



# Piezophone™

Contact microphone for string instruments

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# About Me

B.Sc. Electrical Engineering

*Old Dominion University, 2011*

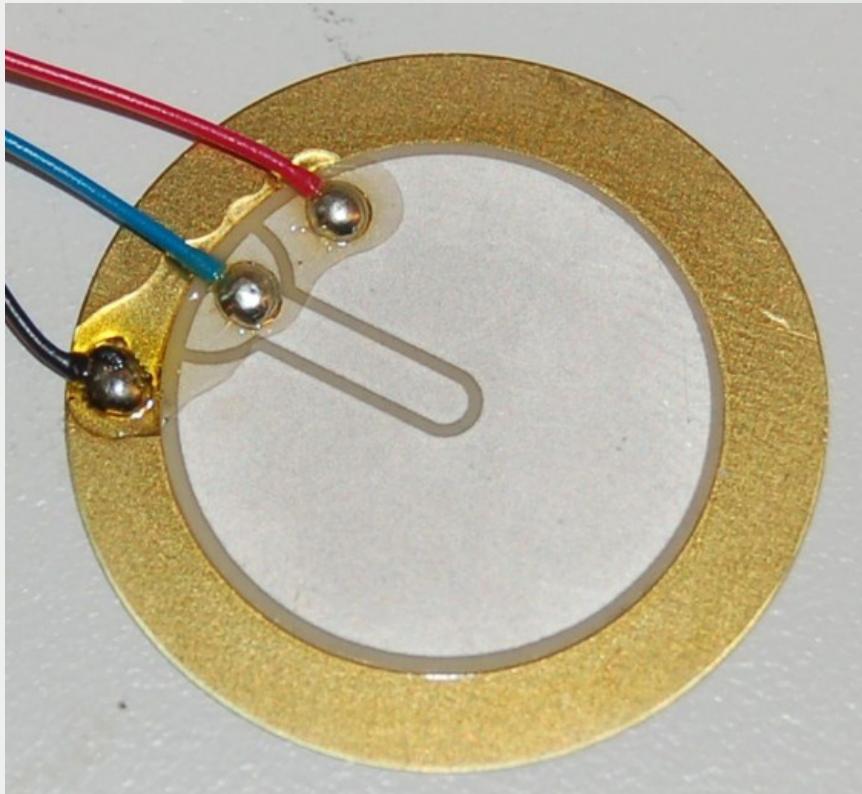
Mandolinist

Violist

Sound Engineer

*Lemongrass Acoustic Trio*

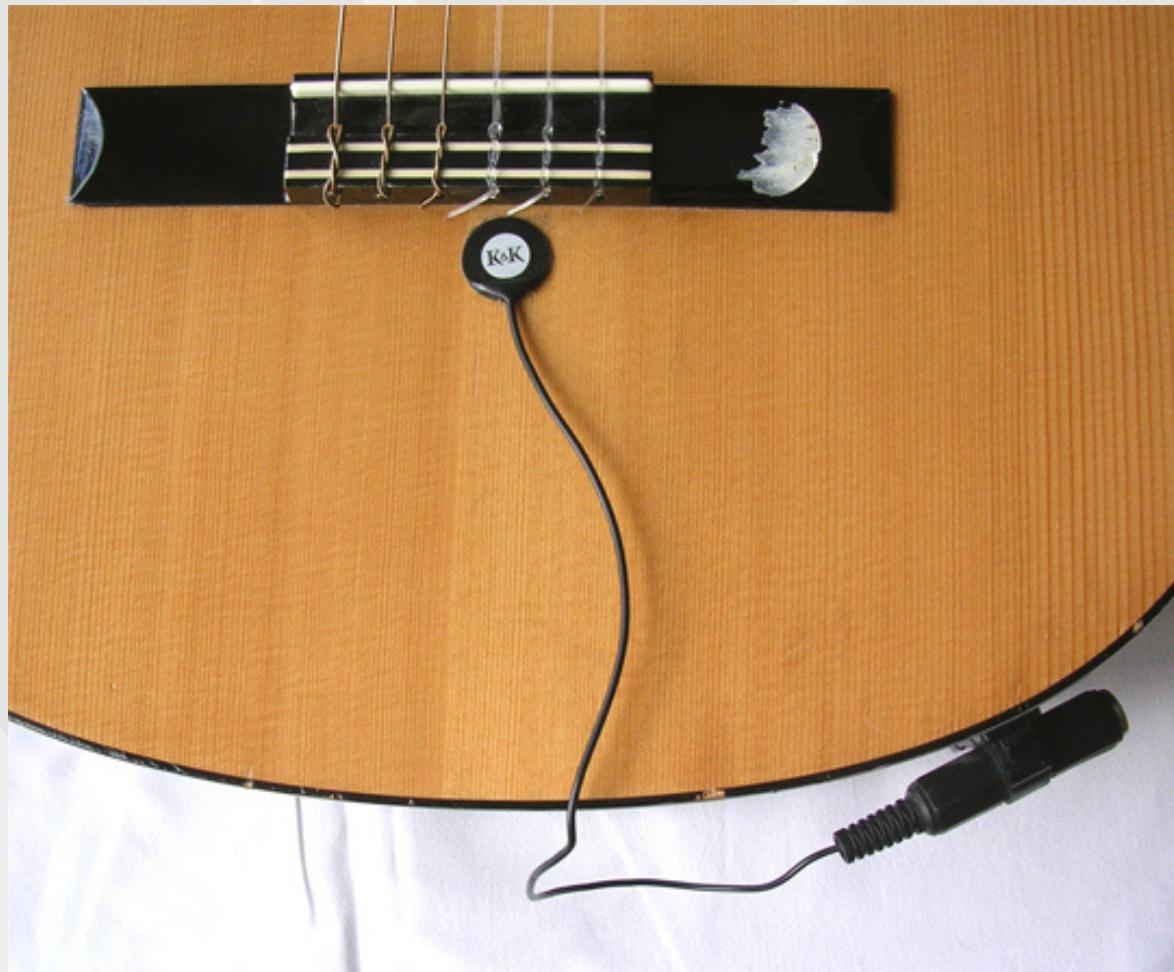
# The Problem



## **Piezoelectric buzzer**

- Cheap
- Readily available
- Fairly reliable
- normally used as a speaker, quite loud

# The Problem



# The Problem



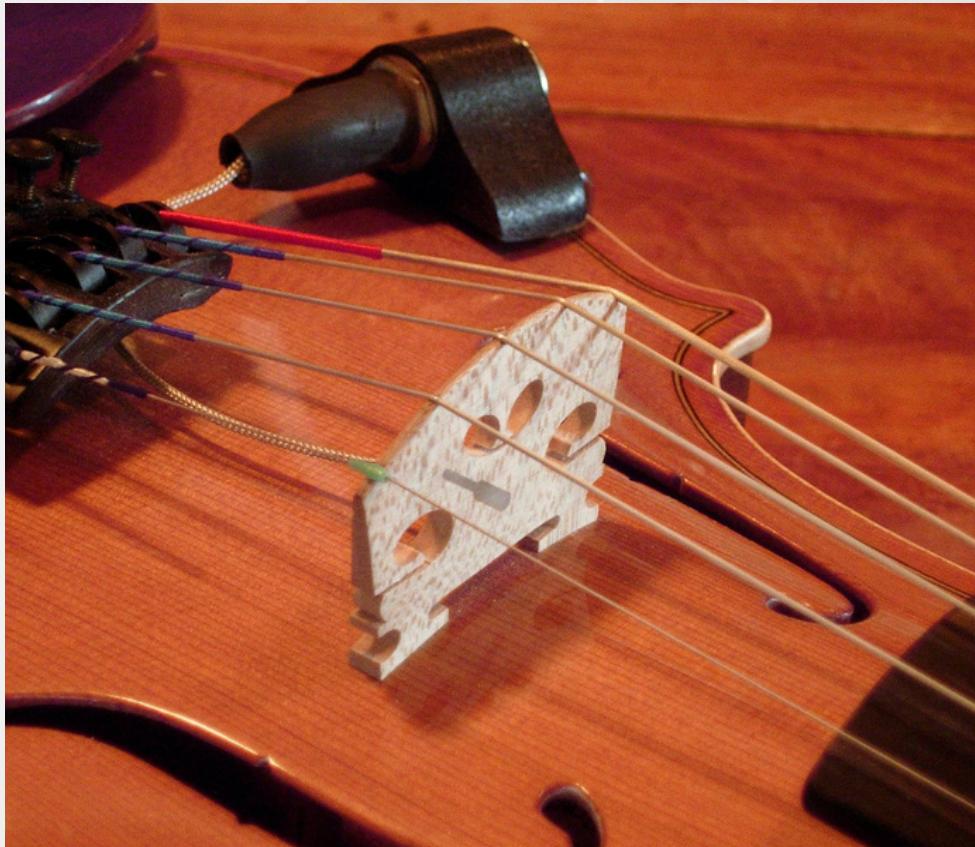
# The Problem



# The Problem

- Piezoelectric discs are typically tuned as speakers in the range of 1-10kHz
- Sold as-is with no information, common for DIY work
- When connected to common audio systems without a special pre-amplifier, this results in *impedance mismatch* which produces a very poor tone, reinforcing the stereotype that "piezos are bad"

# The Competition



**Barcus Berry 1320**  
\$120 (₹9600)

Replaces original bridge, which  
changes the sound

Bridge must be fitted by professional  
luthier at personal expense

Jack connector not included

Preamp provided at additional  
expense

# The Competition

## Barcus Berry 3110

\$350 (₹ 28,000)

Comes with passive preamp (does not require power)

Clamps on to existing bridge with screws

- additional weight changes the acoustic tone
  - screws cause physical damage



# The Competition



**Fishman V-200**

\$160 (₹12,800)

Attaches to bridge without damage

Changes acoustic tone

Preamp provided at additional expense

# The Competition

## AKG C-411

\$200 (₹ 16,000)

Preamp not required;  
electret mic, not piezoelectric

Attaches with black putty that leaves  
residue on instrument surface

Thin wire prone to damage



# The Competition



**DPA 4099**  
\$600 (₹48,000)

Attaches to body without damage

Can be used with wind instruments

No preamp required

Prone to "feedback" at lower volumes

# The Product



Piezo disc + custom cable + preamplifier

# The Product



Piezo disc + custom cable + preamplifier

# The Product



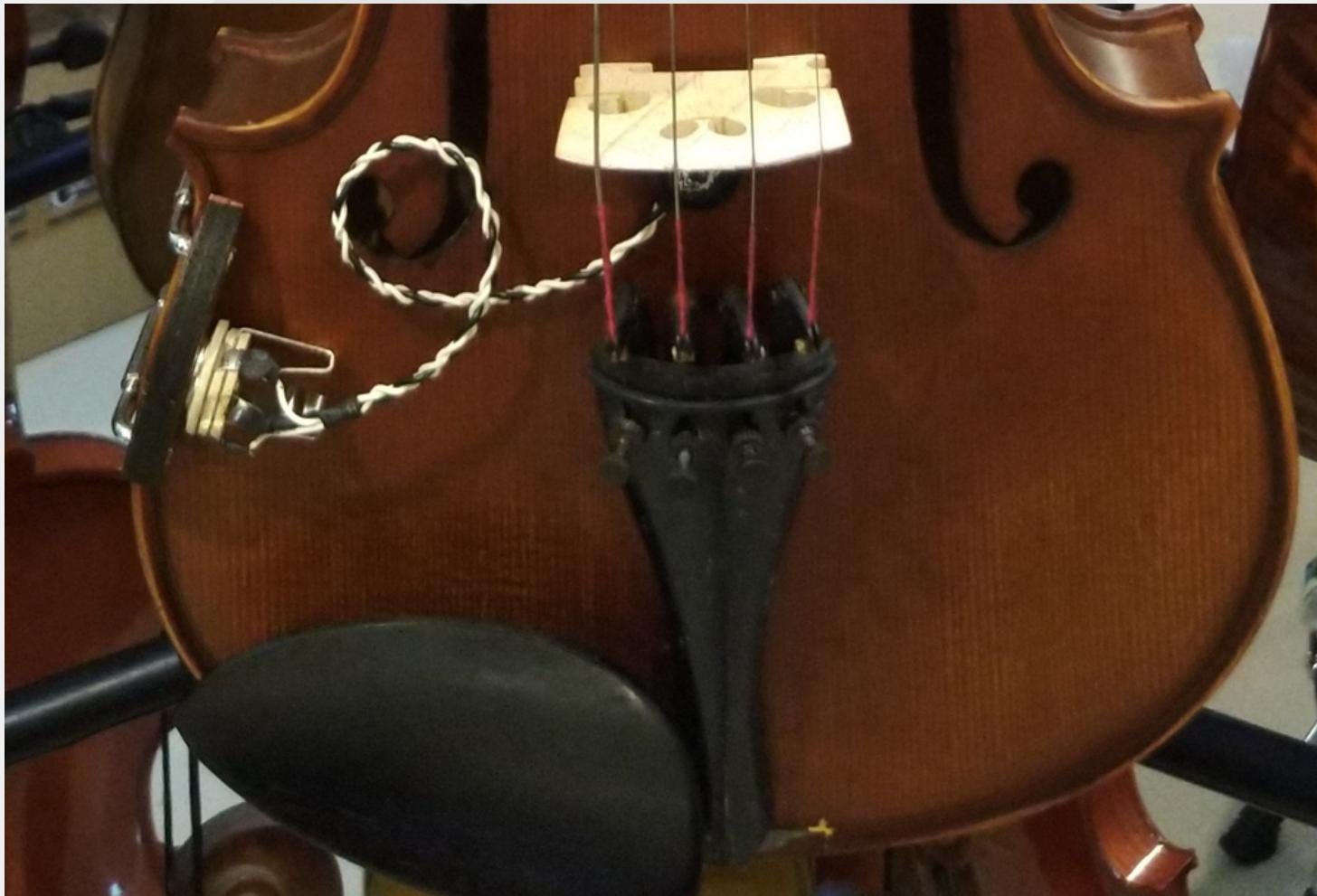
Violin clamp + low-profile plug

# The Product



Violin mounting clamp

# The Product



Violin mounting clamp

# The Product



Violin mounting clamp

# The Product



"Generic" piezo + straight plug

# The Product



"Generic" piezo attachment

# The Product



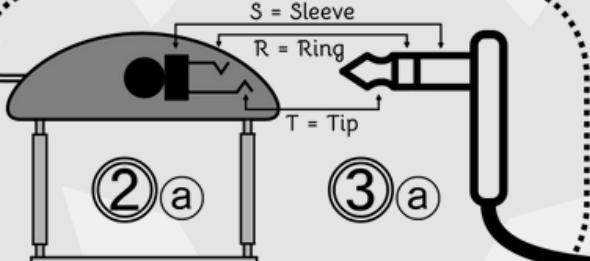
"Generic" piezo attachment

# The Product

Piezoelectric disc



Clamp and low-profile plug  
for violin / viola



Generic connector  
for general purpose

a



TRS - XLR cable



48V 'phantom power' required



Preamplifier

Note:

The preamplifier MUST be used with the provided "stereo" cable.  
Standard (mono) guitar cable or an XLR adapter WILL NOT work.

# The Product

Unit price: ₹16,000

Lead time: 1 week / batch of 10 units

Included:

- 1x piezoelectric disc (choice of violin or 'generic')
- 1x TRS - XLR cable (choice of straight or low-profile)
- 1x preamplifier

Phantom-powered preamplifier module requires no batteries; powered from the audio interface directly.

"Balanced signal" (differential signal) is highly resistant to EMI.

# The Product

Advantages compared to competitors:

- attaches to instrument body rather than bridge, preserving acoustic tone; this also provides a better-sounding audio
- Faber-Castell™ *Tack-It* putty holds securely, leaves no residue, and can be re-used many times
- suitable for bass instruments e.g. cello and double-bass
- preamplifier included in price
- no batteries required, only 'phantom power' which is available on all modern interfaces

# The Plan

Contact with Kadence Music / Yamaha / etc

Sold through Pedro Fernandes music shop

Collaboration with string performers in Goa / Mumbai

Demo through Lemongrass Trio performance

Partner with recording studio / music school

# Frequently Asked Questions / Challenges

## **Volume / tone control?**

Similar to common vocal / instrument microphones e.g. Shure SM-58.  
Adjustment done at mixer.

## **Wireless?**

Parts cost and fabrication time more than double, plus additional cost / special qualification for wireless design and certification.

# Frequently Asked Questions / Challenges

## **Battery?**

Option may be added in future; reduced quality due to lower 'headroom'.

## **Percussion?**

Not recommended.

Parts supply; PCB and certain plugs have to be imported to ensure quality.

# Market

- String instruments
- Indian instruments
- Foley artists
- Recording studios
- Nature recording
- Hydrophone (underwater mic)
- Laryngophones (throat mic)
- Industrial monitoring (?)
- ASMR

# Investment

- Design can be licensed after patent is secured
- Require investment up to 5 lakhs for:
  - parts bulk purchase
  - import fees
  - workshop rental
  - purchase of power tools and supplies
  - hire assistance to assemble units

