Shimmer
ECG & EMG Unit

KEY FEATURES
- Five-wire, four-channel ECG solution, measuring bipolar limb leads and user’s choice of V1 - V6
- Measure two 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, optimized for the measurement of physiological signals, for example 5-lead 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.

APPLICATIONS
The ECG/EMG unit is compatible with the Shimmer3 platform and can be applied to a variety of applications such as:
- 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
- Orthopedics

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.
Shimmer3
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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: Approx 800 mV (for gain = 6)
Dynamic Range: Wilson Type Driven Ground
Input Protection: 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

SHIMMER3 UNIT SPECIFICATIONS

Processing: MSP 430 microcontroller (24MHz, 16Bit)
Communication: Bluetooth – RN42, 802.15.4 radio – TI CC2420
Storage: Integrated 8GB microSD card slot
Battery: 450mAh rechargeable Li-Ion
Integrated 3 Axis Accel: Freescale MMA7361
Accel Range: +/- 1.5g – 6g

SUPPORTING SOFTWARE

Shimmer Consensys Software
ShimmerCapture
Shimmer 9DoF Calibration
ShimmerSensing LabVIEW Instrument Driver
Shimmer MATLAB Instrument Driver
Shimmer Java/Android API & Shimmer C#API
Shimmer Plot
Synchronisation of Data: Consensys Software
Multi Shimmer Sync for Android

ECG MODULE SPECIFICATIONS

Five-wire, four-channel ECG solution, 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 SPECIFICATIONS

Two channels of EMG data
Digital interface includes test signal generation for validation purposes

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S-S/ExG-V1.5