



flexiBrute 1.0 MIDI Interface

Introduction

The flexiBrute 1.0 MIDI Interface is an advanced musical driver designed for both conventional Solid State Tesla Coils (SSTCs) as well as Double Resonant Solid State Tesla Coils (DRSSTCs). The interface is a complete solution designed to convert your SSTC or DRSSTC into a musical instrument by allowing one to directly connect any MIDI type instrument, such as a keyboard or synthesizer, directly to the input of their coil and play music through it. The advanced microcontroller controlled interface allows the playing of both single (monophonic) and multiple (polyphonic) notes through your Tesla Coil. The flexiBrute 1.0 MIDI interface can be user configured through the use of onboard switches and potentiometers and can be custom programmed to operate with Tesla Coils of all sizes, from lower SOT-227 half-bridge coils to high power CM600 full-bridge based Tesla Coils. Onboard LED indicators continuously provide the user with operational feedback to the status of the controller and alert the user if any faults have occurred.

With ease and simplicity in mind, our kits are specifically designed to use thru-hole components which allows for quick and easy soldering. Also, our kits have all connectors and user controls mounted directly to the board (with the option of externally mounting them if desired) which gives a very neat and professional appearance.

Features:

- Onboard MIDI Input Connector (5-Pin DIN)
- Optically Isolated Input
- Maximum Pulswidth Protection
- RCA Output Connector
- BNC Output Connector
- Fiber Optic Output Connector (ST)
- Max. pulswidth detection and truncation
- Pulswidth Mode Select
- Pulswidth Length Select
- Maximum Frequency Range Select
- Monophonic Playback (single notes)
- Polyphonic Playback (multiple notes)

MIDI Channel Operation

The flexiBrute 1.0 MIDI interface is designed to read MIDI channel 1 only. Other channels can be programmed if desired. Please contact us for more information.

Pulswidth Mode Select

If this mode is set to MANUAL, the pulswidth setting by the LOW NOTE PW potentiometer will be used to determine the pulswidth of every note played. If this mode is set to AUTO, a linear mapping between the pulswidth set by LOW NOTE PW potentiometer and HIGH NOTE PW potentiometer will be used when a note is played. For example, if the LOW NOTE PW is set to 200us and the HIGH NOTE PW is set to 100us, then a note played in the middle of the range would produce a pulswidth of 150us.

Pulswidth Length Select

If this mode is set to LOW, the range of adjustment for the LOW NOTE PW and HIGH NOTE PW potentiometers will be 0 to 180us. If this mode is set to HIGH, the range of adjustment for the LOW NOTE PW and HIGH NOTE PW potentiometers will be 0 to 430us.

Maximum Frequency Range Select

These mode selections are used to prevent a Tesla coil from playing notes that are too high which will protect a Tesla coil from damage as high notes operate at a much higher duty cycle than lower notes. Several ranges are selectable via the onboard DIP Switches and this protection can also be disabled as well if desired by the user.

Maximum Pulswidth Protection

Pulswidth protection circuitry monitors each input modulator pulse and compares it to a user programmable maximum pulswidth limit. If the modulator pulswidth exceeds the preset maximum pulswidth limit, the output pulse will be truncated to the maximum pulswidth length. This ensures that the output of the controller will never operate at high or 100% duty (CW.) Specialized logic also ensures that the output pulse cannot be retrigged during a fault condition.

Maximum pulswidth protection circuitry is done externally with discrete components and is independent of the microcontroller. This ensures that if the microcontroller locks-up or fails, that a CW condition is never seen at the output of the MIDI interface card.

LED Status

There are four (4) LEDs which provide status to the user:

- +5V power status
- MIDI input active
- BNC / RCA output active
- Fiber optic output active

Input Connections

Pin	Function
J1-1	NC
J1-2	NC
J1-3	NC
J1-4	MIDI Input +
J1-5	MIDI Input -

Pin	Function
TB1-1	Power In +
TB1-2	Power In -



flexiBrute 1.0 MIDI Interface w/ keyboard shown connected

Modulator Output (J2A) – RCA

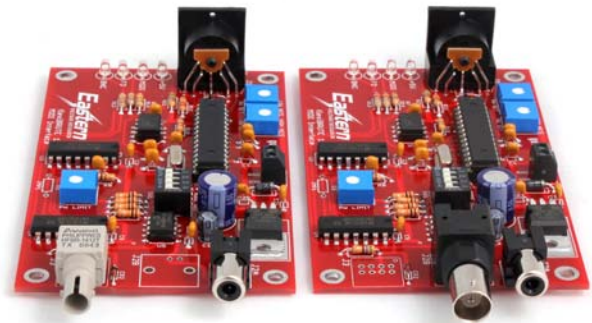
J2A is the electrical modulator output which is a standard female RCA connector. This signal output level is 5V logic and TTL compatible. This type of output will interface our microBrute series of DRSSTCs directly using a standard off the shelf RCA cable.

Modulator Output (J2B) – BNC

J2B is the electrical modulator output which is a standard female BNC connector. This signal output level is 5V logic and TTL compatible. This type of output will interface our miniBrute series of DRSSTCs directly using a standard off the shelf BNC cable.

Modulator Output (J3) – Fiber Optic

J3 is the fiber optic modulator output which is an Agilent HFBR1412T fiber optic transmitter. The fiber optic connector is an ST type connection and we recommend using an Agilent HFBR2412T (or similar) fiber optic receiver at the receiving end if you are using a fiber optic connection.



flexiBrute 1.0 MIDI Interface Cards
Fiber Optic / RCA shown left
BNC / RCA shown right

Power Input

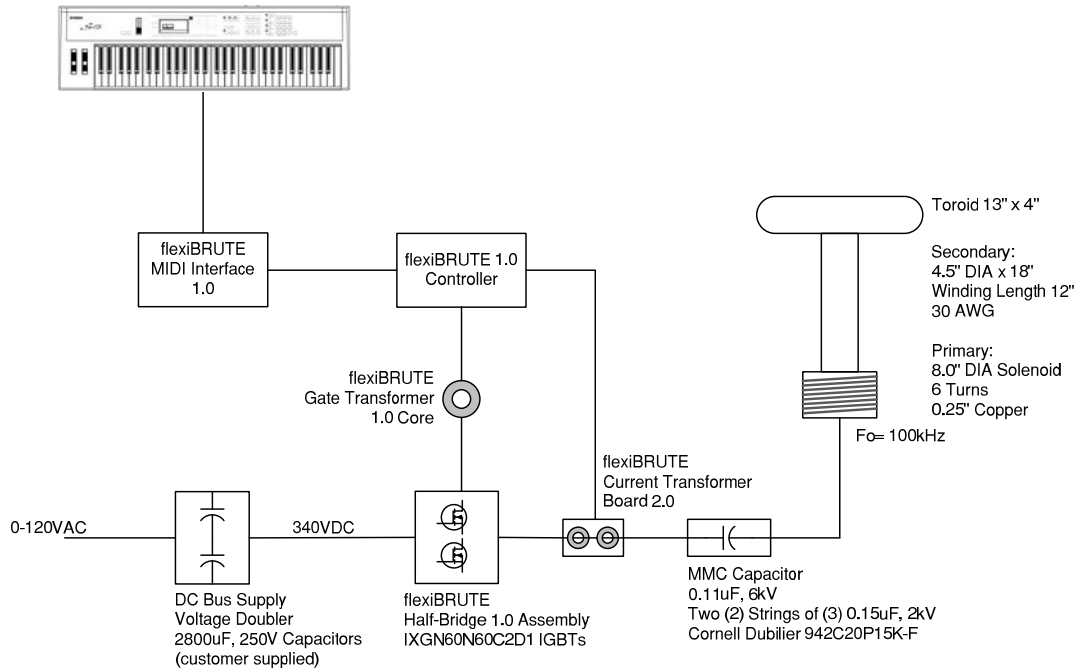
POWER IN + (Pin TB1-1): This should be connected to a DC voltage source as indicated in the table below. If using a DC power source, this pin would be connected to the positive of the DC power source.

POWER IN - (Pin TB1-2): This should be connected to a DC voltage source as indicated in the table below. If using a DC power source, this pin would be connected to the negative of the DC power source.

Power Type	Input Range
DC	7-12VDC, 1A
BATTERY	9V



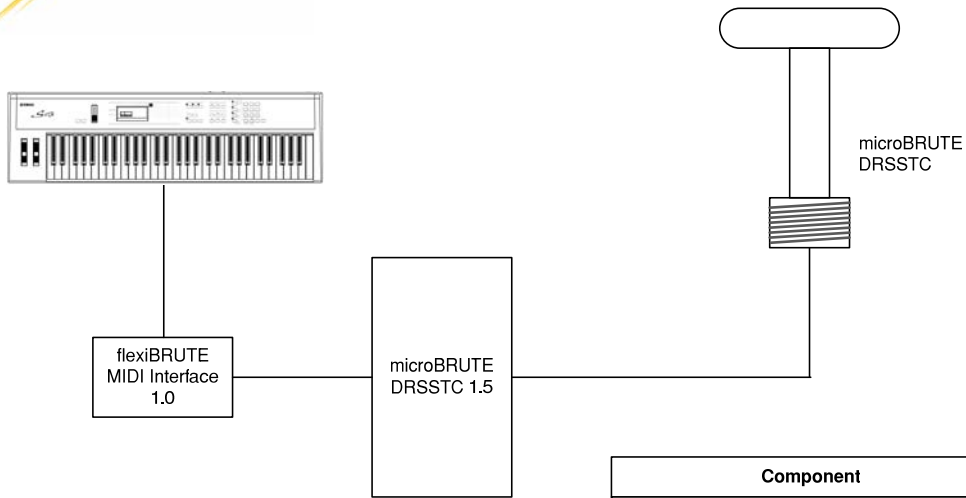
flexiBrute 1.0 MIDI Interface Cards
Fiber Optic / RCA shown above
BNC / RCA shown below



Component	QTY
flexiBRUTE MIDI Interface 1.0 (Polyphonic)	1
flexiBRUTE 1.0 Universal Controller	1
flexiBRUTE Half-Bridge 1.0 Assembly	1
flexiBRUTE Gate Transformer 1.0 Core	1
flexiBRUTE Current Transformer Board 2.0	1

flexiBRUTE Components used for this specific application.

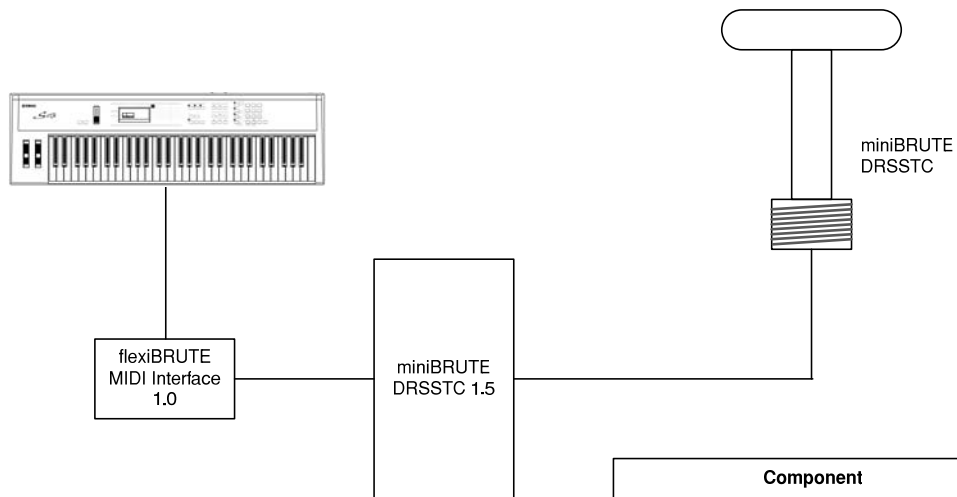
Reference Design 1- Custom DRSSTC System with MIDI Interface



Component	QTY
flexiBRUTE MIDI Interface 1.0 (Polyphonic)	1
microBRUTE DRSSTC 1.5 Kit	1

Eastern Voltage Research Components used for this specific application.

Reference Design 3 – microBrute 1.5 DRSSTC with MIDI Interface



Component	QTY
flexiBRUTE MIDI Interface 1.0 (Polyphonic)	1
miniBRUTE DRSSTC 1.5 Kit	1

Eastern Voltage Research Components used for this specific application.

Reference Design 4 – miniBrute DRSSTC with MIDI Interface