

# TECHNICAL GUIDE

CAL. Y771A

## DIGITAL QUARTZ

### FOREWORD

#### CHECKING AND ADJUSTMENT WHEN THE BATTERY IS INSERTED

Because of the characteristics of the set IC, the Y771A requires the following adjustment when the battery is loaded.

##### [Battery loading and module assembly]

- When the battery is loaded, the liquid crystal panel shows the wrong or no display. After loading the battery, perform the system reset procedure below.

##### < Procedure >

- (1) Just after inserting the battery, depress buttons A, B, C and D simultaneously for a few seconds.
- (2) When button D is released first, the alarm sounds continuously. Always release the buttons other than D first. If the alarm sounds continuously, depress buttons A, B, C and D simultaneously.



##### [Measuring the current consumption]

- Before measuring the current consumption of module or circuit block, the system reset procedure should be performed.

For details, refer to "CHECKING AND ADJUSTMENT" on page 9.

The seal giving the above system reset procedure is stuck on the case back inside.

**NOTE**  
Push 4 buttons  
together after  
replacing the  
battery.

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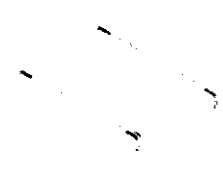
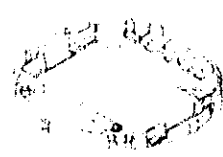
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## I. SPECIFICATIONS

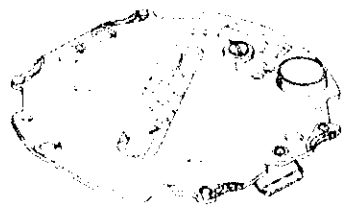
Item	Cal. No.	Y771 A
Display medium		Nematic Liquid Crystal, FEM (Field Effect Mode)
Display system		<ul style="list-style-type: none"> <li>● Time display</li> <li>● Alarm display (Alarm 1/alarm 2)</li> <li>● Stopwatch display</li> <li>● Memory display</li> <li>● Time setting display</li> </ul>
Additional mechanism		<ul style="list-style-type: none"> <li>● Pattern segment checking system</li> <li>● Illuminating light</li> <li>● System reset function</li> <li>● Alarm test system</li> </ul>
Loss/gain		Loss/gain at normal temperature range. Monthly rate: Less than 15 seconds
Casing diameter		φ28.1 mm
Height		4.9 mm
Liquid crystal panel drive system		Multiplex (segment), Dot matrix (dot)
Regulation system		Trimmer condenser
Measuring gate		Any gate is available
Battery		Lithium battery: Matsushita BR2016, Maxell CR2016 Voltage: 3.0V Battery life: approx. 2 years



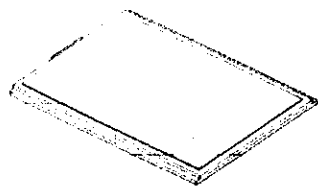
## 2. Cleaning

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

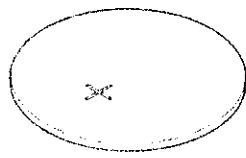
### ☆ Parts that must not be cleaned



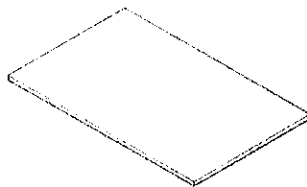
Circuit block



Liquid crystal panel



Battery

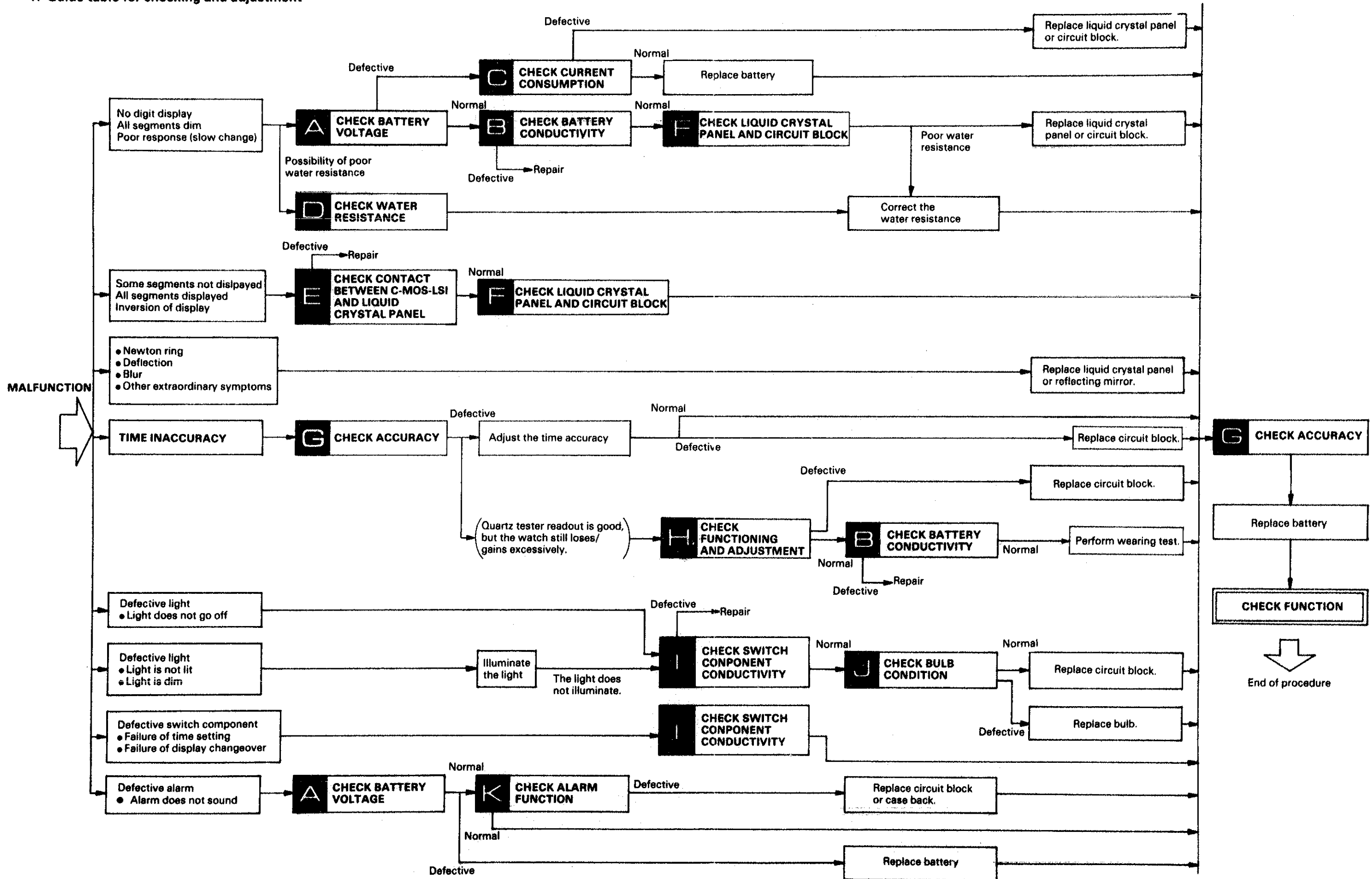


Reflecting mirror

- Only the conductive portions (liquid crystal panel and circuit block etc.) 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.

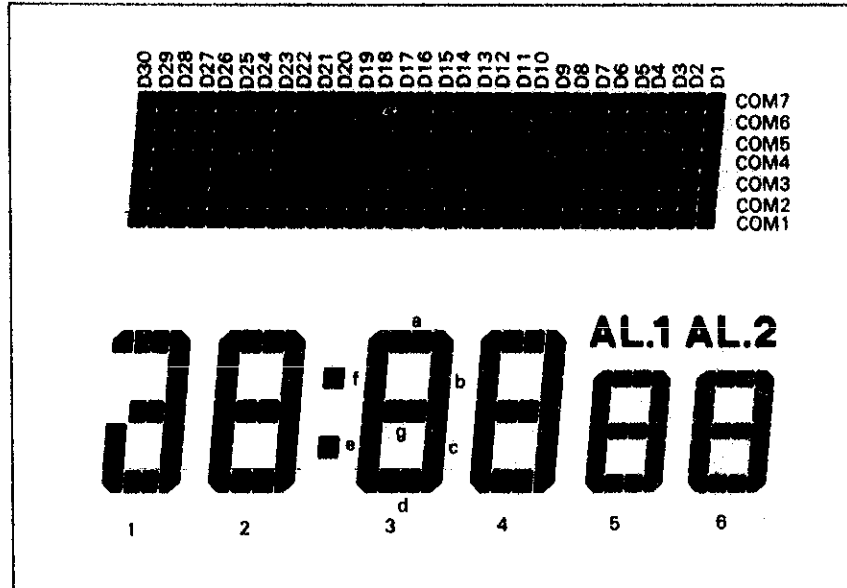
# IV. CHECKING AND ADJUSTMENT

## 1. Guide table for checking and adjustment



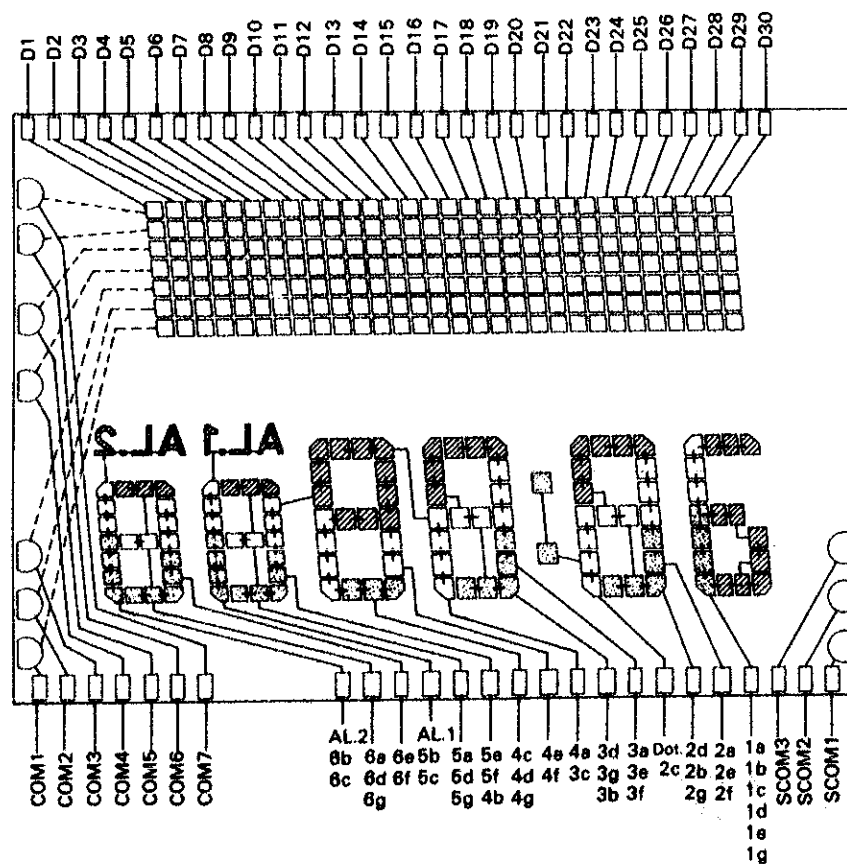
2. Relationship between the segments (Liquid Crystal Panel electrodes) and C-MOS-LSI output terminals

● Disignation of segment

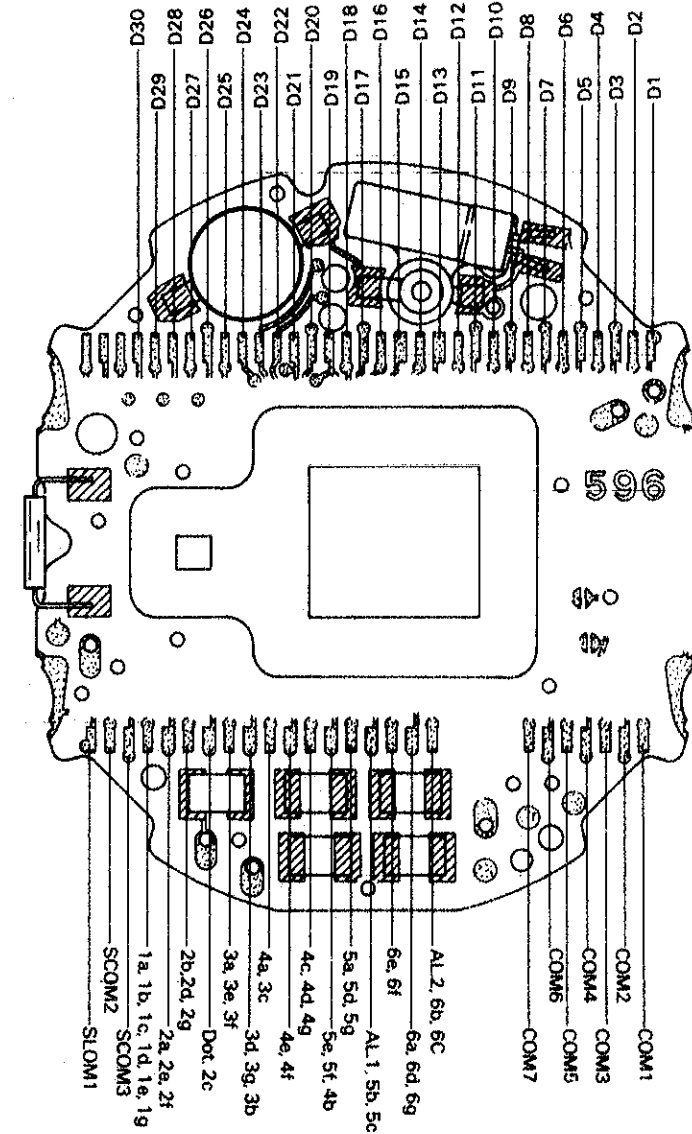


**NOTE:**  
As Cal. Y771 uses dot matrix system, the common electrodes of the liquid crystal panel are described as follows.  
Segment display..... SCOM  
Dot display ..... COM

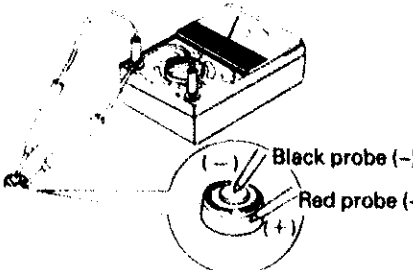
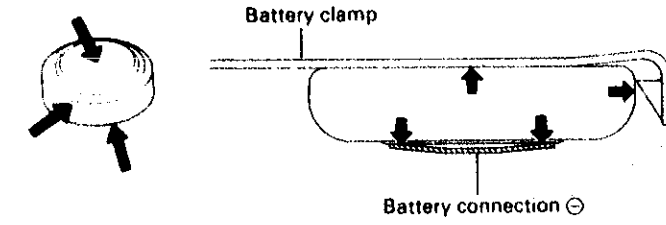
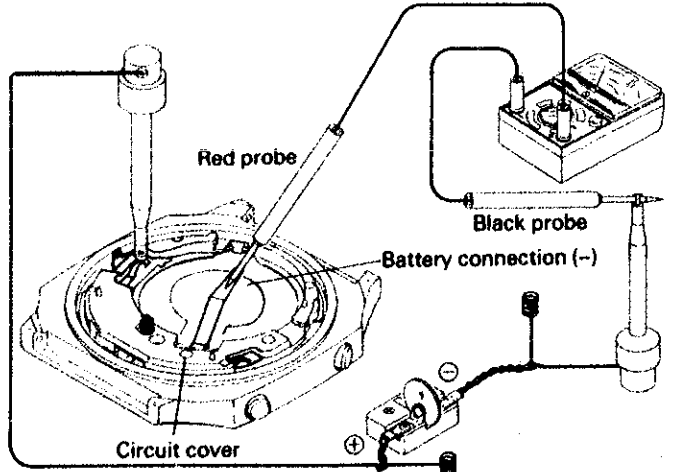
● Segment (liquid crystal panel electrodes)

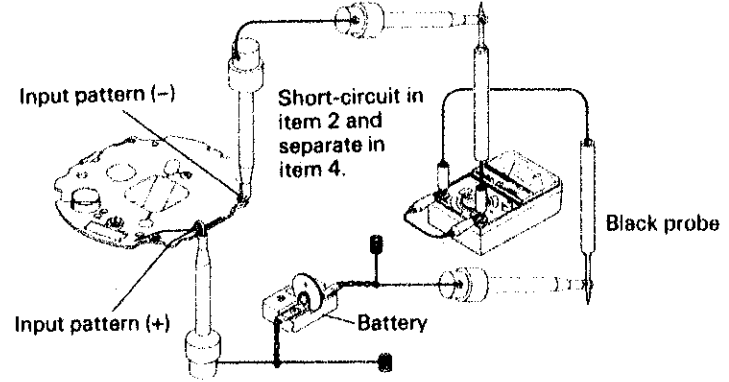
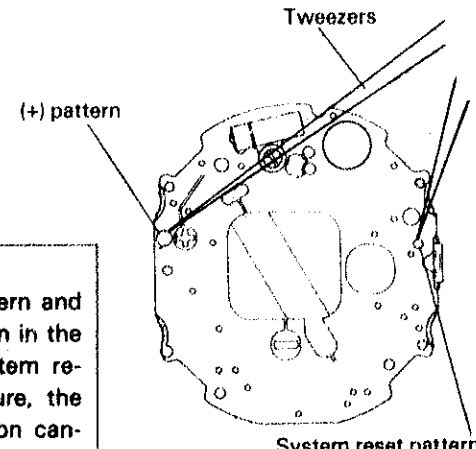
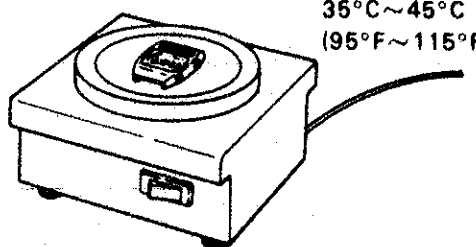


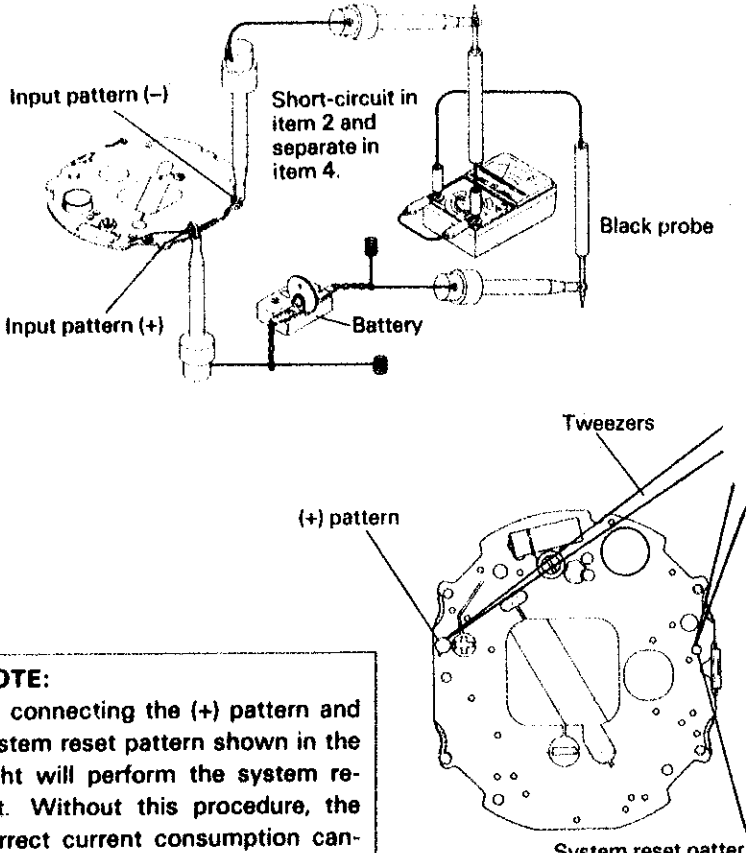
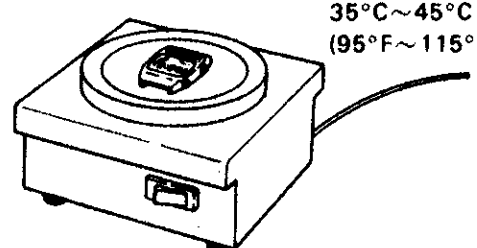
● C-MOS-LSI output terminal

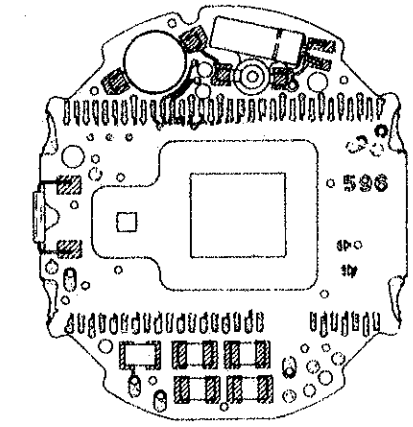
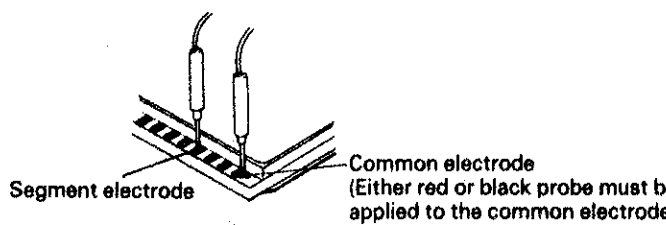


4. Procedure for checking and adjustment

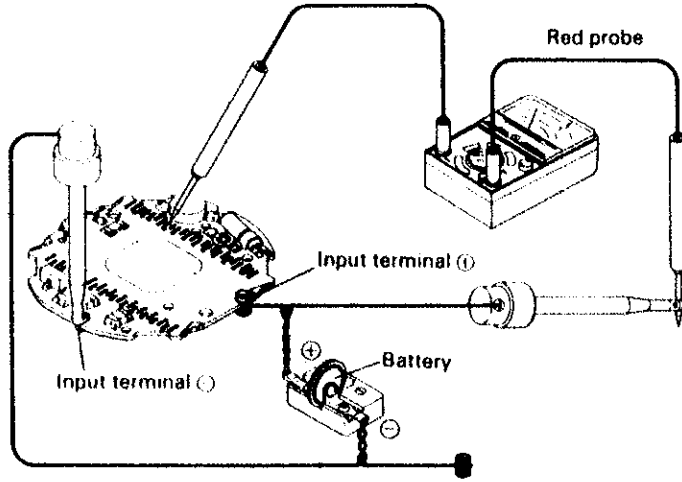
	Procedure	Result and repair
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">CHECK BATTERY VOLTAGE</p>	 <p><b>NOTE:</b> If the battery is swelled up, the battery is defective. This may occur due to large current. Always replace the battery with new one. (Swelling: 0.2 ~ 0.3 mm)</p>	<p>2.8V or more: Normal Less than 2.8V: Defective (Refer to NOTE 1 below.)</p> <p><b>NOTE 1:</b> The battery voltage temporarily drops when the light is illuminated, alarm is operated or battery is short-circuited. When the battery voltage is 2.6 ~ 2.8V, leave the battery for a few minutes. If the battery voltage is still less than 2.8V, replace the battery with new one. ● If the display goes out with the light lit, replace the battery even when the voltage is more than 2.8V.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">CHECK BATTERY CONDUCTIVITY</p>	<p>Check the battery, battery clamp and battery connection (-) for contamination.</p> 	<p>Uncontaminated: Normal Proceed to [ ] Contaminated: Defective Clean. Poor water resistance is found: Correct water resistance.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">CHECK CURRENT CONSUMPTION</p>	<p>(1) Total current consumption of module. Proceed as follows.</p> <ol style="list-style-type: none"> <li>1. Connect the module as shown below.</li> <li>2. Short-circuit the (+) and (-) leads of the Volt-ohm-meter.</li> <li>3. Hold the movement and depress and hold buttons A, B, C and D simultaneously for a few seconds. (System reset is now performed.)</li> <li>4. Separate the (+) and (-) leads which are short-circuited in item 3 and the correct consumption can be measured.</li> </ol>  <p>Short-circuit in item 2 and separate in item 4.</p>	<p>Less than 3.2 <math>\mu</math>A: Normal 3.2 <math>\mu</math>A or more: Defective Proceed to [ ] (2).</p> <p>Release button A, B or C first.</p>

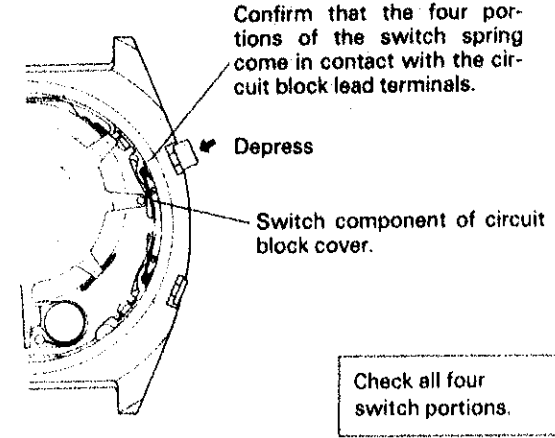
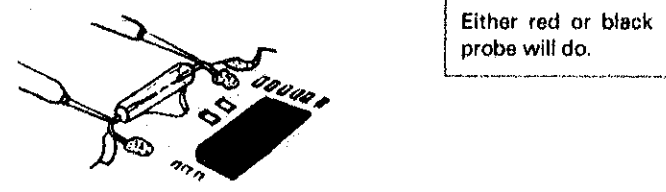
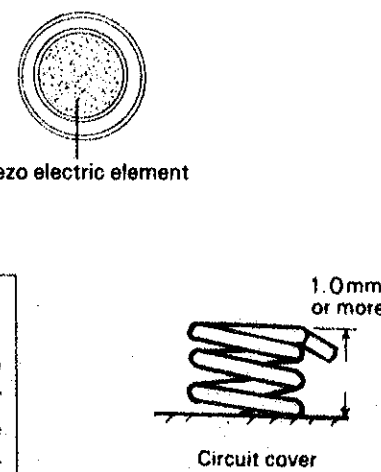
	Procedure	Result and repair
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">CHECK CURRENT CONSUMPTION</p>	<p>(2) Current consumption of circuit block</p> <ul style="list-style-type: none"> <li>● Measure the current consumption of circuit block in the same manner as those of module.</li> </ul> <ol style="list-style-type: none"> <li>1. Connect the module as shown below.</li> <li>2. Short-circuit the (+) and (-) leads of Volt-ohm-meter.</li> <li>3. Short-circuit the (+) pattern and system reset pattern of the circuit block with tweezers (conductive). (For details, refer to NOTE below.)</li> <li>4. Separate the (+) and (-) leads which are short-circuited in item 3 and the correct current consumption can be measured.</li> </ol>  <p>Short-circuit in item 2 and separate in item 4.</p> <p><b>NOTE:</b> By connecting the (+) pattern and system reset pattern shown in the right will perform the system reset. Without this procedure, the correct current consumption cannot be measured.</p> 	<p>Less than 2.5 <math>\mu</math>A: Normal 2.5 <math>\mu</math>A or more: Defective Replace the circuit block.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">CHECK WATER RESISTANCE</p>	<p>Check for moisture in the watch.</p> <p>(1) Place the watch on a hot plate and heat it for 15 minutes.</p>  <p>35°C ~ 45°C (95°F ~ 115°F)</p> <p>(2) Check that the glass does not collect moisture.</p>	<p>Does not collect moisture: Normal Proceed to [ ] Collects moisture: Defective Correct water resistance. Refer to "Watch Case Servicing Guide".</p>

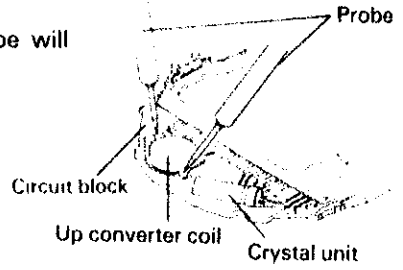
	Procedure	Result and repair
CHECK CURRENT CONSUMPTION	<p>(2) Current consumption of circuit block</p> <ul style="list-style-type: none"> <li>Measure the current consumption of circuit block in the same manner as those of module.               <ol style="list-style-type: none"> <li>Connect the module as shown below.</li> <li>Short-circuit the (+) and (-) leads of Volt-ohm-meter.</li> <li>Short-circuit the (+) pattern and system reset pattern of the circuit block with tweezers (conductive). (For details, refer to NOTE below.)</li> <li>Separate the (+) and (-) leads which are short-circuited in item 3 and the correct current consumption can be measured.</li> </ol> </li> </ul>  <p><b>NOTE:</b> By connecting the (+) pattern and system reset pattern shown in the right will perform the system reset. Without this procedure, the correct current consumption cannot be measured.</p>	<p>Less than 2.5 <math>\mu</math>A: Normal 2.5 <math>\mu</math>A or more: Defective Replace the circuit block.</p>
CHECK WATER RESISTANCE	<p>Check for moisture in the watch.</p> <p>(1) Place the watch on a hot plate and heat it for 15 minutes.</p>  <p>(2) Check that the glass does not collect moisture.</p>	<p>Does not collect moisture: Normal Proceed to <b>F</b>.</p> <p>Collects moisture: Defective Correct water resistance. Refer to "Watch Case Servicing Guide".</p>

	Procedure	Result and repair
CHECK CONTACT OF C-MOS-LSI LIQUID CRYSTAL PANEL	<p>Check for dust, lint and other contamination on the liquid crystal panel electrodes and connectors. Check the liquid crystal panel and connector for scratches, cracks or defects.</p> 	<p>Uncontaminated: Normal Proceed to <b>F</b>.</p> <p>Contaminated: Defective Wipe off any foreign matter.</p>
CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK	<ul style="list-style-type: none"> <li>Check that 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 6.)</li> </ul> <p>(1) Checking the liquid crystal panel</p> <ol style="list-style-type: none"> <li>Set up the Volt-ohm-meter. Range to be used: OHMS R <math>\times</math> 1 ~ R <math>\times</math> 1K</li> </ol> <p><b>NOTE:</b> 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 <math>\times</math> 10K).</p> <ol style="list-style-type: none"> <li>Remove the liquid crystal panel from the module and turn it to the reverse side.</li> <li>Check that the corresponding segment is displayed.</li> </ol> <p><b>NOTE:</b> Either red or black probe will do.</p>  <p>(2) Checking the circuit block output</p> <ol style="list-style-type: none"> <li>Set up the Volt-ohm-meter. Range to be used: DC 3V</li> <li>Set up the circuit block.           <ol style="list-style-type: none"> <li>Disassemble the module and remove the circuit block.</li> </ol> </li> </ol>	<p>Displayed: Normal Proceed to <b>F</b>.</p> <p>Not displayed: Defective Replace the liquid crystal panel.</p>



	Procedure	Result and repair
<b>M</b> CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK	<p>2) Supply power to the circuit block by connecting the power supplier as shown in the illustration below and perform the system reset in the same manner in <b>C</b> "CHECK CURRENT CONSUMPTION" on page 9.</p>  <p>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.)</p>	<p>0.8V or more: Normal            (The voltage at all terminals should be more than 0.8V.)            Return to <b>M</b>.            Less than 0.8V: Defective            Replace the circuit block.</p>
<b>G</b> CHECK ACCURACY	<p>(1) Set the watch in the pattern segment checking mode. (Either pattern segment checking modes will do.)            (2) Any measuring gate of the Quartz tester can be used.            (3) Adjust the level.            (4) Measure the accuracy.</p>	<p>Does not loss or gain: Normal            Losses or gains: Defective            Adjust the time accuracy by turning the trimmer condenser.            If the time accuracy cannot be adjusted by turning the trimmer condenser, replace the circuit block.</p>
<b>I</b> CHECK FUNCTIONING AND ADJUSTMENT	<p>Check functioning referring to "DISPLAY FUNCTION" on page 2.            (1) Check that the time mode and calendar mode are changed correctly.            (2) Perform alarm test and check that the alarm sounds correctly and alarm mark and time signal mark are displayed correctly.            (3) Check the functioning for each digit in the time and calendar modes and confirm that the digit is advanced correctly.</p>	<p>Functions correctly: Normal            Wear the watch on the wrist to check time accuracy.            Does not function correctly: Defective            Replace the circuit block.</p>

	Procedure	Result and repair
<b>I</b> CHECK THE CONDUCTIVITY OF SWITCH COMPONENT	<p>(1) Check that the switch spring functions correctly.</p>  <p>(2) Check for dust, lint and other contamination of the connecting portions.</p>	<p>Functions correctly: Normal            Does not function correctly: Defective            Correct the switch spring with tweezers or replace the circuit block with a new one.</p> <p>Uncontaminated: Normal            Contaminated: Defective            Wipe off any foreign matter.</p>
<b>J</b> CHECK BULB CONDITION	<p>Check that there is a broken filament in the bulb.            (1) Set up the Volt-ohm-meter.            Range to be used: OHMS R x 1            (2) Checking            Apply two probes of the Volt-ohm-meter to the bulb leads as shown in the illustration.</p> 	<p>Bulb lights up: Normal            Bulb does not light up: Defective            Replace the bulb with a new one.</p>
<b>K</b> CHECK ALARM FUNCTION	<p>(1) 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.</p>  <p><b>NOTE:</b>            The speaker lead terminal should be protruded from the circuit cover by 1.0 mm or more. (Check when the speaker lead terminal is completely installed.)</p>	<p>Uncontaminated: Normal            Contaminated: Defective            Wipe off any foreign matter.            Deformed: Defective            Correct with tweezers.</p>

Procedure	Result and repair
<p>(2) Measure the coil resistance of the circuit block to check for a short-circuit and a broken wire. Range to be used: OHMS R x 1</p> <p>● Checking Apply the probes to the up converter coil terminals. Either red or black probe will do.</p> 	<p>50Ω - 90Ω : Normal Less than 50Ω : (Short-circuit) More than 90Ω : Defective (Broken wire) Replace the circuit block with a new one.</p>
<p>(1) Remove the module from the case. (2) Disassemble the module. (3) Wipe off any electrolyte from the circuit block.</p> <ol style="list-style-type: none"> <li>Wipe off the electrolyte with cloth moistened with alcohol. (Pay particular attention to the connecting portion.)</li> <li>Dry with warm air by using a dryer.</li> </ol> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>If the electrolyte leakage is excessive, replace the circuit block.</li> <li>Use a lint-free cloth.</li> </ul> <p>(4) Clean other parts (Circuit cover and liquid crystal panel frame) which become contaminated with the electrolyte.</p> <ol style="list-style-type: none"> <li>Wipe off battery electrolyte on the other parts with a soft brush moistened with alcohol.</li> <li>Dry with warm air by using a dryer.</li> </ol> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>If each part is damaged, replace it with a new one.</li> </ul> <p>(5) Reassemble the module. Replace the battery with a new one. (6) Check function and current consumption.</p>	

## PARTS LIST

CAL. Y771A

Cal. Y771A	
PART NO.	PART NAME
4001 596	Circuit block
4225 596	Battery clamp
4246 795	Buzzer lead terminal
4313 596	Connector
4398 785	Liquid crystal panel frame
4410 785	Circuit cover
4510 625	Liquid crystal panel
4521 840	Reflecting mirror (Silver)
4521 842	Reflecting mirror (Blue)
4521 843	Reflecting mirror (Green)
4530 230	Bulb
MAXELL CR2016	Battery
MATSUSHITA BR2016	