SHIVR HEK-200
MULTI-ACTUATION HAPTIC KIT

FEATURES

- High Performance / High Fidelity Haptic Effects
- Extremely thin & lightweight:
- Custom shapes and designs
- Multi-Touch Point Arrays within the same package
- Easily tuned for relevant haptic frequencies (wide and/or narrow frequency response possible)
- Nonferrous and Nonmagnetic
- **Robust "Piezo Protection Advantage"**
  - Flex/Rigid Flex circuits with integrated electrical connection
  - Space saving FFC termination options
  - Electrical protection
  - Resistance to humidity
  - Hermetically sealed
  - Improved structural properties over bare piezo-electrics

APPLICATIONS

- Military (communication tools, beyond visual cueing, simulation and training)
- Automotive
- Medical (user interface, training, simulators, and rehabilitation tools)
- Clothing (wearable computing)
- Touch Screens, Keyboards, Keypads
- Cell phones, Tablets, Mobile computing, MP3 players
- Gaming systems and controllers
- Situational awareness and safety systems
- Information Technology (IT) tools for the visually impaired and blind

DESCRIPTION

The HEK-200 Haptic Evaluation Kit is designed to showcase SHIVR™ actuators' performance in relevant haptic frequencies and actuation scenarios. With the HEK-200 haptic designers can evaluate how SHIVR piezoelectrics can fulfill a range of their haptic feedback needs.

The HEK-200 kit includes the SHIVR™ SP-21b piezoelectric haptic actuator; which is terminated with a flex circuit tail for easy integration with electronic circuit boards (via ZIF/LIF connections or direct soldering). The HEK-200 ships with a removable multi-actuation clamp enclosure to trial different haptic actuation scenarios.

The included HEK piezo driver board (featuring Texas Instruments' DRV8662 Piezo Driver), comes with both pre-programmed haptic messages, and an optional 3.5 mm jack for user designed haptic message input to give evaluators a flexible system for both demonstration and testing.

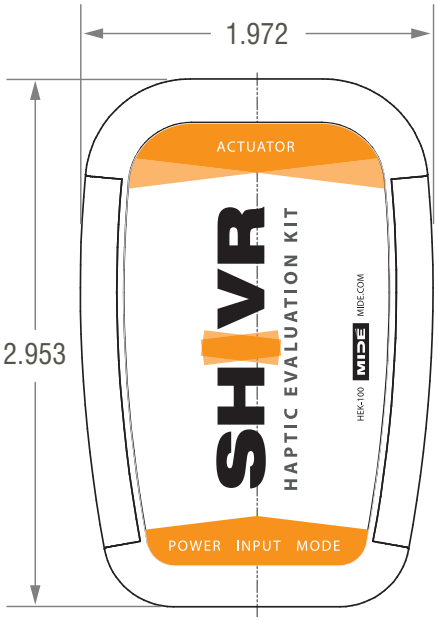
Midé's "Piezo Protection Advantage" packaging techniques create high performance piezo based haptic actuators in the thinnest possible implementation.

Using the HEK-200, we hope our customers will be able to feel the difference our piezoelectric actuator manufacturing techniques offer, evaluate the actuators for their applications and begin the dialogue for custom actuator designs and future OEM opportunities.

ELECTRONICS

HEK Piezoelectric Driver Board Details:
Piezo Driver Chip: Texas Instruments DRV8662
DRV8662 Piezo Driver Configuration:
*Gain: 38.4dB (GAIN1 = 1, GAIN0 = 0)
Iset: 1.875Apeak** (Rset=7.5K)
Boost Voltage (VBST): 105V
** This value sets the inductor peak current limit. The average current seen by the power source will be lower; <=500mA w hen using the preprogrammed waveforms and recommended actuator.
Electronic Driver Board schematic - available by request

Internal Waveform Driver (PIC12 microcontroller):
128-point x 8-bit wavetables (sine, square); 8 amplitude steps
Output mode: PWM @ 125KHz
Output filter: Single-pole RC; Fc = 320Hz
PIC source code - available by request

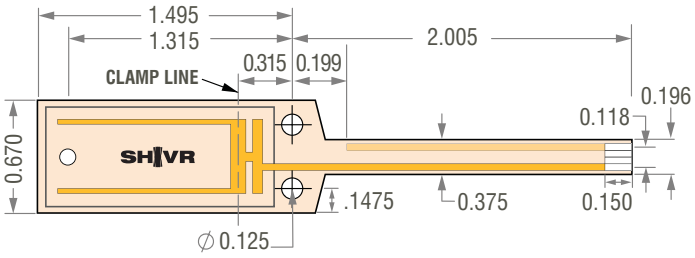


SP-21B PIEZO PIEZO ACTUATOR

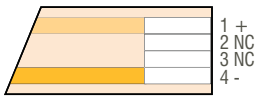
The SP-21b is a bi-morph (2 piezo) actuator with resonance near 170 Hz. The actuator is designed for electronics designers in mind and comes with a 4 pin, 1mm pitch FFC tail termination designed for LIF/ZIF connectors or direct soldering.

SP-21B Active Elements	Two 0.008" piezo wafers. 1 stack of 2
Device Size (inches)	1.694x0.67x0.03 With Flex Tail: 3.5x0.67x0.03
Recommended operating voltage range, ±V:	100*
Device capacitance (nF):	nominal: 103.8 maximum: 123.8
Blocked force, oz. (g):	nominal: 1.64 (46.8) minimum: 1.21 (34.6)
Free stroke, zero peak in. (mm):	nominal: 0.0125 (0.32) minimum: 0.0103 (0.26)
Free stroke, peak-peak, in. (mm)	nominal: 0.0311 (0.79) minimum: 0.0256 (0.65)
Current draw per device mA @± 100V, 10Hz sinusoidal:	nominal: 1.30 maximum: 1.56
@± 100V, DC operation:	<0.01
Device weight, oz (g):	0.1 (2.8)
Device thickness, in. (mm):	nominal: 0.028 (0.71)
Piezo thickness, in (mm):	nominal: 0.008 (0.20)

*The SP-21b can be driven at a range of voltages not to exceed 100V. To achieve the performance specified in this chart, apply the Operating Voltage to device pin 1 with pin 4 as ground. All specifications are for the total device operated as bimorph (i.e., both piezo elements driven together) in the quasi-static region (<57 Hz). If your application requires near resonant driving, please contact Midé for additional information (service@mide.com).

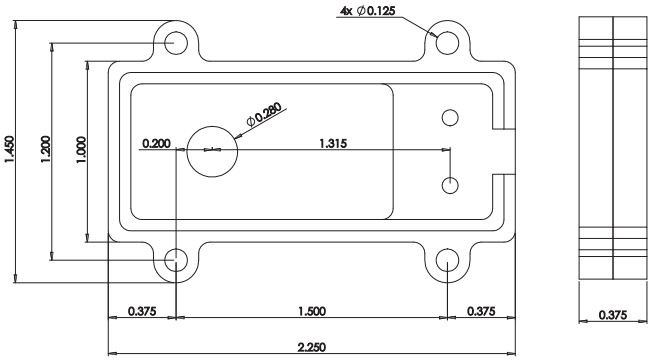


FFC Pinout
4 Pin 1 mm pitch - LIF / ZIF



MULTI-ACTUATION CLAMP ENCLOSURE

The multi-actuation clamp enclosure features a black plastic base, a clear acrylic top, and a thin aluminum clamp plate used to screw the SP-21b in a cantilevered position for both direct actuation and inertial actuation scenarios. Other accessories include assorted double sided tape for bonded configurations, a removable adhesive backed bumper for direct actuation trials, and two tip masses to evaluate inertial actuation performance).



MORE INFORMATION

Please contact Midé at service@mide.com for further questions and ordering information. If you are interested in evaluating more than one actuator (or type of actuator) please call to discuss options.