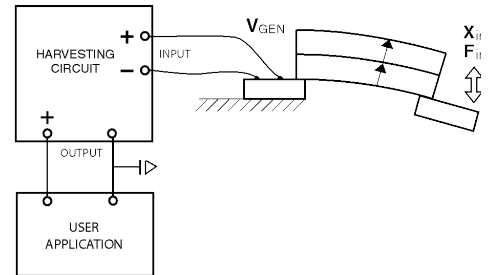
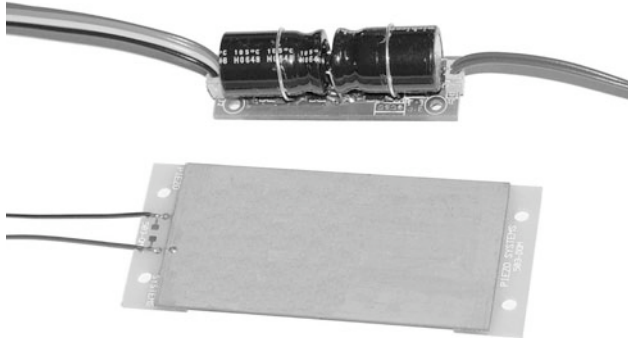


### PIEZOELECTRIC ENERGY HARVESTING KIT PIEZO BENDING GENERATOR & ENERGY HARVESTING CIRCUIT



#### DESCRIPTION

When a piezoceramic transducer 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 stretched, 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 pre-wired Double Quick-Mount Bending Generator (see page 50) 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.

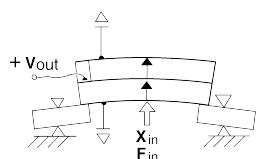
Dimensions for the standard -503 size Double Quick-Mounts are shown on page 48.

#### PIEZO ENERGY HARVESTING CIRCUIT

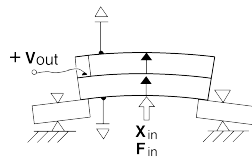
The self powered Piezo Energy Harvesting Circuit collects intermittent or continuous energy input from the piezo generator and efficiently stores their associated energy in an on-board capacitor bank.

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  $\pm 500V$  AC or DC and input currents to 400 mA.



Cantilever Mount



Simple Beam Mount

#### PIEZO ENERGY HARVESTING KIT

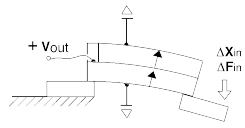
The Energy Harvesting Kit consists of one Double Quick-Mount Harvesting Bender and one Energy Harvesting Circuit.

PRICE & ORDERING INFORMATION		PART NO.	1 pc	5	25	100
Energy Harvesting Kit	Bender & Circuit	KEH-007	\$600			
Energy Harvesting Bender	-503 Size	EH220-A4-503YB	\$274	\$197	\$147	\$120
Energy Harvesting Circuit	3.1V - 5.2V	EHC-601	\$384	\$329	\$263	\$197



## 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 <sup>peak</sup> )	MAX. RATED FREQUENCY (RESONANT FREQUENCY) ① (Hz)	OPEN CIRCUIT VOLTAGE ① At rated deflection (V <sup>peak</sup> )	CLOSED CIRCUIT CURRENT ① At rated deflection / cycle (μA <sup>peak</sup> / Hz)	RATED OUTPUT POWER ① At rated deflection and frequency (mW <sub>rms</sub> )
 <p>Y-poled for parallel bending operation (3 wire).</p>	5A4E	10.4	1.9x10 <sup>2</sup>	232	± 2.6	52	± 20.9	± 57	7.1
① Cantilever mount. Force applied at the outermost tip of the mount.									
<p><b>MECHANICAL</b> Overall Dimensions 3.00" Long x 1.25" Wide x 0.9" High Weight 10.4 grams</p> <p><b>ENVIRONMENTAL</b> Operating Temperature Range 0 to 90° C <b>ROHS</b> Piezo exempt, product compliant</p>									

### ENERGY HARVESTING CIRCUIT

<b>ELECTRICAL</b>	
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	V <sub>L</sub> = 3.1V      V <sub>H</sub> = 5.2V
Useful Average Energy Output	55 mJ
Output On-Time Rating	88 msec @ 150 mA
<b>MECHANICAL</b>	
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
<b>ENVIRONMENTAL</b>	
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
<b>ROHS</b>	<b>ROHS Compliant</b>