown in Fig. 2 and put the anti-static electricity plate over it.



2. How to set the bulb (In case the bulb is required to be replaced)

One end of the bulb lead wire is longer than that of the bulb lead wire for the model without the anti-static electricity plate.



IV. CHECKING AND ADJUSTMENT

Refer to the "SEIKO QUARTZ TECHNICAL GUIDE, GENERAL INSTRUCTION FOR DIGITAL WATCHES" for further details.

Procedure

CHECK BATTERY VOLTAGE

CHECK PATTERN SEGMENT CHECKING SYSTEM

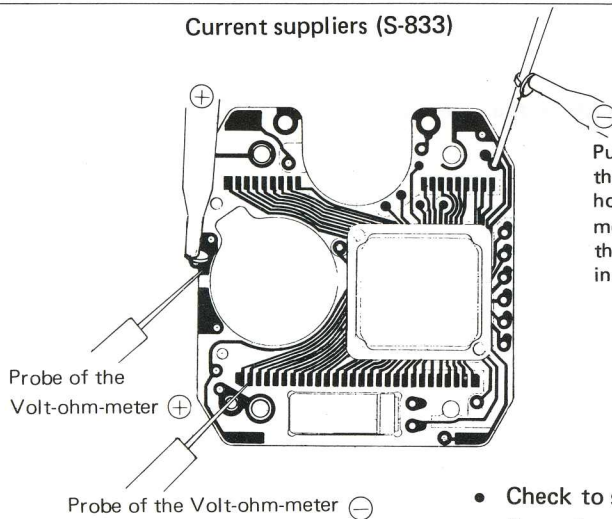


- Depress buttons "A" and "B" together for 4 to 5 seconds, and all segments are displayed with a signal "peep". And the defective segments will be identified.

CHECK CONDUCTIVITY OF LIQUID CRYSTAL PANEL, CIRCUIT BLOCK AND CONNECTOR

CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK

Current suppliers (S-833)

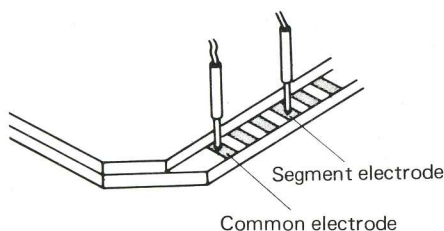


Put a metal probe in the minus electrode hole and clasp the metal probe with the IC clip as shown in the illustration.

- Check to see if the electric signal flows from the circuit block correctly.

Result:

More than 0.8V: Normal
Less than 0.8V: Defective
Replace the circuit block.



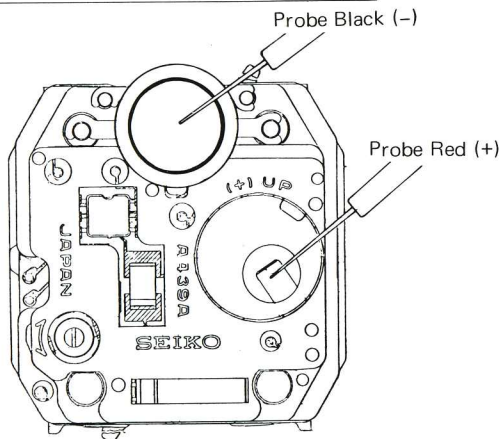
- Check for any broken panel pattern, contamination and short circuit of the liquid crystal panel.

Result:

Lights up: Normal
Does not light up: Defective
Replace the liquid crystal panel.

Procedure

CHECK CURRENT CONSUMPTION



- When the Volt-ohm-meter is used.
Probe Red (+): Battery connection (-)
Probe Black (-): Battery surface (-)

Result:

Less than $3\mu\text{A}$: Normal
More than $3\mu\text{A}$: Defective
* Replace the liquid crystal panel or the circuit block.

* How to check if the liquid crystal panel or the circuit block is defective when the current consumption is more than $3\mu\text{A}$.

- Disassemble the liquid crystal panel from the module, and measure the current consumption (with the liquid crystal panel holder screwed down).

Less than $2.5\mu\text{A}$ – Circuit block: Normal
Replace the liquid crystal panel.

More than $2.5\mu\text{A}$ – Circuit block: Defective
Replace the circuit block.

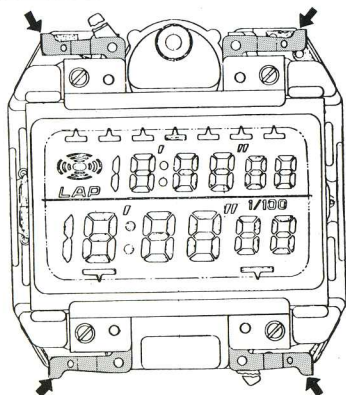
- When checking the current consumption with the module alone, be sure to check with the speaker block disassembled from the module and the speaker lead terminal and the speaker fixing spring reassembled in the module.
- When checking the current consumption with the module in the case, be sure to check with the speaker block reassembled in the module.

CHECK ACCURACY

- It is easier to measure the daily rate if all the segments are displayed.

CHECK FUNCTIONING AND ADJUSTMENT

CHECK CONDUCTIVITY OF SWITCH COMPONENTS



- Check to see if the four arrow-marked spring portions in the illustration on the left touch the switch terminal of the circuit block when the spring portions are pushed with the tips of tweezers and there are clearance between spring portions and switch terminals when released.
- Check for dust, lint and other contamination of the connecting portions.

Result:

Function correctly: Normal
Do not function correctly:

Defective
Correct the switch spring.
If it is impossible to correct, replace the switch springs.

Procedure

CHECK SPEAKER BLOCK

- Check for any broken coil wire and short circuit of the speaker block by measuring the coil resistance.

1. Set up the Volt-ohm-meter.

Range to be used: OHM R x 1

2. Measuring

Apply the probes of the Volt-ohm-meter to the head of the speaker lead pin and the speaker fixing spring.

- Measure with the speaker lead terminal disassembled.

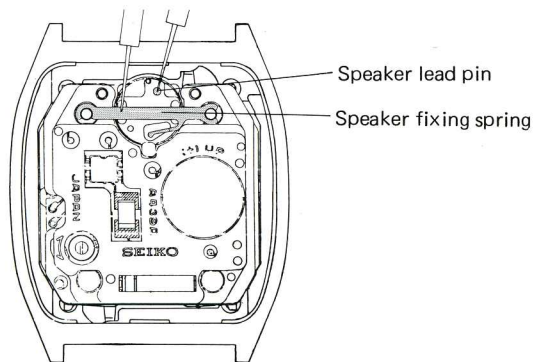
Result:

Resistance $120\Omega \sim 140\Omega$:

Normal

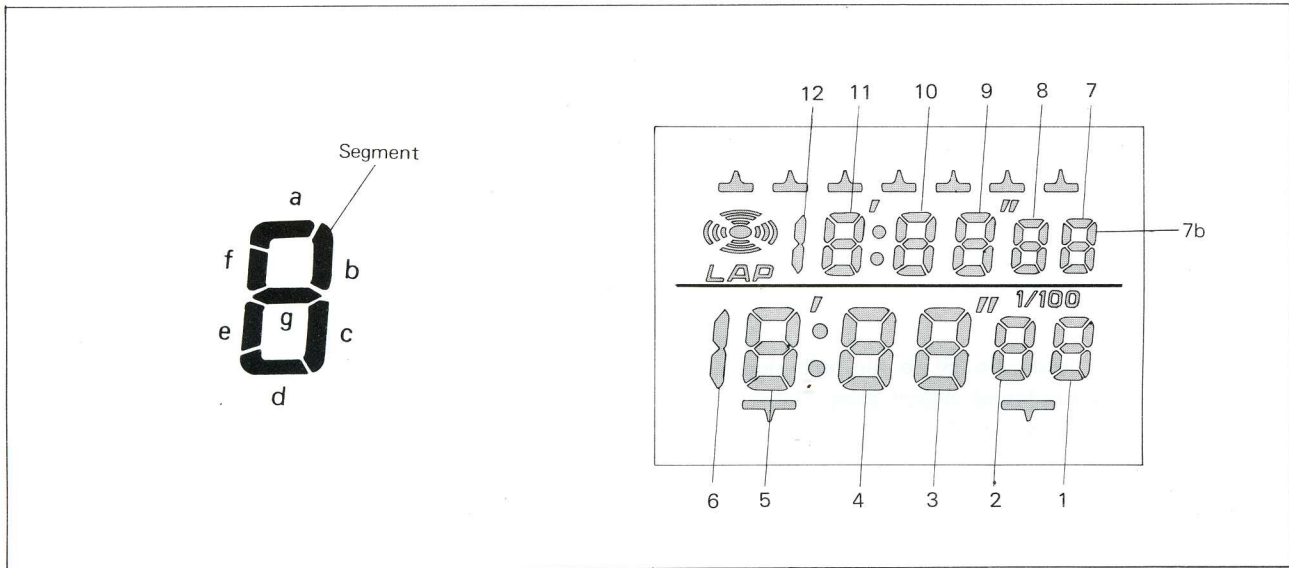
Less than 120Ω (Short circuit)
or more than 140Ω (Broken
coil.wire): Defective

Replace the speaker block.



3. Segment (Liquid crystal panel electrode)

- Designation of segment



Common electrode (1) corresponds to the segment .

Common electrode (2) corresponds to the segment .

