Piezophone™

Contact microphone for string instruments

@ohnoitsalobo_builds

About Me

B.Sc. Electrical Engineering

Old Dominion University, 2011

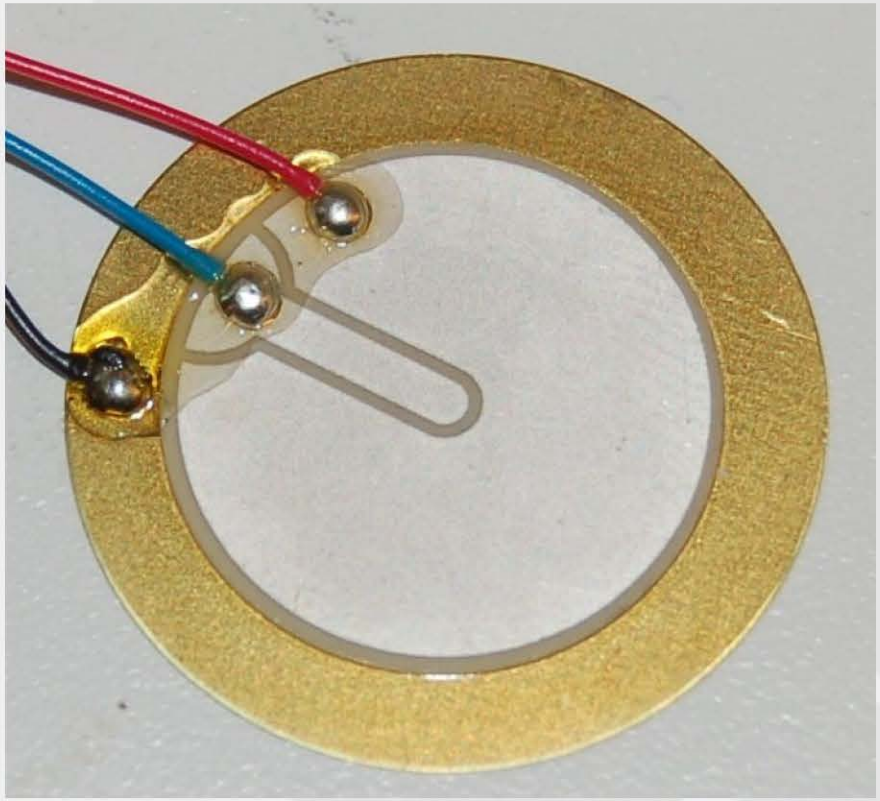
Mandolinist

Violist

Sound Engineer

Lemongrass Acoustic Trio

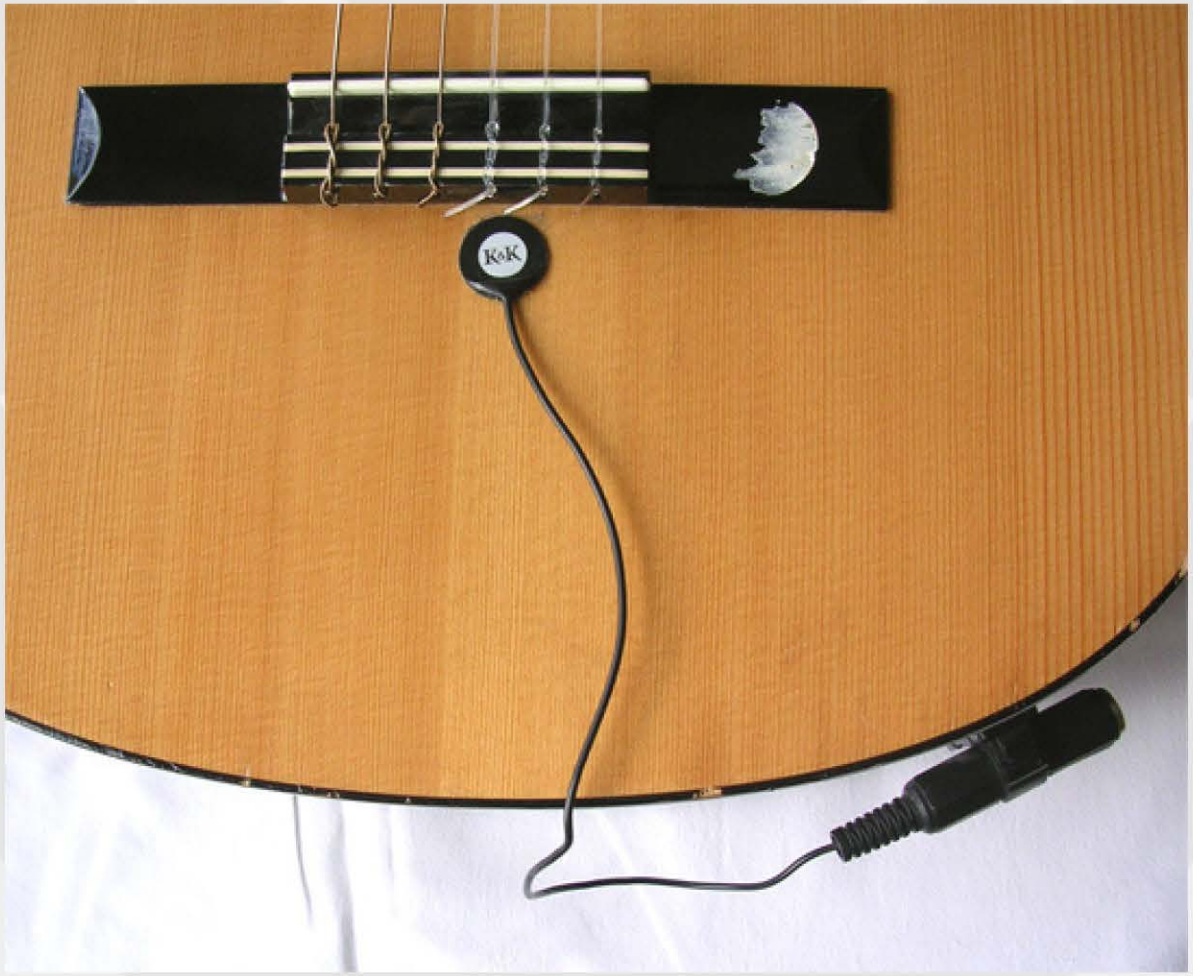
The Problem



Piezoelectric buzzer

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

The Problem



The Problem

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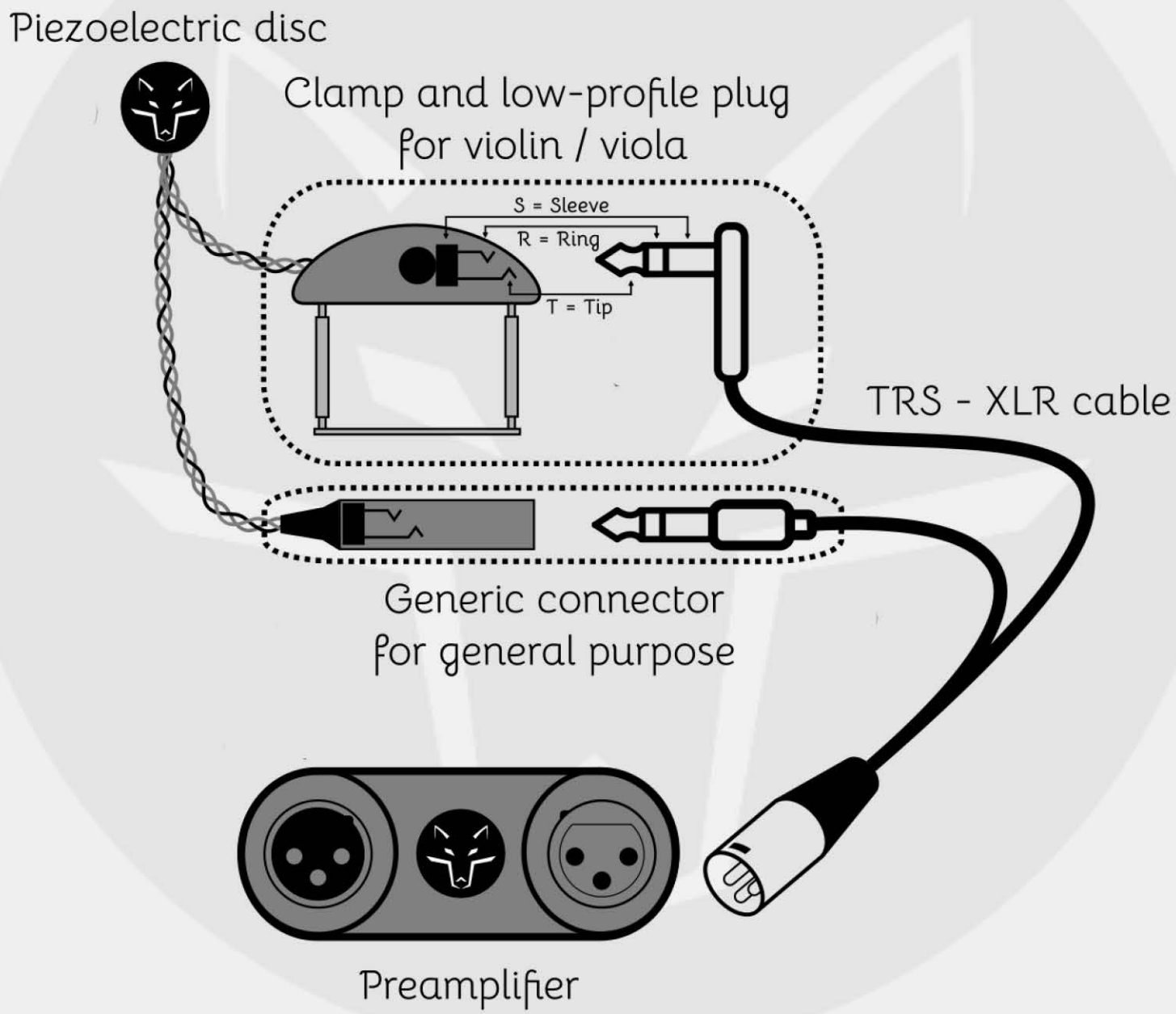
The Problem

- 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 Product


Piezoelectric disc
Clamp and low-profile plug
for violin / viola
S = Sleeve
R = Ring
T = Tip
TRS - XLR cable
Generic connector
for general purpose
Preamplifier

The Product

Piezo disc + custom cable + preamplifier

The (Old) Product

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Piezophone™ Quick Setup
Clamp and low-profile plug for violin / viola
TRS - XLR cable
Generic connector for general purpose
48V 'phantom power' required
Preamplifier
Note:
The preamplifier MUST be used with the provided TRS-XLR cable.
Standard (mono) guitar cable or an XLR adapter WILL NOT work.
Piezophone™
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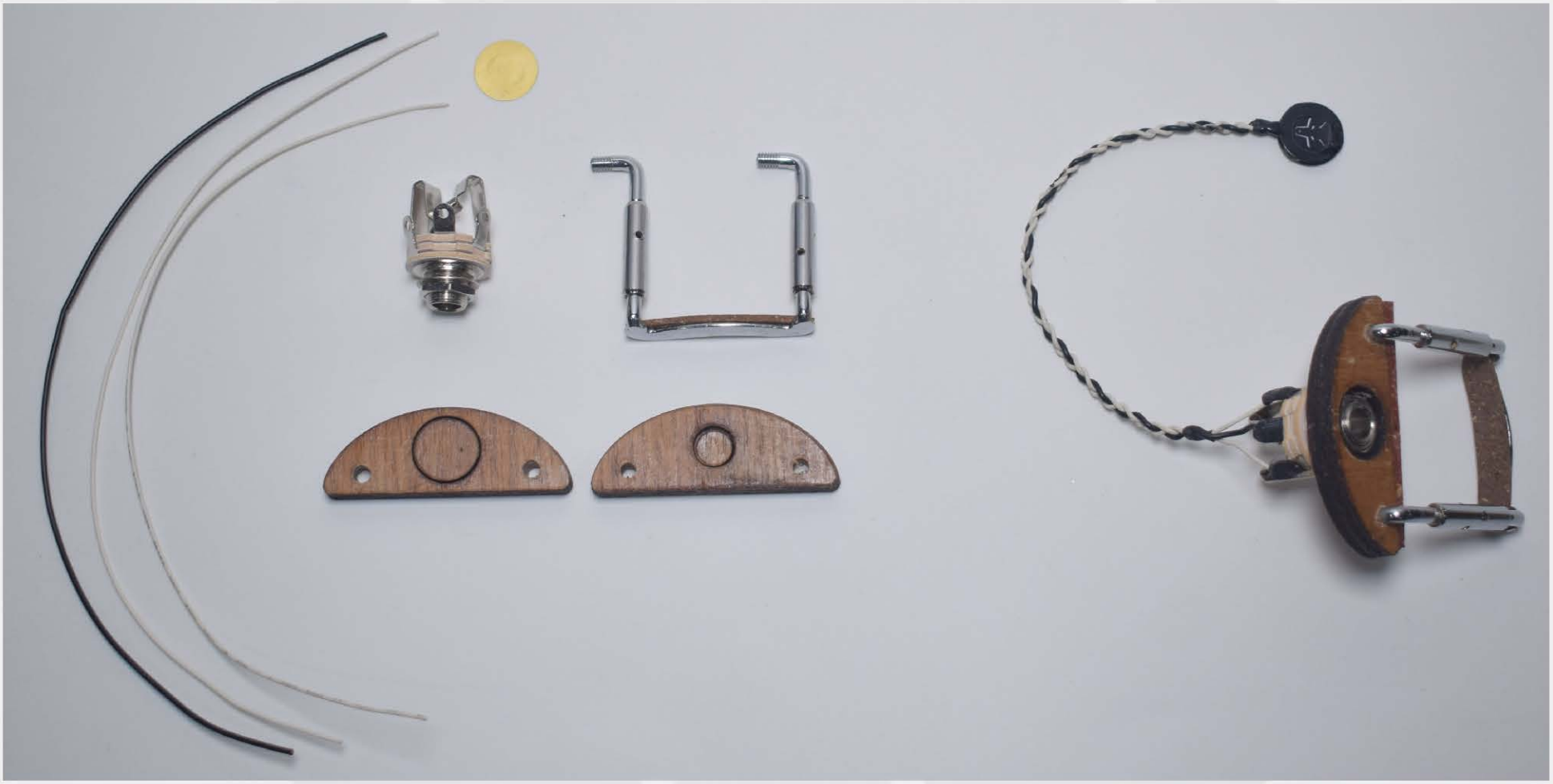
The Product

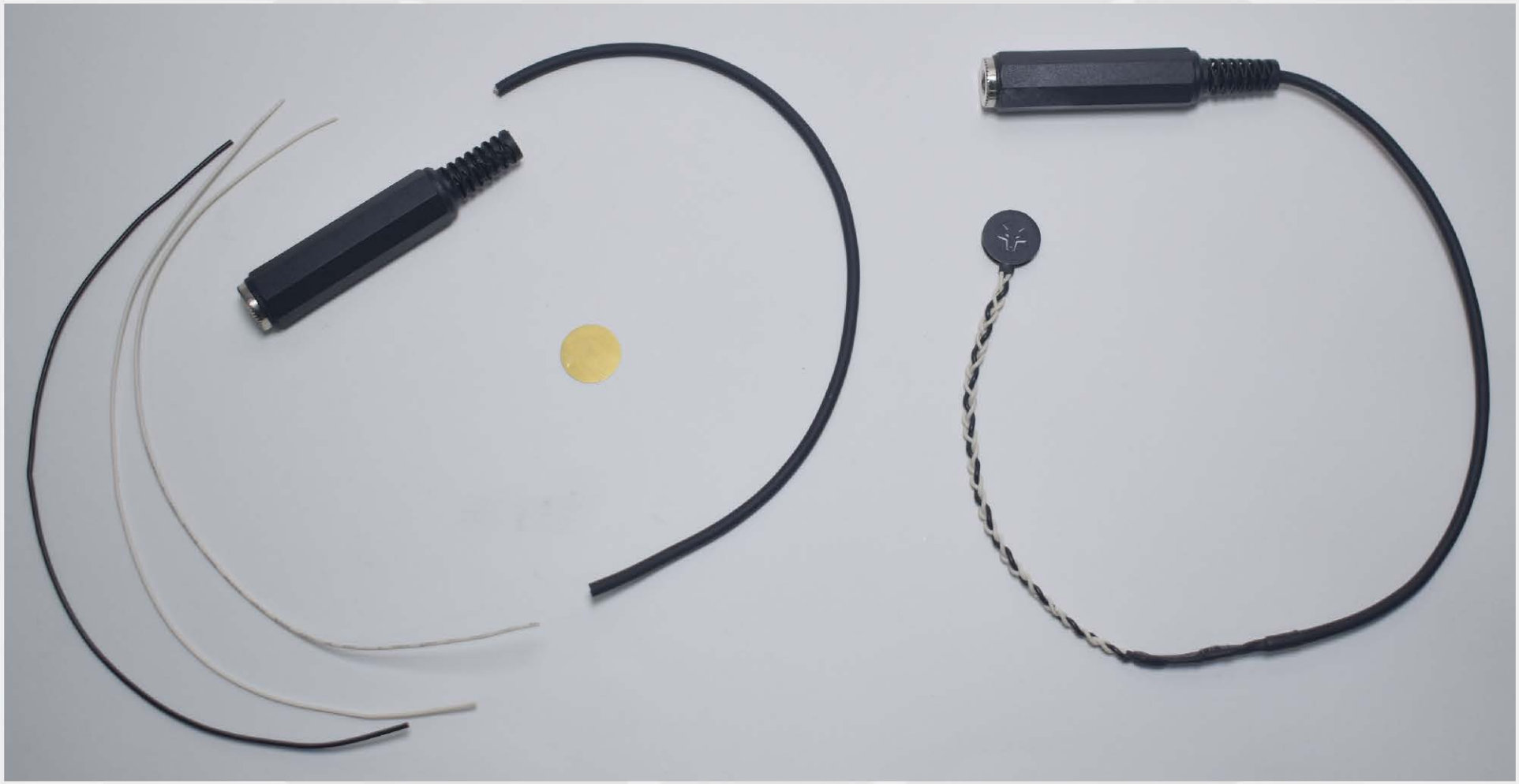


Violin mounting clamp

The Product

Violin clamp + low-profile plug

The Product

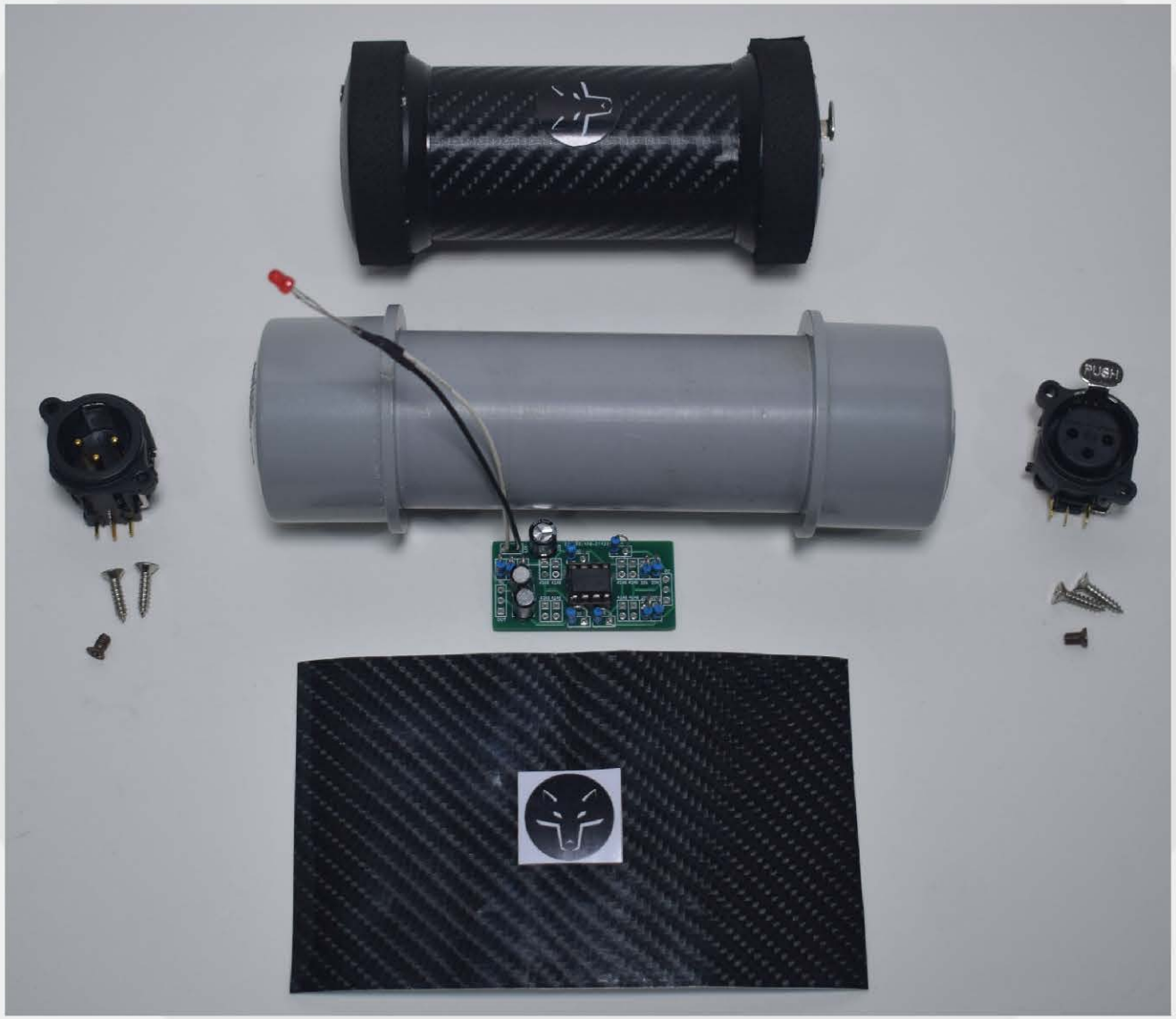


"Generic" piezo attachment

The Product

"Generic" piezo + straight plug

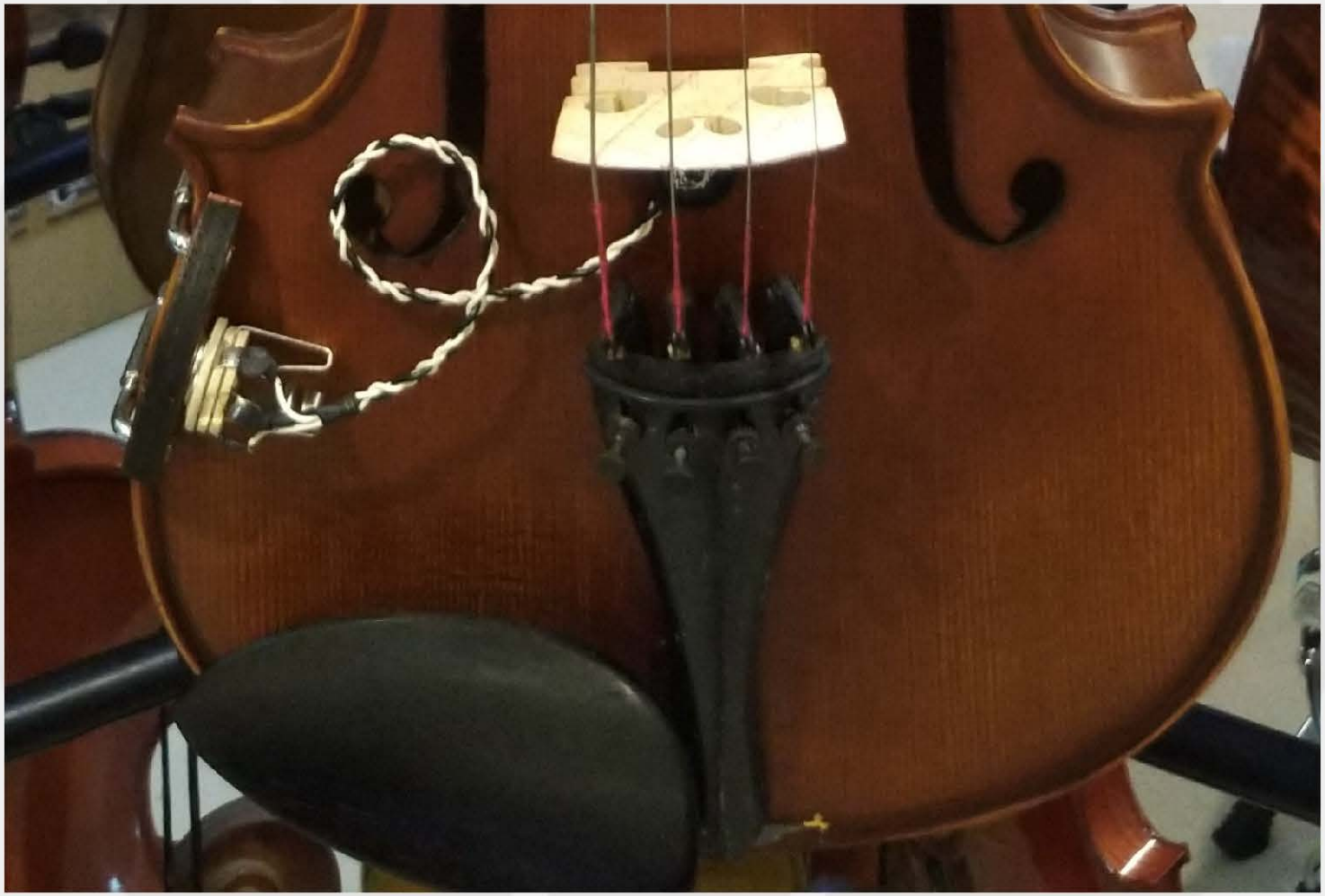
The Product



The Product

Violin mounting clamp

The Product



Violin mounting clamp

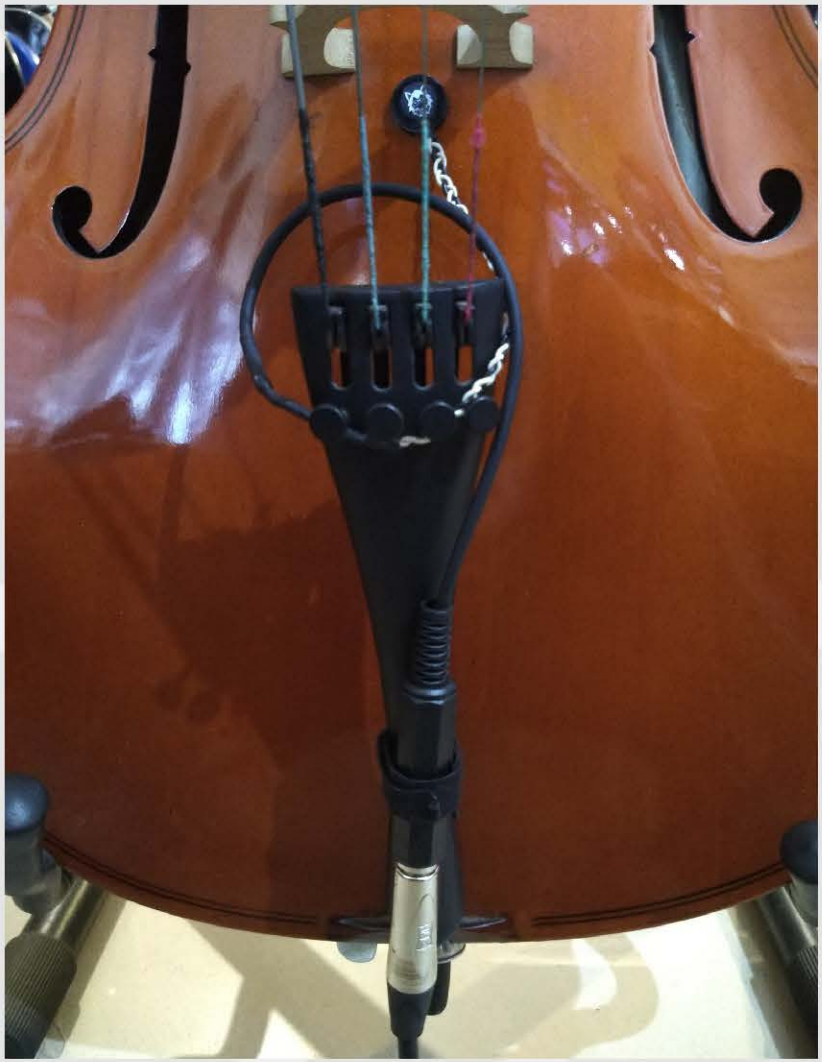
The Product

Violin mounting clamp

The Product

"Generic" piezo attachment

The Product



"Generic" piezo attachment

The Product

Unit price: ₹16,000

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

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

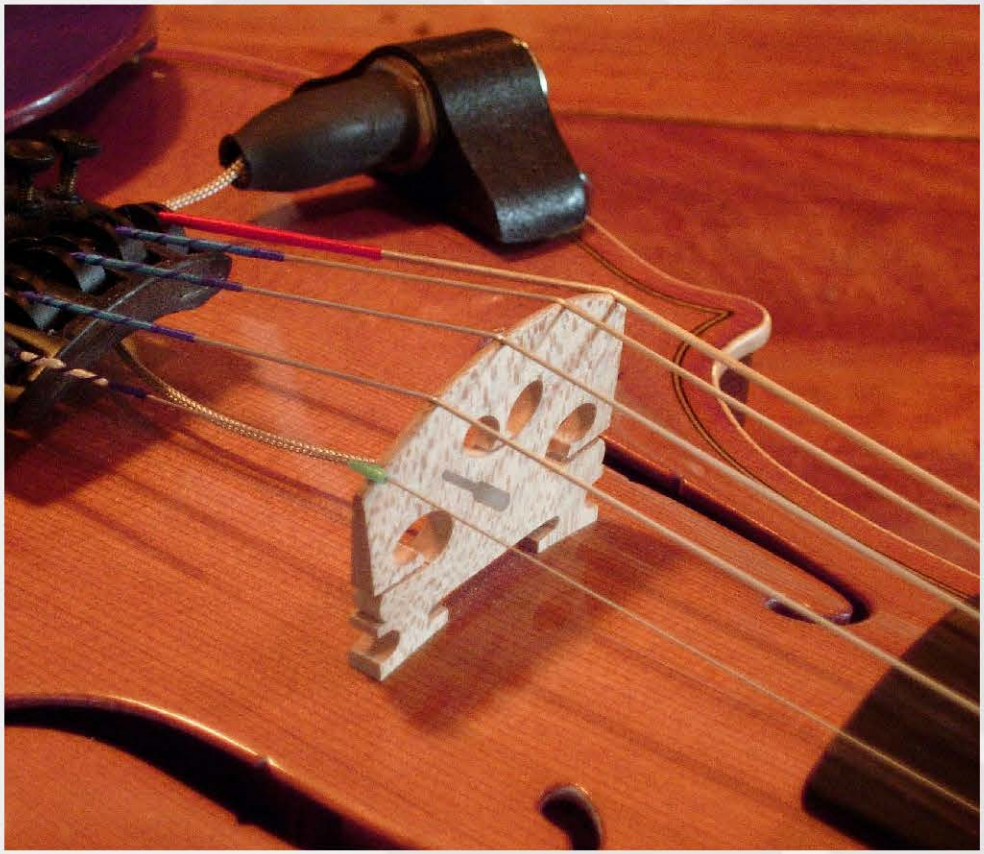
Thanks to FIIRE

- Maintain a stock of parts
- Prototyping lab (laser cutting) and Don Bosco machine shop (lathe and drill press)
- Design suggestions
- Connect with musicians

Roadmap

- Partner with studios
- Music stores
- Alternative industries
- Wireless

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 Competition

Cortado MkIII

$159 (₹ 13,000)

Mic, preamp, cable as single integrated unit

Phantom-powered

Simple volume and EQ adjustment

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