

TECHNICAL GUIDE

AND
PARTS LIST

CAL. Y760A

DIGITAL QUARTZ

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I. GENERAL

As Cal. No. Y760 uses the module of Y75 series, (not exactly identical), the checking and adjustment procedures are nearly same as those for Y75 series. Described below are the checking and adjustment procedures which are exclusive for Y760.

Major differences between Y760 and Y75 series

(For details, refer to the Manual)

1. As a trimmer condenser is employed, regulation adjustment is possible.
2. When the battery is loaded, the liquid crystal panel sometimes does not function correctly. After loading the battery, follow the specified procedures. (For details, refer to this page and page 5 of the Manual.)
3. For measuring the module current consumption, follow the specified procedures. (For details, refer to this page and page 10 and 11 of the Manual.)
4. Different from the Y75 series, the up-converter coil and crystal unit are placed in the 12 o'clock position. The Y760 is basically identical to Y75 series watch except for the items above.

CHECKING AND ADJUSTMENT WHEN THE BATTERY IS INSERTED

Because of the characteristics of the set IC, the Y760 requires the following adjustment when the battery is loaded.

NOTE:

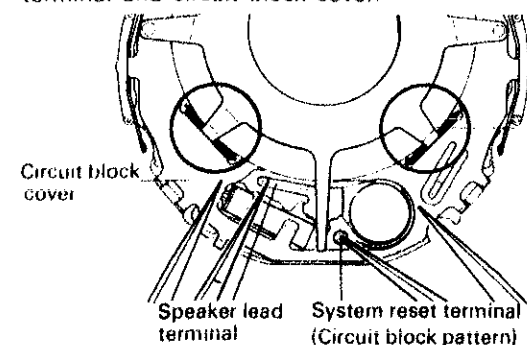
- When the battery is loaded, the Y760 is liable to enter the alarm mode. At that time, the liquid crystal panel shows wrong or no display and in the circuit block alarm signal outputs of 3mA. If the following procedure is not performed, the battery immediately runs down and the liquid crystal panel shows no display. When the battery is loaded, always proceed as follows.

MODULE SETTING WHEN THE BATTERY IS LOADED

- When the battery is loaded, the liquid crystal panel shows the wrong or no display. Just after loading the battery, perform either of the below procedures.

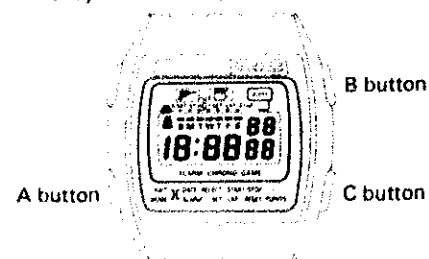
(Procedure 1)

After inserting battery, short-circuit the speaker lead terminal and circuit block cover (+), then system reset terminal and circuit block cover.



(Procedure 2)

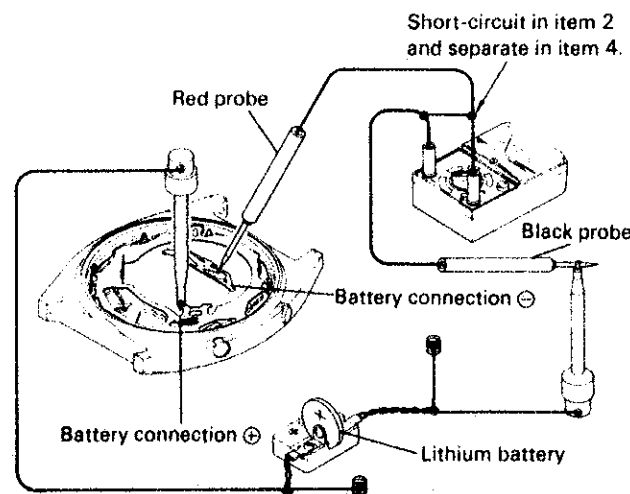
Just after inserting the battery, close the case back as shown in the below figure and depress the A, B and C buttons at the same time for 1 ~ 2 seconds. (This will function the system reset.)



CURRENT CONSUMPTION MEASUREMENT

- The current consumption measurement of the circuit block or module differs greatly from that of the Y75 series. Proceed as follows.

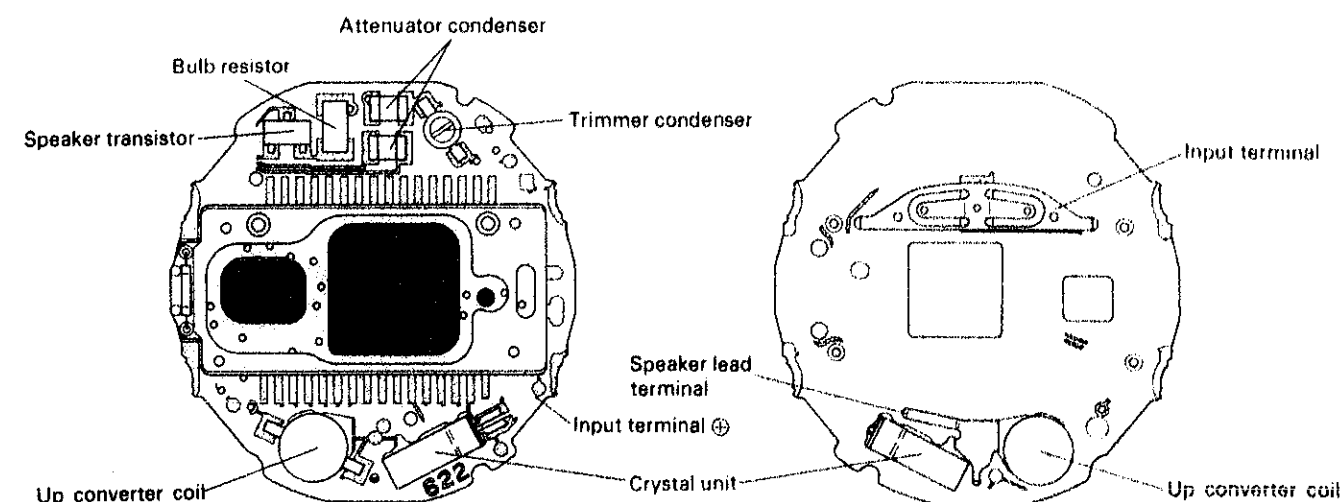
1. Connect the module as shown below.
2. Short-circuit the (+) and (-) leads of Volt-ohm-meter.
3. Short-circuit the speaker lead terminal and circuit block cover (+), then circuit block cover and system reset terminal.
4. Separate the (+) and (-) leads which are short-circuited in item 3 and the correct current consumption can be measured.



II. SPECIFICATIONS

Item	Cal No.	Y760A
Display medium		Nematic Liquid Crystal . FEM (Field Effect Mode)
Liquid crystal panel drive system		Multiplex
Display system		<ul style="list-style-type: none"> • Time function • Time and calendar adjusting function • Alarm set function • Stopwatch function • Game 1 mode (Gunman game) • Game 2 mode (Slot machine game)
Additional mechanism		<ul style="list-style-type: none"> • Pattern segment checking system • Illuminating light • Time signal • Sound demonstration function
Loss/gain		Loss/gain at normal temperature range: Less than 15 seconds per month.
		φ27.1 mm
		5.0 mm (Casing diameter)
Regulation system		Trimmer condenser
Measuring gate		Any gate
Battery life:		Approx. 3 years
Battery		Lithium battery: Maxell CR2016 or Matsushita BR2016
		Voltage: 3V

III. CIRCUIT BLOCK SCHEMATIC



Circuit block identification

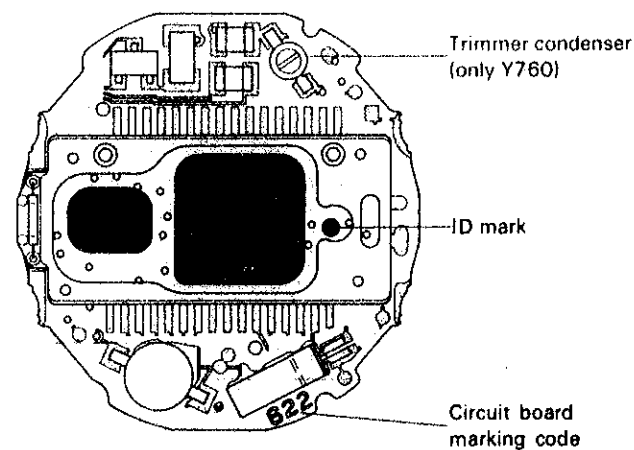
Identify the circuit block with using both the ID mark and marking code on the circuit board. In Y760, a trimmer condenser, which is not used in Y75 or Y74 series watch, is used.

Cal	2-chip/1-chip	Color of ID mark	Main plate marking code	Alarm (Speaker lead terminal, booster coil, speaker transistor)
Y740	2-chip	Black	632	No
	1-chip	↑	619	↑
Y750	1-chip	Non	619	↑
Y744	2-chip	Yellow	632	↑
Y746	2-chip	Non	↑	↑
	1-chip	Non	638	↑
Y756	2-chip	White	632	↑
Y749	2-chip	Non	↑	Yes
	1-chip	Non	638	↑
Y759	2-chip	White	632	↑
Y7580	1-chip	Non	618	↑
Y7581	1-chip	White	↑	↑
Y760	2-chip	Non	622	↑

MAJOR DIFFERENT POINTS

- (1) ID mark color
- (2) No of MOS IC chips
- (3) Main plate marking code
- (4) Alarm component parts
- (5) Trimmer condenser

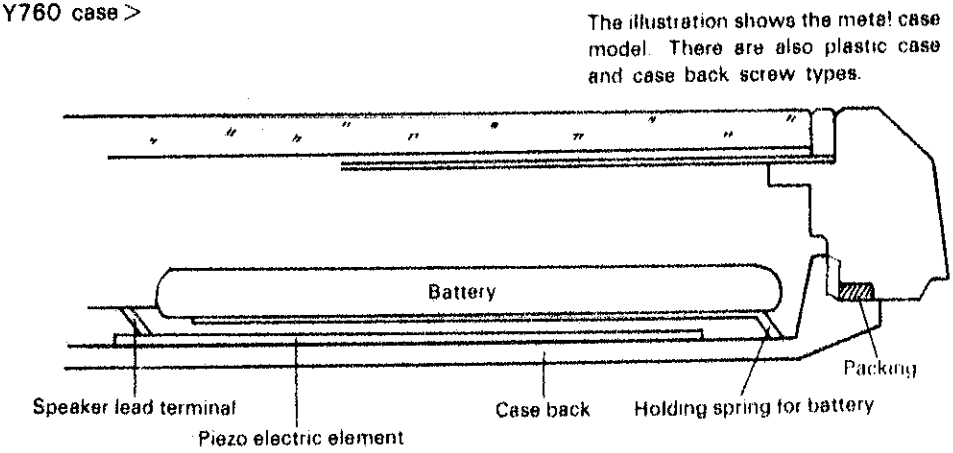
For these points, refer to the above table.



IV. PIEZO ELECTRIC SPEAKER

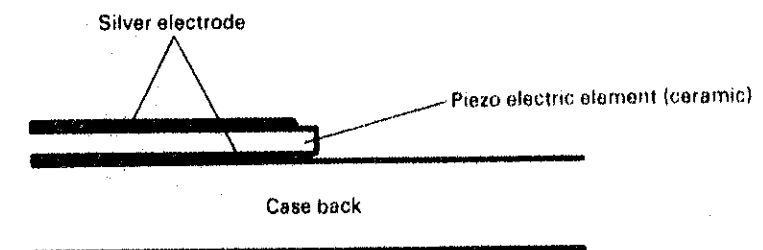
- The alarm of the Y760 is a piezo electric system using a piezo electric element which differs from an electromagnetic system. When a voltage is applied to the piezo electric element on the case back, mechanical distortion occurs in the element, similar to what occurs when a voltage is applied to the quartz oscillator. The distortion is transferred to the case back which vibrates to generate sound.

< Cross section of Y760 case >



- 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

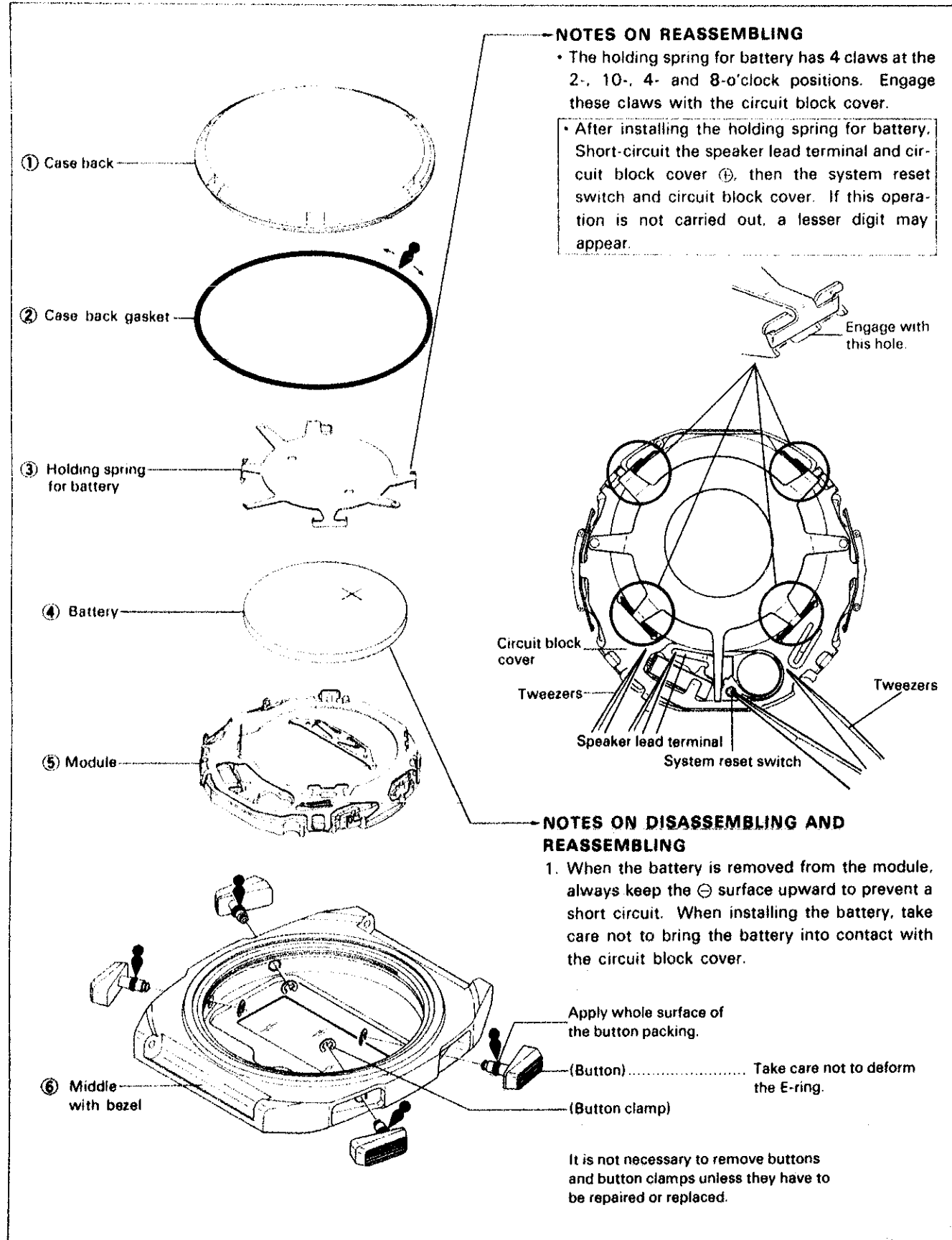
If the piezo electric element is peeled off the case back or cracked, or if the booster coil wire is broken or if the speaker lead terminal is bent, speaker sound will be adversely affected. Be careful in handling during disassembly and reassembly. When cleaning the case back, do not scratch the piezo electric element. The supersonic cleaning will effect the piezo electric element bonding.

V. DISASSEMBLING, REASSEMBLING, LUBRICATING AND CLEANING

1. Disassembling, reassembling and lubricating of the case

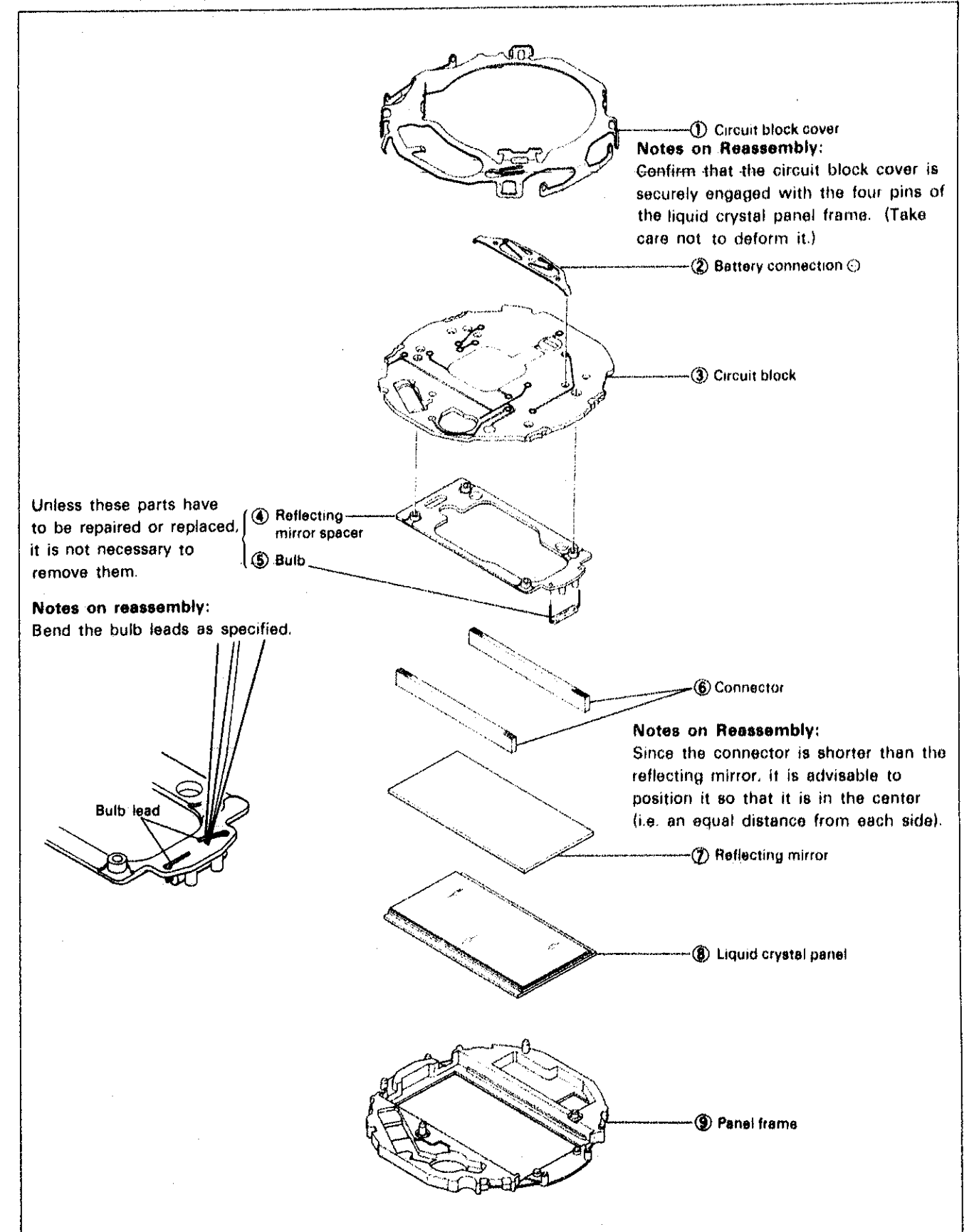
- Disassembling procedures: Figs. ① → ⑥
- Reassembling procedures: Figs. ⑥ → ①

• Lubrication:  Silicon grease (500,000 c.s.)


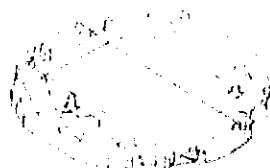


2. Disassembling, reassembling and lubrication of the module

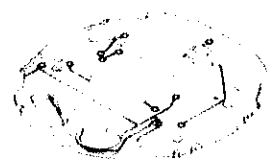
- Disassembling procedures: Figs. ① → ⑨
- Reassembling procedures: Figs. ⑨ → ①



3. Cleaning

Name of parts	Cleaning	Drying	Solution	Remarks
Connector 	Rinse or wash with a soft brush.	Warm air	Alcohol	<ul style="list-style-type: none"> ● Clean the contacting portion between the connector and liquid crystal panel, and circuit block. ● Never use benzene or trichloroethylene as these will dissolve the parts. ● Do not set the connector until it is completely dry.
Plastic parts <ul style="list-style-type: none"> ● Panel frame  <ul style="list-style-type: none"> ● Reflecting mirror spacer 	Rinse or wash with a soft brush.	Warm air	Alcohol or benzene	
Metal parts <ul style="list-style-type: none"> ● 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	

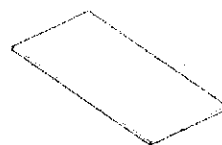
● Parts that must not be cleaned



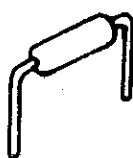
Circuit block



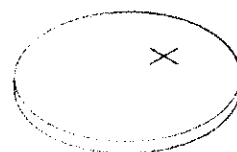
Liquid crystal panel



Reflecting mirror



Bulb



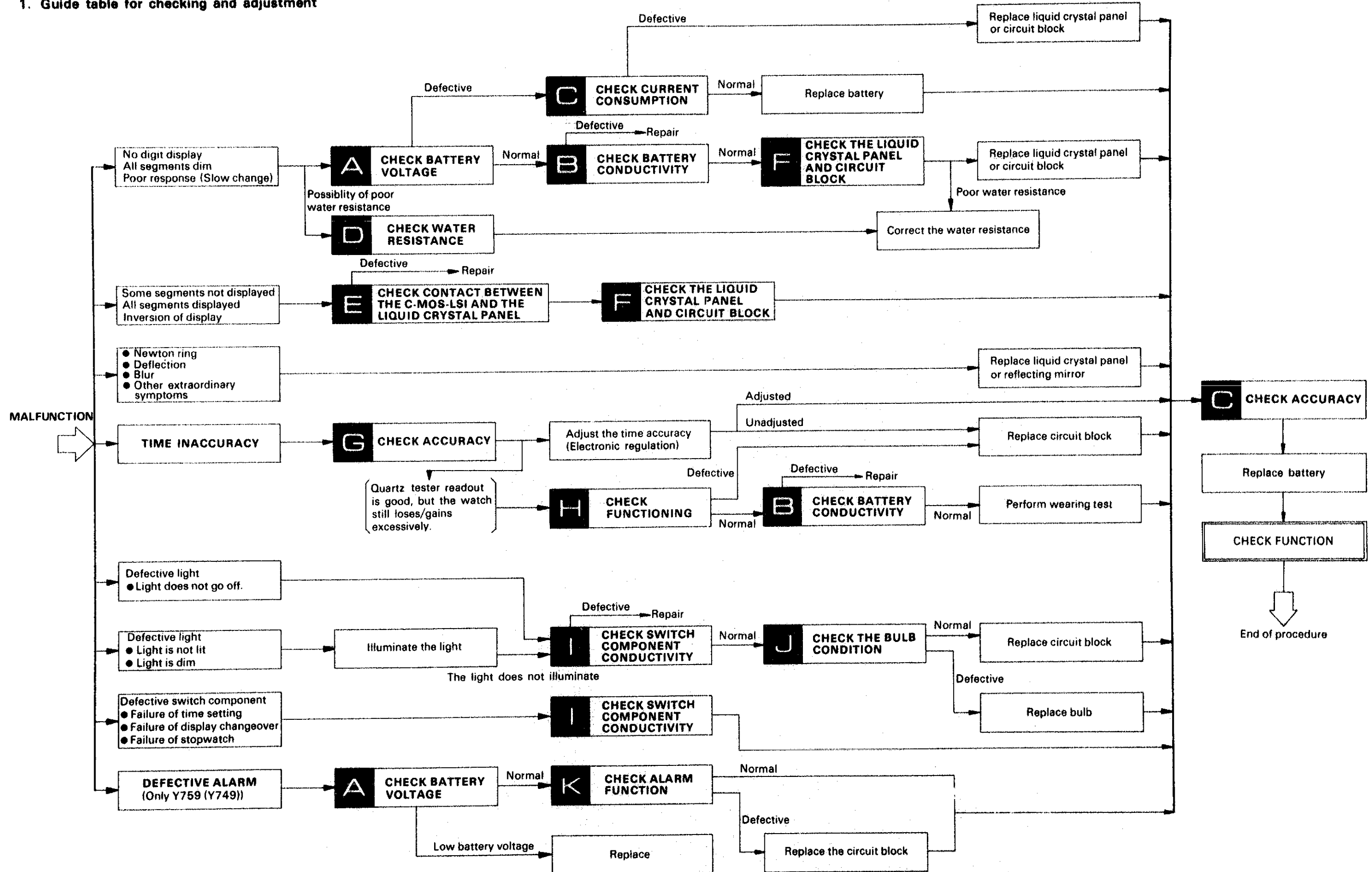
Battery

- 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.

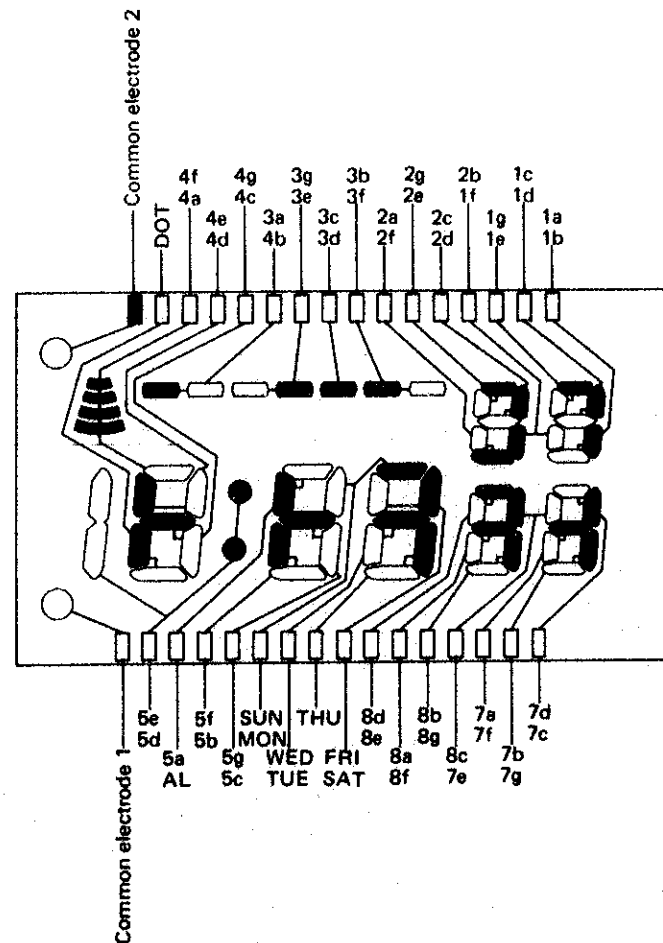
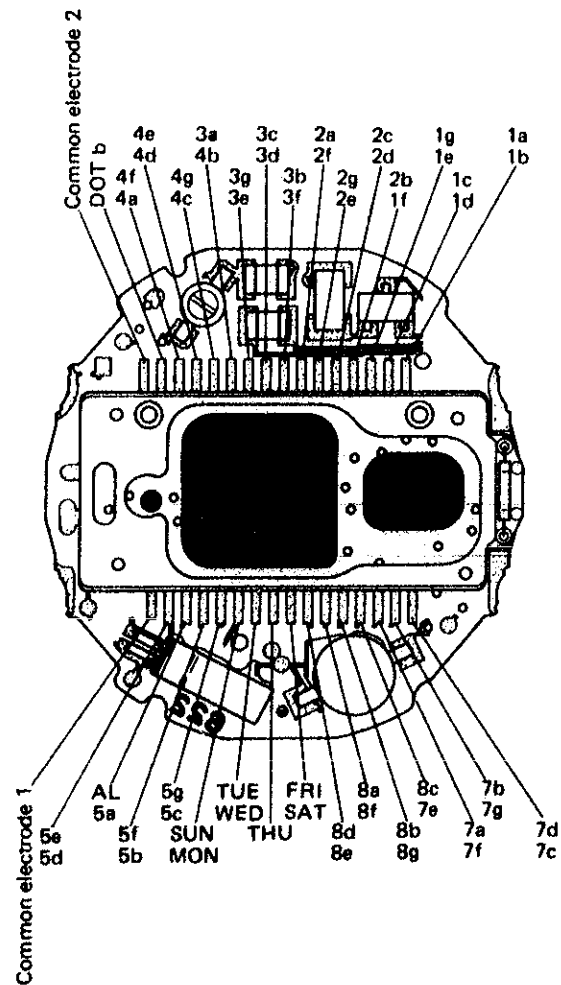
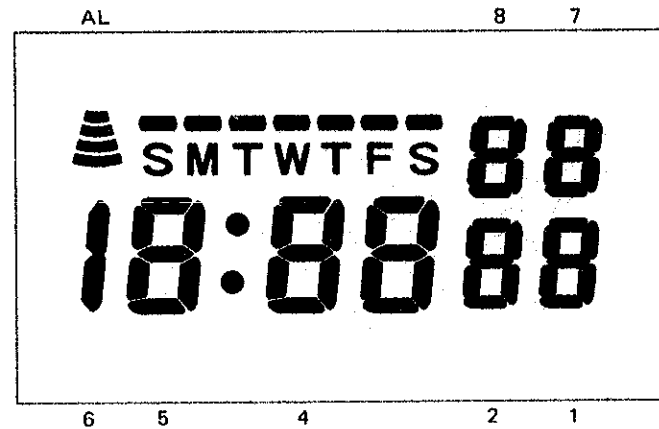
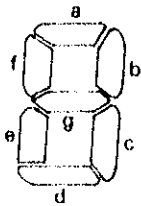
1. Guide table for checking and adjustment



2. Relationship between the segments (liquid Crystal 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 terminal is necessary for proper checking and adjustment.

• Designation of segment

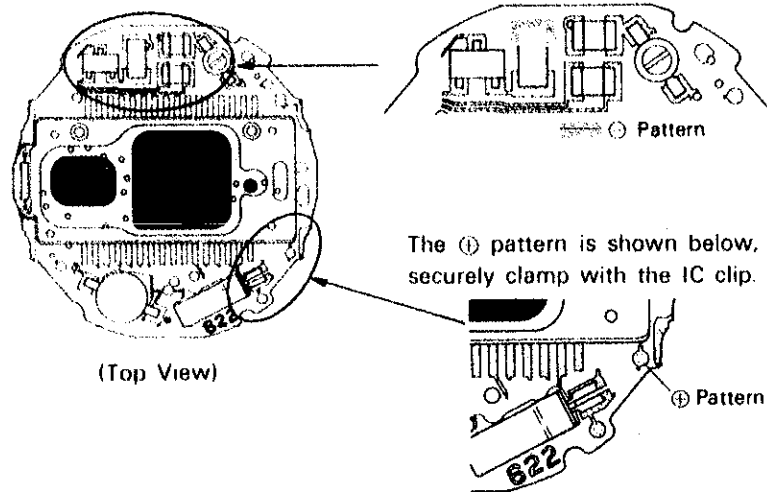


3. Procedures for checking and adjustment

	Procedure	Adjustment and repair
CHECK BATTERY VOLTAGE	<p>Note: Shortly after the light is lit, the battery voltage is occasionally low.</p>	2.6V or more ... Normal Less than 2.6V ... Defective (If the battery surface is protruded, replace the battery with a new one.)
CHECK BATTERY CONDUCTIVITY	<p>Check the battery, circuit block cover and battery connection ⊖ for contamination.</p> <p>Note: Do not bend the battery connection ⊖ and holding spring for battery.</p>	Uncontaminated: Normal Proceed to F Contaminated: Defective Clean. Poor water resistance is found: Correct water resistance
CHECK CURRENT CONSUMPTION	<p>(1) The current consumption measurement of the circuit block or module differs greatly from that of the Y75 series. Proceed as follows.</p> <ol style="list-style-type: none"> 1. Connect the module as shown below. 2. Short-circuit the ⊕ and ⊖ leads of Volt-ohm-meter. 3. Short-circuit the speaker lead terminal and circuit block cover ⊕, then circuit block cover and system reset terminal. 4. Separate the ⊕ and ⊖ leads which are short-circuited in item 3 and the correct current consumption can be measured. <p>Short-circuit in item 2 and separate in item 4.</p> <p>REASON: Because of the characteristics of the employed IC, the watch is liable to enter alarm mode when the battery is inserted. If the above procedure is not carried out, the alarm output current will be measured.</p>	Less than 1.7 μA ... Normal 1.7 μA or more: Defective Proceed to C

- (2) Check current consumption of circuit block
Measure the current consumption of the circuit block in the same manner as that of the module. (Items 1 ~ 4). The ⊕ and ⊖ patterns required for checking are shown below.

Clamp the ⊖ pattern above the white bulb resistor and soldered part with the IC clip. (Shaded part in the illustration below).

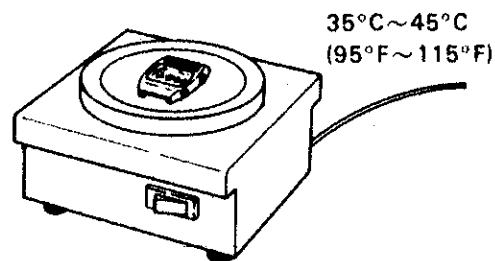


Adjustment and repair

Less than 1.5 μ A:
Normal
Replace the liquid crystal panel.
1.5 μ A or more ... Defective
Replace the circuit block.

NOTE:
There are B switch pattern and ⊖ pattern in the right and left sides of the ⊕ pattern respectively. Take care not to have the IC clip make contact with them.

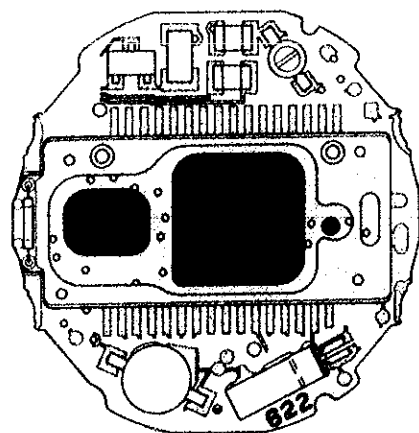
- Check for moisture in the watch.
1. Place the watch on a hot plate and heat it for 15 minutes.



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.

- (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

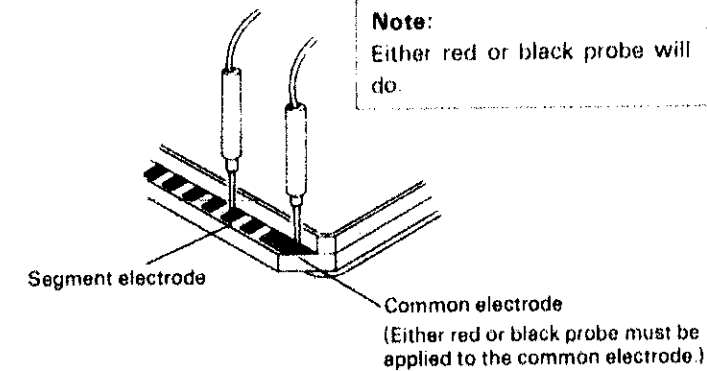
- Check to see if the liquid crystal panel and circuit block function correctly. (Refer to "Relationship between the segments (Liquid Crystal Panel electrodes) and C-MOS-LSI output terminals" on page 9)

- (1) Checking the liquid crystal panel

1. Set up the Volt-ohm-meter
Range to be used: OHMS $R \times 1 \sim R \times 1K$

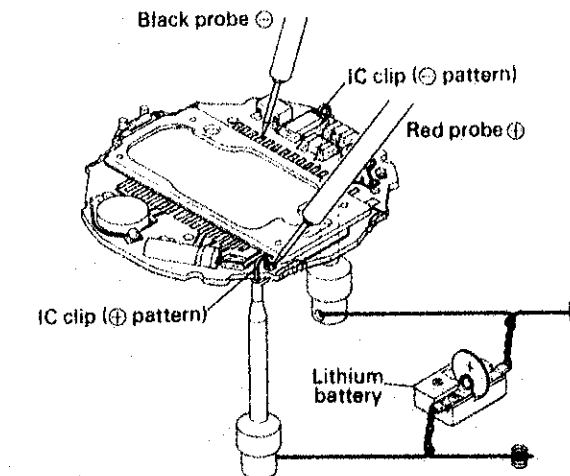
Note:
Any range will do if more than 3V is applied to the terminal of the Volt-ohm-meter. In some Volt-ohm-meters, a voltage of more than 3V cannot be applied to the terminal. In this case, all segments are not displayed. Use a higher resistance range ($R \times 10K$).

2. Remove the liquid crystal panel from the module and turn it to the reverse side.
3. Check that the corresponding segment is displayed.



- (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. At this time, the watch is sometimes in the alarm mode. Connect the speaker lead terminal and ⊕ pattern, then system reset terminal and ⊖ pattern.

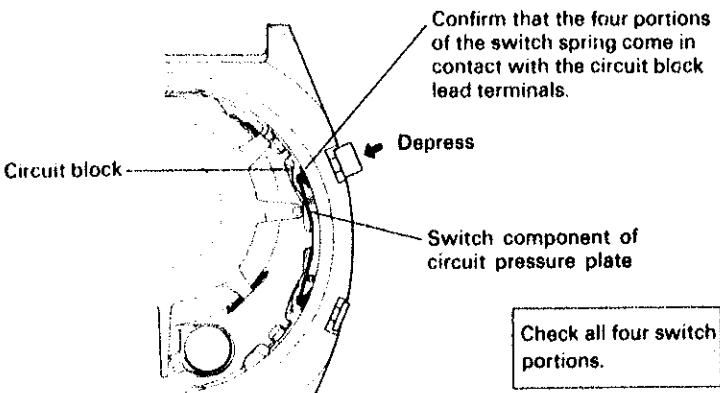
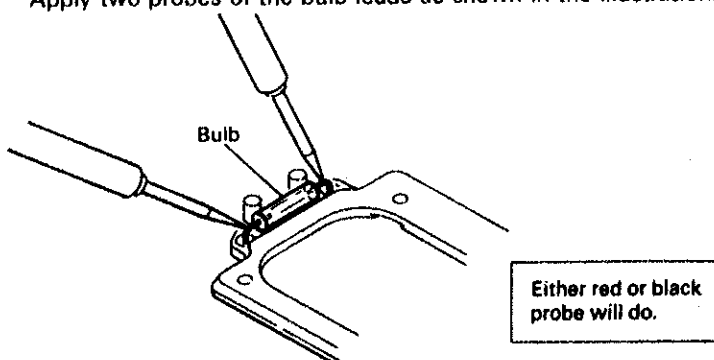


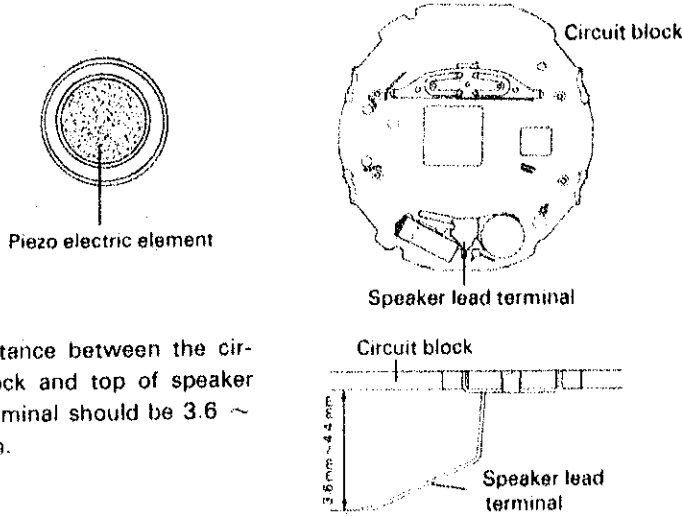
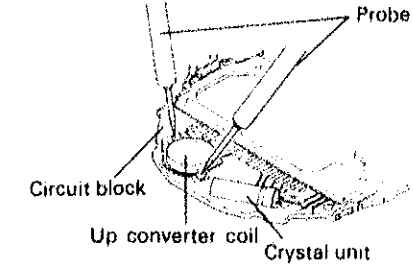
- 3) Checking
Red probe: Circuit block ⊕ terminal
Black probe: C-MOS-LSI output terminal
(If a segment is defective, connect the black probe to the corresponding electrode.)

Adjustment and repair

Displayed ... Normal
Proceed to **F**.
Not displayed ... Defective
Replace the liquid crystal panel.

0.8V or more ... Normal
(The voltage at all terminals should be more than 0.8V)
Return to E.
Less than 0.8V ...
Defective
Replace the circuit block.

	Procedure	Adjustment and repair
CHECK ACCURACY	<ol style="list-style-type: none"> Measuring mode Set the watch in the pattern segment mode. Any measuring gate of the Quartz tester can be used. Adjust the level. Measure the accuracy. 	<p>Does not loss or gain ... Normal Loses or gains ... Defective Adjust the time accuracy by trimming the trimmer condenser.</p>
CHECK FUNCTIONING	<ol style="list-style-type: none"> Check that the time mode and calendar mode are changed correctly. Check the functioning for each digit in the time and calendar modes and confirm that the digit is advanced correctly. 	<p>Functions correctly and can be adjusted ... Normal Wear the watch on the wrist to check time accuracy.</p> <p>Does not function correctly or cannot to be adjusted ... Defective Replace the circuit block with a new one.</p>
CHECK THE CONDUCTIVITY OF SWITCH COMPONENT	<p>(1) Check to see if the switch spring functions correctly.</p>  <p>(2) Check for dust, lint and other contamination of the connection portions.</p>	<p>Functions correctly: Normal</p> <p>Does not function correctly: Defective Correct the switch spring with tweezers, or replace the switch spring with a new one.</p> <p>Uncontaminated ... Normal Contaminated ... Defective Wipe off any foreign matter.</p>
CHECK BULB CONDITION	<p>(1) Check to see 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 x 1 Checking Apply two probes of the bulb leads as shown in the illustration. 	<p>Bulb lights up ... Normal Bulb does not light ... Defective Replace the bulb with a new one.</p>

	Procedure	Adjustment and repair
CHECK ALARM FUNCTION	<p>(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 contamination.</p>  <ul style="list-style-type: none"> The distance between the circuit block and top of speaker lead terminal should be 3.6 ~ 4.4 mm. <p>(3) Measure resistance of the up converter coil to check for a short-circuit and a broken wire. Range to be used: OHMS R x 1</p> <ul style="list-style-type: none"> Checking Attach the probes to the up converter coil terminals. Either red or black probe will do. 	<p>Uncontaminated ... Normal Contaminated ... Defective Wipe off any foreign matter.</p> <p>Deformed ... Defective Correct with tweezers.</p> <p>3.6 ~ 4.0 mm ... Normal Less than 3.6 mm or more than 4.4 mm ... Defective Correct with tweezers When expanding the speaker lead terminal, confirm that the speaker lead terminal comes in contact with the piezo electric element terminal.</p> <p>20Ω ~ 35 Ω ... Normal Less than 20Ω (short-circuit) ... Defective More than 30Ω (Broken wire) ... Defective Replace the circuit block with a new one.</p>
HOW TO CHECK FOR BATTERY ELECTROLYTE LEAKAGE AND REPAIR	<ol style="list-style-type: none"> Remove the module from the case. Disassemble the module. Wipe off any electrolyte from the circuit block. <ol style="list-style-type: none"> Wipe off the electrolyte with cloth moistened with alcohol. (Pay particular attention to the connecting portion.) Dry with warm air by using a dryer. <p>Note:</p> <ul style="list-style-type: none"> If the electrolyte leakage is excessive, replace the circuit block. Use a lint-free cloth. <ol style="list-style-type: none"> Clean other parts (circuit block cover, panel frame, battery connection ⊖ and reflecting mirror spacer) which have become contaminated with the electrolyte. <ol style="list-style-type: none"> Wipe off battery electrolyte on the otehr parts with a soft brush moistened with alcohol. Dry with warm air by using a dryer. <p>NOTE:</p> <ul style="list-style-type: none"> Do not clean the bulb which is installed in the reflecting mirror spacer. If the bulb or any other parts are damaged, replace it with a new one. <ol style="list-style-type: none"> Reassemble the module. Replace the battery with a new one. Check function and current consumption. 	

PARTS LIST

CAL. Y760A

Cal. Y760A	
PART NO.	PART NAME
4001 622	Circuit block
4226 622	Holding spring for battery
4270 632	Battery connection
4313 632	Connector
4398 633	Liquid crystal panel frame
4408 635	Reflecting mirror spacer
4467 632	Circuit block cover
4510 635	Liquid crystal panel
4521 770	Reflecting mirror
4530 649	Bulb
Maxell CR2016 Matsushita BR2016	Lithium Battery