Smash Box Experience Kit Notes

Last Revised March 23, 2020

Table of Contents

Introduction

Thank You for purchasing a Smash Box Experience kit. The Smash Box XP allows you to create your very own Smash Box tailored to whatever your needs are. For experienced modders, this means the flexibility to create a Smash Box however you want it - from the materials to the physical button layout. On top of that, you get to leverage Hit Box's robust feature set with the Smash Box Designer software. We give you the software tools to customize your in-game mappings, button angles, and SOCD methods and you pave your own way for where the buttons are placed and how your case is constructed.

The Smash Box Experience kit consists of a pre-programmed and ready to go PCB with our firmware and bootloader, a breakout harness with a full set of quick disconnects and open harness port pins, the nunchuck and USB breakout boards, the rocker toggle and profile switch, a Sanwa JLF harness, the assembly for the detachable GCC cable and a USB cable for programming.

What follows is a description of the features and some notes regarding their installation and use.

<u>Button Diagrams</u>

The following diagram shows you the generic layout paradigm for the Smash Box.

- LS refers to the Left Analog Stick (Control Stick)

- DP refers to the Dpad Group.

  - When the 2-way rocker switch is on, these buttons function as a DPAD

  - When the 2-way rocker switch is off, these buttons function as modifiers for LS.
    X1, X2, Y1, Y2 correlate to DP-Left, DP-Down, DP-Up, and DP-Right respectively.

  - RS refers to the Right Analog Stick (C-stick)

  - The 8 button action button group correlates to the traditional fighting game design of having punch buttons in a row (P1-P4) above the Kick buttons (K1-K4)

  - Tilt is a modifier for LS. It functions similar to a shift key on a keyboard.

  - Extra is an extra, remappable button. For Smash, players will typically map L, Z or a modifier to it.

Generic Button Labels
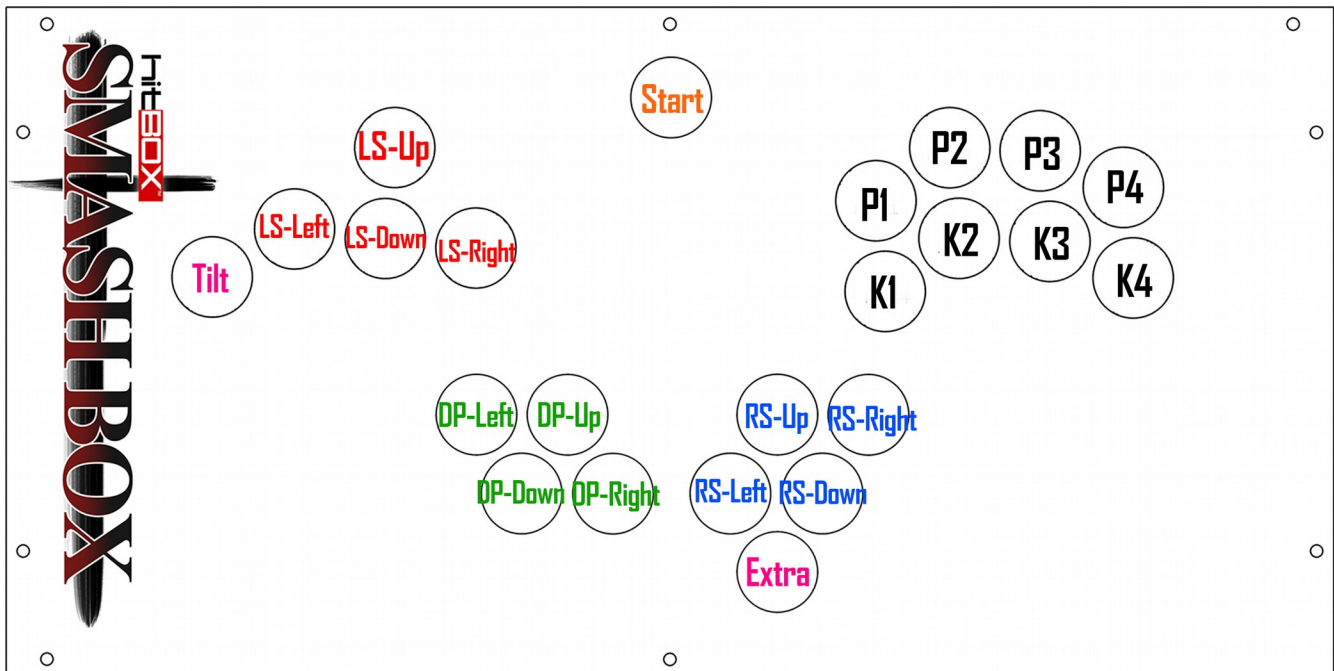

The entire controller is remappable, including what the 2-way rocker does. And there are more functions available to map than there are physical buttons. Combined with the 3-way profile switch. The Smash Box gives you the flexibility to have several game or character-dependent layouts at your disposal. This allows you to spend less time rewiring buttons and more time labbing your games.

Here are some example layouts. These are the Beta 4.03 defaults for the Smash Box.

Default Ultimate Layout
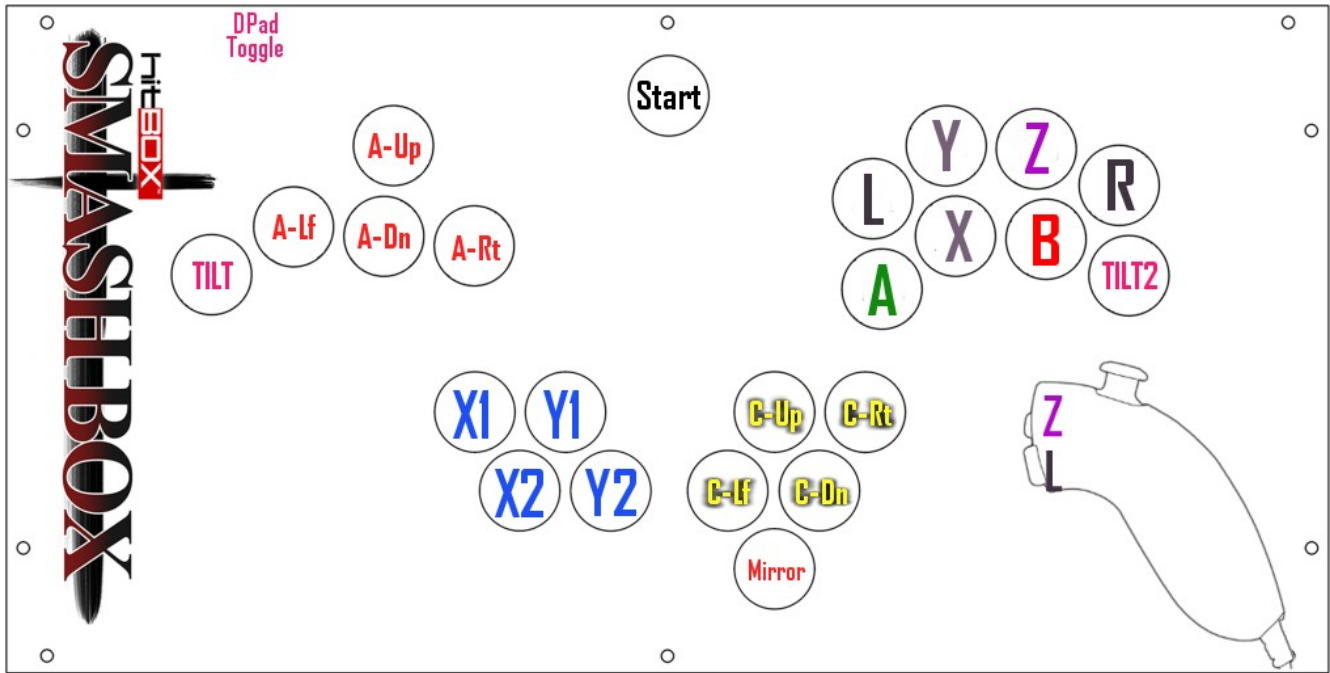
Default Melee Layout
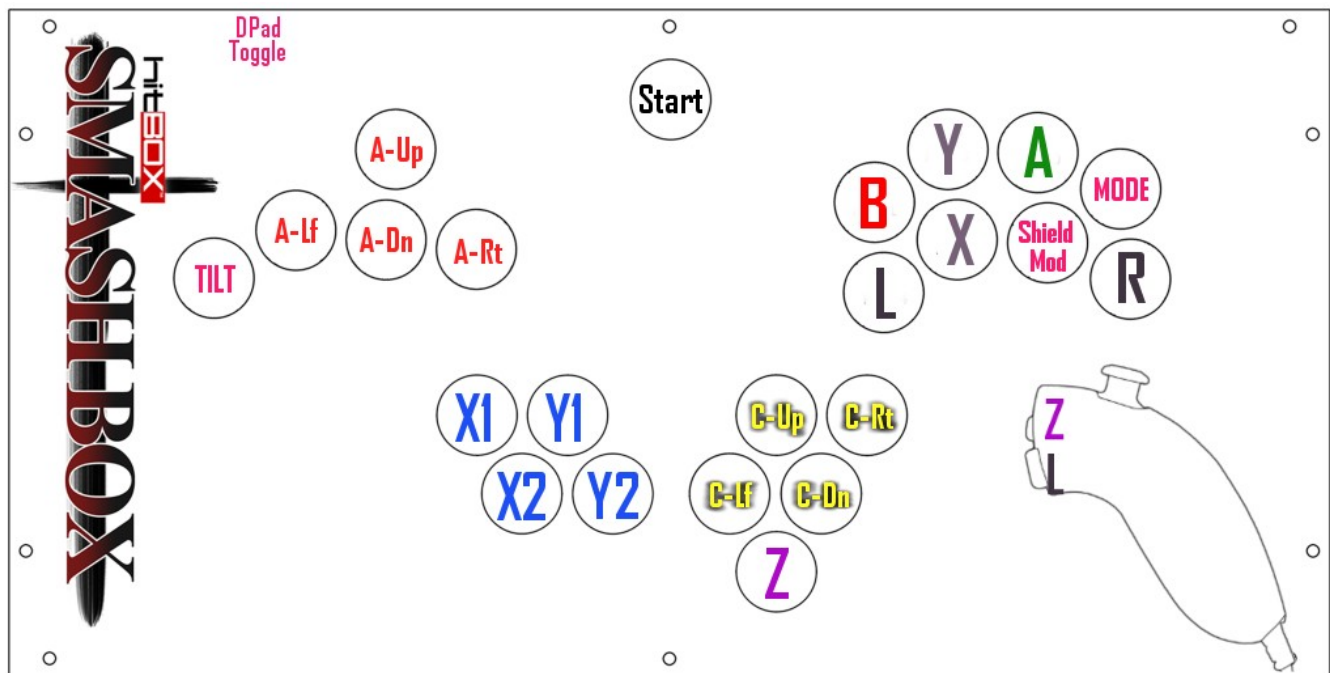
Harness Pinout

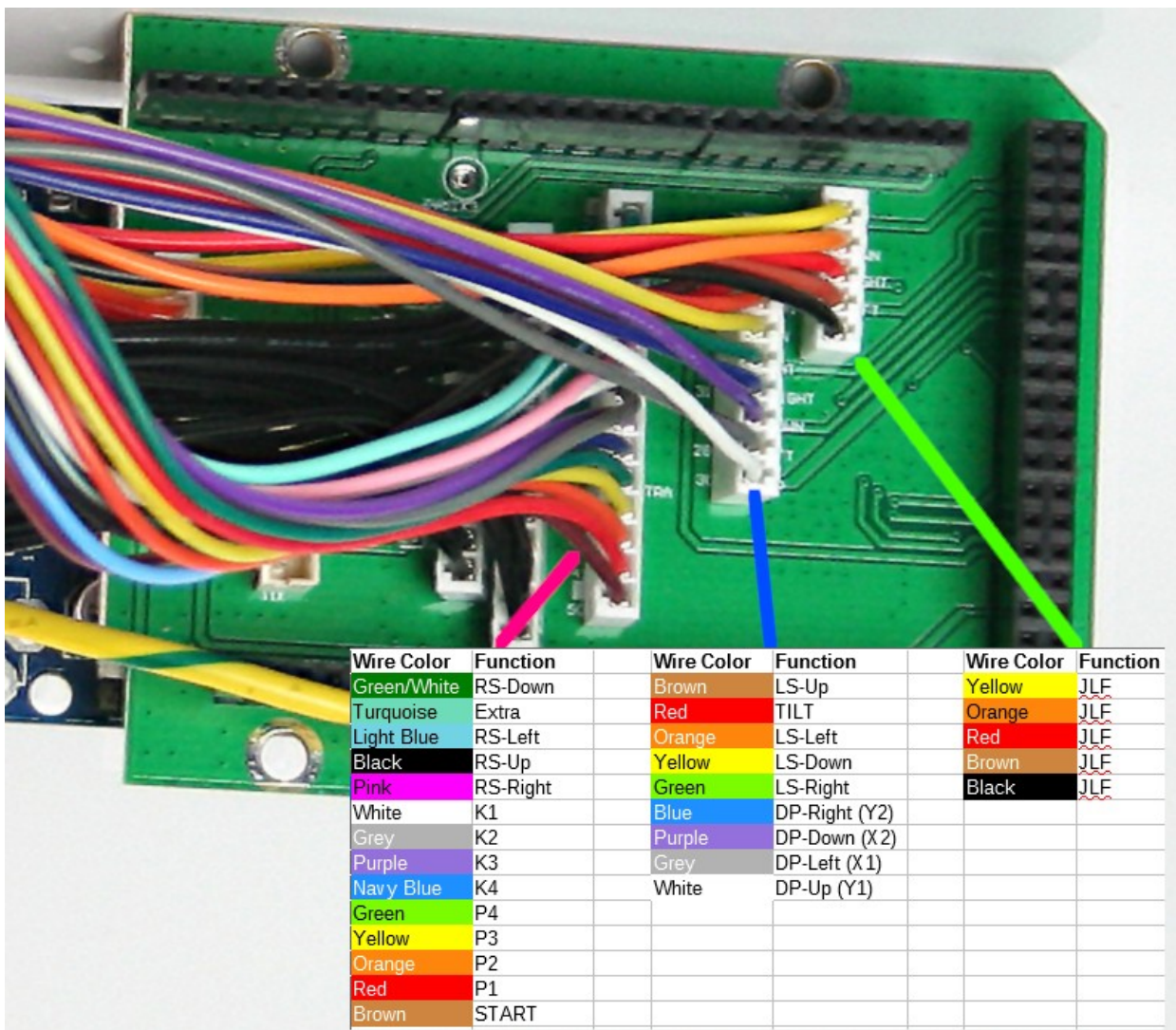This is the pinout for the wires that you connect to your buttons. The quick disconnects are .110" (2.8mm) in width which are standard for all 30mm and 24mm Sanwa or Seimitsu arcade buttons. Although, this is standard across many arcade button manufacturers – there are still makers that use 0.187" (4.8mm) connectors. Check before you purchase buttons for this kit.

The Smash Box Experience kit and *all* Smash Boxes made after December 2018 have a connector and mounting ports for a Sanwa JLF joystick. You can choose to use any lever with a Sanwa mounting plate instead of buttons with this kit and on any newer Smash Box. See the JLF orientation section for more.

The following is the actual pinout for the wire harnesses. Wire colors can change depending on the production run, but the order of the wires will always be the same.

Wire Color	Function	Wire Color	Function	Wire Color	Function
Green/White	RS-Down	Brown	LS-Up	Yellow	JLF
Turquoise	Extra	Red	TILT	Orange	JLF
Light Blue	RS-Left	Orange	LS-Left	Red	JLF
Black	RS-Up	Yellow	LS-Down	Brown	JLF
Pink	RS-Right	Green	LS-Right	Black	JLF
White	K1	Blue	DP-Right (Y2)		
Grey	K2	Purple	DP-Down (X2)		
Purple	K3	Grey	DP-Left (X1)		
Navy Blue	K4	White	DP-Up (Y1)		
Green	P4				
Yellow	P3				
Orange	P2				
Red	P1				
Brown	START				

Open Harness Pins

The Smash Box Experience header section is essentially a shield kit for the PCB. It allows you access to nearly ALL of the pins on the board. This allows modders two ways to access the IO ports on the board: With the breakout wires already provided and with header ports that you can tap into with regular 2.54mm/0.1" Dupont headers. These ports are useful for dual mods like adding an additional PCB board (like a Brook board) or an LED mod. You can tap into them with breadboard jumpers, IDC breakouts or any conductive wire.
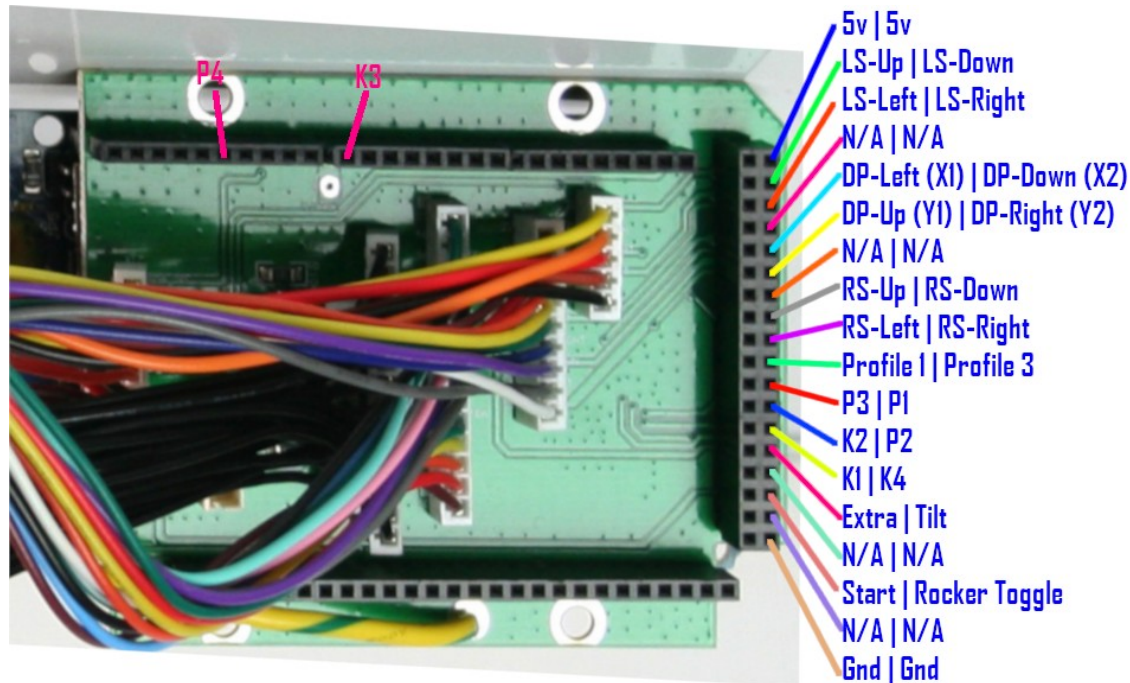
PCB Specifics: the logic runs at 5v and can handle 20ma per pin (enough for a single typical 5mm LED, not an RGB LED) and cannot exceed 500ma total. So if you add LEDs, keep that budget in mind or use an external power supply. Example: you add a Brook board, but that Brook board has its own USB cable. In practice, a Brook board can power an Arduino Mega if its 5v and Gnd lines are tied to the 5v and Gnd lines on the Mega but definitely not the other way around. It's the modder's responsibility to tie lines correctly. Don't leave anything floating, don't tie ground to power, and use diodes and capacitors to regulate power on your external boards as necessary. It's not Hit Box's responsibility if you destroy your controller while making changes directly to the PCB harness.

Detachable Cable

- The detachable cable comes in 2 parts, both of which are solderless.

- The inner part of the cable connects to the only solderless terminal on the top harness.

- You only need to drill a single hole to attach it to a case. The drill width of that hole must be larger than 12mm but smaller than 15mm. A 1/2" drill bit does the job just fine.

- The thickness of the material you're mounting it to must not exceed 8mm (1/4") or else the locking nut will not be able to thread. For cases made out of wood, you will have to partially jig the mounting hole with a router if your case is thicker than 1/4"

- It's advised you use a thread-locker or an adhesive to secure the locking bolt to the inside edge of the case after it's been tightened. This is to keep the detachable cable assembly from rotating during regular usage.

Breakouts

The breakouts for the Smash Box are included in the kit. They are the 2-way rocker toggle (default DPAD Toggle), the 3-way profile switch (to swap between your angle and button mapping settings on the fly), Nunchuck connector port, the detachable Gamecube controller cable, and the USB cable. None of the breakouts come with mounting parts, the modder is responsible for mounting solutions for these pieces.

The dimensions you will need to jig your mounting ports to for the breakout connectors are as follows:

- The rocker toggle and profile toggle are the same size. To mount them, you will need a square hole that is between 17mm and 20mm in length, between 12mm and 15mm in width, and at least 13mm in depth.

- The nunchuck port connector is 13mm x 8mm, the board it sits on is 25mm x 25mm and has 2 through holes for mounting. Two M3 or #6 screws will fasten it.

- The USB port is 12mm by 11mm. The board it sits on is 25mm x 30mm.

Things you can omit installing and what you lose:

- You lose the ability to swap between DPAD and tilt modifiers if you omit the 2-way toggle.

- Only Profile 2 is available for angles/button layouts if you omit the 3-way switch.

- You lose nunchuck and upcoming Smash Box accessories by omitting the nunchuck port.

- You lose the ability to program the controller or update the firmware if you omit the USB connector.

- You lose the ability to use the Smash Box on a Gamecube, Wii, WiiU or Gamecube controller adapter if you omit the detachable cable.

- You lose the ability to force USB Gamepad mode on startup if you omit the TILT button.

We provide no warranty to third parties (ie, your customers) if they want any sort of help or warranty on parts. However, we are available for help/tips on modding, construction and using the Smash Box Designer software in our discord.

USB Functions

The USB cable is used for programming the Smash Box and upgrading the firmware. Smash Boxes are capable of also working as USB Game controllers. This works for emulators and PC games, and has been tested with on Windows, Ubuntu and RetroPie. Any computer capable of working with HID USB devices will work with the Smash Box. Support for more systems (PS3, Xinput, Switch) is planned.

The Smash Box is not capable of working in USB Controller Mode and Gamecube Controller mode simultaneously. To use the Smash Box in PC Controller mode, you must hold the default TILT button while plugging it into a PC. It must not be connected to a console when you do this, it HAS to be fully off. You can also program a Smash Box to always boot up as a PC controller (with the tilt-on-start option swapping it to GCC mode) through the Designer.

JLF Orientation

The Smash Box Experience and ALL Gen2 Smash Boxes and newer (identified by the presence of a detachable cable) come with a cable harness for a Sanwa JLF. The orientation of the PCB assembly on the JLF must have the connector facing to the right (when looking at it from the underside of the panel you're fastening it to). It connects to Analog Up, Analog Down, Analog Left, and Analog Right and gives you 8-way control of the analog stick. For slight movement, a TILT button must be used. The Ultimate profile has a tilt button as part of its right side for exactly this reason.

If you need to rotate the PCB assembly on your Sanwa, follow the steps to remove the restrictor plate: https://www.youtube.com/watch?v=5V_Fh8i6eSY. With the restrictor plate off, you can then rotate the PCB assembly until it faces the correct way, and then you can pop the assembly back on.
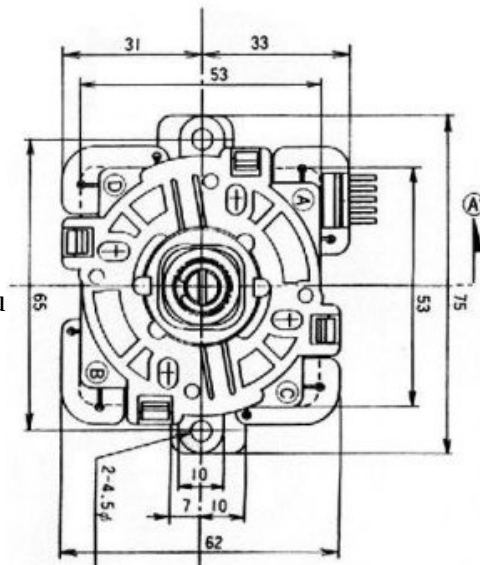
Recommended Tools

The wire lengths and connectors were specifically tooled for the Hit Box brand Smash Box. You may find the lengths to not be a good fit for your own controllers. All of the wires can be extended using butt splices, and all of the connectors can be replaced with new crimps.

For connectors you choose not to install, make sure that signal lines and ground lines are tied separately (or cut off completely). For cables to buttons you choose not to wire, you can generally bundle all of the unused buttons in one group and all of the unused grounds in another group. Gaffing tape or Gorilla brand tape are recommended, as they're residue-free and mostly permanent. Electrical and vinyl tapes will undo themselves with enough heat.

There's a case ground (it's thick, striped yellow and green, and has a ring connector) on the harness. As the Hit Box and Smash Box are made of metal, we attach this wire to the entire case. It's not strictly necessary to attach it to your case, but it helps with electrical interference.

Wire stripper - https://www.amazon.com/gp/product/B000OQ21CA/

Flush cutter - https://www.amazon.com/gp/product/B00FZPDG1K/

Tweezers - https://www.amazon.com/gp/product/B019SLLOMY/

Female .110" quick disconnects - https://www.amazon.com/gp/product/B01962MW2G/

Crimper for insulated quick disconnects - https://www.amazon.com/gp/product/B00YGNGS5S/

22ga stranded wire - https://www.amazon.com/gp/product/B01K4RP9UE/

Male to Male Dupont Headers - https://www.amazon.com/gp/product/B01LXI92LE/

Butt Splices - https://www.amazon.com/gp/product/B01ECFP38C/

Sanwa's Online Catalog - https://global.rakuten.com/en/search/?sid=sanwadenshi&tl=566382

Warranty Statement

We are not responsible for how you use the kit and cannot offer any sort of customer support beyond basic troubleshooting for people who purchase Smash Boxes made with the kit from third parties. As such, it's the responsibility of the modder to provide support for physical controller problems (like button or wiring issues). We're also not responsible for anything relating to modding the boards or harness or for support on unofficial firmware builds.

Links

Users of controllers made with the Smash Box Experience get all of the software and firmware features available to Hit Box's Smash Box customers. Namely, the Firmware Upgrader and Smash Box Designer. On top of that, they get the same support for software/firmware and can make feature requests like anyone else. We want to see your builds!

- General information on the Smash Box can be found at:
  https://www.hitboxarcade.com/blogs/smash-box

- The Smash Box Designer and Firmware can be found at:
  https://www.hitboxarcade.com/pages/downloads

- Smash Box Blog:
  https://www.hitboxarcade.com/blogs/smash-box

- How To Play:
  https://www.hitboxarcade.com/blogs/how-to-hit-box/tagged/smash-box

- Smash Box Product Page:
  https://www.hitboxarcade.com/collections/main-store/products/smash-box

- Hit Box on YouTube:
  https://www.youtube.com/user/HitBoxes/featured

- Twitter:
  https://twitter.com/hit_box

- Come say hi to us on the official Hit Box Discord:
  https://www.hitboxarcade.com/discord