TECHNICAL GUIDE
AND
PARTS LIST

CAL. Y476A

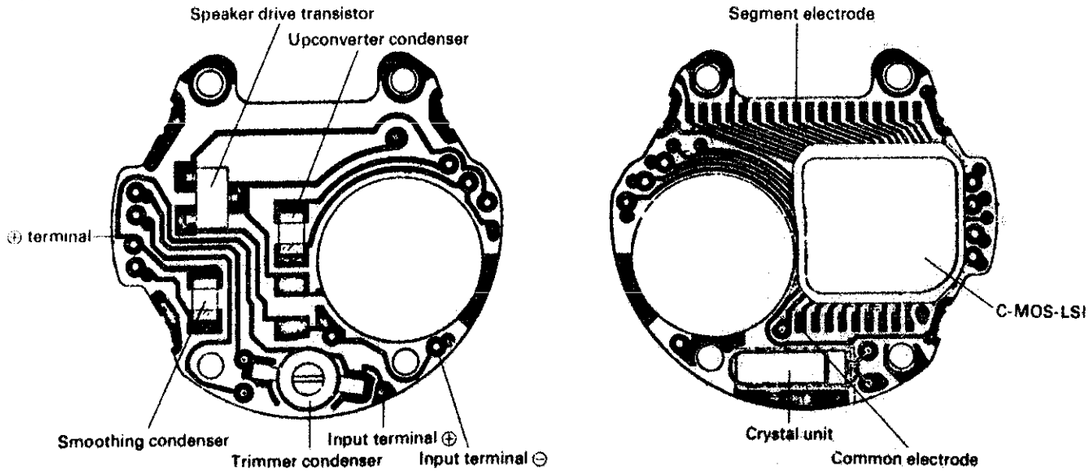
DIGITAL QUARTZ

CONTENTS

I. SPECIFICATIONS

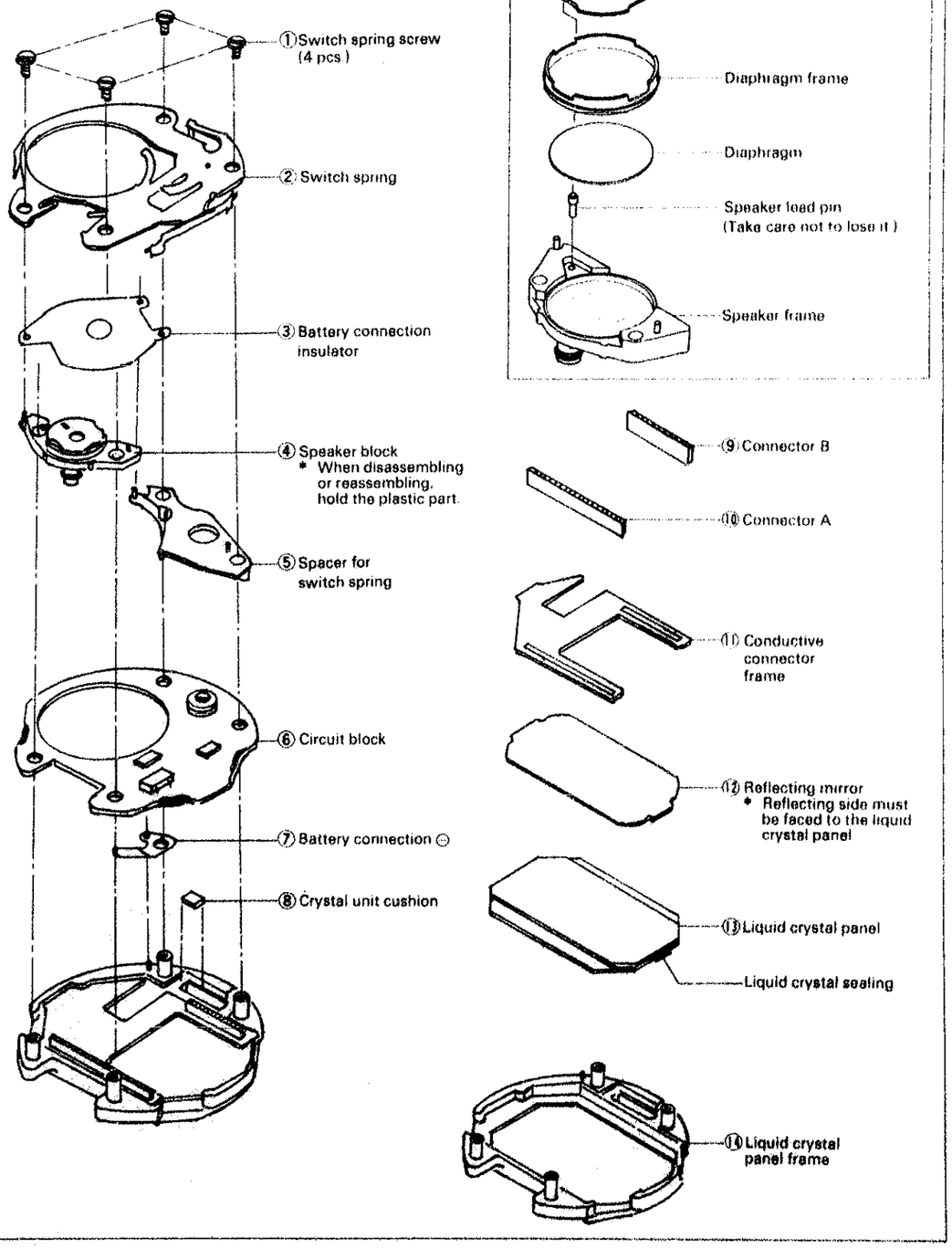
Item \ Cal. No.	Y476A
Display medium	Nematic liquid crystal, FEM (Field Effect Mode)
Display system	Three-function changeover system with time, alarm setting and timer functions. • Time function: 12-hour digital system showing Hour (with "P" (for P.M.) indication)•Minute/Month•Date/Second. • Alarm setting function: Alarm time can be set to operate at the desired time. • Timer: 12-hour digital display system showing hour and minute.
Additional mechanism	• Auto-alarm function • 12-hour timer function
Crystal oscillator	32,768 Hz (Hz = Hertz ..... Cycles per second)
Loss/gain	Loss/gain at normal temperature range Mean monthly rate: less than 20 seconds (Annual rate: less than 4 minutes)
Casing diameter	ϕ 18.7 mm
Height	5.15 mm without battery
Operational temperature range	−5°C ~ +50°C (23°F ~ 122°F)
Regulation system	Trimmer condenser
Quartz tester measuring gate	Any measuring gate
Battery power	Silver oxide battery: Toshiba WG-3 or SR41W, ESB Ray-o-vac RW47 Battery life: Approx. 2 years Voltage: 1.55V

II. CIRCUIT BLOCK SCHEMATIC



III. DISASSEMBLING AND REASSEMBLING

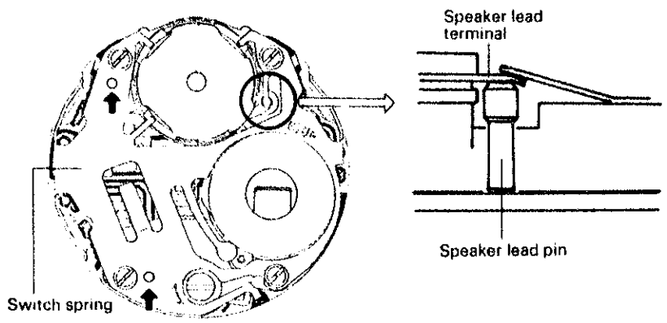
Disassembling procedures: Figs. ① ~ ⑭
Reassembling procedures: Figs. ⑭ ~ ①



Remarks for disassembling and reassembling

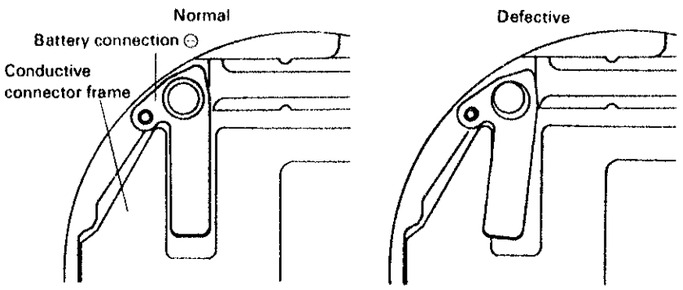
(2) Switch spring

When installing the switch spring, securely engage the switch spring with the guide pins (indicated by the arrows) of the spacer for switch spring and speaker block.
Confirm that the switch spring (circled part) securely depresses the speaker lead terminal and pin.



(7) Battery connection ⊖

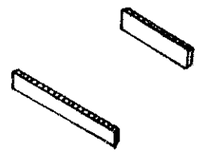
Install the battery connection ⊖ in the liquid crystal panel frame so that the battery connection ⊖ does not come in contact with the panel frame.



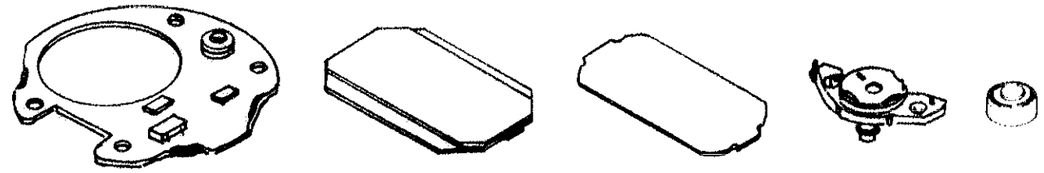
IV. CLEANING

Clean the parts in accordance with the method shown in the table below.

1. How to clean

Name of parts	Cleaning	Drying	Solution	Remarks
Connector Liquid crystal panel unit cushion 	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 melt the parts. ● Do not set the connector until it is completely dry
Plastic parts Panel frame Battery insulator	Rinse or wash with a soft brush.	Warm air	Alcohol, benzene or Diaflon S-3	
Others (parts that must not be cleaned)	Rinse and wash with a cleaner or wash with a soft brush.	Warm or hot air	Benzene, Diaflon S-3, Alcohol or trichloro-ethylene.	

2. Parts that must not be cleaned



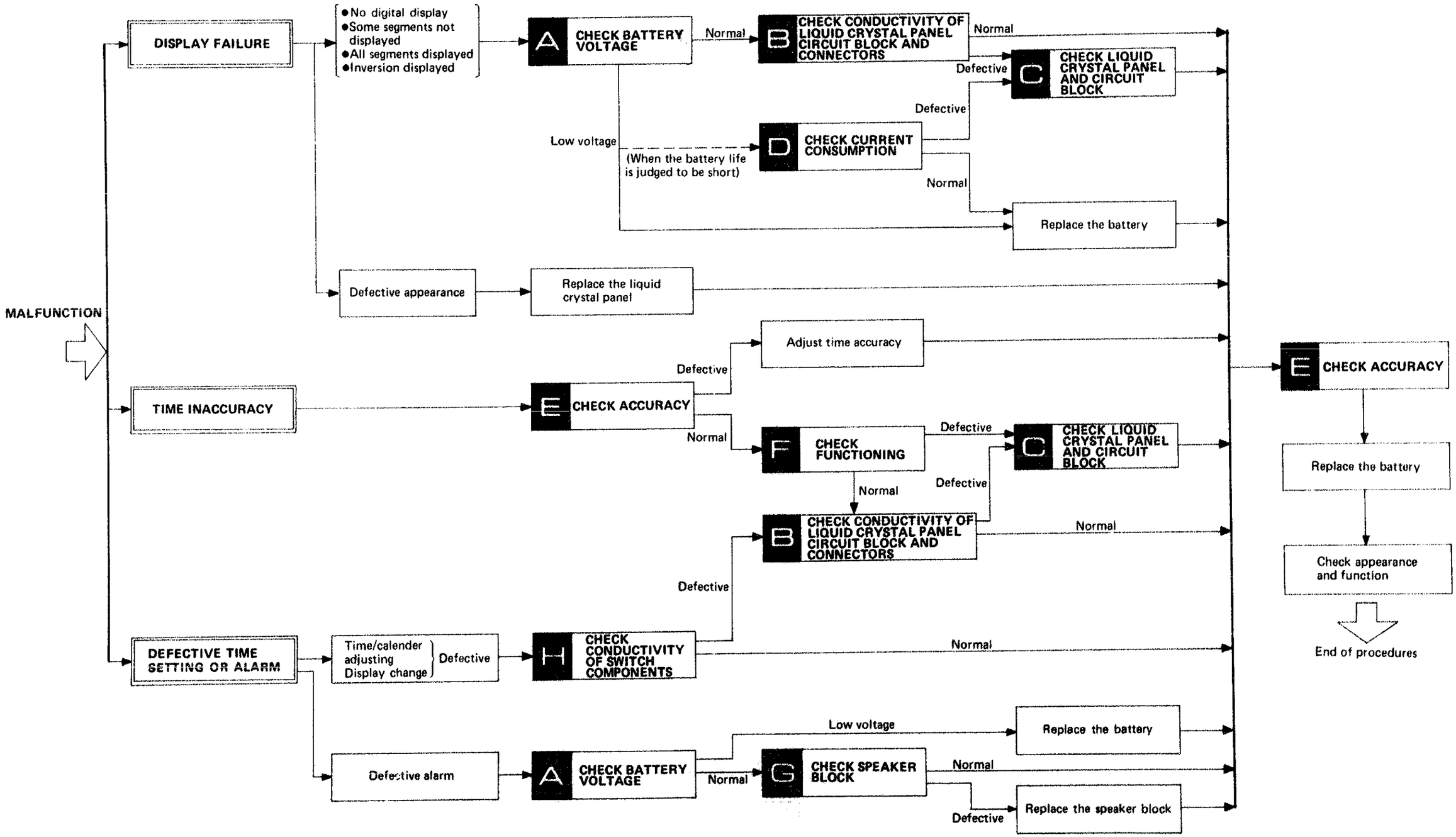
Circuit block | Liquid crystal panel | Reflecting mirror | Speaker block | Battery

- 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.

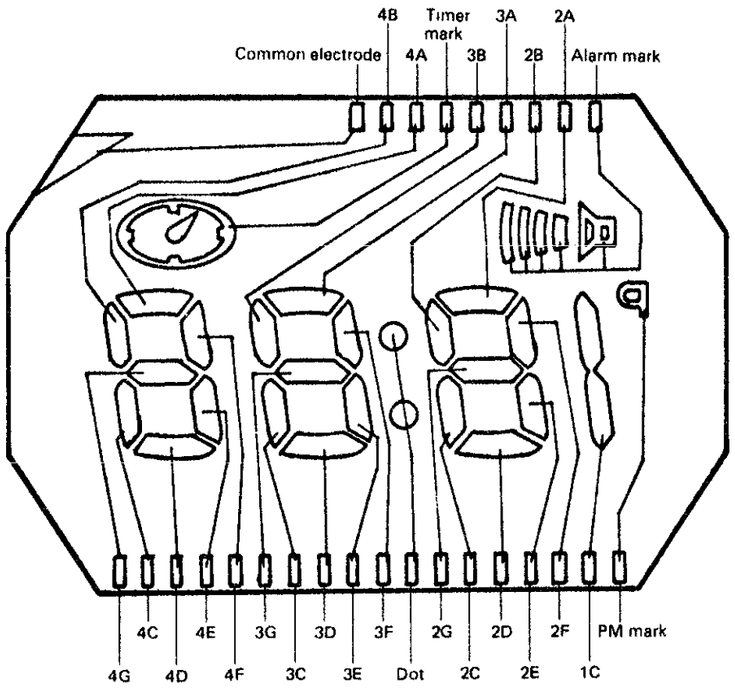
V. CHECKING AND ADJUSTMENT

Be sure to use static electicity protector when handling the module.

1. Guide table for checking and adjustment

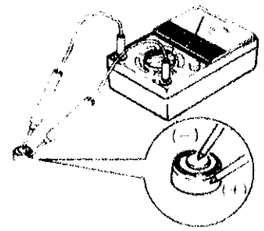
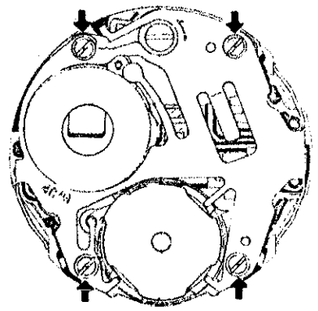
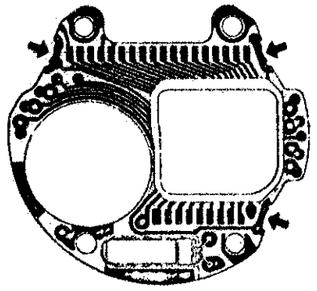
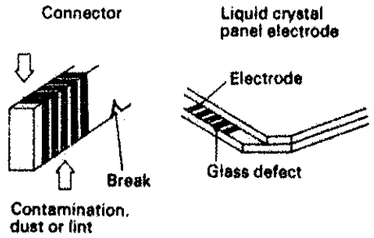


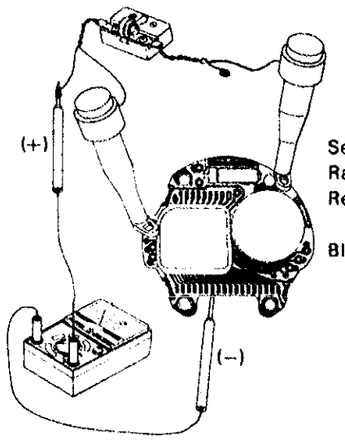
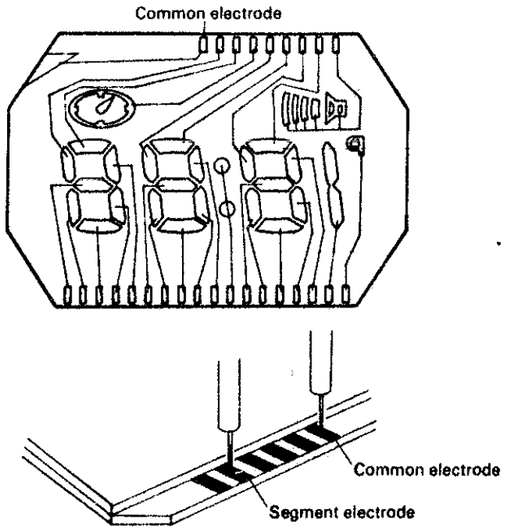
2. Liquid crystal panel electrode

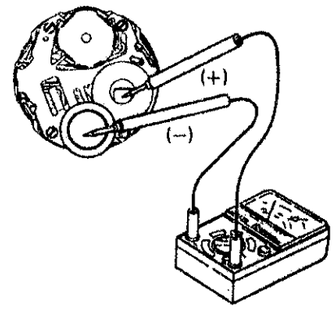
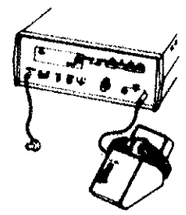


3. Procedures for checking and adjustment

CONTACT OF LIQUID CRYSTAL PANEL ~ CIRCUIT BLOCK ~ CONNECTOR

	Procedures	Result and repair
A BATTERY VOLTAGE	Use the following procedures to check battery voltage. (1) Set up the Volt-ohm-meter. Range to be used: DC 3V (2) Measuring: Red probe ⊕: Battery surface ⊕ Black probe ⊖: Battery surface ⊖ 	More than 1.5V: Normal Less than 1.5V: Defective Replace the battery.
B	(1) Check the screws for tightness.  (2) Check for dust, lint and other contamination on the output terminals of the circuit block.  Do not forget to check the three parts of the switches. (3) Check for scratches, cracks and breaks of the liquid crystal panel and connector. 	No loose screws Proceed to B (2). Loose screws Retighten the screws. Uncontaminated: Normal Contaminated: Defective Wipe off any foreign matter. No scratches, cracks or breaks: Normal Scratched, cracked or broken: Defective Replace the connector or liquid crystal panel with a new one.

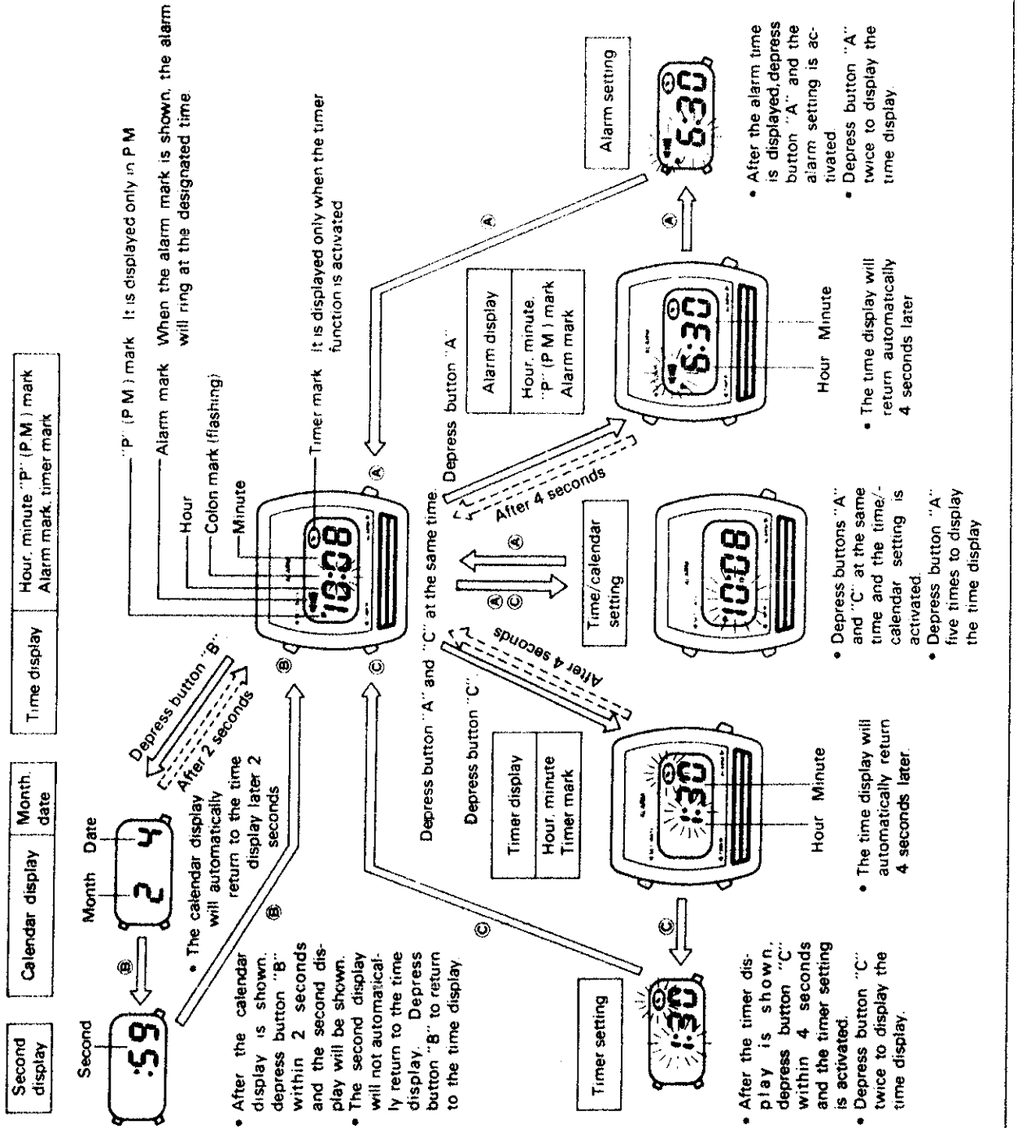
	Procedures	Result and repair
C LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK	Check to see if the liquid crystal panel and circuit block function correctly. (1) Check the circuit block output voltage. 1 Remove the circuit block from the module. 2 Attach the electricity supplier and apply power of 1.5V to the circuit block.  Set up the Volt-ohm-meter. Range to be used: DC 3V Red probe ⊕ ..... ⊕ terminal of the electricity supplier Black probe ⊖ ..... Circuit block electrode (Attach the probe to any electrodes.)	More than 0.8V: Normal Less than 0.8V: Defective Replace the circuit block with a new one.
	(2) Check the liquid crystal panel for broken connecting leads or a short circuit. 1. Remove the liquid crystal panel from the module and turn it to the reverse side. 2. Set up the Volt-ohm-meter. Range to be used: OHMS R × 1 (Any range will do if more than 3V is applied to the terminal of the Volt-ohm-meter.) 3. Attach the probes to the common electrode and segment electrodes. (Either red or black probe will do.)  	Lights up: Normal Does not light up: Defective Replace the liquid crystal panel with a new one.

	Procedures	Result and repair
D CURRENT CONSUMPTION	(1) Check to see if the current consumption is normal. 1. Set up the Volt-ohm-meter. Range to be used: DC12 μA 2. Measuring Red probe ⊕ ..... Battery connection ⊖ Black probe ⊖ ..... Battery minus surface Measure the current consumption as shown in the illustration below.  **Note:** If the pointer of the Volt-ohm-meter swings over the maximum value when DC12 μA is used, change the range to a greater one where the pointer does not run over the maximum value while applying the probes to the respective portions. **(Ex. DC30 mA)** Then, after two or three seconds, return the range to DC12 μA again for measuring.	Less than 2.8 μA: Normal More than 2.8 μA: Defective Replace the circuit block or liquid crystal panel with a new one. Proceed to D (2)
	(2) Check the current consumption of the circuit block. Remove the liquid crystal panel, reflecting mirror and connector from the module and measure the current consumption.	Less than 2.4 μA: Circuit block is normal Replace the liquid crystal panel with a new one More than 2.4 μA: Circuit block is defective. Replace the circuit block with a new one.
E ACCURACY	Check gain and loss of time. 1. Set up the Quartz Tester. 2. Use an electromagnetic field microphone. 3. Measure 	If watch tends to gain or lose, adjust time accuracy by turning the trimmer condenser.

F

FUNCTIONING

1. DISPLAY AND BUTTON OPERATION



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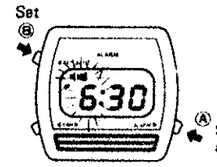
FUNCTIONING

2. HOW TO SET THE ALARM TIME

- Select the digits to be adjusted by depressing button "A" and adjust the digits by depressing button "B".
- While in the time display depress button "A" twice and the alarm time setting function is activated. The alarm mark and the hour digit start flashing.

One digit (flashing) is advanced by each depression of button "B". The digits are automatically advanced by depressing button "B" continuously.



Hour → Minute → Time display

* After the minute digits are adjusted, depress button "A" and the time display is shown.

- **HOW TO ENGAGE OR DISENGAGE THE ALARM**
- Depress button "A" and the alarm display is shown.
- Then depress button "B" and the alarm mark starts flashing or it is extinguished. When the alarm is not required, depress button "B" to extinguish the alarm mark.

* The alarm mark is displayed for 4 seconds. Depress button "B" to engage or disengage the alarm while it is displayed.

- **HOW TO STOP THE ALARM RINGING**
- Depress button "A", "B" or "C" to stop the alarm ringing.

* The alarm rings for 30 seconds and stops if a button is not depressed.

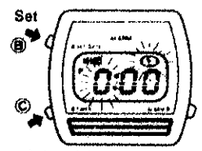
3. HOW TO SET THE TIMER

- Select the digits to be adjusted by depressing button "C", and adjust the digits by depressing button "B".

While in the time display depress button "C" twice. The timer setting function is activated, and the timer mark and the hour digits start flashing.

One digit (flashing) is advanced by each depression of button "B". The digits are automatically advanced by depressing button "B" continuously.

Selection of the digits to be adjusted is made by depressing button "C".



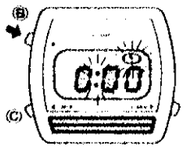
Hour → Minute → Time display

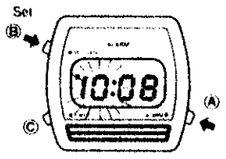
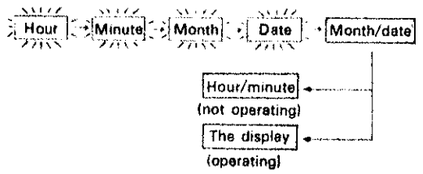
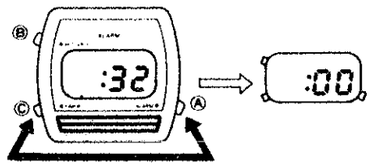
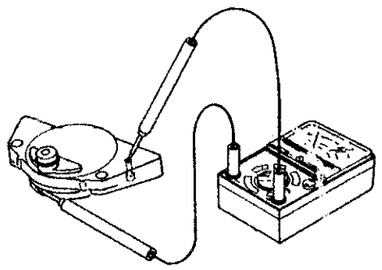
* The timer will start functioning immediately after the timer is set.
* After the minute digits are adjusted, depress button "C" and the time display will return.

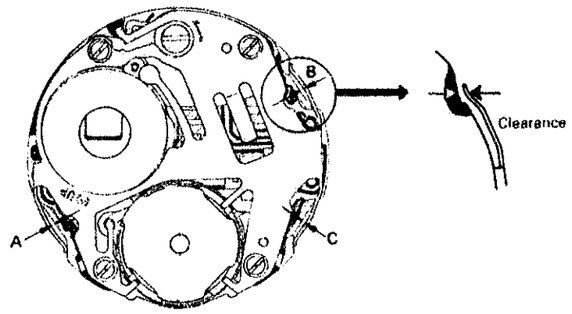
HOW TO DISENGAGE THE TIMER

- Depress button "C" and the timer display is shown for 4 seconds.

Then depress button "B" and the digits in the timer display are reset to "0'00" and the timer function is disengaged.



	Procedures	Result and repair
F FUNCTIONING	**4. HOW TO SET THE TIME AND CALENDAR** • While in the time display depress buttons "A" and "C" at the same time and the time/calendar setting function is activated. The hour digits start flashing. One digit (flashing) is advanced by each depression of button "B". The digits are automatically advanced by depressing button "B" continuously  Selection of the digits to be adjusted by each depression of button "A".  • Select the digits to be adjusted by depressing button "A" and adjust the digits by depressing button "B". • When the minute digits are not adjusted in the above procedures, depress button "A" to display the time display after the month/date display as shown in the above illustration on the right. • When the minute digits are adjusted, the watch stops operating (the colon mark stops flashing,) and the time display is not displayed by depressing button "A" after the month/date display is shown. In this case, depress button "B" in accordance with a time signal and the second digits are reset to "00" and the watch starts operating immediately (the colon mark starts flashing). * When the minute digits are adjusted, be sure to set them 2 or 3 minutes ahead and wait for a time signal to set the correct time. **• HOW TO SET THE SECOND** • From the time display depress button "B" twice and the second display is shown. • Depress buttons "A" and "C" at the same time in accordance with a time signal and the second digits are reset to "00".  * When the second counts any number from "30" to "59" and buttons "A" and "C" are depressed, one minute is added and the seconds are immediately reset to "00". * After the second digits are adjusted, depress button "B" and the time display is shown.	
G SPEAKER BLOCK	Measure the coil resistance of the speaker block to check for a broken coil wire or short circuit. 1. Set up the Volt-ohm-meter. Range to be used: OHMS × 1 2. Measuring Attach the probes to the speaker frame and speaker lead pin. 	120Ω ~ 140Ω: Normal Less than 120Ω: Short circuit (Defective) More than 140Ω: Broken coil wire (Defective) Replace the speaker block.

	Procedures	Result and repair
H CONDUCTIVITY OF SWITCH COMPONENTS	Check to see if the switch spring functions correctly.  1. Check to see that the three switch springs touch the switch terminals of the circuit block when they are pushed in with the tips of tweezers and that they do not touch the switch terminals of the circuit block when released. Confirm that the clearance between the switch spring and switch terminals of the circuit block is twice as much as the width of the switch spring when released. 2. Check for dust, lint and other contamination of the connecting portions.	Functions correctly: Normal Proceed to I (2). Does not function correctly: Defective If the switch spring does not function correctly after the switch spring is set correctly, replace the switch spring with a new one. No dust, lint or uncontaminated Normal Dust, lint or contaminated: Defective Wipe off any foreign matter.

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

VI. PARTS LIST OF MODULE

Cal. Y476A

PART NO.	PART NAME	PART NO.	PART NAME
4001 155	Circuit block	4510 061	Liquid crystal panel
4219 151	Battery connection insulator	4621 152	Reflecting mirror
4245 152	Switch spring	4580 153	Speaker block
4270 151	Battery connection ⊖	4991 152	Speaker gasket
4313 150	Connector A	012 458	Switch spring screw
4313 151	Connector B	017 219	Tube for switch spring screw
4398 157	Liquid crystal panel frame	017 354	Speaker lead pin
4398 166	Conductive connector frame	SEIZAIKEN TR41W MAXELL SR41W	Silver oxide battery
4398 167	Speaker frame		
4408 150	Spacer for switch spring		
4446 320	Crystal unit cushion		

Remarks:

Battery

SEIZAIKEN
TR41W
MAXELL
SR41W
} ..... An additional battery for this calibre might be added as a substitute in the future.

☆ ☆ Please see remarks.