

GUIDE: build your own pedal

Do you have a TAMPCO Business card? Awesome! Follow this guide to build your own effect pedal from it! Different versions exist: vibrato, vintage or modern fuzz, boost or overdrive...

Important notice: I can't provide technical support for these projects.

If you're a beginner, making mistakes is perfectly fine, fixing them is what makes you learn! The cards were all tested and function, you just have to carefully follow the instructions. You may also hurt yourself when soldering or drilling, so be really careful! TAMPCO Pedals and Amplifiers won't be held responsible for the damage cause to beings or objects by the end user. You take the whole responsibility of following this guide. To sum it up: just have fun!

What you will need: in order to build your own pedal

- A drill
- 2mm, 6.5mm, 8mm, 10mm and 12mm metal drill bits
- A soldering iron
- A roll of solder
- A desoldering pump or desoldering braid, if you make a mistake
- Cutting pliers
- A wire stripper
- Some wires, preferably of different colors
- A multimeter, to help you debug the pedal
- The components indicated in the bill of materials (at the end of this document)
- The drill guide for the enclosure (last page of this document)

Solder components on the board:

In order to properly solder the components on the board, insert them one by one starting with the smallest ones. I suggest soldering resistors first, then diodes, capacitors, transistors and integrated circuits (chips), and last the potentiometers.

When putting a component in the board, slightly bend its legs so that it does not fall, then flip the board over and solder on the other side.



You can now solder the legs of the component. Put the tip of the soldering iron against both the component leg and the circuit board's pad, and bring a bit of solder on the pad. It should flow nicely, with a bit of fumes, wait a second or two and remove the iron. The solder joint should look like the left one on this drawing:



Source: digikey.fr

Do that again for all the other components of the board.

Some components, like diodes and some capacitors, need to be correctly orientated on the board. Pay attention to the marking on the component and on the board:

Electrolytic capacitors have a longer leg, going into the square pad on the board, for the "+" side of the component. There is often a marking of the "-" side on the capacitor with a continuous arrow and the "-" symbol, where the smaller leg is. The longer leg should go in the square pad, and the shorter one in the round pad on the board.



- Diodes have a black or colored band that indicates the component cathode. Just place the component the same way it is shown on the board.



 Transistors have three legs and either a metallic top (BC108) or a halfmoon plastic top (MPSA18, 2N5088). In both cases, just place the component as shown on the PCB footprint.



Integrated circuits (chips) often have a dot marking the pin 1, corresponding to the board's square pad. They also often have a halfmoon shape that should align with the one on the board. Here is an example of an IC placed correctly in my 3D modelling software. It appears in green and you can clearly see the half-moon shape on the component aligning with its white footprint underneath.



If you have any doubts, feel free to use this kind of socket that allows for unplugging the IC: <u>https://www.taydaelectronics.com/connectors-</u><u>sockets/sockets/dip-sockets/8-pin-dip-ic-socket-machine-tooled.html</u>

Component values are written on the board. Pay close attention to what is written in order to place the components in the right spot.

Resistors are marked like this: 10k, 4k7, 1M... This value, in Ohms, is the value of the resistor to put at that place.
10k means 10kOhm, hence 10 000 Ohm.
4k7 means 4.7kOhm, hence 4 700 Ohm.
1M means 1Mohm, hence 1 000 000 Ohm!

- Capacitors are marked like this: 100p, 4n7, 1u, 100u... This value, in Farad, is the value of the capacitor to put at that place. 100p means 100pF, hence 0.0000000001 F – that's small indeed! Like the resistors, 4n7 means 4.7 nF, hence 4.7 billionth of Farad. 1u equals 1 μ F, hence 1 millionth of Farad, 100u equals 100 μ F, and so on...

- Potentiometers are written the same way as resistors – being variable resistors themselves in essence – but with an additionnal letter: A, B or C. A indicates a logarithmic/audio pot, B will be for a linear pot, and C is anti-log or rev-log, being the complement of pot type A. They have a little rectangular tab close to the axis : it will prevent the pot from fitting the hole in the enclosure. Just bend it away to break it.



Source : Tayda Electronics

If you just follow the guide with all the links to buy the correct components, everything should work fine! If you are not sure about the value of a resistor, you can use the multimeter as an ohmmeter to measure it. Just select the correct resistance range and place the probes on each leg.



If you have good vision you can refer to the resistor color code:

Source: Anasounds.com

Some components might need to be bent in order to fit on the board correctly, as is the case for the red LED of the Business Vibe:



Once all the components are mounted on the board, you can solder the wires for the 9V power supply, input and output jacks. Be sure to leave enough length for the wiring in the enclosure, a few centimeters should be enough (about 5cm).



The business card should now look like this:

With longer wires!

Enclosure drilling:

You will need to drill the enclosure before assembling the pedal. Print the template on a piece of paper and cut it along the edges. You will have the front template and top template. Use some tape to maintain the front (bigger) sheet on the pedal and use the 2mm drill bit to mark down the position of the footswitch, LED and the knob(s). If your business card has only one knob, drill the center circle. If it has two, drill the outer ones.



Now, use the top sheet to do the same for the 9V power supply, input and output jacks. **Be cafeful to align the bottom of the sheet with the bottom of the enclosure.**



Once the center of each hole marked with the 2mm drill bit, remove the paper and drill with the 2mm bit through the enclosure. You can now progressively drill the holes with a stepped drill, or by changing the drill size for a bigger one each time. The final hole diameters should be as follow:

- 6.5mm for the LED holder
- 8mm for the potentiometers
- 10mm for the input and output jacks
- 12mm for the footswitch
- 12mm for the DC connector

It should now look like this:



Many techniques exist to make the pedal look cool: permanent marker, waterslide decal, transparent vinyle sheets, UV printing, laser engraving... Everyone has its own! Here at TAMPCO we like bicolor engraved plastic sheets, but many companies use UV printing or screen printing. Tayda Electronics has a UV printing service and a drilling service as well if you're not feeling confident about drilling the pedal yourself.

Final assembly:

Place the LED holder in position. You can glue it down if you feel it moving too much. Then insert the business card, put the washers on the potentiometers and tighten their nut. Do the same for the DC connector and the input and output jacks. **Be careful to correctly install them, as shown in the photos on the next page! The slanted part of the jack needs to be oriented the correct way.** Do the same for the footswitch, with the locking washer inside and the flat washer on the outside. **Be careful to have the footswitch pins aligned horizontally.** Now follow the wiring diagram to connect the pedal:



Légende:

Carte de visite Footswitch LED Résistance 4k7 Alimentation + Alimentation – et masse Jack entrée/sortie PCB entrée/sortie Here are some pictures of the assembly process – note that I didn't even use a color code at all, bad practice!





You can now plug a power supply in your pedal and try it out!

Is it not working? Here are some clues!

Check all your solder joints and make sure they are done correctly. Check component values to be sure they are placed in the right spots. Most of the time, the problems come from here. Next, check the board wiring to the power supply, jacks and footswitch.

The Business Vibe is a bit special: it is normal not to hear much of the effect if the inside of the enclosure is exposed to light, the effect needs to be tested in the dark. You can close the enclosure lid, or turn off the light and close the shutters. If the bypass LED prevents the effect from working correctly, you can prevent that by using some opaque electrical tape.

If you can hear your guitar in bypass but not when the effect is engaged, even though the LED lights up, it's encouraging! The issue comes from the circuit board, check component values and solder joints again.

If you came through all those steps:

Congratulations! You just built yourself a guitar pedal! With a bit of practice and patience you 'II be able to learn how they work, build some more for yourself or for your friends. If it does not work, no worries, that's where you really learn! We're here to have fun and make good noise. Many forums and communities on the internet are dedicated to DIY guitar pedals, you can join them to learn more about the building and design process. Enjoy!

Liste du matériel: Business Vibe

Value	Qty	Price	Tot price	Link
Wires (choose your colors)	10	0,09€	0,90€	https://www.taydaelectronics.com/catalogsearch/result/?q=awg+24
3PDT footswitch	1	2,68€	2,68€	https://www.taydaelectronics.com/3pdt-stomp-foot-pedal-switch-fk-series-on-on.html
DC connector	1	0,14€	0,14€	https://www.taydaelectronics.com/dc-power-jack-2-1mm-enclosed-frame-with-switch-external.html
Input/output jacks	2	0,40€	0,80€	https://www.taydaelectronics.com/6-35mm-1-4-stereo-phone-jack.html
				https://www.taydaelectronics.com/electromechanical/led-holders/5mm-led-lampshade-protector-
LED holder	1	0,05€	0,05€	clear.html
4k7 resistor for the LED	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-4-7k-ohm-1-4w-1-metal-film-pkg-of-10.html
				https://www.taydaelectronics.com/leds/round-leds/5mm-leds/led-5mm-yellow-water-clear-ultra-
LED	1	0,03€	0,03€	bright.html
Enclosure	1	5,37€	5,37€	https://www.taydaelectronics.com/violet-125b-style-aluminum-diecast-enclosure.html
Knob	2	0,38€	0,76€	https://www.taydaelectronics.com/hardware/knobs/knob-davies-1510-clone-black.html
LDR	1	0,22€	0,13€	https://www.taydaelectronics.com/photo-conductive-cell-resistor-ldr-540nm-radial.html
1k8 resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/resistor-1-8k-ohm-1-4w-1-metal-film-pkg-of-10.html
2k2 resistor	2	0,01€	0,13€	https://www.taydaelectronics.com/resistor-2-2k-ohm-1-4w-1-metal-film-pkg-of-10.html
7k5 resistor	2	0,01€	0,13€	https://www.taydaelectronics.com/resistor-7-5k-ohm-1-4w-1-metal-film-pkg-of-10.html
10k resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-10k-ohm-1-4w-1-metal-film-pkg-of-10.html
27k resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/resistor-27k-ohm-1-4w-1-metal-film-pkg-of-10.html
100k resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-100k-ohm-1-4w-1-metal-film-pkg-of-10.html
1M5 resistor	3	0,01€	0,13€	https://www.taydaelectronics.com/resistor-1-5m-ohm-1-4w-1-metal-film-pkg-of-10.html
4M7 resistor	1	0,01€	0,11€	https://www.taydaelectronics.com/10-x-resistor-4-7m-ohm-1-4w-5-carbon-film-pkg-of-10.html
100n capacitor	2	0,08€	0,16€	https://www.taydaelectronics.com/0-1uf-100v-5-kemet-polyester-film-box-type-capacitor.html
220n capacitor	2	0,13€	0,26€	https://www.taydaelectronics.com/0-22uf-100v-5-polyester-film-box-type-capacitor.html
1u capacitor	3	0,13€	0,39€	https://www.taydaelectronics.com/nichicon-1uf-50v-105c-radial-electrolytic-capacitor-5-11mm.html
22u capacitor	1	0,02€	0,02€	https://www.taydaelectronics.com/22uf-50v-105c-jrb-radial-electrolytic-capacitor-5x11mm.html
Red LED	1	0,02€	0,02€	https://www.taydaelectronics.com/led-3mm-red-water-clear-ultra-bright.html
MPSA18 transistor	2	0,11€	0,22€	https://www.taydaelectronics.com/mpsa18-npn-general-purpose-transistor.html
				https://www.taydaelectronics.com/tayda-b25k-ohm-linear-taper-potentiometer-round-shaft-pc-mount-
B25k potentiometer	2	0,35€	0,70€	l.html

TOTAL

13,78 € (Excl. VAT and shipping)

Liste du matériel: Business Boost

Value	Qty	Price	Tot price	Link
Wires (choose your				
colors)	10	0,09€	0,90€	https://www.taydaelectronics.com/catalogsearch/result/?q=awg+24
3PDT footswitch	1	2,68€	2,68€	https://www.taydaelectronics.com/3pdt-stomp-foot-pedal-switch-fk-series-on-on.html
DC connector	1	0,14€	0,14€	https://www.taydaelectronics.com/dc-power-jack-2-1mm-enclosed-frame-with-switch-external.html
Input/output jacks	2	0,40€	0,80€	https://www.taydaelectronics.com/6-35mm-1-4-stereo-phone-jack.html
LED holder	1	0,05€	0,05€	https://www.taydaelectronics.com/electromechanical/led-holders/5mm-led-lampshade-protector-clear.html
4k7 resistor for the LED	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-4-7k-ohm-1-4w-1-metal-film-pkg-of-10.html
LED	1	0,03€	0,03€	https://www.taydaelectronics.com/leds/round-leds/5mm-leds/led-5mm-yellow-water-clear-ultra-bright.html
				https://www.taydaelectronics.com/hardware/enclosures/1590b-style-1/matte-dark-gray-style-aluminum-diecast-
Enclosure	1	5,37€	5 <i>,</i> 37€	enclosure.html
Кпоb	1	0,38€	0,38€	https://www.taydaelectronics.com/hardware/knobs/knob-davies-1510-clone-black.html
390R resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-390-ohm-1-4w-1-metal-film-pkg-of-10.html
10k resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-10k-ohm-1-4w-1-metal-film-pkg-of-10.html
100k resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-100k-ohm-1-4w-1-metal-film-pkg-of-10.html
1M resistor	2	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-1m-ohm-1-4w-1-metal-film-pkg-of-10.html
100n capacitor	2	0,08€	0,16€	https://www.taydaelectronics.com/0-1uf-100v-5-kemet-polyester-film-box-type-capacitor.html
10u capacitor	1	0,08€	0,08€	https://www.taydaelectronics.com/10uf-50v-105c-aluminum-radial-electrolytic-capacitor-nhg.html
2N5088 transistor	1	0,06€	0,06€	https://www.taydaelectronics.com/2n5088-npn-general-purpose-transistor.html
A100k potentiometer	1	0,35€	0,35€	https://www.taydaelectronics.com/tayda-100k-ohm-logarithmic-taper-potentiometer-round-shaft-pc-mount.html

TOTAL 11,66 € (Excl. VAT and shipping)

Liste du matériel: Business Drive

Value	Qty	Price	Tot price	Link
Wires (choose your				
colors)	10	0,09€	0,90€	https://www.taydaelectronics.com/catalogsearch/result/?q=awg+24
3PDT footswitch	1	2,68€	2,68€	https://www.taydaelectronics.com/3pdt-stomp-foot-pedal-switch-fk-series-on-on.html
DC connector	1	0,14€	0,14€	https://www.taydaelectronics.com/dc-power-jack-2-1mm-enclosed-frame-with-switch-external.html
Input/output jacks	2	0,40€	0,80€	https://www.taydaelectronics.com/6-35mm-1-4-stereo-phone-jack.html
LED holder	1	0,05€	0,05€	https://www.taydaelectronics.com/electromechanical/led-holders/5mm-led-lampshade-protector-clear.html
4k7 resistor for the LED	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-4-7k-ohm-1-4w-1-metal-film-pkg-of-10.html
LED	1	0,03€	0,03€	https://www.taydaelectronics.com/leds/round-leds/5mm-leds/led-5mm-yellow-water-clear-ultra-bright.html
				https://www.taydaelectronics.com/hardware/enclosures/1590b-style-1/yellow-125b-style-aluminum-diecast-
Enclosure	1	5,37€		enclosure.html
Кпоb	2	0,38€	0,76€	https://www.taydaelectronics.com/hardware/knobs/knob-davies-1510-clone-black.html
4k7 resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-4-7k-ohm-1-4w-1-metal-film-pkg-of-10.html
10k resistor	2	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-10k-ohm-1-4w-1-metal-film-pkg-of-10.html
1M resistor	5	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-1m-ohm-1-4w-1-metal-film-pkg-of-10.html
10p capacitor	1	0,02€	0,02€	https://www.taydaelectronics.com/10pf-50v-multilayer-monolithic-ceramic-capacitor.html
1n capacitor	1	0,07€	0,07€	https://www.taydaelectronics.com/1000pf-100v-5-kemet-polyester-film-box-type-capacitor.html
10n capacitor	1	0,09€	0,09€	https://www.taydaelectronics.com/0-01uf-100v-5-kemet-polyester-film-box-type-capacitor.html
47n capacitor	1	0,07€	0,07€	https://www.taydaelectronics.com/0-047uf-100v-5-kemet-polyester-film-box-type-capacitor.html
1u capacitor	1	0,13€	0,13€	https://www.taydaelectronics.com/nichicon-1uf-50v-105c-radial-electrolytic-capacitor-5-11mm.html
10u capacitor	2	0,08€	0,16€	https://www.taydaelectronics.com/10uf-50v-105c-aluminum-radial-electrolytic-capacitor-nhg.html
1N4148 diodes	2	0,01€	0,02 €	https://www.taydaelectronics.com/1n4148-switching-signal-diode.html
UA741 chip	1	0,29€	0,29€	https://www.taydaelectronics.com/ua741cp-ua741-741-ic-op-amp.html
C1M potentiometer	1	0,53€	0,53€	https://www.taydaelectronics.com/c-1m-ohm-anti-log-taper-potentiometer-round-shaft-pcb-mount-l.html
A100k potentiometer	1	0,35€	0,35€	https://www.taydaelectronics.com/tayda-100k-ohm-logarithmic-taper-potentiometer-round-shaft-pc-mount.html

TOTAL 12,98 € (Excl. VAT and shipping)

Liste du matériel: Business Powerdrive

Value	Qty	Price	Tot price	Link
Wires (choose your colors)	10	0,09€	0,90€	https://www.taydaelectronics.com/catalogsearch/result/?q=awg+24
3PDT footswitch	1	2,68€	2,68€	https://www.taydaelectronics.com/3pdt-stomp-foot-pedal-switch-fk-series-on-on.html
DC connector	1	0,14€	0,14€	https://www.taydaelectronics.com/dc-power-jack-2-1mm-enclosed-frame-with-switch-external.html
Input/output jacks	2	0,40€	0,80€	https://www.taydaelectronics.com/6-35mm-1-4-stereo-phone-jack.html
LED holder	1	0,05€	0,05€	https://www.taydaelectronics.com/electromechanical/led-holders/5mm-led-lampshade-protector-clear.html
4k7 resistor for the LED	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-4-7k-ohm-1-4w-1-metal-film-pkg-of-10.html
LED	1	0,03€	0,03€	https://www.taydaelectronics.com/leds/round-leds/5mm-leds/led-5mm-yellow-water-clear-ultra-bright.html
Enclosure	1	5,37€	5,37€	https://www.taydaelectronics.com/matte-black-style-aluminum-diecast-enclosure.html
Кпоb	1	0,38€	0,38€	https://www.taydaelectronics.com/hardware/knobs/knob-davies-1510-clone-black.html
68k resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/resistor-68k-ohm-1-4w-1-metal-film-pkg-of-10.html
1M resistor	2	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-1m-ohm-1-4w-1-metal-film-pkg-of-10.html
4n7 capacitor	1	0,09€	0,09€	https://www.taydaelectronics.com/0-0047uf-100v-5-jfj-polyester-film-box-type-capacitor.html
1u capacitor	2	0,13€	0,26€	https://www.taydaelectronics.com/nichicon-1uf-50v-105c-radial-electrolytic-capacitor-5-11mm.html
10u capacitor	2	0,08€	0,16€	https://www.taydaelectronics.com/10uf-50v-105c-aluminum-radial-electrolytic-capacitor-nhg.html
100u capacitor	1	0,22€	0,22€	https://www.taydaelectronics.com/100uf-50v-105c-aluminum-radial-electrolytic-capacitor-nhg.html
LM386 chip	2	0,21€	0,42€	https://www.taydaelectronics.com/lm386-lm386l-audio-power-amplifier-ic.html
A100k potentiometer	1	0 25 f	0 25 f	https://www.taydaelectronics.com/tayda-100k-ohm-logarithmic-taper-potentiometer-round-shaft-pc-
A100k potentiometer	1	0,35€	0,35€	mount.html

TOTAL

12,24 € (Excl. VAT and shipping)

Liste du matériel: Business Fuzz

Value	Qty	Price	Tot price	Link
Wires (choose your colors)	10	0,09€	0,90€	https://www.taydaelectronics.com/catalogsearch/result/?q=awg+24
3PDT footswitch	1	2,68€	2,68€	https://www.taydaelectronics.com/3pdt-stomp-foot-pedal-switch-fk-series-on-on.html
DC connector	1	0,14€	0,14€	https://www.taydaelectronics.com/dc-power-jack-2-1mm-enclosed-frame-with-switch-external.html
Input/output jacks	2	0,40€	0,80€	https://www.taydaelectronics.com/6-35mm-1-4-stereo-phone-jack.html
LED holder	1	0,05€	0,05€	https://www.taydaelectronics.com/electromechanical/led-holders/5mm-led-lampshade-protector-clear.html
4k7 resistor for the LED	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-4-7k-ohm-1-4w-1-metal-film-pkg-of-10.html
LED	1	0,03€	0,03€	https://www.taydaelectronics.com/leds/round-leds/5mm-leds/led-5mm-yellow-water-clear-ultra-bright.html
Enclosure	1	5,37€	5,37€	https://www.taydaelectronics.com/red-125b-style-aluminum-diecast-enclosure.html
Knob	2	0,38€	0,76€	https://www.taydaelectronics.com/hardware/knobs/knob-davies-1510-clone-black.html
1k5 resistor	1	0,01€	0,01€	https://www.taydaelectronics.com/10-x-resistor-1-5k-ohm-1-4w-1-metal-film-pkg-of-10.html
6k8 resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/6-8k-ohm-1-4w-1-metal-film-resistor.html
33k resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/resistor-33k-ohm-1-4w-1-metal-film-pkg-of-10.html
100k resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-100k-ohm-1-4w-1-metal-film-pkg-of-10.html
1M resistor	1	0,01€	0,13€	https://www.taydaelectronics.com/10-x-resistor-1m-ohm-1-4w-1-metal-film-pkg-of-10.html
10n capacitor	1	0,09€	0,09€	https://www.taydaelectronics.com/0-01uf-100v-5-kemet-polyester-film-box-type-capacitor.html
2u2 capacitor	1	0,02€	0,02€	https://www.taydaelectronics.com/2.2uf-25v-105c-jrb-radial-electrolytic-capacitor-5x11mm.html
22u capacitor	2	0,02€	0,04€	https://www.taydaelectronics.com/22uf-50v-105c-jrb-radial-electrolytic-capacitor-5x11mm.html
BC108 transistor	2	0,50€	1,00€	https://www.taydaelectronics.com/bc108-bc108b-npn-small-signal-transistor.html
B1k potentiometer	1	0,53€	0,53€	https://www.taydaelectronics.com/p1-b1k-ohm-linear-taper-potentiometer-round-shaft-pc-mount-l.html
				https://www.taydaelectronics.com/tayda-100k-ohm-logarithmic-taper-potentiometer-round-shaft-pc-
A100k potentiometer	1	0,35€	0,35€	mount.html

TOTAL

13,42 € (Excl. VAT and shipping)Warning! Resistors are sold in bag of 10

