Specifications

Shimmer3R ECG/EMG Unit

Key Features

5-wire, 4-channel ECG, measuring bipolar limb leads and user's choice of V1 - V6

Measure 2 channels of EMG data with a common reference electrode

Software configurable right-leg drive for common-mode interference rejection

Software configurable amplifier gain

Software configurable data rate

Respiration demodulation capability on-chip

Lead-off detection capability on-chip

Test signal on-chip for validation purposes

EEPROM storage device (on the ExG daughterboard) enables expansion board detection and identification, as well as 2032 bytes of data storage available to user

Introduction

The ECG/EMG unit, previously also known as the ExG unit, provides a configurable digital front-end, optimised for the measurement of physiological signals, for example 5-wire ECG (Electrocardiography) and 2-channel EMG (Electromyography). Compatible with the Shimmer3 platform, the ECG/EMG unit also boasts best data quality with integrated 10 DoF inertial sensing via accelerometer, gyroscope, magnetometer and altimeter, each with selectable range. The ECG/EMG unit also provides highly accurate and scientifically reliable raw data to allow complete control over capture and interpretation of sensed data in real-time.

Product Overview

While addressing the challenges of mobility, the ECG unit can record the pathway of electrical impulses through the heart muscle, and can be recorded on resting and ambulatory subjects.

When configured for EMG, the unit can also measure and record the electrical activity associated with muscle contractions, assess nerve conduction, muscle response in injured tissue, activation level, or can be used to analyse and measure the biomechanics of human movement.

Applications

Atrial fibrillation
Premature ventricular contraction
Heart function monitoring
Abnormal rhythm detection and alert
Biomechanics, muscle activity, gait and posture disturbance
Fatigue analysis
Sports technique, performance and medicine
Neuro Rehabilitation
Tremor Analysis
Veterinary Science
Orthopaedics
Thoracic Bioimpedance (Respiration)

Technical Specifications

Gain	Software configurable (1, 2, 3, 4, 6, 8, 12)
Data Rate	Software configurable (125, 250, 500, 1000, 2000, 4000, 8000 SPS)
Input Differential Dynamic Range	Approx 800 mV (for gain = 6)
Bandwidth	8.4 kHz
Ground	Wilson Type Driven Ground
Input Protections	ESD and RF/EMI filtering; Current limiting; inputs include defibrillation protection (survive only, not repeat)
Connections	EMG: Input Ch1N, Input Ch1P, Input Ch2N, Input Ch2P, Reference (Ref) ECG: Input RA, Input LA, Input LL, Input Vx, Reference (RL) All Hospital-Grade 1mm Touchproof IEC/EN 60601-1 DIN42-802 jacks
Weight	31 grams
Dimensions	65 x 32 x 12 mm
EEPROM Memory	2048 bytes

Shimmer3R Specifications

Processing	STM32U5A5 Arm Cortex-M33 (160 MHz, 16-bit))
Communication	Classic Bluetooth and BLE (Vela IF820)
Storage	Integrated MicroSD card slot (8GB card supplied)
Battery	450mAh rechargeable Li-ion
Integrated 3-Axis Accel.	LIS2DW12 and the LSM6DSV
Accel. Range	±2g , ±4g , ±8g , ±16g

ECG Module	5-wire, 4- channel ECG, measuring bipolar limb leads and user's choice of V1 - V6 Digital interface includes test signal generation for validation purposes Respiration demodulation from ECG data and lead-off detection
EMG Module	Two channels of EMG data Digital interface includes test signal generation for validation purposes
Supporting Software	Shimmer ConsensysPRO & ConsensysBASIC Shimmer LabVIEW Instrument Driver Shimmer MATLAB Instrument Driver Shimmer Java / Android API Shimmer C# API Shimmer 9DoF Calibration
Supporting Hardware & Accessories	Biophysical Leads Straps, Documents, Charging Dock/Base, Case Electrodes Shimmer3 Calibration Stand

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