

Updated 9/25/2020

Atari Jaguar Rapid fire 2.0 - by grips03 on Atariage

Sales thread on Atariage:

<https://atariage.com/forums/topic/304243-rapid-fire-20>

Supported Controllers:

Starwander (Reproduction) Pro Controller - Pages 2-3

Atari Jaguar Gray and Black keypad controllers - Pages 4-5

Tools Needed:

X-acto knife – used to isolate one wire in the controllers ribbon cable.

#1 Philips head screw driver – Wiha PH1x80 311 - used to open controller case

1/16th inch hex screw driver – Wiha 96316 1/16 hex x 50mm - used to secure RF pcb

¼ inch nut driver – Wiha 26563 Nut Driver, 1/4 x 60mm – used to secure RF pcb

1/16th inch drill bit – used to start led hole

4.2mm drill bit – used to finish led hole

1/8 inch drill bit – used to drill 3 holes in rear of controller case

½ inch step drill bit – Neiko 10182A – used to drill RF button hole

Counter sink drill bit – used to drill top and bottom holes in the back controller case

Wire cutters – Hakko CHP-170

Wire strippers – Hakko CSP-30-1

Soldering iron – Hakko FX-888D with chisel tip

Kapton tape – helps hold wires together (SPC).

Digital caliper – helps with measuring 5mm spacing to drill led hole (stock controller)

Since you are drilling into plastic, get the drill bits designed for metal. Sometimes the wood drill bits are too aggressive.

Starwander Pro Controller Install Instructions

- Make sure the controller works. Use a game or joystick test rom
- Remove 4 screw covers and stick to back of the controller in an area you won't drill. Remove the 4 screws. Controller case comes apart.
- Place the drill template pcb in the area on the back of the controller with **TOP** at the top and **BOTTOM** at the bottom, press it down/left or down/right and hold. Do not allow the pcb to move during this step. Drill three 1/8 inch holes as indicated on the pcb.
- Counter sink the top and bottom holes. Use included 4-40 screw head as guide for depth and size.
- Use step drill, to drill out middle hole to fit button, 8.34mm or .328 inch. Test fit the button and make sure the hole is slightly bigger than the button.
- Placed 4-40 screws in holes and tape the heads. Use a piece of tape for the top and another piece of tape on the bottom screw.
- Place spacers on the screws (inside controller). Secure pcb with nuts provided.
- Desolder L and R button wires from the switch side. Tin L and R switch side leads.
- Remove three screws and take out both circuit boards. Do not bend ribbon cable between top and bottom pcb.
- Pull top and bottom pcbs away from each other on a flat surface. Make sure to do this only once as the ribbon cable is very fragile. This should make the ribbon cable semi-flat.
- Counting the ribbon wires from left to right, mark entire length of wire 8 with marker.
- Cut ribbon cable vertically on each side of wire 8 for the entire length with X-acto knife.
- Snip wire 8 in the middle.
- Desolder wire 8 from top and bottom pcb.
- Remove the buttons and d-pad.
- On the SPC there is a circle on the top / left **INSIDE** of the front controller case above the buttons and near where the cord comes out. Drill in the center of that circle. Drill hole with 1/16 inch drill bit. Re-drill with 1/8 inch drill bit. Re-drill led hole on the **OUTSIDE** of the controller with 4.2mm drill bit. Deburr led hole as needed.
- Place led in hole, long led leg (+) on the left (when looking from **INSIDE** controller) and hot glue in place.
- Return the buttons and d-pad. Make sure to align buttons in the hole using the notches.
- Use marker to label the + and - of the led on the top pcb. Use marker and put letter **G(reen)** on the top pcb and put letter **B(lue)** on bottom pcb. Trim led legs to a ~ 3/16 inch. Separate led legs a little. Tin led legs.
- Layout front and back controller cases, such that the bottom of each controller half is touching each other. You want to be looking at the inside of the controller. Place top and bottom pcb assembly generally in the area they will be. Do not screw down pcb assembly yet.

- Cut Blue (Col3) wire to 6 inches. Trim insulation back ¼ inch. Twist and tin wire and snip just the very end. Solder Blue wire to bottom pcb, pad 8.
- Cut Green (NewB) wire to 6 inches. Trim insulation back ¼ inch. Twist and tin wire and snip just the very end. Solder Green wire to top pcb, pad 8.
- Note VCC and GND pins on the cable header. Now flip pcb assembly over and label VCC and GND.

WARNING!!!!

- **There is no polarity protection on the RF PCB. Do not solder the Black and White wires in the wrong spot.**

WARNING!!!!

- Cut Black (GND) wire to 6 inches. Trim insulation back ¼ inch. Twist and tin wire and snip to 1/8 inch. Solder Black wire to GND on the back of the lower pcb.
- Cut White (VCC) wire to 6 inches. Trim insulation back ¼ inch. Twist and tin wire and snip to 1/8 inch. Solder White wire to VCC on the back of the lower pcb.
- Cut Gray (Led -) wire to 6 inches. Trim insulation back ¼ inch. Twist and tin wire and snip to 1/8 inch. Solder Gray wire to Led -.
- Cut Purple (Led +) wire to 6 inches. Trim insulation back ¼ inch. Twist and tin wire and snip to 1/8 inch. Solder Purple wire to Led +.
- Stuff wires back into controller in a way that they are not pinched when the case is closed. RF wires should be in the middle between the two plastic walls that surround the RF pcb. It helps to fold the wires as needed. Sometimes a little bit of kapton tape helps hold wires in place. Put screws in and test. If it works ok, then put screw covers back on.
- **Done**

Atari Jaguar Gray and Black keypad controller - Install Instructions

- Make sure the controller works. Use a game or joystick test rom
- Remove 4 screw covers and stick to back of the controller in an area you won't drill. Remove the 4 screws. Controller case comes apart. Longer screws go in the bottom holes on black keypad controller.
- Place the drill template pcb in the area on the back of the controller with **TOP** at the top and **BOTTOM** at the bottom, press it down/left or down/right and hold. Do not allow the pcb to move during this step. Drill three 1/8 inch holes as indicated on the pcb.
- On the outside back of the controller counter sink the top and bottom holes. Use included 4-40 screw head as guide for depth and size.
- Use step drill, to drill out middle hole to fit button, 8.34mm or .328 inch. Test fit the button and make sure the hole is slightly bigger than the button.
- Place 4-40 screws in holes and place spacers on the screws (inside controller). Secure pcb with nuts provided.
- Remove two screws and take out pcb assembly from controller front.
- Remove the buttons and d-pad.
- On stock controller mark 5mm to the right of the "I" in ATAR(I) on the front controller case. Center the mark vertically using the mid point of "R" in ATA(R)I. Drill the marked spot with 1/16 inch drill bit. Re-drill with 1/8 inch drill bit. Re-drill with 4.2mm drill bit. Deburr led hole as needed.
- Place led in hole, line up the long led leg (+) on the left (when looking from **INSIDE** controller) and hot glue in place.
- Pull top and bottom pcbs away from each other on a flat surface. This should make the ribbon cable semi-flat.
- Counting the ribbon wires from left to right, mark entire length of wire 7 with marker.
- Starting from ~1/2 inch from the top cut the ribbon cable vertically about ~1.5 inches on each side of wire 7 with X-acto knife.
- Snip wire 7 in the middle of the cut portion. Trim wire about 3/16 inch on each side.
- Tin pin 10 and 20 on 74HC244E IC.
- Return the buttons and d-pad and screw in pcb assembly.
- Use marker to label the + and - of the led on the top pcb. Use marker and put letter **G(reen)** on the top pcb and put letter **B(lue)** on bottom pcb. Trim led legs to a ~ 3/16 inch. Separate led legs a little. Tin led legs.
- Layout front and back controller cases, such that the bottom of each controller half is touching each other. You want to be looking at the inside of the controller.

- Cut Blue (Col3) wire to 6 inches. Trim insulation back $\frac{1}{4}$ inch. Twist and tin wire and snip end. Place heat-shrink tubing over wire. Solder Blue wire to bottom wire 7. Heat tubing.
- Cut Green (NewB) wire to 6 inches. Trim insulation back $\frac{1}{4}$ inch. Twist and tin wire and snip end. Place heat-shrink tubing over wire. Solder Green wire to top wire 7. Heat tubing.

WARNING!!!!

- **There is no polarity protection on the RF PCB. Do not solder the Black and White wires in the wrong spot.**

WARNING!!!!

- Cut Black (GND) wire to 6 inches. Trim insulation back $\frac{1}{4}$ inch. Twist and tin wire and snip to $\frac{1}{8}$ inch. Solder Black wire to pin 10 on 74HC244E IC.
- Cut White (VCC) wire to 6 inches. Trim insulation back $\frac{1}{4}$ inch. Twist and tin wire and snip to $\frac{1}{8}$ inch. Solder White wire to pin 20 on 74HC244E IC.
- Cut Gray (Led -) wire to 6 inches. Trim insulation back $\frac{1}{4}$ inch. Twist and tin wire and snip to $\frac{1}{8}$ inch. Solder Gray wire to Led -.
- Cut Purple (Led +) wire to 6 inches. Trim insulation back $\frac{1}{4}$ inch. Twist and tin wire and snip to $\frac{1}{8}$ inch. Solder Purple wire to Led +.
- Stuff wires back into controller in a way that they are not pinched when the case is closed. RF wires should be in the middle between the two plastic walls that surround the RF pcb. It helps to fold the wires as needed. Put screws in and test. If it works ok, then put screw covers back on.
- **Done**

Troubleshooting:

If RF is not working in a game and you just changed the CPS rate, release B and re-press. This is likely due to game behavior, but I've not been able to prove it. It occurs very rarely.

Black keypad controller's d-pad is not ideal for Raiden game, due to how the d-pad is shaped. Namely diagonals are hard to engage, with down / left being the worse. If you are looking to play Raiden game with rapid fire then use Gray keypad or Reproduction Pro Controller. If you find you are playing a game that mostly uses Up, Down, Left, Right and not diagonals then the black keypad controller is fine.

How it works:

Jag RF 2.0 supports five rapid fire (RF) speeds (cycles per second) for B button for Standard Gray and Black keypad button Jaguar controllers. If using Starwander (reproduction) Pro Controller it supports rapid fire for B and Z**. RF led will flash to let you know you pressed the RF button.

Power on console. RF is off and RF led is off.

- 1) Press RF button in the back of controller to enable rapid fire. RF led turns on and rapid fire rate is set for 5 CPS.
- 2) Press once more for 6 CPS.
- 3) Press once more for 7 CPS.
- 4) Press once more for 8 CPS.
- 5) Press once more for 9 CPS.
- 6) Press once more disable RF. RF led goes out.

Ideal CPS for Jag games:

BSG = 5

Raiden red shot = 6 and 9 if red weapon is fully charged.

Zero 5 shot = 7

Trevor McFur = 9

Mod install Difficulty:

Stock gray / black takes around 45 minutes to mod and 15 minutes to test. It's average difficulty, as the stock PCB pad and ribbon cable are strong.

Starwander Pro Controllers are much harder and take longer due to fragile ribbon cable, fragile pcb pad, re-leveling of the d-pad pcb, and less room. If you bend the ribbon cable that goes between the d-pad/button PCB and keypad PCB 2 to 3 times installing the mod you are fine. If you bend it 5 to 6+ times you will likely break it and it will need to be replaced.*** When replacing the ribbon cable note PCB pads are very fragile.

** Starwander Pro Controllers only - when Rapid Fire is enabled it provides Rapid Fire for both B and Z buttons. If you want Rapid Fire for B only on a pre-modded controller add \$20. More details at the end of this document.

***If you damage the Starwander Pro Controller ribbon cable order:

Qty 2 1832785-1 from Digikey or Mouser. Cut to the correct number of contacts and solder in. This solid core ribbon cable has the correct pitch, wire size and length. It is much stronger than what its replacing. You might want to order 4 as shipping costs more than the ribbon cable.

Rapid fire for B and Z on SPC:

I did some more testing on the Starwander Pro Controller (SPC) and B and Z (aka keypad 7) get enabled for rapid fire when rapid fire is turned on. Please note B and Z still work independently. Its not like if you press and hold B, then some how Z is being pressed, its not. Its just if you press and hold Z, then Z also has rapid fire (if rapid fire is enabled). And yes one could press and hold B and Z and have rapid fire for both. If one did not want rapid fire for Z, and rapid fire was enabled, then just press keypad button #7.

tech details:

What happens is on the SPC's top pcb both B and Z are present. So when the rapid fire microcontroller changes Pin3/Col3 to be Rapid Fire or no Rapid Fire it changes it for everything on the top PCB that use Pin3/Col3, namely both B and Z.

If you want to remove rapid fire from Z on the SPC. It requires cutting a thin trace on the SPC's top board and then scraping the solder mask off and soldering NewB wire to this point vs. using the normal rapid fire insertion point at the ribbon cable. Since the SPC's top pcb trace going to Z and B is so thin it can rip up very easily. It also might make sense to drill a small hole in the top pcb and route the 30awg kynar wire to that spot. Best drill location is likely just above the two holes you see in the picture below. I would drill right through the trace in question. I'm using kapton tape to hold the backside of the top pcb and wire in place, but perhaps hot glue or something else might be better. I'm looking for a recommendation if you have one. I would only recommend doing this for people who don't care if they ruin the SPC's top pcb. Please do not try this if you are not really good at soldering. I would charge \$20 more for this single wire and think most people will be happy with rapid fire for both B and Z on the SPC.

For stock Jag controllers Pin3/Col3 on the top pcb affects B only.

SPC notes:

LB = 4 RB = 6

Z=7 Y=8 X=9