Abstract

A prototype low-cost, portable ECG monitor, the "ECG Boy," is described. A mass produced hand-held video game platform is the basis for a complete three-lead, driven right-leg electrocardiogram (ECG). The ECG circuitry is planned to fit in a standard modular cartridge that is inserted in a production Nintendo "Gameboy." The combination is slightly smaller than a paperback book and weighs less than 500 g. The unit contains essential safety features such as optical isolation and is powered by 9-V and AA batteries. Functionally, the ECG Boy permits viewing ECG recordings in real time on the integrated screen. The user can select both the lead displayed on the screen and the time scale used. A 1-mV reference allows for calibration. Other ECG enhancements such as data transmission via telephone can be easily and inexpensively added to this system. The ECG Boy is intended as a proof of concept for a new class of low-cost biomedical instruments. Rising health care costs coupled with tightened funding have created an acute demand for low-cost medical equipment that satisfies safety and quality standards. A mass-produced microprocessor-based platform designed for the entertainment market can keep costs low while providing a functional basis for a biomedical instrument.
The computers used by these developers cost over $200,000 each in 1965 dollars! Other researchers were attacking more specific challenges in patient monitoring. For example, Cox and associates (1972) in St. Louis developed algorithms to analyze the ECG for heart rhythm disturbances in real-time. The arrhythmia-monitoring system, which was installed in the coronary-care unit of Barnes Hospital in 1969, ran on a relatively inexpensive microcomputer. As we described in Chapter 5, the advent of integrated circuits and other advances allowed computing power per dollar to increase dramatically.

An electrocardiogram (ECG) is a tracing, or drawing, produced by an electrocardiograph – a device which records electrical activity in the heart. An ECG can be used for: A. deciding if the heart is performing normally or suffering from abnormalities, for example cardiac arrhythmia – extra or skipped heartbeats. detecting electrolyte disturbances, for example low plasma potassium levels. B. ECG procedure. Here is an extract from a medical textbook. 1. The patient should lie down and relax. 2. Calibrate the ECG machine – a standard signal of 1mV should move the stylus two large squares (1cm) vertically. 3. Attach the limb leads: left arm (LA), right arm (RA), left leg (LL) and right leg (RL). Medical Instrumentation Application and Design, 4th Edition by John G. Webster.pdf. Biomedical instrumentation. Emerging Medical FINAL PDF. For example, the standards issued by the Association for the Advancement of Medical Instrumentation (AAMI) specify that electrocardiography (ECG) amplifiers must tolerate a dc component of up to ±300 mV resulting from electrode–skin contact. Commercial ECG electrodes have electrode offsets that are usually low enough, ensuring little danger of exceeding the maximum allowable dc input offset specifications of the standards.