TECHNICAL GUIDE
AND
PARTS LIST

CAL. Y750A (Y740A)
CAL. Y756A (Y746A)
CAL. Y759A (Y749A)

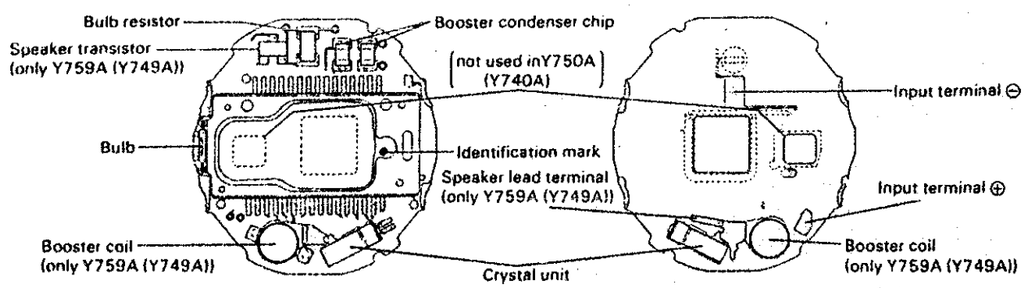
DIGITAL QUARTZ

CONTENTS

I. SPECIFICATIONS

Item \ Cal. No.	Y750A (Y740A)	Y756A (Y746A)	Y759A (Y749A)
Display medium	Nematic Liquid Crystal, FEM (Field Effect Mode)		
Liquid Crystal Panel Drive system	Multiplex		
Display system	• Time function • Time and calendar adjusting function • Electronic regulation function	• Time function • Time memory function • Function mode Stopwatch display Dual zone timer display Counter display Numerical memory display Random numbers display • Time and calendar adjusting function • Electronic regulation function	• Time function • Alarm function • Function mode Stopwatch display Dual zone timer display Counter display Numerical memory display Random numbers display • Time and calendar adjusting function • Electronic regulation function
Additional mechanism	• Pattern segment checking system • Illuminating light	• Pattern segment checking system • Illuminating light	• Pattern segment checking system • Illuminating light • Time signal • Sound demonstration
Loss/gain	Mean monthly rate at normal temperature: Less than 15 seconds		
Casing diameter	ϕ27.1 mm		
Height	5.0 mm (including battery)		
Regulation system	Logical regulation		
Measuring gate	10 seconds (calculation necessary)		
Battery	Lithium battery: Matsushita BR2016 Voltage: 3.0V Life: Approx. 5 years		

II. CIRCUIT BLOCK SCHEMATIC

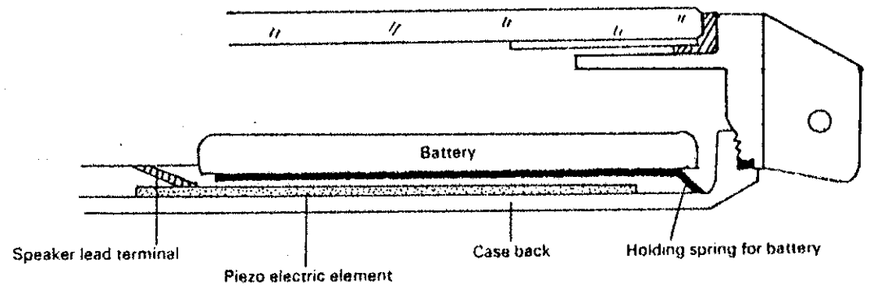


Y750A ..... Brown ID mark, Y740A ..... Black ID mark
Y756A ..... White ID mark, Y746A ..... Without ID mark or with blue ID mark
Y759A ..... White ID mark (with speaker transistor, speaker lead terminal and booster coil)
Y749A ..... Without ID mark (with speaker transistor, speaker lead terminal and booster coil)

III. PIEZO ELECTRIC SPEAKER

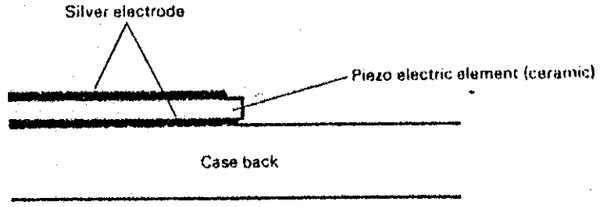
- The alarm of the Y759 is a piezo electric speaker system using a piezo electric element which differs from an electromagnetic system.
  When a voltage is applied to the piezo electric element on the case back, mechanical distortion occurs in the element, as well as in the quartz oscillator. The distortion is transferred to the case back which vibrates to generate sound.

<Construction of Y759A (Y749A) casing>



- The piezo electric element is ceramic. Electrodes are attached to both sides of the element which is fixed to the case back.

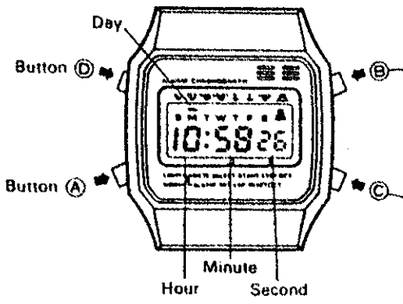
<Construction of piezo electric element>



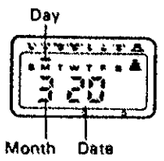
NOTES ON HANDLING
If the piezo electric element is peeled off the case back or cracked, or if the booster coil wire is broken or the speaker lead terminal is bent, speaker sound will be adversely affected. Take care in handling during disassembly and reassembly. When cleaning the case back, do not scratch the piezo electric element.

IV. DISPLAY FUNCTION

- Time display (Y750 (Y740), Y756 (Y746), Y759 (Y749))



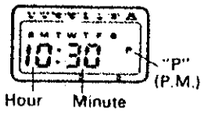
- Calendar display (Y750 (Y740), Y756 (Y746), Y759 (Y749))



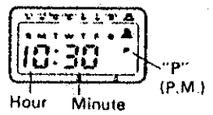
Depress button Ⓑ to set the mode for "calendar display".

Depress button Ⓒ to set the mode for "time memory display" or "alarm time display".

Time memory display
Y756 (Y746)

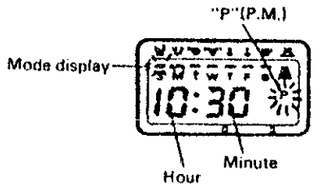


Alarm set time display
Y759 (Y749)

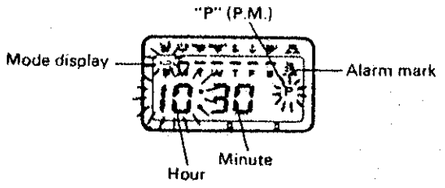


Depress button A once to set "time memory setting mode" or "alarm time setting mode".

- Time memory setting mode (Y756 (Y746))



- Alarm time setting mode (Y759 (Y749))



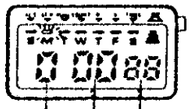
- Function mode (▭: Function selection indicator) (Y756 (Y746), Y759 (Y749))

In the time display, depressing button Ⓐ twice will select one of five functions.

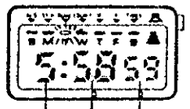
The function and function indicator are moved in the following order by depressing button Ⓑ. After selecting the desired function, depress button Ⓐ to activate the selected function.

Note:
When one of the five functions is selected, the previous function except "dual zone timer" is disengaged and the measurement or stored memory is cleared.

<Stopwatch>

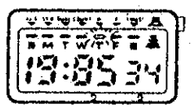


<Dual zone timer>

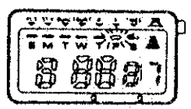


<Counter>

<Numerical memory>

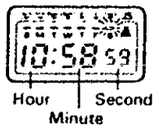


<Random numbers>



- Time and calendar setting mode (Y750 (Y740), Y756 (Y746), Y759 (Y749))

In the time display, depress button Ⓐ 3 times to set for "time and calendar setting mode".



- Electronic regulation adjusting mode Y750, Y756, Y759

1. In the time display, while depressing button Ⓑ, depress button Ⓐ for more than 1 — 2 seconds to set for "electronic regulation adjusting mode". In the electronic regulation adjusting mode, each depression of button Ⓑ will adjust the time accuracy by approximately + 1.3 second/month. Each depression of button Ⓒ will adjust it by approximately — 1.3 seconds/month.

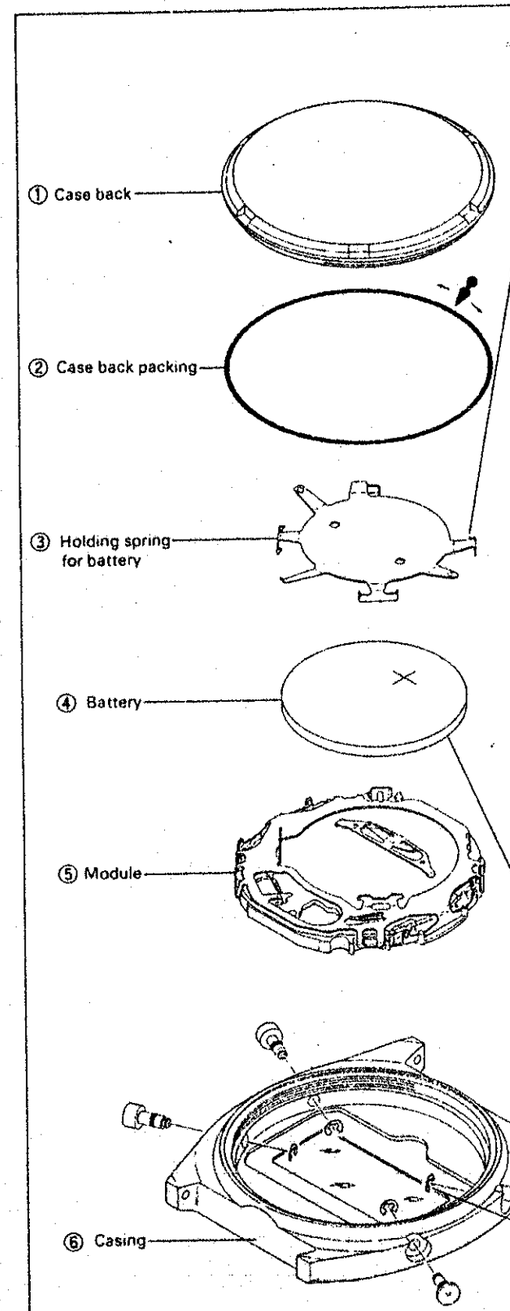
2. Y740, Y746, Y749

In the time display, depress button Ⓐ to set for "electronic regulation adjusting mode".

V. DISASSEMBLING, REASSEMBLING, LUBRICATION AND CLEANING

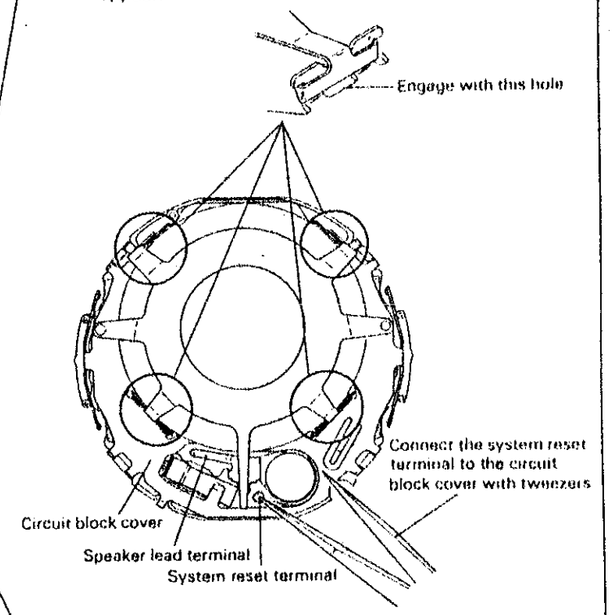
1. Disassembling, reassembling and lubrication of the case

- Disassembling procedures: Figs. ① → ⑥
- Reassembling procedures: Figs. ⑥ → ①
- Lubrication: Silicon grease (500,000 c.s.)



NOTES ON REASSEMBLY

- The holding spring for battery has 4 claws at the 2-, 10-, 4- and 8-o'clock positions. Engage these claws with the circuit block cover.
- In Y756 (Y746) and Y759 (Y749), after installing the holding spring for battery, connect the system reset terminal of the circuit block to the ⊕ terminal. If this operation is not carried out, an undesired digit may appear.



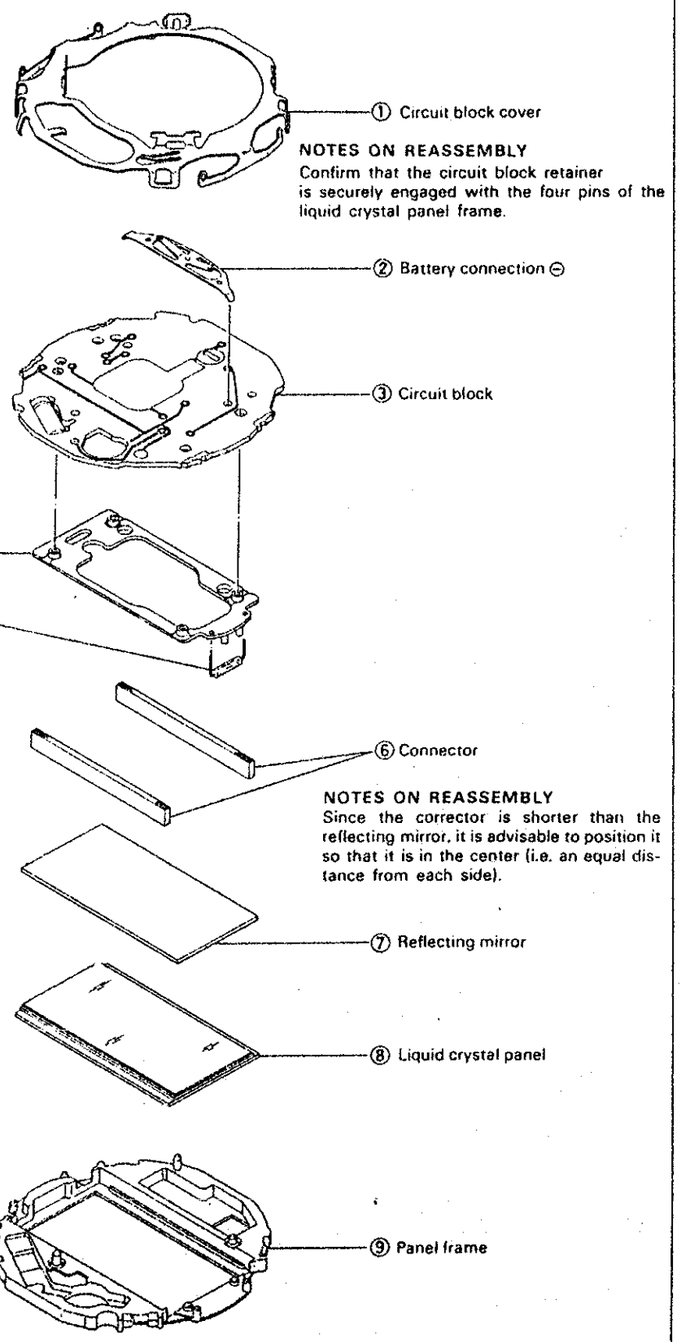
NOTES ON DISASSEMBLY AND REASSEMBLY

1. When the battery is replaced with a new one, the display of the electronic regulation adjusting mode returns to "00". Always check the accuracy.
2. When the battery is removed from the module, always keep the ⊖ surface upward to prevent a short circuit. When installing the battery, take care not to bring the battery into contact with the circuit block cover.

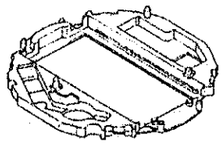
It is not necessary to remove buttons and button clamps unless they have to be repaired or replaced.

2. Disassembling, reassembling and lubrication of the module

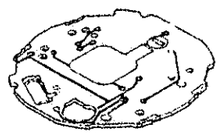
- Disassembling procedures: Figs. ① → ⑨
- Reassembling procedures: Figs. ⑨ → ①

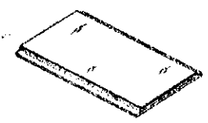


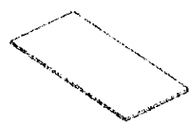
3. Cleaning

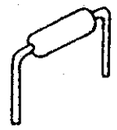
Name of parts	Cleaning	Drying	Solution	Remarks
Connector 	Rinse or wash with a soft brush.	Warm air	Alcohol	• Clean the contacting portion between the connector and liquid crystal panel, and circuit block. • Never use benzene, Diaflon S-3 or trichloroethylene as these will dissolve the parts. • Do not set the connector until it is completely dry.
Plastic parts • Panel frame  • Reflecting mirror spacer	Rinse or wash with a soft brush.	Warm air	Alcohol or benzene	
Metal parts • Holding spring for battery • Circuit block cover • Battery connection ⊖	Rinse or wash with a cleaner or wash with a soft brush.	Warm or hot air	Alcohol, benzene or trichloroethylene	

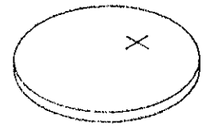
- Parts that must not be cleaned


Circuit block


Liquid crystal panel


Reflecting mirror


Bulb

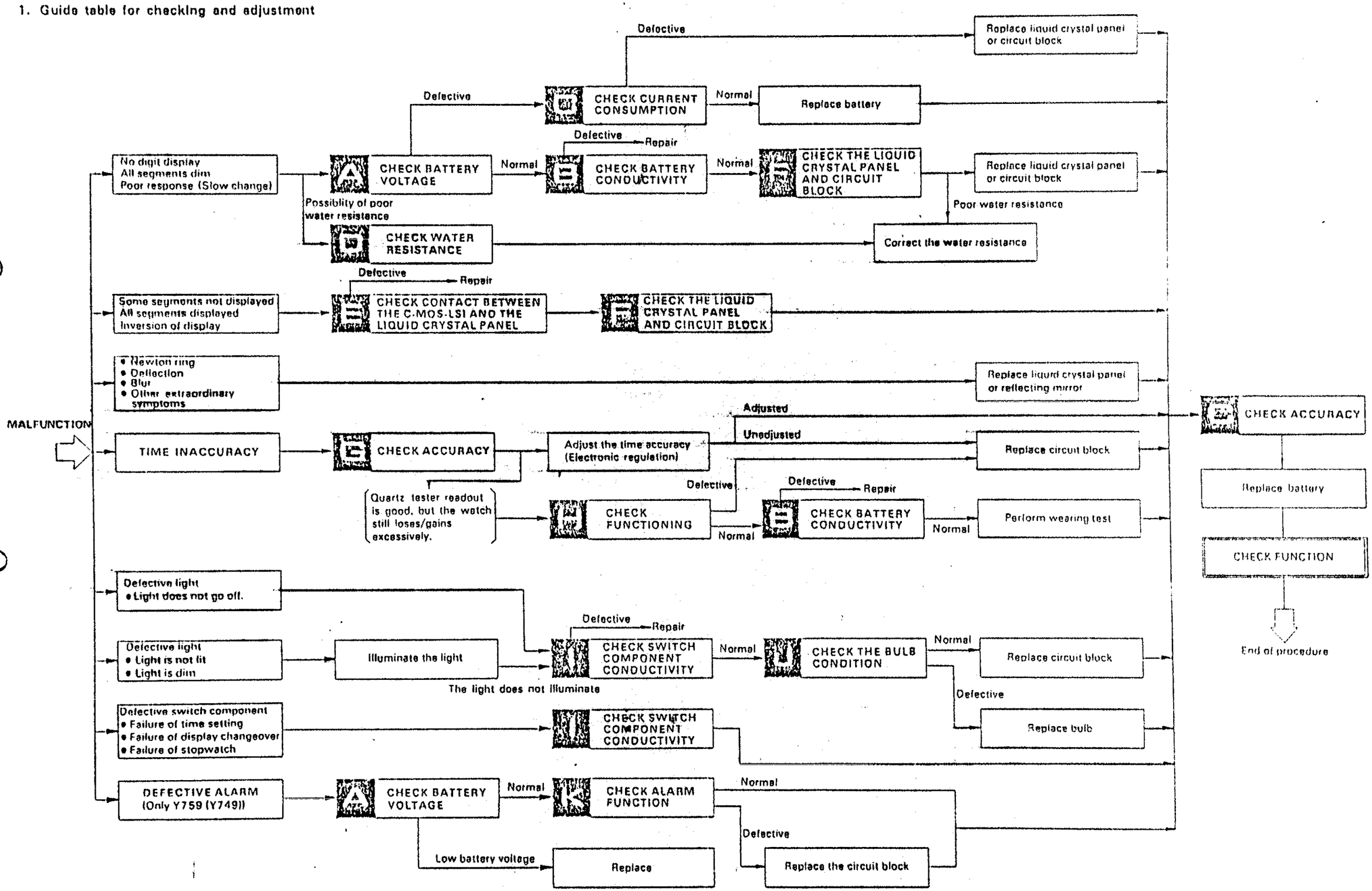

Battery

- Only the conductive portions should be wiped with a cloth moistened with benzene and dried with warm air.
- Remove dust and lint with a brush.
- Be careful not to scratch the front surface of the reflecting mirror.

VI. CHECKING AND ADJUSTMENT

Be sure to use a static electricity protector when handling the module.

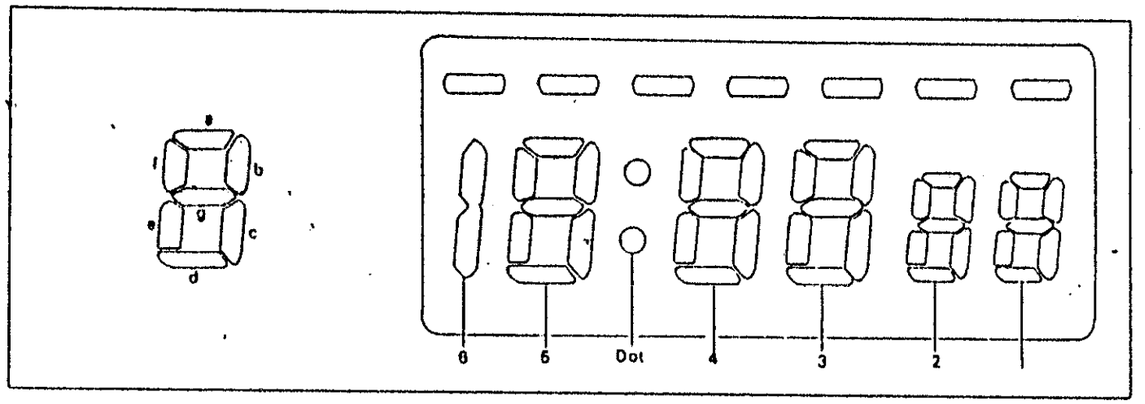
1. Guide table for checking and adjustment



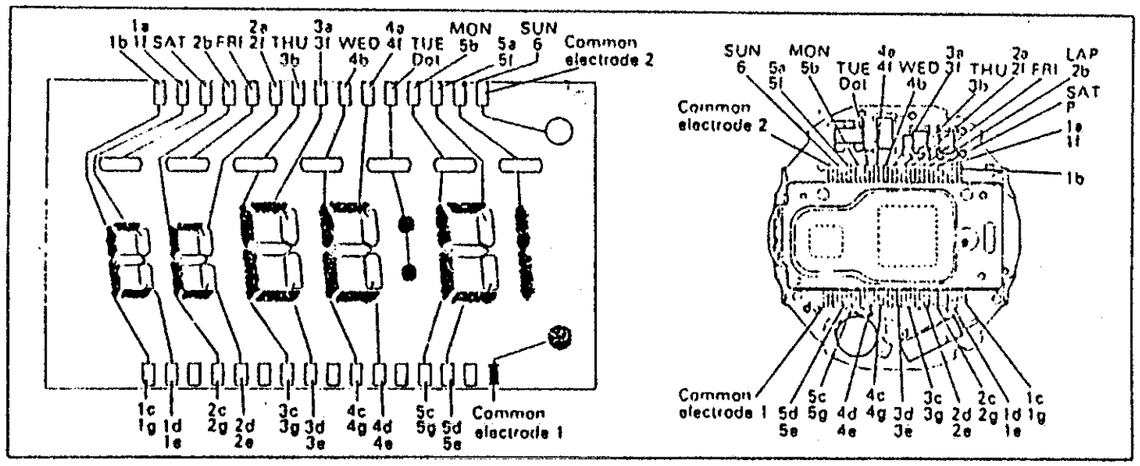
2. Relationship between the segments (Liquid Crystal Panel electrodes) and C-MOS-LSI output terminals

A complete knowledge of how the segments (Liquid Crystal Panel electrodes) connect with the C-MOS-LSI output terminals is necessary for proper checking and adjustment.

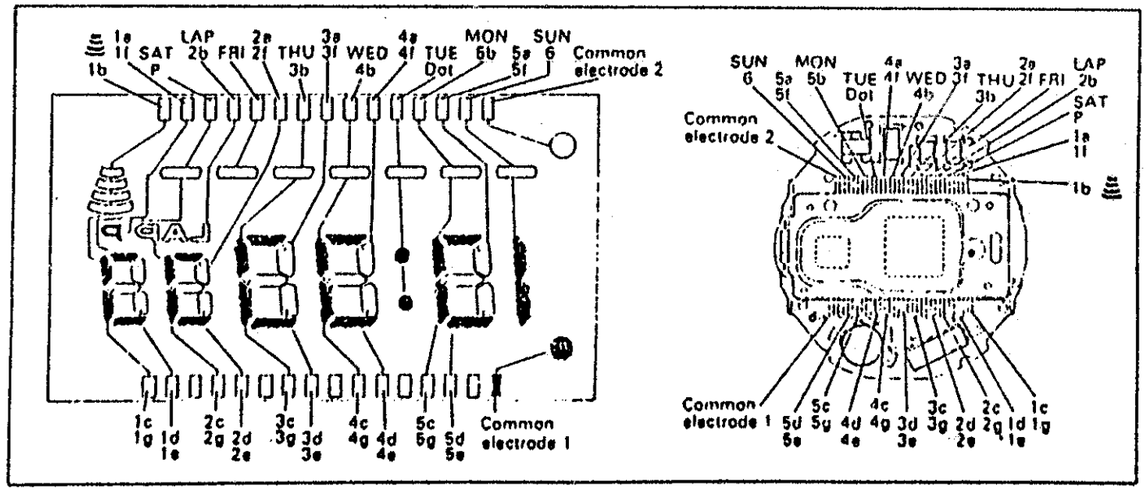
- Designation of segments



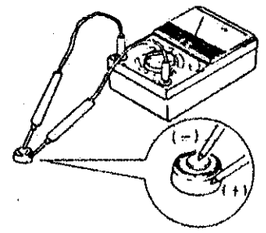
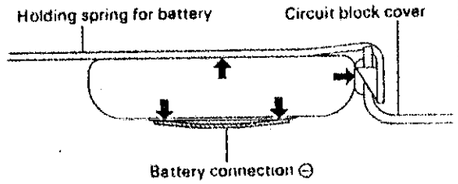
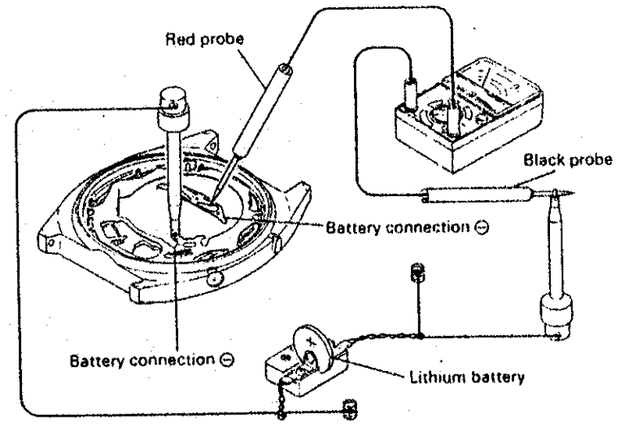
- Y750 (Y740)

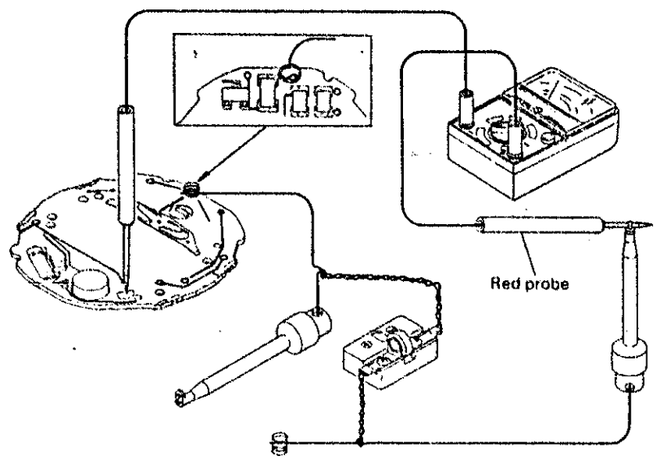
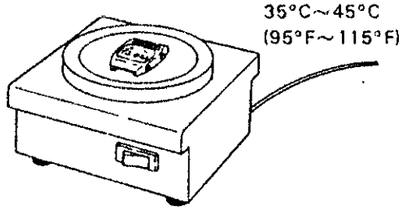
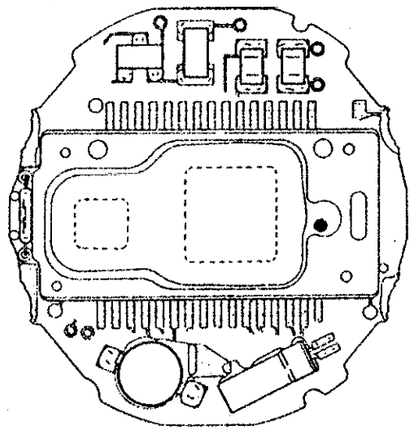


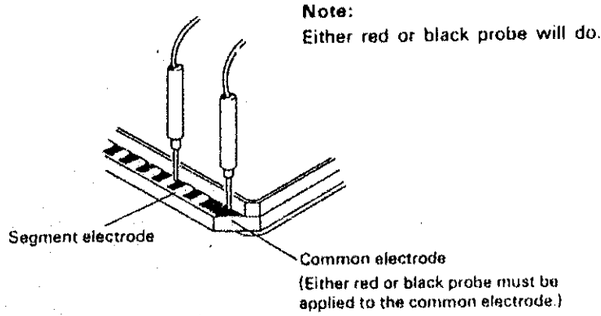
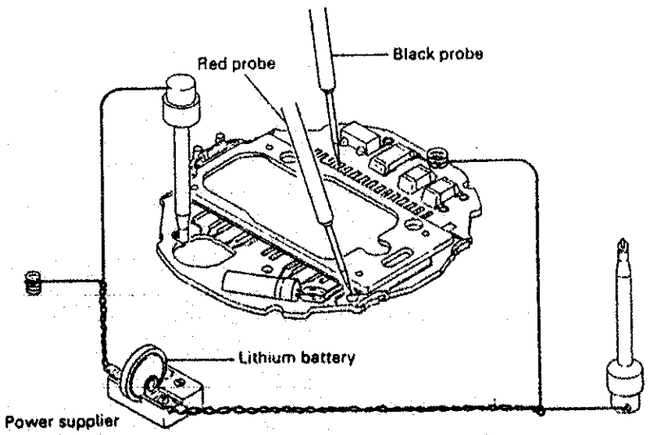
- Y756 (Y746), Y759 (Y749) (Alarm mark is not provided in Y756 (Y746))

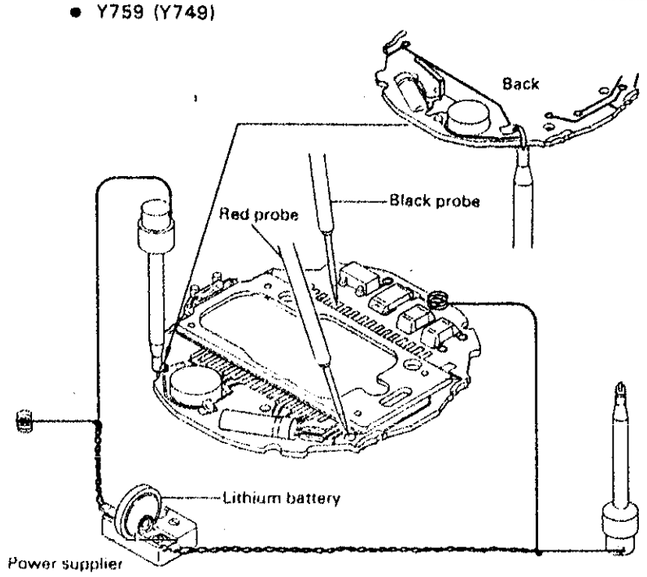


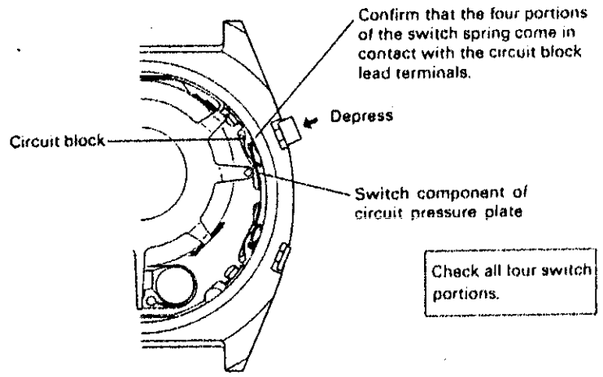
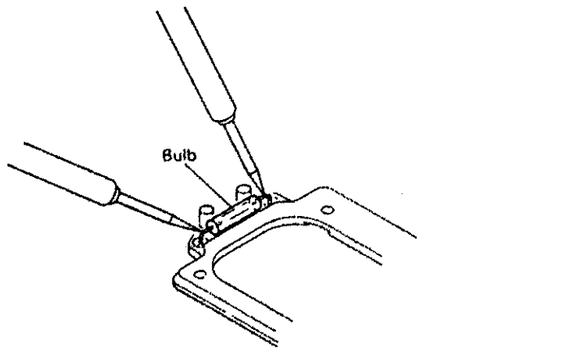
3. Procedures for checking and adjustment

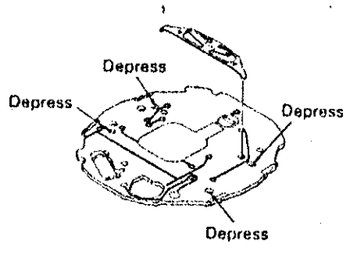
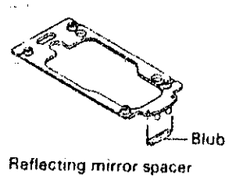
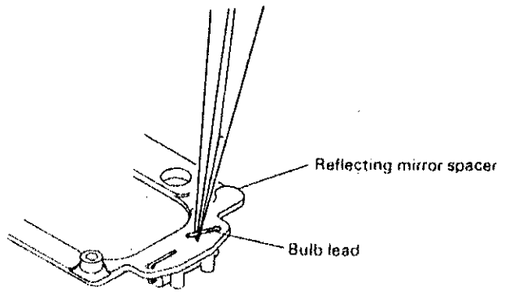
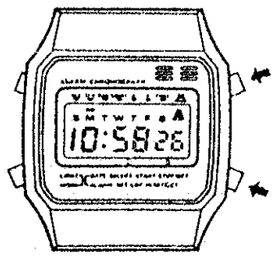
	Procedure	Adjustment and repair
A CHECK BATTERY VOLTAGE	 Note: Shortly after the light is lit, the battery voltage is occasionally low.	2.8V or more..... Normal Less than 2.8V..... Defective
B CHECK BATTERY CONDUCTIVITY	Check the battery, circuit block cover and battery connection ⊖ for contamination.   Note: Do not bend the battery connection ⊖ and holding spring for battery.	Uncontaminated..... Normal Proceed to F Contaminated ..... Defective Clean Poor water resistance is found ..... Correct water resistance.
C CHECK CURRENT CONSUMPTION	(1) Total current consumption of module Points at which probes are applied.  Note: If the pointer of the Volt-Ohm-Meter swings over the maximum value and the current consumption cannot be measured, reset its range, e.g. at DC30 mA. Next, when the pointer is stabilized, return the range to DC12 μA (or 0.03 mA) with the probes applied and read the value indicated.	Less than 1.3 μA..... Normal Replace the battery. 1.3 μA or more ..... Defective Proceed to C (2).

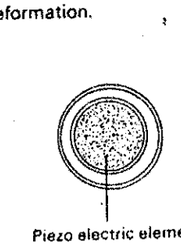
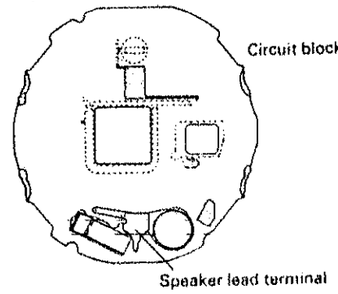
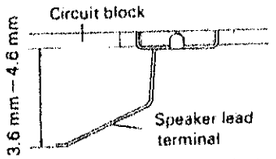
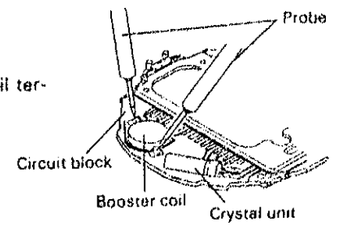
	Procedure	Adjustment and repair
C CHECK CURRENT CONSUMPTION	(2) Current consumption of circuit block 	Less than 1.3 μA..... Normal Replace the liquid crystal panel. 1.3 μA or more..... Defective Replace the circuit block.
D CHECK WATER RESISTANCE	Check for moisture in the watch. 1. Place the watch on a hot plate and heat it for 15 minutes.  2. Check to see that the glass does not collect moisture.	Does not collect moisture ..... Normal Proceed to A Collects moisture ..... Defective Correct water resistance.
E CHECK CONTACT OF C-MOS-LSI-LIQUID CRYSTAL PANEL	(1) Check for dust, lint and other contamination on the liquid crystal panel electrodes and connectors. 	Uncontaminated..... Normal Proceed to F Contaminated ..... Defective Wipe off any foreign matter.

	Procedure	Adjustment and repair
F CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK	• Check to see if the liquid crystal panel and circuit block function correctly. (Refer to "Relationship between the segments (liquid crystal panel electrodes) and C-MOS-LSI output terminals" on page 8.) (1) Checking the liquid crystal panel 1. Set up the Volt-Ohm-Meter Range to be used: OHMS R × 1 — R × 1k **Note:** Any range will do if more than 3V is applied to the terminal of the Volt-Ohm-Meter. In some testers, a voltage of more than 3V cannot be applied to the terminal. In this case, all segments are not displayed. Use a higher resistance range (R × 10k). 2. Remove the liquid crystal panel from the module and turn it to the reverse side. 3. Check that the corresponding segment is displayed. **Note:** Either red or black probe will do.  (2) Checking the circuit block output 1. Set up the Volt-Ohm-Meter Range to be used: DC3V 2. Set up the circuit block. 1) Disassemble the module and remove the circuit block. 2) Supply power to the circuit block by connecting the power supplier as shown in the illustration below. • Y750 (Y740) and Y756 (Y746) 	Displayed ..... Normal Proceed to F (2). Not displayed ..... Defective Replace the liquid crystal panel.

	Procedure	Adjustment and repair
F CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK	• Y759 (Y749)  3. Checking Red probe: Circuit block ⊕ terminal Black probe: C-MOS-LSI output terminal (If a segment is defective, connect the black probe to the corresponding electrode.)	More than 0.8V..... Normal Return to E (The voltage at all terminals should be more than 0.8V.) 0.8V or less ..... Defective Replace the circuit block.
G CHECK ACCURACY	1. Measuring mode Set the watch in the mode in which the indication does not change (stopwatch mode "0 00 00"). 2. Set the measuring gate of the quartz tester to "10 second". 3. Adjust the level. 4. Measure the accuracy. The displayed value is the watch accuracy when the electronic regulation is 00. Note: An unstable value may be displayed for 10 out of 120 seconds. Do not take this value into account. 5. Read the electronic regulation value. Set the watch for electronic regulation adjusting mode and read the value. 6 Calculate the accuracy of the watch. One step of the electronic regulation is 0.044 second/day. Multiply the electronic regulation value by 0.044 and add or subtract the result from the watch accuracy measured by the quartz tester. The result is the actual accuracy. < Example of watch accuracy calculation > Quartz tester reading: Electronic regulation value: Electronic regulation (1 step) A [+0.09] second/day B [02] C [0.044] second/day B × C [0.088] second/day A + B × C [0.178] second/day	Uncontaminated..... Normal Contaminated ..... Defective → Time Adjustment Adjust the electronic regulation.

	Procedure	Adjustment and repair
H CHECK FUNCTIONING	Check the functioning referring to "Display function" on page 3. 1. Check that the time mode and calendar mode are changed correctly. 2. Check the functioning for each digit in the time and calendar modes and confirm that the digit is advanced correctly.	Functions correctly and can be adjusted ..... Normal Wear the watch on the wrist to check time accuracy. Does not function correctly or cannot be adjusted ... Defective Replace the circuit block with a new one.
I CHECK THE CONDUCTIVITY OF SWITCH COMPONENT	(1) Check to see if the switch spring functions correctly.  (2) Check for dust, lint and other contamination of the connecting portions.	Functions correctly..... Normal Does not function correctly ..... Defective Correct the switch spring with tweezers, or replace the switch spring with a new one. Uncontaminated..... Normal Contaminated ..... Defective Wipe off any foreign matter.
J CHECK BULB CONDITION	(1) Check to see if there is a broken filament in the bulb. 1. Set up the Volt-Ohm-Meter. Range to be used: OHMS R × 1 2. Checking Apply two probes of the Volt-Ohm-Meter to the bulb leads as shown in the illustration. 	Bulb lights up..... Normal Bulb does not light up..... Defective Replace the bulb with a new one.

	Procedure	Adjustment and repair
J CHECK BULB CONDITION	(2) Bulb replacement procedure 1. Remove the reflecting mirror spacer (with bulb) from the circuit block.  Depress four pins of the reflecting mirror spacer to remove it from the circuit block.  Reflecting mirror spacer 2. Remove the defective bulb. Straighten the bulb lead with tweezers as shown in the illustration and remove the bulb from the reflecting mirror spacer.  3. Install a new bulb. Before installing the new bulb, cut off the leads of the bulb with pliers or scissors.	
K CHECK ALARM FUNCTION	(1) Check to see if the alarm (piezo electric speaker) sounds correctly. (Y759 (Y749)) In the time display, depress two buttons simultaneously to check the alarm function. 	Sounds correctly..... Normal Does not sound or low sound level..... Defective Proceed to K (2) (3).

	Procedure	Adjustment and repair
K CHECK ALARM FUNCTION	(2) Check the contacting portion of the piezo electric element on the case back and speaker lead terminal and check the speaker lead terminal for deformation.   	Uncontaminated..... Normal Contaminated ..... Defective Wipe off any foreign matter. Deformed ..... Defective Correct with tweezers.
	• The distance between the circuit block and top of speaker lead terminal should be 3.6 – 4.6 mm.  	3.6 – 4.6 mm..... Normal Less than 3.6 mm or more than 4.6 mm..... Defective Correct with tweezers
	(3) Measure the coil resistance of the circuit block booster to check for a short circuit and a broken wire. Range to be used: OHMS R × 1 • Checking Attach the probes to the booster coil terminals. Either red or black probe will do.  	20 – 30Ω..... Normal Less than 20Ω (short circuit)..... Defective More than 30Ω (broken wire) Replace the circuit block with a new one.

How to check for battery electrolyte leakage and repair

(1) Remove the module from the case.
(2) Disassemble the module.
(3) Wipe off any electrolyte from the circuit block.
1. Wipe off the electrolyte with cloth moistened with alcohol. (Pay particular attention to the connecting portion)
2. Dry with warm air by using a dryer.

Note:
If the electrolyte leakage is excessive, replace the circuit block.
Use a lint-free cloth.

VII. PARTS LIST OF MODULE Cal. Y750(Y740), Y756(Y746), Y759 (Y749)

PART NAME	Cal. Y750A	Cal. Y740A	Cal. Y756A	Cal. Y746A	Cal. Y759A	Cal. Y749A
Circuit block	4001 601	4001 600	4001 607	4001 606	4001 609	4001 608
Holding spring for battery	4225 601	4225 600	4225 607	4225 606	4225 609	4225 608
Battery connection ⊖	4270 632	4270 632	4270 632	4270 632	4270 632	4270 632
Connector	4313 632	4313 632	4313 632	4313 632	4313 632	4313 632
Liquid crystal panel frame	4398 632	4398 632	4398 632	4398 632	4398 632	4398 632
Reflecting mirror spacer	4408 635	4408 635	4408 635	4408 635	4408 635	4408 635
Circuit block cover	4457 632	4457 632	4457 632	4457 632	4457 632	4457 632
Liquid crystal panel	4510 560	4510 560	4510 640	4510 640	4510 630	4510 630
Reflecting mirror	4521 770	4521 770	4521 770	4521 770	4521 770	4521 770
Bulb	4530 649	4530 649	4530 649	4530 649	4530 649	4530 649
★ Lithium battery	Matsushita BR2016	Matsushita BR2016	Matsushita BR2016	Matsushita BR2016	Matsushita BR2016	Matsushita BR2016

Remarks:

*Lithium battery

Matsushita BR2016..... An additonal battery for this calibre might be added as a substitute in the future.