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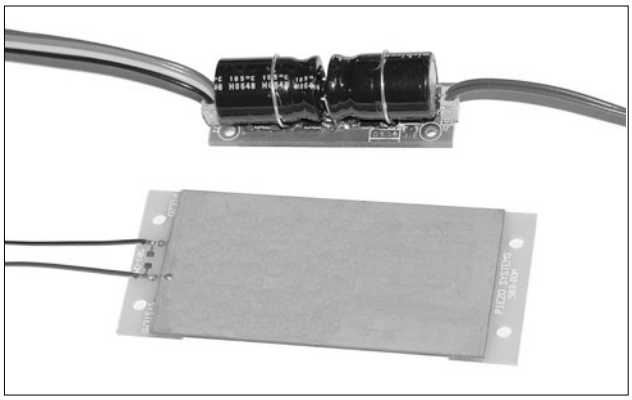
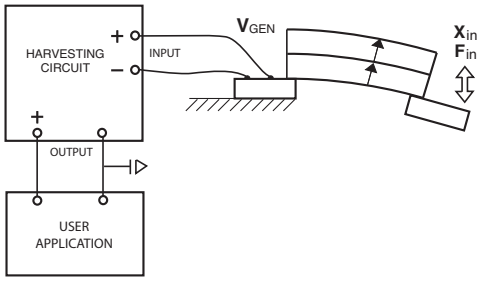
PIEZOELECTRIC ENERGY HARVESTING KIT

PIEZO BENDING GENERATOR & ENERGY HARVESTING CIRCUIT





DESCRIPTION

When a piezoceramic trandsucer is stressed mechanically by a force, its electrodes receive a charge that tends to counteract the imposed strain. This charge may be collected, stored and delivered to power electrical circuits or processors.

THE PIEZO BENDING GENERATOR

When the Energy Harvesting Bender is flexed, one layer is compressed while the other is streched, resulting in power generation. It may be excited by intermittent pulses or continuously from low frequency to resonant frequency (where rated displacement is achieved at the lowest force level).

The Energy Harvesting Bender is a pre-mounted and prewired Double Quick-Mount Bending Generator (see page 48) designed to attach easily to sources of mechanical strain. Its double ended design lends itself to being mounted either as a cantilever or a simple beam.

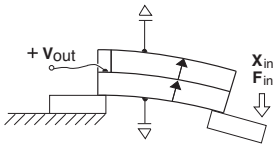
Dimensions for the standard -503 size Double Quick-Mounts are shown on page 46.

PIEZO ENERGY HARVESTING CIRCUIT

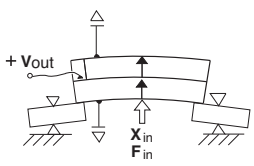
The self powered Piezo Energy Harvesting Circuit collects intermittent or continuous energy input from the piezo generator and efficiently stores their associated energy in an on-board capacitor bank.

During the charging process, the capacitor voltage is continuously monitored. When it reaches 5.2V the module output is enabled to supply power to an external (user) load. At this point 55 mJ of energy are available. When "generator" energy input is high, the output voltage remains ON continuously. Capacitor voltage is clamped at 6.8V. If external power demand exceeds generation, the output voltage decreases. When the output voltage drops to 3.1V, power to the load is switched OFF and is not turned on again until the capacitor bank has been recharged to 5.2V.

The circuit accepts input voltages from 0V to ±500V AC or DC and input currents to 400 mA.



Cantelever Mount



Simple Beam Mount

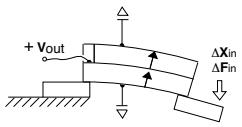
PIEZO ENERGY HARVESTING KIT

The Energy Harvesting Kit consists of one Double Quick-Mount Harvesting Bender and one Energy Harvesting Circuit.

PRICE & ORDERING INFORMATION		PART NO.	1 pc	5	25	100
Energy Harvesting Kit	Bender & Circuit	KEH-007	$549			
Energy Harvesting Bender	-503 Size	EH220-A4-503YB	$249	$179	$134	$109
Energy Harvesting Circuit	3.1V - 5.2V	EHC-601	$349	$299	$239	$179

SPECIFICATIONS

PIEZO BENDING GENERATOR

Part Numbers Double Quick-Mount Bending Generators	Piezo Material	Weight (grams)	Stiffness (N/m)	Capacitance (nF) (Parallel Operation)	Rated Tip Deflection ① (mm_{peak})	Max. Rated Frequency (Resonant Frequency) ① (Hz)	Open Circuit Voltage ① At rated deflection (V_{peak})	Closed Circuit Current ① At rated deflection / cycle (μA_{peak} / Hz)	Rated Output Power ① At rated deflection and frequency (mW_{rms})
 Y-poled for parallel bending operation (3 wire).									
EH220-A4-503YB	5A4E	10.4	1.9×10^2	232	± 2.6	52	± 20.9	± 57	7.1

① Cantilever mount. Force applied at the outermost tip of the mount.

MECHANICAL

Overall Dimensions	3.00" Long x 1.25" Wide x 0.9" High
Weight	10.4 grams

ENVIRONMENTAL

Operating Temperature Range	0 to 90° C
ROHS	Piezo exempt, product compliant

ENERGY HARVESTING CIRCUIT

ELECTRICAL

Maximum Instantaneous Input Voltage	± 500 V
Maximum Instantaneous Input Current	400 mA
Maximum Input Power	500 mW
Minimum Charging Input (Power Dissipation)	6.0 V @ 500 nA (3 µW)
Internal Voltage Clamp	7.0 V @ 10 mA
Maximum Output Current	1 amp
Operating Life Cycles	Virtually unlimited
Logic Compatibility	CMOS
Supply Voltage Thresholds	VL = 3.1V VH = 5.2 V
Useful Average Energy Output	55 mJ
Output On-Time Rating	88 msec @ 150 mA

MECHANICAL

Outline Dimensions	2.00" Long x 0.55" Wide x 0.7" High
Mounting Holes	.085" Diameter, 4 places
Weight	14 g (0.5 ounce)
Input / Output Cable	6" J1 connector / 6" J2 connector

ENVIRONMENTAL

Operating Temperature Range	0 to 70° C
Max. Average Operating Temperature	50° C
Storage Temperature	-40 to 85° C
Humidity	To 90% (no condensation)
Protection	Conformal and epoxy coated
ROHS	ROHS Compliant