

TECHNICAL GUIDE AND PARTS LIST

CAL. Y665A

DIGITAL QUARTZ

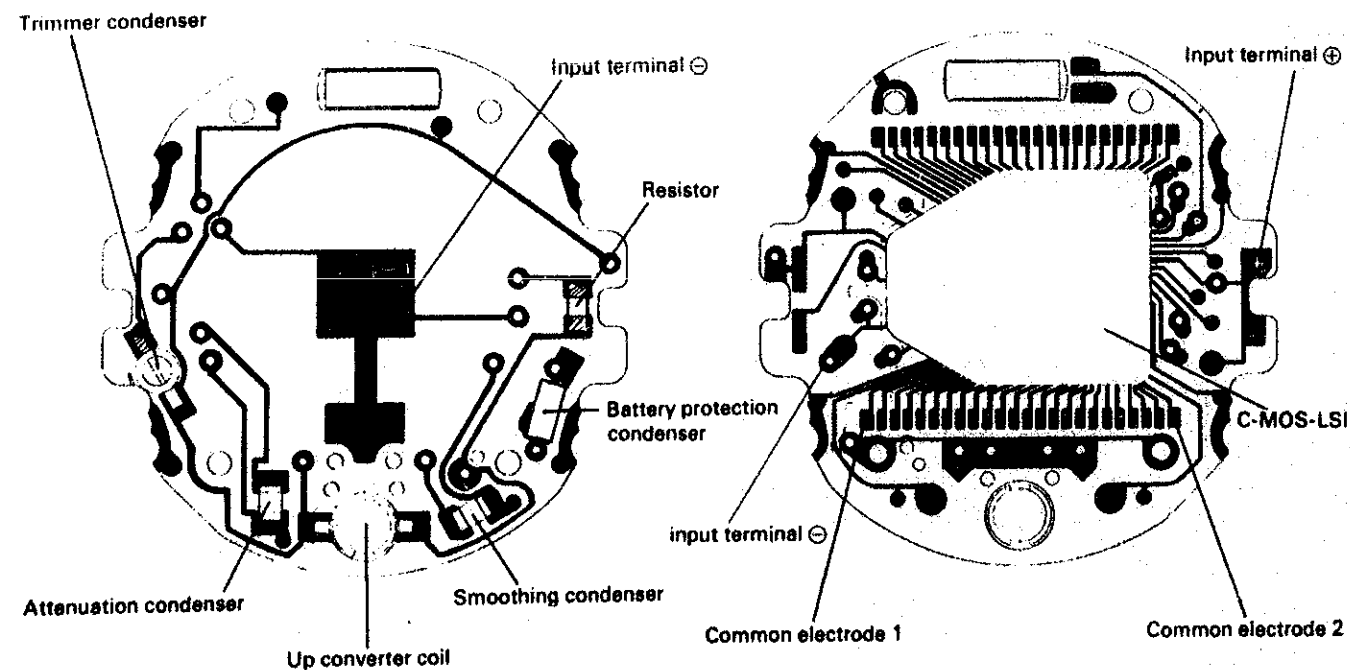
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I. SPECIFICATIONS

Item	Cal. No.	Y665A
Display medium		Nematic Liquid Crystal, FEM (Field Effect Mode)
Liquid crystal panel drive system		Multiplex
Display system		<ul style="list-style-type: none"> ● Time display ● Alarm display ● Stopwatch display ● Timer counter display ● 4 (four) counter display
Additional mechanism		<ul style="list-style-type: none"> ● Counter function ● Sound demonstration function ● Time signal function
Operational temperature range		Loss/gain at normal temperature Monthly rate: Less than 15 seconds
Casing diameter		φ28.0 mm
Height		4.9 mm (including battery)
Regulation system		Trimmer condenser
Quartz tester measuring gate		Any gate is available
Battery		Lithium battery: SANYO CR2016 Battery life: Approx. 4 years Voltage: 3.0V

II. CIRCUIT SCHEMATIC



III. DISASSEMBLING, REASSEMBLING AND LUBRICATING

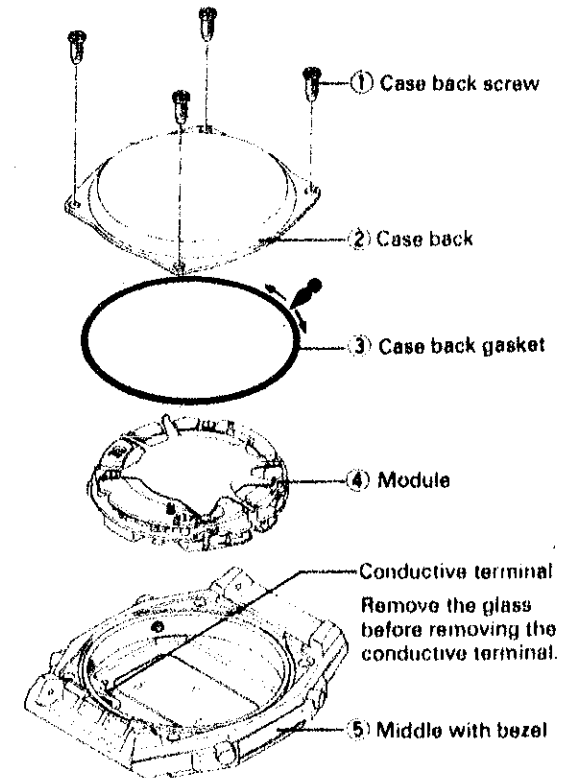
1. Disassembling, reassembling and lubricating of the case

Disassembling procedures: Figs. ① ~ ⑤
Reassembling procedures: Figs. ⑤ ~ ①

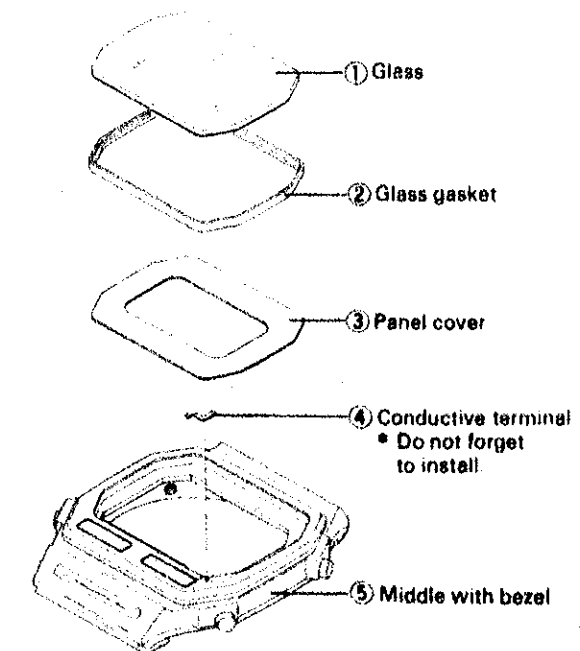
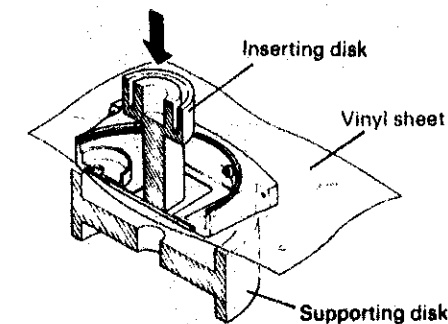
Lubrication: Silicon grease

Quantity: Standard quantity

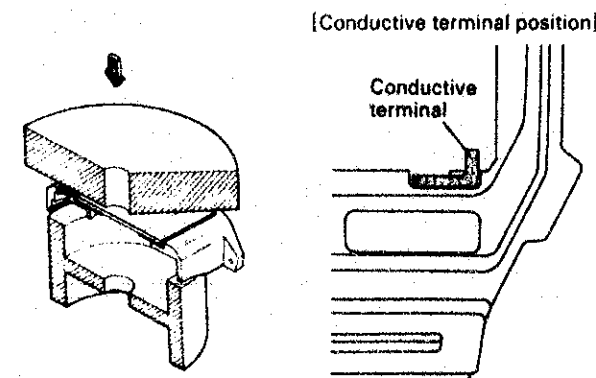
- ① Case back screw
Use a correct watch screwdriver to loosen/tighten the case back screws.
- Be sure to tighten two by two the four screws which are positioned diagonally each other so that the clearance between the middle with bezel and the case back is equal.



- How to remove the glass
Use the supporting disk and inserting disk shown in the below and depress the glass directly.
- Use an enough size of the supporting disk.



- How to install the glass
Use a flat disk and press in the glass evenly.
- Do not forget to install the conductive terminal.

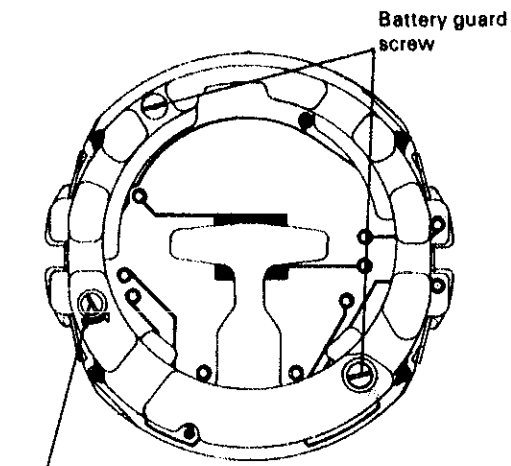


2. Disassembling and reassembling of the module

Disassembling procedures: Figs. ① ~ ⑭

Reassembling procedures: Figs. ⑭ ~ ①

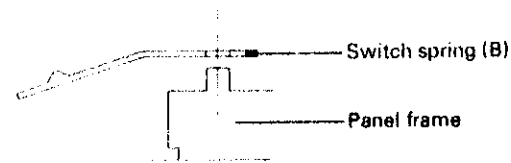
⑤ Battery guard screw



Trimmer condenser
* Do not rotate by mistake.

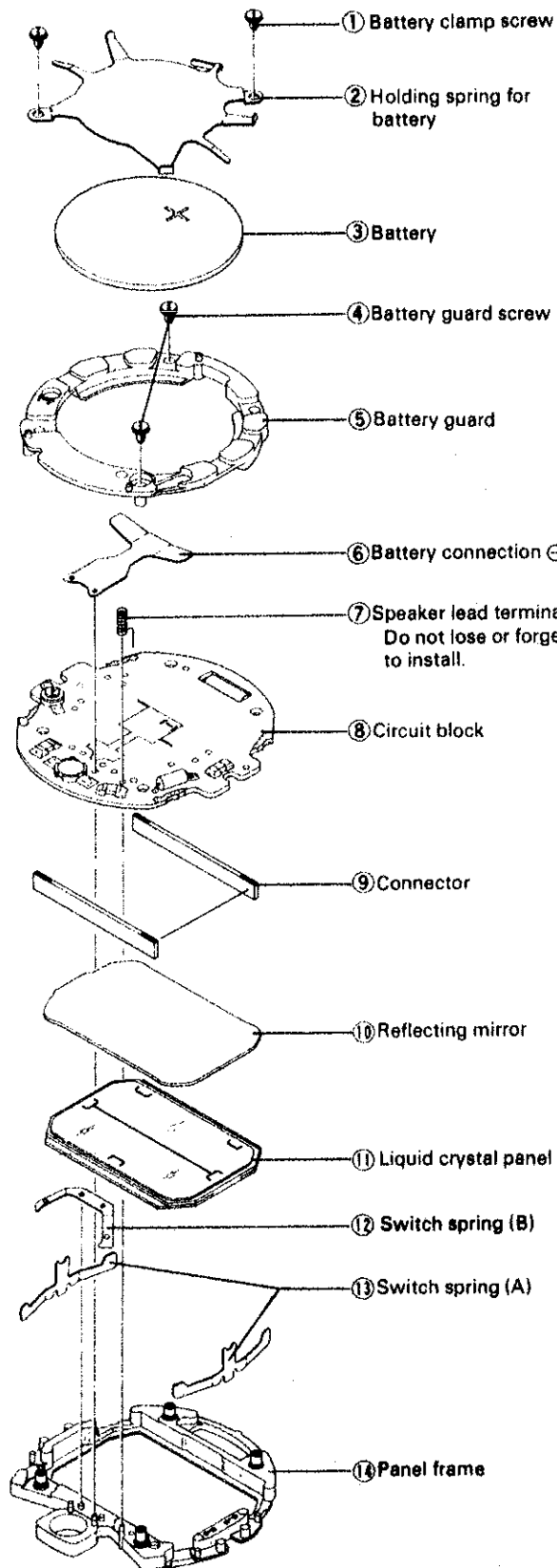
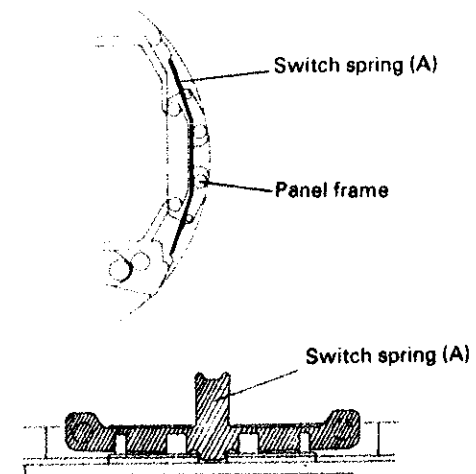
● Switch spring (B)

Install the switch spring (B) in the direction shown in the figure below.



● Switch spring (A)

Install the switch spring (A) as shown in the figure below.

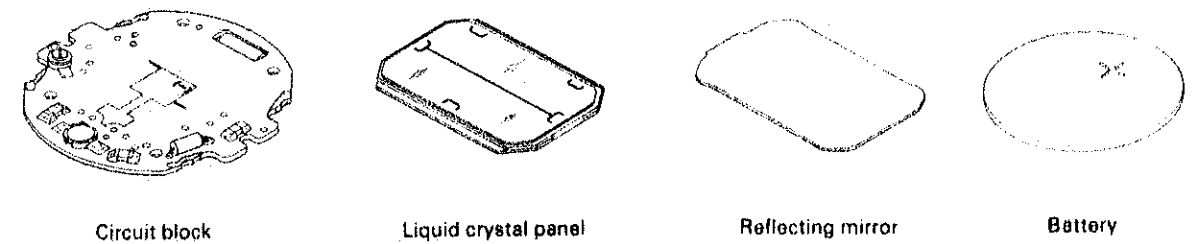


IV. CLEANING

1. How to clean

Name of parts	Cleaning	Drying	Solution	Remarks
Connector	Rinse or wash with a soft brush.	Warm air	Alcohol	<ul style="list-style-type: none"> ● Never use benzene or trichloroethylen as these will melt the connector. ● Do not set the connector until it is completely dry.
Plastic parts (Battery guard) (Panel frame)	Rinse or wash with a soft brush.	Warm air	Alcohol, Benzene	
Other parts (excluding parts that must not be cleaned)	Clean with a cleaner, rinse or gently wash with a soft brush.	Warm or hot air	Benzene, Alcohol	

2. Parts that must not be cleaned

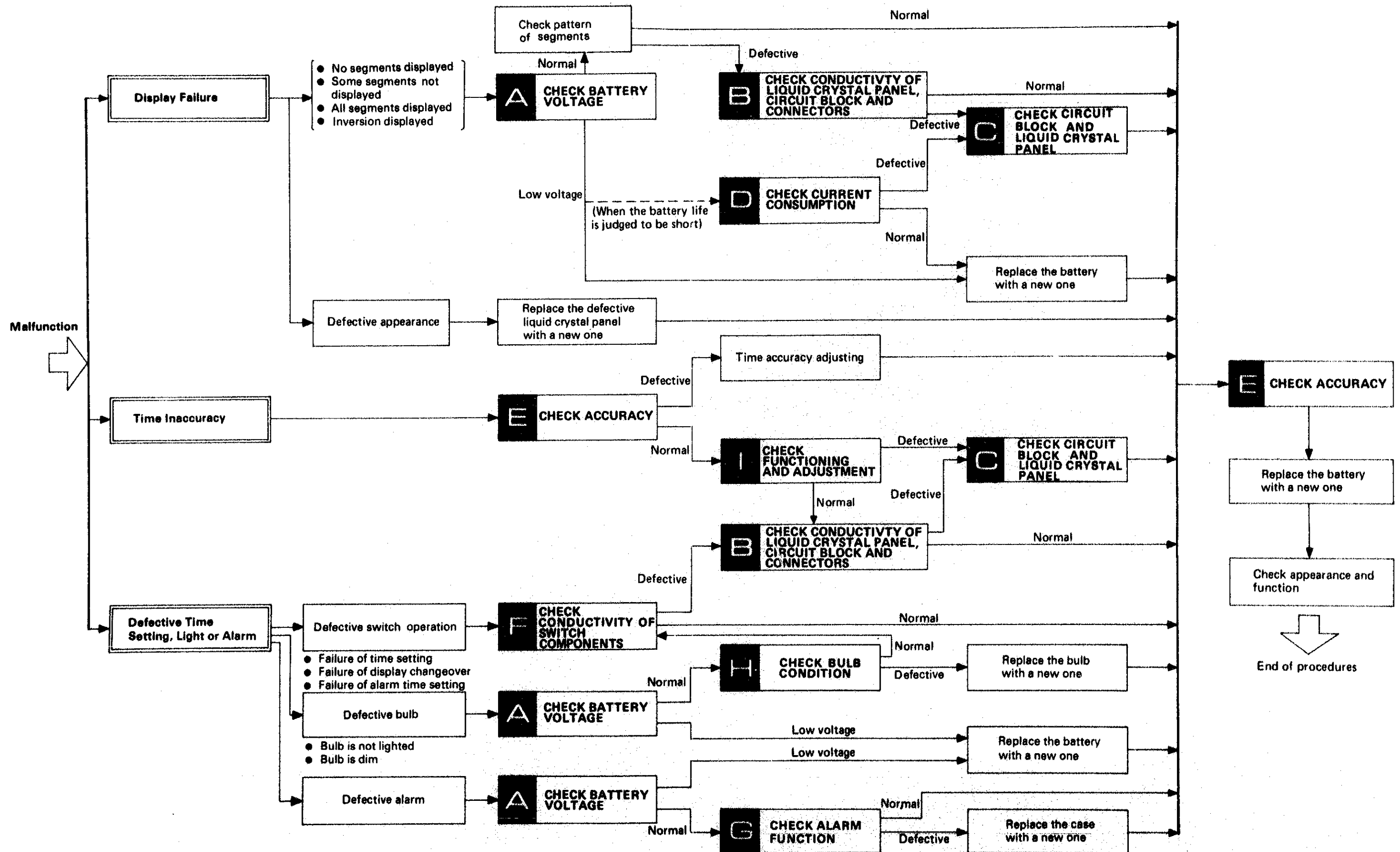


- Only the conductive portions should be wiped with a cloth moistened with benzene or alcohol and dried with warm air.
- Remove dust and lint with a brush.

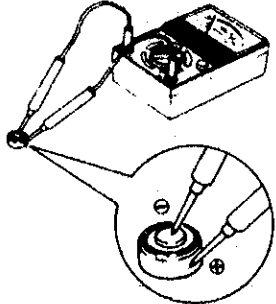
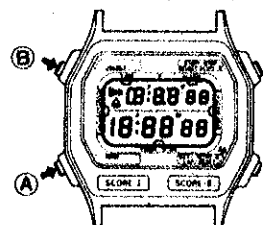

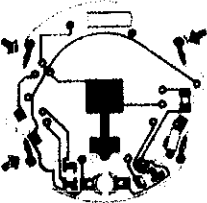
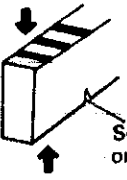
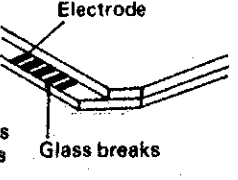
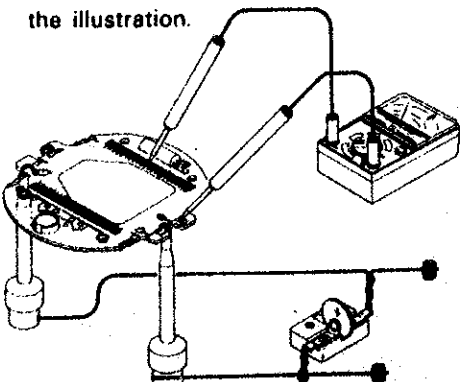
V. CHECKING AND ADJUSTMENT

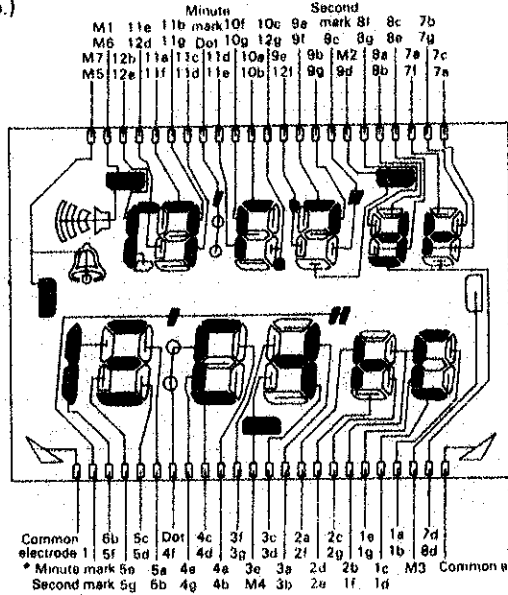
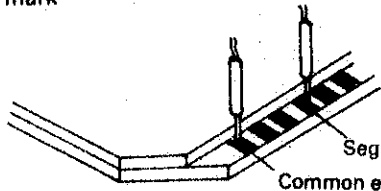


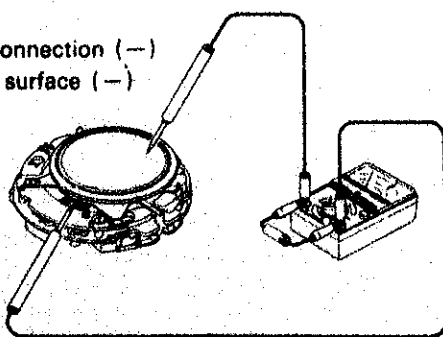
Be sure to use the static electricity protector when handling the module.

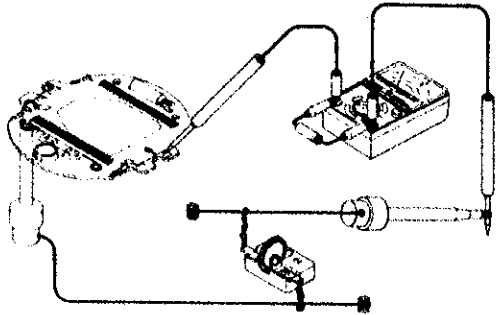
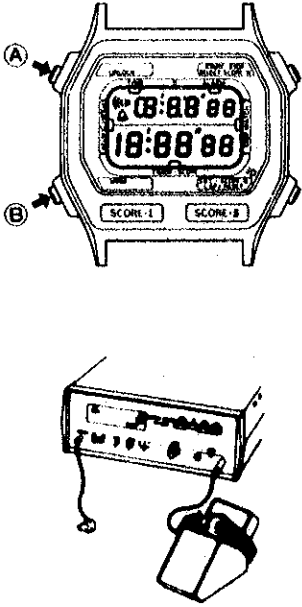
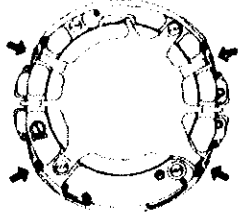
(1) Guide table for checking and adjustment

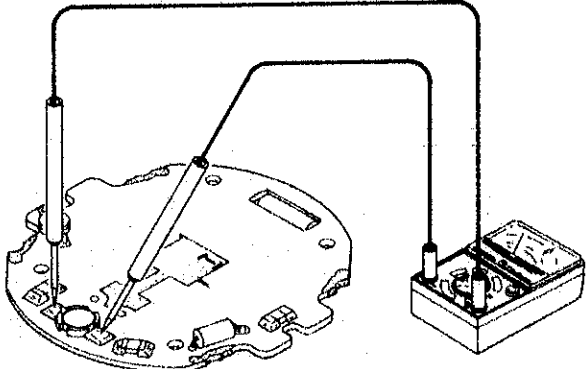
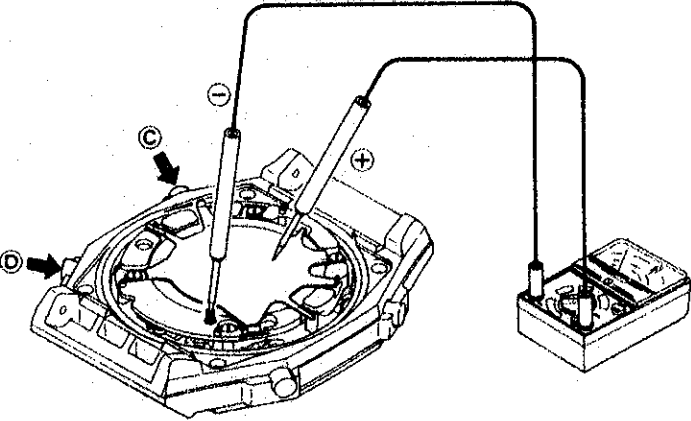
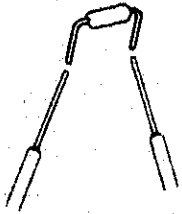


2. Procedure for checking and adjustment

	Procedure	Result and repair
CHECK BATTERY VOLTAGE	<p>Check the battery voltage.</p> <ul style="list-style-type: none"> Set up the Volt-ohm-meter. Range to be used: DC 6V Measuring Red probe (+)... Battery surface (+) Black probe (-)... Battery surface (-) 	<p>When CR2016 is used: 3.0V or more: Normal Less than 3.0V: Defective</p>
CHECK PATTERN OF SEGMENTS	<p>When the left buttons (A) and (B) are depressed for 3 ~ 4 seconds, all segments are displayed. Check the defective segment. (in this mode, the watch accuracy can be measured easily.)</p> 	<p>All segments displayed: Normal Some segments not displayed: Defective Proceed to B and C.</p>
CHECK CONDUCTIVITY OF LIQUID CRYSTAL PANEL, CIRCUIT BLOCK AND CONNECTORS	<p>(1) Check the screws for tightness.</p>  <p>(2) Check for dust, lint, cracks and breaks of the liquid crystal panel and connector and for any contamination of the contacts.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Circuit block</p>  <p>Check four side surface of the switch components.</p> </div> <div style="text-align: center;"> <p>Connector</p>  <p>Contamination, dust or lint</p> </div> <div style="text-align: center;"> <p>Liquid crystal panel</p>  <p>Electrode Scratches or cracks Glass breaks</p> </div> </div>	<p>No loose screws: Normal Proceed to B (2). Loose screws: Defective Retighten</p> <p>Uncontaminated: Normal Contaminated: Defective Wipe off any foreign matter.</p> <p>No scratches, cracks or breaks: Normal Scratches, cracks or breaks: Defective Replace the parts with new ones.</p>
CHECK CIRCUIT BLOCK AND LIQUID CRYSTAL PANEL	<p>(1) Check the circuit block output signal.</p> <ol style="list-style-type: none"> Remove the circuit block from the module. Attach the electricity supplier and Volt-ohm-meter as shown in the illustration.  <p>Set up the Volt-ohm-meter. Range to be used: 3V DC Red probe (+)... Electricity supplier (+) terminal Black probe (-)... Segment electrode</p>	<p>0.8V or more: Normal Less than 0.8V: Defective Replace the circuit block with a new one.</p>

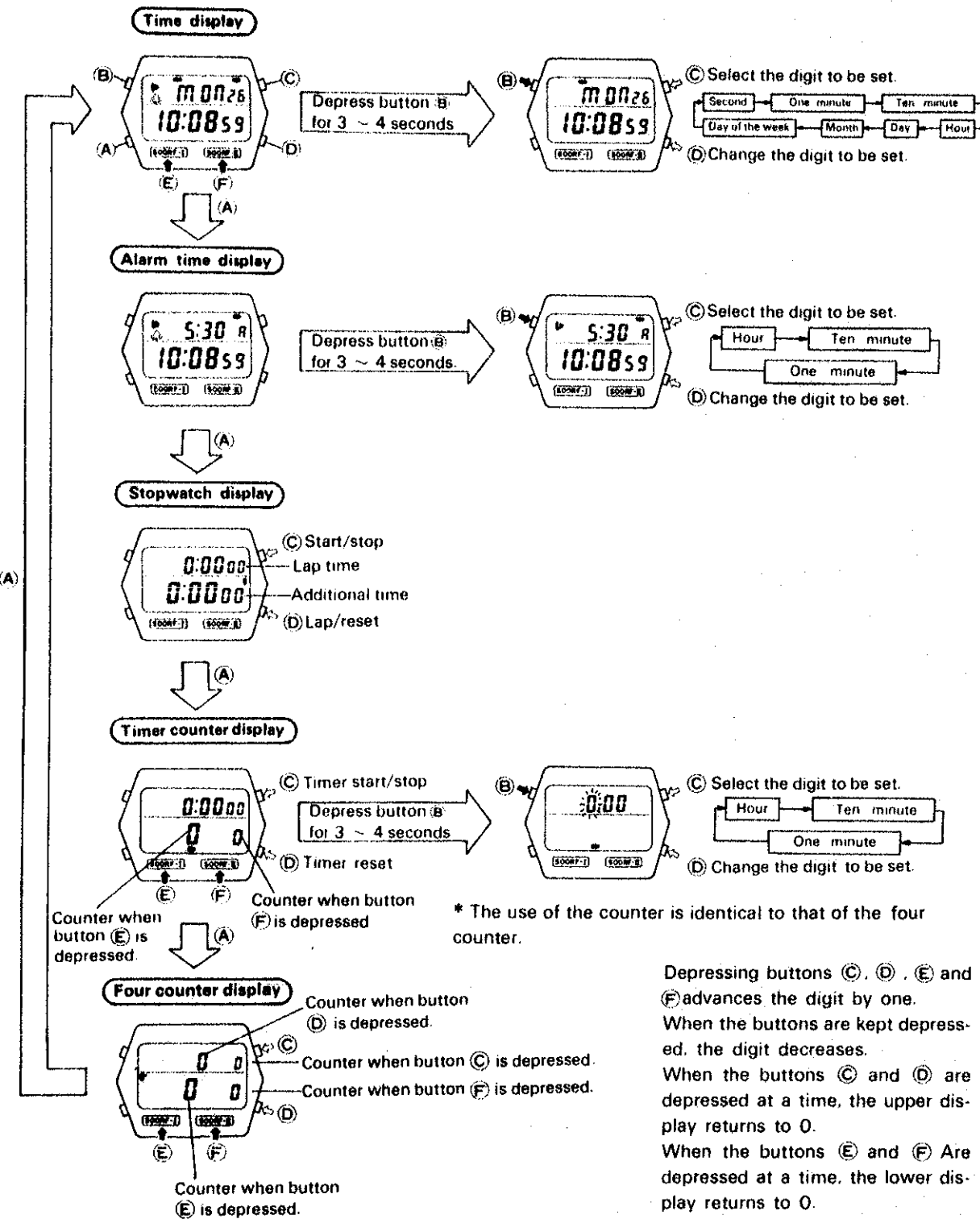
	Procedure	Result and repair
CHECK CIRCUIT BLOCK AND LIQUID CRYSTAL PANEL	<p>(2) Check the liquid crystal panel for broken wire and short-circuit.</p> <ol style="list-style-type: none"> Turn the liquid crystal panel to the reverse side. Set up the Volt-ohm-meter. Range to be used: OHMS R x 1 (Any range will do if more than 3V is applied to the terminal of the Volt-ohm-meter.) Attach the probes to the common electrode and segment electrodes of the liquid crystal panel (Either red or black probe will do.)  <p>(Symbol description) M1: Time display mark M2: Alarm display mark M3: Stopwatch display mark M4: Timer counter display mark M5: Four counter display mark M6: Alarm set mark M7: Alarm signal mark</p>  <ul style="list-style-type: none"> The liquid crystal panel has two common electrodes. Each segment is displayed with the potential difference between one of two common electrodes and each segment electrode. 	<p>Displayed: Normal Not displayed: Defective Replace the liquid crystal panel with a new one.</p> <p>Common electrode 1 is connected electrically with  segment. Common electrode 2 is connected electrically with  segment.</p>
CHECK CURRENT CONSUMPTION	<p>Check if the current consumption is normal.</p> <ol style="list-style-type: none"> Set up the Volt-ohm-meter. Range to be used: DC 12μA Measuring Red probe (+)... Battery connection (-) Black probe (-)... Battery surface (-)  <ul style="list-style-type: none"> As a special IC is used in this watch, the Volt-ohm-meter sometimes swings when measuring. Read the mean value of the Volt-ohm-meter or use condenser kit (250 ~ 500μF). 	<p>1.0μA or less: Normal More than 1.0μA: Defective Replace the circuit block or liquid crystal panel with a new one.</p>

	Procedure	Result and repair
CHECK CURRENT CONSUMPTION	<p>If the current consumption is large, check as follows.</p> <ul style="list-style-type: none"> Judgement for large current consumption Check the current consumption of only the circuit block. Electricity supplier (DC 3V) 	<p>0.8μA or less: Circuit block is normal. Replace the liquid crystal panel with a new one.</p> <p>More than 0.8μA: Circuit block is defective. Replace the circuit block with a new one.</p>
CHECK ACCURACY	<p>Check gain or loss of time by using the Quartz tester.</p> <ol style="list-style-type: none"> Keep the left buttons (A) and (B) depressed for 3 ~ 4 seconds to obtain pattern segment mode. In this mode, the watch accuracy can be measured easily. <ul style="list-style-type: none"> To obtain the time display, depress either button. Set up the Quartz Tester Use the Electric-field detection microphone for liquid crystal panel watch. 	<p>Does not gain or loss: Normal</p> <p>Gains or losses: Defective</p> <p>Adjust the time accuracy by turning the trimmer condenser.</p>
CHECK CONDUCTIVITY OF SWITCH COMPONENTS	 <p>Confirm that the four portions of the switch spring come in contact with the circuit block lead terminals when the four portions are depressed with tweezers.</p>	<p>When switches are not depressed Clearance: Normal No clearance: Defective*</p> <p>When switches are depressed Clearance: Defective* No clearance: Normal</p> <p>*Replace the switch spring with a new one.</p>

	Procedure	Result and repair
CHECK ALARM FUNCTION	<p>Check that the alarm functions correctly.</p> <ol style="list-style-type: none"> Checking up converter coil Measure the upper converter coil resistance of the speaker block to check for a broken wire or short-circuit. Range to be used: OHMS R × 1  <p>Checking alarm output Check that the circuit block supplies correct alarm output.</p> <ol style="list-style-type: none"> Set up the Volt-ohm-meter. Range to be used: DC 12μA Measuring Red probe (+)... Battery guard Black probe (-)... Speaker lead terminal  <ol style="list-style-type: none"> Checking piezo electric element If the alarm does not function even when the upper converter coil and alarm output are normal, check the piezo electric element for scratches and cracks. 	<p>70Ω ~ 95Ω: Normal Less than 70Ω: Defective (short circuit) More than 95Ω: Defective (broken wire)</p> <p>Replace the circuit block with a new one.</p> <p>The Volt-ohm-meter pointer swings when the buttons (C) and (D) are depressed at a time: Normal The volt-ohm-meter pointer does not swing when the buttons (C) and (D) are depressed at a time: Defective Replace the circuit block with a new one.</p> <p>No scratch or crack: Normal Scratches or cracks: Defective If the alarm sound is small, replace the case back.</p>
CHECK BULB CONDITION	<p>Check if there is a broken filament in the bulb.</p> <ol style="list-style-type: none"> Set up the Volt-ohm-meter. Range to be used: OHMS R × 1 Checking Apply two probes of the Volt-ohm-meter to the bulb leads as shown in the illustration. (Either red or black probe will do.) 	<p>Bulb lights up: Normal Bulb does not light up: Defective Replace the bulb with a new one.</p>

Procedure

Depress button (A) and confirm that the display changes correctly.



NOTE:

1. The stopwatch, timer counter, four-counter cannot be used independently. After operating these functions, be sure to reset all the displays of the function used to zero. If all the displays are not reset to zero, the other functions cannot be used.
2. When one of the stopwatch, timer counter and four-counter is being used, the display does not change as shown above, even if the button "A" is depressed.

Example:

Depress button "A" when operating the timer counter, and the display changes as follows:



CHECK FUNCTIONING AND ADJUSTMENT

V. PARTS LIST for Cal. Y665A

PART NO.	PART NAME
4001 202	Circuit block
* 4225 022	Battery clamp
4245 038	Switch spring (A)
4245 039	Switch spring (B)
4246 014	Speaker lead terminal
4270 034	Battery connection (-)
4313 033	Connector
4398 176	Battery guard
4398 178	Liquid crystal panel frame
4610 491	Liquid crystal panel
4521 027	Reflecting mirror
4530 013	Bulb
012 178	Battery guard screw
012 178	Battery clamp screw
017 287	Tube for battery guard
017 287	Tube for battery clamp screw
* Sanyo CR2016	Lithium battery
* MATSUSHITA	
BR2016	

Remarks:

* Battery clamp for Pulsar Watches

4225023 Battery clamp (Pulsar marking)