



SALIENT FEATURES

Battery operated body signal measurement for safety.
PC based graph drawing facility & display to capture body signals.
Aesthetically designed injection moulded electronic desk. Master unit carrying useful experiment resources like Power supplies, Computer, Interface, while the central slot will carry replaceable experiment panel secured in an ABS molded plastic.
Has colorful screw less overlay showing circuit & its connection tag numbers for easy connectivity.
Hands on learning emphasized. Set of Users Guide provide with each unit

Specification of Master unit

Power Supply

Dc supply

+5V / 1A, +/- 12V, 500mA
0 to 15V DC (Variable) / 100mA.
0 to -15V DC (Variable) / 100mA.

Computer Interface (CIA)

Optoisolated Adaptor prevent to PC parallel port (25 pin PLT) due to wrong connections. Interfaces through 25 pin M to F cable 1mtr Length. P4XP not in scope of supply.

4DAC channels : 0 to 2.5V full scale.
1 DAC channels : O/P 2.5 V full scale
V to I Function block : Input : 0-2.5Vdc
Output: 0-20 or 4-20mA, in 100E load Max
V to PWM function block: I/P -0-2.5V, O/P-1KHz PWM
O/P±9V.

PC Software

PC (P4/XWIN7) USB based Graph Utility Software for line waveform measurement

USB I/O Module

USB IO module to interface 25 pin D connector on CIA panel to USB port enclosed in 25 pin D shell using Type A to mini B cable

MIC Pre-Amplifier

Handheld electret microphone with preamplifier function block with DC gain= 1, AC gain=50

Audio Amplifier & speaker

Amplifier gain 20, for audio range, Built in loud speaker - 8ohm / 500mw / earphone

Level Shift card

2 No. level shifter converting ± 9 V to 0-2.5 V for PC interface

Operating Voltage

220/240Vac switch settable ± 10%, 50Hz/35VA

Mechanical Dimensions

(A) Master Unit : mm(w), 160mm (H), 350mm(D), Net weight 7.5kg. Gross Wt. : 9.51kg.
(B) Panel : 215mm(w), 165mm(H), 40mm(D), Net Weight = 700gm approximately.
(C) Patch Cords: 4mm male to patchcords 16 Nos. [2-120mm length, 14-500mm length]

Modular experiment panels- Select one or more to work

1) RPM / BPM / HRM / Pulse Oximeter Expt. Panel (BM1) (Provided with 16 banana & 3 test points)

Function Blocks used:

- LED driver @350Hz, RED & IR LED, I to V converter circuit, Sample & hold circuit, Blood pressure Sensor (300mm Hg) mounted inside panel, Shares MIC with pre-amplifier and loudspeaker with Audio amplifier from master Unit Band pass filters (11Hz & 1.6Hz) Analog wave to square wave converter, Wheastone Bridge, Instrumentation amplifier circuit (Gain=X50 & X 1), Skin Contact Measurement go/no go circuit, AC Amplifier (X20 gain)

Detachable Sensor Modules / Electrodes:

- i) Pulse oximeter probe / Module
- ii) Lie detector With CAL & Temperature sensor,
- iii) Sphygmomanometer / blood pressure apparatus,
- iv) Electronic stethoscope probe / Module using Electret MIC

List of Experiments :

- Pulse oximeter / plyphysmogram (HRM)
- Respiration rate measurement (RRM)
- Lie Detector based on skin impedance change
- Blood pressure measurement (BPM) using Korotkoff's Method

Note: Specifications are subject to change.

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- Blood pressure measurement (BPM) using Oscillometry Method
- Heart Rate measurement (HRM) by using Electronic stethoscope
- Study of Bandpass (11Hz) filter to plot frequency waveform for HRM
- Study of Bandpass (1.6Hz) filter to plot frequency waveform for Oscillometry method

2) ECG / EMG study Experiment panel (BM2)

Function Blocks used :

- Buffered 3 lead einthoven triangle creating 6 measurement Combinations using 2 pole 6 way Rotary Switch, Instrumentation amplifier (Gain = 10 / 100), NIV amplifier (Gain = 10 to 100), 1 no. of isolation amplifier, Span zero amplifier. (Gain = 2 to 20), Notch filter (50Hz) HPF or DC blocker, LEF or Highpass noise suppressor, Battery operated body signal measurement for safety, ECG signal simulator.

Detachable Sensor modules / Electrodes:

- Supplied with Limb Electrodes of ECG (4 nos), Disposable Electrodes (Ag/AgCl-10 Nos)

List of Experiments :

- Plotting & measurement of ECG, EMG waveform
- Study of band reject (50 Hz notch) Filter Working with simulated ECG signals Optionally EEG Measurements

3) RRM, BIA Experiment panel / BM3

Function Blocks used :

- R & C component Bi Simulator, 50KHz wein bridge oscillator, 90° phase shifter, Buffered Excitation

current source (800uA), instrumentation Amplifier (X10), Resistive component synchronous detector (IPS), Capacitive component synchronous detector (QPS), peak detector, AC amplifier, Span zero amplifier (Gain = 2 to 20), Battery operated body signal measurement of safety.

Detachable Sensor modules / Electrodes :

- Supplied with Limb Electrode (4 nos), chest Electrodes (2 Nos)

List of Experiments :

- Measure Body impedance using Body impedance Analyzer (BIA) and compare with standard
- Measurement of Respiration Rate using BIA

4) Ultrasound HRM + Audiometry Experiment panel / BM4

(Provided with 16 banana & 4 test points)

Function Blocks used :

- **Ultrasound HRM** : Transmitter @ 2.14MHz FR Oscillator, Receiver @ 2.34MHz detuned RF Amplifier, diode detector, bandpass filter (1.3Hz Center Frequency), AC Amplifier with gain 7, notch filter (band stop filter) 50Hz.
- **Audiometry** : Audio tone generator with built in LS Amplifier (frequency range 20Hz - 20KHz), swept tone (FM sweep) generator using wobulator (Warble), noise generator (pink noise) with built in LS amplifier, 3P-4W Rotary selector switch to select Audio or noise signal with Right of left or Both ear's at a time, User response switch, optional PC Based GUI.

Detachable Sensor Modules / Electrodes :

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