SEIKO

DIGITAL QUARTZ

Cal. A557A

PARTS CATALOGUE

Cal. A557A

4001 835

☆4018 835

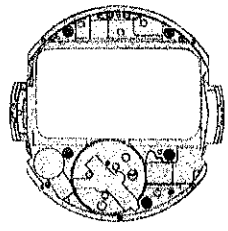
4020 835

4246 845

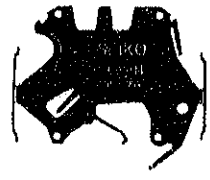
4313 835

4313 836

4313 837

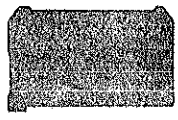


4398 835



4457 835

☆4510 835



4521 830

4530 649

022 493 2/1

☆⇨Please see remarks on the next page.

Cal. A557A

Characteristics

Casing diameter : ϕ 29.1 mm
Maximum height : 4.0 mm
Frequency of quartz crystal oscillator : 32,768 Hz (Hz = Hertz . . . . . Cycles per second)
Time and calendar display : Hour, minute, second, date and day of the week can be displayed in 12-hour indication or 24-hour indication. (The month is displayed only when the calendar is adjusted.)
Alarm display : Can be set to operate at any desired hour and minute.
Timer display : Can be set to operate at any desired minute up to 60 minutes.
Stop watch display : Digital Display System showing 12-hour, minute, second and 1/100 second.
Time signal : Can be set to ring every hour on the hour.
Regulation system : Trimmer condenser
Illuminating light : Illuminates all the digital displays in the dark by depressing the light button.
Battery recharge indicator : If all the digits in the display begin flashing, recharge is required.

PART NO.	PART NAME	PART NO.	PART NAME
4001 835	Circuit block		
☆4018 835	Secondary battery unit		
4020 835	Solar battery		
4246 845	Solar battery lead terminal		
4313 835	Connector A		
4313 836	Connector B		
4313 837	Connector C		
4398 835	Liquid crystal panel frame		
4457 835	Circuit block cover		
☆4510 835	Liquid crystal panel		
4521 830	Reflecting mirror		
4530 649	Bulb		
022 493	Circuit block screw		

Remarks :

Liquid crystal panel

☆4510 835·····Be sure that the combination between the color of panel cover and liquid crystal panel should be matched according to the **"SEIKO Quartz Casing Parts Catalogue".**

Secondary battery unit

☆4018 835·····This secondary battery unit is specially produced as secondary rechargeable battery. Be sure to use this number to order the secondary battery.

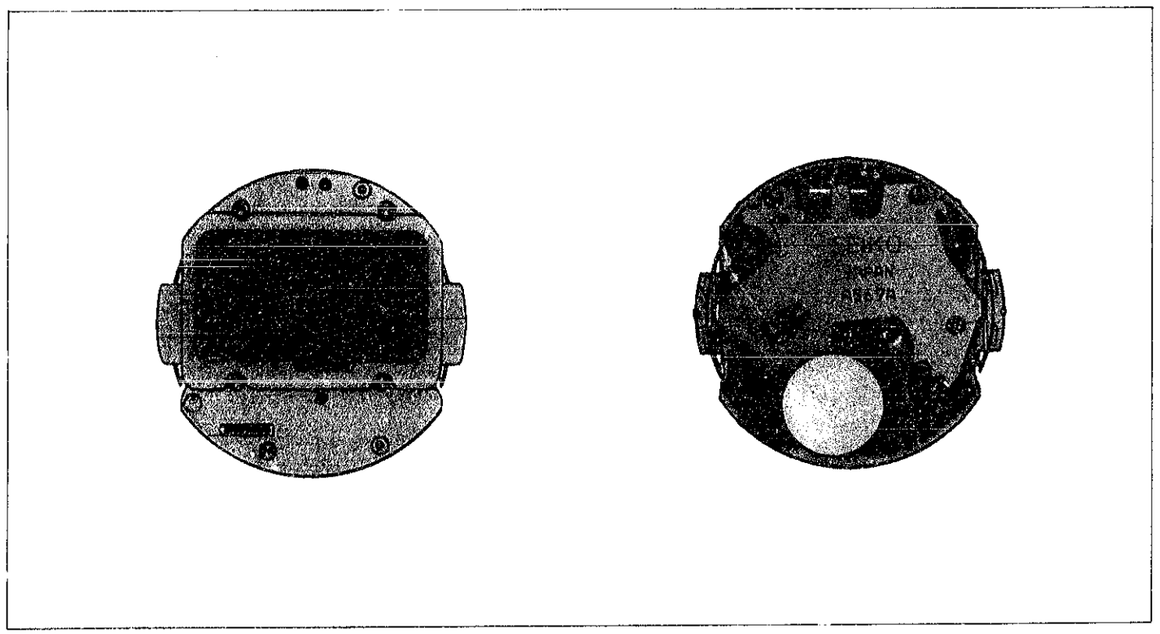
☆⇨Please see remarks.
Part numbers in light letters are not shown in photos.

TECHNICAL GUIDE

SEIKO

DIGITAL QUARTZ

CAL. A557A

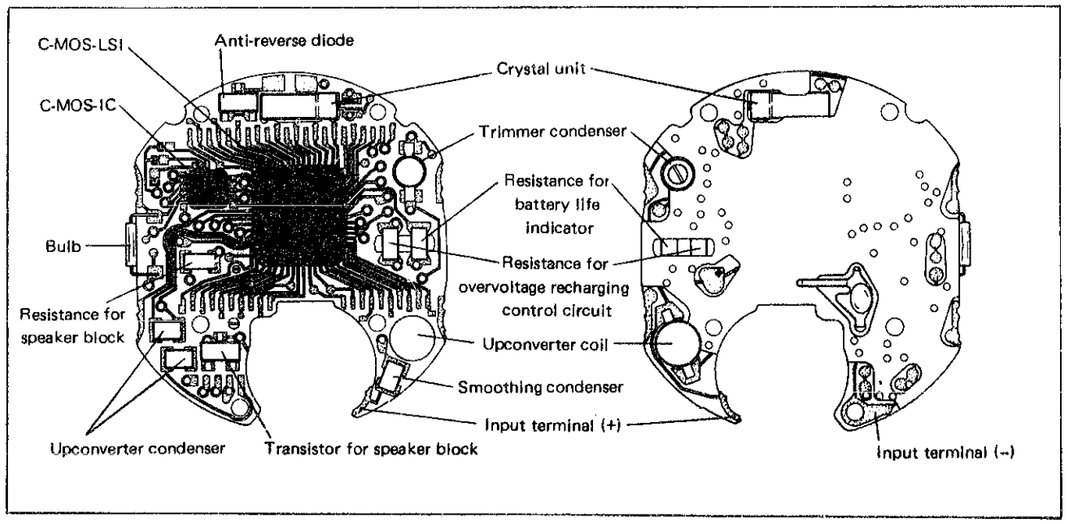


CONTENTS

I. SPECIFICATIONS

Item \ Cal. No.	A557A
Display medium	Nematic Liquid Crystal, FEM (Field Effect Mode)
Liquid crystal driving system	Multiplex driving system
Display system	Time and calendar function (12 or 24 hour indication) Alarm function (12 or 24 hour indication) Stopwatch function Timer function
Additional mechanism	Battery life indicator Pattern segment checking system Illuminating light
Loss/gain	Loss/gain at normal temperature range Montly rate : less than 15 seconds (Annual rate : less than 3 minutes)
Outside diameter	ϕ29.1mm
Height	4.0mm
Regulation system	Trimmer condenser
Measuring gate by Quartz Tester	Any gate is available.
Battery	Primary battery (Solar battery): Silicon solar cell Secondary battery unit: Silver oxide battery with a battery connection (–) and an insulator for battery. (Parts No. 4018835) Secondary battery life is approximately 7 years.

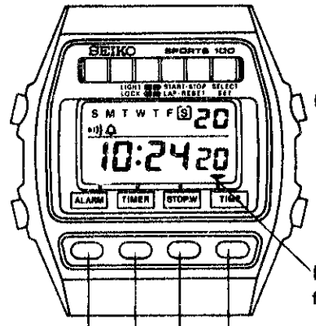
II. STRUCTURE OF THE CIRCUIT BLOCK



III. DISPLAY FUNCTION

The illuminating light is activated by depressing button D in any function.

Depress button A, and the setting function is activated.

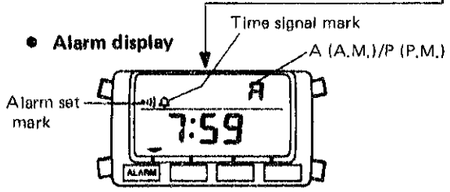


Quick selection button (4 pcs.)

Depress the appropriate quick-selection button, and the desired function will be called from any display.

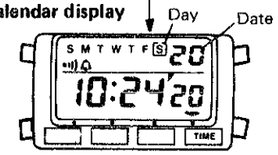
(not changed)

- **Alarm display**



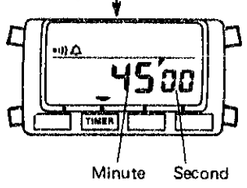
Depress button A, and the alarm time setting function is activated.

- **Time and calendar display**

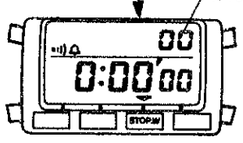


Depress button A, and the time and calendar setting function is activated. Depress button B continuously for 1 ~ 2 seconds, and the 12-hour indication is changed to or from the 24-hour indication.

- **Timer display**



- **Stopwatch display**



IV. DISASSEMBLING, REASSEMBLING AND LUBRICATING

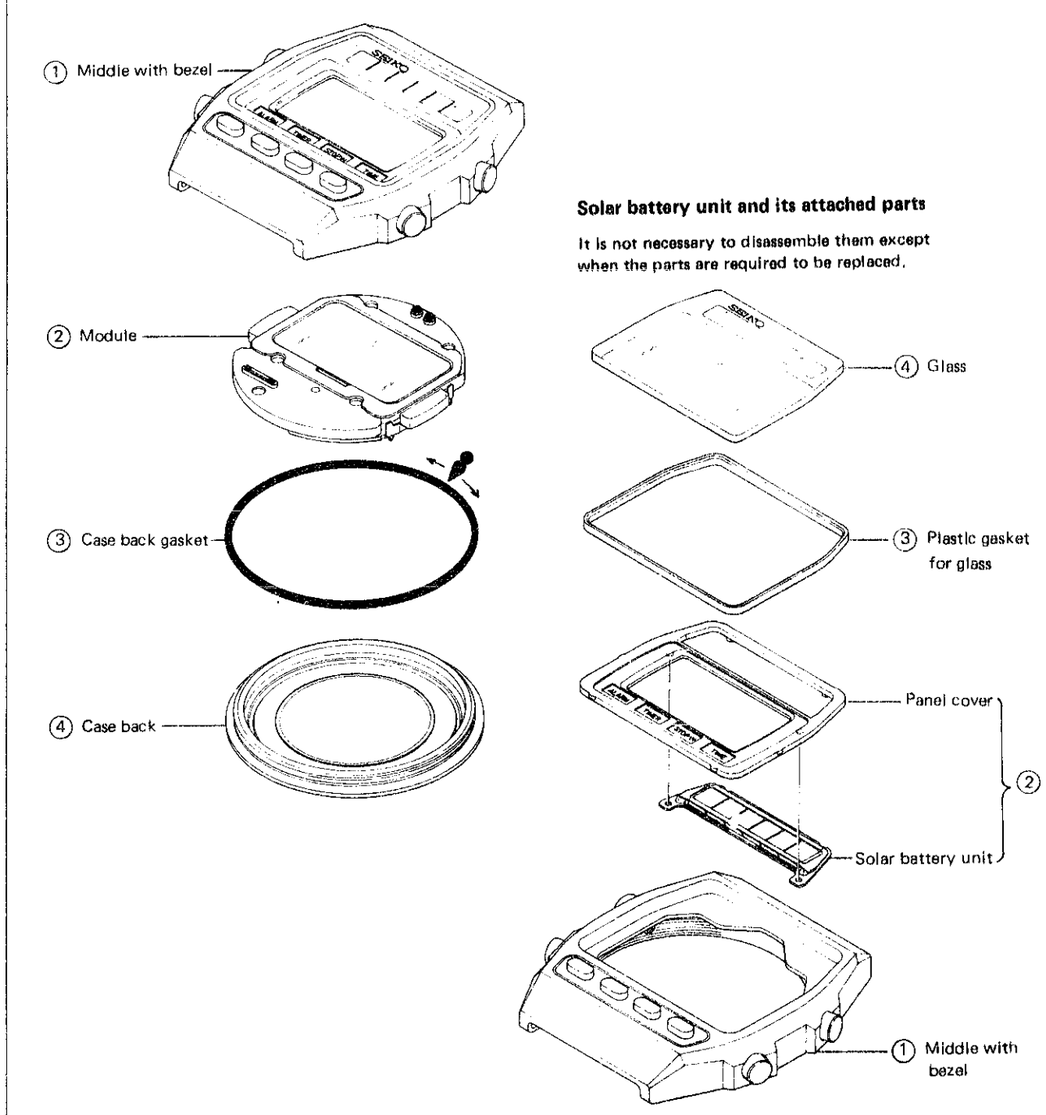
1. Disassembling, reassembling and lubricating of the case

Disassembling procedures Figs.: ④ → ①

Reassembling procedures Figs.: ① → ④

Lubricating

●▬ Silicone grease 500,000 c.s.

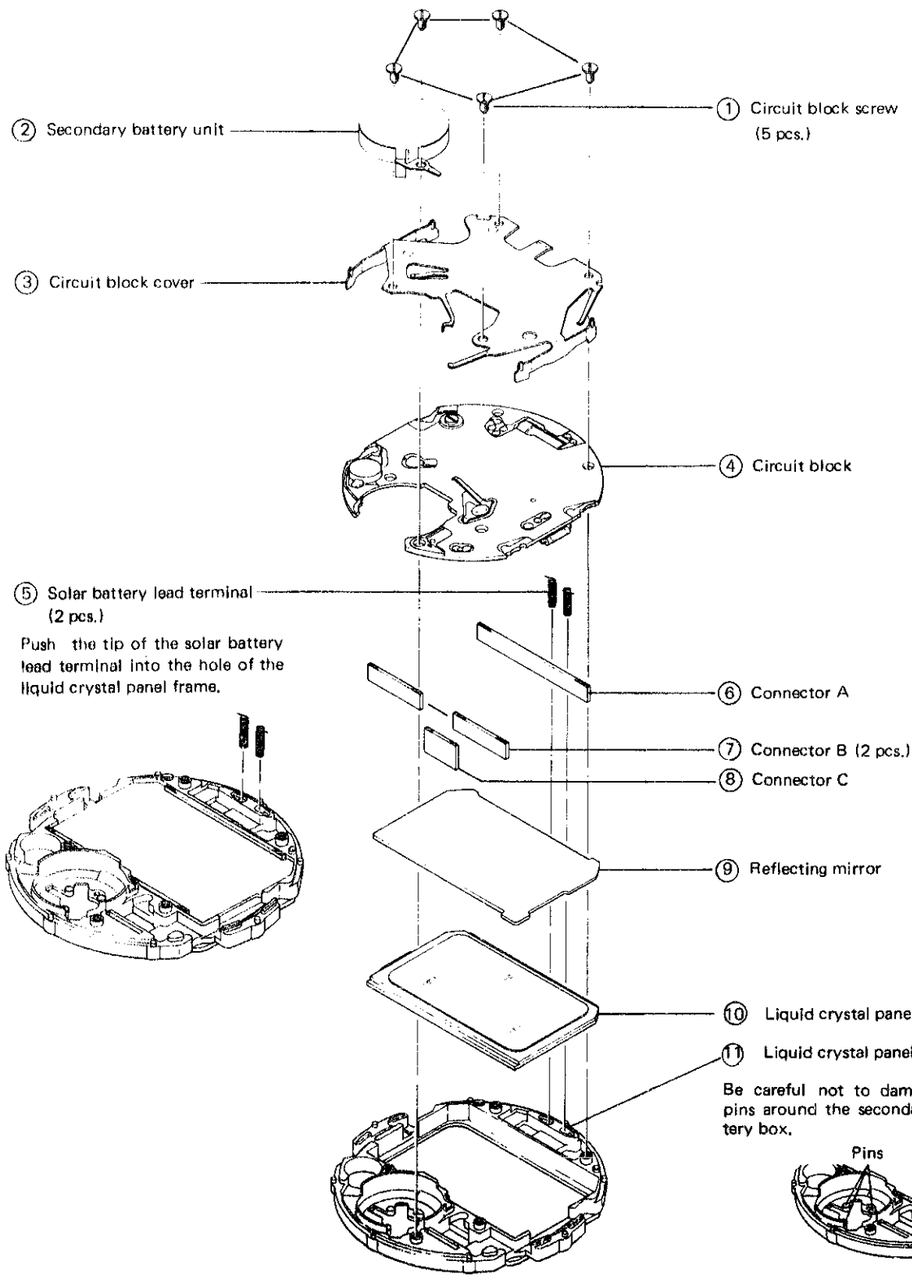


* Refer to the Technical Guide of Cal. A547A for disassembling and reassembling of the front button portion.

2. Disassembling and reassembling of the module

Disassembling procedures Figs.: (1) → (11)

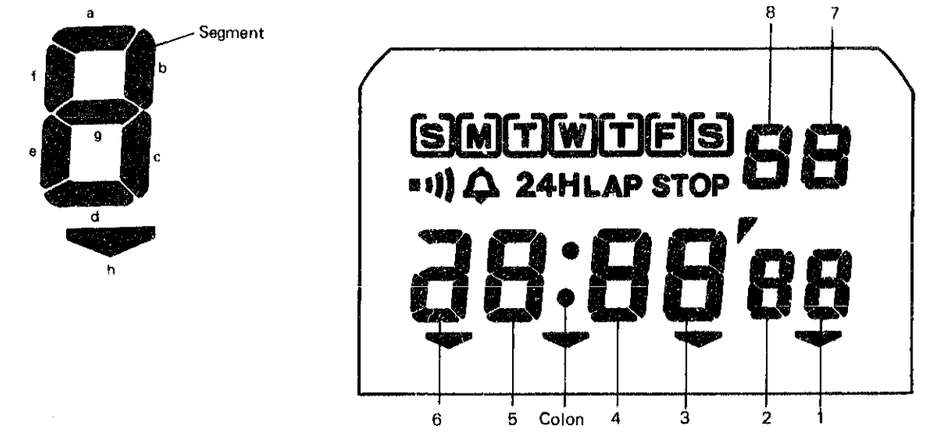
Reassembling procedures Figs.: (11) → (1)



3. Relationship between the segment (Liquid Crystal Panel Electrode) and the C-MOS-LSI output terminal

A complete knowledge of how the segment (Liquid Crystal Panel Electrode) works with the C-MOS-LSI output terminal will provide the proper procedures for checking and adjustment.

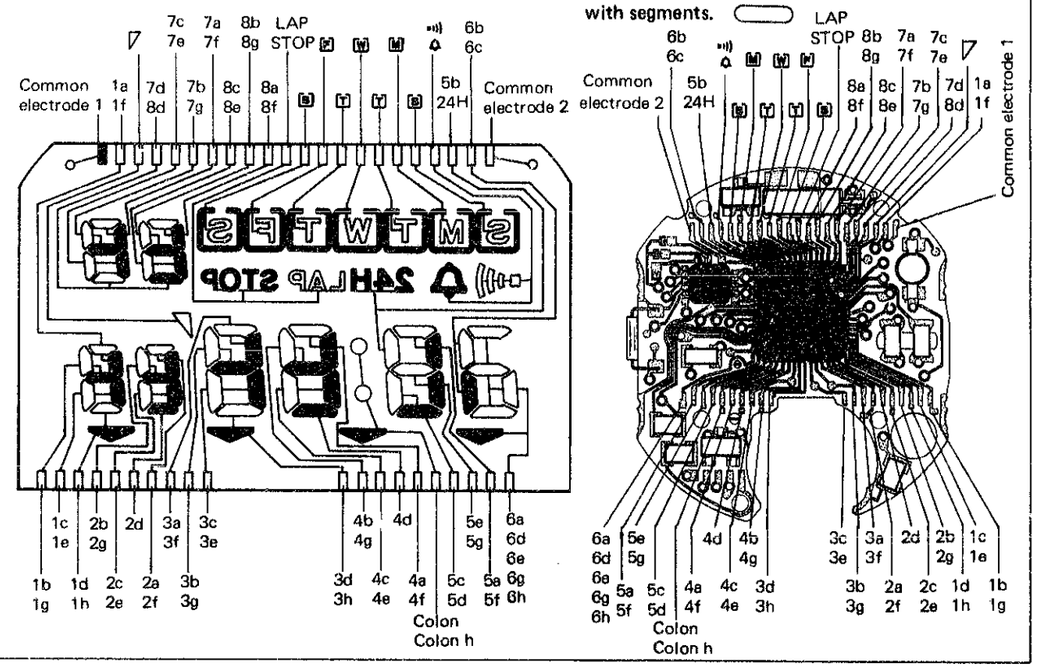
- Designation of segment



- Relationship between the segment and the C-MOS-LSI output terminal

Common electrode 1 electrically connected with segments.

Common electrode 2 electrically connected with segments.



V. CHECKING AND ADJUSTMENT

Refer to the "SEIKO QUARTZ TECHNICAL GUIDE GENERAL INSTRUCTION" for digital watches for details.

Procedure

CHECK RECHARGING CONDITION

- When the display is not shown or when the entire digits are flashing, the cause might be a poor voltage. Recharge the watch with the battery set by exposing the watch face to the direct sunlight for about 4 ~ 6 minutes. And if the watch is kept in a place that may shield it from light for a long time, it is necessary to make a checking after recharging in the same manner as the above.

Result:

The watch functions correctly	Insufficient charging Recharge the secondary battery according to the "Recharging time".
The watch does not function correctly	Proceed to check as follows: (1) Check solar battery In case solar battery is normal, – proceed to (2). In case solar battery is defective, – replace solar battery. (2) Check secondary battery voltage In case secondary battery is normal, – replace circuit block. In case secondary battery is defective, – replace secondary battery.

[Recharging time]

Type of light	To operate the watch one day	To operate the watch one month
Direct sunlight (Clear day)	3 minutes	1.5 hours
Outside on a cloudy day	10 minutes	5 hours
On the window sill (Clear day)	20 minutes	10 hours

* Do not recharge the secondary battery with the light that has an extremely high temperature such as light bulbs that may cause the watch to malfunction.
* When recharging under the direct sunlight, be sure to set the watch at a place where there is sufficient air circulation so that it may not heat up excessively.
* When an malfunction probably resulted from an insufficient charging, instruct your customer to observe the following.

1 Be sure to recharge the secondary battery daily by exposing the watch face to the direct sunlight in order to keep its charge.

2 Be careful not to keep the watch in a place that may shield it from light for a long time (cabinet, drawer of a desk, etc.).

CHECK SECONDARY BATTERY VOLTAGE

Check the secondary battery voltage after checking charging condition.

Result:

More than 1.5V: Normal
Less than 1.5V: Defective

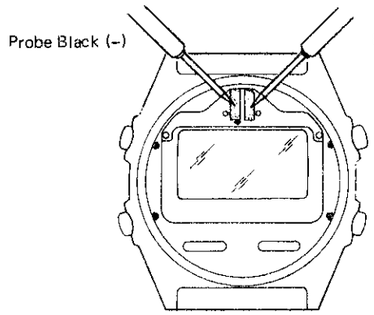
Check the solar battery.
When the solar battery is normal, replace the secondary battery.

Procedure

CHECK SOLAR BATTERY

1. Check to see if the solar battery functions correctly.

   Apply the probes of the Volt-ohm-meter to the electrode of the solar battery connections on the back of the panel cover and check to see if the pointer of the Volt-ohm-meter swings.



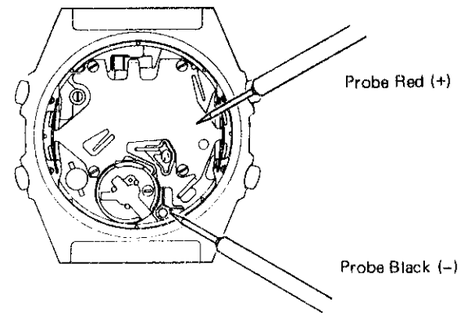
Type of light: Direct sunlight or fluorescent lamp
Range to be used: DC 3V – 6V

- The swinging range of the pointer varies depending upon the power of and distance from the light source.
- Do not check by a high temperature light source such as light bulbs.

Result:

The pointer swings : Normal
The pointer does not swing: Defective
Replace the solar battery unit.

2. Check to see if the charging circuit functions correctly from the solar battery to the secondary battery.

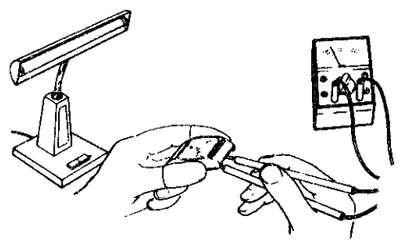


- Remove the secondary battery unit (silver oxide battery with a battery connection (–) and an insulator for battery) from the module and apply the probes of tester.
- In this condition, expose the glass side of the watch to the light source and check to see if the pointer of the tester swings.

Note: Be careful not to shadow the surface of solar battery by your hand, and be sure to wipe the glass clean.

Result:

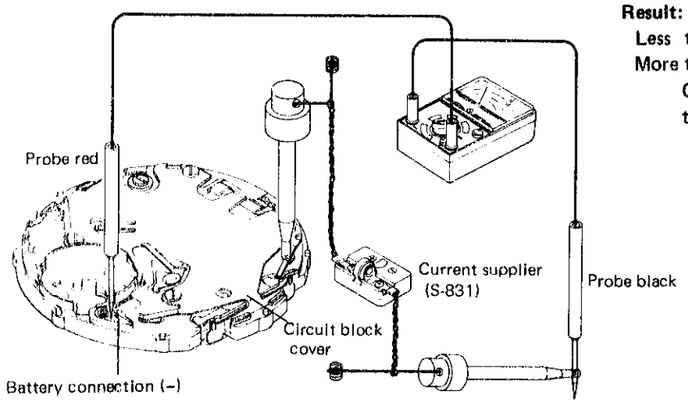
The pointer swings : Normal
The pointer does not swing: Defective
Replace the circuit block with a new one.



Procedure

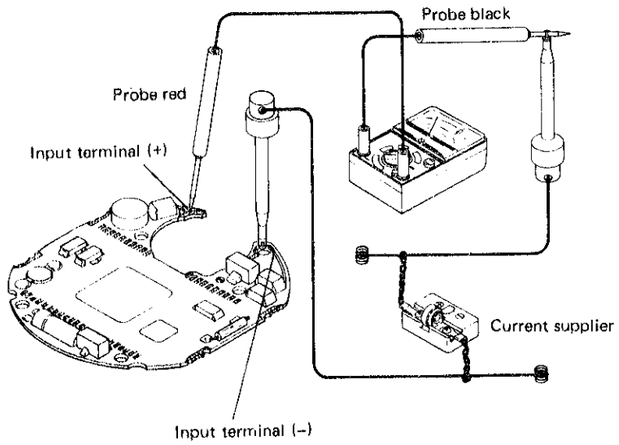
CHECK CURRENT CONSUMPTION

1. Current consumption for the whole of the module
   It is possible to check the current consumption in any functions.



Result:
Less than 1.3μA: Normal
More than 1.3μA: Defective
Check the current consumption for the circuit block alone.

2. Current consumption for the circuit block alone



Result:
Less than 1.3μA: Normal
Replace the liquid crystal panel.
More than 1.3μA: Defective
Replace the circuit block.

Procedure

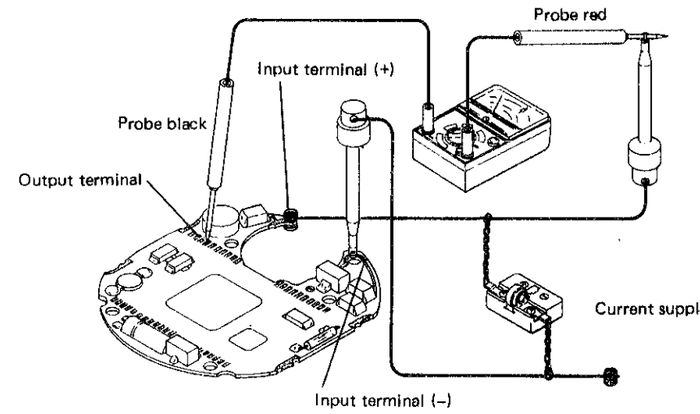
CHECK WATER RESISTANCE

Note: When the water resistance is poor, water may have entered into the front button portion. Disassemble the front button portion for repairing.

CHECK CONTACT BETWEEN C-MOS-LSI AND LIQUID CRYSTAL PANEL

CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK

- Check the liquid crystal panel.
- Check the circuit block output voltage.



CHECK ACCURACY

Check the watch for accuracy in the daily rate measuring function with all the segments displayed. Depress button A to activate the setting function and then depress buttons B and C at the same time, and all the segments light up. At this time, the alarm rings every second.
Check the accuracy by using the electromagnetic microphone in the same mannar as for the analogue quartz watches.

CHECK FUNCTIONING AND ADJUSTMENT

CHECK ALARM TEST SYSTEM

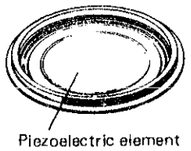
Depress buttons B and C at the same time in the time and calendar function or the alarm function.

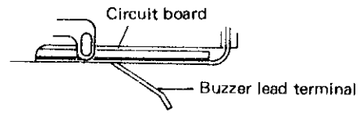
Procedure

CHECK CONDUCTIVITY OF SWITCH COMPONENTS

CHECK ALARM CONDITION

(1) Check to see if there is any contamination on the connecting portion of the piezoelectric element on the case back and the buzzer lead terminal. Also, check to see if there is seen a deformation on the buzzer lead terminal.

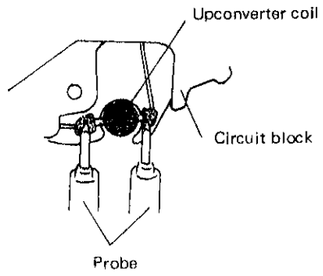




Limit the protrusion of the buzzer lead terminal from the module to approx. 2mm.

(2) Measure the upconverter coil resistance of the circuit block and check it for broken wire and short circuit.

Range to be used: OHMS R x 1



Apply the probes of the Volt-ohm-meter to the wire terminal of the upconverter coil.

Result:

45Ω ~ 70Ω: Normal

Less than 45Ω (Short circuit) — Defective

More than 70Ω (Broken wire) — Defective

Replace the circuit block.

CHECK BULB CONDITION

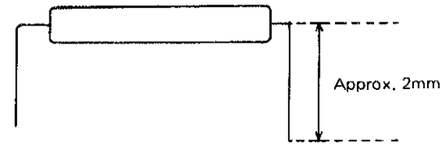
*** How to replace the bulb**

Be sure to use the soldering iron of low heat capacity with as fine a tip as possible.
Thickness of the tip: Approx. ϕ1mm
Heat capacity : 5W ~ 20W of power consumption

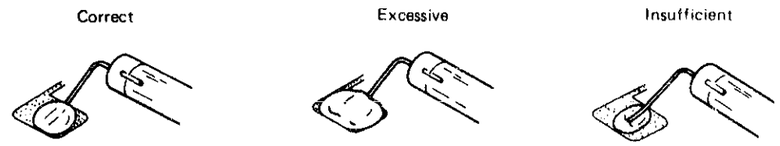
(1) Remove the defective bulb.
Hold the defective bulb gently with tweezers, apply the soldering iron to the bulb lead terminal and lift the lead of the bulb to remove it.

Procedure

(2) The lead of the bulb is made somewhat longer.
Cut it off properly with nippers.



(3) Solder the new bulb.
Note: If the soldering iron is applied too long, the circuit block may be damaged. Be sure to apply the soldering iron to such an extent that the solder is melted uniformly at the connection (for approx. 1 second).



(4) Finally check the bulb condition again.

CHECK FUNCTIONING

All procedures of Disassembling, Reassembling, Checking and Adjustment are completed.