CLAIMS

1. A personal hand-held monitor (PHHM) which comprises a signal acquisition device for acquiring signals which can be used to derive a measurement of a subject's blood pressure (BP), the signal acquisition device being integrated with a personal hand-held computing device (PHHCD), wherein the signal acquisition device comprises a blood flow occlusion means adapted to be pressed against one side only of a body part or to have one side only of a body part pressed against it, a means for measuring the pressure applied by or to the body part, and a means for detecting the flow of blood through the body part in contact with the blood flow occlusion means, wherein the blood flow occlusion means comprises at least part of an external surface of the PHHM wherein the pressure is sensed by means of a flexible and essentially incompressible gel in which is immersed a pressure sensor which is adapted to provide electrical signals to the processor of the PHHCD.

2. The PHHM of claim 1, wherein the essentially incompressible gel is a fluid covered by a flexible membrane forming some or all of the external surface.

3. The PHHM of claim 1 or claim 2, wherein the blood flow occlusion means is saddle-shaped.

4. The PHHM of any one of claims 1 to 3, which is arranged to act as a tonometer.

5. The PHHM of claim 4, which is adapted to calibrate the tonometer by use of occlusion measurements obtained from the pressure sensor when used to occlude an artery.

6. The PHHM of any one of claims 1 to 5, wherein the means for detecting the flow of blood through the body part comprises a blood photosensor having one or more photo-emitters for transmitting light to a body part of a user and one or more photo-detectors for detecting light transmitted through or scattered by the body part, wherein the or each photo-emitter and/or the or each photo-detector is/are provided with one or more lenses to narrow the field of view.

7. The PHHM of any one of claims 1 to 6, wherein the means for detecting the flow of blood through the body part comprises ~~comprises~~ a blood photosensor having one or more photo-emitters for transmitting light to a body part of a user and one or more photo-detectors for detecting light transmitted through or scattered by the body part, wherein there are either two photo-emitters or two photo-detectors arranged such that light emitted in two different directions can be detected, and the processing means of the processor of the PHHCD is adapted to process the signals received from each direction to locate a blood vessel in the user's body.

8. The PHHM of claim 6 or claim 7, which is adapted to provide a visible or audible signal to the user to move a body part to optimise the position of the photo-sensor with respect to the blood vessel.

9. The PHHM of claim 7 or claim 8 when dependent on claim 7, ~~which~~ wherein the processor of the PHHCD is adapted to compensate the signals from the photo-detector(s) when the blood vessel is not optimally positioned with respect to the photo-sensor.

10. The PHHM of any one of claims 6 to 9, wherein the position and orientation of the photo emitter(s) and photo-detectors(s) are such that optical axes of the photo-emitter(s) and photo-detector(s) are aligned: to maximise the sensitivity of the signal produced by the photo-detectors to absorption of the emitted light by blood; and/or to minimise the sensitivity of the signal produced by the photo-detectors to the location of the blood vessel; and/or to optimise the performance of the personal hand-held monitor.

11. The PHHM of any one of claims 1 to 10, wherein the pressure sensor of the PHHM is used to provide ~~binary or~~ continuously variable means for the subject to enter data to the PHHCD in order to control some function of the PHHCD other than the measurements that are made by the PHHM.

12. The PHHM of any one of claims 1 to 11, wherein the processor of the PHHCD is adapted to correlate the signals received from the pressure sensor with the signals received from the means for detecting the flow of blood ~~or the optical sensor~~ so that the pressure exerted between the occlusion means and the body part is correlated with the luminal area of the artery and to fit the correlated values to a curve to provide measurements of the subject's SBP and/or DBP.

13. The PHHM of any one of claims 1 to 12, which includes a plurality of pressure-responsive or force-responsive devices.

14. The PHHM of any one of claims 1 to 13, wherein the processor of the PHHCD is adapted to provide audible or visual instructions, advantageously via a display means, if present, to the user to enable the user to use the device optimally.

15. The PHHM of claim 14, wherein the processor of the PHHCD is adapted so that the instructions are interactive and based on signals received from the sensor(s) which can be used to determine whether the device is in the best position or being used correctly.

16. A PHHM of any one of claims 1 to 15, wherein the PHHCD is a games controller, computer pointing device (usually referred to as a mouse) or a remote controller for a television or other electronic equipment.

17. The PHHM of claim 16, wherein, when the PHHCD is a computer pointing device, the PHHM communicates with the computer with which the pointing device is being used or another PHHCD by means of a cable or by means of a wireless connection.

18. The PHHM of any one of claims 1 to 17, comprising means to measure atmospheric pressure ~~which is adapted~~ to estimate the height of the PHHM with respect to a fixed point on the subject's body.

19. The PHHM of claim 18, wherein the fixed point is the subject's eyes and the PHHM is adapted to analyse an image of the subject's face obtained from a camera in a PHHCD to detect the eyes and a measure of the tilt angle of the PHHCD obtained from tilt sensors incorporated within the PHHCD.

20. The PHHM of any one of claims 1 to 19, which is adapted to use other vibration or movement sensors incorporated within the PHHCD to detect if the PHHCD has been agitated in the period before the measurement and hence to warn the user of possible errors in blood pressure measurement or to prevent such measurements until the PHHCD has been essentially at rest for sufficient time.

21. The PHHM of any one of claims 1 to claim 20, which is adapted to provide audible or visual instructions requesting the user to adopt two or more phases of operation, the first of which is used to measure the approximate values of SBP and DBP and/or to check that the user's body part is correctly located and/or at a suitable temperature, the second of which is used to make measurements of the said SBP and DBP and the subsequent phases (if any) are used to refine those measurements.

22. The PHHM of any one of claims 1 to 21, wherein the PHHM has a unique identifier that may be read by the associated processing means.

23. The PHHM of claim 22, wherein the sensors are calibrated on manufacture and the calibration data for each device associated with its unique identifier so that they may be downloaded to the device via the internet.

24. The PHHM of any of claims 1 to 23, wherein the PHHM includes a means for locating a blood vessel in the body part with respect to the pressure sensor.

25. The PHHM of claim 24, wherein the means for locating a blood vessel comprises a photo-sensor and the PHHM is adapted to process the signals from the photosensor to locate the blood vessel and/or to confirm the correct location of the blood vessel.

26. The PHHM of claim 25, wherein the PHHCD of the PHHM is adapted to provide a visible or audible signal to prompt the user to move the body part to optimise the position of the pressure sensor with respect to the blood vessel.

27. The PHHM of claim 25 or 26, wherein the PHHCD is adapted to compensate the signals from the photo-sensor when the blood vessel is not located with respect to the pressure sensor in order to derive the measurement of a subject's blood pressure (BP).