

Miniature Physiologic Recorder manual

一. Brief introduction

Developing a tiny and very cheap of miniature physiologic recorder, Holter, recording the parameters of sleep differentiate (Electroencephalography, called “ EEG”, Electromyography, called “ EMG”, Electrooculography, called “ EOG”) and Heart Rate Variability (abbreviation HRV) reacted contain the parameters of the neural regulation that can be put on the same page to analyze, and this recorder system surmount the restriction of the checked in traditional sleep, and realize the neural regulation control situation of the heart while sleeping. In addition, it is convenient to wear and exceed 24 hours continuously, store and launch the function wireless at the same time to make experimenter’s free activity. The following is Holter simple occupation methods.

Accessories are miniature physiological record systems (Holter) ,Receiving board (naked board) and the charger (naked board) .

二. CONNECT and TURN ON

1) Circuit and channel

Circuit	Channel	remark
1	Reference	There is white point mark in GND place on Holter, and GND place on lead wire is blank channel (have no line to connect out) , so connect GND place to holter Holter when using.
2	EMG	
3	EMG	
4	EOG	
5	EOG	Reference involves the relative zero point of the heart electric wave electric potential for the brain.
6	EEG	
7	ECG	
8	Temperature	GND represents the place of circuit connects (Ground) .
9	GND	

2)Stick to the line position:

- a. EEG: According to 10-20 systems, EEG is stuck on C3, Reference is stuck on Fz. (can study the demand and alter EEG and Reference positions)
- b. EOG: Stick it on upside of right canthus 1~2 cm away and downside of left canthus 1~2 cm away. Left and right sides can be upside down , but must keep about eyes lie in canthus to the side (namely have) .
- c. EMG: Stick it on the chin both sides, try one's best to avoid the beard, and stick on the bone (signal is better) .

d. ECG: Stick it on one palm place of left nipple.

3) Wake holter up:

a. Open the procedure:



double click , program , will be shown the figure (1) below ,

b. Confirm the position of receiving board :

Open COM3: OK

Click B place on figure (1) , if it appears 5.22 Terry B J Kuo that means the signal of receiving board is normal, if it appears Open COM2: Fail (255), that means can not reach to receiving board, need to confirm if receiving board is connected to USB or not; however, drop A place menu bar to choose other COM to confirm receiving board again.

c. Set up Channel and ID:

Click F place on figure (1) , one menu appear, replace RF Channel and ID to Holter channel and ID.

d. Begin to wake up:

Select D place on figure (1), Start.

At this moment, receiving board begins to wake Holter up, and in G place of on figure (1) will appear different color lights. The left side expresses operation state of Holter, and the right expresses the memory card operation state.

Blue, black: There is no signal. If the right side becomes black means no memory card.

Yellow: already found Holter or the memory card, and connected .

Green: Wrong signal.

Red: already connected to Holter and begun to transmit in step. If it shows red light means the signal has already been written down in the memory card

4) wake up successful:

It appears figure (2) ,and warning light of Holter flashes 2 seconds one flash or onesecond one flash.

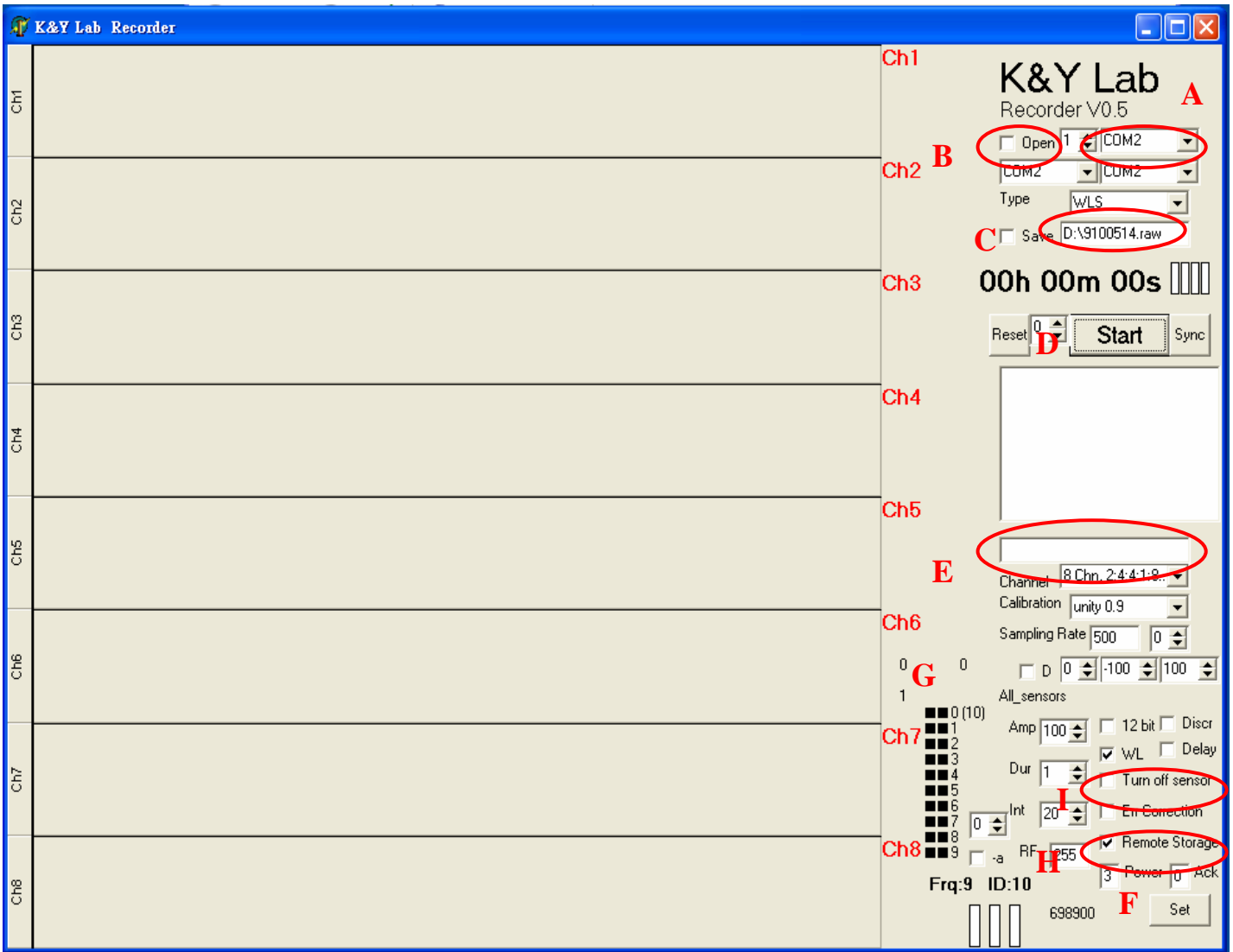


Figure (1)

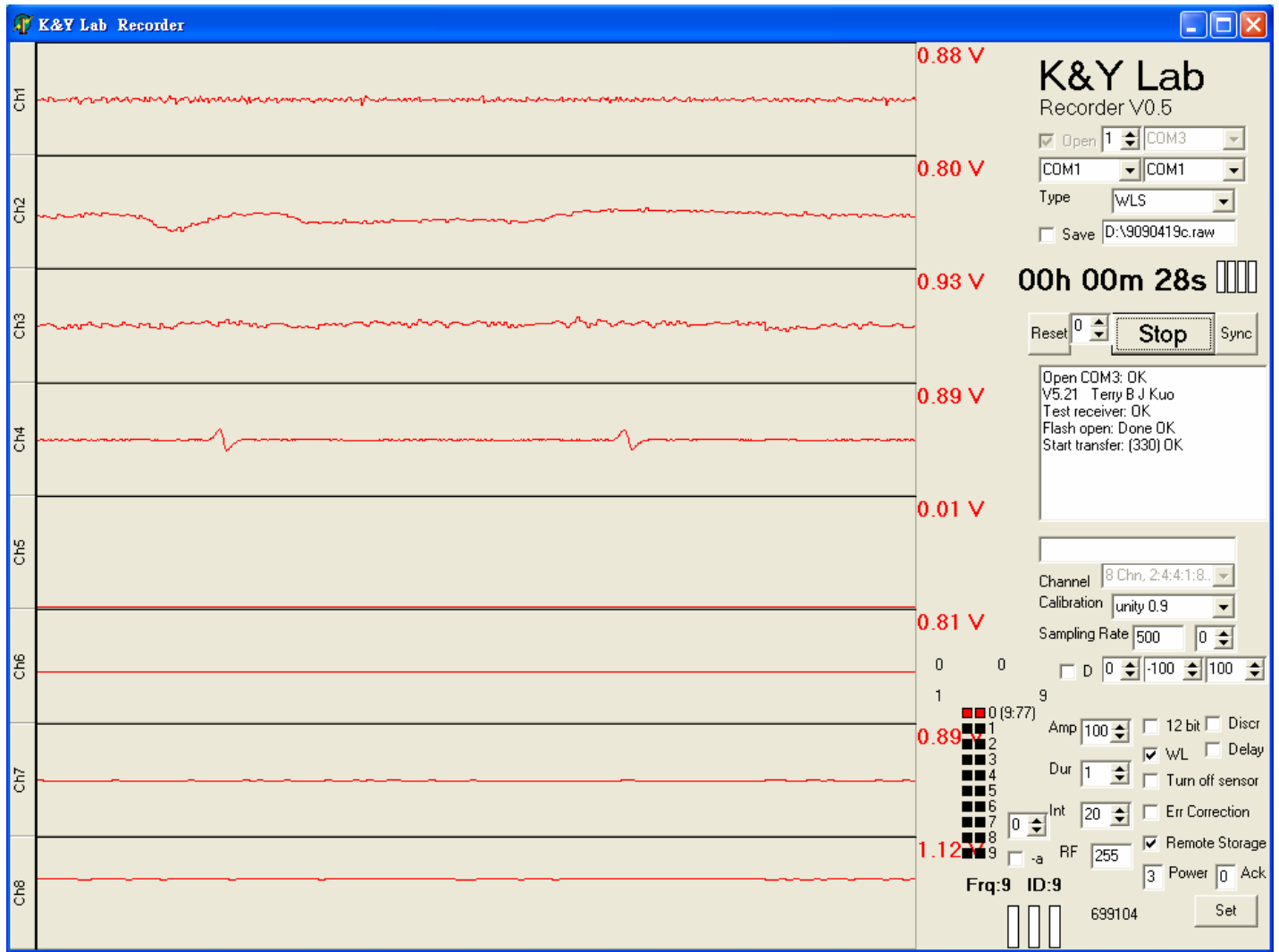


Figure (2)

三.

1) The signal confirm and correct

Channel of the procedure: Channel	Content
1	EMG
2	EOG
3	EEG
4	ECG
5	Temperature
6	X acceleration
7	Y acceleration
8	Z acceleration

2.The physiology is corrected:

- a. EMG: Please ask experimenter to move and grip the mouth to see whether if the EMG changes as Figure(3)
- b. EOG: Please ask experimenter to blink and look right- left sides to see whether the EMG channel signal as Figure (4)
- c. EEG: Please ask experimenter to close the eyes to relax to see if appear the alpha wave , such as Figure (5)
- d. ECG: Confirm with eyes whether there are pqrst waves, confirm whether ECG amplitude is correct.
- e. XYZ acceleration: Please ask experimenter to jump and move to see if the signal is correct.

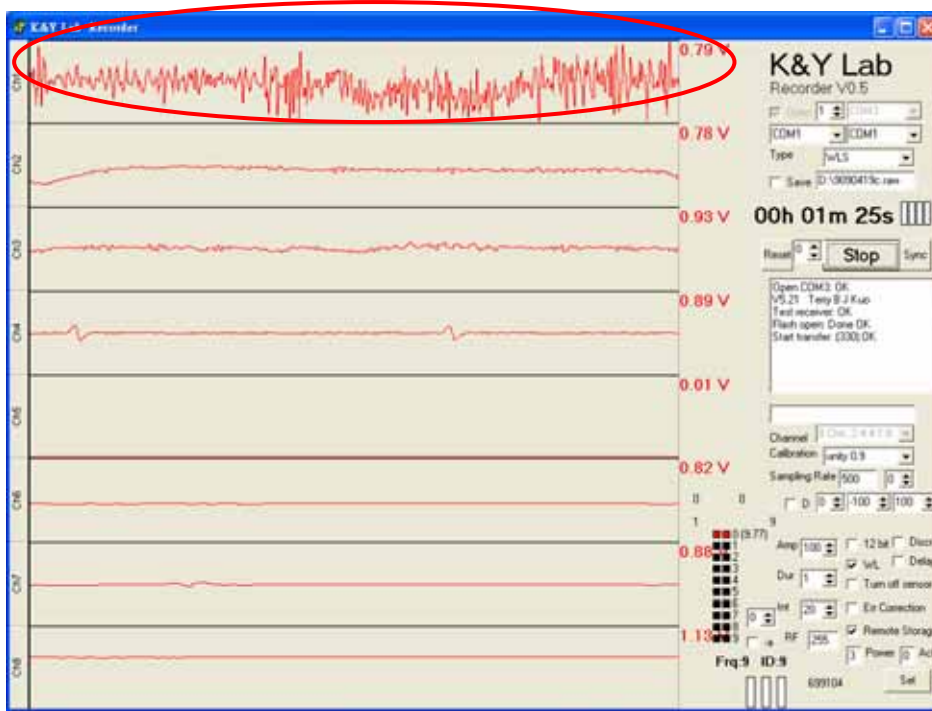


Figure (3)

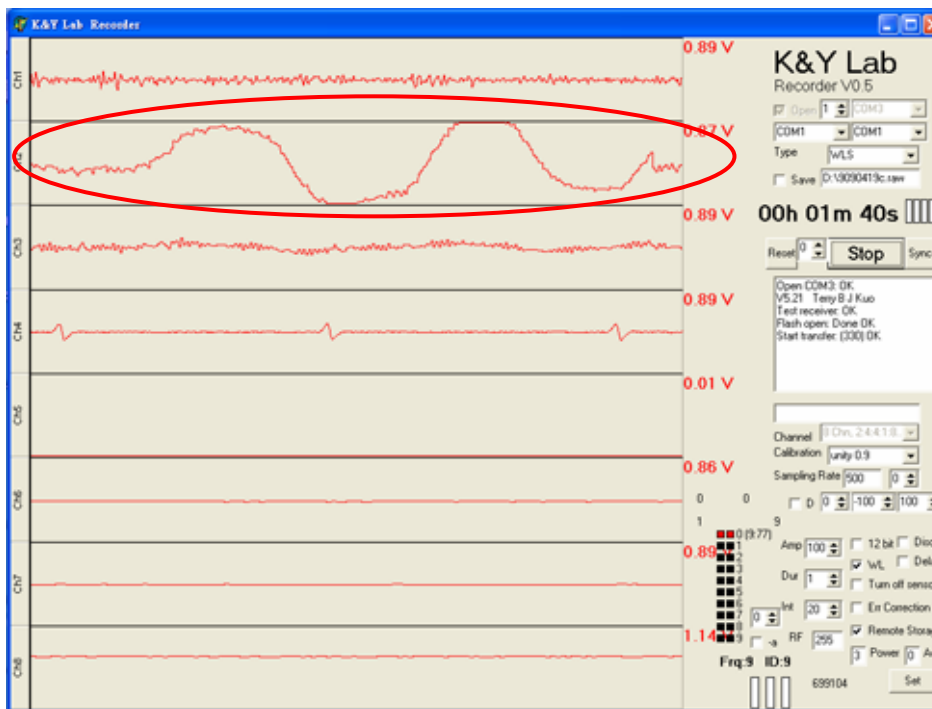


Figure (4)

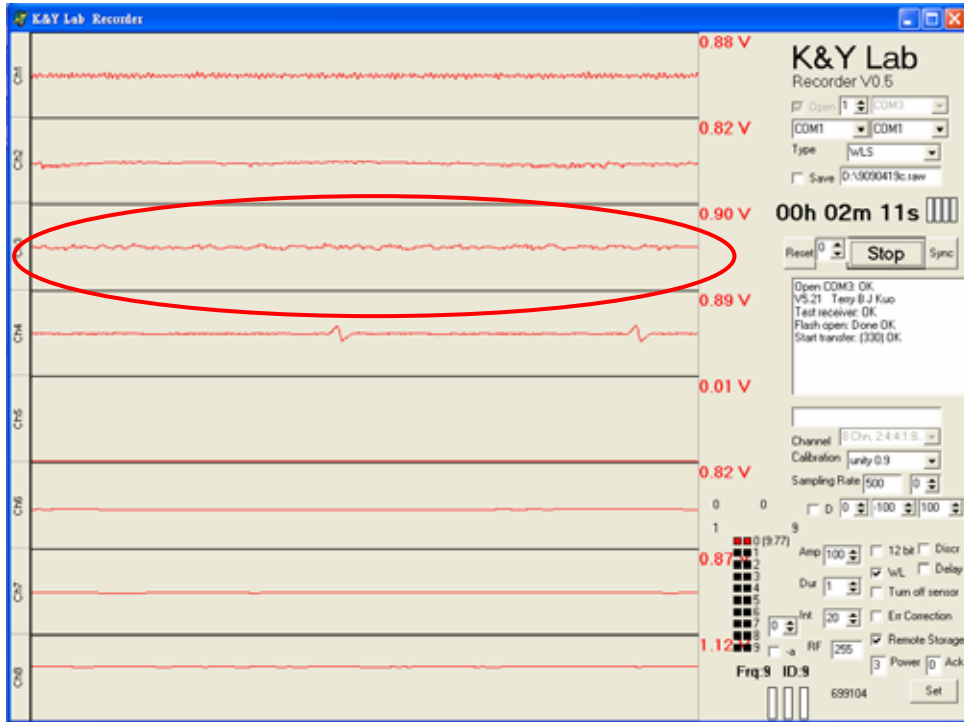


Figure (5)

3) Noise and problem are solved:

a. What is meant of noise:

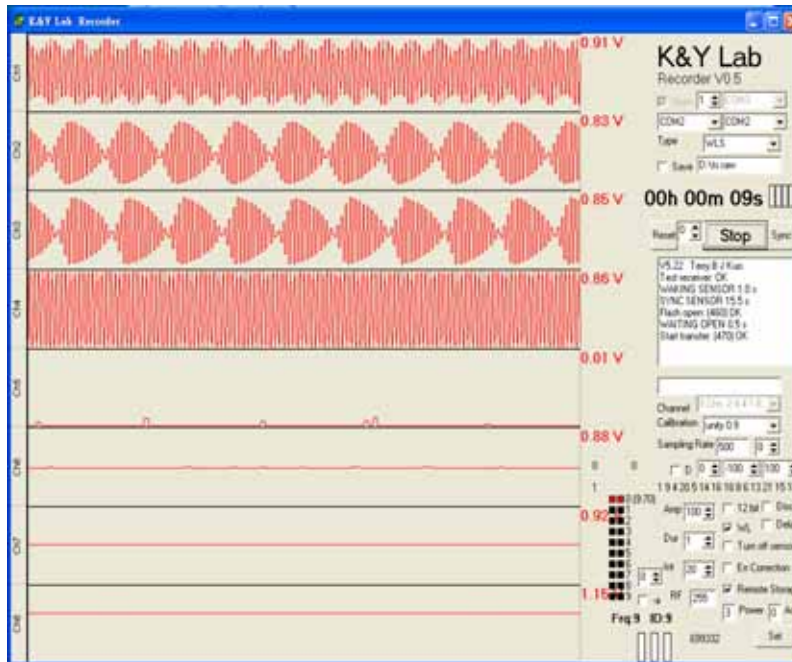
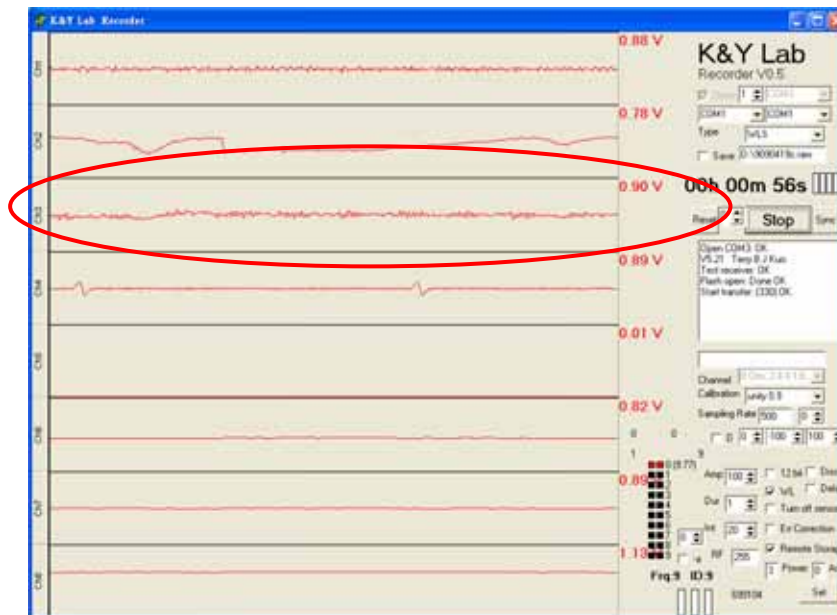


Figure (6)



Figure(7)

Figure (6) , (7) ,All can be regarded as noise, figure (6) it is the large electric wave noise, figure (7) it is small

The noise is appear repeated and interfere the signal collection, especially has great influence on the brain wave (because brain wave signal extremely small) .

b. Reduce the noise:

The noise may be the reason of electric apparatus from surrounding area, include computer screen, computer, cell-phone, dehumidifier, etc., or may come from circuit short-cut, so the way to overcome the noise, first, far away from electric facilities, and have the proper ground, second, confirm if the circuit connected well without any blocks, include sticking to use which rubbed sand and conductive lotion before the line, etc..

c. Other problems and settlement:

Other questions that may meet, include unable to wake Holter up, after wake up then can't stop and short-cut or stop recording when using. Have already overcome a lot of questions at present, but if still meet the emergence state of inviting the problem, pls record the problems in detailed and inform us.

To the question for wake up, we propose it when it is unable to wake up, charge first, then wake up, when it is still unable to wake up, we propose opening Holter by manually and then wake up, if still unable to wake up please inform the related person.

- 一、 In addition, for guaranteeing the quality and time when it is recording, we suggest the experimenter should wash hair and draw, and confirm Holter's electric consumption.

4. Store, write down and output

1)Store and record:

- a. Store: Holter can be stored in the small memory card, if store in the memory card, please click H place, Remote Storage, on figure (1) before waking Holter up, , after waking Holter up, on G place on figure (1) shows red lights means transmitting and storing in the memory card. The establishment of the name on C place on figure (1), can only express with English or numbers, can't exceed eight numbers, shelf name is called RAW.
- b. Record: Holter can be record from 10 seconds to 24 hours, short time and long-term record. If record for a long time, the function of please transmit Holter toing computer stops, after waking Holter up, input 1(small character) on figure(1) E place ,then press Enter, Holter will stop transmitting, if select Remote Storage, Holter will download the signal in the memory card (at this moment, Holter warns will flash in two seconds, flash four seconds means the system is halted) .
- c. Wake up again: When finishing the download, please wake Holter up once again, and select I place on figure(1) after waking up , then press STOP on D place of figure (1), the whole record can be done.

2.Output :

After finishing download, take out the memory card, and connect to computer for analyze. The output file is written as RAW shelf name, can use chkdsk to repair the disc when meet the question during download, If download as a repeated shelf name, the shelf name will be stored by way of 001, 002, 003 in order, when analyzing, change shelf name to RAW.

Federal Communications Commission (FCC) Statement

15.21

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

15.105(b)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Operation is subject to the following two conditions:

- 1) this device may not cause interference and
- 2) this device must accept any interference, including interference that may cause undesired operation of the device.