

# **TECHNICAL GUIDE**

**AND**  
**PARTS LIST**

CAL. W309A

**DIGITAL QUARTZ**

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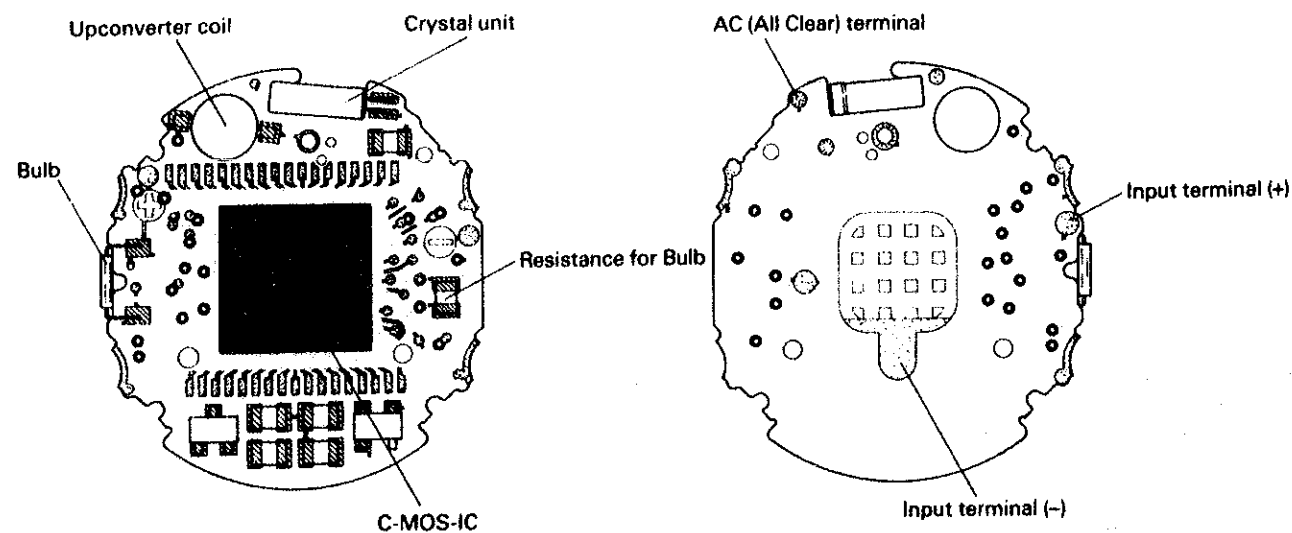
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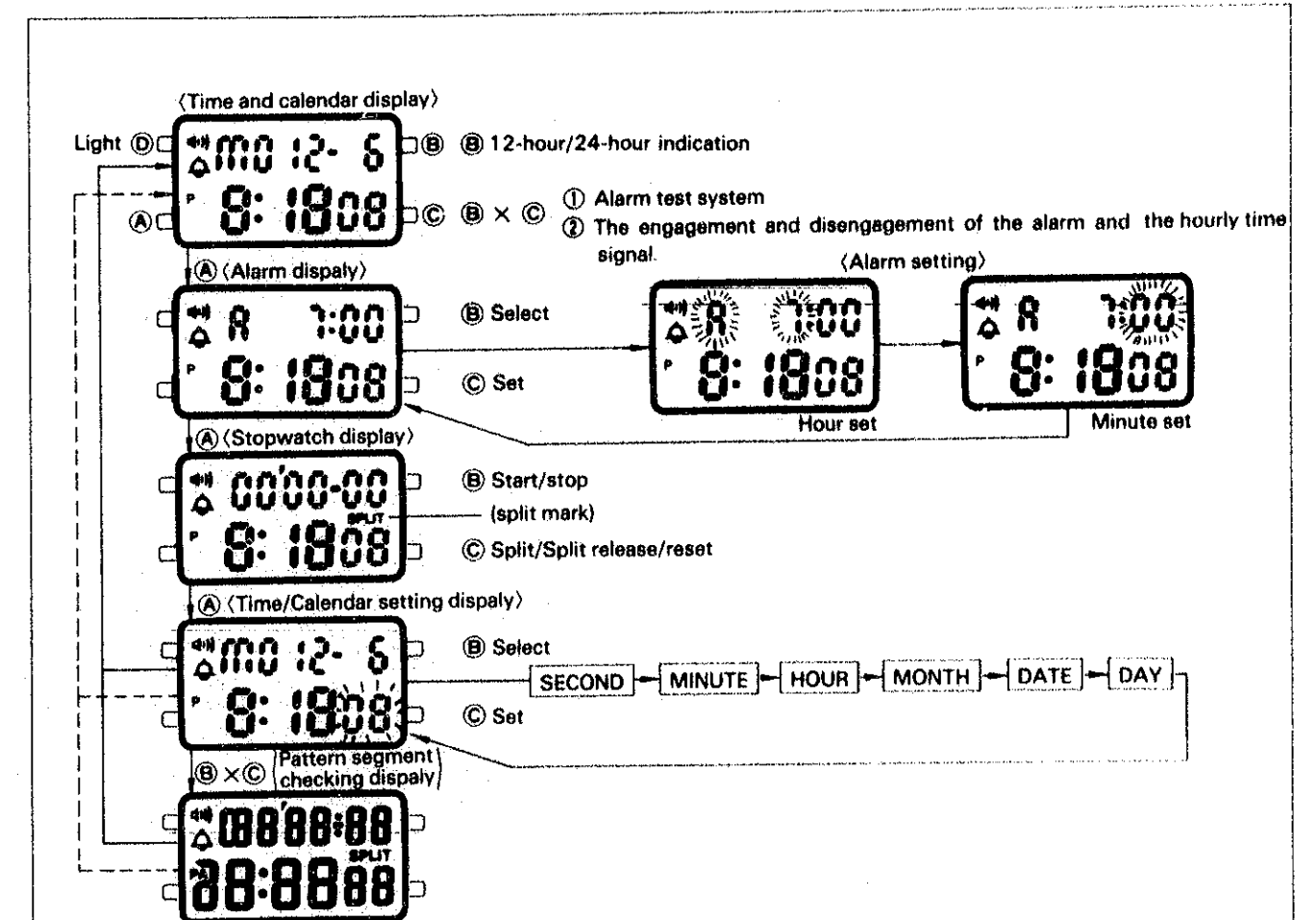
## I. SPECIFICATIONS

Item	Cal. No.	W309A
Display medium		Nematic Liquid Crystal, FEM (Field Effect Mode)
Liquid crystal driving system		Multiplex driving system
Display system		<ul style="list-style-type: none"> <li>● Time and calendar display (12-hour/24-hour indication)</li> <li>● Alarm display (alarm time: 20 seconds)</li> <li>● Stopwatch display (up to 60 minutes)</li> <li>● Time/calendar setting display</li> </ul>
Additional mechanism		<ul style="list-style-type: none"> <li>● Alarm test system</li> <li>● Hourly time signal</li> <li>● Automatic return system</li> <li>● Full-automatic calendar</li> <li>● Illuminating light</li> <li>● Pattern segment checking system</li> </ul>
Loss/gain		Monthly Rate: Less than 20 seconds at normal temperature range
Module size (mm)	Casing diameter	φ27.4 mm
	Height	4.8 mm
Regulation system		—
Quartz Tester measuring gate		Any gate is available
Lithium battery		<ul style="list-style-type: none"> <li>● SEIKO (SEIZAIKEN)</li> <li>● MAXELL</li> <li>● SANYO</li> <li>● MATSUSHITA</li> </ul> CR2016 BR2016 Battery life: Approx. 7 years Voltage: 3.0V

## II. STRUCTURE OF CIRCUIT BLOCK



## III. DISPLAY SYSTEM AND BUTTON OPERATION

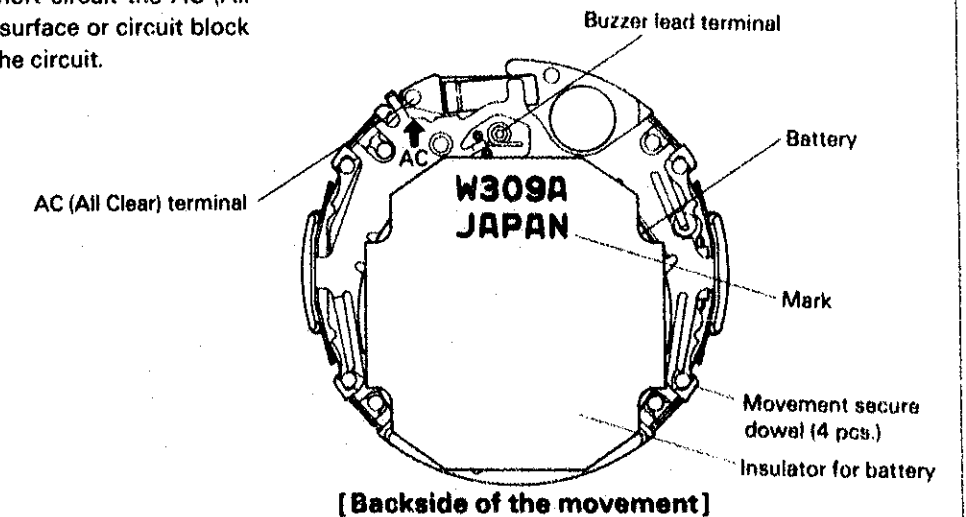


### Notes:

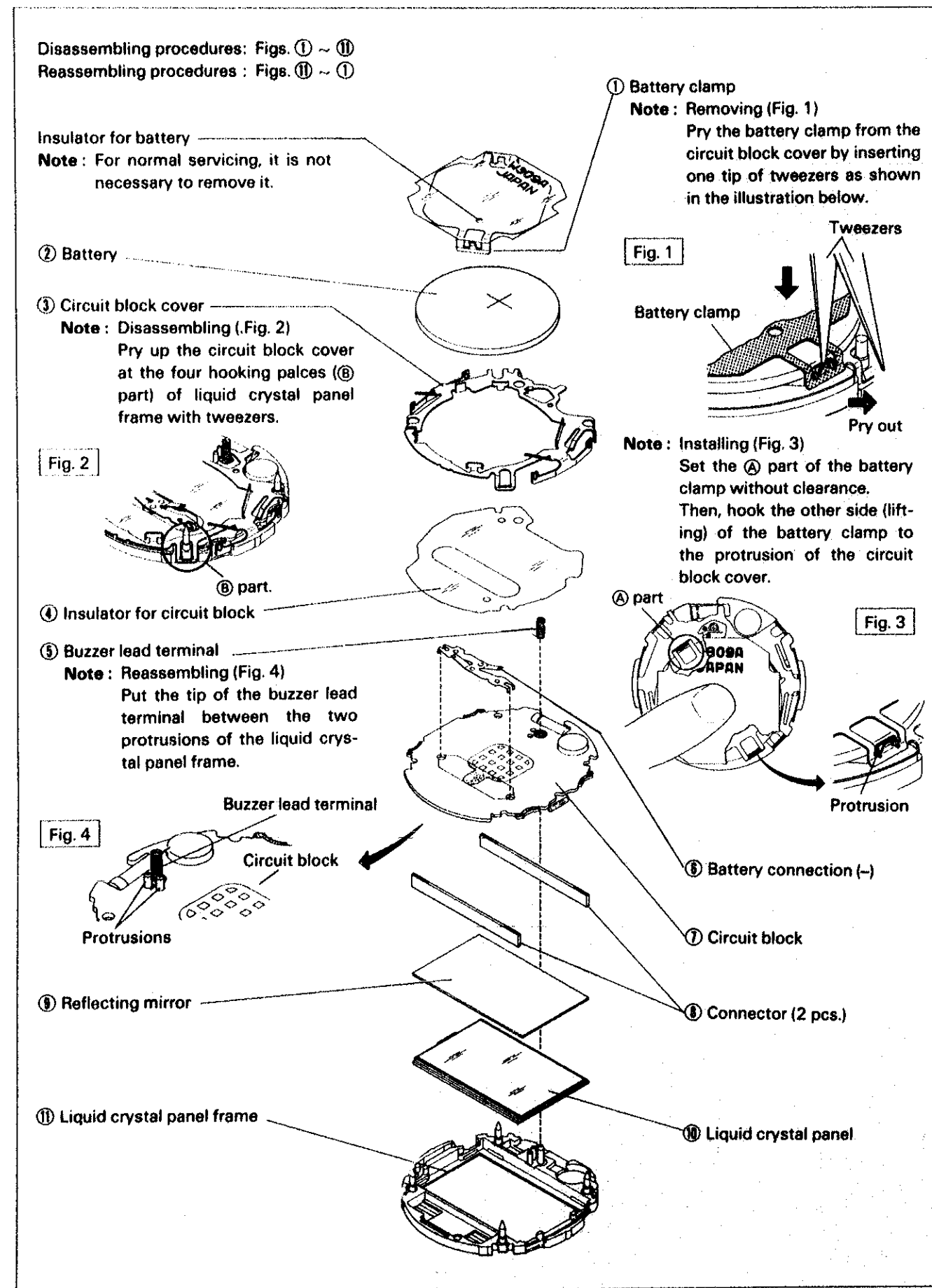
1. In any display, press any one of buttons (A), (B) and (C) to stop alarm manually.
2. In the time/calendar or alarm setting display, the digits except seconds are advanced quickly by keeping button (C) pressed for a few seconds.
3. If the watch is left untouched in the time/calendar setting or pattern segment checking display, it will automatically return to the time/calendar display in 1 ~ 2 minutes.
4. In the time/calendar display, pressing button (B) for 1 to 2 seconds selects the 12-hour indication or 24-hour indication.

### [SYSTEM RESET AFTER REPLACING THE BATTERY]

After replacing the battery, short-circuit the AC (All Clear) terminal and battery (+) surface or circuit block cover with tweezers to reset the circuit.

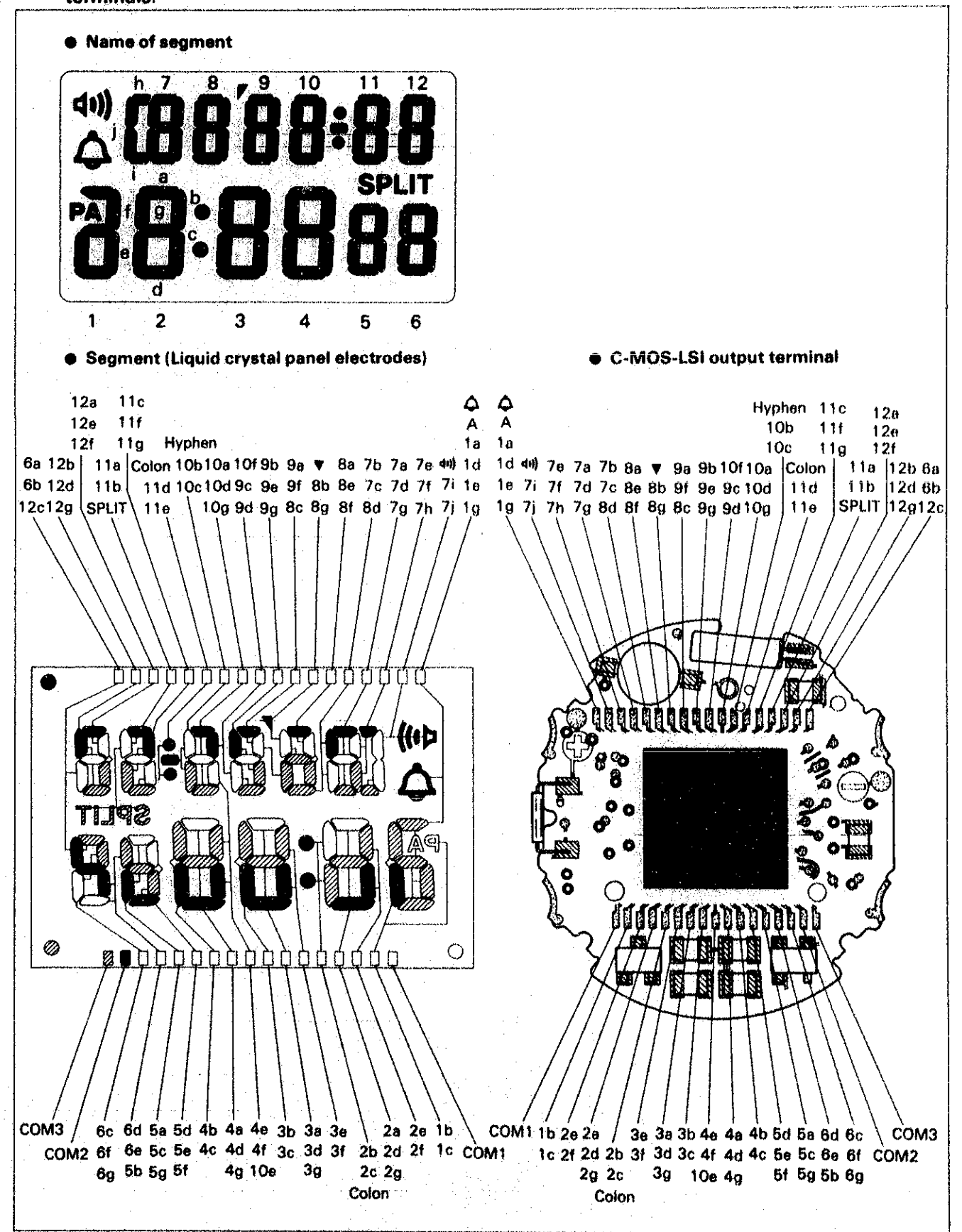


## IV. DISASSEMBLING AND REASSEMBLING OF THE MODULE



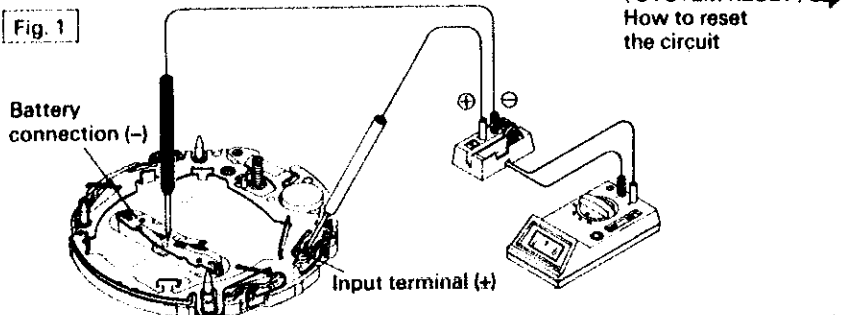
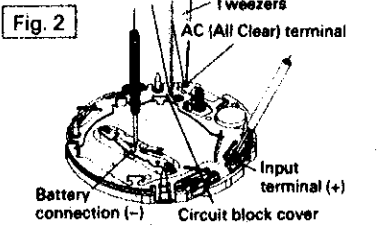
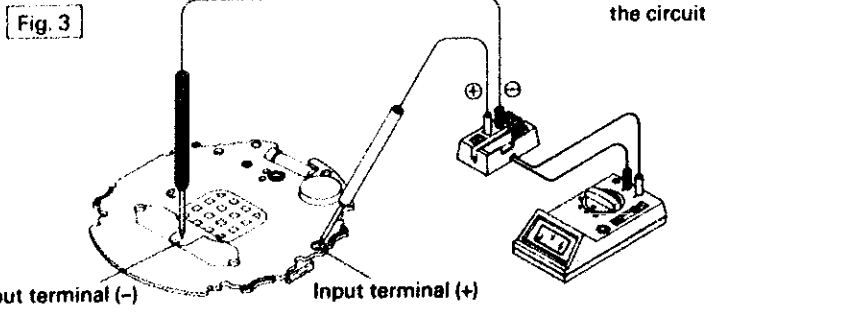
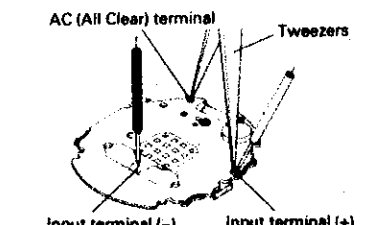
## V. CHECKING AND ADJUSTMENT

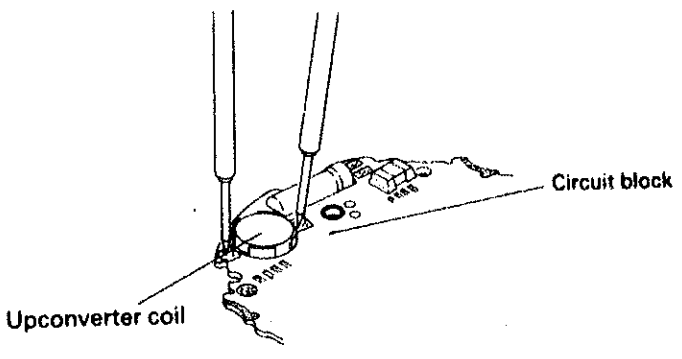
### 1. Relationship between the segments (Liquid crystal panel electrodes) and C-MOS-LSI output terminals.



## 2. Checking and adjustment

- This section only gives the checking and adjustment procedure which is exclusive for cal. W309A.  
For the normal checking and adjustment, refer to the "TECHNICAL GUIDE GENERAL INSTRUCTION, Digital Quartz".

BATTERY VOLTAGE	
<p>Use the SEIKO Digital Multi Tester S-840A. Range to be used: DC V</p> <p><b>Notes:</b> The battery voltage slightly differs according to the used battery (CR2016 or BR2016). However, it does not affect the watch function.</p>	<p><b>Result:</b></p> <ul style="list-style-type: none"> <li>● CR2016 battery More than 2.9V: Normal Less than 2.9V: Defective</li> <li>● BR2016 battery More than 2.8V: Normal Less than 2.8V: Defective</li> </ul>
CURRENT CONSUMPTION	
<p>Use the SEIKO Digital Multi Tester S-840A and the Multi Adaptor MA-40. Range to be used: <math>\mu\text{A}</math></p> <p><b>Notes:</b> Before measuring the current consumption, reset the circuit (fig. 2, 4), and read the stable display. (fig. 1, 3)</p>	
<p><b>1 CHECK THE CURRENT CONSUMPTION FOR THE WHOLE OF THE MODULE</b></p> <p>Black probe: Battery connection (-) Red probe: Input terminal (+)</p> <p><b>Fig. 1</b></p>  <p><b>Fig. 2</b></p> <p>After setting as shown in Fig. 1, short-circuit the AC (all clear) terminal and circuit block cover with tweezers as shown fig. 2.</p>  <p><b>Result:</b></p> <ul style="list-style-type: none"> <li>More than <math>1.7\mu\text{A}</math>: Normal</li> <li>Less than <math>1.7\mu\text{A}</math>: Defective</li> </ul>	
<p><b>2 CHECK THE CURRENT CONSUMPTION FOR THE CIRCUIT BLOCK ALONE</b></p> <p>Black probe: Input terminal (-). Red probe: Input terminal (+).</p> <p><b>Fig. 3</b></p>  <p><b>Fig. 4</b></p> <p>After setting as shown in Fig. 3, short-circuit the AC (all clear) terminal and input terminal (+) with tweezers as shown fig. 4.</p>  <p><b>Result:</b></p> <ul style="list-style-type: none"> <li>Less than <math>1.5\mu\text{A}</math>: Normal</li> <li>More than <math>1.5\mu\text{A}</math>: Defective</li> </ul>	

BULB CONDITION	
<p>Check to see if the bulb lights up by pressing button ⓐ.</p>	<p><b>Result:</b></p> <ul style="list-style-type: none"> <li>Lights up: Normal</li> <li>Lights dimly: Defective Replace the battery.</li> <li>Does not light: Defective Replace the bulb or check the circuit block.</li> </ul>
ACCURACY	
<p>In the time/calendar setting display, press buttons ⓑ and ⓒ simultaneously, and all the segments light up. (Pattern segment checking display) The daily rate can be measured in the pattern segment checking display.</p>	
ALARM TEST SYSTEM	
<p>In the time/calendar display, check to see if the alarm rings by pressing buttons ⓑ and ⓒ simultaneously.</p>	<p><b>Result:</b></p> <ul style="list-style-type: none"> <li>Alarm rings: Normal</li> <li>Does not ring: Defective Proceed to Alarm condition</li> </ul>
ALARM CONDITION	
<ol style="list-style-type: none"> <li>1. Check to see if there is any contamination on the part of contact between the piezoelectric element and the buzzer lead terminal. And check for any deformation of the buzzer lead terminal.</li> <li>2. Measure the resistance for the upconverter coil of the circuit block and check it for any broken wire and short circuit.</li> </ol> <p>Use the SEIKO Digital Multi Tester S-840A. Range to be used: <math>\Omega</math></p> 	<p><b>Result:</b></p> <ul style="list-style-type: none"> <li><math>50\Omega - 90\Omega</math>: Normal</li> <li>Less than <math>50\Omega</math> (Short Circuit)</li> <li>More than <math>90\Omega</math> (Broken Wire)</li> </ul> <p>} Defective</p> <p>Replace the circuit block.</p>

**VI. PARTS LIST**

Cal. W309 A	
PARTS NO.	PARTS NAME
4001 640	Circuit block
4216 643	Insulator for battery
4216 644	Insulator for circuit block
4225 640	Battery clamp
4246 640	Buzzer lead terminal
4270 871	Battery connection (-)
4313 759	Connector
4457 640	Circuit block cover
*4510 749	Liquid crystal panel (Gold)
*4510 759	Liquid crystal panel (Silver)
4512 759	Liquid crystal panel frame
4521 970	Reflecting mirror
4589 650	Piezo electric element
SEIKO (SEIZAIKEN) CR2016	LITHIUM BATTERY
SANYO CR2016	
MAXELL CR2016	
MATSUSHITA BR2016	

**Remarks:**

\* Liquid crystal panel

- \* 4510 749 (Gold)
- \* 4510 759 (Silver)

Be sure that combination between the color of panel cover and liquid crystal panel should be matched according to the "Casing Parts Catalogue".