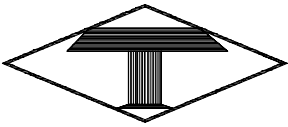


QUARTZ WATCH ANALYZER

MODEL:QWA-5A



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QUARTZ WATCH ANALYZER

QWA-5A

SECTION ----- GENERAL INFORMATION

- 1-1 This manual contains information necessary to install, operate, test and adjust the Model QWA-5A Quartz Watch Analyzer.
- 1-2 Instrument and Manual Identification.
- 1-3 Unpack the QWA-5A and save the packing materials for future unit storage or transportation.
- 1-4 Check for the following items ,which are supplied with the QWA-5A
 - ✧ Operating Manual
 - ✧ Watch Module Test Pedestal with cable
 - ✧ QWA-5A Main Assembly
 - ✧ Power Cord
 - ✧ Set Test Probes

**COMPUQUARTZ
ANALYSIS**

Item	QWA-5A	Vibrograph	Citiren CQT-201
Microprocessor Technology	Yes	No	No
Single Unit-All tests	Yes	No	No
Test to Watch Mfg .Specs.	Yes	No	No
Test to Battery Mfg. Specs.	Yes	Yes	No
Sound Monitor	Yes	No	No
Analog Watch	Yes	Yes	Yes(Time Only)
Digital Watch	Yes	Yes	Yes(Time Only)
Clock Module	Yes	Yes	NO(optional)
Crystal Test	Yes	No	No
Self Test	Yes	No	No
Time Accuracy			
Limit Test	Yes	No	No
Seconds Per Day	Yes	only	only
Seconds Per Month	Yes	No	No
Parts Per Million	Yes	No	No
Speed			
Digital-fast/normal	0.25/1.25sec	4sec	2,4,10,60 sec
Analog-fast/normal	2sec/10sec		
Voltage Testing	Yes	Yes	No
Motor Drive Voltage	Yes	Yes	No
LCD/Display Voltage	Yes	No	No
Battery Voltage	Yes	Yes	No

Resistance Measured for:

Switch Contacts	Yes	Yes	No
Battery Contacts	Yes	Yes	No
Lamp Resistance	Yes	Yes	No
Motor Coil	Yes	Yes	No
Display Segments	Yes	Yes	No

Current:

Lamp Test	Yes	Yes	No
Pulsing Current	Yes	Yes	No

Time Based 10MHz TCXO 8.6MHz 4.32MHz

Accuracy 2*10⁻⁷(Ann1) 1*10⁻⁹(Short term) 2*10⁻⁸(Short term)

Power 100-240V 220V(110 opt) 100V 10% Std
50-60Hz Std 50-60Hz Std 60Hz

SECTION ---- **INSTALLATION**

2-1 Introduction

2-2 This section contain information necessary to install QWA-5A

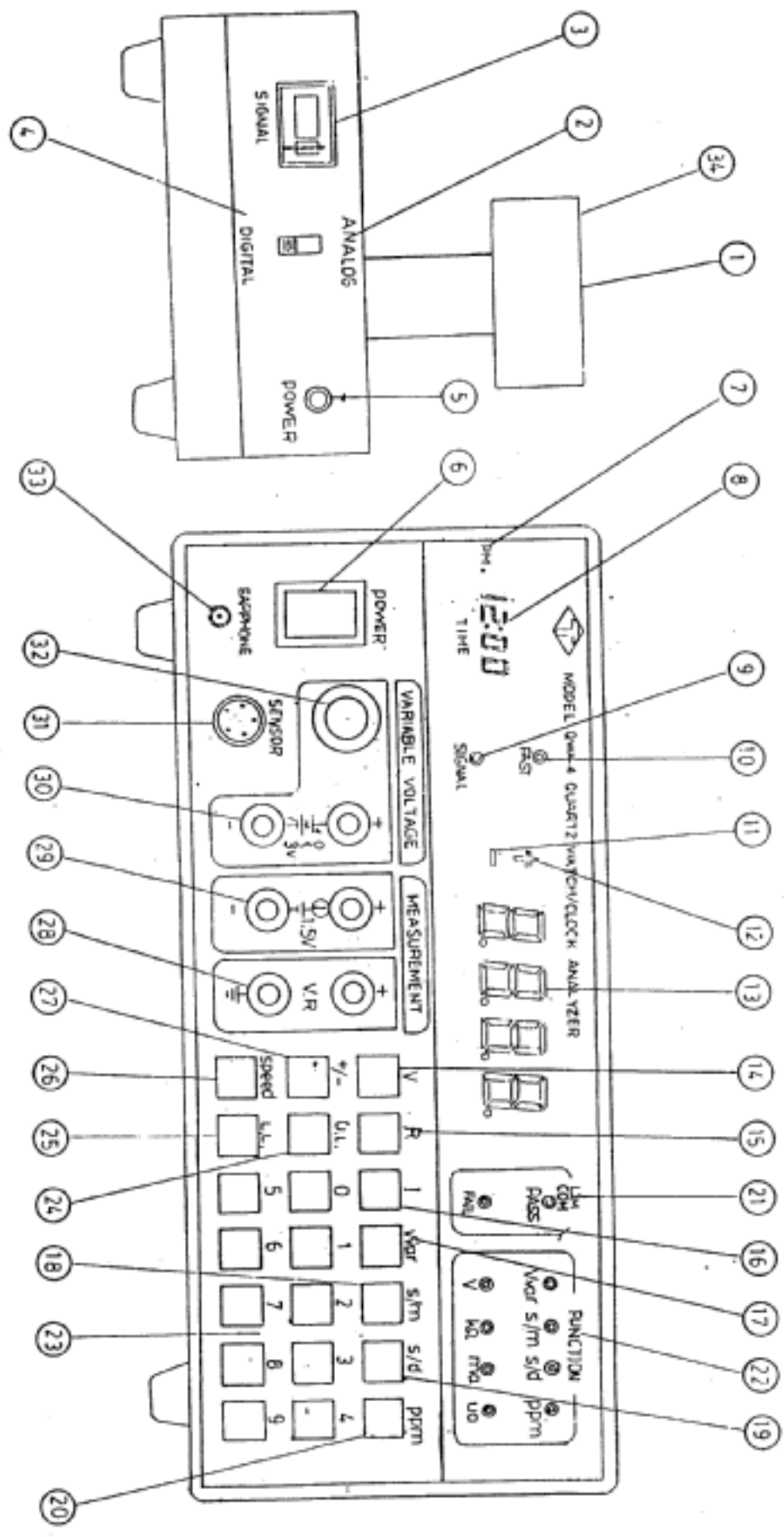
2-3 Preparation for use

2-4 Power requirements

2-5 Connect the power cord to the main assembly, and connect plug to power source. The power required for QWA-5A poeration is 110V/220V 50/60Hz.

Attach the Watch Module Test Pedestal cable to the connector on the Main

Fig. 3-1



2/3 Analog/Digital Select Switch	To test a clock or watch that has a stepping motor, the switch is at ANALOG. To test a Digital watch, clock/watch module, or crystal frequency 32768Hz the switch is at DIGITAL
4 Signal Level Indicator	Indicates the signal level sufficient to assure stable reading
5 Power Indicator of Sensor	Lights when the sensor is connected properly to the main unit and the power switch is ON.
6 Power Switch Indicator	Applies power to unit
7 PM. Indicator	ON when the clock shows PM time
8 Clock	Provides time of day reference and operates when the power cord is connected
9 Signal Indicator	The lamp is ON when sufficient signal is detected and received at the main unit. It will flicker as fast as the testing speed.
10 Test Speed	There are two test speeds. FAST and SLOW, and the lamp will be ON when the selected speed is FAST.
11 Negative Sign Indicator	It indicates NEGATIVE for voltage and current, and SLOW for timing.
12 Positive Sign Indicator	It indicates POSITIVE for voltage and current, and FAST for timing.
13 Digital Display	Displays measurement results.

14	Voltage/Signal Test Key	Selects the voltage test and signals test
15	Resistance Test Key	Selects the resistance and continuity test.
16	Current Test Key	Selects the current consumption test.
17	Variable Voltage Source Monitor Key	This key is timed to display the variable voltage source output in Volts
18	Sec/Month Measurement Key	Selects the timed accuracy measured in the unit of “seconds/month.”
19	Sec/ Day Measurement Key	Selects the timed accuracy measured in the unit of “seconds/day”
20	PPM Measurement Key	Selects the time accuracy measured in the unit of “parts par million”. It is commonly used to test watch crystals.
21	“PASS/FAIL” Indicator	Indicates whether the result of limit comparison is PASS or FAIL.
22	Function Indicator	This indicates the function selected
23	Set Keys for Limit Comparison	Used to set the limit for comparison
24	Upper Limit Set Key	Used to display or reset the Upper Limit
25	Lower Limit Set Key	Used to display or reset the Upper Limit
26	Test Speed Select Key	Select the test speed

27	Polarity of Limit Set Key	This key is used to set the polarity of both Upper and Lower Limit
28	Voltage/Signal Resistance Test	These connectors are used to connect test probes for voltage signal and resistance measurement
29	1.5V Simulated Battery Connector	These Connectors are used to output the simulated 1.5 volt battery source.
30	Variable Voltage Source Connector	These connectors are used to output the variable voltage source.
31	Sensor Connector	This connector is used to connect the sensor
32	Variable Voltage Adjustment	This knob is used to adjust the voltage , range 0~6 Vdc
33	Earphone Connector	This connects the earphone for signal monitoring
34	Test Socket for Watch Crystal	This socket is for testing 32768Hz watch crystal. Accuracy at the load capacitance of 12pf, is 15ppm .

SECTION ----- OPERATION

3-1 Introduction

3-2 This section contains information necessary for operation of Model QWA-5A

3-3 Variable Voltage Test.

3-4 This test verifies watch module or clock operation before any other tests. It also determines lowest operating voltage of the module or clock under

test, Figure 3-2 illustrates the procedure for performing the Variable test.

Preliminary Adjustments:

- a. Set the QWA-5A to Vvar (Press key 17)
- b. Connect probes to terminal 30.
- c. Set Variable Voltage Output to zero by turning knob 32 fully counter clockwise
- d. Open clock/watch and remove battery.
- e. Connect probes to clock/watch using correct polarity.

Test Procedure

- f. Increase Voltage using knob 32 until clock/watch begins to operate.
- g. Note value on display. This is minimum operating voltage for the unit under test.

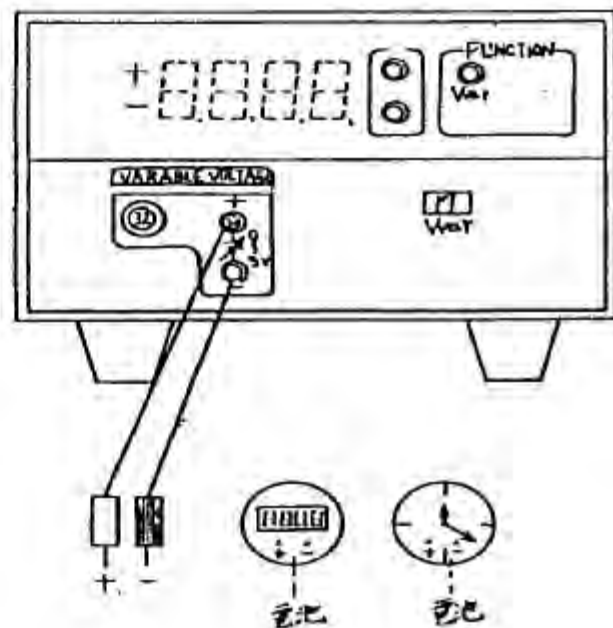


FIG. 3-2

3-5 Current Measurement/Power Consumption Measurement

3-6 This test determines the Power Consumption of the unit under test. By measuring the current consumed .one can determine the power used by the unit . Figure 3-3 illustrates the procedure used to perform this test.

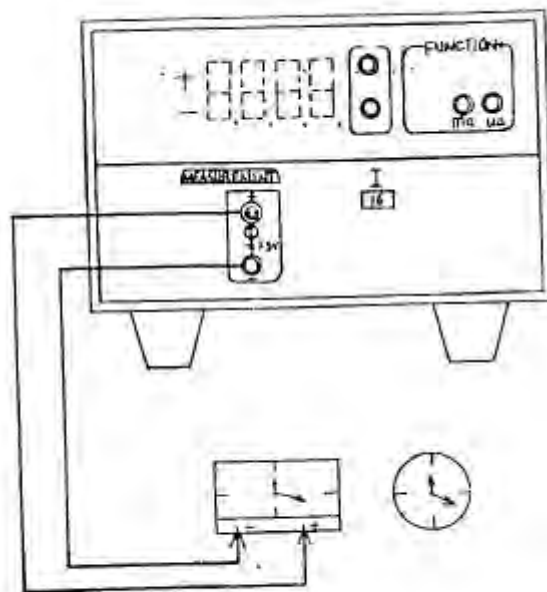


FIG. 3-3

Preliminary Adjustment:

- Set QWA-5A to Current Measurement (press key 16)
- Connect probes to terminal 29.
- Open back of clock/watch and remove battery.
- Connect probes to unit observing correct polarity.

Test Procedure

- A reading will be displayed in 15 seconds. It takes this amount of

time since the unit samples and averages the pulsing current.

- f. The units displayed will be uA for watch modules and mA for clock module. QWA-5A automatically displays the correct units.

Test Results

- g. Note the reading on the QWA-5A

Analyzer Adjustment

- h. If another reading must be made the QWA-5A display can rapidly returned to zero by depressing key 14 after removing the probes from the unit under test. The unit will return to zero normally 15 seconds after removal of the probes.

3-7 Timing Accuracy Measurement

- 3-8 This test is used to determine the accuracy of the time standard in the clock/watch module. The units displayed for this test are Parts Per Million (ppm), Seconds Per Day (S/d), Seconds Per Month (S/m). Figure 3-4 illustrates the procedure used to perform this test.

Preliminary Adjustments

DIGITAL UNITS

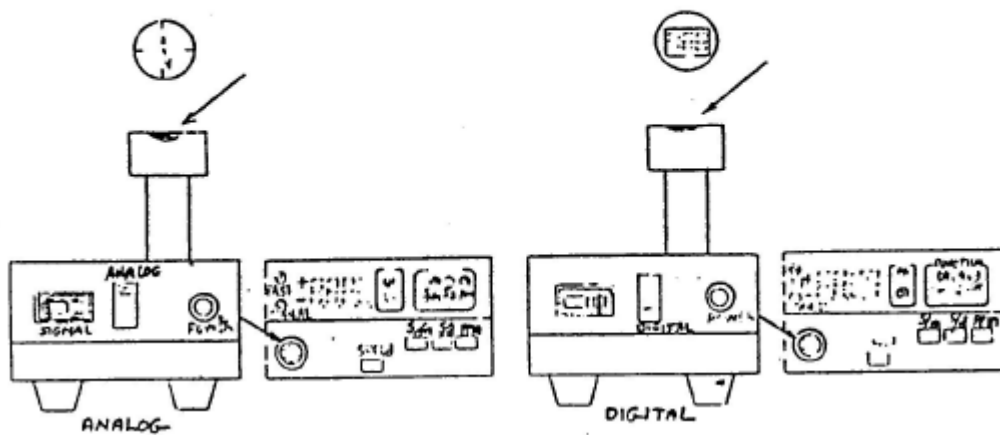
- a. Set Analog/Digital Switch to Digital.
- b. Place unit on test pedestal and move over covered area until signal

meter needle is in Red zone.

ANALOG UNITS

- c. Set Analog/Digital Switch to Analog
- d. Place units on test pedestal and move .over covered area until there is a steady Pulsing of the needle join the signal meter.

FIG. 3-4

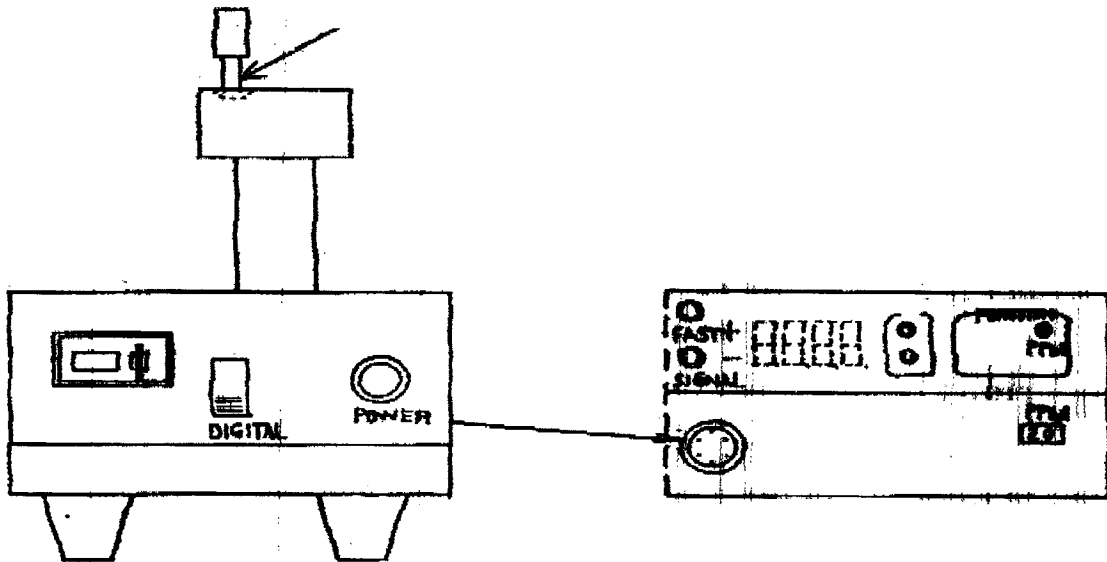


Measurement of Accuracy

- e. Select the units desired ,is ppm(key 20), sec/day(key 19) ,or Sec/mo(key 18)
- f. Display will indicate accuracy of units selected with a “+” on the display, meaning fast or gaining time and a”-“on the display ,meaning slow or losing time.

NOTE: For the Analog units, select the FAST test speed, DEPRESS KEY 26, and see that indicator light 10 is lit, the signal light,9. should be on to indicate the main unit is receiving a signal.

3-9 Crystal Operation/Accuracy Test



3-10 This test determines whether a crystal is functioning, and if it is functioning, its accuracy. Figure 3-5 illustrates the procedure used for this test.

Preliminary Adjustments

- a. Set Analog/Digital Switch to Digital
- b. Insert Crystal to be tested in Socket on Pedestal.
- c. If needle of Signal meter is in Red zone. The crystal is functioning, if not, then crystal is defective.
- d. If crystal is functioning, this select FAST reading, key 26.
- e. Select units, ppm key 20, and read the accuracy on display.
- f. Reading greater than 100ppm indicates an out of tolerance crystal.

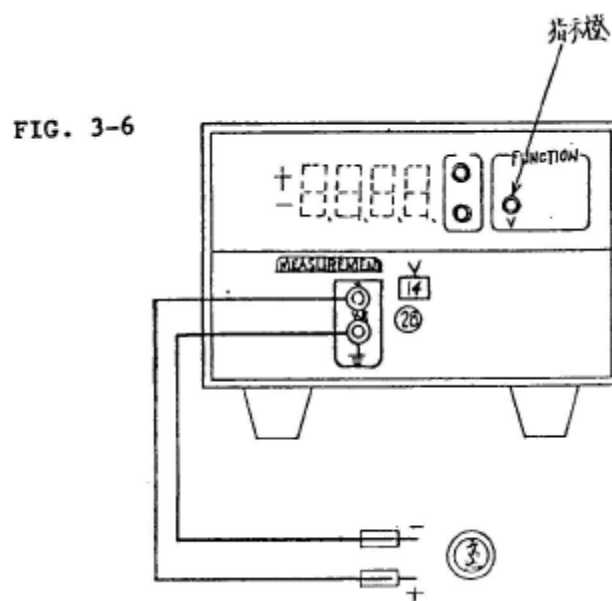
NOTE: To convert readings of ppm to seconds per day use the following formula:

Reading in PPMX.0864=seconds per day .

3-11 Battery Test

3-12 This test determines whether the battery used in the clock/watch is within tolerance. Fig.3-6 illustrates the procedures used in the test.

Preliminary Adjustment



- Select the V (Voltage) function by pressing key 14.
- Insert probes into V.R. terminals (28).
- Remove battery from clock/watch and connect probes. Observing the “+” probe is connected to “+” terminal of battery and the “-“ probe is connected to “-“ terminal of battery.
- Dispose of battery of value is less than published specification.

NOTE: In general the battery is considered out of tolerance if the measured value is less

than those indicated below.

3-13 Motor Coil, Lamp Resistance, Open/Short Measurement.

3-14 This test verifies a motor coil by determining the motor coil resistance, and checks the lamp of a digital unit by measuring its resistance Fig 3-7 illustrates the procedure used in this test.

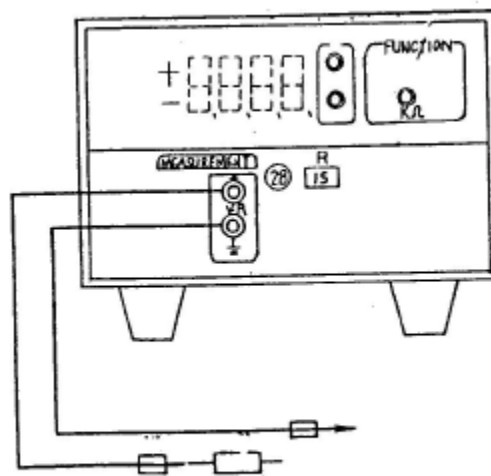


FIG. 3-7

Preliminary Adjustment

- Set QWA-5A to resistance measurement by pressing “R” key (15).
- Insert probes in V.R. terminals (28).
- Open clock/watch and remove battery.

Motor Coil Measurement

- Place probes across motor coil, and read display.
- A reading of 3.4-3.7k or 4.3-4.8k indicates a functioning motor coil.

f. Overflow, very high reading, or zero, indicates a defective motor coil.

Lamp Resistance Measurement

g. Place probe across lamp terminals, and display.

h. A reading 100 00.10K , indicates an operating lamp.

i. Open/Short Test

j. Using manufactures specifications, use probes to determine if there are opens (high reading) or shorts (zero reading).

3-15 Integrated Circuit Test

3-16 This test is to determine whether the Integrated Circuit (I.C) used to control the watch operation is functioning properly ,Figure 3-8 illustrates the procedure in this test.

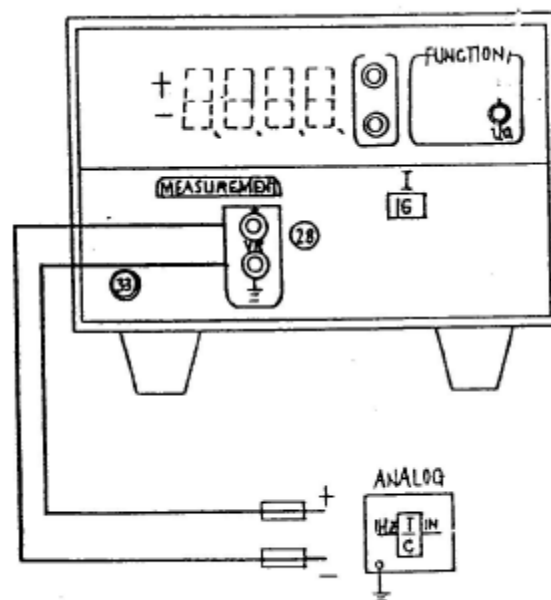


Figure 3-8

Preliminary Adjustment

- a. Set QWA-5A to Voltage Measurement, V(16).
- b. Connect probes to V.R. terminals (28).
- c. Open watch back.
- d. Connect probes to module, positive probe to IC, and negative probe to ground.
- e. A regular audible sound should be heard at approximately one tone per second.
- f. If there is no sound, or it is very fast the IC. is defective and the unit should be returned to the manufacturer.

3-17 Production/Incoming Inspection Testing

3-18 This test is used to determine whether a clock/watch module is within the manufactured tolerance on timing accuracy ,Using the “Limit Storage” Ability of the QWA-5A. A Pass/Fail light will indicate whether the item being tested meets the test parameters. Fig. 3-9 illustrates the procedure used in this test.

Preliminary Adjustment

- a. Set Analog/Digital Switch to Digital.
- b. Press UL. (Upper Limit) key(24). The current value will be displayed.

This value is always 9999 when the power is turned on.

- c. Enter the new value, using the data Keys(0-9), and the sign of the value ,
“+” or “-“, key 27.
- d. Store the UL. value by pressing key 24.
- e. Repeat the step b c and d to set LL.(Lower Limit) value by pressing key
25.

Test Procedure

- f. Select units (ppm S/d, S/m)to the measured by pressing key 18,19 or 20.
- g. Place unit to be tested on covered area on pedestal. When needle is in
RED zone either the PASS light or the FAIL light will come on, indicating
the status of unit under test.

PASS light on = unit within tolerance

FAIL light on = unit outside tolerance