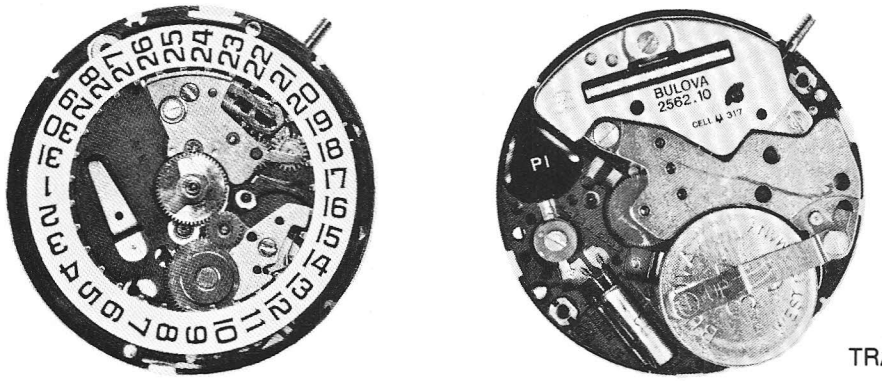
1980

# BULOVA WATCH COMPANY, Inc.
# TECHNICAL BULLETIN

## BULOVA® ACCUTRON® QUARTZ
## S M Q® Caliber 2562.10

Fig. 1.




DIAL SIDE — TRAIN BRIDGE SIDE

Enlarged view of movement

### INTRODUCTION

The Caliber 2562.10 is an electronic movement with analog display. A Quartz Crystal controlled Stepping Motor drives the gear train and the dial train, causing the hands to turn.

### TOOLS:

- Quartz Crystal Counter with 32,768 Hz. capacity
- Bulova Service Meter #700
- Accessory #9920/6603
- Non-magnetic tweezers
- Watchmaker's hand tools
- Watchmaker's Loupe

### IMPORTANT:

DO NOT depress the stem release post with a pointed tool. (See Page 5 ).

### CHARACTERISTICS

**QUARTZ FREQUENCY**
32,768 Hz. (cycles per second).

**ELECTRONIC CIRCUIT**
Integrated circuit with one impulse every second.

**POWER DISCONNECT SYSTEM**
There is saving of Battery life when watch is stored with crown in setting (position 3).

**STEPPING MOTOR**
Bipolar, 2 steps per revolution.

**DIMENSIONS**
25.60 × 3.35 mm.

**LIGNE SIZE**
11½

**DISPLAY**
Caliber 2562.10 - Hour, Minute, Second, and Date.

**POWER SOURCE**
One Silver Oxide Battery 1.55 volts, Bulova 317. (Low Drain).

## BASIC ELECTRONIC FUNCTION OF ACCUTRON QUARTZ CALIBER 2562.10

Refer to Fig. 2

The Accutron Quartz Caliber 2562.10 is powered by a 1.55 Volt Bulova 317 (Low Drain) battery. Voltage from the battery is introduced into the electronic circuit, which then transmits current to the Quartz Crystal circuit causing the crystal to vibrate at 32,768 Hz (cycles per second). The accuracy of the watch is dependent on the frequency of the Quartz Crystal. If the Quartz frequency is incorrect, the TRIMMER capacitor regulator, within the movement, can be turned to make adjustments of up to 8 seconds per day. This Quartz frequency (rate) then must be converted to one-second impulses before it can be used to mechanically drive the hands of the watch. This is accomplished by means of an electronic divider circuit. The divider circuit, which contains 15 stages, receives the signal generated by the Quartz Crystal and divides this signal by two in each of the 15 stages.

The 15th stage emits one pulse per second. The divider circuit divides the 32,768 Hz to 1 Hz $2^{15}$ = 32,768, which drives the stepping motor in the timekeeping mode. The motor in turn drives the gear train which is connected to the dial train causing the hands to turn.

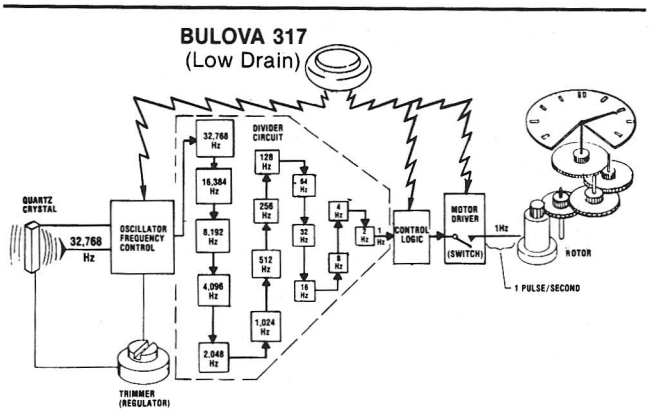



**Fig. 2** This illustration is a simplified version of the complicated circuit within the Accutron Quartz Caliber 2562.10. It is not intended to be used as a means of conveying any other thought but a practical way of demonstrating a theory.

## CHECKING THE FREQUENCY (RATE)

Quartz Frequecy should be regulated to "0" ± 0.17 seconds per day.

## ADJUSTING THE FREQUENCY (RATE)

To Regulate: turn the trimmer (See Page 2). The maximum rate change is approximately 8 seconds per day.

## AUDIBLE SOUND

There is no constant audible sound present as with other types of watch movements.

## POWER CELL REPLACEMENT

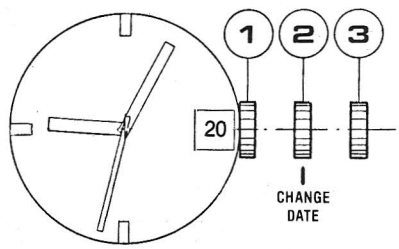
1) Loosen the cell strap sufficiently to allow the strap tab to disengage from hole in train bridge.
2) Swing strap counter clockwise.
3) Remove cell from movement and insert new cell printed (+) side up. Use Bulova cell number 317 (1.55 Volt Low Drain).
4) Reposition cell strap over cell and tighten strap screw.

If the cell is not replaced before it is exhausted, the watch will simply stop. The movement should not be harmed in any manner.

HOWEVER, WHEN IT BECOMES EXHAUSTED, it should be replaced at the earliest opportunity to diminish the possibility of leakage. NEVER store a watch with an exhausted power cell in it.

## CROWN POSITIONS

Fig. 3




POSITION 1

Normal Running

POSITION 2

Instant
Calendar Setting

POSITION 3

Stops Second Hand
Minute and Hour Hand Setting
Disconnect Position: Conserves life of power cell when watch is not in use.

## CONNECTING METER TO MOVEMENT.

**Step 1.** Remove Power Cell from Movement and place in the Meter Cell Well.

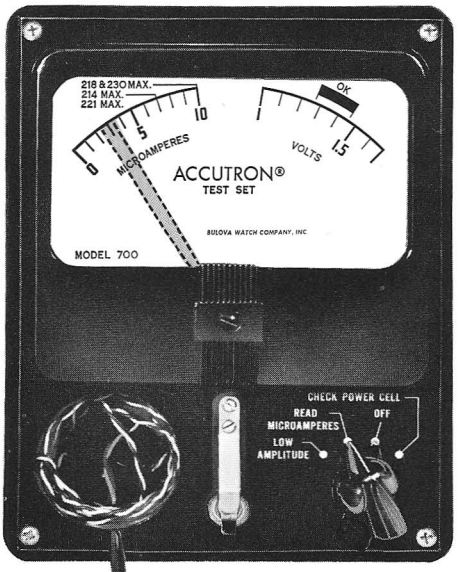
**Step 2.** Set Meter Selector at "LOW AMPLITUDE".

**Step 3.** Connect Blue Meter Clip to loop in service Accessory (9920/6603) marked "Blue"; Yellow Meter Clip to Accessory loop marked "Yellow".

**Step 4.** Loosen upper cell screw and swing strap to side of movement to prevent upper and lower straps from touching during testing and servicing.

**Step 5.** Connect "Red" Accessory Clip to Power Cell Strap (+). DO NOT ATTACH METER CLIP TO STEM DURING ELECTRONIC TESTS. The composition of the main plate is such that a natural insulation occurs between the stem and the movement. This condition will create a "0" (open) meter reading.

**Step 6.** Connect "Black" Accessory Clip to lower contact spring (−) as illustrated in Fig. 4.




**BULOVA NO. 700 METER**

**Note: photographs of units are not to actual size.**

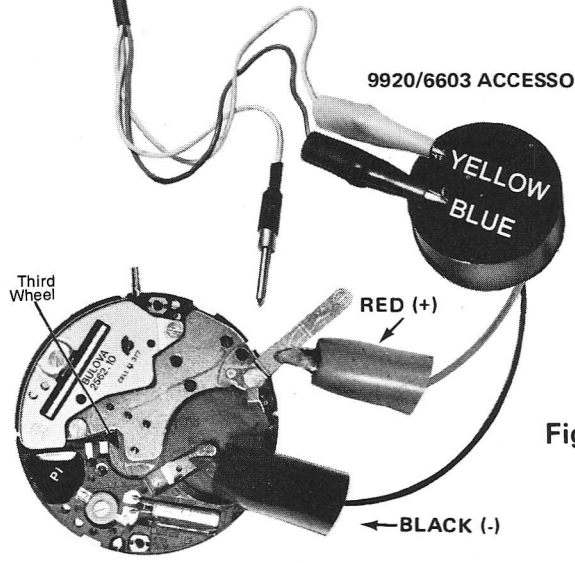
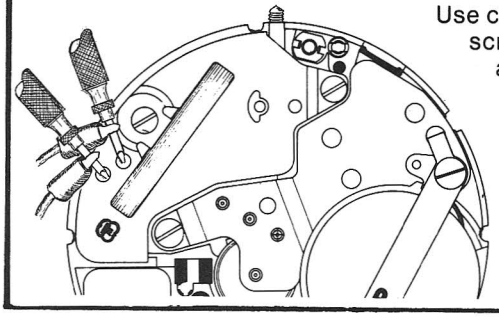



**Fig. 4**



Use clip to the screwdriver as probe.

**Fig 5**

**DURING P.C. CHECK**

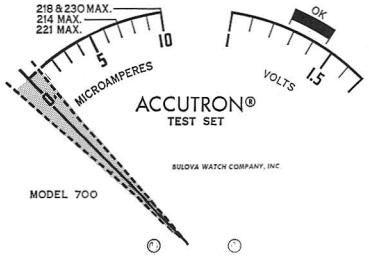



**Fig. 6**

## BASIC TEST PROCEDURE

**Step 1**

**CHECK POWER CELL** →

- 1.50 to 1.58 volts: O
- Less than 1.50 volts

**Step 2**

**CHECK FREQUENCY (RATE)** →

- Rate OK or regulate
- No Rate or Very Err

**Step 3**

**ELECTRONIC CIRCUIT CHECK** → With Power Cell in r view third wheel. Fi

If Meter Pointer flic nately above and be (fig. 6), Electronic C If Meter Pointer doe replace Electronic C

**Step 4**

**COIL WINDING CHECK** →

Remove cell from m and insert it into the well. Remove alligat from Electronic Circ meter at Low Ampli nect meter to mover shown in fig. 4.

**Step 5**

**CURRENT CHECK** →

Set Meter selector a Micro-amperes. Poi fluctuate. This is nc

***IMPORTANT:** The meter cell well clip must make firm contact with the well contact button. If necessary, slip a metal disc between the spring and contact button.

**NOTE: It is imperative that the basic "step-by-step" procedure be strictly adhered to beginning with Step 1 and continuing through Step 5.**

< to use
: Replace
→ Proceed to Step 2...

if necessary. → Proceed to Step 3...
atic → Replace Electronic Module → Rate OK or regulate if necessary. → Proceed to Step 3

movement, g. 4
→ Third Wheel steps. Electronic circuit, coil winding, and mechanical portion OK → Remove cell from movement and insert it into the meter cell well. Connect meter to movement. Fig. 4. → Proceed to Step 5
→ Third Wheel does not step. → With a power cell still in movement and none in meter,* set meter at low amplitude. Place accessory alligator clips on electronic module as shown in fig. 5. → Continue as follows:

s alter-
low "O"
ircuit OK.
s *not* flick,
Circuit.
→ It Third Wheel still does not step, problem is in the coil assembly or mechanical blockage. → Proceed to Step 4...
→ If Third Wheel steps → Remove cell from movement and insert into meter well. Connect meter to movement. Fig. 4 → Proceed to Step 5

ovement
meter cell
or clips
uit. Set
tude. Con-
ent as
→ Meter pointer does not fluctuate. Replace coil assembly. → Meter pointer fluctuates. See fig. 4 . Third wheel steps. → Proceed to Step 5
→ Meter pointer fluctuates (see fig. 4) but Third wheel does not step. Coil assembly OK. Problem is caused by mechanical blockage. → Remove blockage. Third wheel steps.

t Read
ter will
rmal.
→ Meter pointer should indicate approximately 2.5 microamps low and approximately 3.3 microamps high during fluctuations. See fig. 4 → If reading is above 3.3 microamperes, recheck mechanical area for bind or blockage.

## IMPORTANT: SERVICING PROCEDURES

The contact between the printed circuit and the coil winding leads is created by the downward pressure of the magnetic shield. Removing the shield relieves the pressure and creates an open circuit (no impulse meter reading). To obtain a meter reading, it will be necessary to have the magnetic shield in place or apply slight downward pressure on the printed circuit where contacts the coil leads.

## CHECKING THE COMPONENTS

The following components can be tested and replaced, if necessary, without removing the movement from the case (see Pages 3 and 4 for basic test procedures):

1. Power Cell (#20.570)
2. Coil Assembly Winding (#20.590)

## REMOVING THE STEM

To remove the stem from the movement, press the setting lever post with a screwdriver, one (1) mm in diameter, or a similar tool.

The use of any but the recommended tool will cause the setting lever (#51.080) to disengage from the date corrector lever (#53.022) necessitating additional disassembly.

## CLEANING

It is not necessary to periodically clean the Caliber 2562.10 movement. If cleaning is necessary, proceed as follows:

**A-** Gear & dial train, train bridge, setting & calendar mechanism in the usual ultrasonic or mechanical cleaning manner.

**B-** Rotor:
Clean magnet using either gummed paper or "One Touch". Clean pivots in pith wood. Use a non-magnetic tweezer to grip the rotor by its pinion and not by the magnet.

**C-** Electronic module/Main plate:
Brush plate using Isopropyl Alcohol (Rubbing Alcohol). Peg out bearing jewels.

**Note:** Do not expose main plate/electronic module (#10.513), coil winding (#20.590), rotor (#20.580), or date indicator (#91.440) to cleaning solutions or heat dryers normally used for cleaning metal parts.

DO NOT IMMERSE THE MAGNETIC SHIELD INTO CLEANING OR RINSE SOLUTIONS. THE PAINTED CALIBER IDENTIFICATION MARKINGS WILL DISSOLVE IF EXPOSED TO MOST SOLUTIONS.

## DIALING

**Calendar Mechanism:** Turn crown clockwise until DATE changes. Push Crown "in" (Fig.3). Assemble Minute and Hour Hand at the 12 o'clock position.

**Second Hand:** Wait until rotor has indexed a few times, then pull crown to the "out" position (Position 3). While holding in position, align the sweep hand with the 12 o'clock marker, and press hand into place.

The second hand is counterpoised. If replacement is necessary, use only genuine replacements.

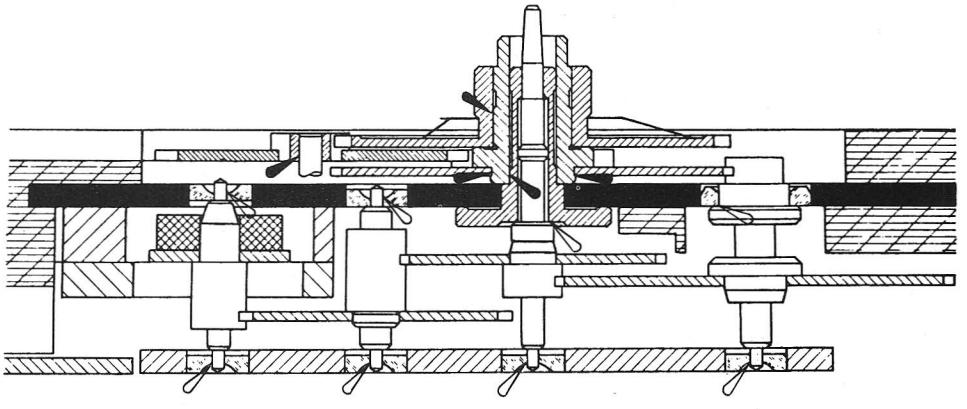
Assemble hands carefully! Minimum space available between dial and crystal.

## LUBRICATION

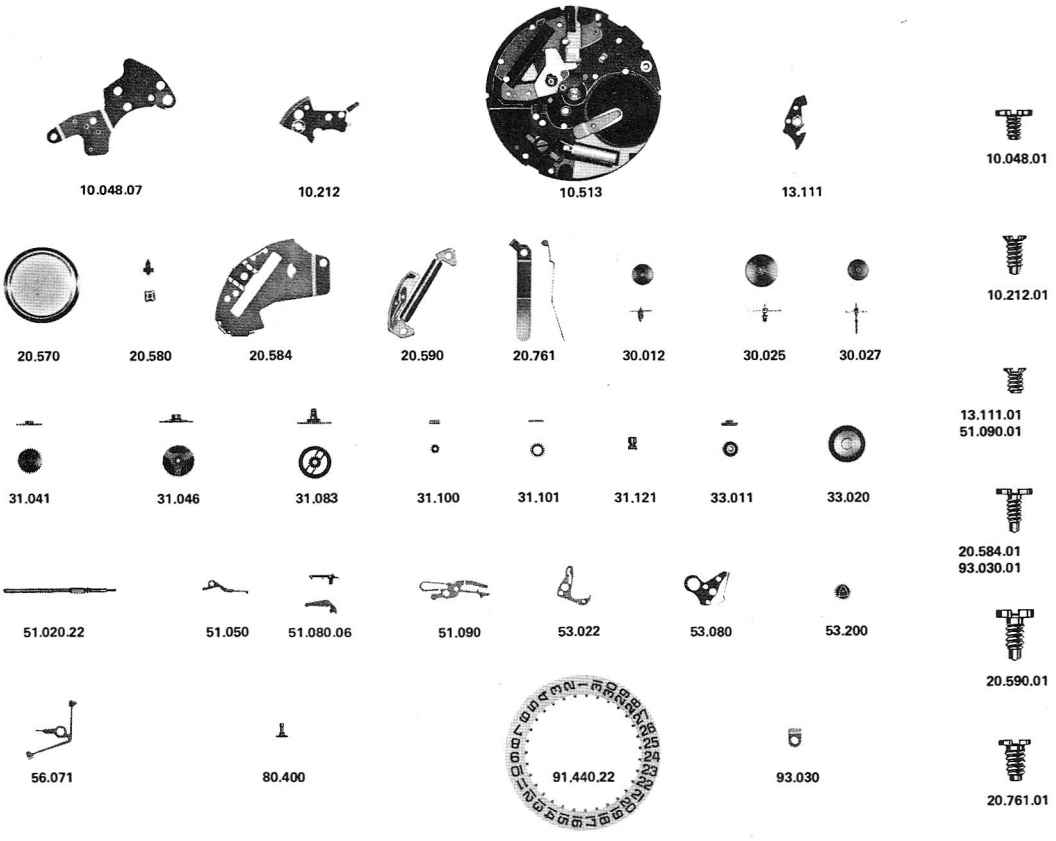
Fig. 7

**OL 206**

**OL 216**



## ISO PART NUMBERS




| Part No. | Part Name |
|---|---|
| 10.048 | Train Wheel Bridge |
| 10.048.01 | Train Wheel Bridge Screw |
| 10.212 | Minute Train Cover |
| 10.212.01 | Minute Train Cover Screw |
| 10.513 | Electronic Module (Pillar Plate) |
| 13.111 | Date Jumper Maintaining Plate |
| 13.111.01 | Date Jumper Maintaining Plate Screw |
| 20.570 | Power Cell |
| 20.580 | Rotor |
| 20.584 | Magnetic Screen |
| 20.584.01 | Magnetic Screen Screw |
| 20.590 | Coil |
| 20.590.01 | Coil Screw |
| 20.761 | Cell Strap |
| 20.761.01 | Cell Strap Screw |
| 30.012 | Intermediate Wheel |
| 30.025 | Third Wheel |
| 30.027 | Sweep Second Wheel (HT. 4.70) |
| 31.041 | Minute Wheel |
| 31.046 | Hour Wheel |

| Part No. | Part Name |
|---|---|
| 31.083 | Cannon Pinion With Driver (Ht. 1.0) |
| 31.100 | Setting Wheel |
| 31.101 | Intermediate Setting Wheel |
| 31.121 | Sliding Pinion |
| 33.011 | Intermediate Date Wheel |
| 33.020 | Date Indicator Driving Wheel |
| 51.020 | Handsetting Stem |
| 51.050 | Yoke |
| 51.080 | Setting Lever |
| 51.090 | Setting Lever Jumper |
| 51.090.01 | Setting Lever Jumper Screw |
| 53.022 | Date Corrector Lever |
| 53.080 | Date Jumper |
| 53.200 | Date Corrector |
| 56.071 | Stop Lever For Sweep Second |
| 80.400 | Centre Tube |
| 91.440 | Date Indicator |
| 93.030 | Casing Clamp |
| 93.030.01 | Casing Clamp Screw |