Three Leads Six Channels
Precision Bio-signals Detector

Guangzhou Setchief Electronics Technology Company Limited

2017-09

1.Introduce

It is hard work detecting bio-signals of lives, because there is too much interference on the lives.

The detector has high performance because the newest chips have been adopted in the detector, so that it could be suitable for detecting and recording and analyzing EEG, ECG, fetal ECG, myoelectricity and surface potential of a human.

The modules of the detector, such as low noise DC/DC converter, precision pre-amplifier, precision double-T active notch filter for power-line interference and precision 3-order all pole low-pass filter, could be used independently because they have the high performances. And all modules could be designed according to client requirements.

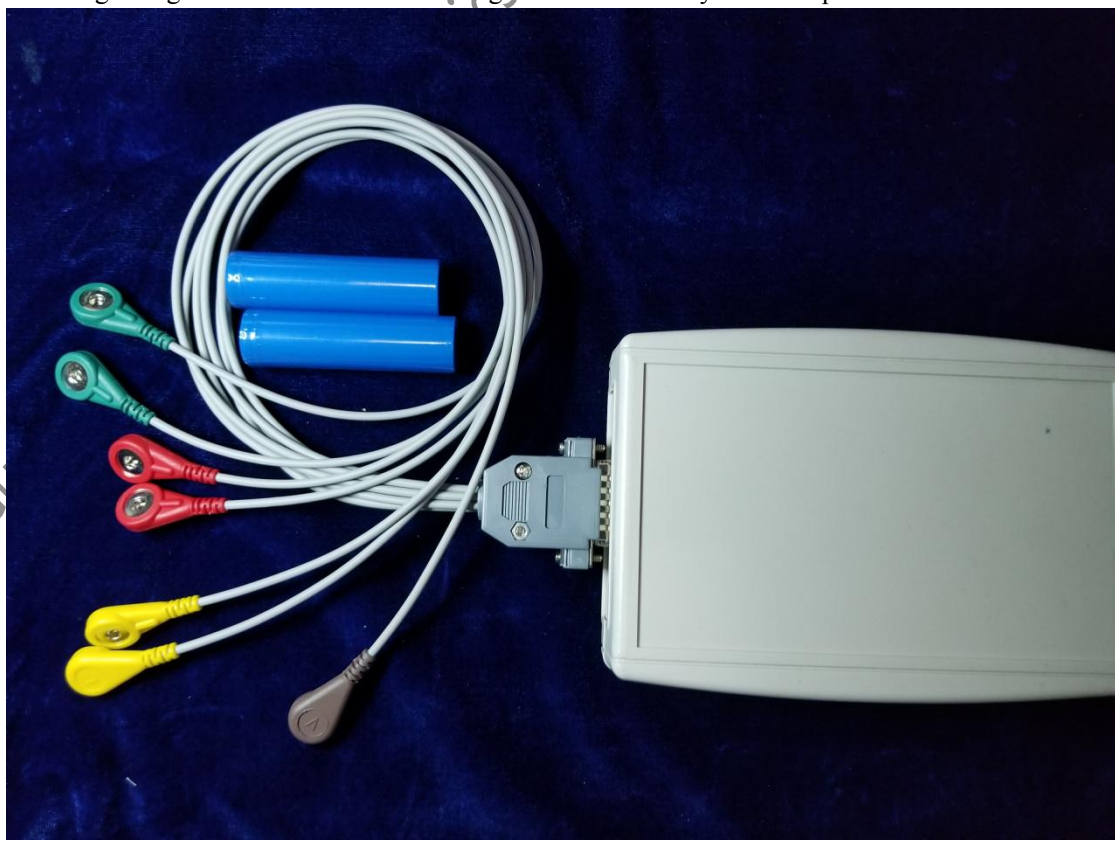
2. Main features

♣ Ultra-low noise pre-amplifer, could be satisfied with requirements of biomedical detecting.

♣ Single power input and ultra-low noise DCDC converter, raising battery efficiency.

♣ Supply independent 3 leads and 6 channels signals directly, reducing the work of software.

♣ Analog to digital converts six channels signal simultaneously with sample 1000Hz.



3.Main parameters

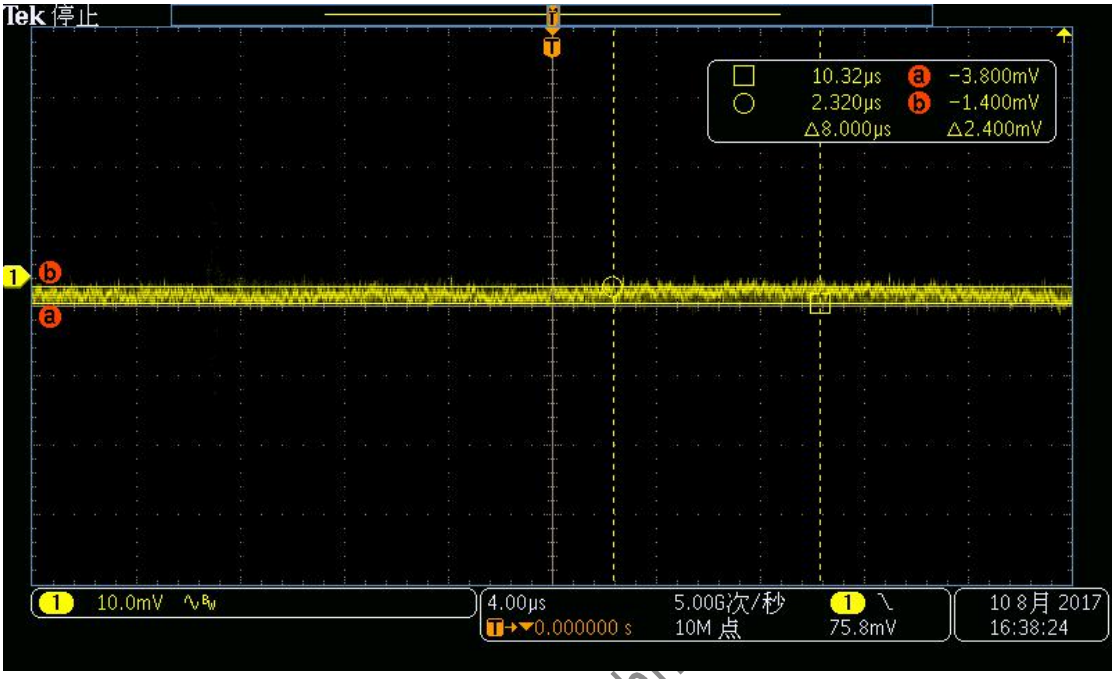
The main measurement instruments are as the following:

Oscilloscope: MDO3104； Function generator: GW AFG-2125； 6½ AC Volt meter: GW GDM 8261A

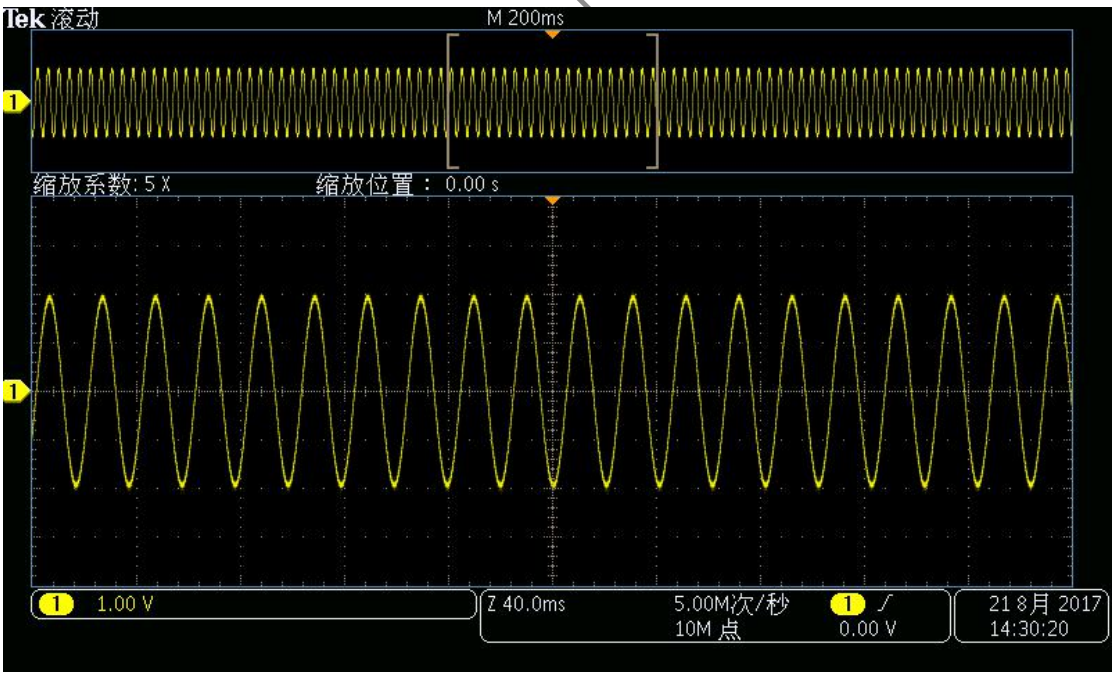
No.	Parameter	Unit	Type	Measuring reference	Index
1	Differential Input Impedance	MΩ	≥2000	Chinese standard: YY/T 1095-2007 Myoelectric biofeedback equipment	
2	Signal Common-mode Rejection Ratio	dB	≥116	Chinese standard: YY/T 1095-2007 Myoelectric biofeedback equipment	
3	Power line Common-mode Rejection Ratio	dB	≥113		Active double-T notch filter, adopting VIKING resistances and TDK C0G capacitors.
4	Analog Channel Minimum Resolution	nV	≤300		
	Analog and ADC Minimum Resolution	nV	≤0.3		24bit Simultaneous ADC
5	Input dynamic range	mV	±500		10Hz
6	Gain		500		Pre-amplifier:25 second amplifier:20
7	Sample rate	Hz	1000		
8	A B C channels Band width	Hz	0.05~ 200	>200Hz,-60dB/dec	200Hz Active all pole 3-order low pass filter
9	D E F channels Band width	Hz	0.05~ 10	>10Hz,-60dB/dec	10Hz Active all pole 3-order low pass filter
10	Noise	μV	≤4.8	Chinese standard: YY/T 1095-2007 Myoelectric biofeedback equipment	
11	Gain temperature cieffucuent	ppm	≤7		Adopting VIKING resistances
12	Leads		3		7 poles,3 leads
13	Signal channels		6		0.05~10Hz，3channels 0.05~200Hz，3channels
14	DCDC converter Noise	μV	≤4.8		

3. Measuring Waves

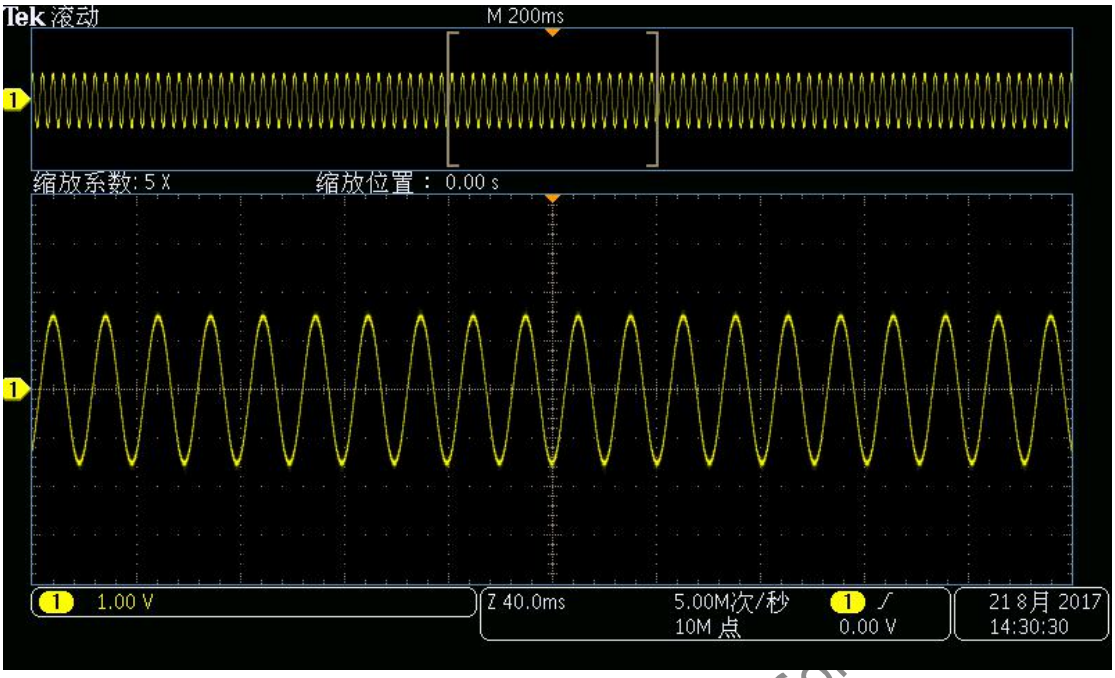
3.1 Noise



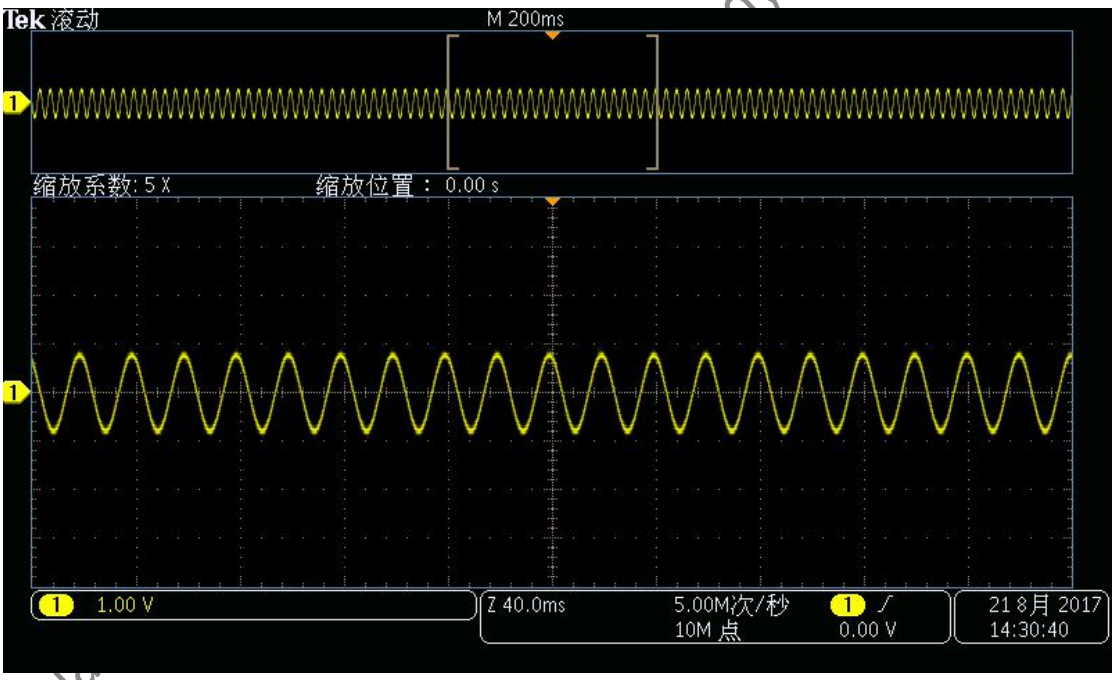
3.2 Notch Filter（50Hz, power-line）



49Hz


Tek 滚动
M 200ms
缩放系数: 5 X
缩放位置： 0.00 s
1.00 V
Z 40.0ms
5.00M次/秒
10M 点
0.00 V
21 8月 2017
14:30:30

49.5 Hz


Tek 滚动
M 200ms
缩放系数: 5 X
缩放位置： 0.00 s
1.00 V
Z 40.0ms
5.00M次/秒
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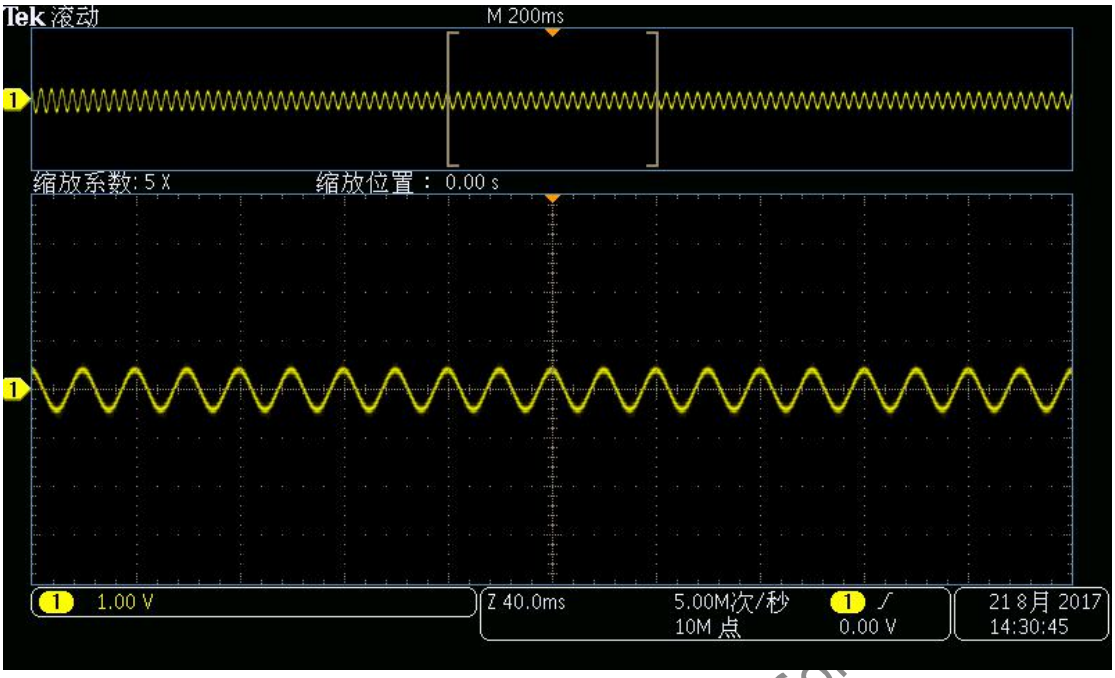
0.00 V
21 8月 2017
14:30:40

49.8 Hz


Tek 滚动
M 200ms
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缩放位置： 0.00 s
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Z 40.0ms
5.00M次/秒
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0.00 V
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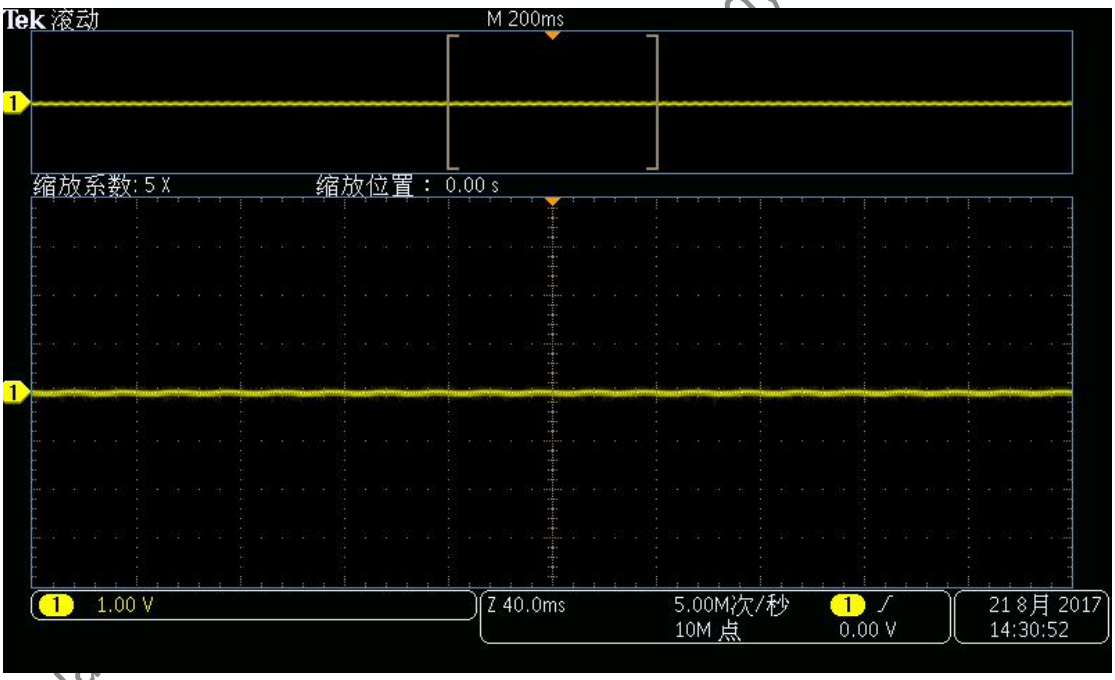
14:30:45

49.9 Hz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缩放位置： 0.00 s
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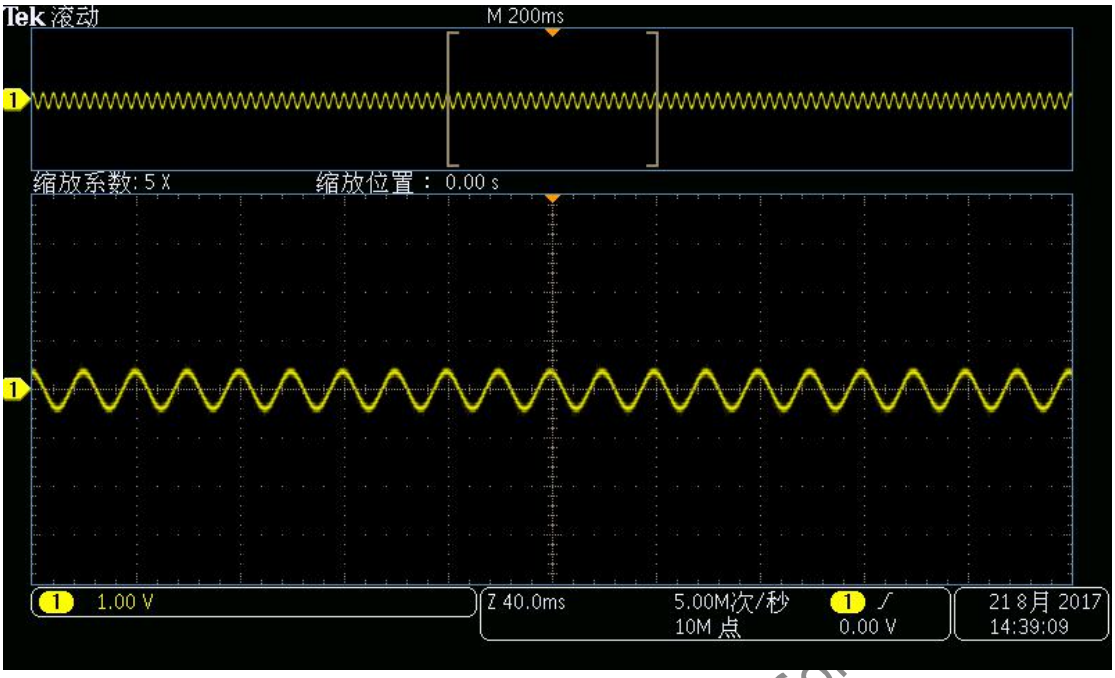
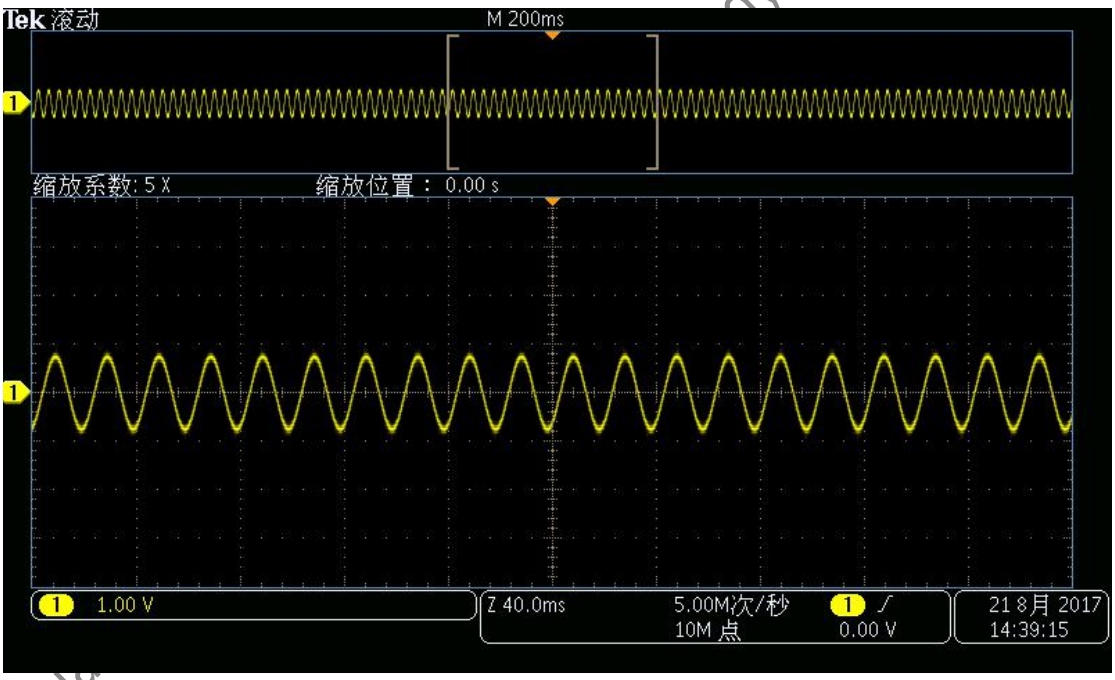
Z 40.0ms
5.00M次/秒
10M 点
0.00 V
21 8月 2017
14:30:52

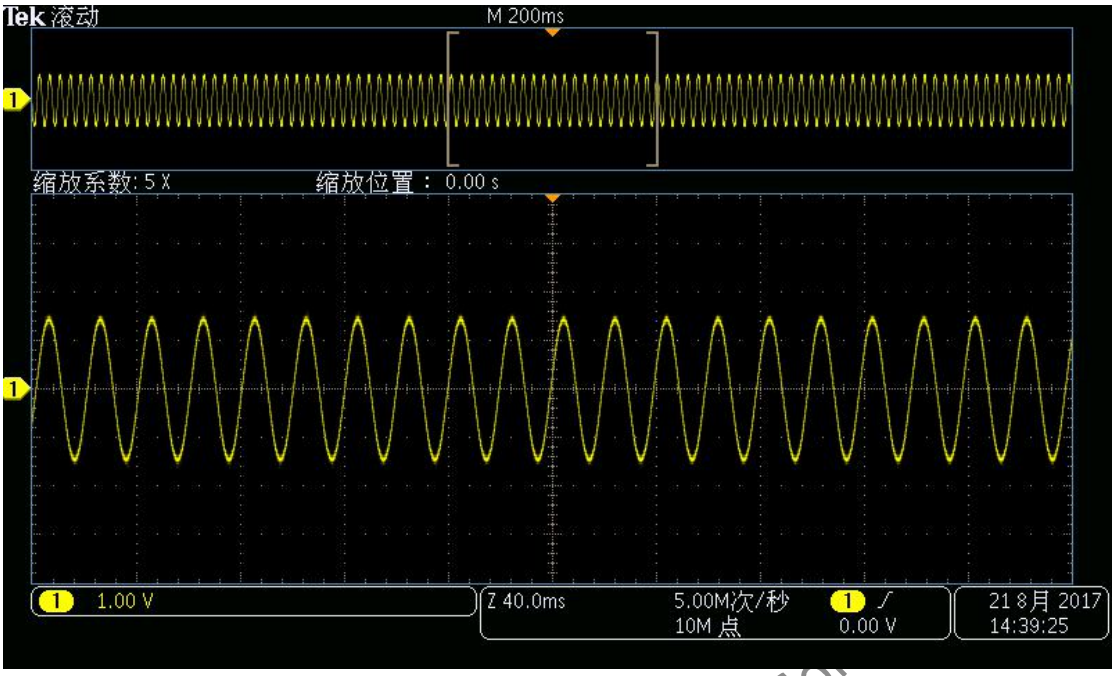
50 Hz


Tek 滚动
M 200ms
缩放系数: 5 X
缩放位置： 0.00 s
1.00 V
Z 40.0ms
5.00M次/秒
10M 点
0.00 V
21 8月 2017
14:39:09

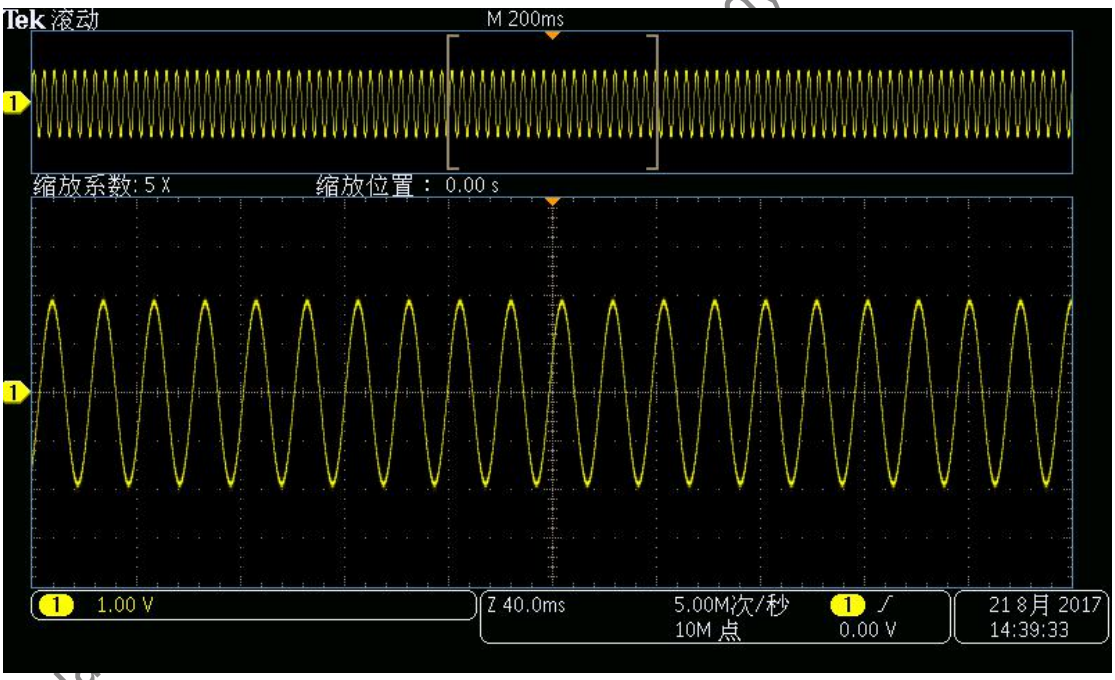
50.1 Hz


Tek 滚动
M 200ms
缩放系数: 5 X
缩放位置： 0.00 s
1.00 V
Z 40.0ms
5.00M次/秒
10M 点
0.00 V
21 8月 2017
14:39:15

50.2 Hz



50.5 Hz



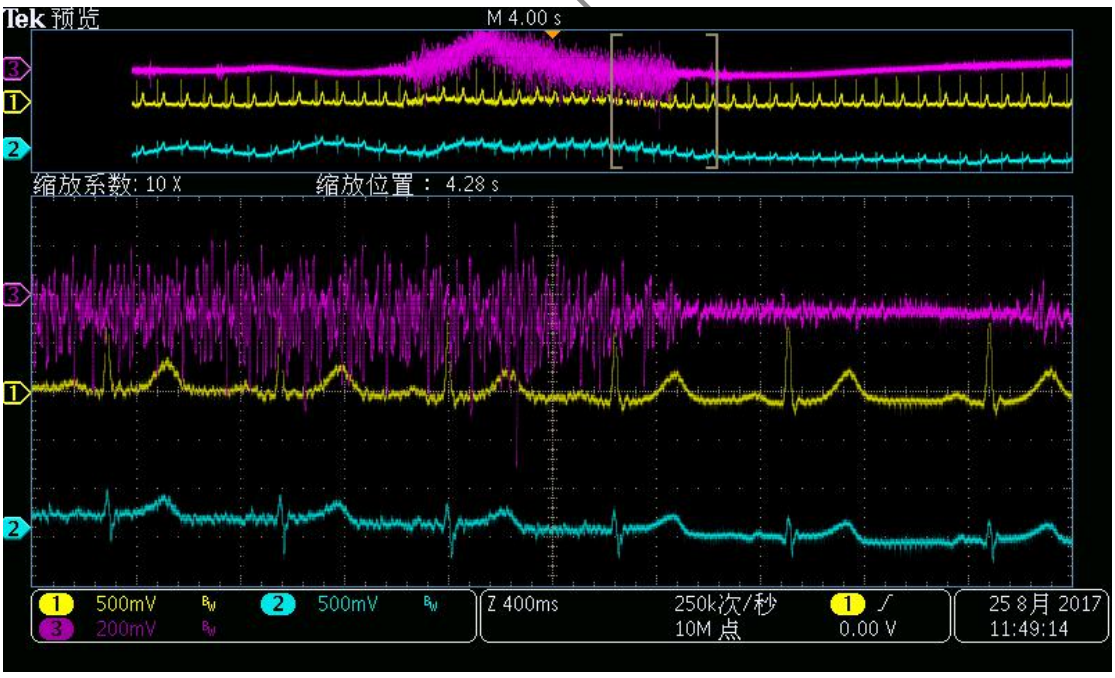
51 Hz

3.3 ECG Measurement

3.3.1. ECG

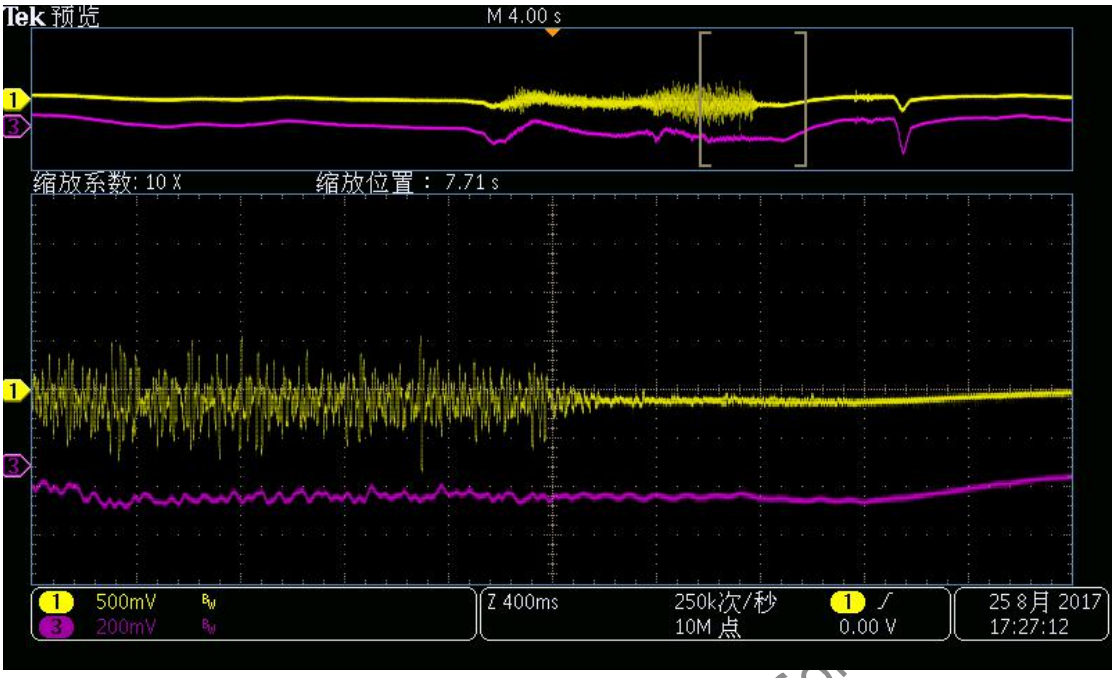
Where: wave 1 is V5 lead of ECG, wave 2 is V2 lead of ECG, A and B channels.

- 3.3.2. ECG and Myoelectricity Simultaneous Measurement in the Same Transmission Bands



Where: wave 1 is V5 lead of ECG, wave 2 is V2 lead of ECG, wave 3 is bicipital muscle of arm, A and B and C channels.

3.3.3. Bicipital muscle of arm simultaneous measurement in different channel



Where: wave 1 is the measuring signal of bicipital muscle of arm of a man at channel A (0.05~200Hz), and wave 3 is the same bicipital muscle also, but on the channel D (0.05~10Hz).