

TECHNICAL GUIDE AND PARTS LIST

CAL. Y652A

COMBINATION QUARTZ

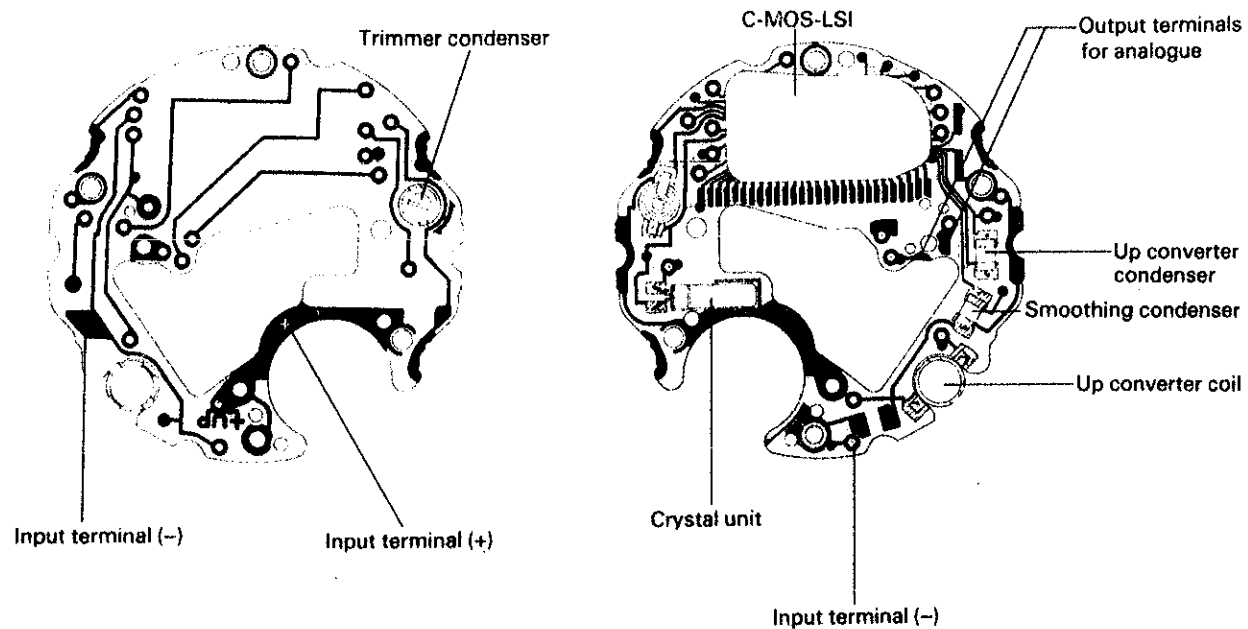
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I. SPECIFICATIONS

Item	Cal. No. Y652A	
	Analogue section	Digital section
Display medium	Three hands	Nematic Liquid Crystal, FEM (Field Effect Mode)
Driving system	Step motor	Multiplex
Display system		<ul style="list-style-type: none"> ● Time (12 or 24 hour indication) ● Calendar ● Alarm (Sounds for 20 seconds) ● Stopwatch (60 minutes)
Additional mechanism	<ul style="list-style-type: none"> ● Electronic circuit reset switch ● Second setting device 	<ul style="list-style-type: none"> ● Alarm test ● Time signal ● Illuminating light
Loss/gain	Loss/gain at normal temperature range Monthly rate: Less than 15 seconds	
Casing diameter	φ28.0 mm	
Height	3.4 mm (4.0 mm including battery)	
Regulation system	Trimmer condenser	
Quartz tester measuring gate	Any gate is available	
Battery	TOSHIBA SR41W Voltage: 1.55V Battery life: Approx. 2 years	
Jewels	2 jewels	

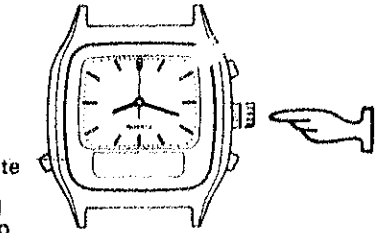
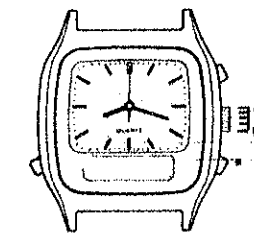
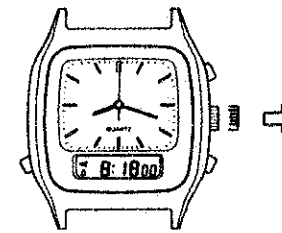
II. CIRCUIT BLOCK SCHEMATIC



III. TIME SETTING AND DISPLAY FUNCTIONS

Time setting for analogue indication

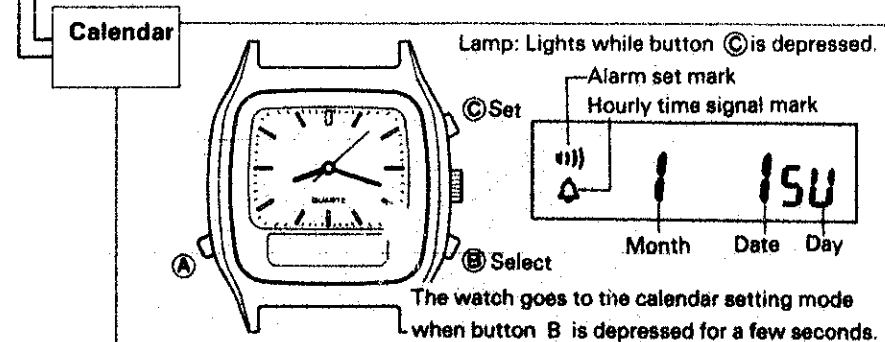
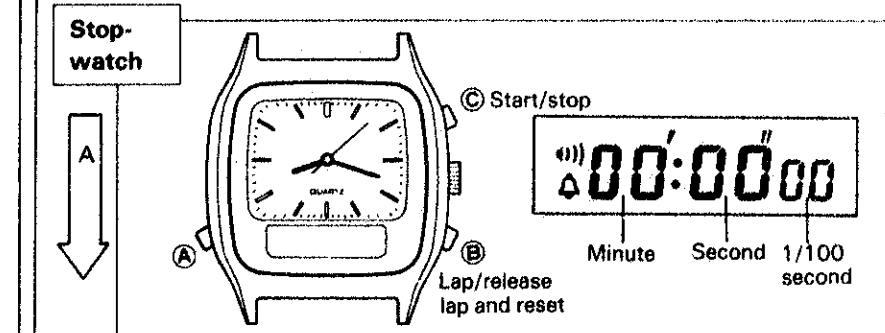
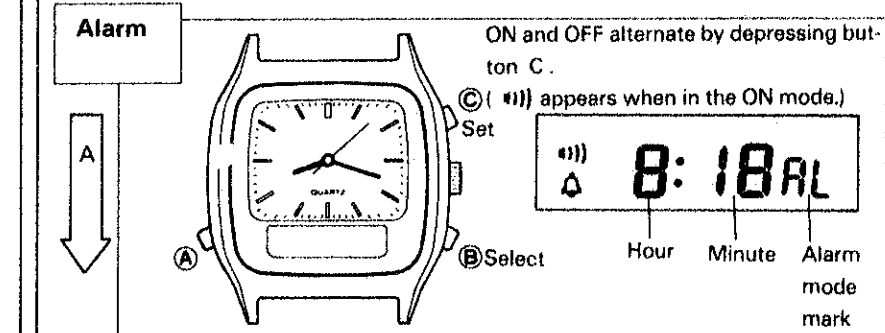
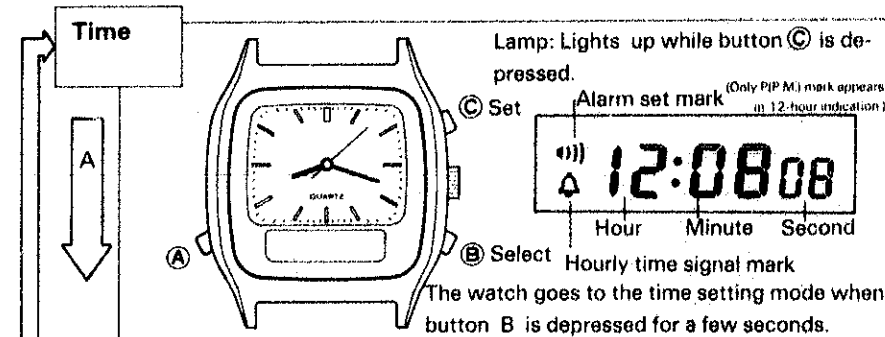
- ① Setting the second hand
Pull the crown out when the second hand points the 12 o'clock mark.
- ② Setting the hour hand and the minute hand
Turn the crown and set the hands to the correct time.
- ③ Push the crown back in accordance with a time signal for "00" seconds to set the exact time.



Advance the minute hand four or five minutes ahead and then turn it back to the exact time.

Functions for digital display

Displays are changed by depressing button A.



Alarm test

- Alarm sound can be monitored by depressing the buttons (B) and (C) simultaneously when the watch is in either the time or calendar mode.

Engage and disengage the hourly time signal

- Each time when the alarm test is carried out, the time signal mark flickers.
- Time signal mark displayed - Time signal sounds.
- Time signal mark not displayed - Time signal does not sound.

Pattern segment checking mode

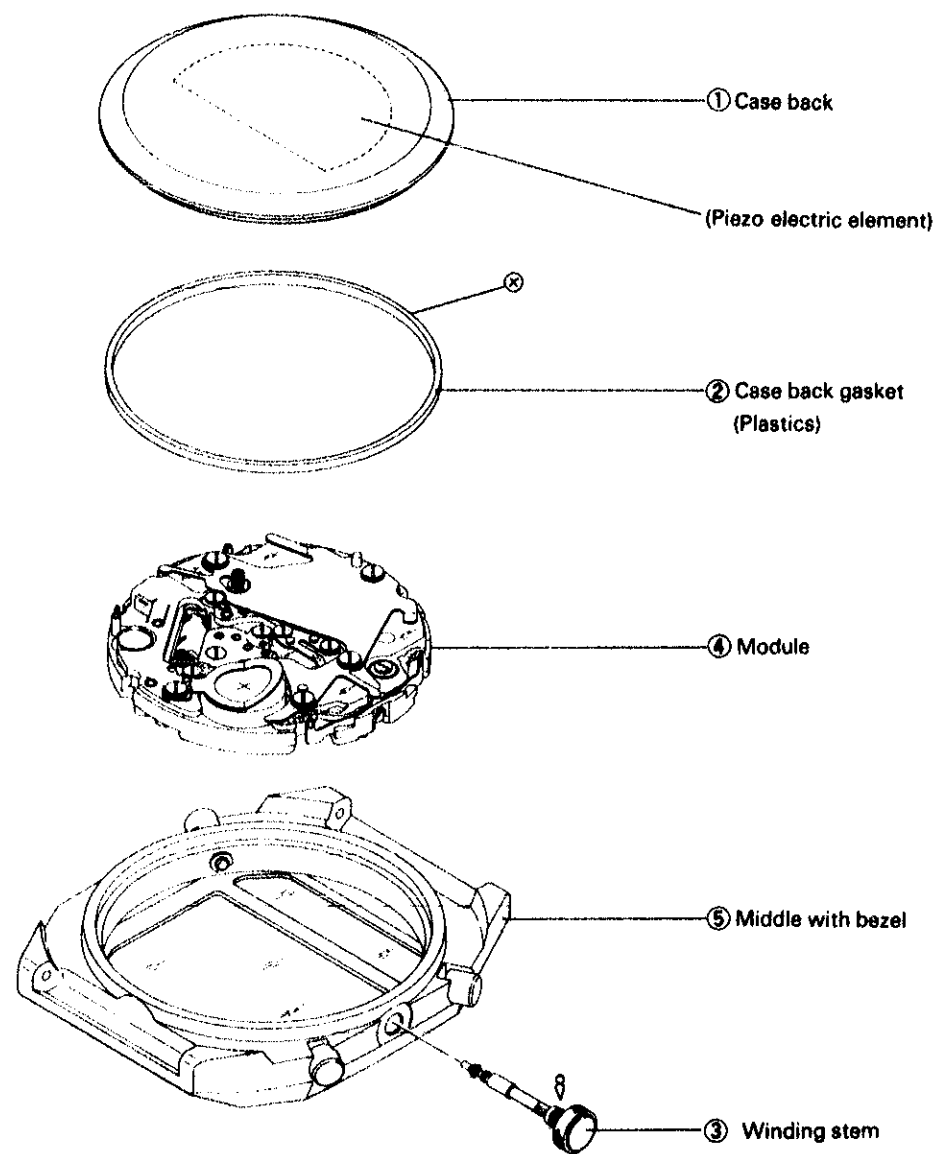
- All segments are simultaneously displayed when button (B) is depressed for a few seconds in the stopwatch display mode.
- To release the pattern segment checking mode, depress one of buttons (A), (B) or (C)

IV. DISASSEMBLING, REASSEMBLING AND LUBRICATING OF THE CASE

Disassembling procedures: Figs. ① ~ ⑤

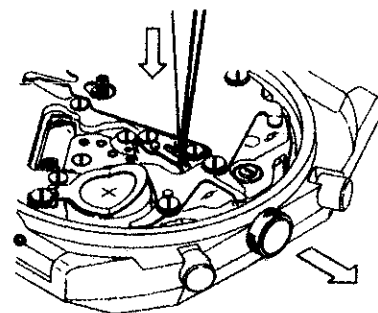
Reassembling procedures: Figs. ⑤ ~ ①

- **Lubrication**
- Silicone grease (500,000 c.s.)
- Quantity
- Standard amount ○
- *: No oiling to ⊗



③ Winding stem

Pull out the winding stem while depressing with tweezers the punched portion at the end of the winding stem holder.



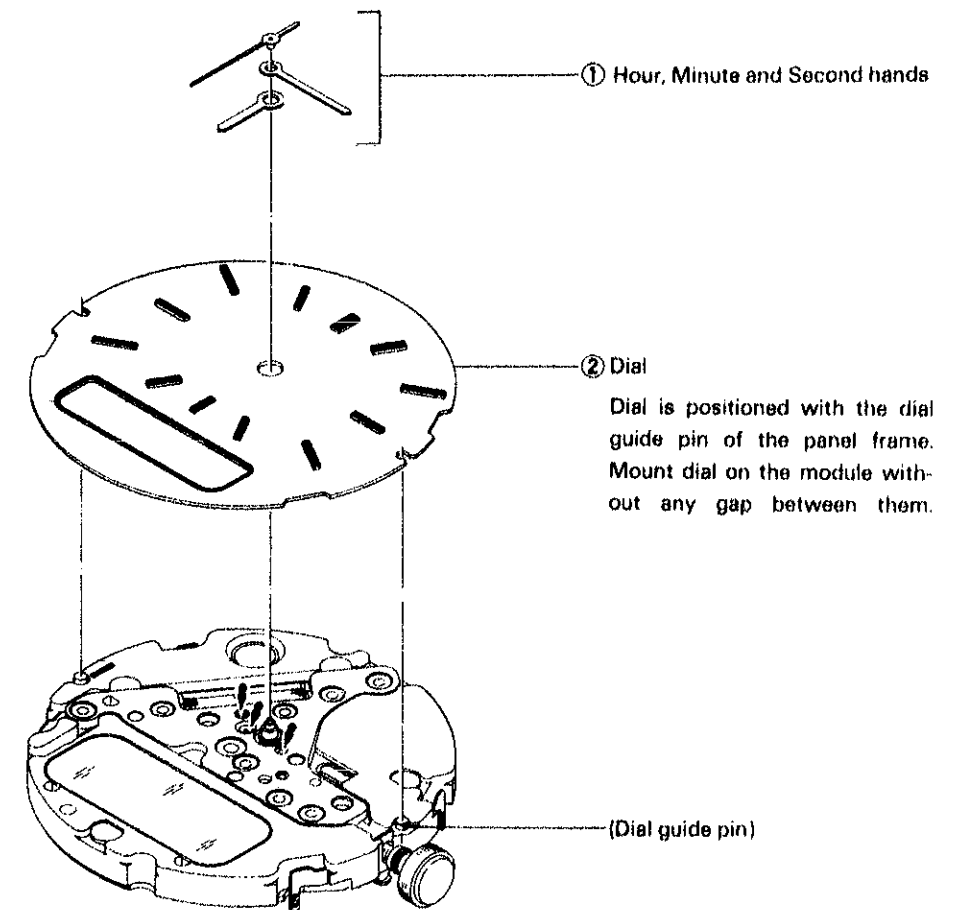
V. DISASSEMBLING, REASSEMBLING AND LUBRICATING

Disassembling procedures: Figs. ① ~ ⑭

Reassembling procedures: Figs. ⑭ ~ ①

- **Lubrication**
- Types of oil
- Moebius Synt-A-Lube ●
- Moebius Synt-V-Lube ○
- Quantity
- Normal ○
- Very small amount ●

1. Hands and Dial



2. Battery clamp ~ Winding stem

● For 100m water resistant watch

6: Battery connection (+) screw

3: Battery clamp screw

4: Battery clamp

5: Battery

Speaker lead terminal

3: Battery clamp screw

4: Battery clamp

5: Battery

6: Battery connection (+) screws

7: Battery connection (+)

8: Insulator for circuit block

9: Speaker lead terminal

10: Circuit block screw

11: Circuit block

12: Connector

13: Reflecting mirror

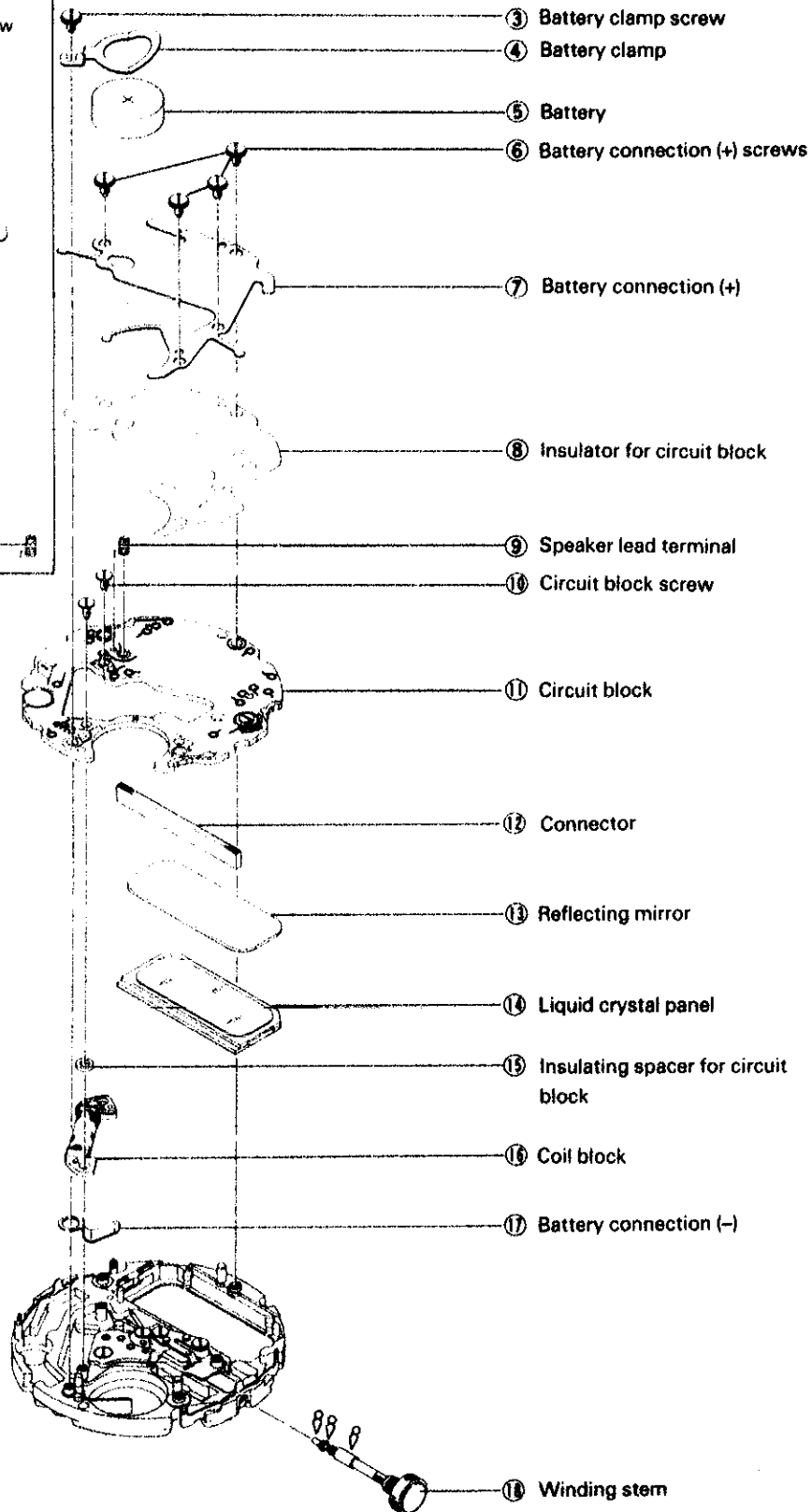
14: Liquid crystal panel

15: Insulating spacer for circuit block

16: Coil block

17: Battery connection (-)

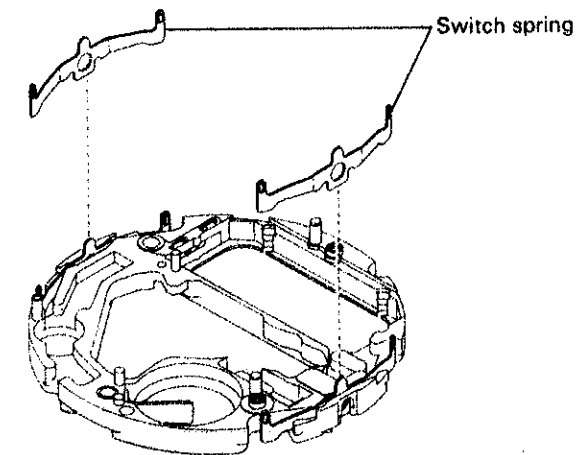
18: Winding stem



3. Panel frame ~ Main plate

19: Panel frame

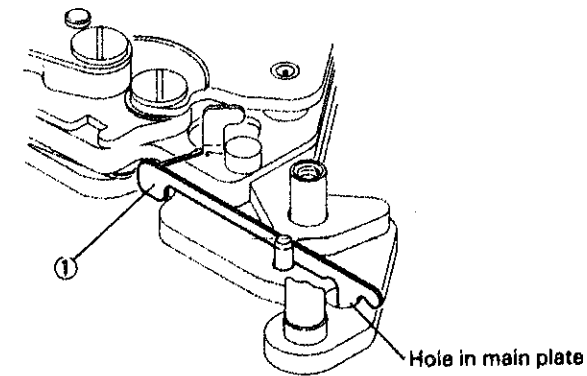
Assemble/disassemble switch springs according to the illustration below.



20: Train wheel setting lever spring

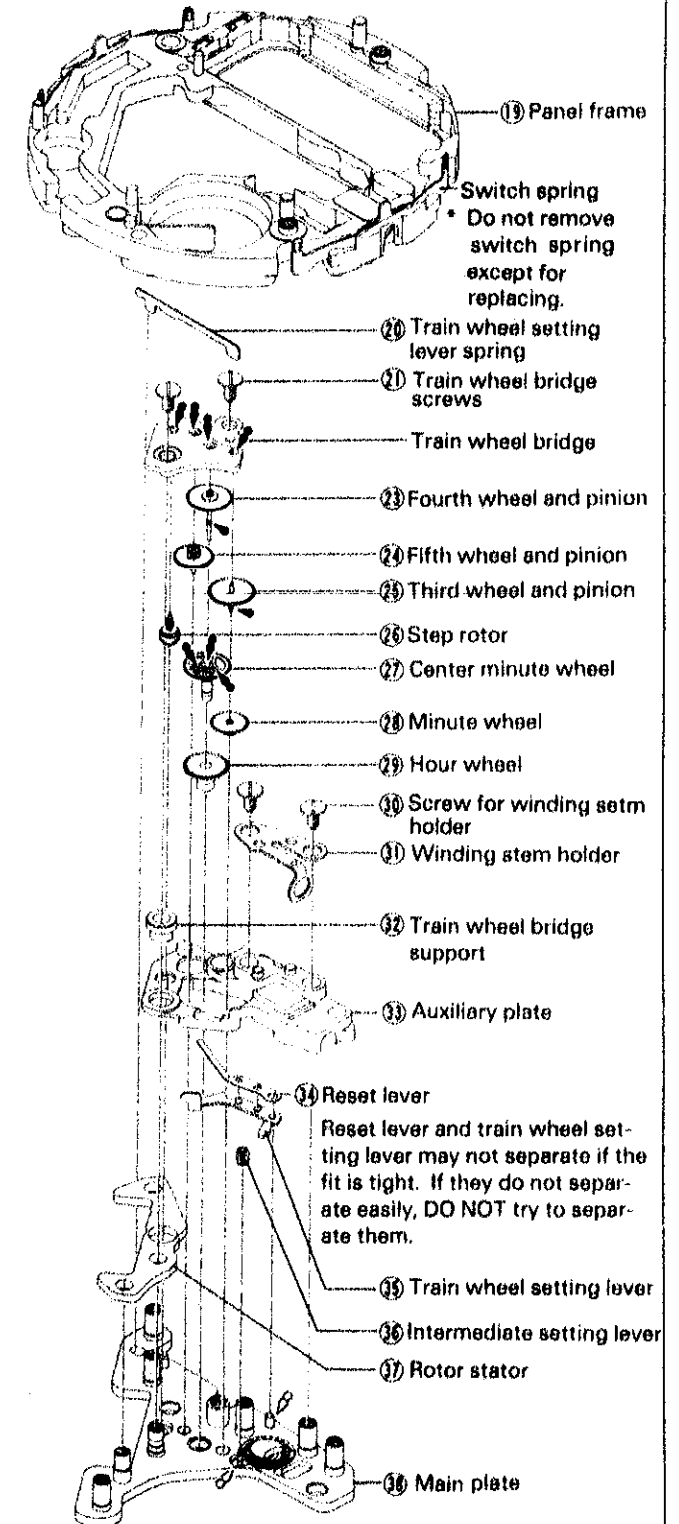
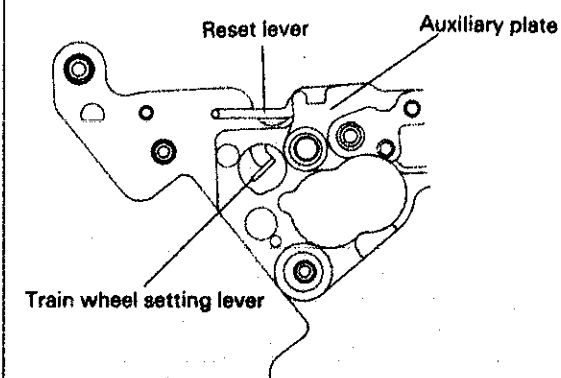
Insert the end ① which contacts the train wheel setting lever first and put the other end into the hole in the main plate.

Do not bend or warp the reset lever.



33: Auxiliary plate

Auxiliary plate should not be mounted on the train wheel setting lever and reset lever.



19: Panel frame

Switch spring
Do not remove switch spring except for replacing.

20: Train wheel setting lever spring

21: Train wheel bridge screws

Train wheel bridge

23: Fourth wheel and pinion

24: Fifth wheel and pinion

25: Third wheel and pinion

26: Step rotor

27: Center minute wheel

28: Minute wheel

29: Hour wheel

30: Screw for winding stem holder

31: Winding stem holder

32: Train wheel bridge support

33: Auxiliary plate

34: Reset lever

Reset lever and train wheel setting lever may not separate if the fit is tight. If they do not separate easily, DO NOT try to separate them.

35: Train wheel setting lever

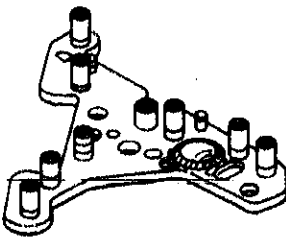


36: Intermediate setting lever

37: Rotor stator

38: Main plate

VI. CLEANING

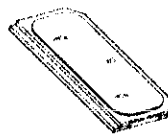
1. How to clean

Name of parts	Cleaning	Drying	Solution	Remarks
Main plate  Step rotor 	Rinse or scrub with a soft brush	Warm air	Benzene	<ul style="list-style-type: none"> ● Be careful not to deform or remove the parts fixed to the main plate. ● Use a clean solution as the step rotor is magnetized. Any foreign matter which cannot be removed by cleaning should be removed with rodico.
Connector 	Rinse or clean with a soft brush.	Warm air.	Alcohol	<ul style="list-style-type: none"> ● Never use benzene or trichloroethylene as these will melt the connector ● Do not install a connector until it is completely dry.
Plastic parts Panel frame Circuit block insulator Auxiliary plate	Rinse or clean with a soft brush	Warm air	Alcohol or benzene	
Other parts (excluding parts that must not be cleaned.)	Clean with a cleaner, rinse or gently scrub with a soft brush.	Warm air	Alcohol or benzene	

2. Parts that must not be cleaned



Circuit block



Liquid crystal panel



Reflecting mirror



Coil block



Battery



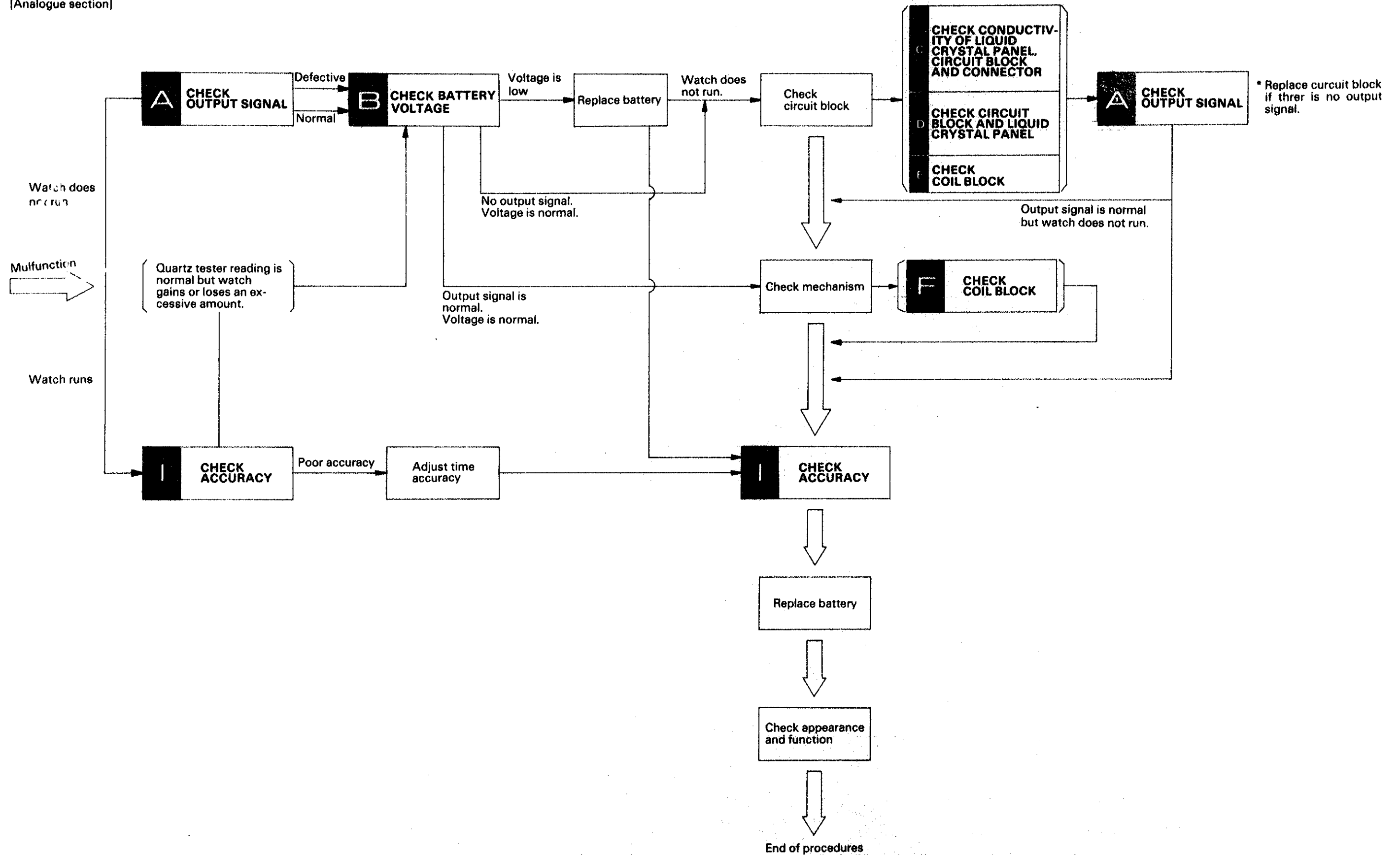
Lamp

- Clean only the contacts of the liquid crystal panel and circuit block with a cloth moistened with benzene or alcohol and blow dry with warm air.
- Remove dust or lint with a soft brush.

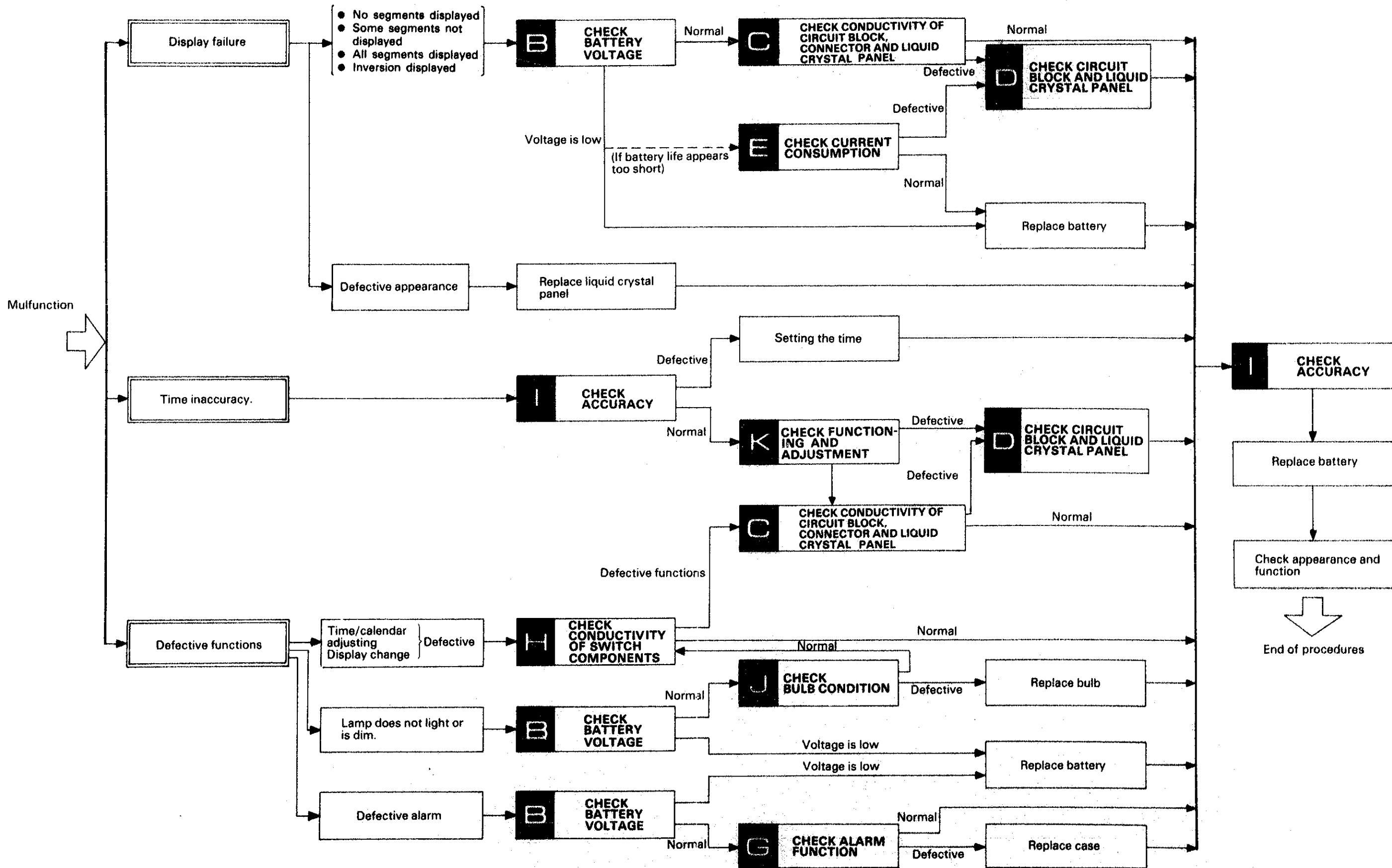
VII. CHECKING AND ADJUSTMENT

1. Guide table for checking and adjustment

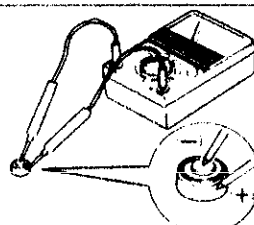
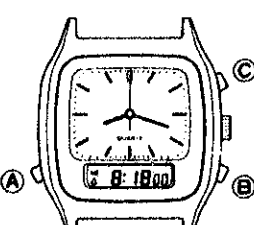
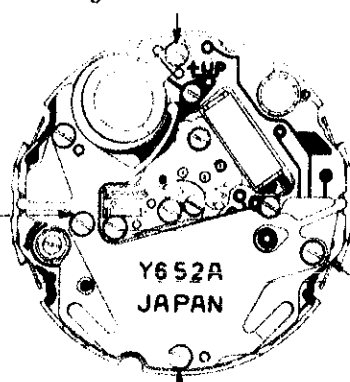
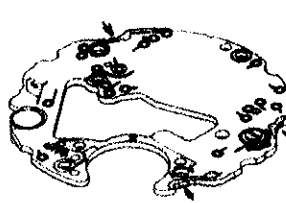
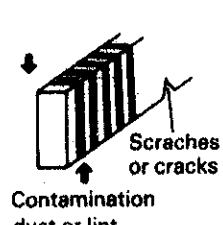
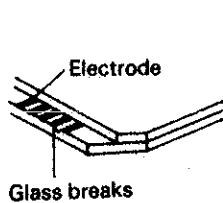
[Analogue section]

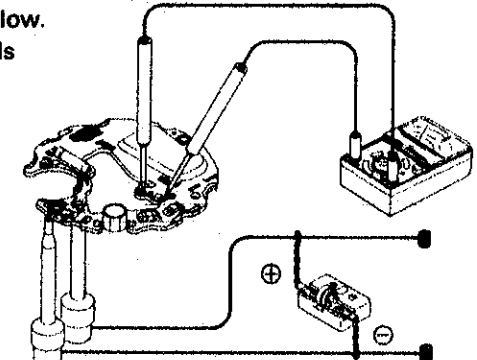
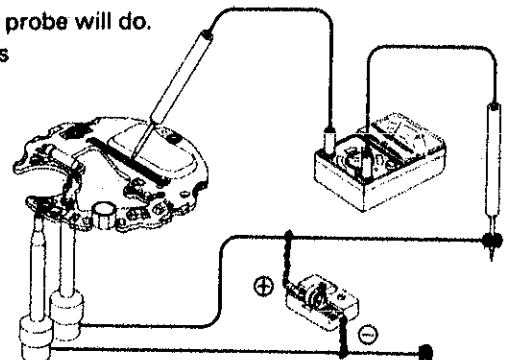
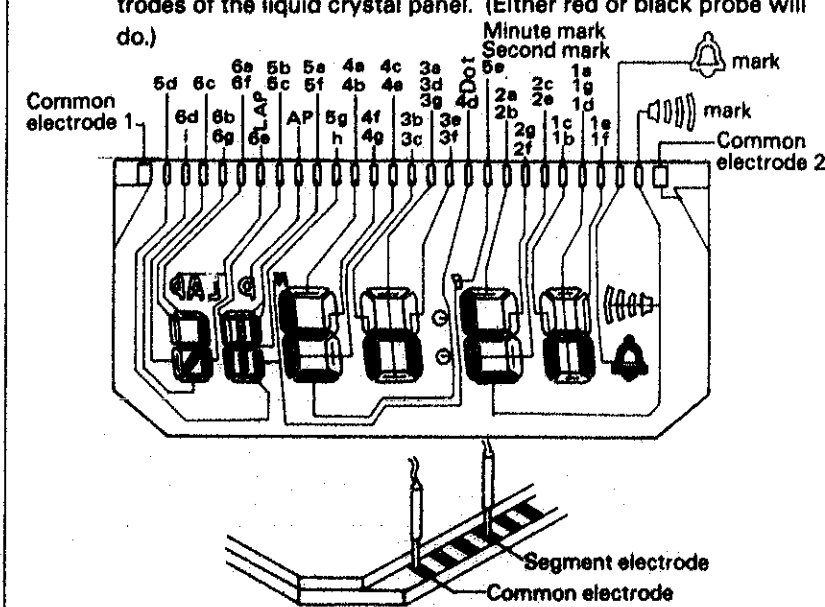


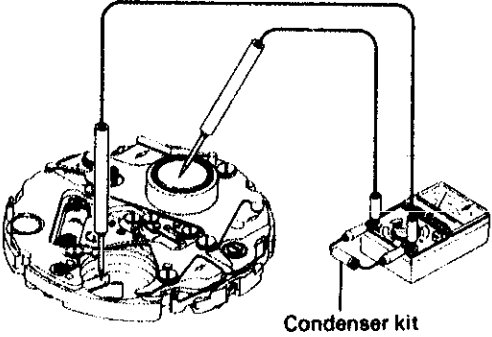
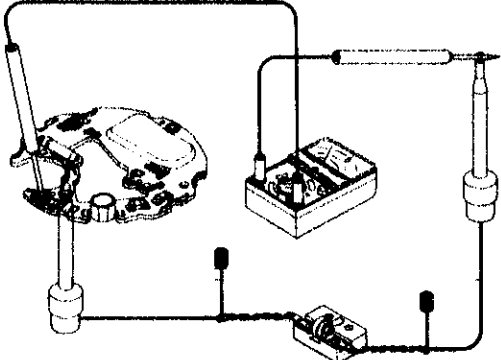
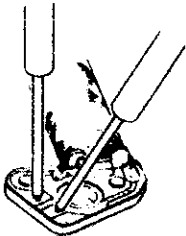
[Digital section]

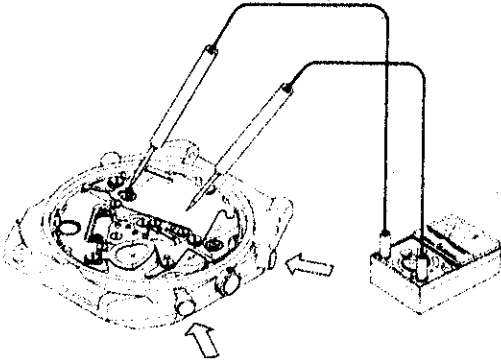
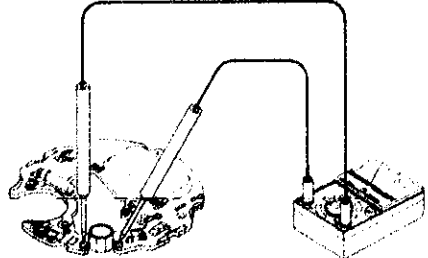


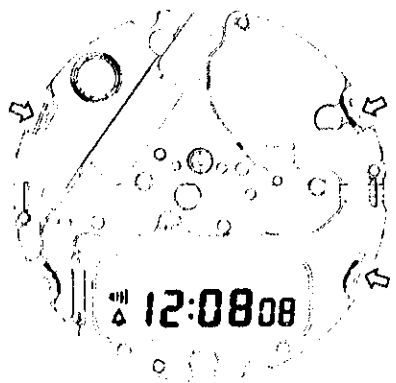
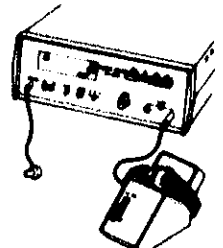
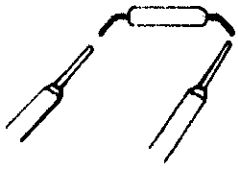
2. Procedure for checking and adjustment

	Procedure	Result and repair
CHECK OUTPUT SIGNAL	<p>Check output signal of the watch.</p> <ul style="list-style-type: none"> ● Set up the quartz tester. ● Use an electromagnetic microphone for the analogue watch. 	<p>Blinks every second: Normal Does not blink: Defective</p>
CHECK BATTERY VOLTAGE	<p>Check battery voltage</p> <ul style="list-style-type: none"> ● Set up the Volt-ohm-meter. Range to be used: DC 3V ● Measuring Red probe (+)...Battery surface (+) Black probe (-)...Battery surface (-) 	<p>1.5V or more: Normal Less than 1.5V: Defective</p>
PATTERN SEGMENT CHECKING	<p>Check if the appearance of the liquid crystal panel is normal.</p> <ol style="list-style-type: none"> ① Depress button (A) and set the display mode to stopwatch. ② Depress button (B) for a few seconds to display all segments at one time. ③ Depress either one of buttons (A), (B), or (C) to release the displays. 	<p>All segments are displayed: Normal Some segments are not displayed: Defective</p>
CHECK CONDUCTIVITY OF CIRCUIT BLOCK, CONNECTOR AND LIQUID CRYSTAL PANEL	<p>(1) Check the screws for tightness.</p>  <p>(2) Check for dust, lint contamination, cracks and breaks of conductive portion.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Circuit block</p>  </div> <div style="text-align: center;"> <p>Connector</p>  </div> <div style="text-align: center;"> <p>Liquid crystal panel</p>  </div> </div> <p>Check three side surfaces of the switch components and output terminal for analogue.</p>	<p>No loose screws: Normal Proceed to (2) Loose screws: Defective Retighten</p> <p>Uncontaminated: Normal Contaminated: Defective Wipe off any foreign matter.</p> <p>No scratches, cracks or breaks: Normal Scratches, cracks or breaks: Defective Replace the parts with new ones.</p>

	Procedure	Result and repair
CHECK CIRCUIT BLOCK AND LIQUID CRYSTAL PANEL	<p>(1) Check electric signal from circuit block.</p> <ol style="list-style-type: none"> ① Remove circuit block from the module. ② Connect circuit block to the Volt-ohm-meter and power supplier as illustrated below. <ul style="list-style-type: none"> ● Analogue terminals  <ul style="list-style-type: none"> ● Digital terminals  <p>* Either red or black probe will do.</p> <ul style="list-style-type: none"> ● Digital terminals <p>* Apply red probe (+) to positive terminal of power supplier and black probe (-) to digital terminals.</p> <p>(2) Check the liquid crystal panel for broken wire and short-circuit.</p> <ol style="list-style-type: none"> ① Turn the liquid crystal panel to the reverse side. ② Set up the Volt-ohm-meter. Range to be used: OHMS R x 1 (Any range will do if more than 3V is applied to the terminal of the Volt-ohm-meter.) ③ Attach the probes to the common electrode and segment electrodes of the liquid crystal panel. (Either red or black probe will do.)  <p>* Common electrode 1 is connected electrically with segment.</p>	<p>The pointer swings every second: Normal The pointer does not swing: Defective Replace circuit block.</p> <p>0.8v or more: Normal Less than 0.8V: Defective. Replace circuit block.</p> <p>Displayed: Normal Not displayed: Defective Replace the liquid crystal panel with a new one.</p>

	Procedure	Result and repair
CHECK CURRENT CONSUMPTION	<p>Check if the current consumption is normal.</p> <ol style="list-style-type: none"> Set up the Volt-ohm-meter. Range to be used: DC 12 μA Measuring Red probe (+)...Battery connection (-) Black probe (-)...Battery surface(-)  <p>Condenser kit</p> <p>If the current consumption is large, check as follows.</p> <ol style="list-style-type: none"> Measure the current consumption when the coil block is removed from the module. * Connection is the same as above. Measure the current consumption of only circuit block. 	<p>Less than 2.8 μA: Normal. 2.8 μA or more: Defective. Replace the circuit block or liquid crystal panel with a new one.</p> <p>Less than 1.5 μA: Normal. Check for lubrication, dust and lint on train wheel and converters. Check coil block. 1.5 μA or more: Defective.</p> <p>Less than 1.4 μA: Circuit block is normal. Replace liquid crystal panel. 1.4 μA or more: Circuit block is defective. Replace circuit block.</p>
CHECK COIL BLOCK	<p>Check the coil block for short circuit and broken wire.</p> <ol style="list-style-type: none"> Set up the Volt-ohm-meter. Always calibrate the Volt-ohm-meter beforehand. Range to be used: OHMS R x 100 Checking Apply red and black probes of the Volt-ohm-meter to the coil block leads. (Either red or black probes will do.) 	<p>2.2k Ω ~ 2.6k Ω: Normal. Less than 2.2k Ω (short circuit): More than 2.6k Ω (broken wire) Defective. Replace coil block.</p>

	Procedure	Result and repair
CHECK ALARM FUNCTION	<ol style="list-style-type: none"> Check alarm output signal Check alarm output signal from circuit block. <ol style="list-style-type: none"> Set digital display to time or calendar mode. Set up the Volt-ohm-meter. Range to be used: DC 3V or DC 12 μA. Red probe (+)...Battery connection (+). Black probe (-)...Speaker lead terminal. Depress buttons B and C simultaneously to set the watch to the alarm test mode.  Check up-converter coil Check up-converter coil for a broken wire or short-circuit <ol style="list-style-type: none"> Set up the Volt-ohm-meter. Range to be used: OHMS R x 1 Check according to the figure. Always calibrate the Volt-ohm-meter beforehand.  Check piezo electric element If the alarm does not function even when alarm output signal is normal, check the piezo electric element for scratches and cracks and check the speaker lead terminal for connection. 	<p>The pointer swings: Normal. Proceed to step (3). The pointer does not swing: Defective. Proceed to step (2) Up-converter coil checking.</p> <p>130Ω ~ 150Ω: Normal Less than 130Ω: Defective (short circuit) More than 150Ω: Defective (broken wire) Replace the circuit block with a new one.</p>

	Procedure	Result and repair
CHECK CONDUCTIVITY OF SWITCH COMPONENT	<p>Check if switches function properly.</p> <ul style="list-style-type: none"> ● Perform the test on the assembled module. ● Switch spring must contact the terminal of the circuit board when pushed using tweezers and it must disconnect when released. Check all three springs. ● Check for dust, lint or contamination on the contacts. 	<p>Functions correctly: Normal Does not: Defective Replace switch spring if not repairable.</p> <p>No dust, lint or contamination: Normal. Dust, lint or contamination: Defective. Remove them.</p>
CHECK ACCURACY	<p>Check gain and loss of time by using the Quartz Tester.</p> <ol style="list-style-type: none"> ① Set up the Quartz Tester Use an electromagnetic microphone for analogue watch. ② Measuring. 	<p>Does not gain or loss: Normal. Gain or losses: Defective. Adjust the time accuracy by the trimmer condenser.</p>
CHECK BULB CONDITIONS	<p>Check if there is a broken filament in the bulb.</p> <ol style="list-style-type: none"> 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. (Either red or black probe will do.) 	<p>Bulb lights: Normal Bulb does not light up: Defective. Replace the bulb with a new one.</p>
CHECK FUNCTIONING AND ADJUSTMENT	<p>Check if operations listed below can be performed according to the procedures on page 2.</p> <ul style="list-style-type: none"> ● Analogue watch: Time setting. ● Digital watch: Time setting. Calendar setting. Alarm time setting. Stop watch operation. 	

VIII. PARTS LIST

Cal. Y652A		Cal. Y652A	
PART NO.	PART NAME	PART NO.	PART NAME
102 322	Auxiliary plate	4270 033	Battery connection (-)
125 460	Train wheel bridge	4271 322	Battery connection (+)
231 481	Third wheel & pinion	4313 322	Connector
*241 481	Fourth wheel & pinion	4398 332	Liquid crystal panel frame
*241 482	Fourth wheel & pinion	4408 026	Insulating spacer for circuit block
261 481	Minute wheel	4455 322	Reset lever
*270 481	Center minute wheel	4510 356	Liquid crystal panel (Normal)
*270 482	Center minute wheel	4510 367	Liquid crystal panel (Gold)
*271 064	Hour wheel	4521 356	Reflecting mirror
*271 082	Hour wheel	4530 230	Bulb
354 322	Winding stem	011 541	Upper hole jewel for step rotor
361 322	Second setting lever spring	011 541	Lower hole jewel for step rotor
391 322	Second setting lever	012 168	Train wheel bridge screw
426 001	Train wheel bridge support	012 168	Circuit block screw
701 481	Fifth wheel & pinion	012 470	Battery clamp screw
735 322	Winding stem holder	012 470	Screw for winding stem holder
805 481	Intermediate setting wheel	012 470	Screw for battery connection (+)
4001 322	Circuit block	017 203	Tube for train wheel bridge (A)
4002 480	Coil block	017 286	Tube for battery connection (+) screw (B)
4146 480	Step rotor	017 653	Tube for circuit block screw (A)
4216 322	Insulator for circuit block	017 654	Tube for circuit block screw (B)
4225 026	Battery clamp	017 655	Tube for train wheel bridge (B)
*4225 322	Battery clamp	017 656	Tube for battery clamp screw
4239 481	Rotor stator	017 656	Tube for battery connection (+) screw (A)
4245 327	Switch spring	017 656	Tube for winding stem holder screw
4246 013	Speaker lead terminal (280 mm)		Tube for battery connection (+) screw (A)
*4246 021	Speaker lead terminal (321 mm)	TOSHIBA 6R41W	Battery

Remarks:

- ★ Fourth wheel and pinion, Center minute wheel and pinion, Hour wheel.
There are two different types as specified below.

Combination:

Type	Fourth wheel and pinion	Center minute wheel	Hour wheel
a	*241 481	*270 481	*271 084
b	*241 482	*270 482	*271 082

- ★ Battery clamp and Speaker lead terminal.
4225 322 (Battery clamp)
4246 021 (Speaker lead terminal) } Used for "100m water-resistant" watch