The "Obey" Chip version 3 Turbografx-16 / PC Engine Region Mod Switch Install

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TOP VIEW   BOTTOM VIEW   BOTTOM VIEW WITH SWITCHLESS OPTION

ATTENTION: We cannot be held responsible for any damages that may occur while attempting this mod. Proceed at your own risk!!!!!

This modification requires that you **permanently** modify your console. If you are not comfortable with irreversibly altering your console from its factory design, then DO NOT proceed! Installation of this region chip requires that you do some soldering of some very tiny wires and connections. If you are not skilled with a soldering iron, please have this installed by someone experienced!

* All Japan region consoles will require Pin 29 of the HuC6280 chip grounded. This defeats a CPU region lockout check. ** I would advise against modifying these units due to their rarity. *** Some issues have been reported with some SGX games when Pin 29 of HuC6280 is grounded. It is recommended that you use a DPDT switch and use the second switch to switch between grounding or connecting the HuC6280 pin 29 connection.

Parts & Tools list

Console Installation: "Obey" Chip Version 3 (Qty 1), SPDT Switch (Qty 1), 26 or 28 gauge Wire (~ 2 ft)

Portable Installation: "Obey" Chip Version 3 with Switchless option (Qty 1), 28 and 30 gauge Wire (~ 2 ft)

Tools You Will Need: Soldering Iron, Desolder Braid (Useful if you use too much solder), Snips (small sharp snips for cutting hucard slot pins), Wire Cutters / Strippers, Drill / Files (for cutting holes for switches), Tweezer, Screwdrivers (Philips and Flat) – Express / GT / Duos, Security Bit (4.5mm) – US Duo, CGFX, etc, Security Torx T10 – PC Engine Duo

A few more precautions!

This version of the region chip is very fragile. Please handle with care during the installation process. Before proceeding with install, inspect region chip to insure there are good solder on Main IC (U2) legs to pads on flex board as they tend to separate. It would not hurt to resolder or reflow the IC legs prior to installation. It is also recommend to check continuity between IC to hucard slot pinouts referencing diagram below. Each red label on the motherboard side and hucard side corresponds to the red labels on U2 by its number. Note there is a bridge between U2's pins 11 & 12 which is normal and part of the design. Please read this guide through its entirety prior to installation!!

Motherboard Side   **Hucard side**

Console Installation

Turbo Duo/PCE Duo   PC Engine/Coregrafx   Duo-R/Duo-RX   Turbografx-16
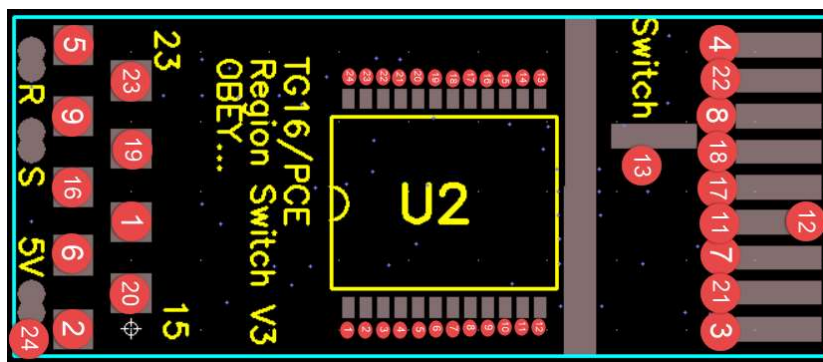
1. **Step: Opening Consoles**

   Before we can install the region mod, we need to extricate the motherboard from the system's shell. So to begin with, we need to unscrew and remove the plastic shell. This is fairly straightforward on these systems. Just be sure to remove every screw that secures the case together. Set your shell aside for now. Once you have the shell removed, we need to remove the motherboard. By having the bare motherboard out of the shell, we can access the bottom solder points of the hucard slot. On most systems the motherboard is held in with several screws. On duo systems you will have to unplug the laser mechanism connections as well. On US Systems, there will also be large RF shields that will have to be removed. They are usually soldered on, so you'll have to heat the solder while pulling on the shield or use a solder vacuum. If you are modifying a Japanese system, see the appendix at the end of this guide!
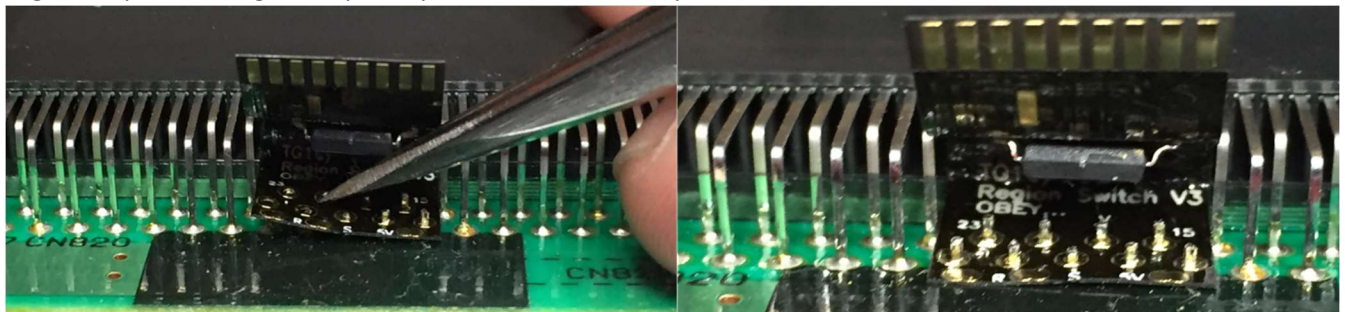
2. **Step: Cut Hucard slot pins**

   OK now the fun part! Locate your hucard slot and look for markings on the motherboard that indicate pins 1 and 2, and pins 37 and 38. We need to find pins 15 through 23 and cut all 9 pins as shown below. The bottom pins can also be removed (not recommended for Duo-R systems) using your soldering iron to heat up the solder point on the motherboard for each one and using tweezer to remove each cut pin from the motherboard.
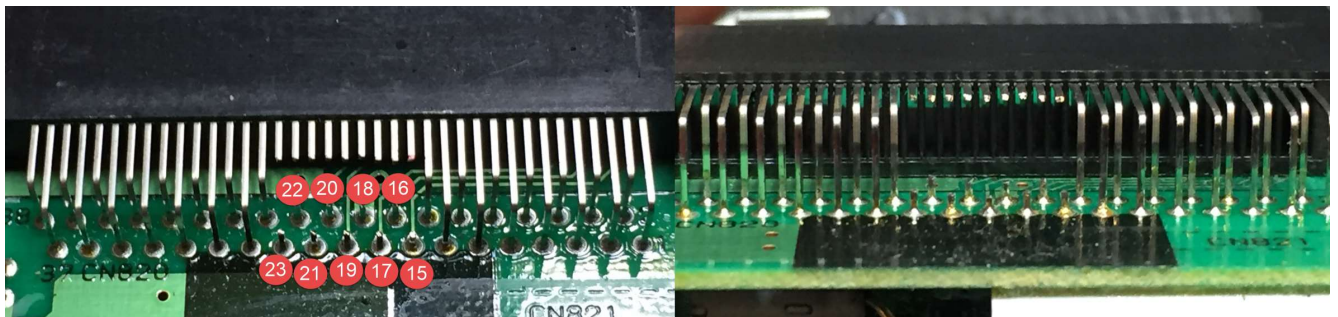

3. **Step: Insert motherboard side of Region Chip**

   Note: removing bottom pins as mentioned earlier will help with this step. With a tweezer, carefully align and place the region chip to the bottom pins on the motherboard. You may need to align the bottoms pins to the opening on region chip. You can align the pins using a tweezer. Space will be a little tight but DO NOT force the region chip on bottom pins. Doing so can rip out the traces around the opening on motherboard side of the region chip. Once region chip is in place, solder bottom pins.
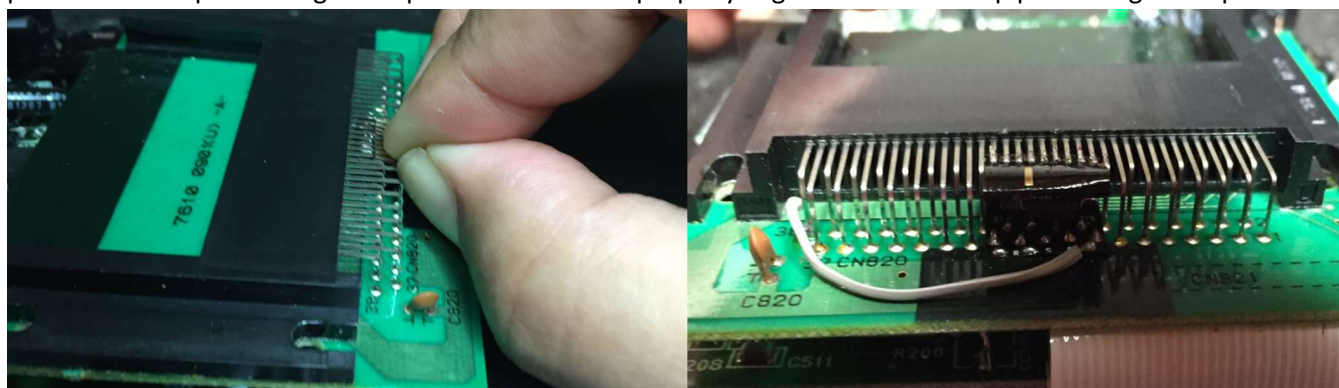
4. **Step: Wire 5V to Region Chip**

   Cut and solder a wire from 5V on motherboard to "5V" on region chip. Careful not to bridge "5V" to pin 15 on motherboard side of region chip. In most cases, you can get 5V directly from hucard slot pin 38. However, there will be cases where you'll need to get 5V from another source such as from a regulator. One thing to note, "R" and "S" are not utilize for console installation.
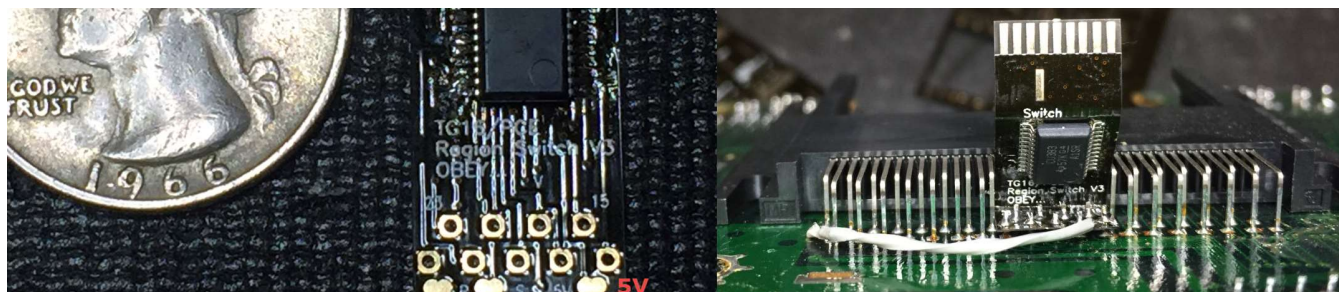
5. **Step: Tuck Hucard side of Region Chip**

   Carefully fold the hucard side of region chip and tuck it underneath the top pins of the hucard slot. Ensure top pins and solder pads of region chip's hucard side are properly aligned and solder top pins to region chip.

6. **Step: Wire SPDT Switch & Mount Switch**

   Lastly, we need to wire in our SPDT switch! Solder wire from the center pole (middle position) of the switch to "Switch" pad on region chip. Wire and solder 5V (Hucard pin 38, etc) to one end pole of the switch and the opposite end pole to ground (Hucard Pin 18, etc). I recommend testing your region mod to make sure it's operation before mounting your switch on your shell. You can also test region mod by wiring ground directly to "Switch" for default/native region check and 5V directly to "Switch" for opposite region check.

   Mount your switch on your shell wherever you like. Reassemble your system and give it a try! If you put in the wrong region hucard, you'll just get a blank colored screen. So put your game in, try it and if it doesn't work just turn the system off, flip your switch and try again! If it works, then you've done it! Congratulations!

   If it doesn't work, don't panic! Just re-check all your connections and make sure no wires had gotten pinched or came loose during the re-assembly of your system.

# Portable "Switchless" Installation

This guide is tailored to the Turbo Express and PC Engine GT systems. I haven't tried this on a PC Engine LT system.

1. **Step: Opening Handhelds**
   To begin with you need to remove your system's motherboard from the shell. Use caution when removing ribbon cables and connectors to make sure they do not get damaged! Note: While working on an Express or GT system, try and not flex the ribbon cable between the main board and the hucard slot too many times. It will eventually fatigue and could break!

2. **Step: Cut Hucard slot pins & Install Region chip**
   From here, the procedure is similar to the procedure on a console system. The same pins must be snipped / removed. The switchless option will have a couple of additional components that are missing from the console install version. Note the "5V", "R" and "S" on region chip. "5V" can be tapped from the hucard slot Pin 38. "R" is tapped from hucard slot pin 36. Solder one end of a wire to "S" on region chip. The other end of the wire will go to the Express/GT controller board later.
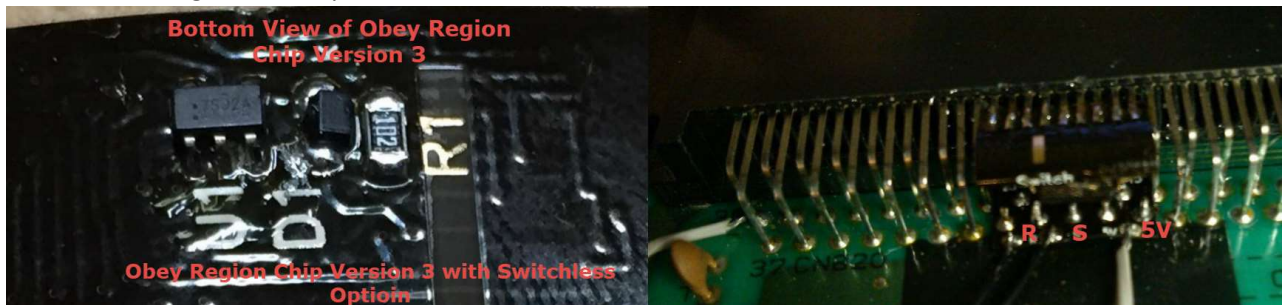
3. **Step: Wiring "S" to Controller Board**
   Lastly solder the other end of the wire from "S" to the indicated point on the controller board. The solder point is right below the "8" where "IC800" is printed. You will need to remove the controller circuit board from the shell to access the solder point. Secure that solder point with some hot glue. Route the wire to where it won't get pinched during assembly.
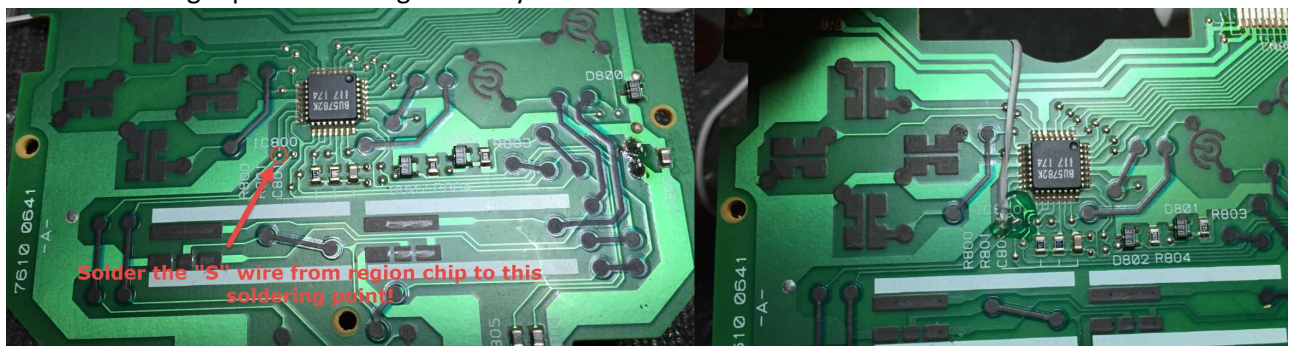
Now that all these connections are made, reassemble your system, put in some batteries and test it! The way this region switch works is, if you insert a native region hucard, the system will operate as normal. If you insert a hucard from the non-native region, you need only hold the select button while powering the unit on. It's as simple as that!

One small caveat. If you are using a non-native region hucard and you quickly turn the unit off and pop in a native region hucard, the system may not switch back to the original region immediately. This is a limitation of the design. There is a capacitor that must discharge before the region will revert back to the native region. Wait 5 seconds before turn the system back on and you won't have a problem.

Also, when running one of these systems on batteries, if your batteries get discharged to the point where the screen starts to get brighter and brighter, the system may freeze up. This is because the voltage is too low for the switch chip to operate correctly. If this happens, change your batteries!
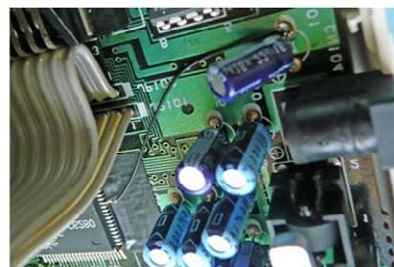
Appendix A: Additional Installation Method & Modification Required on Japanese Systems only!

Because of the fragile nature of the flex board design of the new region chip, some people prefer to solder wires from motherboard and hucard slot pins to the region chip like previous revision of the obey chip.

On all Japanese systems, one additional modification must be done in order for the region switch to work. This requires that you carefully solder wire to Pin 29 of the HuC6280 chip and connect it to ground.

Connect a piece of wire to HuC6280's Pin 29 and connect it to a ground point!

(Pictures sourced from http://www.mmmonkey.co.uk/console/pce/region.htm)