# Parts FAQ (Frequently Asked Questions)

## What wattage resistors should I buy?

**1/4W** (.25watt) or higher will work fine for everything midibox, unless otherwise noted.

## What voltage capacitors should I buy?

The whole MBHP works on 5V, so all Caps should be at about **16V or higher**. It doesn´t matter if you go higher.

## What is the correct polarity of the (resistor / capacitor / diode / etc)

**Resistors can be installed in any direction**.

Smaller value capacitors (i.e. usually under 1 uF) generally have no polarity. Anything above 1 uF is typically an electrolytic capacitor, and it will have a polarity marking. Most often the “-” side is marked with a big stripe, although sometimes it's the “+” side that is marked. (Strangely, the “+” side seems to be marked on capacitors made in U.S.A.)

***Diodes absolutely must be installed in the right direction***. Diodes have a stripe on the cathode side.

Most other components have some sort of mark as to their correct orientation. IC's will have a dot, transistors have a flat side, LEDs have a flat side (and the two leads will be different lengths).

## What kind of switches do I need?

**Short answer:**

For everything except the power switch, you need a momentary-on switch, like a tact.

**Long answer:**

As for the actuator, you can have a pushbutton, or tact, or toggle, or whatever you want. The actuator can be either momentary (it springs back to it's normal position when you don't apply pressure) or latching (it stays where you put it - this would not be very useful though, except for the power switch) Most of the time, the actuator style is implied; most pushbuttons are momentary (they pop back out when you don't press them) and most toggles are latching (you flick them and they stay there, you flick them back and they stay back)

The important part, is how they behave electronically. you want them to be normally OFF, so no circuit is made, and momentary ON, so they make a circuit only when you push them. Only a single 'throw' is required, extra throws will not break it, but will usually go to waste. Only a single 'pole' is required, extra poles will not break it, but will usually go to waste.This configuration goes by a few names, and brackets are often used to describe momentary action.

Some of the acronyms used and combined are:

- SP - Single Pole
- ST - Single Throw
- DP - Double Pole
- DT - Double Throw

**NC - Normally Closed**

- MOM OFF - Momentary OFF
- (OFF) - Momentary OFF
- (OPEN) - Momentary OFF

(these last three all mean the same thing. These are NOT the ones we want!)

**NO - Normally Open**

- MOM ON - Momentary ON
- (ON) - Momentary ON
- (CLOSED) - Momentary ON

(these last three all mean the same thing. THESE are the ones we want!)

**So they come out like these:** SPST Momentary ON, Single Pole Normally Open, SPNO, OFF-(ON), (ON)-OFF, OPEN-(CLOSED), (CLOSED)-OPEN and if they're toggles you might also use SPDT and then you want (ON)-OFF-(ON) or (ON)-OFF-ON or (ON)-NONE-(ON) or (ON)-NONE-ON or (ON)-NONE-OFF (note they all have a momentary ON throw)
As you can see, there is no real standard for naming them, but the right switch by any other name will drive your DIN module ;)
When in doubt, don't hesitate to contact the distributor for clarification. This may save you some headache and some money as some do not accept returns!

# What size/type of faders should I buy?

The physical size of the faders is not important. The pots/faders should have 10k resistance. It's important that they are linear, as opposed to logarithmic ones. The pots/faders in stereo equipment

are almost always logarithmic, so you can't take one from your dad's stereo.

Trying to save money on wobbly cheap plastic faders, uh? You might hate yourself for that decision after six months of using your favorite new midi-toy. Consider that.

# What type of crystal do I need?

More information here:

Crystals and Oscillators

# I can't find a bridge rectifier to fit the PCB's.

You can substitute four 1N4001 (or any of the 1N400X series) for the bridge rectifier, they will handle more than enough current.

# What Power supply should I use, and how much power should it have?

## Voltage ?

Even though the MidiBox platform is 5 Volts, you'll actually need a higher-volt rated power supply to get things working. Many seem to feel like a 9V DC power supply is a good choice for general MB use. Others seem to go a bit higher (as high as 12v) when powering the “instrument” type midiboxes like the sequencer or synths.

**The voltage regulators in your MIDIbox system (7805, etc) require an input voltage a little higher than the regulated output. But if the input voltage is a lot higher, the regulator will overheat. It is not an exact science, but you are generally safe at about 3 volts higher than the rating of the regulator.**

Midibox SID has its own power supply specs. Midibox LC and Midibox FM need extra voltage. Be sure to look up the details for this in the specific project’s docs!

## Current ?

The power supply must be able to deliver constant current above your total current consumption of the entire project (boards, pots, LEDs, LCD backlights, etc.) Current is measured in either Amps (A) or milliAmps (mA).[1)] The ideal transformer will deliver more current than you need, and the MIDIbox will only draw what it requires. 500mA is usually sufficient, but I personally have a 1.67amp 9V supply for my MB64e and it works great.

**The more current your power supply can provide, the cooler it will run, and the better it will be able to respond to transient demands of your circuit.**

In most cases, buying a simple wall-wart external psu is the quickest and safest method to get your MB powered up. You probably have a suitable PSU just lying around the house, but if not it shouldn't cost much at a decent electronic store, or “big box” discount store.

It is good practice to have a hefty power supply, capable of supplying 1000 mA or more, for your MIDIbox development and experimentation. When you complete a project, you can use a multimeter to measure its total current draw, and select a more modest power supply if necessary.

<box round>As an approximation: Core + AINs + DINs + SIDs + bankstick ... = 50 up to 100 mA needed, LCD = 100 mA up to appr. 300 mA for a appropriate backlighting, DOUTs = appr. 30 mA per DOUT IC (four are on one module) as the outputs are multiplexed.</box>

### The USB module requires a 1N4002 diode, the closest I can find is a 1N4004 - is this a suitable replacement?

Yes, 1N4004 is a replacement for 1N4002, it's just a type for higher Voltages (100V for 1N4002 vs. 400V for 1N4004). Any 1N400X diode will work in place of any other 1N400X diode -WITH A SMALLER NUMBER- Do replace a 1N4002 with a 1N4004 Don't replace a 1N4004 with a 1N4002

## PIC Stuff

### Which PIC should I order, 18LF452-I/P or 18F452-I/P?

Both work fine, the “LF” version is a low voltage version.

### Can I use the 18F4520 series?

Although it looks good on paper, there is a bug that prevents back-to-back interrupt driven transfers on the serial port. This makes it unusable for MIOS. The 18F4520 has been tested and it is confirmed that it does not work due to this bug. Microchip are aware of this bug but it is not, and may never be resolved.

### I'm trying to build the JDM. I have two zener diodes of 8.1v and 5.7v, but on them its only printed with 4733 and 4738. Which is which?

8.2V = 1N4738A 5.1V = 1N4733A The “A” on the end is optional.

[1)]

1000 mA = 1 A

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