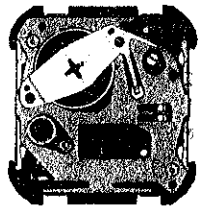
SEIKO

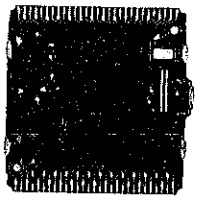
DIGITAL QUARTZ

Cal. D138A

PARTS CATALOGUE

Cal. D138A





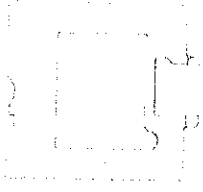
4001 855

4225 775

4246 775

4270 775

4313 775



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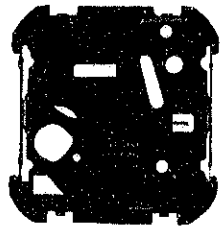

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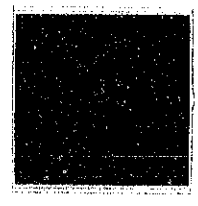
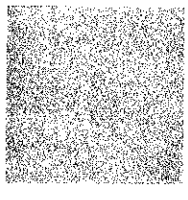
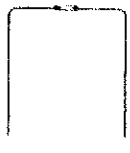


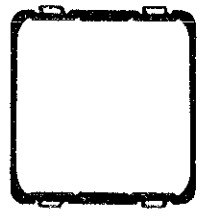
☆4510 855



4521 810



4530 230



4540 775

☆ Maxell SR1120W

T

022 340 2/1

☆⇨Please see remarks on the next page.

Cal. D138A

Characteristics

Casing diameter : 28.5 × 27 mm
Maximum height : 5.9 mm
Frequency of quartz crystal oscillator : 32,768 Hz (Hz=Hertz ..... Cycles per second)
Time and calendar display : Digital display system showing hour (12-hour or 24-hour indication), minute, second, date, "A.M."/"P.M." mark (displayed only in the 12-hour indication), and day of the week. Month is displayed only when the calendar is adjusted.
Alarm display : Can be set to ring at any desired hour and minute every day. The five patterns of messages (picture) can be selected for your specific schedule (pictorial message display system). The alarm set on the alarm channel 1 and 2 rings differently.
Stopwatch display : Hour, minute, and second up to 12 hours (minute, second and 1/100 second up to 60 minute). The "runner" (picture) is displayed on the display screen in the stopwatch display.
Display medium : Nematec Liquid Cryatal, FE-Mode.
Regulation system : Trimmer condenser
Time signal : Can be set to ring every hour on the hour.
Illuminating light : Illuminates the display in the dark.

PART NO.	PART NAME	PART NO.	PART NAME
4001 855	Circuit block		
4225 775	Battery clamp		
4246 775	Buzzer lead terminal		
4270 775	Battery connection (−)		
4313 775	Connector		
4408 775	Reflecting mirror spacer		
4410 855	Circuit cover		
☆**4510 855**	Liquid crystal panel		
4521 810	Reflecting mirror		
4530 230	Bulb		
4540 775	Liquid crystal panel holder		
022 340	Circuit block screw		
022 340	Battery clamp screw		
☆ Maxell SR1120W ☆ Toshiba SR1120W ☆U.C.C. 391	Silver oxide battery		

Remarks :

Liquid crystal panel

☆4510 855·····Be sure that the combination between the color of panel cover and Liquid crystal panel should be matched according to the **"SEIKO Quarts Casing Parts Catalogue."**

Battery

☆Maxell SR1120W
☆Toshiba SR1120W
☆U.C.C. 391
·····The substitutive battery might be added to the applied battery in the future. In that case, please refer to separate **"BATTERY LIST FOR SEIKO QUARTZ WATCHES"**.

☆ ⇨Please see remarks.
Part numbers in light letters are not shown in photos.

TECHNICAL GUIDE

SEIKO

DIGITAL QUARTZ

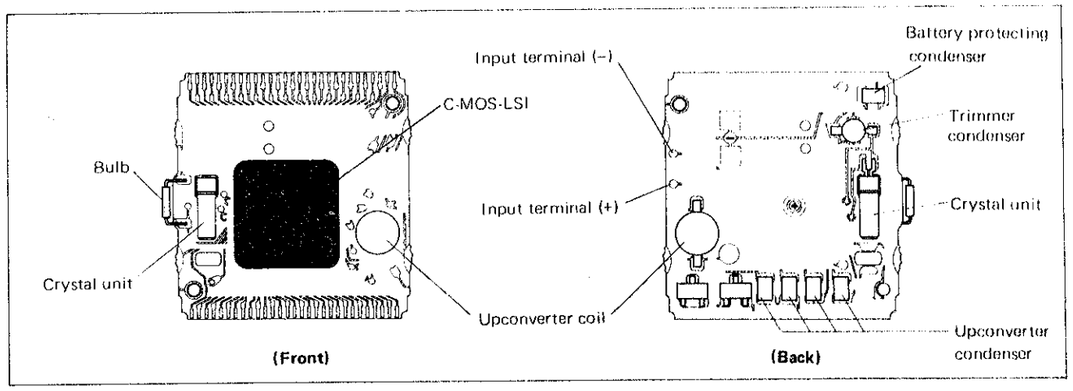
CAL. D138A

CONTENTS

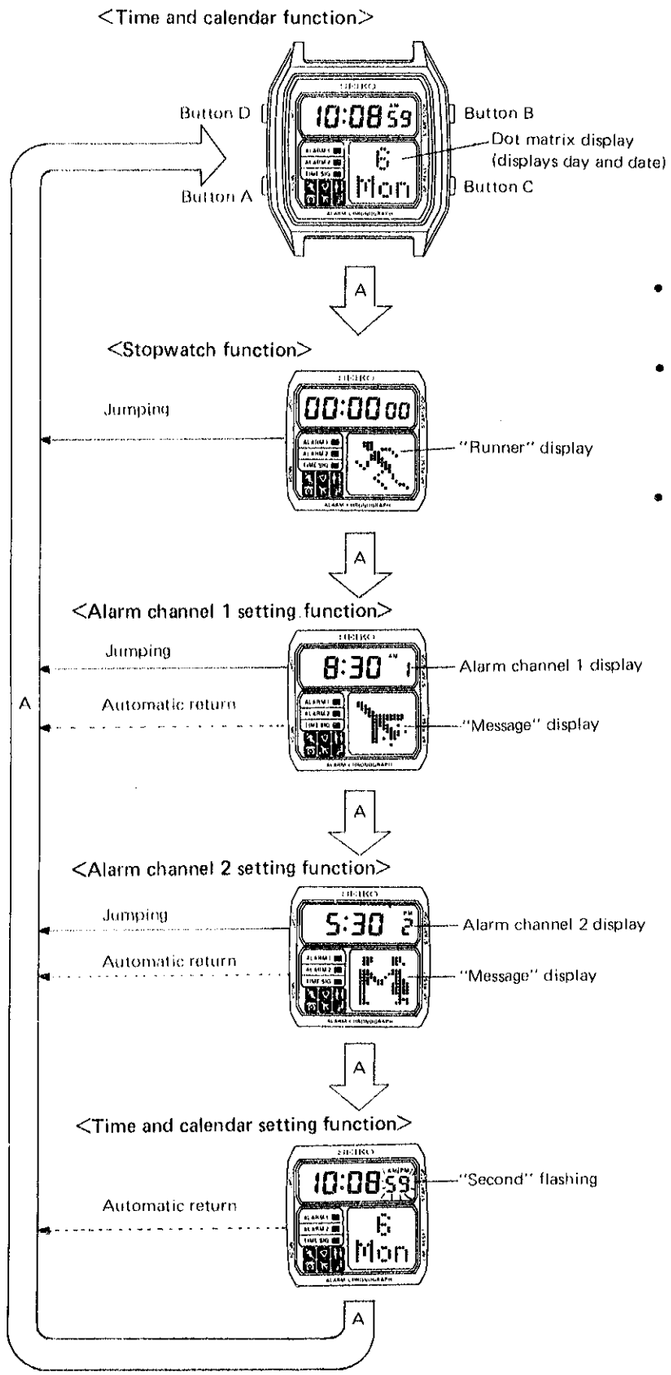
I. SPECIFICATIONS

Item \ Cal. No.	D138A
Display medium	Nematic Liquid Crystal, FEM (Field Effect Mode)
Liquid crystal driving system	Multiplex driving system
Display system	• Time and calendar function (12 or 24 hour indication) • Stopwatch function • Alarm channel 1 function • Alarm channel 2 function
Additional mechanism	• Automatic return system • Pattern segment checking system (also transmits the pulse for measuring the daily rate) • Dot matrix display leak checking system • Time signal • Illuminating light • Alarm test system
Loss/gain	Loss/gain at normal temperature range Monthly rate: less than 15 seconds (Annual rate: less than 3 minutes)
Outside diameter	27.0 mm (between 3 o'clock and 9 o'clock sides) 28.5 mm (between 12 o'clock and 6 o'clock sides)
Height	5.9 mm
Regulation system	Trimmer condenser
Measuring gate by Quartz Tester	Any gate is available.
Battery	Silver oxide battery U.C.C. 391, Maxell SR1120W, Toshiba SR1120W Battery life is approximately 1.5 years. Voltage: 1.55V

II. STRUCTURE OF THE CIRCUIT BLOCK



III. DISPLAY FUNCTION

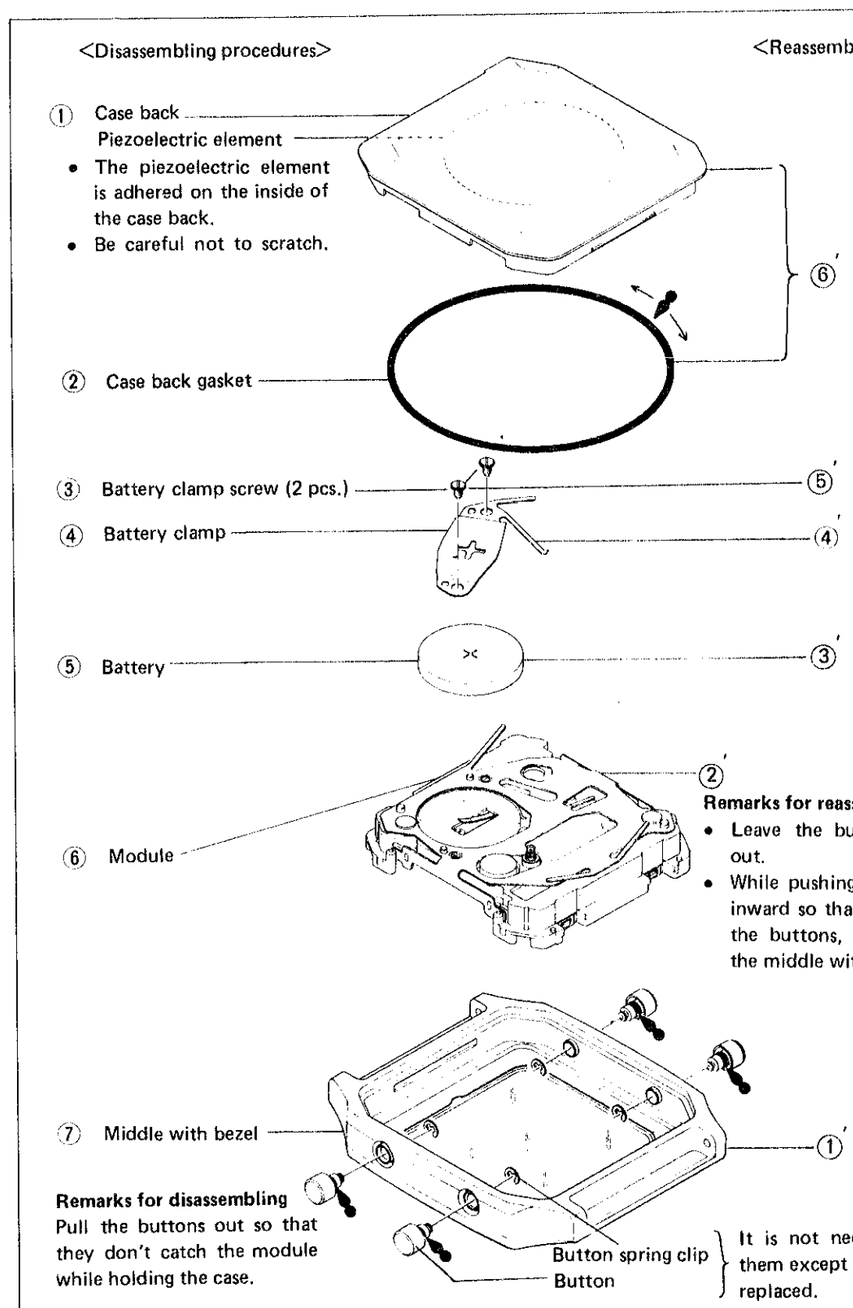


- Each depression of the button A changes the functions in the order shown on the left.
- Jumping
  In each function, depress the button A after operating the button B or C, the time and calendar function will return.
- Automatic return system
  In any function, even if the button B or C is not depressed, the time and calendar function will return in 1 to 2 minutes (except for the stopwatch function).

IV. DISASSEMBLING, REASSEMBLING AND LUBRICATING

1. Disassembling, reassembling and lubricating of the case

- Disassembling procedures Figs: ① → ⑦
- Reassembling procedures Figs: ⑥ → ①
- Lubricating: Silicone grease 500,000 s.c.



- The piezoelectric element is adhered on the inside of the case back.
- Be careful not to scratch.

Remarks for reassembling

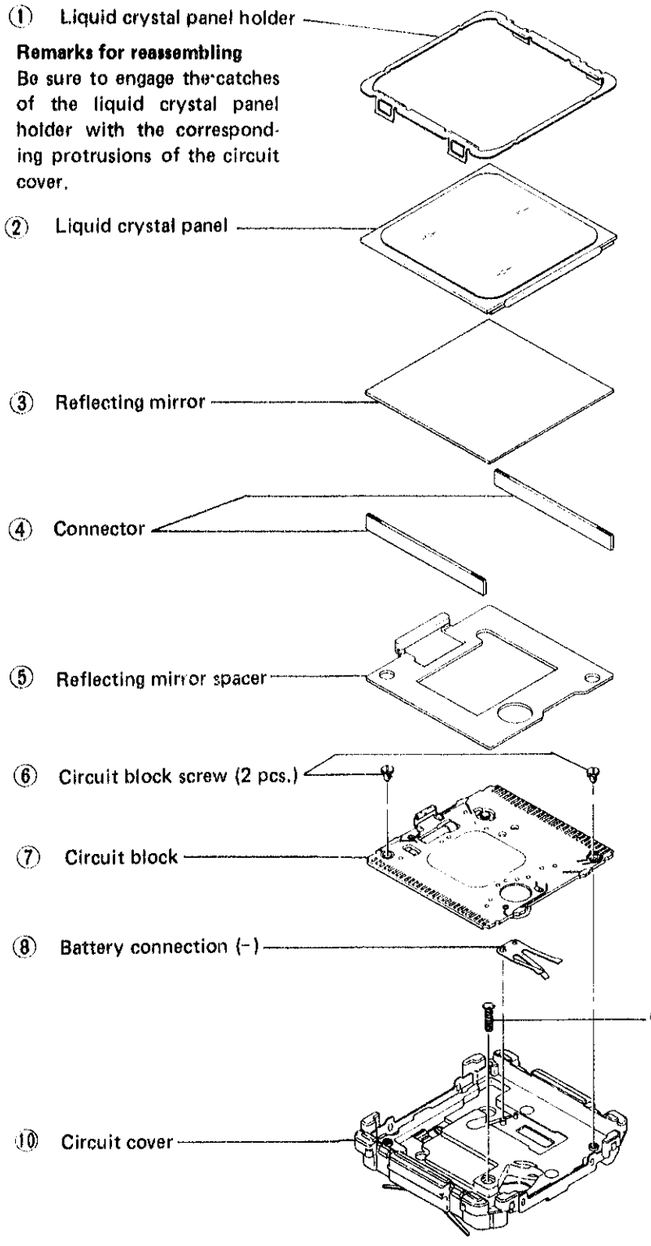
- Leave the buttons all the way out.
- While pushing the switch spring inward so that it does not catch the buttons, set the module in the middle with bezel.

Remarks for disassembling
Pull the buttons out so that they don't catch the module while holding the case.

It is not necessary to disassemble them except they are required to be replaced.

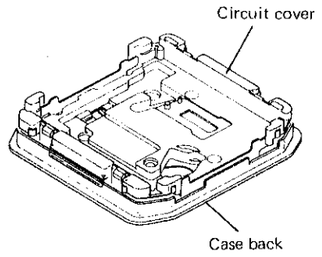
2. Disassembling and reassembling of the module

Disassembling procedures Figs: ① → ⑩
Reassembling procedures Figs: ⑩ → ①



Remarks for reassembling
Be sure to engage the catches of the liquid crystal panel holder with the corresponding protrusions of the circuit cover.

* If the module is reassembled with the circuit cover put on a level plate, the switch spring may deform.
Use the case back as the module holder to prevent the switch spring from deforming.

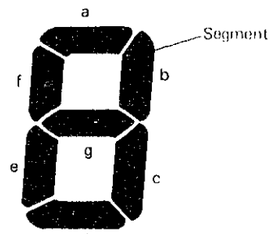


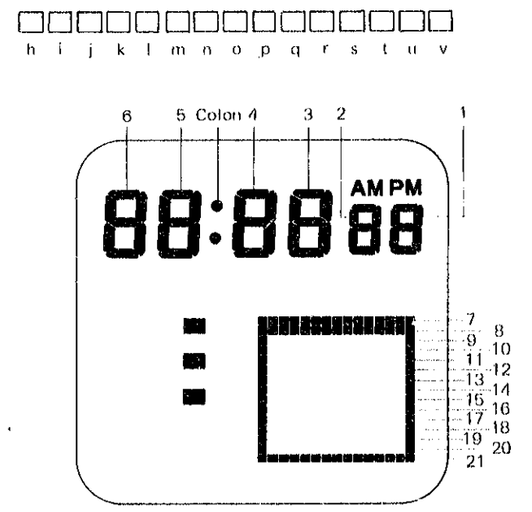
Remarks for reassembling
Be sure to set the buzzer lead terminal into the corresponding hole on the circuit cover.

3. Relationship between the segment (Liquid Crystal Panel Electrode) and the C-MOS-LSI output terminal

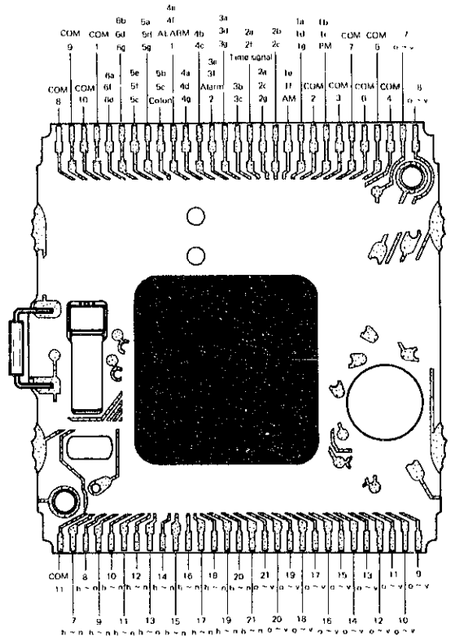
A complete knowledge of how the segment (Liquid Crystal Panel Electrode) works with the C-MOS-LSI output terminal will provide the proper procedures for checking and adjustment.

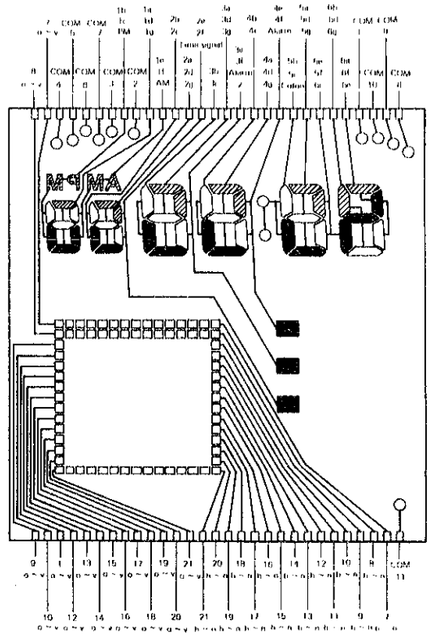
- Designation of segment





Common electrode 1
Common electrode 2
Common electrode 3





V. CHECKING AND ADJUSTMENT

Refer to the "SEIKO QUARTZ TECHNICAL GUIDE GENERAL INSTRUCTION" for digital watches for details.

Procedure

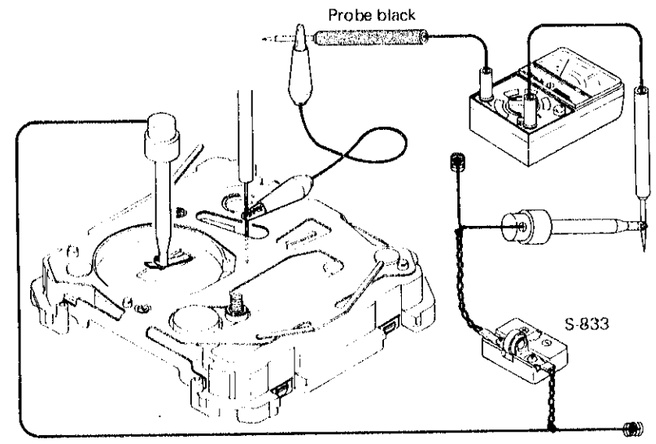
CHECK BATTERY VOLTAGE

Result:
More than 1.5V: Normal
Less than 1.5V: Defective

CHECK BATTERY CONDUCTIVITY

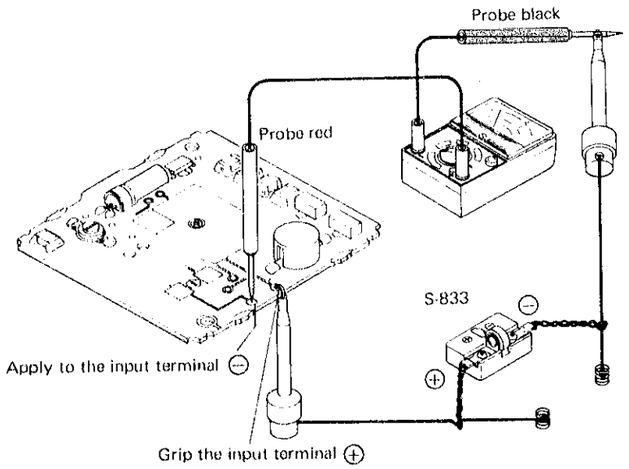
CHECK CURRENT CONSUMPTION

- Current consumption for the whole of the module.



Result:
Less than 3.2μA : Normal
More than 3.2μA : Defective

- Current consumption of the circuit block alone.



Result:
Less than 2.1μA : Normal
More than 2.1μA : Defective

Note: When checking the current consumption of the circuit block alone, be sure to shield the C-MOS-LSI from light, such as fluorescent lamp, etc., by using the reflecting mirror or black paper.

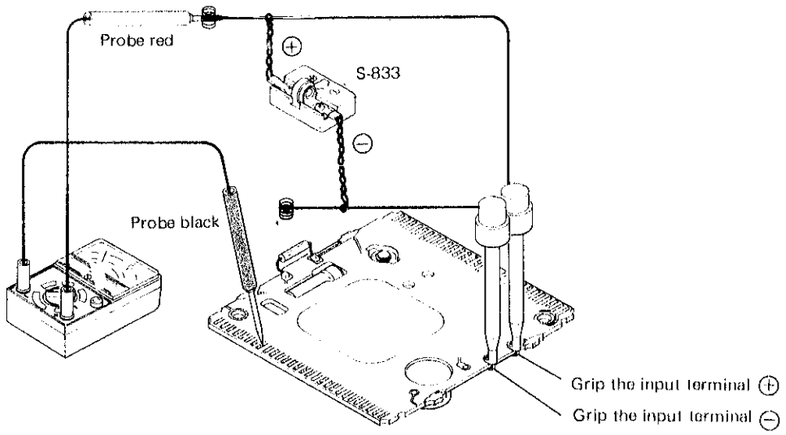
Procedure

CHECK WATER RESISTANCE

CHECK CONTACT BETWEEN C-MOS-LSI AND LIQUID CRYSTAL PANEL

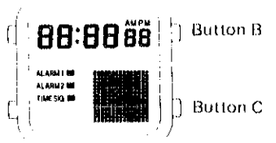
CHECK LIQUID CRYSTAL PANEL AND CIRCUIT BLOCK

- Check the liquid crystal panel.
- Check the circuit block output voltage.



CHECK ACCURACY

Check the watch for accuracy in the daily rate measuring function with all segments displayed. Set the watch function to the time and calendar setting function, then depress the buttons B and C at the same time, and all the segments light up.



CHECK FUNCTIONING AND ADJUSTMENT

CHECK ALARM TEST SYSTEM

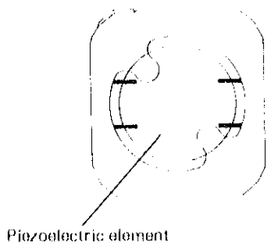
In the time and calendar display, depress the buttons B and C at the same time to check to see if the alarm rings.

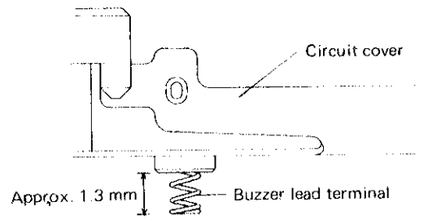
CHECK CONDUCTIVITY OF SWITCH COMPONENTS

Procedure

CHECK ALARM FUNCTION

(1) Check to see if there is any contamination on the connecting portion of the piezoelectric element adhered to the inside surface of the case back and the buzzer lead terminal, and to see if there is any deformation in the buzzer lead terminal.

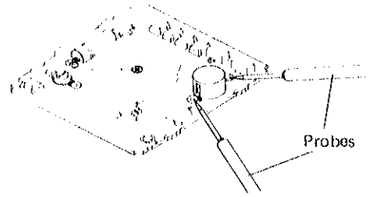




The buzzer lead terminal should protrude approx. 1.3 mm from the circuit cover.

(2) Measure the resistance for the upconverter coil of the circuit block and check it for broken wire and short circuit.

Range to be used: OHMS R x 1



Apply the probes to the soldered portion of winding terminals of the upconverter coil.

Result:
40Ω ~ 80Ω : Normal
Less than 40Ω — Defective
More than 80Ω — Defective

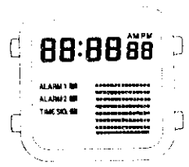
CHECK BULB CONDITION

Refer to the Technical Information No. 18 for how to replace the bulb.

CHECK FUNCTIONING

CHECK LEAK OF DOT MATRIX DISPLAY

Check to see if there is any leak of the dot matrix display by depressing the button B with all the segments display.



Result:
Dot matrix portion:
Light up every other row: Normal
Do not light up every other row: Defective

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