

Shimmer Bridge Amplifier+



INTRODUCTION

The Shimmer Bridge Amplifier+ module allows for strain and load cell data acquisition for force and resistance measurements free from wired constraints, allowing for natural range of motion, and measurement outside of a dedicated lab setting.

Compatible with the Shimmer3 Platform, the Bridge Amplifier module also boasts best data quality with integrated 10DoF inertial sensing via accelerometer, gyroscope, magnetometer and altimeter, each with selectable range.

PRODUCT OVERVIEW

The Bridge Amplifier+ Module contains a bridge amplifier, excitation source, and connector enabling force measurement with Shimmer, as well as a buffered resistance divider amplifier to enable resistance measurements.

The bridge amplifier is ideal for all load, weight, force, torque, and pressure measurements through the connection of a user-supplied strain gauge based bridge sensor or load cell. The resistance divider input is suitable for variable resistance sensors, such as a temperature probe.

KEY FEATURES

- Interface strain gauge or load cell sensors with Shimmer3 to measure load, weight, force, torque or pressure.
- Interface variable resistance sensor with Shimmer, for example, temperature sensitive resistor, to measure ambient, skin-surface or other temperatures.
- Provides excitation source for strain gauge or load cell, meaning no external voltage source is required.
- Excitation source and amplifier enable are software controlled, allowing optimisation of power consumption.
- Two channels of output from bridge amplifier, providing both low and high gain; low gain is ideal for bipolar inputs, whilst high gain provides additional 3x gain for unipolar load cells.
- EEPROM storage device enables expansion board detection and identification, as well as 2032 bytes of data storage.

APPLICATIONS

- Strength Capacity and Force Measurement
- Resistance Measurement
- Rehabilitation
- Sports Training
- Muscular-skeletal Clinical Research
- Environmental Monitoring
- Fall Risk Assessment (Grip Strength)

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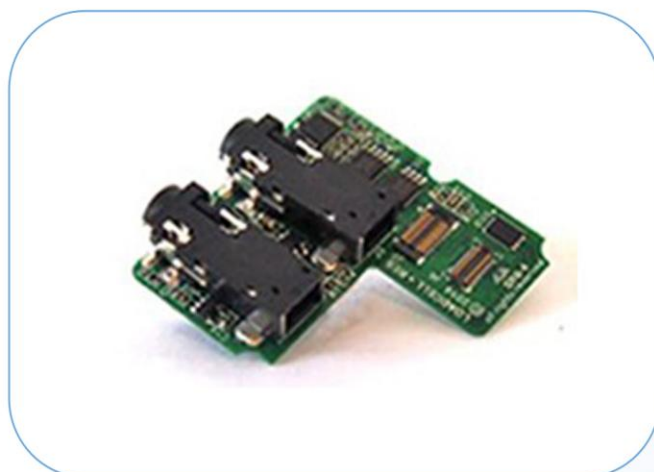
| TECHNICAL SPECIFICATIONS - BRIDGE AMPLIFIER | |
|---|--|
| Gain ¹ | Normal Channel 183.7 ± 1%, 551 (3x Normal), ± 1% High Gain Channel |
| Frequency Range ¹ | DC..1kHz, High Gain Channel DC..100Hz |
| Common Mode Rejection ¹ | >110dB |
| Input Impedance ¹ | 50MΩ |
| Input Signal Range | Normal Channel ± 7mV, ± 2.5mV/V; Hi-gain Channel 0-4mV, ±1.43mV/V |
| Zero Noise | Low Noise - Normal Channel <1% Full-scale; High Gain Channel <0.5% Full-scale |
| Excitation Voltage | 2.8V ± 5% ² |
| Input Protection | Current limiting, EMI/RF suppression |

| TECHNICAL SPECIFICATIONS - RESISTANCE AMPLIFIER | |
|---|---|
| Gain ¹ | 10.1 +/-2% |
| Pull-up/Input Impedance | 200kΩ to +3.0V |
| Frequency Range ¹ | IDC..408Hz (2nd Order) |
| Signal Range | 280mV or 20kΩ (1kΩ-20kΩ measurement range recommended) |
| Zero Noise | 0.1 mV RMS at output |

| TECHNICAL SPECIFICATIONS | |
|--------------------------|---|
| Connections | Two 3.5mm jacks (headphone type) for 4 conductor shielded cable for Bridge and Resistance Amplifiers |
| Current Consumption | Excitation disabled < 100µA, Excitation enabled 17mA ³ |
| EEPROM memory | 2048 bytes |

¹ Calculated specification, exact value subject to environmental and component variation.
² The excitation source is software controlled.
³ This value is load-cell dependant, to estimate use the formula $I = 1 + 2.8 / (RSGin \parallel RSGout)$
 RSG data is available from the load-cell manufacturer.

| SUPPORTING SOFTWARE | |
|---|--|
| Shimmer 9DoF Calibration | |
| Shimmer LabVIEW & MatLAB Instrument Drivers | |
| Shimmer Java/Android API & Shimmer C# API | |
| Synchronisation of Data: Consensus, Multi Shimmer Sync for Android | |



| SHIMMER UNIT SPECIFICATIONS | |
|-----------------------------|--|
| Processing: | MSP 430 microcontroller (24MHz, 16Bit) |
| Communication: | Class 2 Bluetooth Radio Roving Networks RN42 |
| Storage: | MicroSD card slot (supporting upto 32GB) |
| Battery: | 450mAh rechargeable Li-ion polymer |
| Integrated Sensors: | MPU9150, LSM303DLHC, KXR5-2042 and BMP180 |

CLASS LEADING WEARABLE WIRELESS SENSING

Small, lightweight wearable design provides full mobility, unrestricted movement and comfort for wearer.

Highly flexible and adaptable sensor platform can convert captured data to digital format, and provide real-time physiological data collection and streaming.

Highly accurate and scientifically reliable raw, calibrated or un-calibrated data to allow complete control over capture and interpretation of sensed data in real-time

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