

Biotester

Version 1.00

Copyright, Sept, 2007

ECG Respiration Simulator
Stimulator Meter

Stirling Rock International
Tel. 612 9482 5898

The manufacturer assumes no responsibility for the use of this product in a medical environment or any incidents that may occur from the use of this product.

The manufacturer reserves the right to update the hardware, software and documentation at any time without notice.

1. Contents

1.	Contents	1
2.	Quick Guide	2
3.	Operation.....	2
4.	ECG Simulation	3
5.	Pace Operation	4
6.	Stimulator Meter	4
7.	Respiration Simulator.....	4
8.	Sine Waveform.....	5
9.	Triangle Waveform	5
10.	Pulse Waveform	6
11.	Options	6
12.	Power Down.....	6

2. Quick Guide

Biotester v1.00 where v1.00 is the current software version

Id Line

then

ECG 60S Normal Press the down or up arrows to select the function,
Sinus and the left right arrow to change parameters
 within the function

Pace 60S Normal
Sinus

Stim --.- ---mA
--.- ---mA

Resp 14 0.7R

Sine 50.0Hz S

Tri 50.0Hz S

Pulse 50.0Hz S

Options

To turn off the Biotester, press the left or Quit button until the arrows are displayed under the leftmost text. Then press and hold the down button until the display shows:

Power Off
Let go!!

3. Operation

The *Biotester* is a compact instrument, designed to simulate some functions of a patient. The Biotester is designed for use by a wide range of different medical personnel. The main applications are for Biomeidcal Engineering during routine testing, service and repair of equipment, by medical personnel during training and by hospital and medical staff to ensure that functions of equipment is correct and accurate . The *Biotester's* main features are:

ECG simulation	any rate from 10BPM to 240BPM
Stimulator tester	testing stimulators and TENS units
Respiration simulation	0.1R to 10.0R

To run the unit, install a PP3 size 9V battery into the battery compartment. Now activate the unit by pressing the on/off switch on the front of the unit. The display will activate and show "Biotester v1.00" where 1.00 is the software version. The second line is the operator ID line (*please see Section 10.0 for a detailed explanation*). This display and the display backlight will be on for 2 seconds, and then the current function will be displayed.

4. ECG Simulation

Press the down arrow repeatedly until the display shows ECG at the top left. If needed, first press the left or Quit button to set the arrows to the leftmost item, and then press the down button until the ECG function is shown..

In this mode, the ECG waveform parameters are displayed and can be adjusted. The ECG waveform is output continuously. The ECG type, rate and size are displayed on the LCD screen - these values are configurable by the operator. The heart symbol will flash during the QRS complex.

A pulse beep is available in the Options mode, which will make the Biotester beep twice during the QRS complex.

To change the ECG rate, press the right (or left) button until there are three up arrows underneath the ECG rate. This indicates that the ECG rate is selected and ready for adjustment. Press the up and down arrows to adjust the ECG rate.

To change the ECG size, press the right (or left) button until one arrow is displayed underneath the ECG size indicator. This indicates that the ECG size is selected and ready for adjustment. The three ECG sizes are low, medium and high.

To change the ECG waveform type, press the right (or left) button until two arrows are shown on either side of the ECG waveform name. The ECG waveform name is the furthest text to the right on the screen. The typical waveform is Normal Sinus. Other waveforms are:

Number	Name	Description
1	Normal Sinus	Normal rhythm for a healthy person
2	Myocard Infarc	Myocardial Infarction
3	Angina Invert	Angina Inverted T
4	Angina Flat T	Angina with a Flat T wave
5	Angina Peak T	Angina with a Peak T wave
6	ST-depr InverT	ST-depressed and Inverted T
7	ST_elev T	ST elevated T
8	ST-depr T	ST depressed T
9	ST-JPt Depres	St Junctional Point
10	AVBlock Type 3	Third-degree AV block
11	AVBlock Type 2	Type2 second-degree AV block
12	AVBlock Type 1	Type1 second-degree AV block
13	AVBlock	First degree AV block
14	IdioVent Rhythm	Idioventricular rhythm
15	Ventric Fibril	Ventricular Fibrillation

16	Junction rhythm	Junctional Rhythm
17	Atrial Fibril	Atrial Fibrillation
18	Flutter	Flutter
19	Prematur Atrial	Premature Atrial

5. Pace Operation

The Pace waveform is identical to the ECG waveform, with the addition of a short 2ms pacemaker spike. This can also be heard when the pulse beep is activated.

6. Stimulator Meter

The stimulator tester will measure the output amplitude and rate of nerve muscle stimulators and TENS machines. The stimulator tester will measure to an amplitude range of 100mA +/-1mA and a rate of 8000ms +/- 1ms (for a pulse width greater than 200us). The load applied is 220R for Channel1 and 100R for Channel2.

The stimulator should be connected across V6-LA for Channel1 (with V6 being the positive) and RA-V2 for channel2 (with RA being the positive). Since the stimulator pulses are measure through the ECG leads, this means that a small ECG signal is also put into the stimulator which is very useful for electrophysiological machines, such as the Micropace EPS.

The stimulator screen will automatically show the Stimulator mA and period as shown below:

```
Stim    25.0mA 498ms
▲▲▲▲ 25.0mA 498ms
```

In addition a lightning symbol will illuminate for a short time after each pulse. After 10seconds of no activity each channel will revert to bars as shown below.

```
Stim    --.mA ---ms
▲▲▲▲ --.mA ---ms
```

To calibrate the mA reading, press the enter button. Then adjust the reading on the right to the current value and press Enter. Repeat this for channel2 and press Enter again to quit to Stimulator mode. Quit may be pressed at any time to quit. The calibration will only be saved if either channel value is saved. The first number on the left is the ADC value, and the second number is the current cal value. The third number is the calibrated value to be adjusted.

7. Respiration Simulator

The respiration function changes the resistance across the RArm and LArm connectors to simulate an expiring and inspiring chest. A pair of lung symbols are displayed on the screen during inspiration (when the resistance is increasing). The waveform changes linearly with time, and the respiration will be displayed as a triangle wave on a patient

monitor.

In this mode, the Respiration waveform parameters are displayed and can be adjusted. The Respiration waveform is output continuously. The respiration rate and size are displayed on the LCD screen - these values are configurable by the operator.

To change the respiration rate, press the right (or left) button until there are three up arrows underneath the respiration rate. This indicates that the respiration rate is selected and ready for adjustment. Press the up and down arrows to adjust the respiration rate to any value from 2 to 120BPM.

To change the respiration amplitude, press the right (or left) button until there are four up arrows underneath the respiration amplitude. This indicates that the respiration amplitude is selected and ready for adjustment. Press the up and down arrows to adjust the respiration rate to any value from 0.1R to 10.0R.

8. Sine Waveform

Press the down arrow repeatedly until the display shows Sine at the top left. If needed, first press the left or Quit button to set the arrows to the leftmost item, and then press the down button until the Sine function is shown. The Sine waveform is very similar to the ECG waveform with the exception that the frequency is displayed in Hz (or Hertz).

To change the frequency, press the right (or left) button until there are four up arrows underneath the frequency. This indicates that the frequency is selected and ready for adjustment. Press the up and down arrows to adjust the frequency to any value from 0.1Hz to 99.9Hz.

To change the amplitude, press the right (or left) button until one arrow is displayed underneath the amplitude indicator. This indicates that the amplitude is selected and ready for adjustment. The three amplitudes are low, medium and high.

9. Triangle Waveform

Press the down arrow repeatedly until the display shows Tri at the top left. If needed, first press the left or Quit button to set the arrows to the leftmost item, and then press the down button until the Tri function is shown. The Tri waveform is very similar to the ECG waveform with the exception that the frequency is displayed in Hz (or Hertz).

To change the frequency, press the right (or left) button until there are four up arrows underneath the frequency. This indicates that the frequency is selected and ready for adjustment. Press the up and down arrows to adjust the frequency to any value from 0.1Hz to 99.9Hz.

To change the amplitude, press the right (or left) button until one arrow is displayed underneath the amplitude indicator. This indicates that the amplitude is selected and ready for adjustment. The three amplitudes are low, medium and high.

10. Pulse Waveform

Press the down arrow repeatedly until the display shows Pulse at the top left. If needed, first press the left or Quit button to set the arrows to the leftmost item, and then press the down button until the Pulse function is shown.. The Pulse waveform is very similar to the ECG waveform with the exception that the frequency is display in Hz (or Hertz). The pulse waveform is a 200ms pulse which is used to calibrate ECG recorder speeds.

To change the frequency, press the right (or left) button until there are four up arrows underneath the frequency. This indicates that the frequency is selected and ready for adjustment. Press the up and down arrows to adjust the frequency to any value from 0.1Hz to 99.9Hz.

To change the amplitude, press the right (or left) button until one arrow is displayed underneath the amplitude indicator. This indicates that the amplitude is selected and ready for adjustment. The three amplitude are low, medium and high.

11. Options

Press the down arrow repeatedly until the display shows Options at the top left. If needed, first press the left or Quit button to set the arrows to the leftmost item, and then press the down button until the Options function is shown.. The options is a list of options adjustable by the used. Press Enter to access the options list.

In each option, press Enter to access the option, Quit to quit, and up or down to adjust the option value. The Enter button will save any adjusted options.

Option Number	Display	Description
1	ID	Adjust the startup second line ID screen – 16 characters in total
2	Low Battery	Adjust the low battery setting, and view the curent battery voltage
3	Auto Off	Adjust the auto off time in minutes
4	Backlight	Adjust the backlight timer in seconds
5	Pulse beep	Adjust the ECG QRS pulse beep to OFF (0) or ON (1)
6	Default	Set all options and calibratiosn to default values

12. Power Down

To turn off the Biotester, press the left or Quit button until the arrows are displayed under the leftmost text. Then press and hold the down button until the display shows:

Power Off
Let go!!