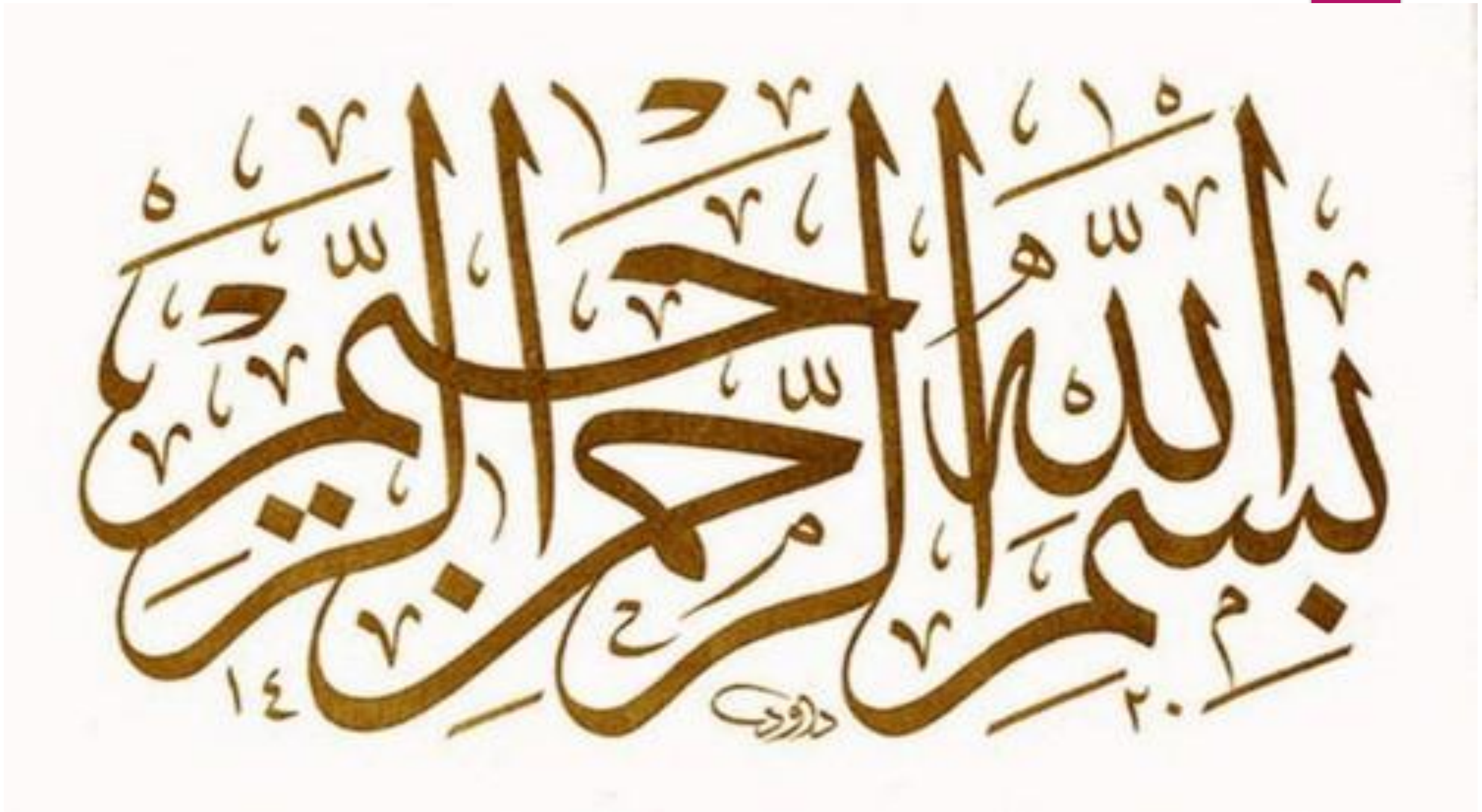
بسم الله الرحمن الرحيم

POWER LAB SYSTEM.

BY:

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THE POWER LAB SYSTEM

- The PowerLab System is a high-performance data acquisition system.
- **The purpose of the PowerLab system is to acquire, store and analyze data.**
- The raw input signal is in the form of an analog voltage whose amplitude varies continuously over time.
- This voltage is monitored by the hardware, which can modify it by amplification and filtering processes called signal conditioning
- Signal conditioning may also include zeroing, the removal of an unwanted steady offset voltage from a transducer's output.
- After signal conditioning, the analog voltage is sampled at regular intervals.
- The signal is then converted from analog to digital form before transmission to the attached computer

THE POWER LAB SYSTEM

- The Power Lab System is basically used to record various Physiological activities of humans and animals or from isolated organs for which the signal or data analysis and manipulation become very easy and less time consuming.
- It has wide range of research applications such as animal physiology, pharmacology, neurophysiology, biology, zoology, biochemistry, and biomedical engineering.
- These units are capable of recording at speeds of up to 400,000 samples per second continuously to disk (aggregate), and are compatible with instruments, signal conditioners and transducers

PARTS OF SYSTEM:

The system consists of :

- an input device connected to a Microsoft Windows or Mac OS computer using a USB cable.
- LabChart software which is supplied with the PowerLab and provides the recording, display and analysis functions.
- The PowerLab and a LabTutor panel, displays recorded data.
- Power Lab Converts signals of mechanical and Physiological activities into amplified electrical Signal by different devices.
- Devices which receive signal, amplify it and transmit it towards the Computer are called as **Transducers**.

ACCESSORIES

Signal Transducers

- Transducer generates an analog voltage between ±10V may be attached to the PowerLab. Either directly or through any signal conditioners.

EVENT MARKER

STIMULATING BAR ELECTRODE

FORCE TRANSDUCER

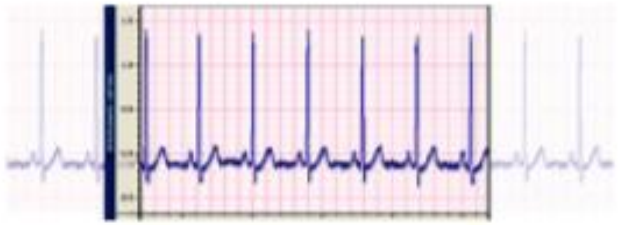
HISTORY:

- The technology is derived from equipment such as the kymograph and paper chart-recorders.
- Drum kymograph according to Ludwig.
- **PowerLab** (before 1998 was referred to as MacLab) developed by ADInstruments comprising hardware and software and designed for use in research and teaching applications
- original **MacLab** unit was developed in the late 1980s to run with only Macintosh computers to perform computer-based data acquisition and analysis.
- The MacLab was renamed "PowerLab" in 1997.

1890s

Drum kymograph according to Ludwig

Today



The PowerLab and a LabTutor panel, displaying a section of recorded data

Features:

- User friendly – no programming required
- Fastest data collection
- Up to 16 input channels. choice to select either 4-,8-, or 16-Channel Systems
- Up to 16 Analog inputs
- Two independent stimulator outputs
- External trigger input and signal triggering
- Wide range of low-pass filters
- AC or DC coupling
- Digital inputs and outputs for external instrument control
- High-Speed USB 2.0 interface

How does data acquisition occur

- External signals detected are converted into analog electrical signal.This raw input signal is in the form of an analog voltage whose amplitude varies over time.
- Signals are amplified and filtered to remove unwanted frequencies or noise.
- After signal conditioning, the analog voltage is sampled at regular intervals
- Analog signal is multiplexed to an analog to digital converter
- The digitized signal is transmitted to the computer using USB connection
- Software receives, displays, analyses and records data in real time

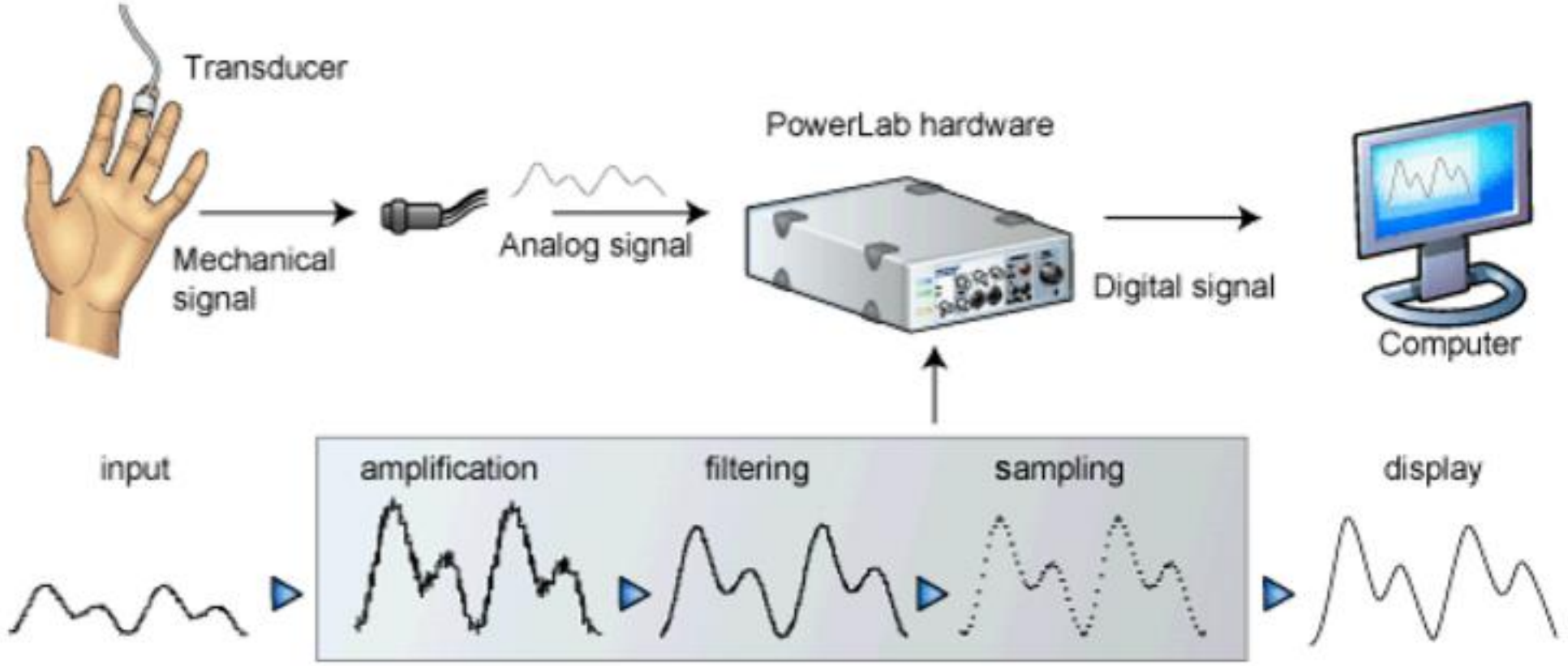


Figure 1. A Summary of Data Acquisition Using a PowerLab System

Software for PowerLab

- **LABCHART**

1. LabChart is suitable for research on any species from humans to mice to flies.
2. The software provides the capability to continuously record and display up to 16 channels of data, perform online or offline calculations, display numerous analysis windows and automatically extract data.
3. Quick and easy set up of experimental parameters, powerful computation and analysis.
4. Parameters of interest are easily extracted to an internal spreadsheet and can be exported for further analysis or graphing.

LABCHART

5. Formerly known as Chart,functions like a traditional multi-channel chart recorder, XY plotter and digital voltmeter.
6. It is compatible with both Windows and Macintosh operating systems.
7. Large specialised add-ons called Modules provide data acquisition and analysis features for specific applications such as ECG, blood pressure, cardiac output, HRV etc.
8. Smaller software plugins provides additional and specialized functionality to LabChart.
9. Latest version of LabChart is 8.