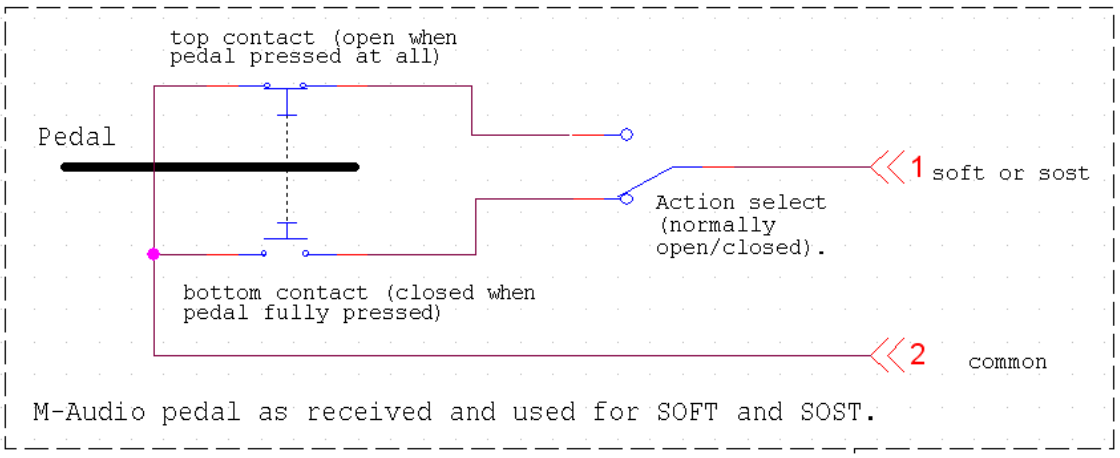
Using three M-Audio SP-2 pedals for soft, sostenuto, sustain and half-sustain on a Casio PX-120 digital piano.

John O'Flaherty Jan 2, 2012

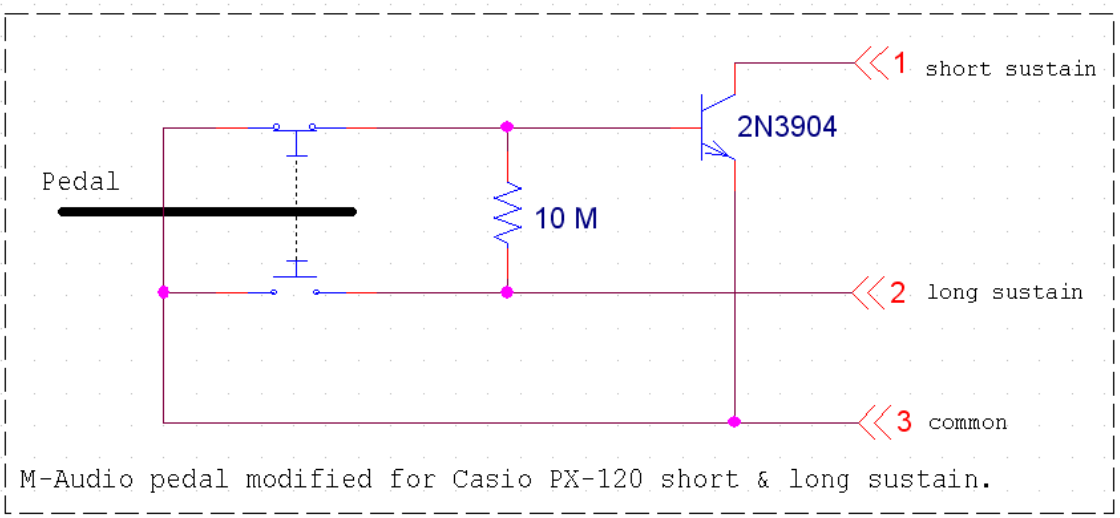
There were some reports that the Casio 3-pedal add-on is not too reliable, having plastic hinges, so three M-Audio pedals were substituted. This shows the mechanical assembly and some electrical connections that enable use of the functions provided on the connector on the bottom of the piano.

The M-Audio pedals are about $15 to $20 each. They are substantial chrome-plated metal pedals in a plastic housing. They have steel shoulder screws going into brass studs as the pedal suspension, and a sizable spring. They have two contacts, one that is closed when the pedal is not pressed, and one that is closed when the pedal is pressed. There is a slide switch on the bottom of the pedal assembly to select which contact is used, according to the application. For soft, sostenuto and sustain, the Casio piano uses the contact that closes when the pedal is pressed.

The sustain pedal can also be used for the half- or short-sustain available on the PX-120 by the means described here. The following is a circuit diagram of the pedal as received and used for soft and sostenuto functions, and of a modified pedal that gives two sustain levels. **(N.B.: This is for two-level sustain only, not for continuously variable sustain as may be available on some models.)**



M-Audio pedal as received and used for SOFT and SOST.



M-Audio pedal modified for Casio PX-120 short & long sustain.

The Casio pedal functions are actuated by closing a connection between a common line and the individual function line. All function lines are at about +3 V with respect to common. The current when any function is actuated is only about 35 uA, so there is no particular hazard to the piano, technician or player from connecting to and using these functions.

The operation of the soft and sostenuto pedals is obvious. The sustain pedal is modified. The full- or long-sustain works in the usual way, with a closure from common to the sustain function line when the pedal is pressed all the way down. The short-sustain is actuated by a transistor which turns on when there is +3 V on the 10 Mohm resistor connected from its base to the upper, normally closed contact. That voltage is only present when the pedal has been pressed halfway: far enough to open the top contact, disconnecting the base from common, but not far enough to connect the long-sustain line to common.

When this circuit was first tried, it worked, but the pedal span for short sustain wasn't very wide. Bending the metal plate that operates the lower contact upwards a bit gave a wider span, making it easily controllable.

The pedals were fastened onto a plate of thin scrap aluminum by removing a couple of the screws holding the housing on each pedal, and replacing them with the aluminum plate in place. The anti-skid rubber on the bottom of the pedals was removed in the area covered by the aluminum plate so the screws would still be long enough, and the bottom of the assembly would be flat on the floor. The aluminum plate was screwed to a wooden harp that attaches to the piano. The ¼" connectors on the pedals had to be removed. A terminal strip was used to terminate the wires from the pedals, and a cable was made up to go from the terminal strip to the PEDAL connector on the bottom rear of the piano. The piano end of the cable was made from a commonly available male 0.1" dip header. These details are shown without further commentary in the pictures that follow this text.

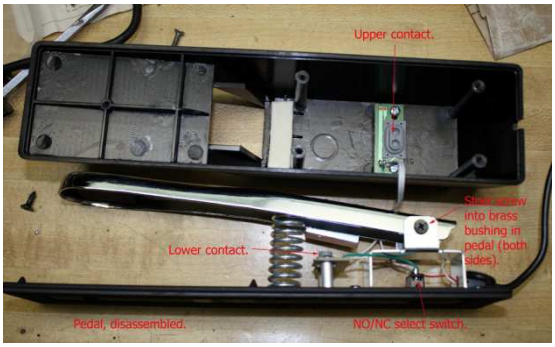
A couple of minor points:

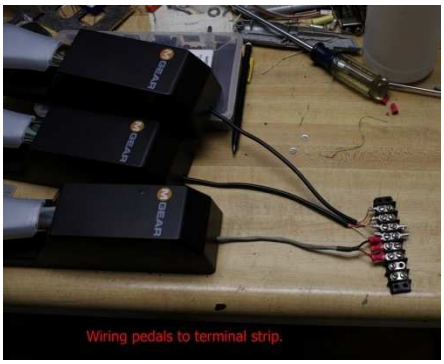
1. The pedals may squeak a little. This can be fixed by putting some thick grease on the pedal hinges and both ends of the big spring.
2. The pedals may click against the housing when released. This can be fixed with something soft on the top surface of the pedal where it would strike the housing. Something like the anti-skid rubber removed from the bottoms of the pedals.
3. If the plastic pads are kept on the pedals, the chrome won't get scratched, but they sometimes pop off. This can be fixed by putting some double stick carpet tape in the sides of the pads and pushing them hard onto the pedals.


Pedals mounted on piano cabinet.

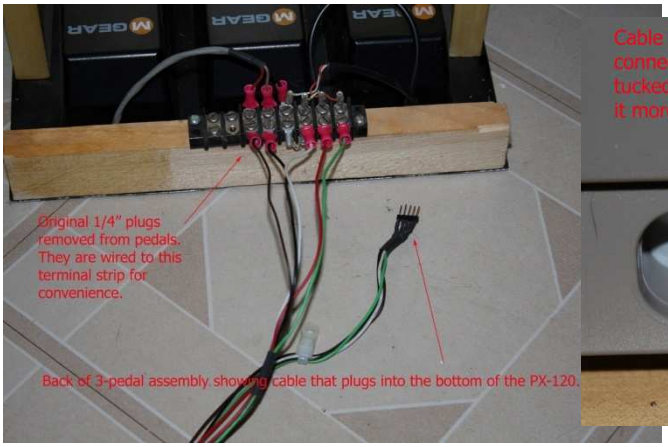

Front of wooden "harp" showing pedals.


Back of wooden "harp", showing the back of the three pedals mounted to an aluminum plate.

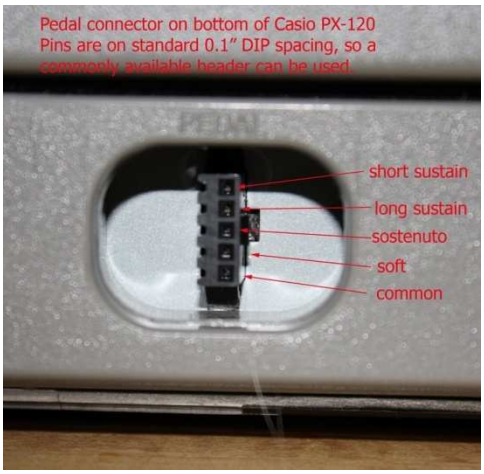

Upper contact.
Slide screw into brass bushing in pedal (both sides).
Lower contact.
Pedal, disassembled.
NO/NC select switch.


Wiring pedals to terminal strip.


Side view of disassembled sustain pedal.


Original 1/4" plugs removed from pedals. They are wired to this terminal strip for convenience.
Back of 3-pedal assembly showing cable that plugs into the bottom of the PX-120.


Cable from pedals plugged into connector on piano (wires tucked into cavity to hold it more securely).
Front
Casio PX-120
PEDAL
Rear


Pedal connector on bottom of Casio PX-120
Pins are on standard 0.1" DIP spacing, so a commonly available header can be used.
short sustain
long sustain
sostenuto
soft
common


Plastic covers come with pedals. Use double-stick carpet tape inside cover to keep it from popping off.
Part of original bottom pad, glued to pedal where it may click against housing.


Bottom of pedal.
Normally open/ normally closed select switch.