

## VC2000 INTELLECTIVE FREQUENCY COUNTER OPERATION MANUAL

### 1. General specification

#### 1-1. General specification

VC2000 frequency counter is an intellectual with multi-functions, with include frequency measurement, pulse counting, crystal measurement and so on, and has 4-step gate time, 5-range function select and 8 LED display.

All functions depend on a single CPU. A crystal controlled temperature circuit provides constant compensation for temperature change. Thereby, reducing measurement errors typically caused by temperature drift. This instrument has the function of operation mode stored, due to this reason .after turning the power on, it can be operated by previous setting .

To assure best operation, read this manual before operation.

#### 1-2. Technical specification

##### 1. Measurement

##### (1) Input terminal

This instrument has 3 input channel terminals.

CH.A. high frequency terminal 50MHz-2400MHz.

CH.B. low frequency terminal 10Hz-50MHz.

Crystal Oscillator: crystal measuring terminal

##### (2) Frequency measurement

##### ① Step

Total 5 steps, No.1-3 steps are for frequency, No.4 step is for counting and No.5 is for crystal oscillator measurement.

No.1 step 50MHz-2400MHz, input from CH.A

No.2 step 4MHz-50MHz, input from CH.B

No.3 step 10Hz-4MHz, input from CH.B

##### ② Resolution

Step	Function	Frequency	Resolution			
			0.1s	1.0s	5.0s	10s
1	Frequency measurement	2400MHz-1000MHz	1KHz	100Hz	100Hz	100Hz
		1000MHz-100MHz	1KHz	100Hz	10Hz	10Hz
		100MHz-50MHz	1KHz	100Hz	10Hz	10Hz
2		50MHz-4MHz	100Hz	10Hz	1Hz	1Hz
3		4MHz-10Hz	10Hz	1Hz	0.1Hz	0.1Hz
4	Counting	Max. counts 99999999	—	—	—	—
5	Crystal oscillator measurement	16MHz-3.5MHz	10Hz	1Hz	1Hz	1Hz

③ Gate time : 0.1s    1.0s    5.0s    10s

④ Accuracy : time base deviation  $\times$  frequency  $\pm 1d$

##### (3) Progressive counting measurement

4 steps CH.B input terminal

resolution :  $\pm 1d$     counting frequency : 10Hz-4MHz

##### (4) Crystal measurement

5 steps insert from crystal oscillator plug-board on the panel.

Testing scope: 3.5 MHz-16MHz

2. Input features:

Input sensitivity for CH.A, 25mVrms/200mVrms

Input resistance: approx. 50 Ω

Max. safety voltage : 3 V

Input sensitivity for CH.B: No. 2 range: 25 mVrms/80mVrms

No. 3 range: 10mVrms/30mVrms

Input resistance: approx. 1M Ω (less than 35pF) Max. safety voltage : 30V

3 Time base

short -term stability :  $\pm 3 \times 10^{-9}$ /second

long-term stability :  $\pm 2 \times 10^{-5}$ /month

temperature:  $\pm 2 \times 10^{-5}$  /10°C-40°C

4. Display

8 digital LED display with frequency, counting, crystal oscillator, kHz ,MHz ,every range and gate time .

5. Power: breadth AC 220V/110V  $\pm 10\%$ ; frequency: 50Hz/60Hz

6. Temperature: - 5°C-50°C

Storage and delivery : - 40°C~ 60°C

7. Humidity: 10-90%R.H

Storage: 5-90%R.H

8. Warm-up time: 10 minutes

9. Size: 270×215×100 mm

Weight: approx. 1.5kg

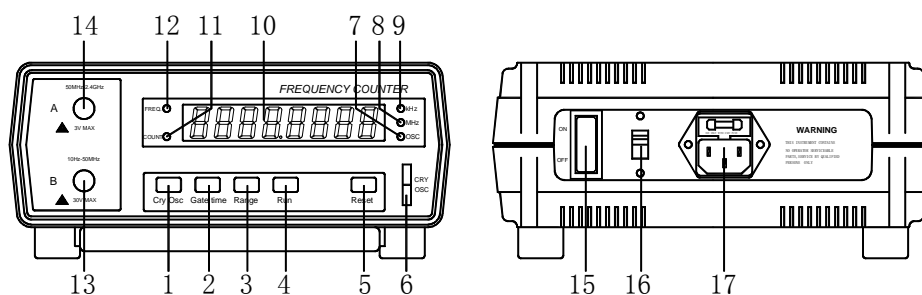
2. Operation Specification

2-1 Requirement

(1) Power : AC 220/110V  $\pm 10\%$  Max. consumption is 5 W at 50Hz/60Hz.

(2) Warm up: before measurement, the instrument should be warm up for 10 minutes to assure the stability of the crystal oscillator.

2-2. Panel description



- |                                 |                                  |                                 |
|---------------------------------|----------------------------------|---------------------------------|
| 1. Crystal oscillator key       | 2. Gate time key                 | 3. Range key                    |
| 4. Confirm key                  | 5. Reset key                     | 6. Crystal oscillator playboard |
| 7. Crystal oscillator indicator | 8. MHz indicator                 | 9. kHz indicator                |
| 10. LED display                 | 11. Counting indicator           | 12. Frequency indicator         |
| 13. CH.B terminal (10Hz-50MHz)  | 14. CH.A terminal (50MHz-2.4GHz) | 15. Power switch                |
| 16.                             | 17. Power jack                   | 18. Warning                     |

(1) Input terminal: CH.A and CH.B are on the left of panel.

① The input terminal on the top and left of the panel is CH.A, at the bottom one is CH.B.

② Crystal oscillator plug-board is on the bottom and left of the panel.

(2) Keys:

- ① crystal oscillator key: When measuring, insert the crystal oscillator under into the play-board, and press the key simultaneously. After measuring press the key one again to stop.
- ② gate key: It is for setting different counting period on measurement, it is has 4 gate time, i.e . 0.1s, 1s, 5s, 10s.
- ③ step key : 5 steps
  - No.1: 50MHz-2400MHz range. CH.A "MHz" displays
  - No.2: 4MHz-50MHz range. CH.B "MHz" displays
  - No.3: 10Hz-4MHz range. CH.B "KHz" displays

The above 3 steps are for frequency measurement, "frequency" indicator lights

  - No.4: Progressive counting measurement, input from CH.B "counting indicator lights.
  - No.5: Crystal measurement, input from CH.C (I.e., crystal oscillator plug-board), "crystal oscillator indicator lights, KHz displays.
- ④ After select gate, step and pressing confirm key, the frequency counter begins to work, every time, when power on or press "RESET" key, the instrument enters into the previous working mode automatically .
- ⑤ "return" key: When the instrument is in off normal mode, press it and return to the normal work.

**3. Back panel description (see the fig 1.1)**

(1) AC 220/110V power plug      (2) Power switch      (3) Fuse socket

**4. Operation steps:**

Firstly, connect power cord (AC 220/110V) and turn the power on, after warning up for 10 minutes, it starts to work.

**4-1. Frequency measurement:**

- ① Select CH.A or CH.B according to the frequency under measured.
- ② Gate time setting:

The gate time has 4 steps. When pressing "gate" key, gate time displays on the LCD regular (see fig 2.1), the display value is the seconded gate time (fig2.2)

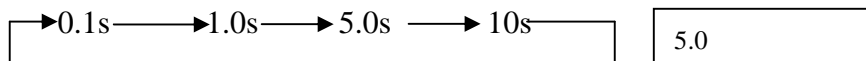


fig 2.1

fig. 2.2

- ③ Step setting:

When pressing "step" key, the last display value on LCD is the selected step in fig 3.1, the present step. There are only 3 steps for frequency measurement, when pressing "step" key, the steps display regular as:

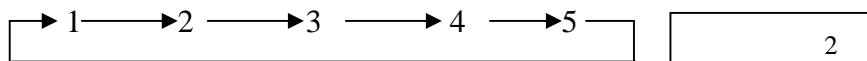


fig 3.1

No.4 step is for counting, No.5 is for crystal oscillator frequency, the displaying value is present step.

- ④ Press "CONFIRM" key after the above 3 steps are finished, the instrument starts to operate and measures according to the setting, and displays the result.

**2. Testing progressive counting**

- ① Connect the testing wire to CH.B terminal.
- ② Set gate time. In this case, the gate time is for interval period.
- ③ Press "step" key and step No.4 start.

④ Press "confirm" key to start.

### 3. Crystal oscillator frequency measurement

① Insert the crystal under measured into CH.C, and press "crystal " key.

② Set gate time.

③ Set No. 5 step.

④ Press "confirm" to start.

⑤ After finish measurement, press " crystal" key again to stop.

### 5. The measurement of the modern communicating tools.

(1) Analog mobile phone measurement:

The step can be set to "1", and the gate time can be selected according to requirement.

0.1	1
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(2) 30MHz interphone emitting frequency measurement: the step can be set to No.2

0.1	2
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(3) Measuring self-oscillation of BP, interphone and controlling and controlled telephone: set the step to "2" 

0.1	2
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 connect one of wire of 0.5p capacitance to the red clamp of cable, and the

other one is to be probe to connect frequency point .

(4) After finishing turn the power off and pull the plug out.

### 6. Note:

1. When measuring high voltage or strong RF signal by cable input, cables should be in series with large resistance to prevent damage. Wireless input of very strong signals should be measured in coarse mode to avoid damage.
2. When instrument is working abnormally, press "reset" key once or turn off power to renew the system.
3. When there is no input signal, instrument display may not zero, it's normal and has no effect on measurement or accuracy.
4. Avoid exposing the instrument to extreme temperature, damp and dust environment and extremely shock.
5. When working strong disturbing environment, the sensitivity will reduce according .To assure correct, the input signal should not be less than 200mV.