Related topics
Pulse, throat and chest sonic measurement, quiet and strained heart, contraction tune, systole, flapping sound, diastole

Principle and task
Cardiac and vascular sonic measurement at different locations of the circulatory system. Measurement of the pulse rate at different levels of athletic loading.

Equipment
Cobra3, Basic-Unit	12150.00	1
Power supply, 12 V	12151.99	1
RS232 data cable	14602.00	1
Cobra3 Universal Recorder software	14504.61	1
Acustic measuring probe	03544.00	1
PC, Windows® 95 or higher		

Set-up
According to Fig. 1.

Procedure
— Prepare to record measured values with parameters in accordance with Fig. 2: Press **Continue**, **Start**
— Place the acoustic measuring probe lightly on the pulse over the radial artery. The correct position can be determined by feeling with the fingertips. To avoid an undesired contact with the microphone's membrane, the measuring location should be without hair.
— Use the "Zoom" icon to cut a PCG sequence (at least 3 heartbeats) which is good to evaluate from the finished phonocardiogram
— After putting a strain on the heart with athletic activity, e.g. 10 deep kneebends, repeat the measurement as described above. Instead of measuring the pulse on the arm, it can also be measured on other parts of the body, e.g. throat or chest.

Fig. 1. Experimental set-up

Results and evaluation

— In accordance with Fig. 3, the time in which exactly 3 pulse intervals occur can be determined with the "Survey" icon; in this case, 2.505 s. To determine the pulse rate per minute, (60 / 3) * 2.5 is calculated, e.g., with the calculator available in WINDOWS®. The pulse rate in the plot shown in Fig. 3 is 72 beats per minute.

— The pulse frequency oscillates between 50 and 130 beats per minute depending on the cardiac loading and the experimental subject.

Note

— The cardiac tones are always bipartate: The first heart sound occurs at the beginning of the systole (contraction tone). The second heart sound marks the beginning of diastole and occurs when the semilunar valves close (flapping sound).
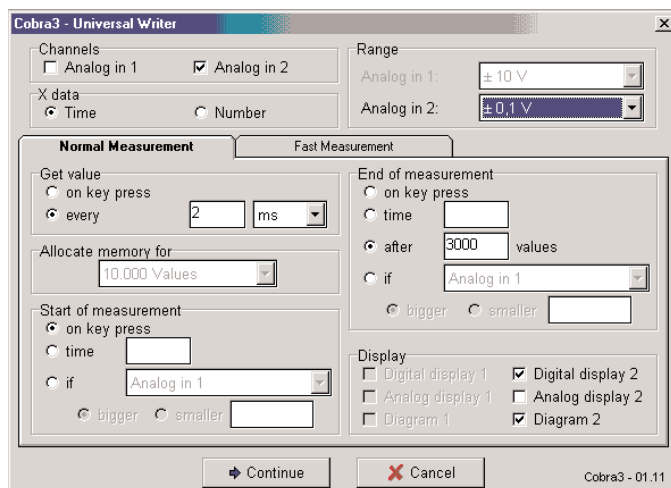
Fig. 2. Measurement parameters

Fig. 3. Typical vascular phonometric measurement