Preparation

Tools

Software

This is based on a PC running Windows

Software Development

Please see the toolchain setup docs for info on the software I use:

- Part 1 - Setup the core software toolchain for MIOS application development on Windows - These are the minimal Windows applications you need, to write a MIOS Application in C for your MIDIbox.
- Part 2 - Extend your toolchain with MinGW to build the AC-Sim DOS C Simulator, or MPASM for ASM coding - These lesser-used options are both still important in certain situations. You will need MPASM if you would like to write applications in PIC ASM, or if you want to edit TK's ASM apps. MinGW is used to build the AC-Sim simulator, which is helpful for testing complex algorithms within your applications, without the need to upload to your MIDIbox. If you are likely to use this, it is recommended that you install MinGW prior to Code::Blocks.
- Part 3 - Extend your toolchain with Code::Blocks and GDB - Code::Blocks is an IDE which has several helpful features when developing applications, such as code highlighting, code completion, and debugging.

Hardware Development

Eagle Layout Editor
Eagle 3D
POV-Ray
Schaeffer Front Panel Designer
Google SketchUp 3D
InkScape Vector Graphics Editor
http://www.electronics2000.co.uk/ Electronics Assistant Calculators
http://www.miscel.dk/ MiscEl Miscellaneous Electronics Calculators
Linear Technology Corporation LTspice/SwitcherCAD III Circuit Emulator

MIDIBox Control

Sun Java RE

JSynthLib
MIOS Studio

Misc

Adobe Acrobat Reader
PDF Creator
Microsoft Internet Explorer
StrokeIt Mouse Gesture Recognition

WIKI

Microsoft Office
MSWord to DokuWiki Converter

Forum

FireFox Search Engine Plugin

Hardware

You don't absolutely *need* to have all of these things, but it sure helps! Using a tool for purposes other than those for which it was designed can be just a little more difficult, or downright dangerous. Please be safe :)

Safety

- Workbench - Protect your house, have a proper work area
- Safety Glasses - Protect your sense of sight
- Ear plugs/Ear Muffs - Protect your sense of hearing
- Face mask - Protect your lungs
- Fire Extinguisher - Don't let your soldering iron start a fire you can't put out
- Fire Blanket - As above
- Storage Unit - Put your tools and components somewhere safe
- Small Plastic Cup - Somewhere to put things temporarily. Don't leave your kit lying around.
- Soldering Smoke Absorber/Ventilator - MMmmm, Lead smoke. Mmmmm, Cancer. Mmmm, Insanity. Mmm.... I think not.

Soldering

- Soldering Iron - Temperature controlled
- Soldering Iron Stand - Put it where it belongs
- Soldering Iron Tip Cleaner - Take care of your tools

- Solder - Good quality solder for good quality joints, 63/37 Eutectic
- Tinning Block - for taking care of soldering iron tips
- PCB Holders - Make soldering easier and cleaner
- Desoldering Braid - For removing chips from inferior boards, to insert in you MBHP ;)
- Desoldering Pump - As above
- Breadboard - Prototyping

Electronics

- Multimeter - For testing circuitry. RS232 connected Autoranging DMM
- Oscilloscope - For testing signals. Dual trace
- Power Supply - Regulated lab power supply
- Digital Camera - For taking snaps to share with other MIDIBoxers
- Mini Torch - Let there be light. A AA Cell MagLight in your mouth means you get perfect light

Drilling

- Rotary Tool
- Drill Press - For accurate drilling of PCB's and faceplates
- Drill bit set
- Router bit set
- Nibbling tool - for making odd shaped holes (Careful! These can be savage)
- Reamer - for making odd shaped holes
- Center punch - For marking the location of holes to be drilled and scribing lines on metal

Abrasive/Cutting

- File Set - Flat, round, half round, rasp and needle
- Hacksaw - For cutting solid objects
- Spare Hacksaw Blades - For use by hand
- Coping Saw - For cutting holes in cases
- Razor Knife - Stanley/X-Acto, etc. NOT for use on plastic cases unless you have a death wish

Measurement

- Flexible Steel Ruler with Cork backing - From Arts stores. An excellent idea that I stole ;)
- Calipers - For measuring drill bits, shaft diameters, and hole diameters
- Clamps/Vices - Various sizes and shapes, for holding things still while you drill/saw/bust them up

Trimming and Fastening

- Wire Strippers - For stripping insulation from cabling
- Pliers Set - Various Sizes and types
- Side Cutters - For trimming componenet leads
- Screwdriver Set - Various sizes
- Spanner Set - Various sizes, including shifter spanners
- Socket Set - Various sizes

- IC Puller - Little tool for pulling IC's from sockets
- IC Placer - Little tool for putting IC's in sockets, spreads even pressure over all the pins
- Claw - One of those little pens with a three-fingered claw for grabbing loose bits from where fingers can't reach
- IDC Crimping Tool - Because doing it with pliers sucks
- Electrical Tape - Too many uses to list

Accessories

- Mirror - Little mirror on a telescopic shaft for peeking where your eyes can't reach
- Compressed Air Can - For cleaning stuff by blasting off dust
- PC/Mac - For surfing ucapps.de, the forum, this wiki, etc, for printing stuff, for talking to the DMM
- Internet Connection - You will need a fairly high-speed connection for downloading instructional images, PDFs, tools, etc. 56kbps will probably not be enough. I recommend 128kbps ADSL at the very minimum. I've got 12Mb ADSL2+ which is the fastest thing available, and recommend it highly.
- Printer - For everything from quick reference guides to datasheets to documentation to PCB screens to.....

Please note that I haven't mentioned any PCB creation tools... I don't make my own PCB's yet, so Internet Explorer (pointed at Smash's Shop) is the only tool I need for this. I don't think that will last due to some other projects I'm doing (I haven't given upon the SRAM yet!), so I will put PCB tools up here one day, but until then, please feel free to add them yourself!

Lab Supplies

A few handy things to have around the lab for experimenting....

- a complete set of resistors,
- breadboard PCBs to mount hardware-parts
- sockets with screws (eg for DIN-buttons)
- set of capacitors (esp. those 104's)
- some additional switches (like power-switches)
- enough cables with connectors

Thoughts

A MIDIBox is a serious project. Thanks to the efforts of TK and a few assistants, it is accessible to anyone who wishes for one, but don't be fooled into thinking it's going to be a walk in the park.

The forum is not school. It is not warranty. It is not tech support. It is a place where you can find a bunch of people just like you. It is a place where everyone should help everyone else as much as possible. If you have a question, ask it! Don't worry if your response is not forthoming in a short time, be patient, help will come along. If someone on the forum says to 'go and read ucapps.de' or 'search the forum' or 'google it', please don't be offended. They aren't trying to get rid of you :) It just means that they know that the perfectly documented and most easily understood response to your question exists elsewhere, and they want you to know where you can find it. If they answered in the forum, they'd probably just be giving you a less complete answer than the one elsewhere. If you've read something that says it is your answer, but you don't understand it, first try googling it and then come ask on the forum. Don't be shy, but don't be lazy either :)

A MIDIBox is not a cheap way out. If you're thinking “Heck, why buy one when I can build one of my own for half price?” then you are barking up the wrong tree. Your first project will involve not only the purchase of a large range of expensive tools, but a collosal investment of your time and efforts. Even if you only earn a few bucks an hour, you're FAR better off investing your time in a second job or some extra shifts, and saving that money to buy a commercial offering.

Take your time. If you're in a rush, go buy a commercial offering. Do not be fooled, a MIDIBox will take at least a couple of months to build, with the exception of some of the very simple devices like the clockbox. Talk to your wife and kids about this thing, or they might wonder if you're having an affair or something ;)

Read. READ. READ!!! Read until your eyes can't take it any more. If you think you've read enough to get started, go and read it again. Seriously, information is imperative. I personally spend around 2 hours every day (at least - it's not unusual for me to spend over 20 hours in a weekend) reading and learning about the electronics involved - but I do this for fun, not the end result.

Use the right tool for the job. Get all the tools you need. Don't be a cheapskate, get what you need. This doesn't mean you have to spend a fortune, but you will get what you pay for.

Be safe. Don't F*&% around with safety, tools, your workspace, etc - you can do anything from stripping a screw to killing yourself. Take every single safety measure available to you. Seriously, you never know... a tiny piece of scrap plastic can get flicked into your eye when you sneeze and leave you blind for life. There is absolutely NO need to be paranoid or concerned about this, PROVIDED that you don't be lax and you DON'T F*CK AROUND !!!!!!

Thanks to these websites for saving me having to think about this:

http://www.makezine.com/blog/archive/2006/01/10_most_needed_tools_for_the_e.html

http://www.diylive.net/index.php/2006/01/11/ten-most-needed-tools-for-the-electronics-diyer/

http://www.makezine.com/blog/archive/2005/12/makes_mostly_under_100_gift_gu.html

http://www.headwize.com/ubb/showpage5.php?fnum=3&tid=532

http://tangentsoft.net/audio/new-diyer.html

http://www.devrs.com/e/

http://www.streettech.com/archives_DIY/stToolkit.html

http://www.i-hacked.com/content/view/191/94/

http://tangentsoft.net/audio/

There are more, but that about covers it :)

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