

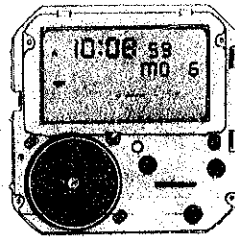
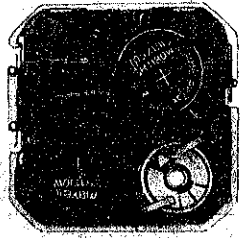
SEIKO

DIGITAL QUARTZ

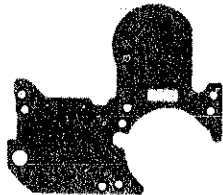
Cal. M516A

**PARTS
CATALOGUE**

Cal. M516A



4001 629



4216 622



4224 620



4225 630



4242 624



4242 628



4242 629



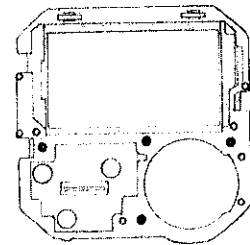
4270 620



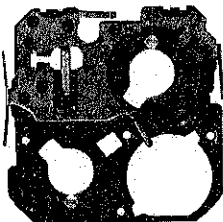
4313 620



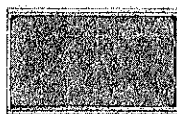
4313 621



4398 620



4410 621



4510 505



4521 930



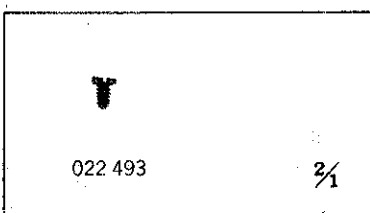
4530 230



4580 620



☆ Maxell SR1130W



022 493

2/1

Cal. M516A

Characteristics

Casing diameter : 30.0 × 30.0 mm
 Maximum height : 7.8 mm without battery
 Frequency of quartz crystal oscillator : 32,768 Hz (Hz=Hertz Cycles per second)
 Digital time and calendar display
 Voice memory function (Record and Reproduce function)
 Alarm display
 Stopwatch display
 Regulation system : Trimmer condenser
 Display medium : Nematic liquid crystal, FE-Mode
 Illuminating light

PART NO.	PART NAME	PART NO.	PART NAME
4001 629	Circuit block		
4216 622	Insulator for circuit		
4224 620	Switch plate		
4225 630	Battery clamp		
4242 624	Battery connection		
4242 628	Speaker lead terminal (A)		
4242 629	Speaker lead terminal (B)		
4270 620	Battery connection (-)		
4313 620	Connector (A)		
4313 621	Connector (B)		
4398 620	Liquid crystal panel frame		
4410 621	Circuit cover		
4510 502	Liquid crystal panel		
4521 930	Reflecting mirror		
4530 230	Bulb		
4580 620	Speaker block		
022 493	Battery clamp screw		
022 493	Circuit cover screw		
☆Maxell SR1130W } ☆U.C.C. 389 }	Silver oxide battery		

Remarks :

Battery

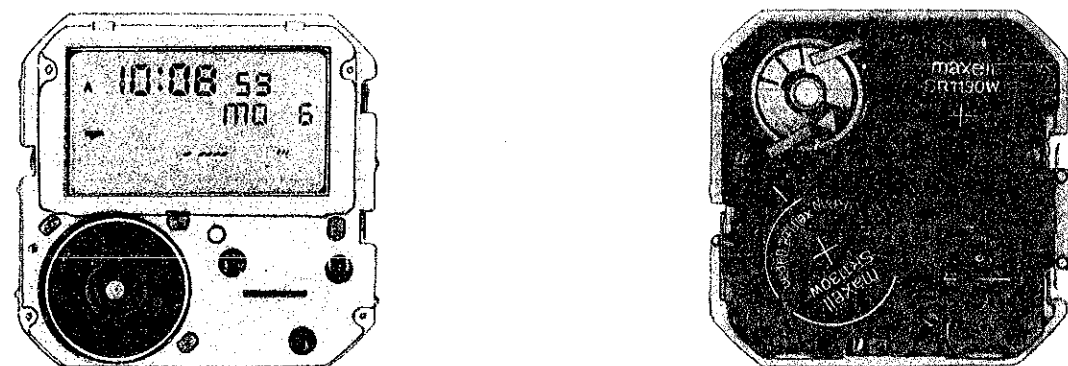
☆Maxell SR1130W }The substitutive battery might be added to the applied battery in the future.
 ☆U.C.C. 389 }

In that case, please refer to separate "BATTERY LIST FOR SEIKO QUARTZ WATCHES".

TECHNICAL GUIDE

SEIKO DIGITAL QUARTZ

CAL. M516A



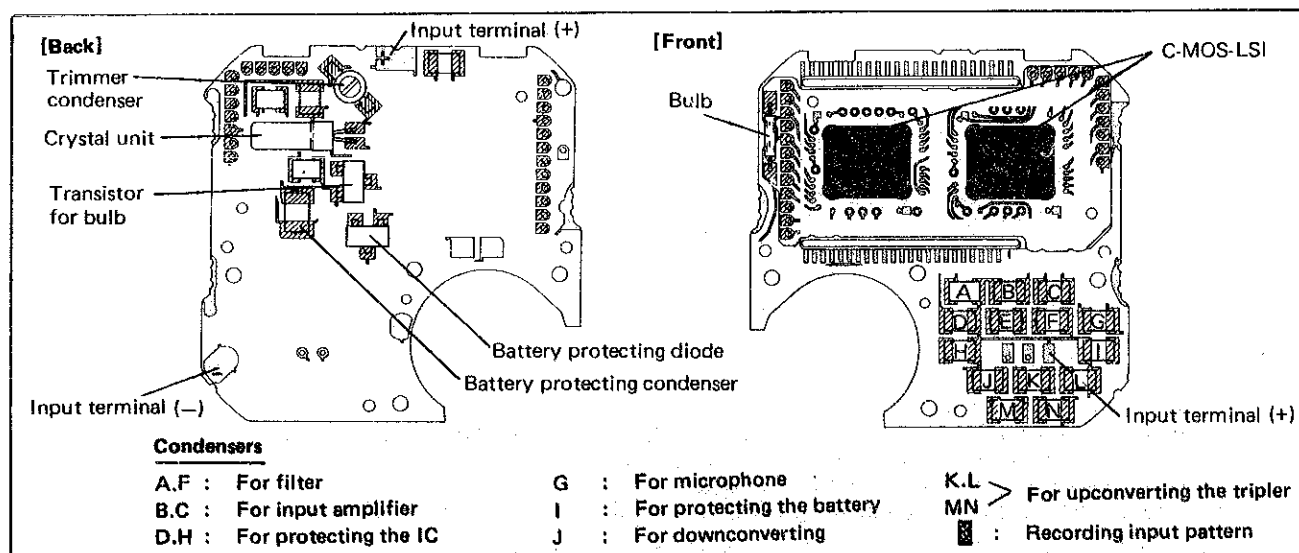
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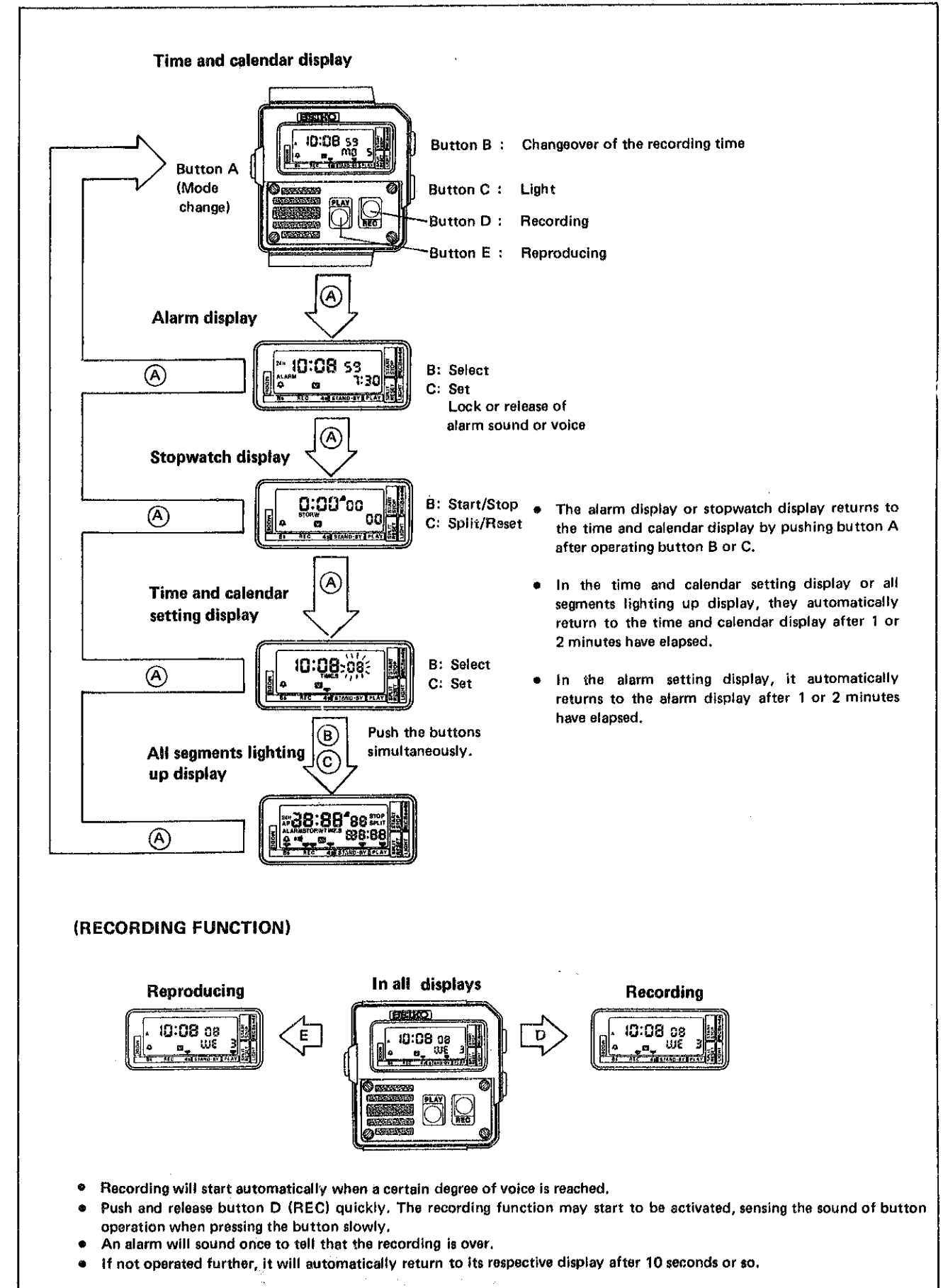
I. SPECIFICATIONS

Item	Cal. No.	M516A
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 and calendar function (12- or 24-hour indication) Alarm function (Rings for 20 seconds.) Stopwatch function (up to 12 hours) Time and calendar setting function
Additional mechanism		<ul style="list-style-type: none"> Alarm test system Hourly time signal Automatic calendar display system Illuminating light Record function (Recording time: 4 seconds or 8 seconds) Voice alarm function Pattern segment checking system
Loss/gain		Monthly rate at normal temperature range: less than 15 seconds
Module size	Outside diameter	$\phi 37.0$ mm (30.0 mm between 6 o'clock and 12 o'clock sides) (30.0 mm between 3 o'clock and 9 o'clock sides)
	Height	7.8 mm
Regulation system		Trimmer condenser
Measuring gate by quartz tester		Any gate is available.
Battery		Silver oxide battery, 2 pcs. Maxell SR1130W or SONY EVEREADY 389 Battery life is approximately 2 years. Voltage: 1.55V

II. STRUCTURE OF THE CIRCUIT BLOCK



III. DISPLAY FUNCTION

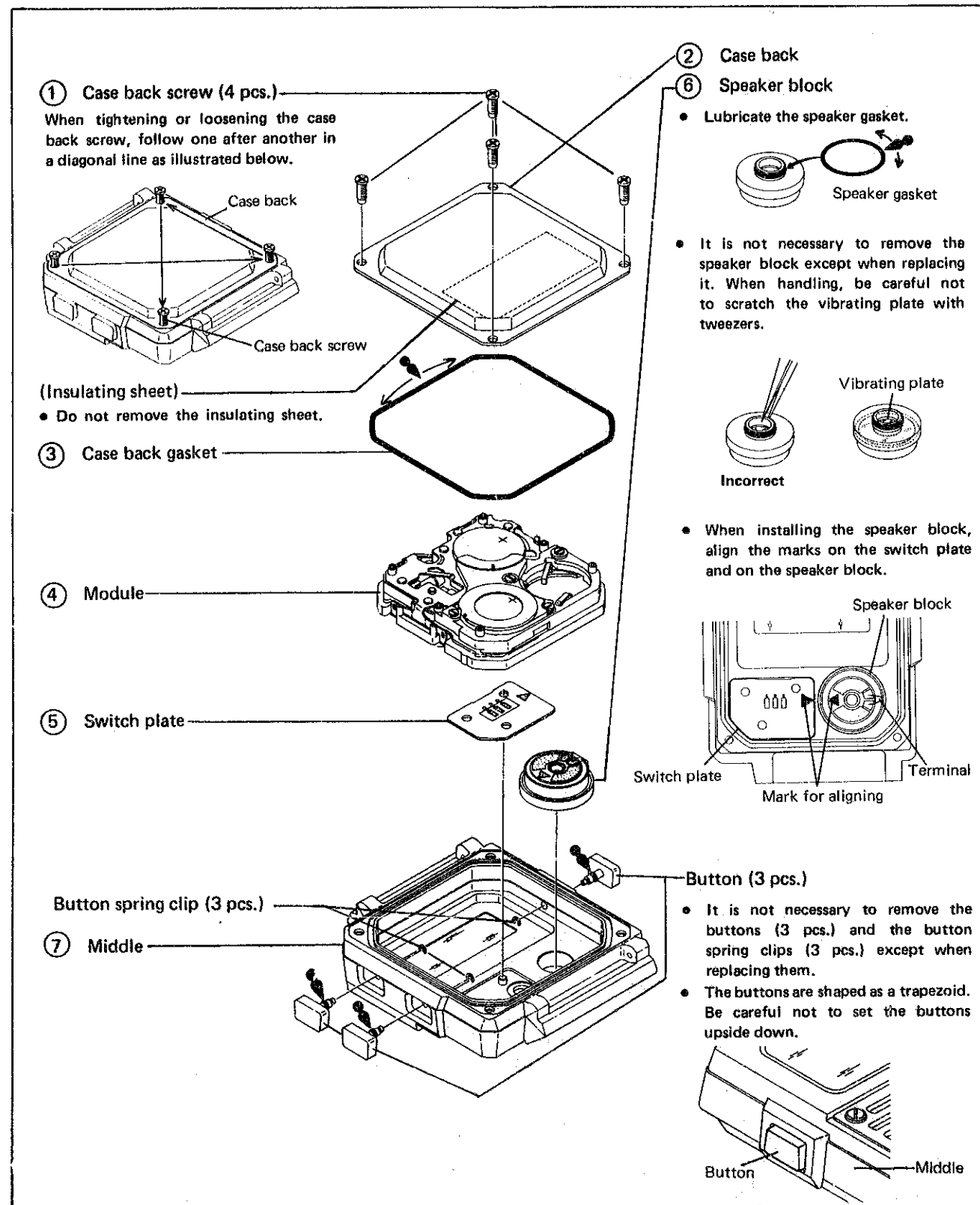


IV. DISASSEMBLING, REASSEMBLING, AND LUBRICATING OF THE CASE

Disassembling procedures Figs.: ① → ⑦

Reassembling procedures Figs.: ⑦ → ①

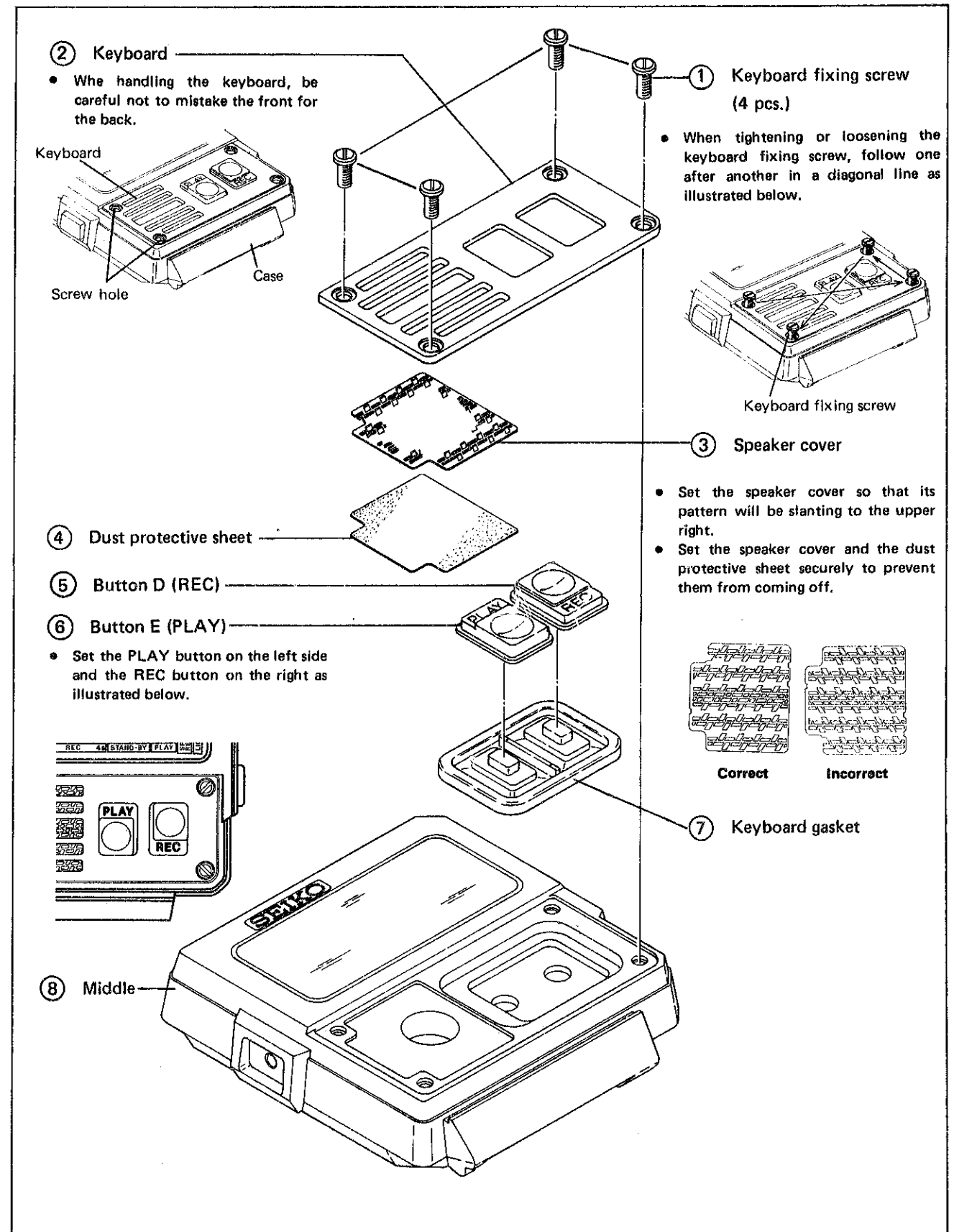
Lubricating: ● Silicone grease 500,000 c.s.
Normal quantity



V. DISASSEMBLING AND REASSEMBLING OF THE FRONT BUTTONS

Disassembling procedures Figs.: ① → ⑧

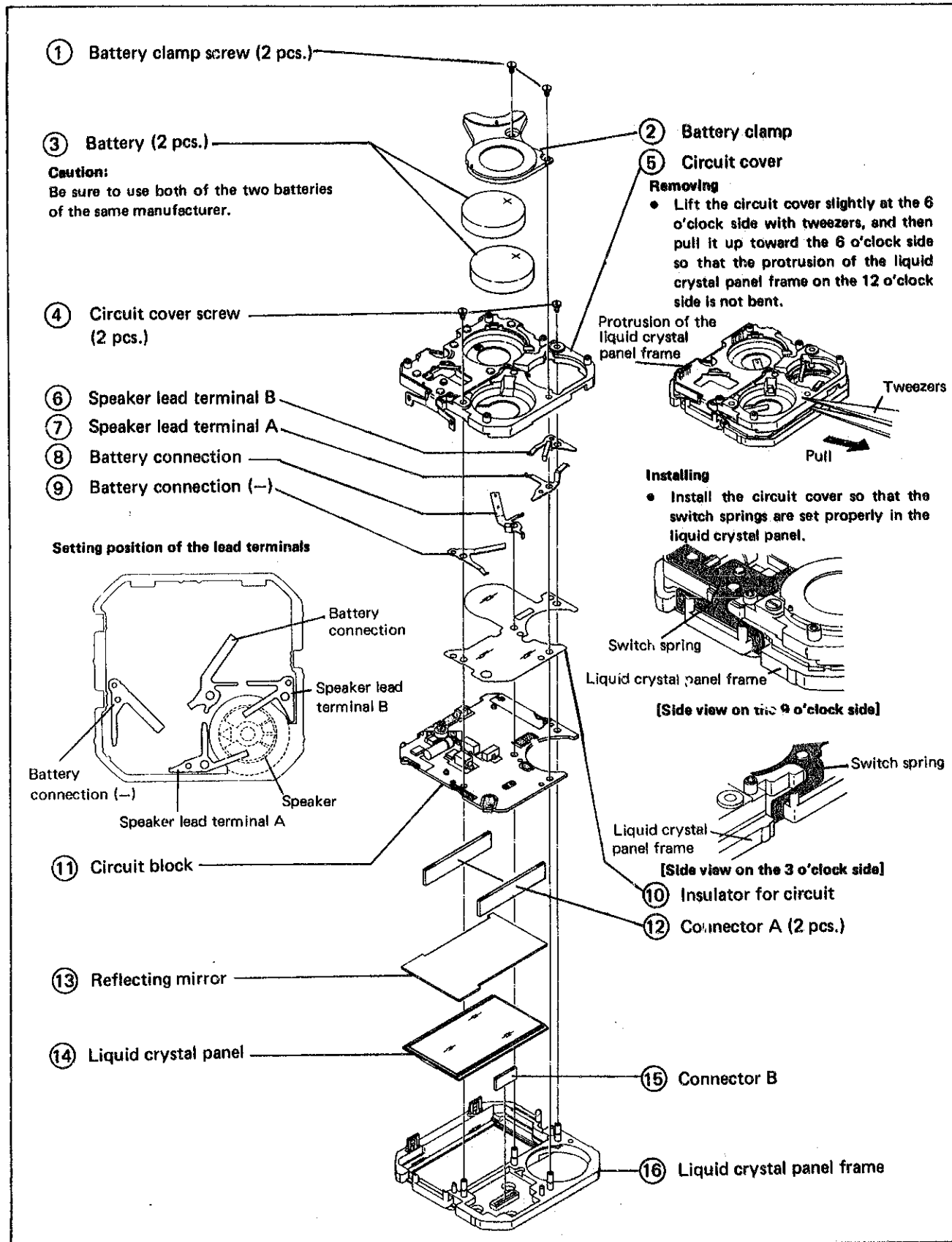
Reassembling procedures Figs.: ⑧ → ①



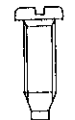

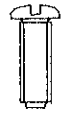
VI. DISASSEMBLING, REASSEMBLING, AND LUBRICATING OF THE MODULE

Disassembling procedures Figs.: ① → ⑩

Reassembling procedures Figs.: ⑩ → ①



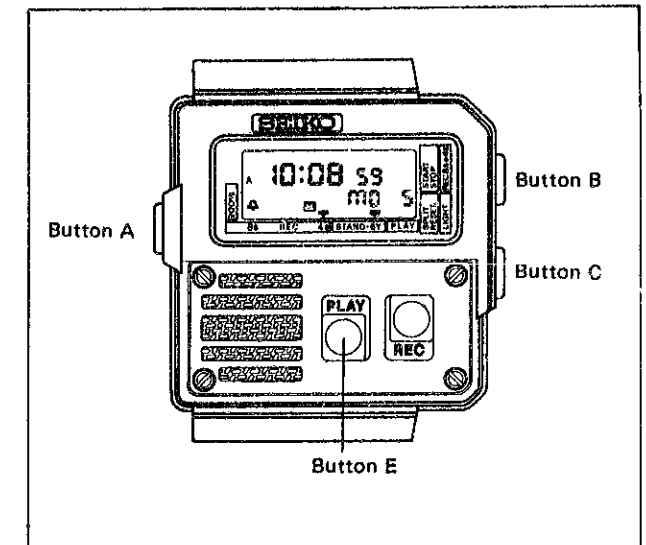
List of the screws used

Shape	Part No.	Name	Shape	Part No.	Name
	8150 1269	Case back screw (4 pcs.)		0022 493	Battery clamp screw (2 pcs.)
	8150 1869	Keyboard fixing screw (4 pcs.)			Circuit cover screw (2 pcs.)

Remarks on replacing the battery

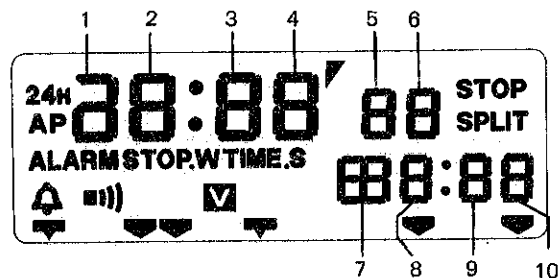
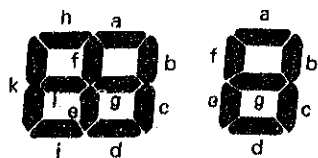
- Use batteries of the same manufacturer and replace both of the 2 pieces at the same time even if only one of the two batteries is necessary to be replaced.
- The display may become disordered when the battery is installed. The display will return to normal through the operations as shown below.

1. Push buttons A, B, and C at the same time.
2. Then, push button E.

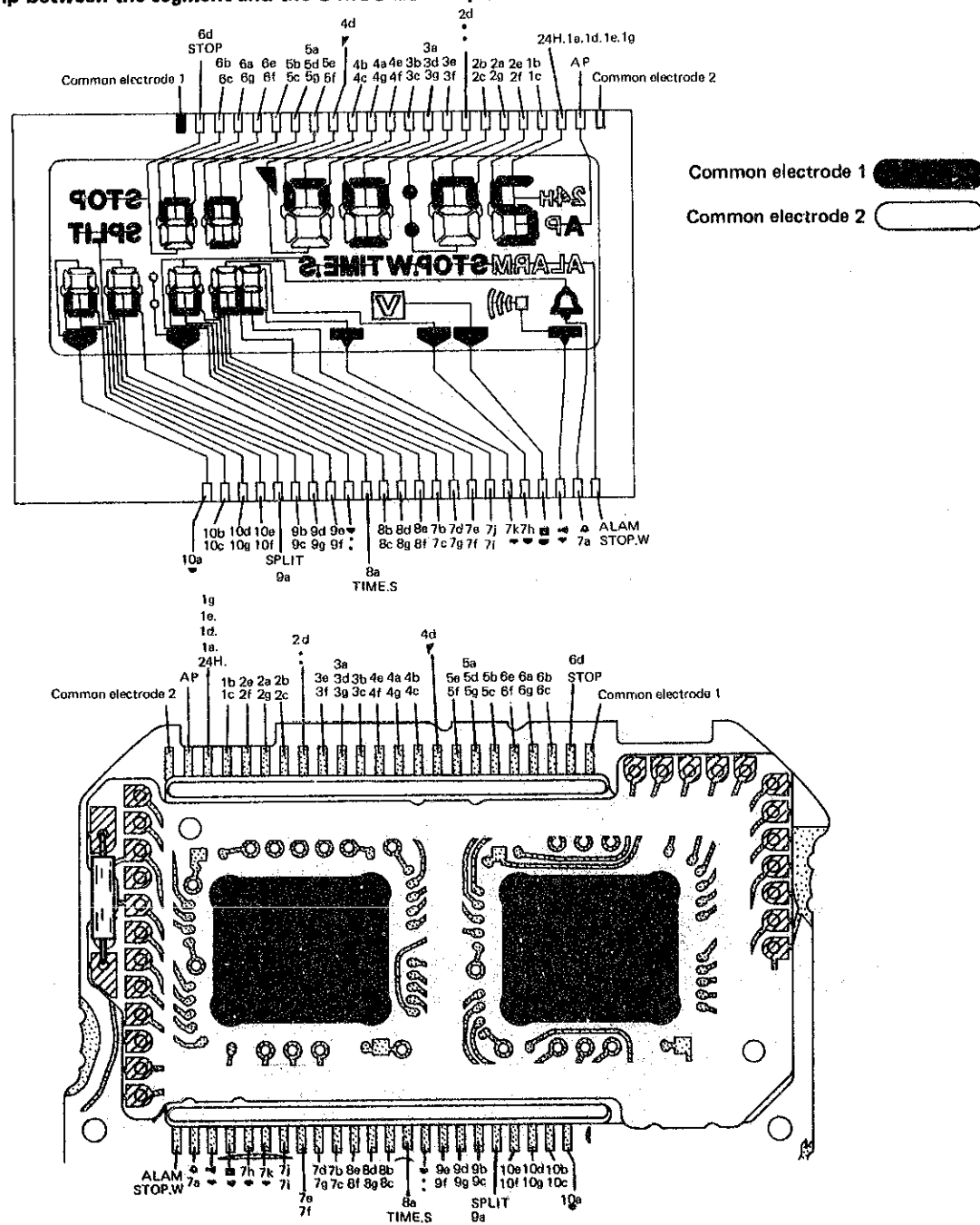


Relationship between the segment (Liquid Crystal Panel Electrode) and the C-MOS-LSI output terminal

Designation of the segment



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



VII. CHECKING AND ADJUSTMENT

- The explanation here is only for the particular points of Cal. M516A. Refer to the "TECHNICAL GUIDE, GENERAL INSTRUCTION" for SEIKO DigitalQuartz for details.

Procedure

CHECK BATTERY VOLTAGE

- Two batteries of the same manufacturer should be installed in a watch.

Result:
 Normal: More than 1.55V for both
 Defective: Less than 1.55V for one
 Less than 1.55V for both
 Replace both with new ones.

Note: After checking battery voltage, push button A, B, and C at the same time and then push button E.

CHECK BATTERY CONDUCTIVITY

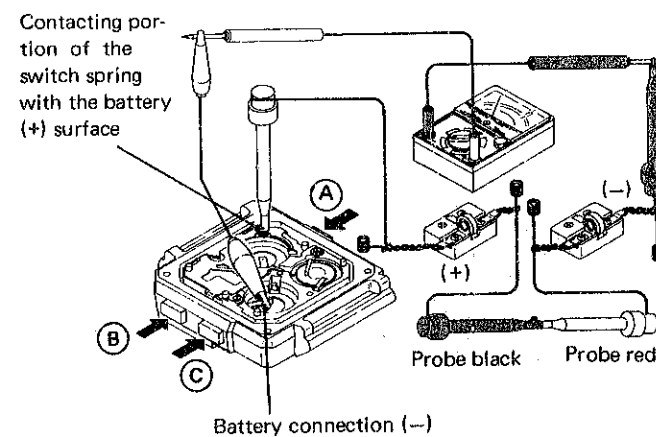
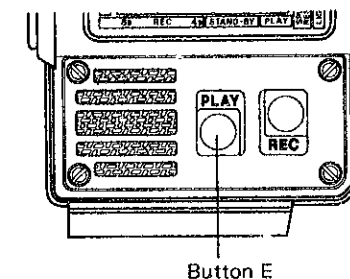
CHECK CURRENT CONSUMPTION

- Do not check current consumption under an incandescent lamp since strong light may cause the watch to consume excess current.
- Be sure to protect the module from light with a black cloth while measuring.
- Reset the circuit and measure current consumption when the reading becomes stable 10 seconds after resetting the circuit.

1. Check current consumption for the whole of the module.

Resetting the circuit

Push buttons A, B, and C at the same time and then push button E.



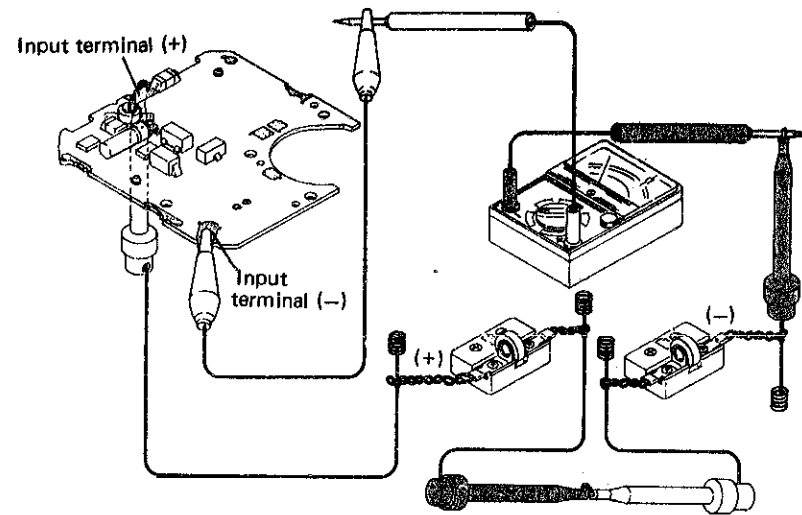
Result:
 Normal: Less than 1.7μA
 Defective: More than 1.7μA

Procedure

***How to find defects when the current consumption is more than 1.7 μ A.**

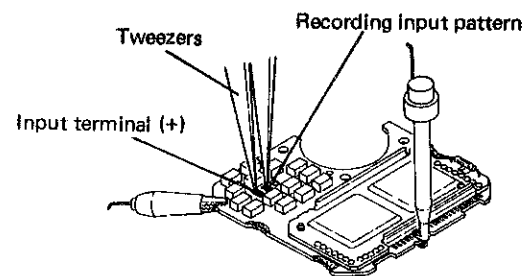
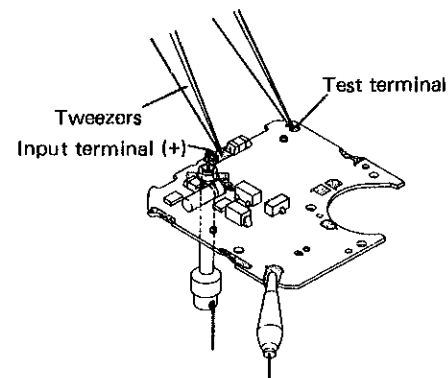
Check current consumption for the circuit block alone.

Resetting the circuit



1) Touch the input terminal (+) and the test terminal with tweezers.

2) Touch the input terminal (+) and the recording input pattern with tweezers.



Result:
 Normal: Less than 1.5 μ A
 Defective: More than 1.5 μ A

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

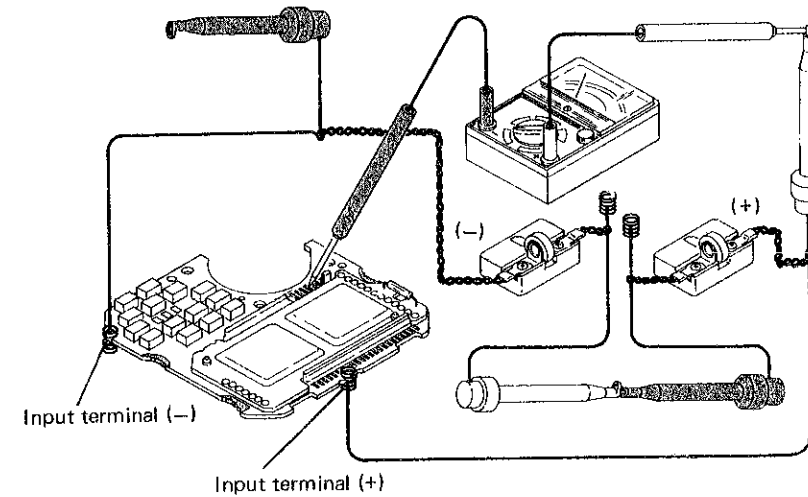
Procedure

CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK

- Check the liquid crystal panel for any broken wire and short circuit.
- Check the circuit block output voltage.

Use the volt-ohm-meter.

Range to be used: DC 3V



CHECK ACCURACY

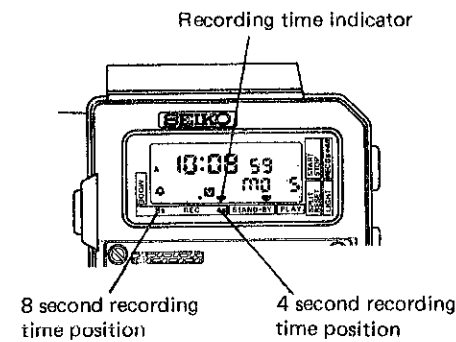
CHECK FUNCTIONING AND ADJUSTING

- Check to see if the recording time indicator moves from the "8 sec. position" to the "4 sec. position" and vice versa when pushing button B for approximately 1 second in the time and calendar display.

Result:
 Normal: The indicator moves.
 Defective: The indicator does not move.

Proceed to the procedure **CHECK ALL SEGMENTS LIT UP.**

All segments light up:
 Replace the circuit block with a new one.
 All segments do not light up:
 Replace the liquid crystal panel with a new one.

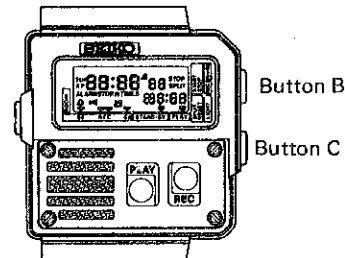


- Check reproducing condition.
 If the speaker block is exposed to water, it will cause the volume to become low or cause difficulty with reproducing.

Procedure

CHECK ALARM TEST SYSTEM

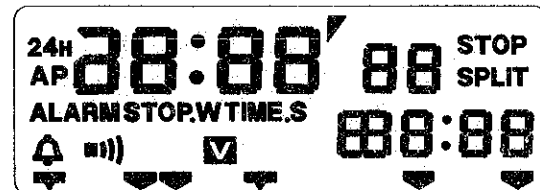
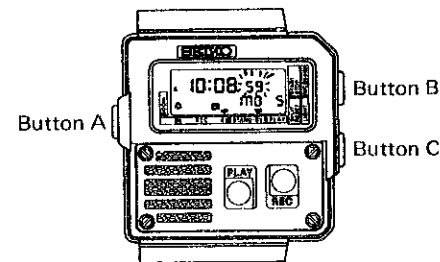
In the time and calendar display, check to see if the alarm rings by pushing buttons B and C at the same time.



Result:
 Normal: Alarm rings.
 Defective: Alarm does not ring.
 Replace the speaker block with a new one.

CHECK ALL THE SEGMENTS LIT UP

In the time and calendar setting function, check to see if the all the segments light up by pushing buttons B and C at the same time.
 The display returns to the time and calendar display by pushing button A.



CHECK CONDUCTIVITY OF SWITCH COMPONENTS

CHECK SPEAKER BLOCK

1. Check to see whether the speaker block is contaminated with dust or lint or whether the vibrating plate is scratched.

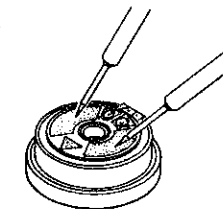
Result:
 Normal: Neither contaminated nor scratched.
 Defective: Contaminated
 Clean the speaker block
 Scratched
 Replace the speaker block with a new one.

Procedure

2. Check to see if there is any broken wire or short circuit in the speaker block.

Use the volt-ohm-meter.

Range to be used: OHMS x 1



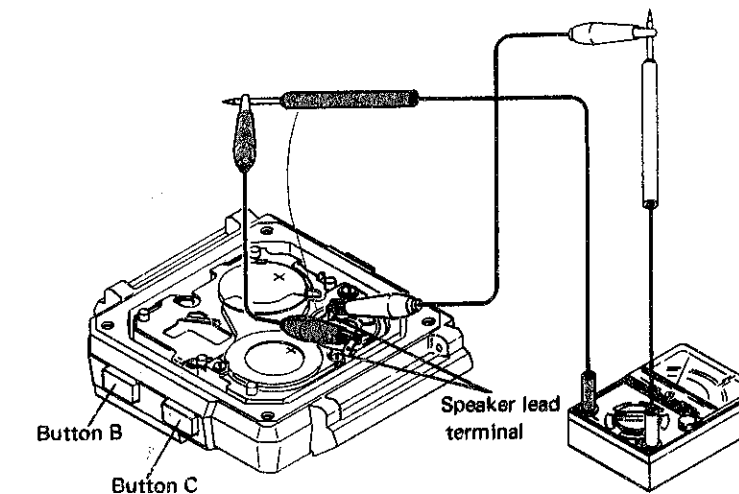
Result:
 Normal: $80\Omega \sim 100\Omega$
 Defective: Less than 80Ω (Broken wire)
 More than 100Ω (Short circuit)
 Replace the speaker block with a new one.

3. Check to see if the output signal of the circuit block is transmitted to the speaker block.

Use the volt-ohm-meter.

Range to be used: DC 3V

● Check by keeping buttons B and C pushed in the time and calendar display.



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

CHECK BULB CONDITION

CHECK FUNCTIONING

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