***Arduino MIDI Swell Pedal***

***User Manual***

# Introduction

The Arduino MIDI swell pedal is a software and hardware design that allows an analogue controller pedal to be used as a MIDI controller. The default controller set in the firmware is controller 11 (Expression) to provide volume or swell control, but this can be changed in the firmware.

The software and hardware designs are © Robin Terry 2023.

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# Brief description of the hardware

The circuit diagram is given below. It consists of a standard MIDI OUT interface driven directly from the Arduino Nano, plus a ¼” jack socket which accepts an analogue controller pedal.

The pedal used for this project is a Yamaha FC7 foot controller.

The jack socket has to have both normally-open and normally-closed contacts.

The USB connection is required to power the unit at all times, as there is no power available from MIDI IN interfaces on sound producers (such as synthesisers or sound modules).

The 1k0 resistor is required so that the firmware is able to detect when the pedal has been removed or inserted. The analogue reading from the pedal is prevented, by this resistor, from dropping all the way to zero. However, when the pedal is removed, the normally-closed contact will pull the analogue input all the way to ground, so it will read as zero.

# Brief description of the firmware

The firmware requires the Arduino MIDI library to be installed in the Arduino IDE.

The firmware will read the A0 analogue input frequently and will convert the pedal position to a 10-bit analogue reading. Various conditions are applied to the reading to limit the rate of change (to suppress glitches which can occur when the pedal is removed).

The firmware is able to support MIDI controller messages (the controller number is settable at compile time) or MIDI System Exclusive Master Volume messages. The default operation is to use MIDI controller messages.

When the pedal is removed, the firmware will set the controller to maximum level (127) which is the default level for controller 11.

Circuit diagram

2220R

2220R

21k0

25V

2GND

2TX

2A0

Arduino Nano

23

25

22

24

21

212

24

216

219

1/4” stereo jack socket

for foot pedal

2NO

2NC

25V (USB)

20V (USB)

MIDI

OUT

2TIP

2RING

2SLEEVE