

TECHNICAL GUIDE

SEIKO DIGITAL QUARTZ

CAL. D229A



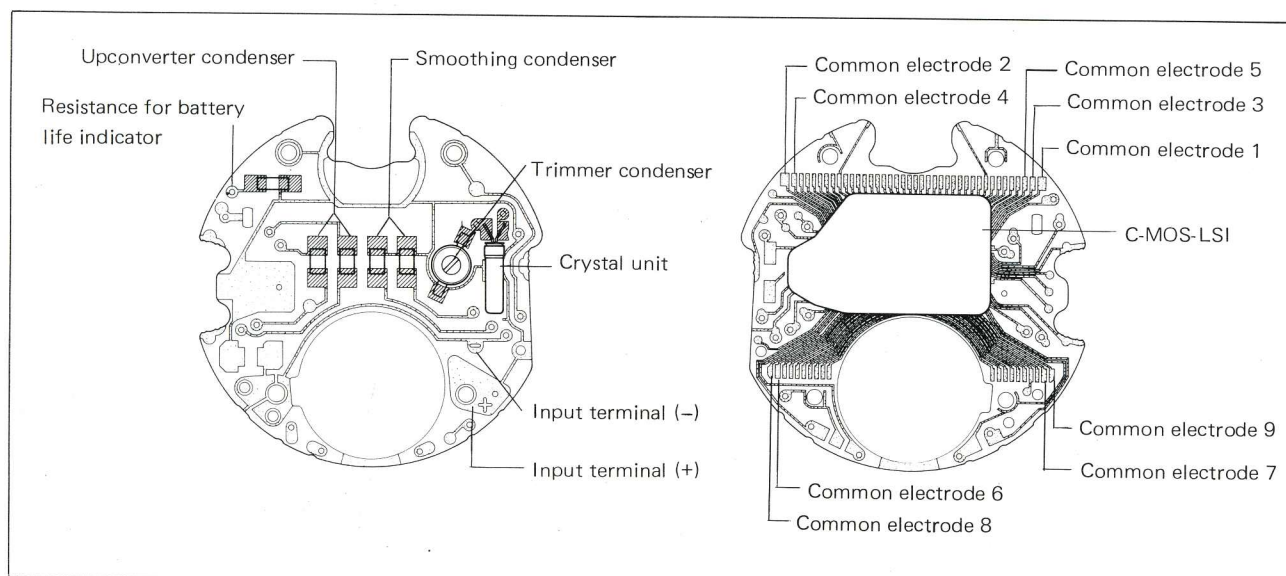
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I. SPECIFICATIONS

Cal. No.	D229A
Item	
Display medium	Nematic liquid crystal, FEM (Field Effect Mode)
Liquid crystal driving system	Multiplex driving system
Display system	Dot-matrix display (upper row) Segment display (lower row) • Alarm function • Time and calendar function (12- or 24-hour indication) • Stopwatch function • Timer function
Additional mechanism	• Time signal • Alarm test system • Battery life indicator • Pattern segments checking system • Changeover confirmation sound • Illuminating light
Loss/gain	Loss/gain at normal temperature range Monthly rate : less than 15 seconds (Annual rate : less than 3 minutes)
Casing diameter	φ28.3mm
Height	5.1mm without battery
Regulation system	Trimmer condenser
Measuring gate by Quartz Tester	Any gate is available
Battery	Silver oxide battery Maxell SR1130W, U.C.C. 389, Toshiba SR1130W Battery life is approximately 2 years Voltage: 1.55V

II. STRUCTURE OF CIRCUIT BLOCK



III. DISASSEMBLING, REASSEMBLING AND LUBRICATING

● Remarks for setting of battery

When replacing a battery or reassembling a battery after repairing the watch, be sure to adjust the time and the calendar through the following procedures. Depress quick selection buttons "1" (Alarm) and "2" (Timer) on the front panel at the same time while depressing button "A" with the winding stem pulled out.

When the buttons are depressed, all displays disappear, and when they are released the display shows the time of 12:00'00" A.M., Thursday, January 1, 1981.

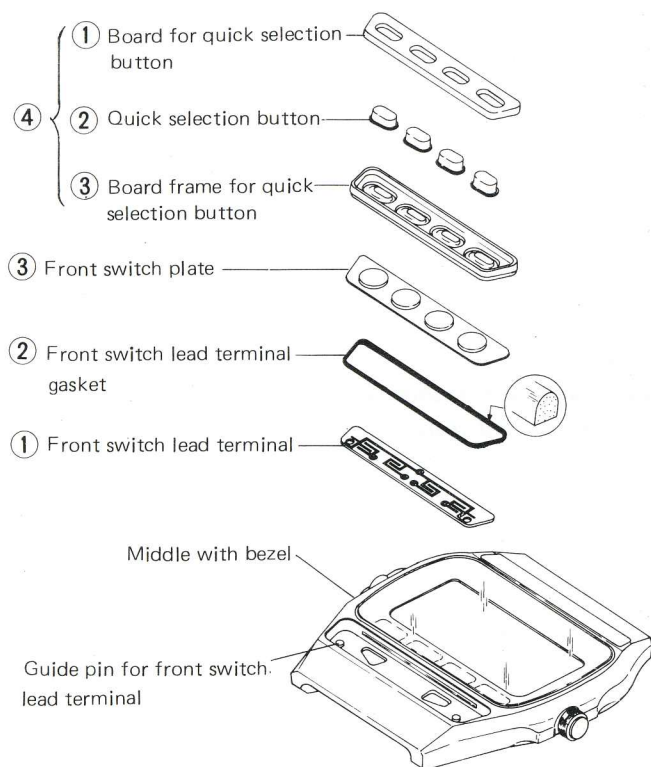
1. Disassembling, reassembling and lubricating of the case

Followings are the procedures for disassembling and reassembling of the front switch portion.

Disassembling procedures: ① ~ ④

Reassembling procedures: ④ ~ ①

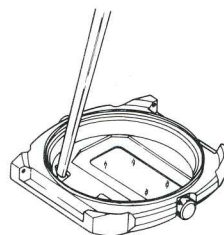
Lubricating: SEIKO Watch Oil S-6 



Remarks for reassembling

- Parts to be set in the fixed direction
 - Front switch lead terminal : Set it with its pattern side up.
 - Front switch lead terminal gasket : Place it with its rounded surface up.
 - Front switch plate : Place it with its projecting surface up.
- Be sure to replace the following parts with new ones when reassembling.
Keyboard fixing frame, Front switch plate, Front switch lead board.

Disassembling



Push the front switch portion from the back side of the middle with bezel with a soft stick.

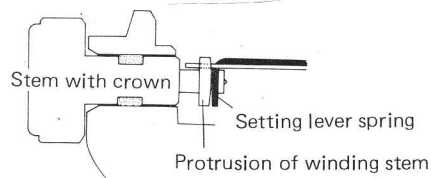
Reassembling

First set the board for quick selection button and quick selection buttons into the front switch plate and reassemble it into the middle with bezel. When reassembling, use the replaced board for quick selection button as an inserting disk.

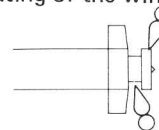
● Reassembling of the winding stem

As shown in the illustration, be sure to set the setting lever spring in the groove of the winding stem.

(There are two types of winding stem, one with 4 protrusions and the other with 2 protrusions.)



● Lubricating of the winding stem



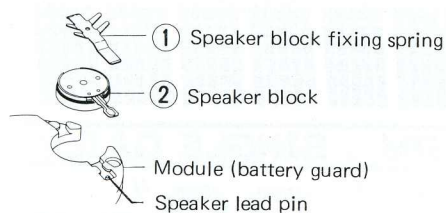
2. Disassembling, reassembling and lubricating of the module

Disassembling procedures: ① ~ ⑱

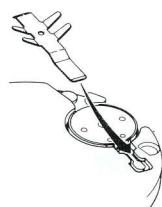
Reassembling procedures: ⑱ ~ ①

Lubricating: SEIKO Watch Oil S-6 

● Battery side

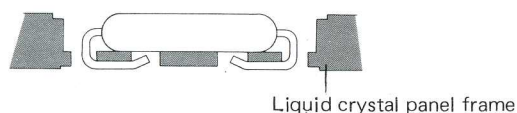


● How to set the speaker block fixing spring



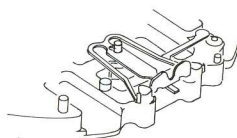
● Bulb

It is not necessary to remove the bulb except when the defective bulb is replaced with a new one. When replacing, insert the both ends of bulb lead wire into the holes of the liquid crystal panel frame as shown in the illustration.

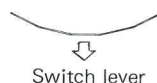


● Setting position of the switch lever

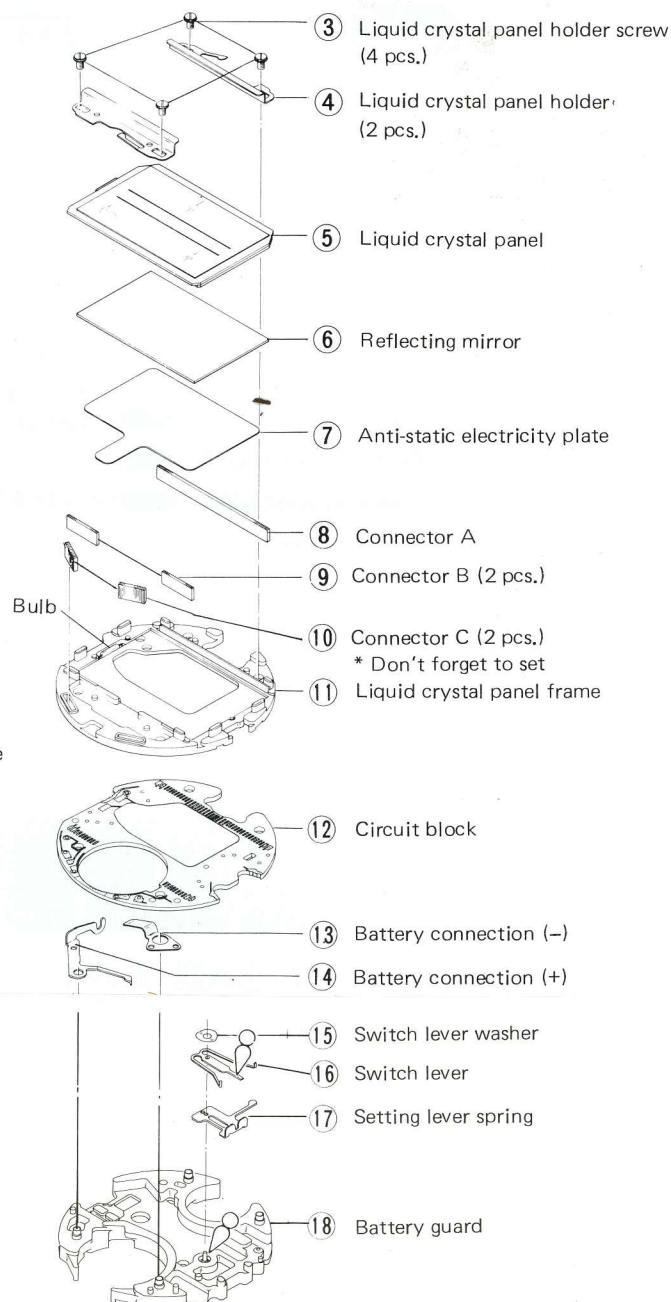
Be sure to assemble the switch lever so that the bending portions of the tips face the circuit block.



● How to set the switch lever washer

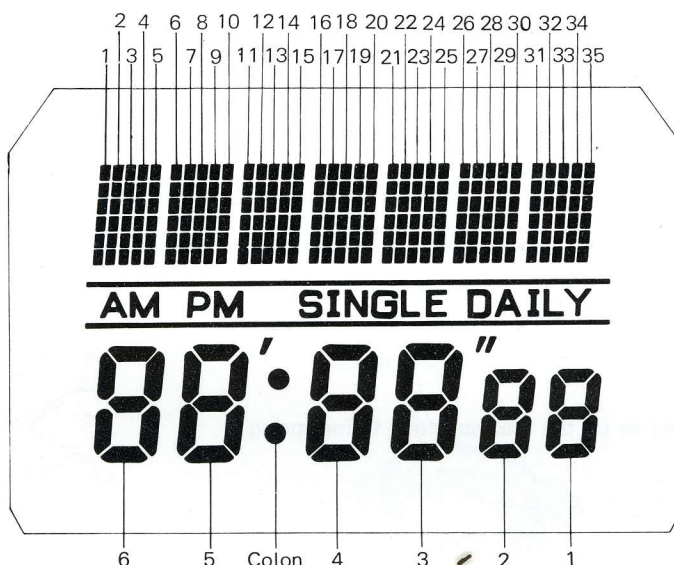
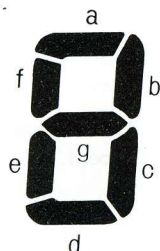


● Liquid crystal panel side

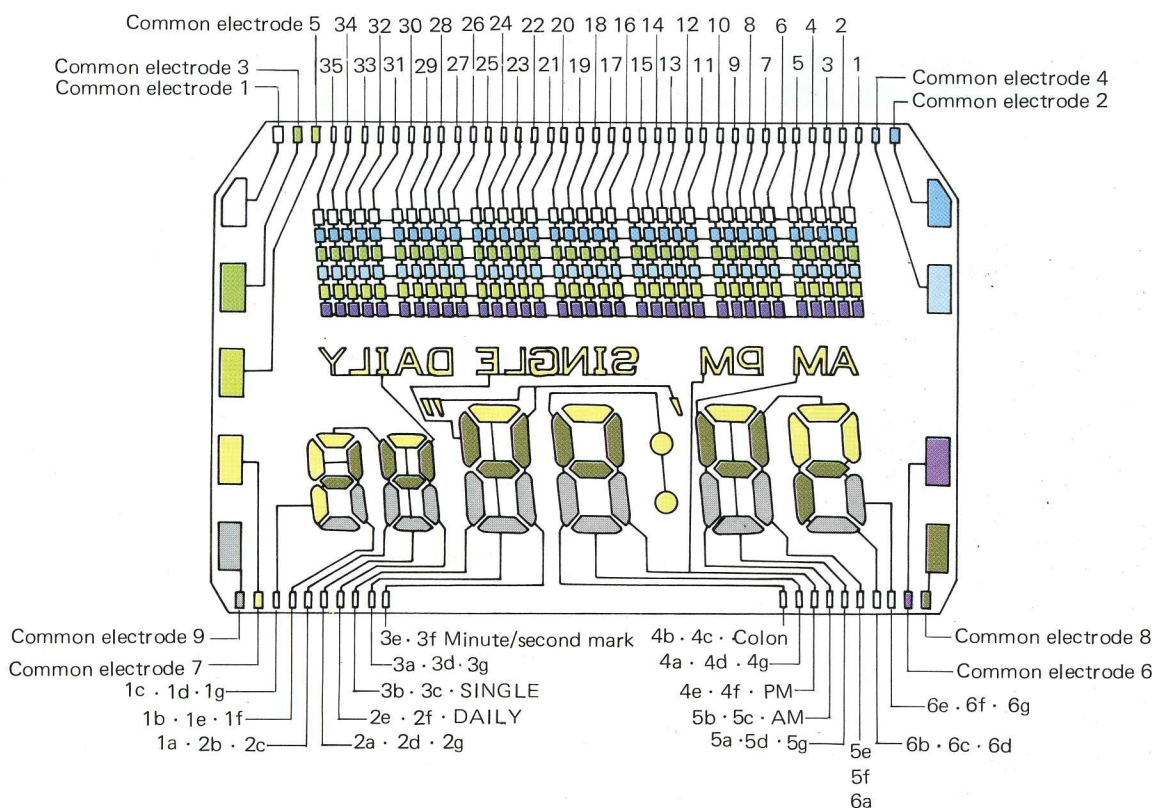


3. Relationship between the segment (Liquid crystal panel electrode) and C-MOS-LSI output terminal

• Designation of segment



Common electrode 1		Common electrode 6	
Common electrode 2		Common electrode 7	
Common electrode 3		Common electrode 8	
Common electrode 4		Common electrode 9	
Common electrode 5			



IV. 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 ALL DOTS AND SEGMENTS DISPLAY

- Depress the quick-selection button "4" (TIME) for 3 to 4 seconds continuously, and all the dots and segments light up.



All dots and segments light up.

Result:

All dots and segments light up: Normal

Any parts of dots or segments don't light up: Defective

[Ex: Defective dot display]

When a vertical line of dots do not light up

..... Defective conductivity other than common electrode.

When a horizontal line of dots do not light up

..... Defective conductivity of common electrode.

CHECK CONDUCTIVITY OF LIQUID CRYSTAL PANEL, CIRCUIT BLOCK AND CONNECTOR

CHECK CIRCUIT BLOCK

- Check output voltage for circuit block.

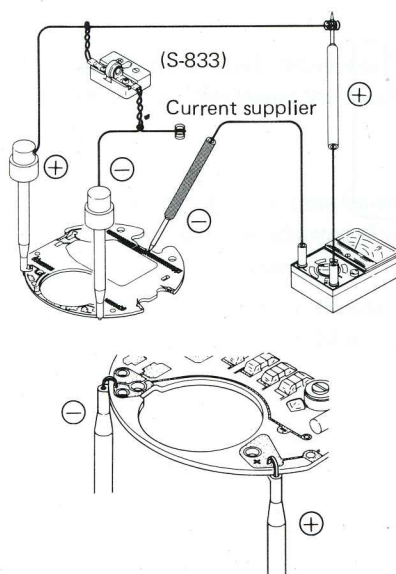
Range to be used: DC3V

Result:

More than 0.8V: Normal

Less than 0.8V: Defective

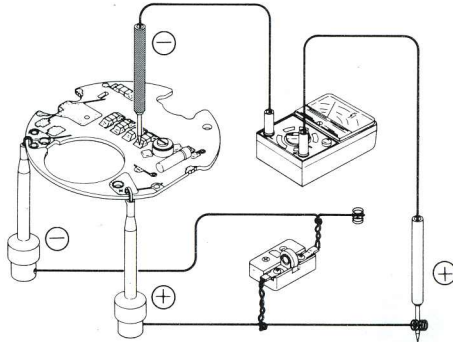
Replace the circuit block with a new one.



Procedure

2. Check upconverter voltage of the circuit block

Range to be used: DC3V

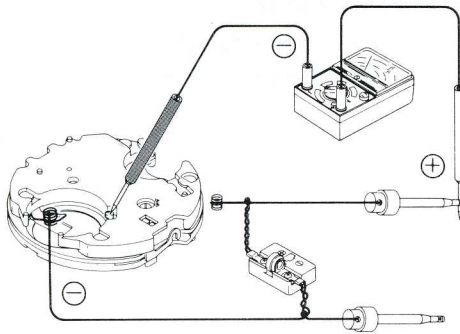


Result:

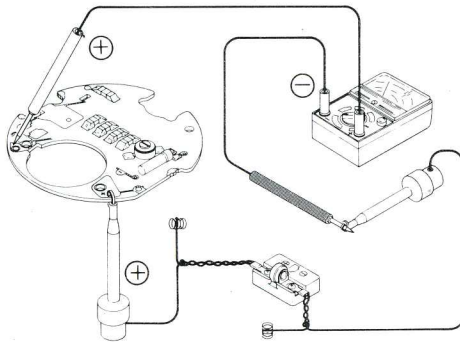
More than 4.0V: Normal
Less than 4.0V: Defective
Replace the circuit block with a new one.

CHECK CURRENT CONSUMPTION

- Check the current consumption for the whole of the module.



- How to check if the liquid crystal panel or the circuit block is defective when the current consumption is more than 4.0μA.



Result:

Less than 4.0μA: Normal
More than 4.0μA: Defective

Check the current consumption with the circuit block alone.

Result:

Less than 2.8μA
Replace the liquid crystal panel with a new one.
More than 2.8μA
Replace the circuit block with a new one.

CHECK SPEAKER BLOCK

Result:

120Ω ~ 140Ω: Normal
Less than 120Ω (Short circuit) } Defective
More than 140Ω (Broken wire) }

Replace the speaker block with a new one.

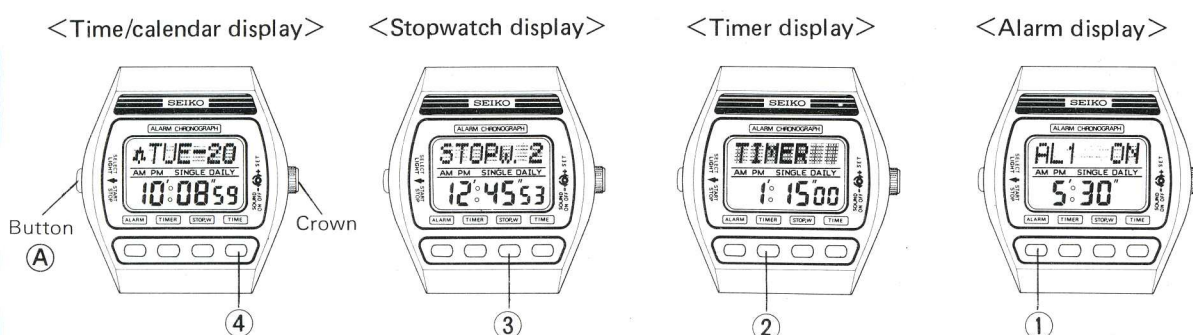
Procedure

CHECK ACCURACY

- Depress the Quick-selection button "4" (TIME) for 3 to 4 seconds continuously, and all dots and segments light up. That facilitates measuring the daily rate.

CHECK FUNCTIONING AND ADJUSTMENT

- Check to see if the display changes in the following order by depressing the quick-selection button "1", "2", "3" and "4"



- Check to see if each display functions correctly.

Alarm time setting:

Check to see if in the alarm display, the setting of the alarm time can be made by pulling out the crown and turning it. And check also if the alarm type can be selected by turning the crown after depression of button "A".

Timer setting:

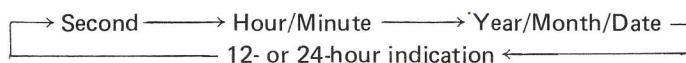
Check to see if in the timer display, the setting of the timer can be made by pulling out the crown and turning it. And check also if each depression of button "A" repeats start and stop of counting down with the crown pushed in.

Stopwatch operating:

Check to see if in the stopwatch display, each depression of button "A" repeats start and stop of measuring and also if the digits can be reset to "00" by depressing the quick-selection button "3".

Time/calendar setting:

Check to see if in the time/calendar display, the time/calendar setting function can be activated by pulling out the crown. And check to see also if the digits to be adjusted changes in the following order by each depression of button "A" and they can be adjusted by turning the crown.



- Check to see if the alarm sound can be stopped by depressing the button "A", "1", "2", "3", or "4" or turning the crown.

Note: When the time is set in the 24-hour indication, the alarm time will also be set in the 24-hour indication.

All procedures of disassembling, reassembling, lubricating, checking and adjustment are completed.