

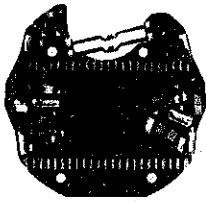
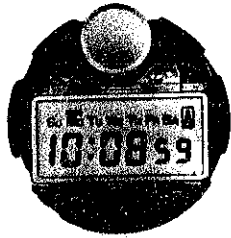
SEIKO

DIGITAL QUARTZ

Cal. A133A

PARTS LIST

Cal. A133A



4001 885



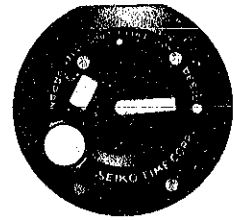
4033 880



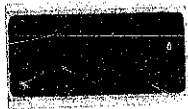
4245 880



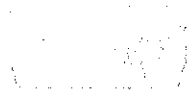
4313 880



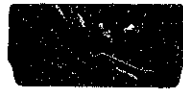
4410 885



4510 880



4521 510



4521 511



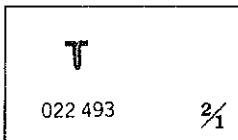
4540 880



4580 880



☆ SEIKO SB-BU



T
022 493 2/1

Cal. A133A

Characteristics

Casing diameter : ϕ 28.9 mm
 Maximum height : 7.0 mm
 Frequency of quartz crystal oscillator : 32,768 Hz (Hz=Hertz Cycle per second)
 Time functions : Digital Display System showing hour, minute, second and day
 Calendar functions : Digital Display System showing month, day and date
 Alarm functions : Can be set to operate at desired minute and hour
 Display medium : Nematic Liquid Crystal, FE-Mode
 Time micro adjustor : Trimmer condenser system
 Illuminating light : Illuminates all the digital displays in the dark by depressing the light button.
 Battery life indicator : All the digits in the display begin flashing.

PART NO.	PART NAME	PART NO.	PART NAME
4001 885	Circuit block		
4033 880	Liquid crystal panel frame (with bulb)		
4245 880	Switch spring		
4313 880	Connector		
4410 885	Circuit bridge plate		
4510 880	Liquid crystal panel		
4521 510	Reflecting mirror (Silver)		
4521 511	Reflecting mirror (Gold)		
4540 880	Liquid crystal panel holder		
4580 880	Speaker block		
022 493	Liquid crystal panel holder screw		
☆SEIKO SB-BU ☆Maxell SR1130W	} Silver oxide battery		

Remarks :

☆Battery.....The applied battery for this calibre might be added the substitutive in the future. In that case, please refer to separate "BATTERIES FOR SEIKO QUARTZ WATCHES".

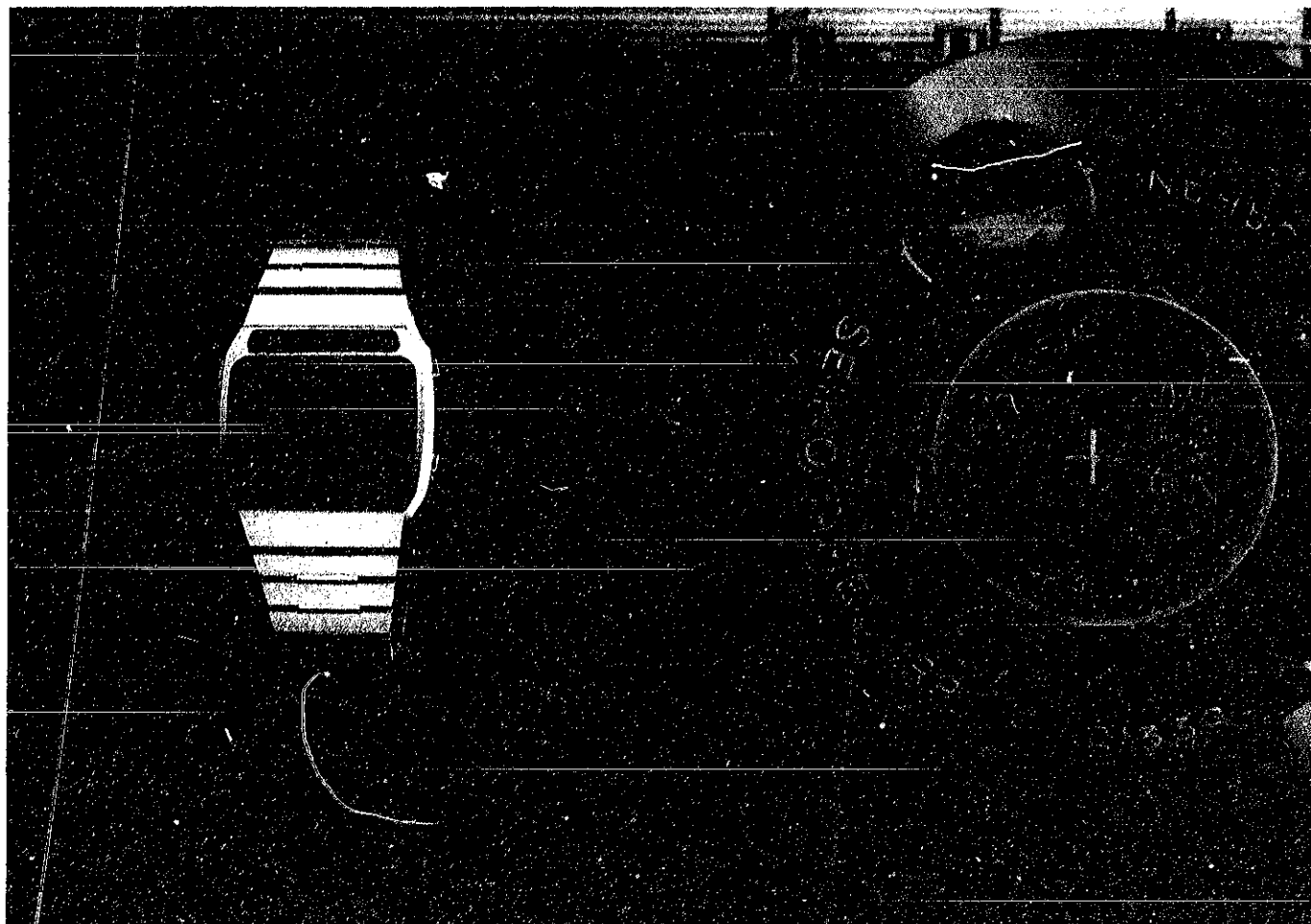
☆⇒ Please see remarks.

Part numbers in light letters are not shown in photos.

TECHNICAL GUIDE

SEIKO DIGITAL QUARTZ

CAL.A133A



CONTENTS

I. SPECIFICATIONS AND FEATURES	1
1. Specifications	1
2. Features	1
II. HOW TO USE	2
1. How to set the time and calendar	3
2. How to use the alarm	4
III. SPEAKER MECHANISM AND ITS WORKING PRINCIPLE	6
1. Speaker mechanism	6
2. Sounding principle of the speaker	6
3. Working principle of the alarm circuit	7
IV. DISASSEMBLING AND REASSEMBLING	8
1. Disassembling and reassembling of the case	8
2. Disassembling and reassembling of the module	12
3. Cleaning	14
V. CHECKING AND ADJUSTMENT	15
1. Guide table for checking and adjustment	15
2. Malfunction and checking points	16
3. Relationship between the segment (Liquid Crystal Panel Electrode) and the C-MOS-LSI output terminal	17
4. Procedures for checking and adjustment	18
A. Check battery voltage	18
• How to check battery electrolyte leakage and repair	18
• Check pattern segment checking system	18
B. Check contact of C-MOS-LSI and Liquid crystal panel	19
C. Check liquid crystal panel and circuit block	20
D. Check current consumption	21
E. Check accuracy	22
F. Check functioning and adjustment	22
G. Check speaker block	22
H. Check bulb condition	24
I. Check conductivity of switch components	25

Calibre A133A



Display panel side

Module



Case back side

I. SPECIFICATIONS AND FEATURES

1. Specifications

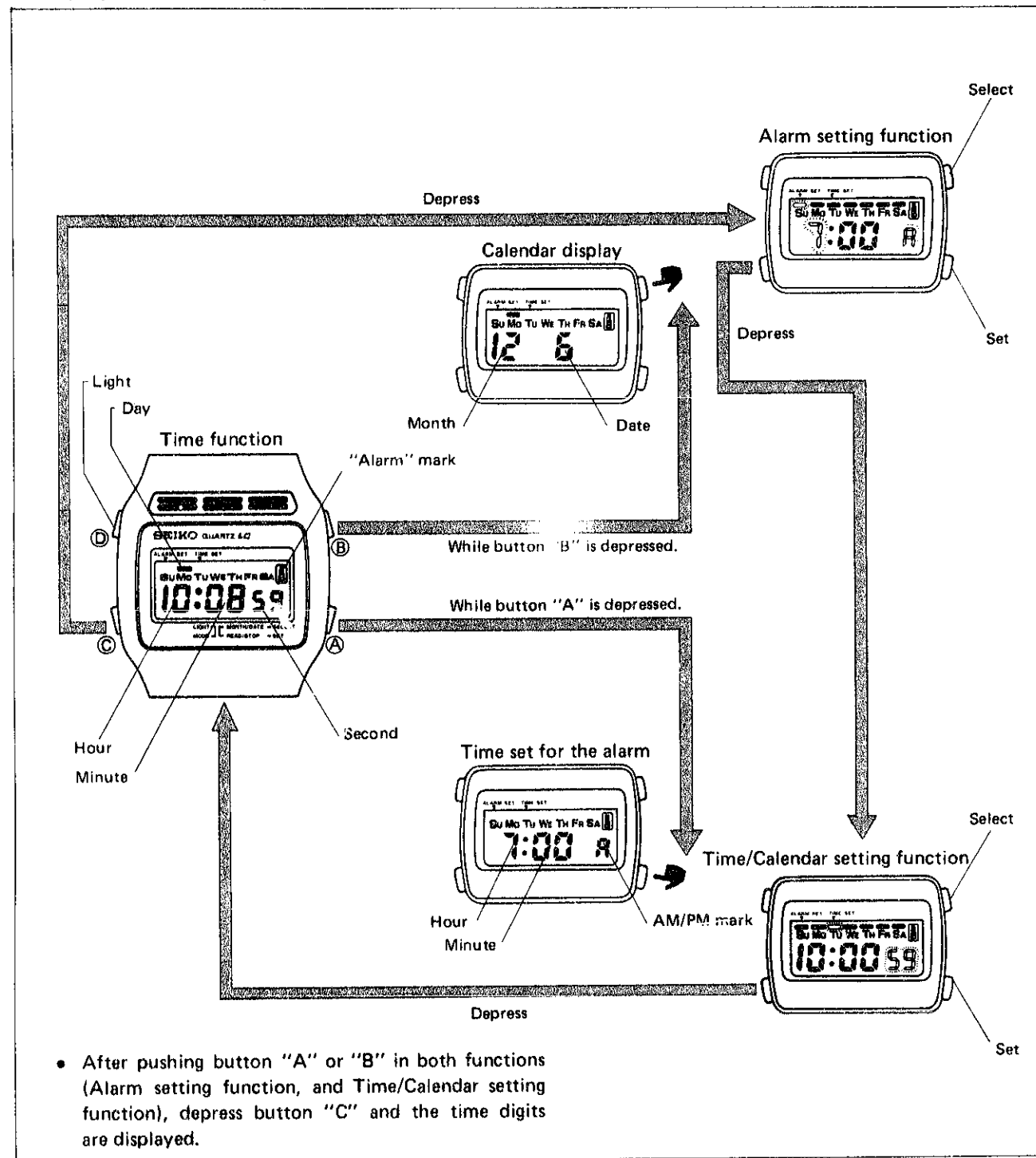
Item	Calibre No. A133A
Display medium	Nematic Liquid Crystal, FEM (Field Effect Mode)
Display system	Three-function changeover system with time, alarm setting and time/calendar setting functions. <ul style="list-style-type: none"> Time function: Digital display system showing hour, minute, second and day. In the time function, calendar and time set for the alarm are displayed by depressing a button. Calendar: Digital display showing month, date and day. Time set for the alarm: Digital display showing hour, minute and "A" (for AM)/"P" (for PM). Alarm setting function: Alarm time can be set to operate at the desired minute and 12-hour (with "A" (AM)/"P" (PM) indication).
Additional mechanism	<ul style="list-style-type: none"> Battery life indicator (It starts the entire display flashing when the time digits are displayed.) Alarm test system Pattern segment checking system Illuminating light
Crystal oscillator	32,768 Hz (Hz. = Hertz . . . cycles per second)
Loss/gain	Loss/gain at normal temperature range Mean monthly rate: less than 15 seconds Annual rate: less than 3 minutes
Casing diameter	φ28.9 mm
Height	7.0 mm
Operational temperature range	-10°C ~ +60°C (14°F ~ 140°F)
Regulation system	Trimmer condenser
Battery power	Silver oxide battery SEIKO SB-BU or Maxell SR1130W Battery life is approximately two years. (If the light is used 5 times a day and the alarm is used once a day.) Voltage: 1.5V
IC (Integrated Circuit)	C-MOS-LSI 1 unit

2. Features

Not only has Cal. A133 the time function but the alarm function to serve wide needs of users, and it is thinner enough to fit on the wrist.

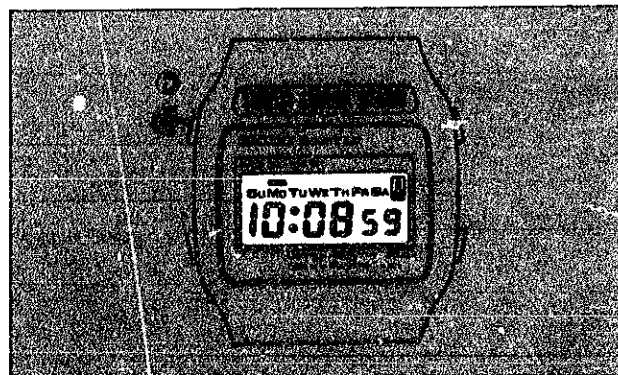
II. HOW TO USE

• Display and button operation

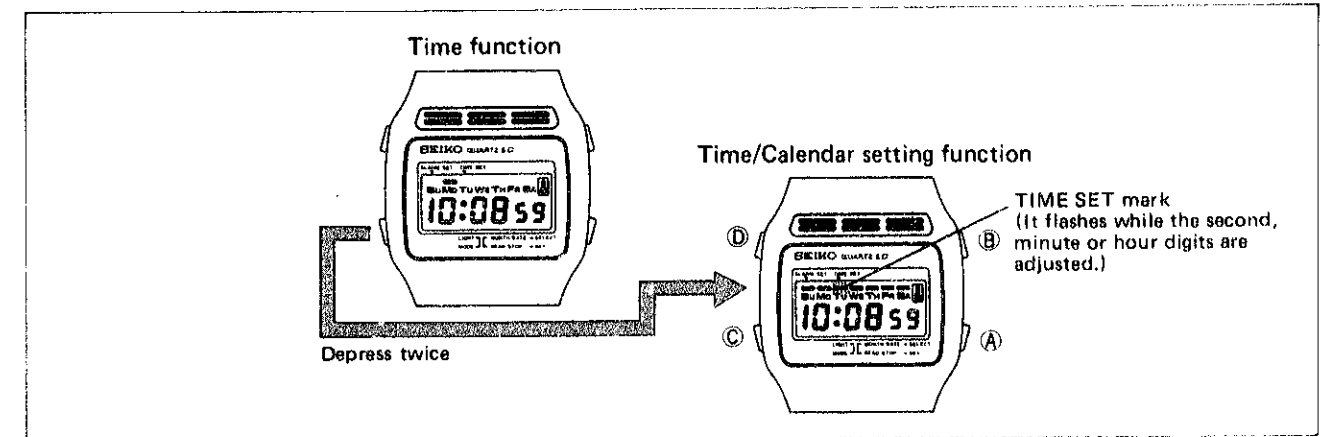


- After pushing button "A" or "B" in both functions (Alarm setting function, and Time/Calendar setting function), depress button "C" and the time digits are displayed.

- Depress button "D" in all functions to activate the illuminating light.



1. How to set the time and calendar

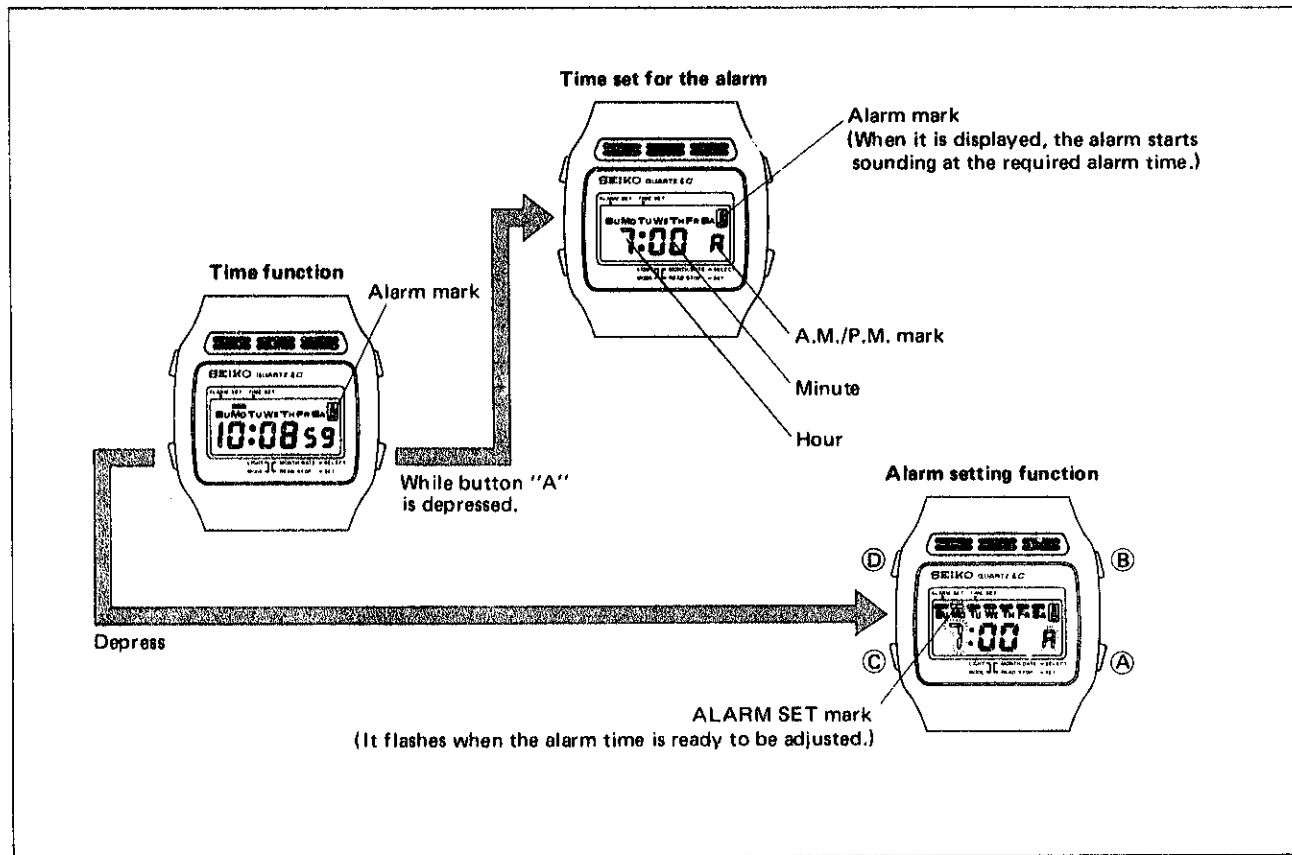


Example: The illustrations show that the indication of 10:08:42 A.M., Monday, December 6 is changed into 7:00:00 P.M., Wednesday, August 10.

Digits to be adjusted	Button operation	
	SELECT (Select the digits to be adjusted.)	SET (Digit adjustment)
Second	Depress button "C" twice to operate the time and calendar setting function.	One digit (flashing) is advanced by each depression of button "A". The digits are automatically advanced by depressing and holding button "A" for one or two seconds.
Minute		Depress button "A" in accordance with "00" second of a time signal and the seconds are then reset to "00" and start immediately.*
Hour		Depress button "A" in accordance with "00" second of a time signal and the seconds are then reset to "00" and start immediately.*
Hour	A.M. or P.M. mark is displayed.	While setting the hours, be sure that the time setting is made with the A.M. or P.M. period appropriately displayed. This will ensure the calendar changing at midnight.
Date	Calendar digits are displayed.	
Month		
Day		After the time and calendar setting are completed, depress button "C" to display the time function. Remarks: if button "B" is depressed after the day digits are set, the second digits start flashing again thus beginning the entire procedure again.

* When the seconds count any numbers from "00" to "29", the seconds are reset to "00" automatically whenever button "A" is depressed. When the seconds count any numbers from "30" to "59" and button "A" is depressed, one minute is added and the seconds are immediately reset to "00".

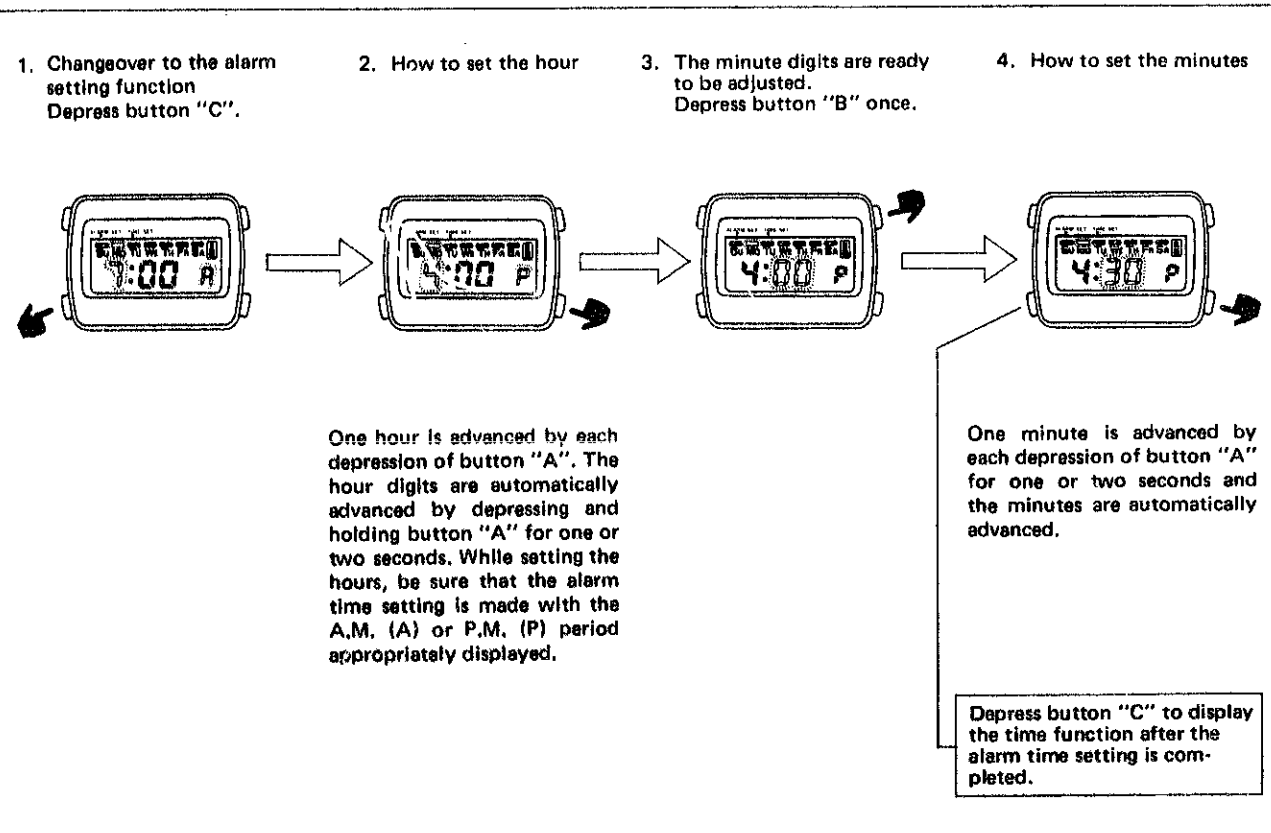
2. How to use the alarm



(1) How to set the alarm time

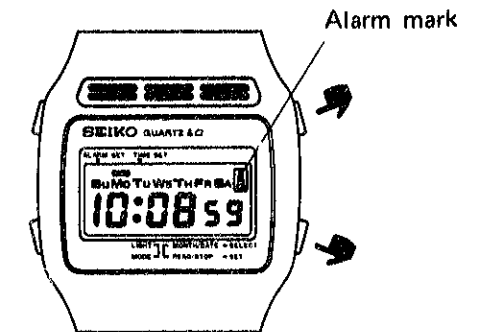
(The alarm mark is displayed when the alarm time is set.)

Example: How to change the alarm time from 7:00 A.M. to 4:30 P.M.



(2) How to test the alarm

Depress buttons "A" and "B" at the same time in the time function and the alarm will ring. And the alarm mark is displayed and extinguished by each depression. Be sure to check if the alarm is in the original condition after the alarm test.



(3) How to stop the alarm

1. When the alarm is sounding.



The alarm sounds up to one minute and it is stopped by depressing button "A" in the time function.

2. When the alarm is not required.

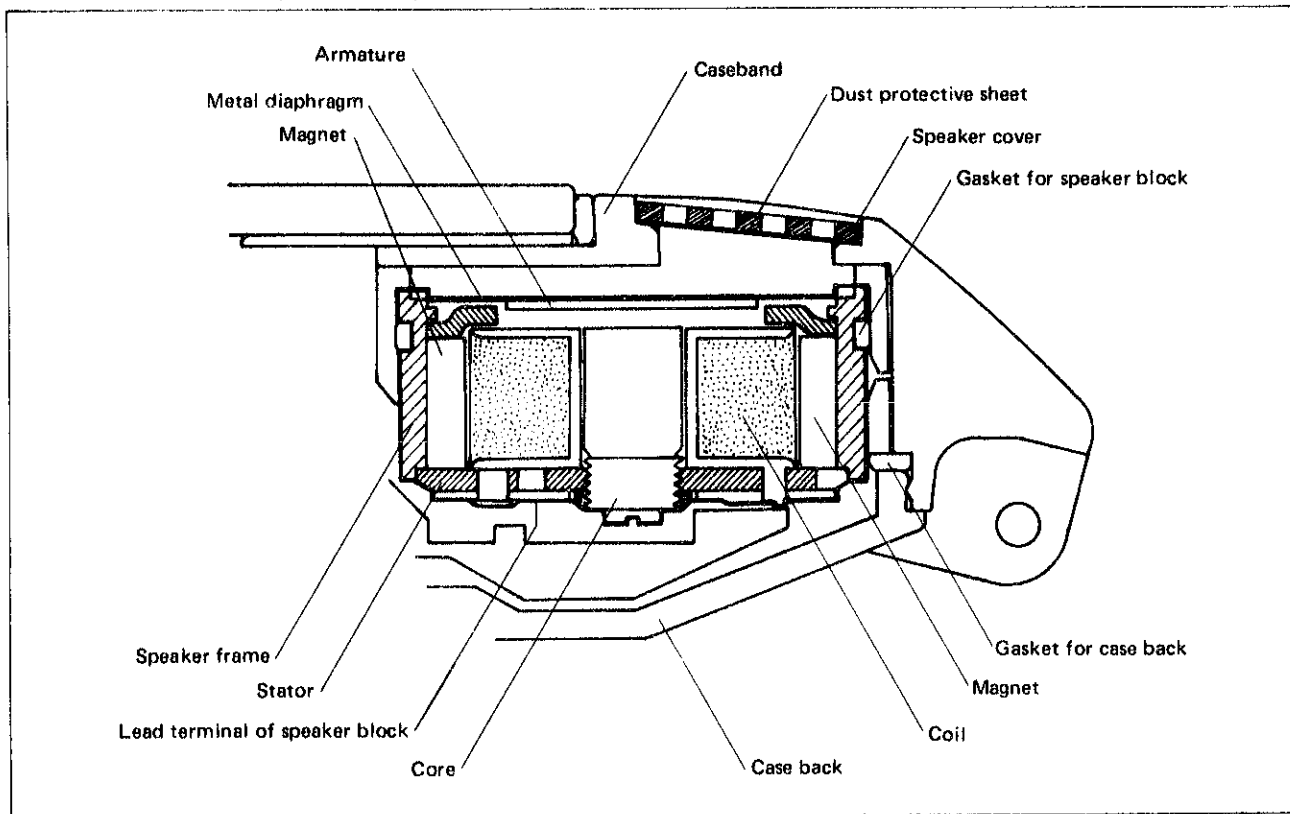


Depress buttons "A" & "B" at the same time in the time function and the alarm mark is extinguished. (The alarm test function is operated and the alarm starts sounding.) Then the alarm will not sound at the required alarm time. If the button "A" is depressed, however, the alarm time which was previously set before buttons "A" and "B" were depressed to extinguish the alarm mark, will continue to be displayed as it is memorized by the alarm memory circuit. When the same alarm time is desired depress buttons "A" and "B" together once again (the alarm starts sounding) and the alarm mark will be displayed and the alarm will sound at the required time.

III. SPEAKER MECHANISM AND ITS WORKING PRINCIPLE

1. Speaker mechanism

The speaker for SEIKO Digital Alarm Chronograph Cal. A133A has been specially developed by SEIKO for use in SEIKO alarm wrist watches. It is an ultra-small speaker characterized by excellent durability in shock and humidity, with low current consumption and high efficiency, all of which are vital to the speaker for a wrist watch.

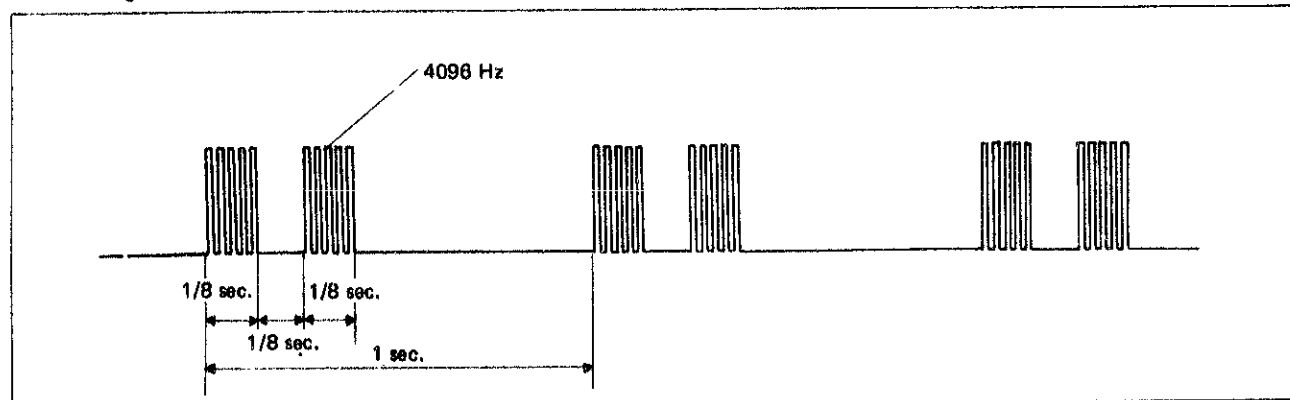


2. Sounding principle of the speaker

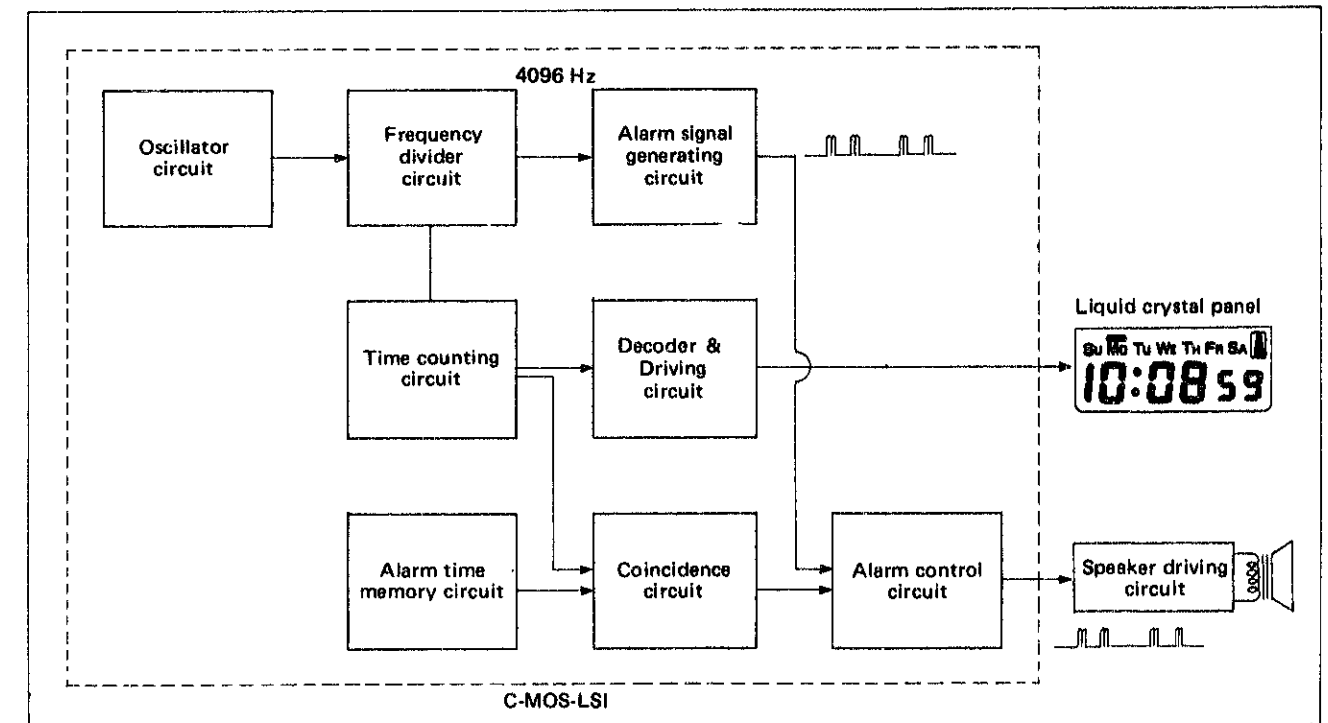
1. C-MOS-LSI transmits a 4096 Hz signal to the speaker coil.
2. The alternative magnetic field of 4096 Hz is generated in the speaker coil.
3. Accordingly, the core of the coil becomes magnetized with the same oscillation frequency and draws the armature.
4. As the armature is combined with the vibrating plate, the vibrating plate also vibrates with the same oscillation frequency and produces a sound.

As the resonance point of the speaker is 4096 Hz, the same as that of driving signal, enough volume of sound can be produced even if the current consumption is very low.

The signal transmitted to the speaker from the C-MOS-LSI is as shown in the illustration below.



3. Working principle of the alarm circuit



- (1) The alarm time memory circuit memorizes the time set for the alarm.
- (2) The coincidence circuit checks the time in the time counting circuit with the time set for the alarm memorized by the alarm time memory circuit to see if both times coincide with each other.
- (3) The alarm signal generating circuit transforms the signal received from the frequency divider circuit, into the signal shown in the illustration on the previous page.
- (4) The alarm control circuit decides whether to operate the speaker or not according to the output from the coincidence circuit. Also, it is the control circuit that starts or stops the alarm. The output of the control circuit during alarm operation takes the pattern shown in the illustration on the previous page.
- (5) The speaker driving circuit amplifies the signal received from the alarm control circuit and operates the speaker.

IV. DISASSEMBLING AND REASSEMBLING

1. Disassembling and reassembling of the case

Disassembling procedures Figs.: ① - ⑦

① - ⑦

Reassembling procedures Figs.: ⑦ - ①

⑦ - ①

Lubricating:

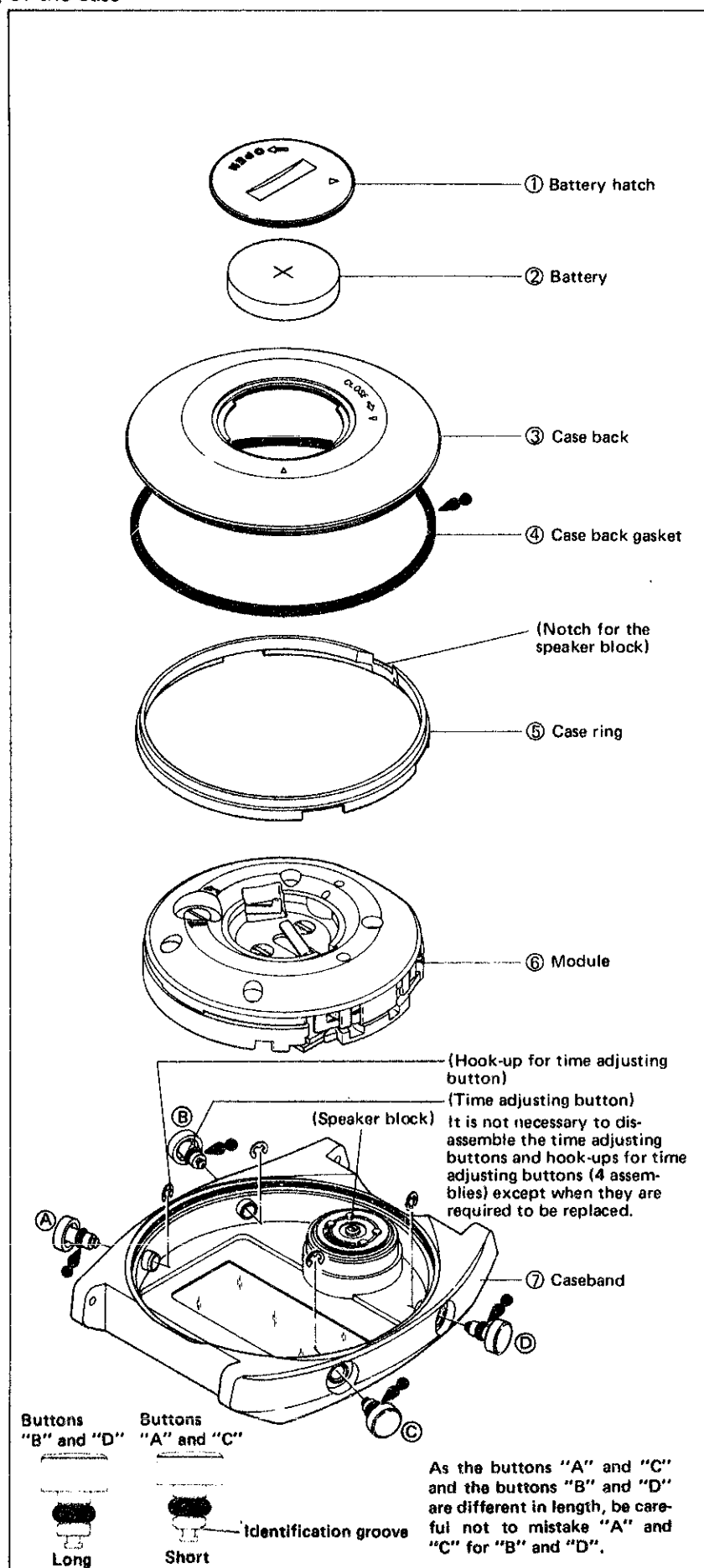
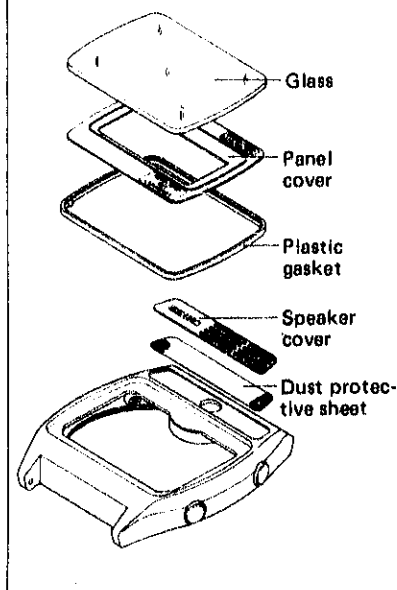
Silicon grease 500,000 c.s.

Normal quantity ●

Example: A133 - 5009

Glass and speaker portions

It is not necessary to disassemble the glass and the speaker cover except when they are required to be replaced.



Remarks for disassembling and reassembling

③ Case back

Note for disassembling

- Use the case opener with a narrow tip for easy opening of the case back.

Note for reassembling

- Reassemble the case back by using an inserting disk whose outside diameter matches that of the case back.

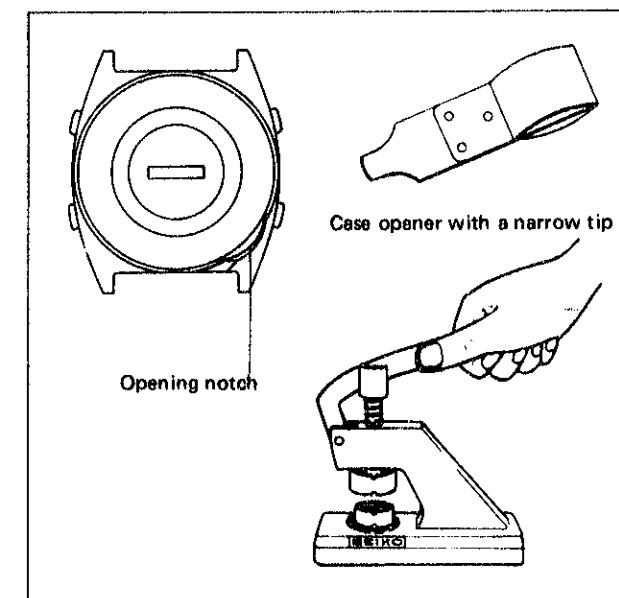
Depress the brim of the case back.

Inserting disk: $\phi 29.0$ or

$\phi 29.5$ mm

Supporting disk: Plastic supporting disk (S-173)

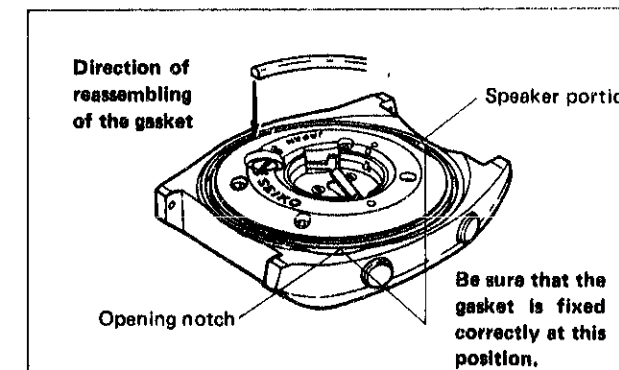
- Before reassembling, place the case in such a way that its center comes under the center of the inserting disk.



④ Case back gasket

Note for reassembling

- Be sure to reassemble the case back gasket firmly.
- Make sure specially that the gasket is fixed correctly at the opening notch and the speaker portions.



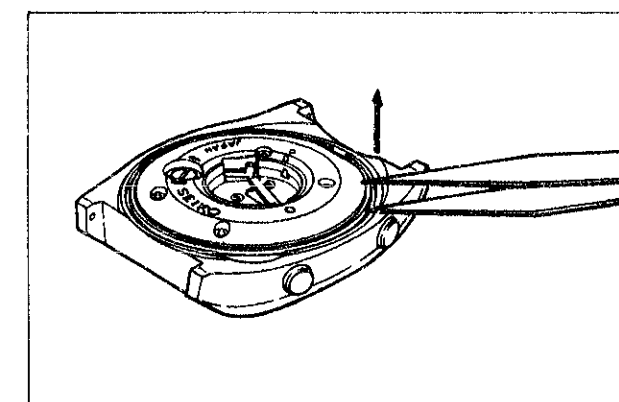
⑤ Case ring

Note for disassembling

- Pry up the case ring with tweezers as shown in the illustration on the right.
- The module is disassembled together with the case ring.

Note for reassembling

- Reassemble the case ring in such a way that the notch of the speaker block comes to the speaker block and that the notch of the button pipes come to the button portions.
- Be careful not to depress any button before reassembling the case back.



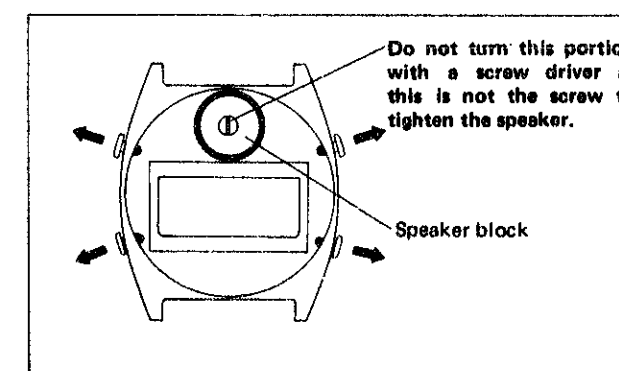
⑦ Caseband

Note for disassembling

- The speaker block is set in the caseband. (See page 13 for disassembling procedures.)

Note for reassembling

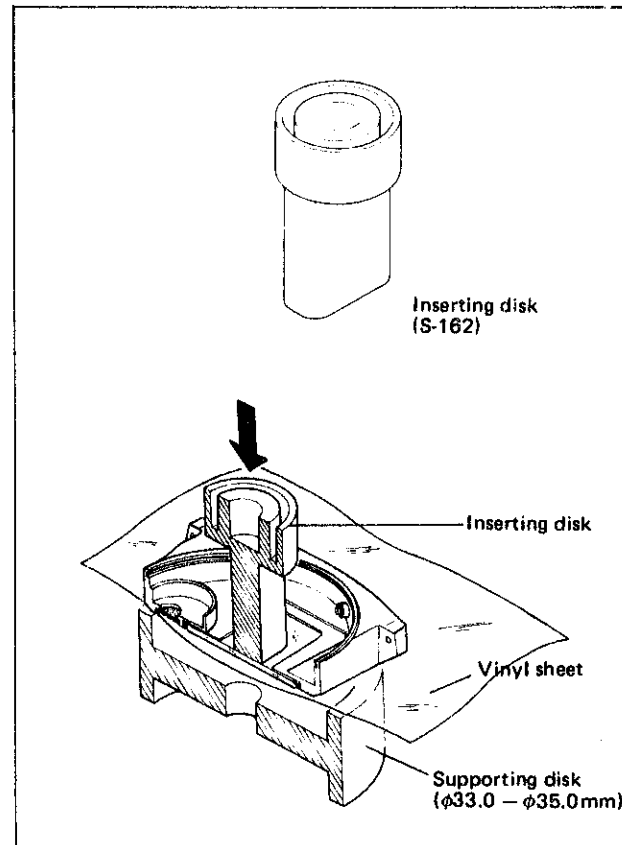
- Before reassembling the module, pull out all buttons so that the switch spring does not prevent the module from being reassembled. (Push the buttons from the inside with the tips of tweezers.)



How to replace the glass
 (Do not disassemble the glass except when the replacement of the glass and the panel cover is necessary.)

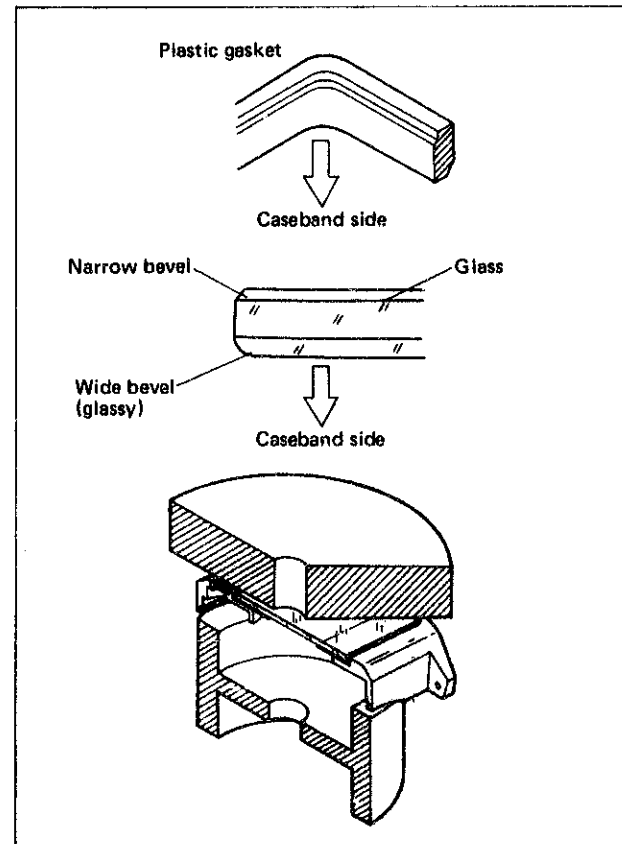
● **Disassembling of the glass**

- Use the tightening tool S-220 to disassemble the glass.
 Inserting disk: S-162
 Supporting disk: $\phi 33.0 \sim \phi 35.0$ mm
- Place a vinyl sheet between the glass and the supporting disk as shown in the illustration.
- Push down the handle of the tightening tool S-220 slowly so that the panel cover is not pushed together.



● **Reassembling of the glass**

- Set the plastic gasket**
 - Be sure to replace the plastic gasket with a new one.
 - Be careful not to mistake the upper side for the lower side.
- Reassemble the panel cover**
 - Be sure to set the back side of the panel cover in position of the caseband firmly.
 - Make sure that the space between the caseband and the edge of the panel cover is uniform in width.
- Place the glass**
 - Be careful not to mistake the upper side for the lower side.
- Fix the glass (use S-220)**
 - Inserting disk: Plastic supporting disk (S-173)
 - Supporting disk: $\phi 28.0$ mm or $\phi 28.5$ mm

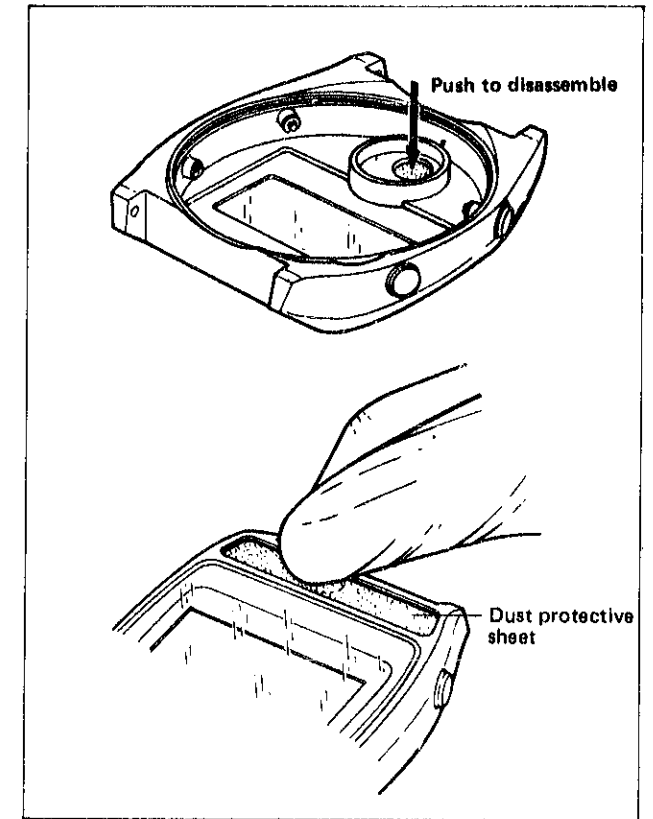


How to replace the speaker cover

The speaker cover and the dust protective sheet are attached by an adhesive to the caseband. It is not necessary to disassemble the speaker cover and the dust protective sheet except when they are required to be replaced. But be sure to replace the dust protective sheet with a new one when replacing the speaker cover.

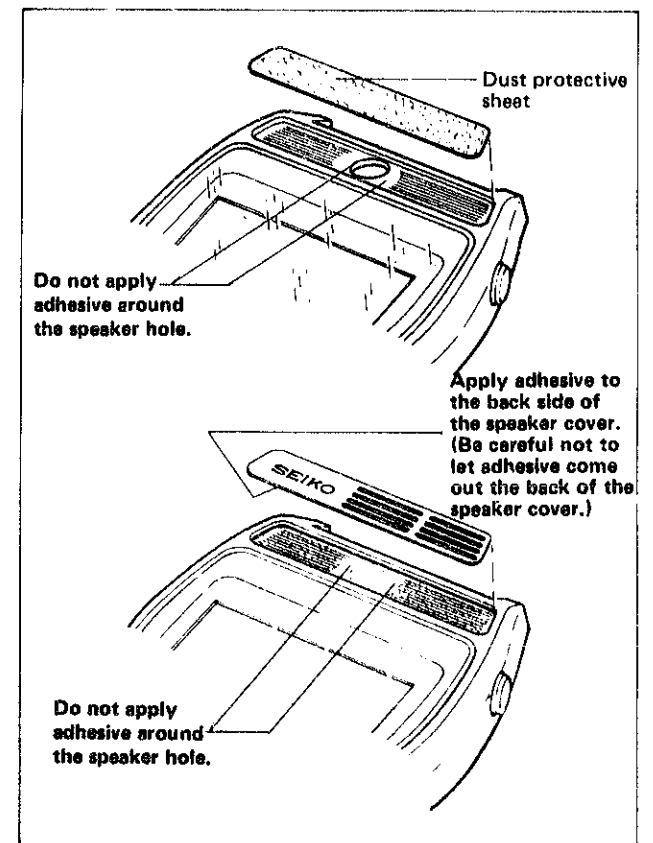
● **Disassembling of the speaker cover**

- Disassemble the speaker**
 (See page 13 for the disassembling procedures of the speaker.)
- Disassemble the speaker cover by pushing it through the speaker hole inside the caseband.**
 (Use the stake of the staking tool for disassembling.)
- Remove the dust protective sheet attached to the caseband with a cloth moistened with alcohol.**
 Remove the adhesive on the caseband by the tip of a large screw driver if it is difficult to remove it with a cloth moistened with alcohol.



● **Reassembling of the speaker cover**

- Apply adhesive to the speaker cover portion of the caseband.** (Do not use instant adhesive.)
 Be careful not to apply adhesive to the areas close around the speaker hole.
- Stick the dust protective sheet on to the caseband.**
- Apply adhesive over the dust protective sheet attached to the caseband.**
 Be careful not to apply adhesive to the areas close around the speaker hole.
- Apply adhesive to the back side of the speaker cover,** while making sure not to apply it around the speaker hole. Be careful not to let adhesive come out the back of the speaker cover.
- Stick the speaker cover on to the caseband.** Fix the speaker cover by holding it with a clip.



2. Disassembling and reassembling of the module

Disassembling procedures Figs.:

① - ⑩

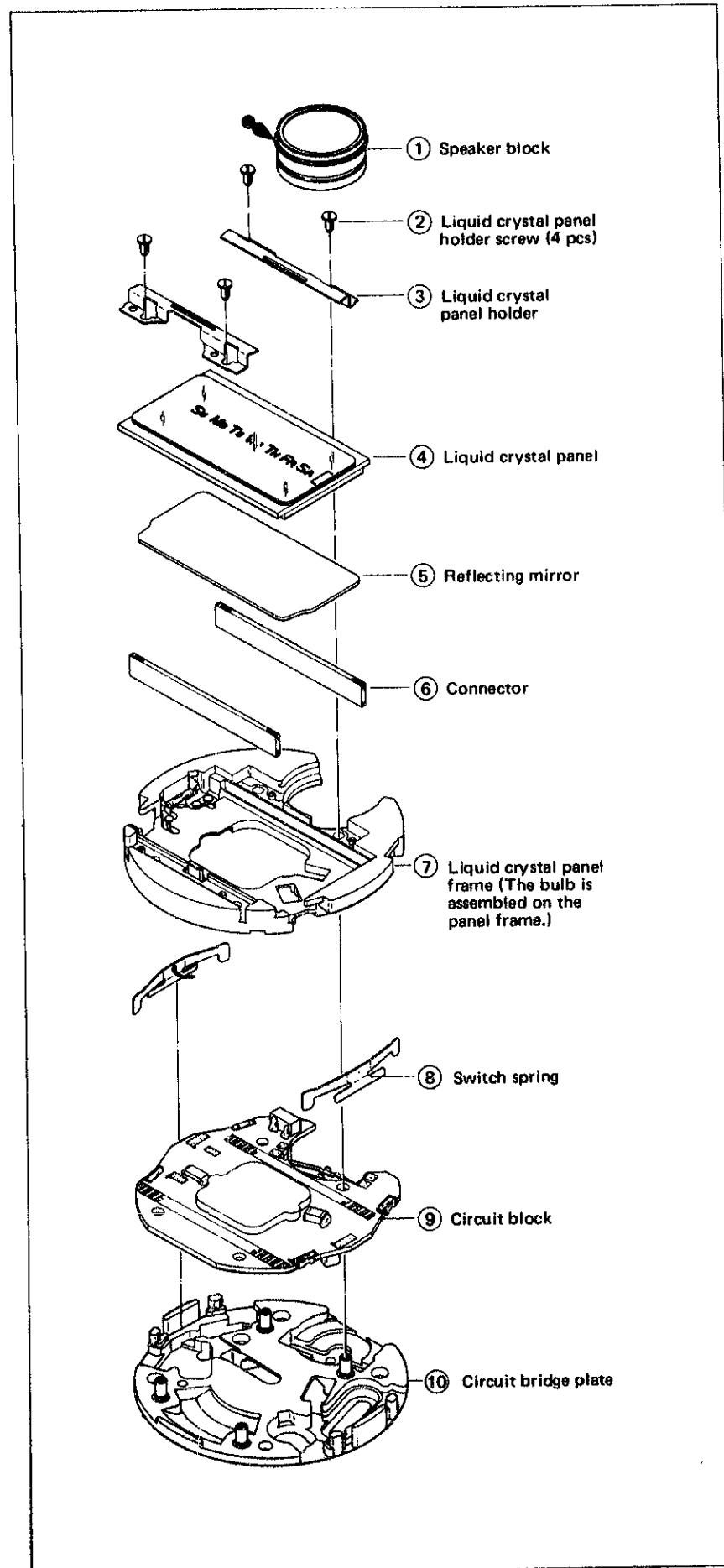
Reassembling procedures Figs.:

⑩ - ①

Lubricating:

Silicon grease 500,000 c.s.

Normal quantity 

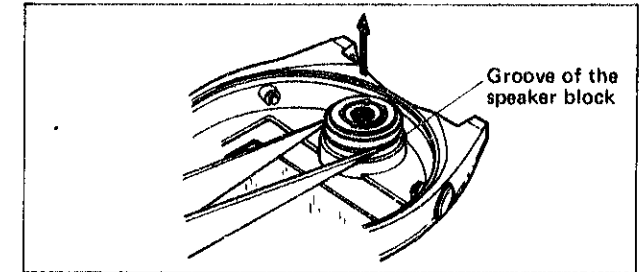


Remarks for disassembling and reassembling

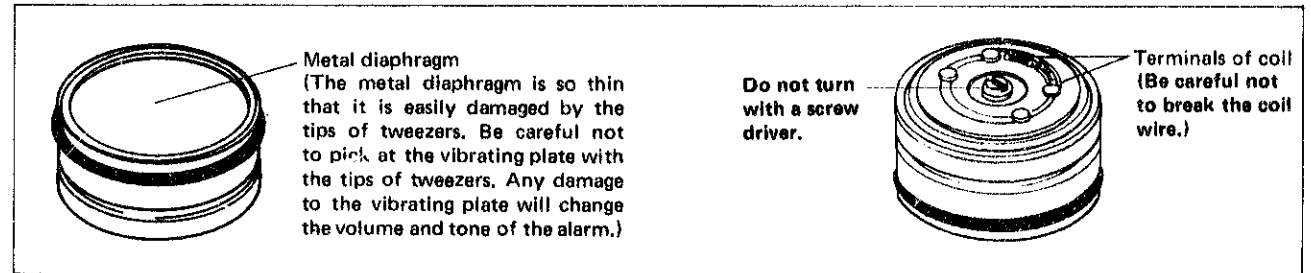
① Speaker block

Note for disassembling

- Hold the speaker block at its groove by the tips of the tweezers and pull out the speaker block from the caseband as shown in the illustration.
- Or pry out the speaker block by pushing up on its outer edge evenly with a tip of a screw driver.



Note for handling



⑤ Reflecting mirror

Note for disassembling and reassembling

- Be careful not to scratch or contaminate the reflecting mirror.

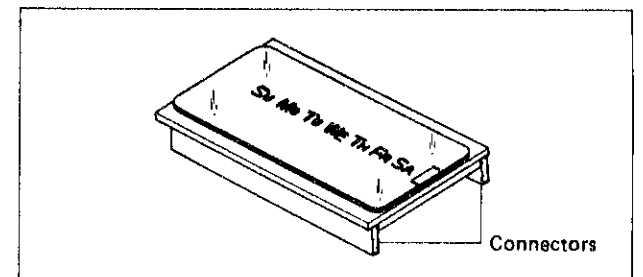
⑥ Connector

Note for disassembling

- The connectors may be disassembled together with the liquid crystal panel.

Note for disassembling and reassembling

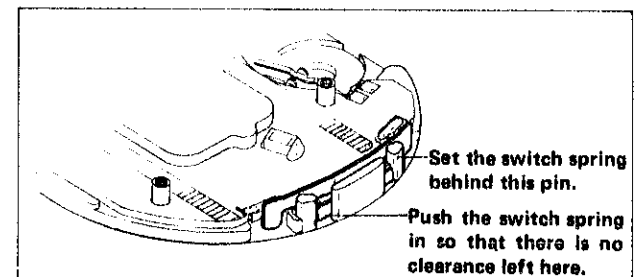
- Although two connectors are used, there is no difference between the two.
- Be careful not to scratch the connectors with tweezers.



⑧ Switch spring

Note for reassembling

- Set the switch spring vertically in its position.





⑨ Circuit block

Note for disassembling and reassembling

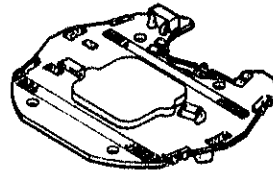
- Be careful not to touch the electronic parts except when necessary.

3. Cleaning

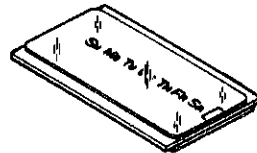
1) HOW TO CLEAN

Name of parts	Cleaning	Drying	Solution	Remarks
Connector 	Rinse	Cool air	Alcohol	Be sure to reassemble after drying thoroughly. Do not use benzine or trichloroethylene.
Circuit bridge plate 	Rinse or clean with a brush.	Cool air	Alcohol	Do not use a solution other than alcohol
Other parts (Switch spring, liquid crystal panel holder, liquid crystal panel holder screw)	Clean or rinse with a cleaner or a brush.	Cool or hot air	Trichloroethylene, benzine or alcohol	

2) PARTS THAT MUST NOT BE CLEANED



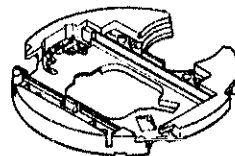
Circuit block



Liquid crystal panel



Reflecting mirror



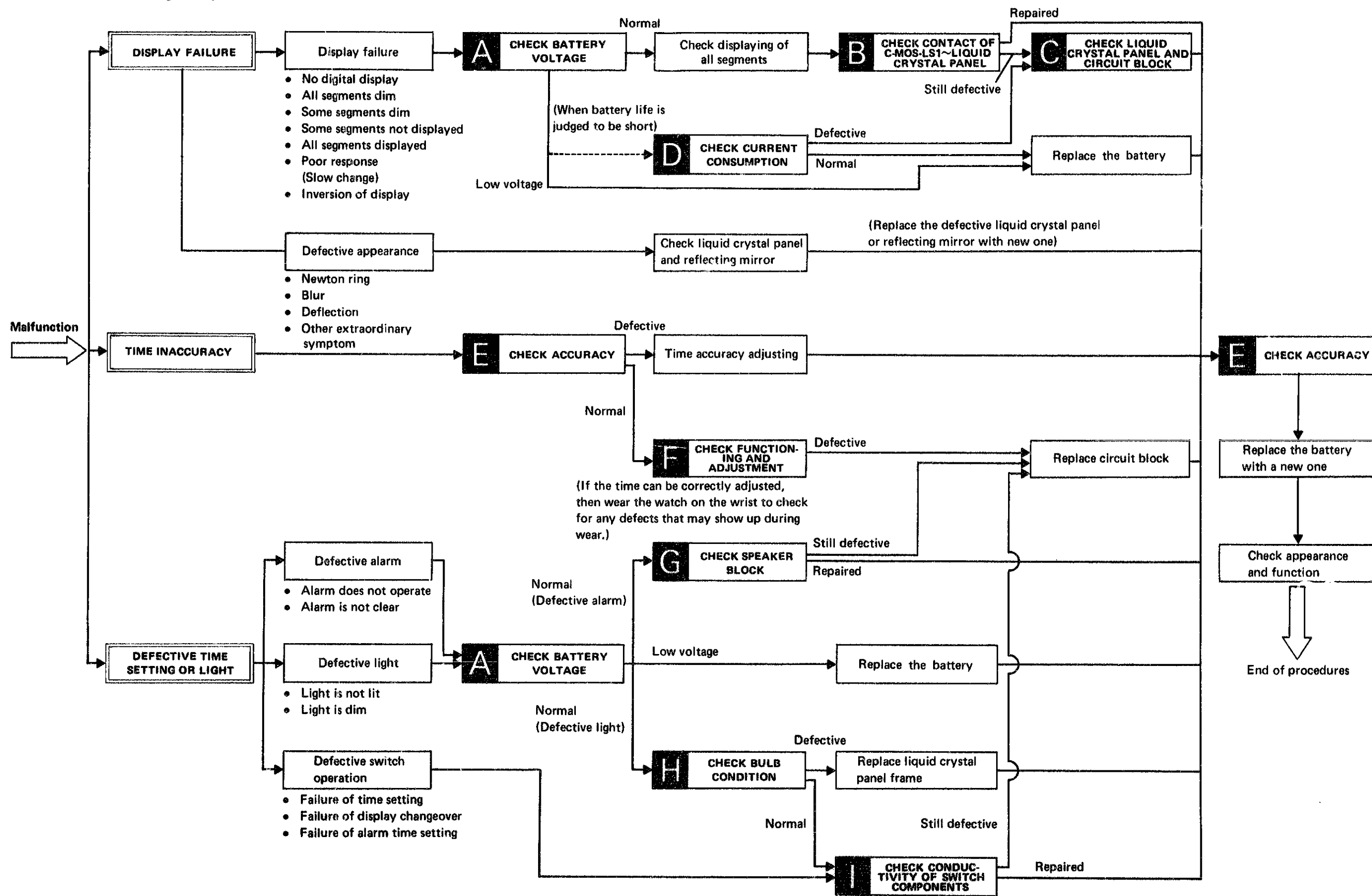
Liquid crystal panel frame (with bulb)



Speaker block

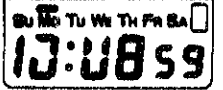



- Wipe dust and lint off with a soft brush.
- Be sure to clean only stains on the electrodes of the liquid crystal panel and the metal diaphragm of the speaker block with a cloth moistened with benzine or alcohol. (Be sure to remove the gasket for the speaker block before cleaning.)

1. Guide table for checking and adjustment



2. Malfunction and checking points

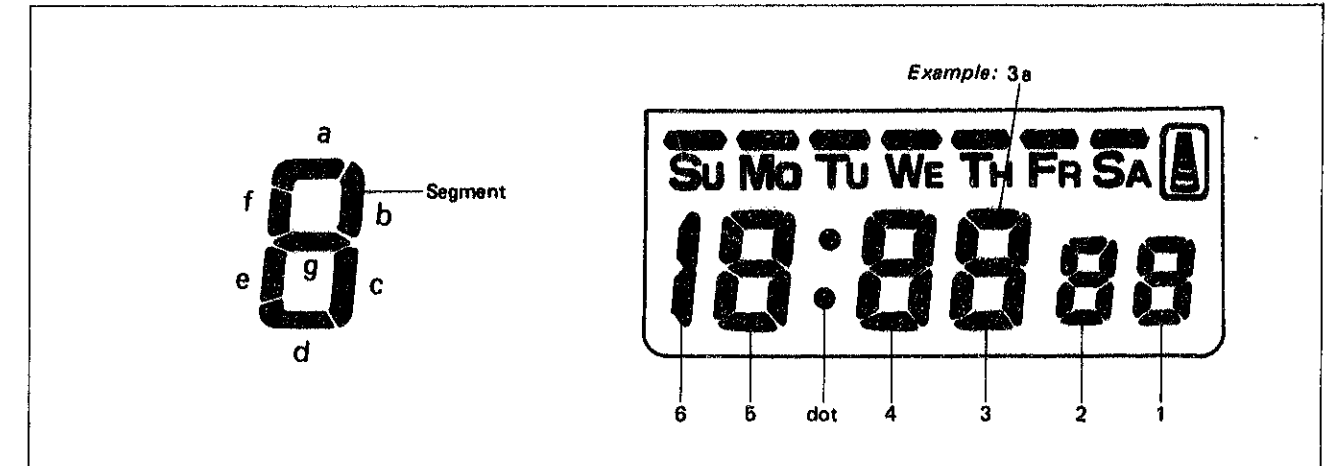
- Check in the numerical order.
- Refer to "Guide table for checking and adjustment" on page 15.

FAULTY SYMPTOMS		CHECKING POINTS									
		A		B	C			F	G	H	I
		Battery voltage	Check pattern segment checking system	Contact of C-MOS-LSI~ liquid crystal panel	Liquid crystal panel	Circuit block	Time accuracy adjusting	Functioning and adjustment	Speaker block	Bulb	Switch components
DISPLAY FAILURE	No digital display, dim digital display or extremely slow response.	①		②	③	④					
	All segments displayed.			①	②	③					
	Some segments not displayed.  Inversion of display. 		①	②	③	④					
	(Deflection) Some or all of one segment do not show clearly depending on the direction of view.  (Poor appearance) Some portions of the liquid crystal panel will have air bubbles or iridescent view. 				①						
TIME INACCURACY	Gain or loss tested by Quartz tester.						①				
	Though Quartz Tester indicates the normal accuracy, the watch gains or loses when it is worn on the wrist.							①			
DEFECTIVE ALARM, LIGHT OR TIME AND CALENDAR SETTING	Alarm does not operate or alarm operates but is not clear.	①							②		
	Light is not lit or light is lit but dims soon.	①								②	③
	Failure of time setting, display changeover or alarm time setting.										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.

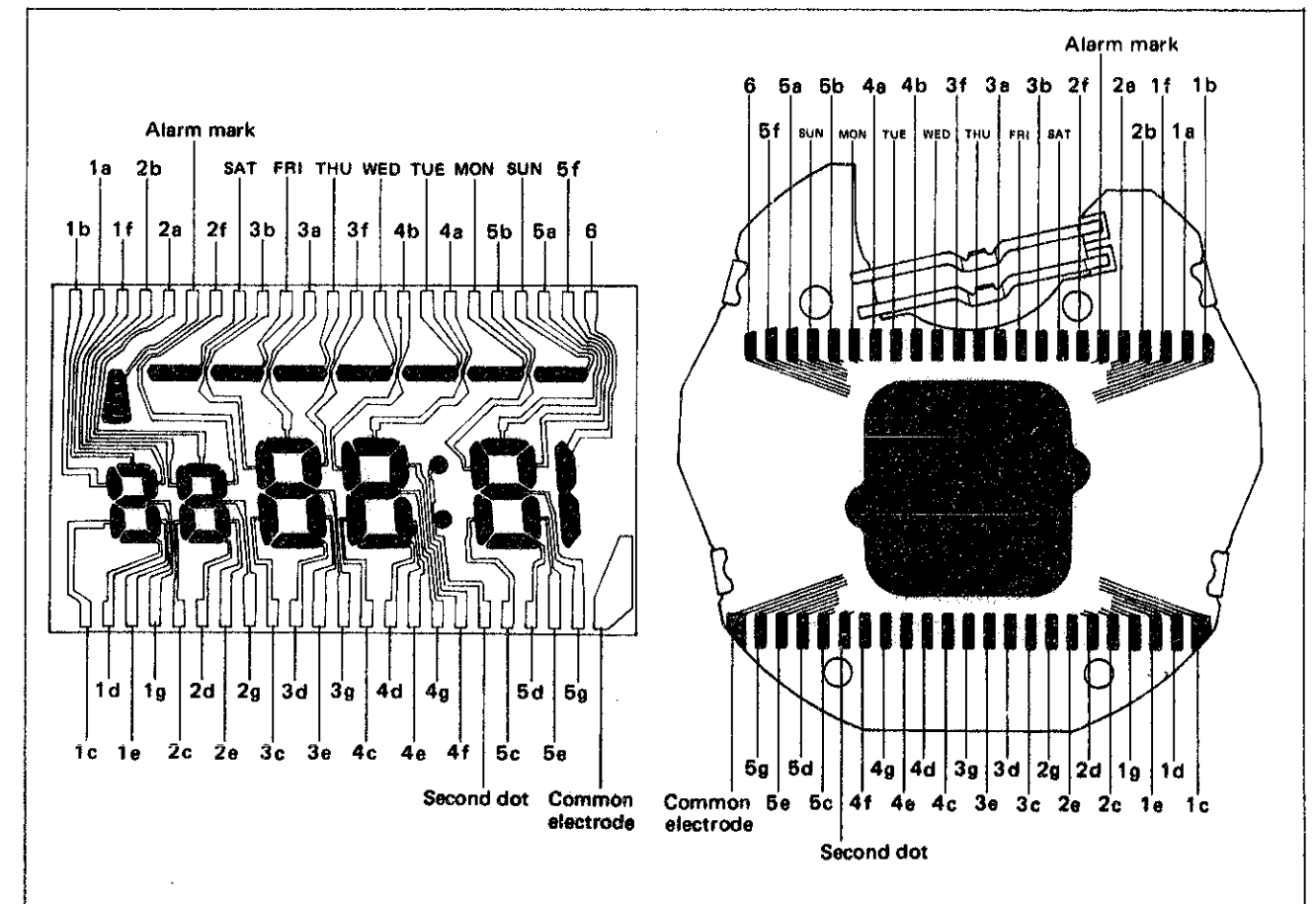
• Identification of segment



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

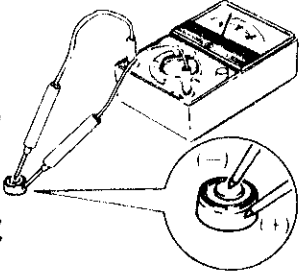
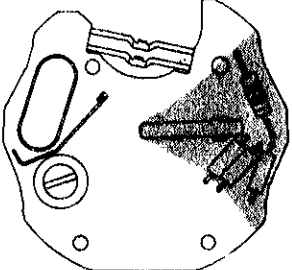
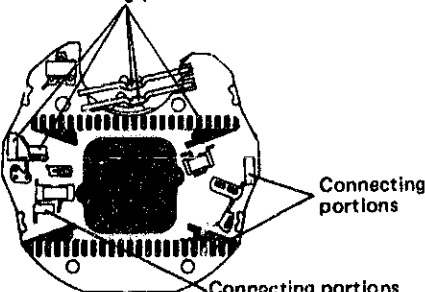
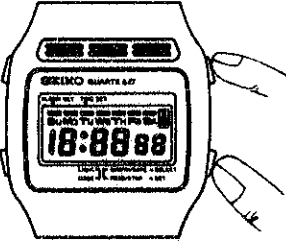
The liquid crystal panel electrode is connected electrically with each segment which forms a digital figure as shown in the illustration of the panel pattern below. (The panel pattern can be seen if the panel is slightly tilted and looked at in an angular position.)

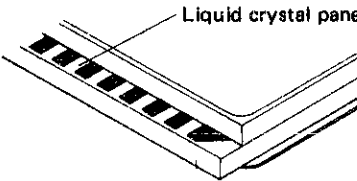
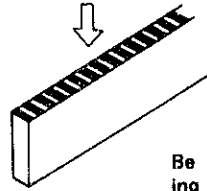
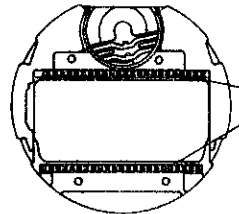
Also, the liquid crystal panel electrode is connected electrically with the C-MOS-LSI output terminal by the connector.

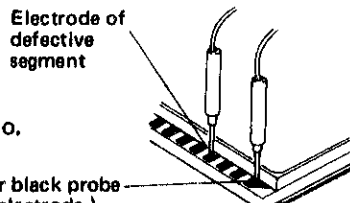
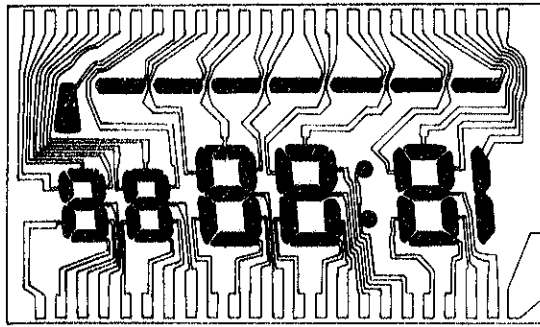
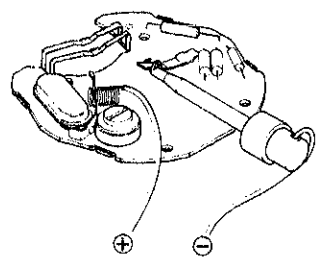
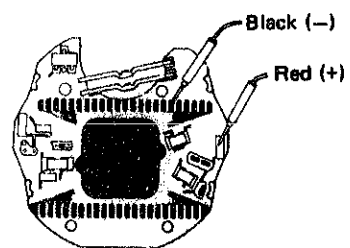


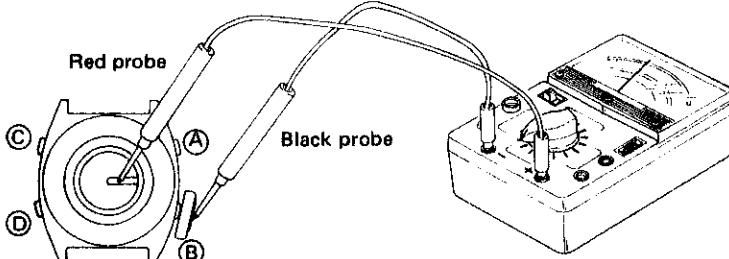
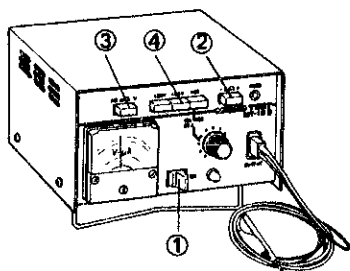
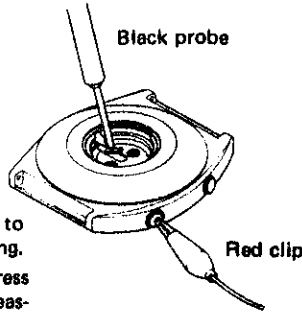
Note: Poor conductivity of the common electrode causes the lighting of all segments or inversion of the display.

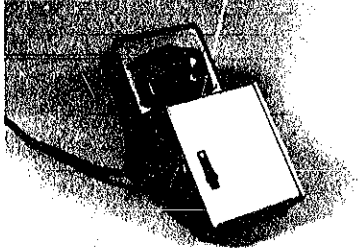
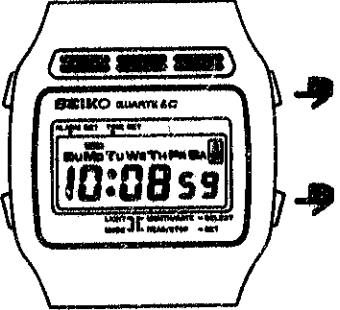
4. Procedures for checking and adjustment

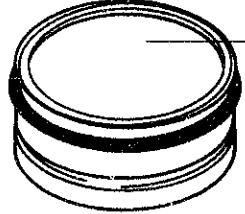
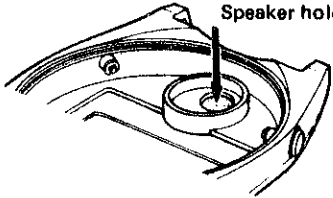
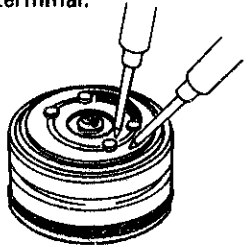
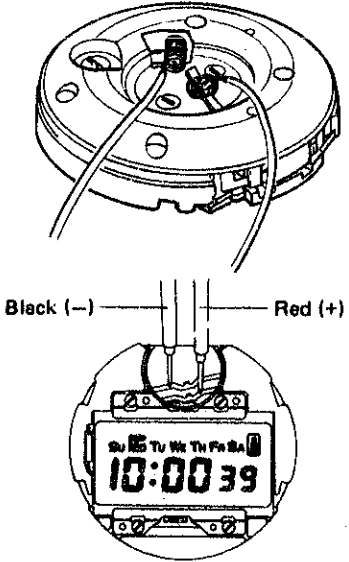
	Procedure	Result
A CHECK BATTERY VOLTAGE	<p>Use the following procedures to check battery voltage</p> <p>(1) Set up the volt-ohm-meter Range to be used: DC3V</p> <p>(2) Measuring Probe Red (+) . . . Battery surface (+) Probe Black (-) . . . Battery surface (-)</p>  <p>When there is battery electrolyte leakage, refer to "HOW TO CHECK BATTERY ELECTROLYTE LEAKAGE AND REPAIR" below for repairing.</p>	<p>More than 1.5V Normal Less than 1.5V Defective</p>
B HOW TO CHECK BATTERY ELECTROLYTE LEAKAGE AND REPAIR	<p>(1) Remove the module from the case.</p> <p>(2) Disassemble the module.</p> <p>(3) Wipe off battery electrolyte on the circuit block.</p> <p>1. Wipe off battery electrolyte with a cloth moistened with distilled water. If distilled water is not available, use normal tap water.</p> <p><i>Note:</i></p> <ul style="list-style-type: none"> Do not use a cloth which gives off lint such as gauze, flannel, etc. Do not expose the trimmer condenser to water or alcohol, and if it is exposed, there may be a change in its condenser capacity and eventually in the time accuracy. When the circuit block is cleaned, be sure to clean the shaded portions shown below and the connecting portions.  <p>Case back side</p>  <p>Display panel side</p> <p>Connecting portions</p> <p>Connecting portions</p> <p>2. Wipe the shaded portions and the connecting portions again with a cloth moistened with alcohol. (If the cleaned portions remain wet with water, they will corrode with rust.)</p> <p>3. Dry with cool air by using a dryer.</p> <p>(4) Clean the other parts. (circuit bridge plate, switch spring, etc.)</p> <p>1. Wipe off battery electrolyte on the other parts with a soft brush moistened with distilled water. (If distilled water is not available, use normal tap water.)</p> <p>2. Rinse with alcohol.</p> <p>3. Dry with cool air by using a dryer.</p> <p>(5) Reassemble the module. Replace the battery with a new one.</p> <p>(6) Check to see if the time and calendar function, the calendar function and the current consumption are normal.</p>	<p>Proceed to B.</p>
C CHECK PATTERN SEGMENT CHECKING SYSTEM	<p>If some segments are dead or dim, change the function into the time and calendar setting functions. Then depress buttons "A" and "B" together to find the defective segments. (If there is no defective segment, all segments will be displayed.)</p> 	<p>Proceed to B.</p>

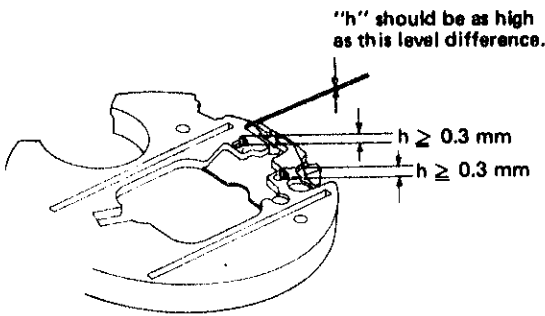
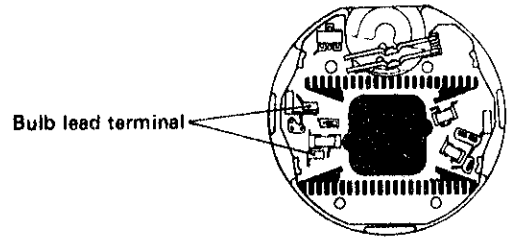
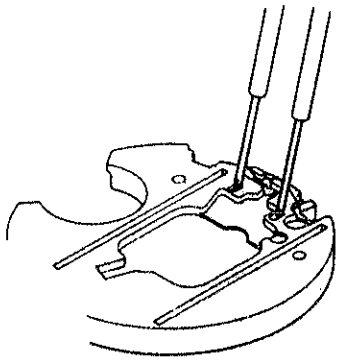
	Procedure	Result
B CHECK CONTACT OF C-MOS-LSI~LIQUID CRYSTAL PANEL	<p>After removing the liquid crystal panel, check for poor conductivity of the liquid crystal panel, connector and C-MOS-LSI output terminal whose segments are found to be defective in "CHECK PATTERN SEGMENT CHECKING SYSTEM". (Refer to "Relationship between the segment and the C-MOS-LSI output terminal" on page 17.) Use a microscope for checking.</p> <p>(1) Check for dust, lint and other contamination on the liquid crystal panel electrode.</p>  <p>Liquid crystal panel electrode</p> <p>(2) Check for any contamination, scratch, crack and break of the connector.</p>  <p>Be sure to check the connecting portion of the liquid crystal panel and the circuit block carefully.</p> <p>(3) Check for dust, lint and other contamination on the output terminal of the circuit block.</p>  <p>Output terminal of the circuit block</p>	<p>Uncontaminated: Normal Proceed to B (2).</p> <p>Contaminated: Defective Wipe off any foreign matter.</p> <p>No contamination, scratch, crack or break: Normal Proceed to B (3).</p> <p>Contaminated: Defective Cleaning (See page 14)</p> <p>Scratched, cracked or broken: Defective Replace the connector with a new one.</p> <p>Uncontaminated: Normal Proceed to C.</p> <p>Contaminated: Defective Wipe off any foreign matter</p>

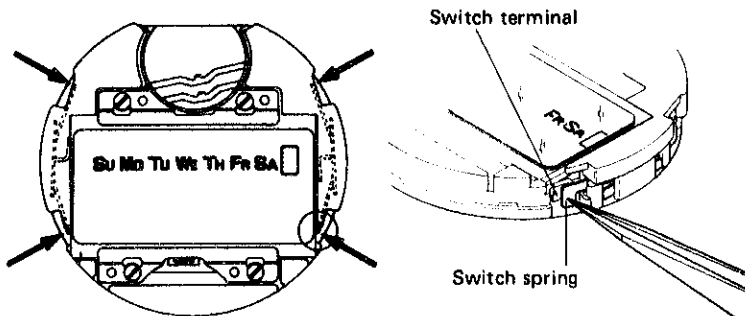
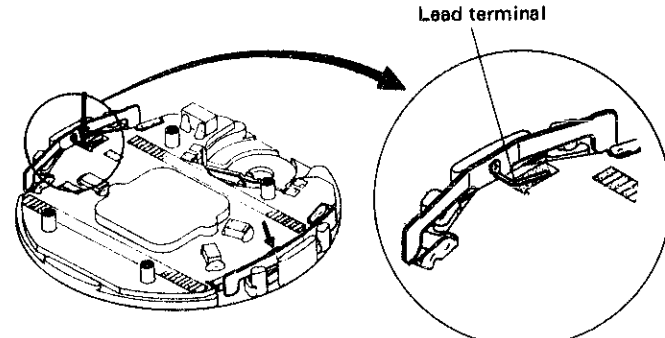
	Procedure	Result
C	<p>Check to see if the liquid crystal panel and the circuit block function correctly. (Refer to "Relationship between the segment and the C-MOS-LSI output terminal" on page 17.)</p> <p>(1) Check liquid crystal panel</p> <ol style="list-style-type: none"> 1. Set up the volt-ohm-meter Range to be used: OHMS R x 1 ~ R x 1K <p>Note:</p> <ul style="list-style-type: none"> • Any range will do if more than 3V is applied to the terminal of the volt-ohm-meter. • If the output voltage of the volt-ohm-meter is less than 3V in measuring, all segments may not be lit. If any segment does not light, change the range to the one (R x 10K) which is higher in resistance. <p>2. Remove the liquid crystal panel from the module and turn it upside down.</p> <p>3. Measuring (Check to see if the corresponding segment lights up.)</p> <p>Note: Either red or black probe will do.</p>  <p>Electrode of defective segment</p> <p>Common electrode (Either red or black probe must be applied to the common electrode.)</p> 	<p>Lights up: Normal Proceed to C (2).</p> <p>Does not light up: Defective Replace the liquid crystal panel with a new one.</p>
	<p>(2) Check the circuit block output voltage</p> <ol style="list-style-type: none"> 1. Set up the volt-ohm-meter Range to be used: DC3V 2. Attach the electricity supplier (S-833) to the circuit block. Spring (+): Plus terminal of battery connection Probe (-): Battery connection  <p>3. Measuring Probe Red (+): Connecting portions of the switch spring of the circuit block. Probe Black (-): Each portion of the output terminal of the C-MOS-LSI. (If some displays are defective, apply to the corresponding output terminals of the C-MOS-LSI.)</p>  <p>Black (-) Red (+)</p>	<p>More than 0.8V: Normal (All the terminals must be more than this range of voltage.) Return to B.</p> <p>Less than 0.8V: Defective Replace the circuit block with a new one and check to see if it functions correctly.</p>

	Procedure	Result												
D	<p>Check to see if the current consumption is normal. (Can be checked no matter which function the watch may be performing.)</p> <ul style="list-style-type: none"> • Volt-ohm-meter Range to be used: 12μA or 0.03mA Probe Red (+) : Battery connection Probe Black (-) : Battery surface (-)  <p>Red probe Black probe</p> <p>Touch the battery surface (+) to the button (except the buttons "C" and "D") for measuring. Be careful not to depress the button while measuring.</p> <ul style="list-style-type: none"> • Micro Test MT-1011 Set up the Micro Test MT-10II <table border="0"> <tr> <td>① Power switch</td> <td>: ON</td> </tr> <tr> <td>② Polarity changeover button</td> <td>: +</td> </tr> <tr> <td>③ Current consumption/ Voltage indication button</td> <td>: μA</td> </tr> <tr> <td>④ Voltage selection button</td> <td>: 1.55V</td> </tr> </table> <table border="0"> <tr> <td>Probe Black (-)</td> <td>: Battery connection</td> </tr> <tr> <td>Clip Red (+)</td> <td>: Button (except the buttons "C", "D")</td> </tr> </table>   <p>Black probe Red clip</p> <p>Apply the red clip (+) to the button for measuring. Be careful not to depress the button while measuring.</p>	① Power switch	: ON	② Polarity changeover button	: +	③ Current consumption/ Voltage indication button	: μ A	④ Voltage selection button	: 1.55V	Probe Black (-)	: Battery connection	Clip Red (+)	: Button (except the buttons "C", "D")	<p>Less than 3.5μA: Normal Replace with the battery.</p> <p>More than 3.5μA: Defective Proceed to C.</p> <p>Remarks: Be careful not to depress the button while measuring. If the pointer of Volt-ohm-meter or Micro Test MT-10II swings over the maximum value or the alarm starts sounding while measuring current consumption, follow the procedures below.</p> <ul style="list-style-type: none"> • When Volt-ohm-meter is used: Turn the switch to over 300mA position and while the probes are being applied as shown in the illustration, depress button "A" to stop the alarm. Then turn the switch to the correct range and measure current consumption. • When Micro Test MT-10II is used: Depress the Current consumption/voltage indication button to the V (μA) position, and while the black probe and the red clip are being applied as shown in the illustration, depress button "A" to stop the alarm. Then depress the current consumption/voltage indication button to the μA (μA) position for measuring current consumption.
	① Power switch	: ON												
② Polarity changeover button	: +													
③ Current consumption/ Voltage indication button	: μ A													
④ Voltage selection button	: 1.55V													
Probe Black (-)	: Battery connection													
Clip Red (+)	: Button (except the buttons "C", "D")													

	Procedure	Result
CHECK ACCURACY	<p>Check gain and loss of time.</p> <ol style="list-style-type: none"> 1. Set up the Quartz Tester. As there are several types of Quartz Testers, refer to the respective instruction manual. 2. Measuring 	<p>If the watch tends to gain or lose, proceed to Time accuracy adjusting. Time accuracy is adjusted by turning the trimmer condenser.</p>
CHECK FUNCTIONING AND ADJUSTMENT	<p>See "HOW TO USE" on page 2 to check the functioning and adjustment.</p> <ol style="list-style-type: none"> 1. Check the alarm time setting function. Set the hour and minute more than one cycle and check to see if the digits are advancing correctly. 2. Check the time and calendar setting function. Set the time and calendar digits more than one cycle for each unit and check to see if each digit is advancing correctly. 	<p>Function correctly and can be adjusted: Normal Wear the watch on the wrist to check time accuracy.</p> <p>Does not function correctly or cannot be adjusted: Defective Proceed to Replace circuit block.</p>
CHECK SPEAKER BLOCK	<p>(1) Check to see if the speaker sounds the alarm correctly. Check to see if the speaker sounds when the watch is in the time function and when the two buttons on the right side are depressed together.</p> 	<p>Speaker sounds: Normal Set the alarm time and if the alarm does not operate at the required time, proceed to Replace circuit block.</p> <p>Speaker does not sound or it sounds but not clear: Defective Proceed to (2).</p>

	Procedure	Result
CHECK SPEAKER BLOCK	<p>(2) Check for any dust and scratches on the metal diaphragm of the speaker block.</p>  <p><i>Note:</i> Check to see if the speaker hole is clogged with dust.</p>  <p>(3) Check for any broken coil wire and short-circuit of the coil of the speaker block.</p> <ol style="list-style-type: none"> 1. Set up the volt-ohm-meter Range to be used: OHMS R x 1 2. Measuring Apply the probes of the volt-ohm-meter to the lead terminal of the speaker block. <i>Note:</i> Be careful not to break the coil wire when the probes are applied to the coil terminal.  <p>(4) Check to see if the output signal of the circuit block is transmitted to operate the speaker block.</p> <ol style="list-style-type: none"> 1. Set up the volt-ohm-meter. Range to be used: DC 3V 2. Attach the electricity supplier (S-833) to the module. ● Make the alarm ready for sounding by adjusting the switch spring. 3. Measuring Apply the probes of the volt-ohm-meter to the output terminals for speaker of the circuit block as shown in the illustration on the right. Check to see if the pointer of the volt-ohm-meter swings twice every second. 	<p>No dust or scratches: Normal Proceed to (3).</p> <p>Dust: Defective Wipe off any foreign matter softly with a cloth moistened with cleaning solution. (Benzine or alcohol)</p> <p>Scratched: Defective Replace speaker block.</p> <p>Resistance: 30Ω ~ 150Ω: Normal Proceed to (4).</p> <p>Less than 30Ω or more than 150Ω: Defective Replace circuit block.</p> <p>Swings: Normal Replace speaker block.</p> <p>Does not swing: Defective Replace circuit block.</p>

	Procedure	Result
<p>I</p> <p>CHECK BULB CONDITION</p> <p>(1) Check to see if the bulb lead terminals touch the lead terminal of the circuit block.</p> <p>1. Check to see if the two bulb lead terminals protrude by more than 0.3 mm from the back side of the panel frame. And check for any dust, lint and other contamination of the bulb lead terminal.</p>  <p>2. Check for any contamination on the bulb lead terminal of the circuit block.</p>  <p>(2) Check to see if there is a broken filament in the bulb and if there is any break in the welded portion of the bulb lead terminal.</p> <p>1. Set up the volt-ohm-meter Range to be used: OHMS R x 1</p> <p>2. Measuring Apply the two probes of the volt-ohm-meter to the bulb lead terminals as shown in the illustration.</p> <p><i>Note:</i> Either red or black probe will do.</p> 	<p>Protrudes by more than 0.3 mm: Normal</p> <p>Protrudes by less than 0.3 mm: Defective</p> <p>Pull out by using tweezers.</p>	
	<p>No dust, lint or uncontaminated: Normal</p> <p>Proceed to I(2).</p> <p>Dust, lint or contaminated: Defective</p> <p>Wipe off any foreign matter.</p>	
<p>Bulb lights up: Normal</p> <p>Proceed to I.</p> <p>Bulb does not light up: Defective</p> <p>Replace panel frame.</p>		

	Procedure	Result
<p>I</p> <p>CHECK CONDUCTIVITY OF SWITCH COMPONENTS</p> <p>Check to see if the switch spring functions correctly.</p> <p>(1) Check to see if the switch springs (four arrow-marked portions shown in the illustration below) function correctly when they are pushed in.</p> <p>1. Check to see if the four arrow-marked springs touch the switch terminals of the circuit block when they are pushed in by the tips of tweezers and if they do not touch the switch terminals of the circuit block when released.</p>  <p>2. Check for dust, lint and other contamination on the contacting portions.</p> <p>(2) Check to see if the lead terminal of the switch spring touches the lead terminal of the circuit block.</p> <p>1. Check to see if the two arrow-marked portions touch correctly when the panel frame is removed.</p>  <p>2. Check for dust, lint and other contamination on the contacting portions.</p> <p>When there is battery electrolyte leakage, refer to "HOW TO CHECK BATTERY ELECTROLYTE LEAKAGE AND REPAIR" for repairing.</p> <p>All procedures of Disassembling and Reassembling, and Checking and Adjustment are completed.</p>	<p>Functions correctly: Normal</p> <p>Does not function correctly: Defective</p> <p>If the switch springs do not function correctly after the switch springs are adjusted, replace the switch springs with new ones.</p>	
	<p>No dust, lint or uncontaminated: Normal</p> <p>Proceed to I(2).</p> <p>Dust, lint or contaminated: Defective</p> <p>Wipe off any foreign matter.</p>	
<p>Touch: Normal</p> <p>Do not touch: Defective</p> <p>Adjust by using tweezers so that the lead terminal of the panel frame touches the lead terminal.</p> <p>No dust, lint or uncontaminated: Normal</p> <p>Replace circuit block.</p> <p>Dust, lint or contaminated: Defective</p> <p>Wipe off any foreign matter.</p>		