

**BG2/P41 w/slave flash and external camera batteries
In a Seahorse SE 120**



Specs:

Control board: BG2

Fresnel lens: Standard Fresnel Tech .65 focal length LODIFF

Camera: Sony P41

Enclosure: Seahorse SE 120...plain black

Slave: FM 600

Slave Power Controller: BG2

Slave Trigger: Digital Peanut

BG2 power: 9 Volt

Slave flash power: 2 C size

Camera external power: 2 C size

Moisture protection: 40 Gram Desiccant Pack

This is a brief overview of the steps taken to build this trail camera. If you want more detailed information feel free to ask on the forums. Please know that you could ruin your camera if not very careful, and you may be exposed to high voltages. Care must be taken to avoid damage or injury.

Parts and supplies needed:

Sony P41 digital camera
BG2 camera control board/w standoffs and lens from hagshouse online store
40 Gram Desiccant Pack from hagshouse online store
Shutter assembly from hagshouse online store
PT 1100 tape from hagshouse online store
Label Sheet from hagshouse online store
2-1¼ inch circles from hagshouse member gddean (Trails End website)
Seahorse waterproof case (link in hagshouse online store)
FM 600 flash unit (link in hagshouse online store)
Wein Digital Peanut (link in hagshouse online store)
P41 flash gasket from arkensaselkhunter.com (link in hagshouse online store)
2- Radio Shack 270-1803 enclosures
Radio Shack momentary pushbutton switch 275-646 or equivalent
Radio Shack toggle switch 275-324 or equivalent
1 five-wire connector needed...I also recommend one for the connection to the BG2
9-volt battery holder (I like P/N 12BH610 from Mouser Electronics)
2 two "C" cell battery holders Radio Shack 270-385 or equivalent
0.47 ohm 5 watt resistor Radio Shack 271-130 or equivalent
In-line fuse holder Radio Shack 270-1281 or equivalent
2.0 amp 250-volt fuse Radio Shack 270-1007 or equivalent
Heat shrink tubing Radio Shack 278-1627, 278-1610 or equivalent
Black electrical tape
Denatured alcohol
Marine Goop or similar glue...and a small syringe to apply it is nice too
Solder (I use .032 Rosin core from Radio Shack)
Replacement seal for case (highly recommended) from hagshouse member Mibucks

Optional supplies:

Aluminum tape used in home air and heating work
Double sided tape (see picture of this below)
Velcro tape to attach the desiccant canister to the case

Tools you will need are:

Soldering gun (I recommend Radio Shack 64-2055)
Drill and drill bits
Small Philips screwdriver
Hobby knife and new blades
Wire cutter and stripper
Pliers, hammer and Allen wrenches

Basic Layout:

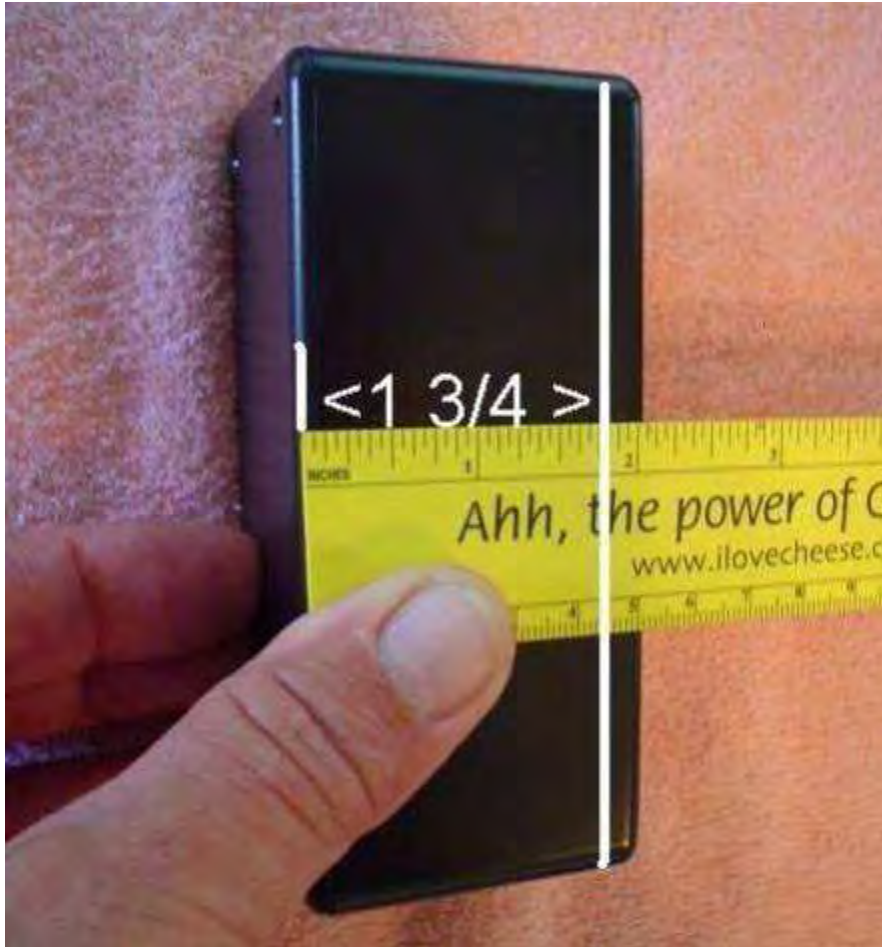
You will need to decide how you want to lay out your components. First thing is deciding if you want the camera looking out the front of the case, or out the back. On my cam I wanted to keep everything on one side, to keep the wires as short as possible and to prevent them from getting pinched. Personally I like the camera facing the back of the case, but it will work either way you choose.



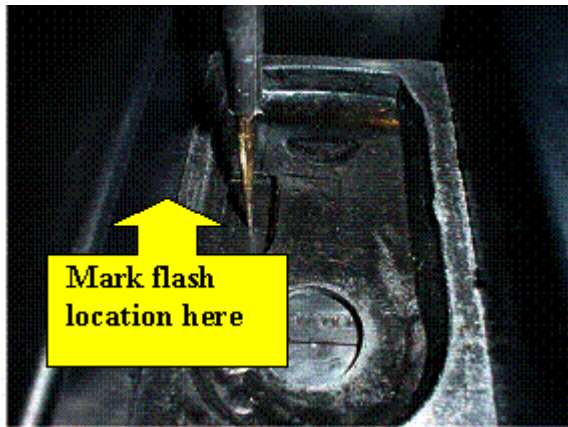
Before you start your build, I recommend separating the front from the back of the case to make access much easier. To do this, drill through the end of the hinge just enough to see the pin (see picture) then tap the pin out with a hammer and a bent nail or Allen wrench only enough to grasp it with pliers. Pull the pin straight out, do not twist it.



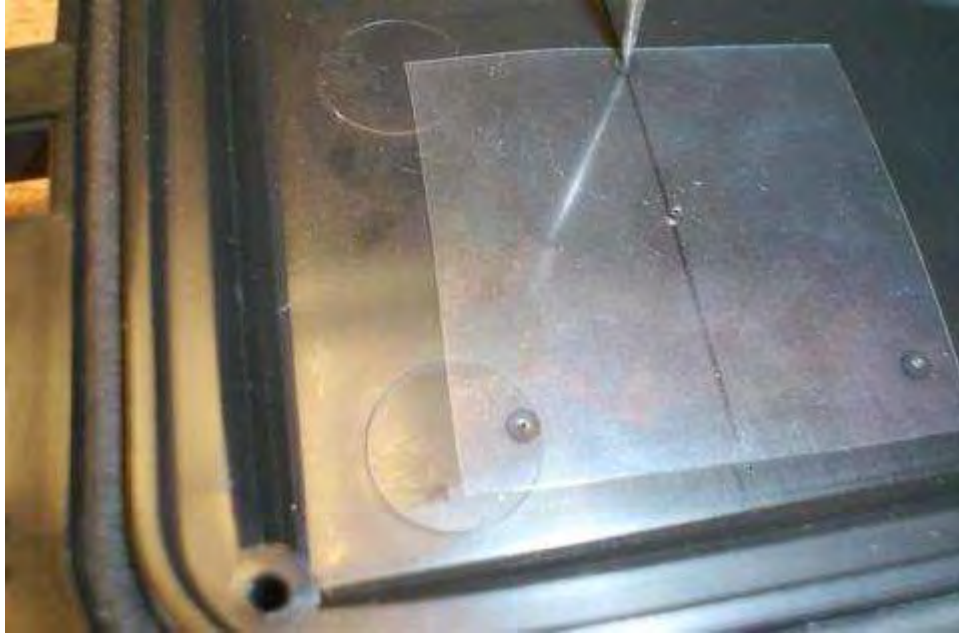
I chose to enclose the BG2 in a project box for a simple to use cam. To fit everything inside the case, with the lid ON the box, measure $1\frac{3}{4}$ inch from the top and cut the bottom off of the boxes. This gives plenty of room for the flash and the BG2, while allowing room for the batteries.



Put both “cut to size” project boxes and the flash gasket, with the camera in it, where they go. You will want to put everything as close together as you can so the case can be closed without things hitting...there is room, but not much extra. Now mark the project box position from inside, remove the camera from the gasket, and mark where to drill the holes for the camera lens and flash. Now is a good time to also mark the top box where the camera flash will line up with it. The slave trigger will be inside the box and needs to see the flash from the camera, so it can tell the slave to fire.



With a straightedge and a marker draw a line down from the center of where the camera lens will be to the center of the BG2 sensor location. Then, using your BG2 template, mark the location of the stand-offs and the center of the sensor.



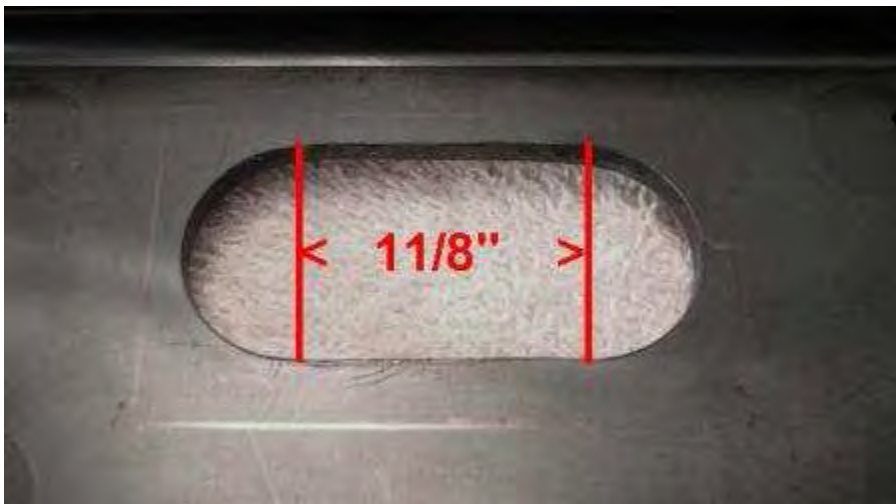
Next mark the location of the slave flash bulb. You will want it high enough in the box for the Peanut to have room toward the bottom, so put the bulb high of center.



The easiest way I have found is to put the glass... or if building an infrared camera, the IR filter material in place and mark around it with a marker. That way you can easily align it.



For the slave flash opening I used a 1 1/8 center to enter size hole drilled with a 1 inch bit. Measure and mark the locations within the lines. After drilling the two holes, cut the rest and clean it up with a file or wrap some sandpaper around a file and do it that way for a clean smooth hole.



For the camera lens and the camera's flash openings I used a 1/4-inch Forstner bit and countersunk the glass flush with the case surface. I used outdoor goop to install them. If building an IR camera, you can easily grind the IR filter material on a bench grinder to fit the recessed hole. If you want to use 3D camo on your camera, I see no reason why you couldn't put the glass on the front of the case. However you do it, remember that the flash gasket **NEEDS** to sit flat against the case... nothing must stick up... or you will get flash bleed.

The BG2 sensor gets a 1-inch hole, and I used a 1/8-inch bit for the stand-offs. Note **DO NOT OVERTIGHTEN THE BOLTS!** The PIR lens is cut leaving about 3/16 around where the rings start, this gives enough surface to use the PT 1100 tape to hold it, then you will want to go around it with Goop for extra measure.

The slave flash glass is installed using PT1100 tape, and will be Gooped around the edges as well. Sorry...it is hard to photograph inside the black case, but you do all this before installing the project boxes.



Now drill a 1/4-inch hole in the bottom corner of each project box for your wires. Be sure to see that they align with each other when inside the case. Also drill your hole for the light to enter the box from the Sony camera flash; 3/8-inch hole is OK for this.



Make a hole through your flash gasket above the Sony camera flash with a hole punch or hobby knife...see picture. This is so the Peanut slave trigger can see it inside the project box, and tell the slave when to fire.



Test fit your project boxes and flash gaskets in the case...with the camera pressed firmly in the gasket, and make sure everything lines up as it should before continuing. If it does, you are ready to glue the boxes in place.

Take a small syringe, and with the plunger removed, fill it with the Goop. I get these from my local pharmacy for free; they are for giving medicine to children and come with no needle. You will thank yourself for this.



Glue around, and up over the edge of your PIR lens and slave flash opening, then put a dot of glue where the “posts” or whatever they are called, will be in the case. Now put the boxes and flash gasket inside the case where they go and put dabs of glue around the inside of each box, you do not need to put a lot.

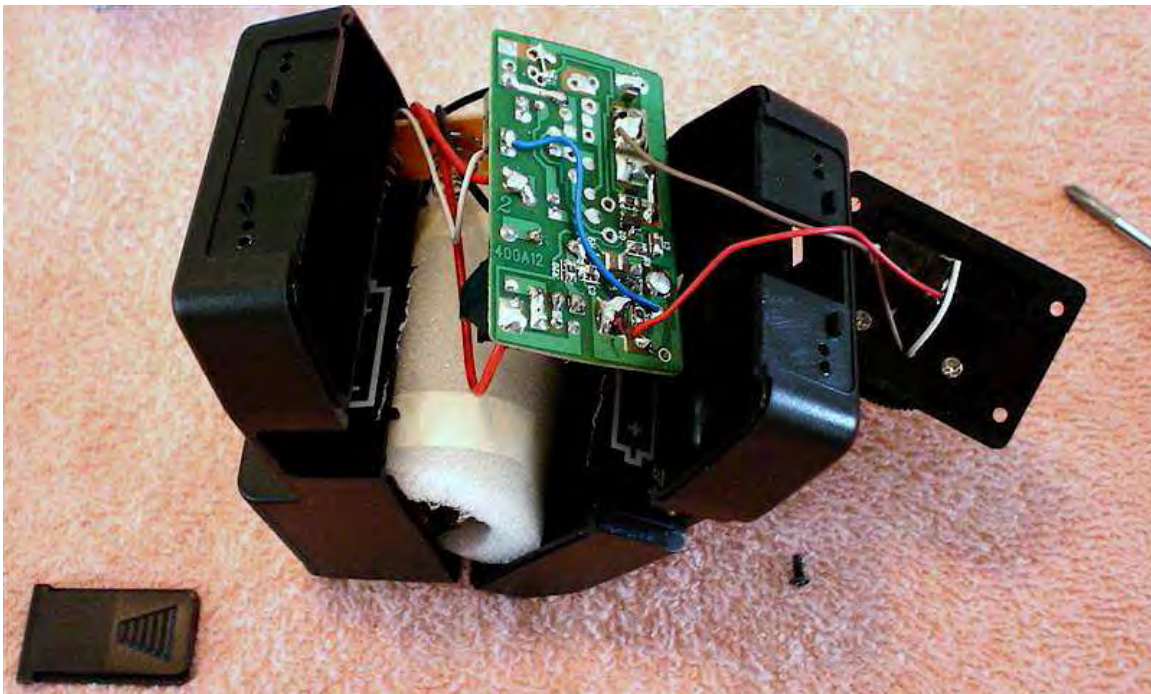
Note...these were taken after the fact; be sure you have the gasket in place when you do this part so you know it will fit when the glue dries. If you are putting everything in the case front lid, be sure the boxes are as far toward the hinge side as they will go. Put a couple of spacers to hold them if you need to.



Set that aside to dry and work on the slave flash.

Warning! The capacitor voltage in the flash could be at over 300 volts if it has been on recently, use precautions when opening the case or it might bite you.

Start the disassembly by removing the four screws from the bottom of the flash and separate it from the unit, don't pull the wires loose. Remove the battery door so the front and back pieces can be separated. Pull it apart gently so you don't tear the wires off of anything... hold the board by the edges where it is safe from "biting". If it is difficult to separate them, it is likely the sticker showing how the batteries go, cut it with your hobby knife and it will come apart easy.



The flash capacitor, which stores the power to make the bulb flash, is wrapped in the foam. You can remove the foam and move it out of the way. Take everything else out of the case and then remove the screw holding the flash bulb in. Be careful with the wires going to the bulb, the white one is a little delicate.



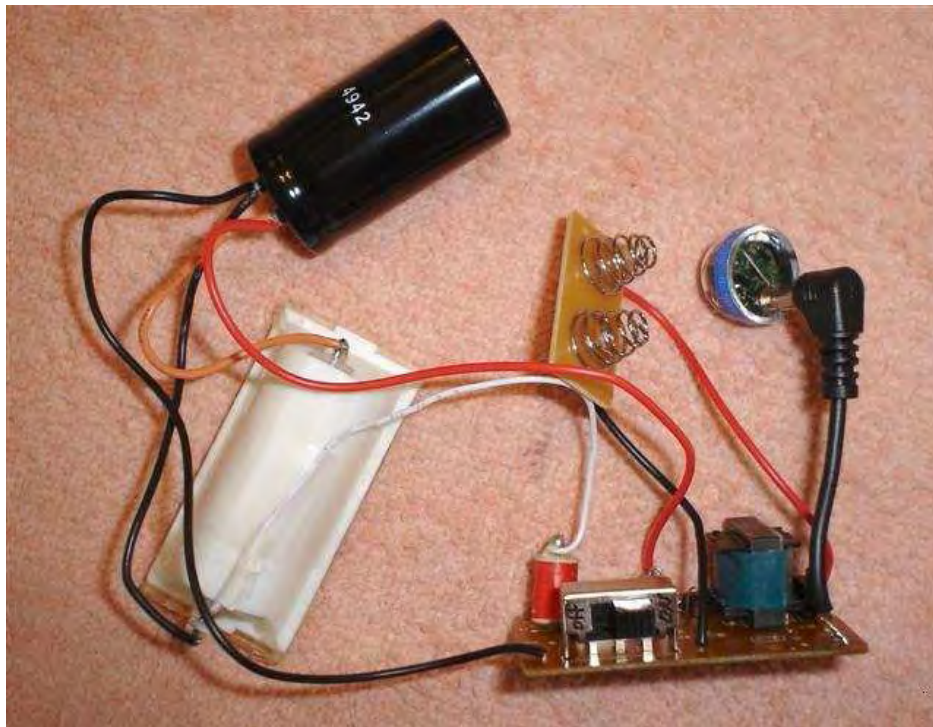
It is wise to tape the white wire to the reflector. This will prevent it from being broken off when handling it.



This is a really simple and easy flash to modify, but it does a good job. Here is what you will be starting with once you remove all the components from the enclosure. Note that I have found two versions; the main difference to you is the hole is missing in the number 1 board.



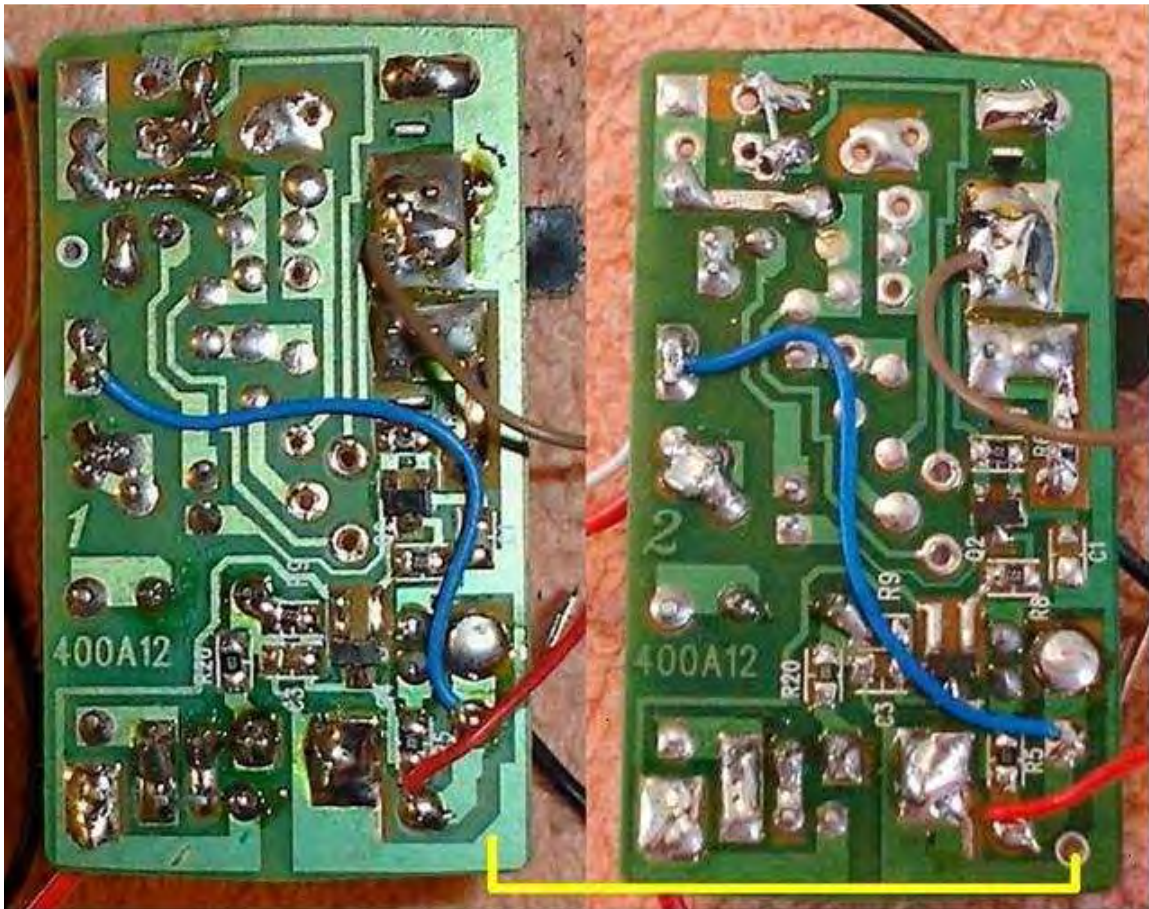
Here it is ready to install.



Shown here are the two versions of the board that I am aware of, they both work fine. If yours doesn't have the hole, like is shown in the number two version, then you can drill one there. Scrape the green coating off around the hole and all the way out to the corner of the board, until you see the copper. This is where the negative wire for the Peanut slave trigger will connect.

Next, remove the brown and red wires from the back of the board, these are the ones that go to the hot shoe connection on the bottom of the original enclosure.

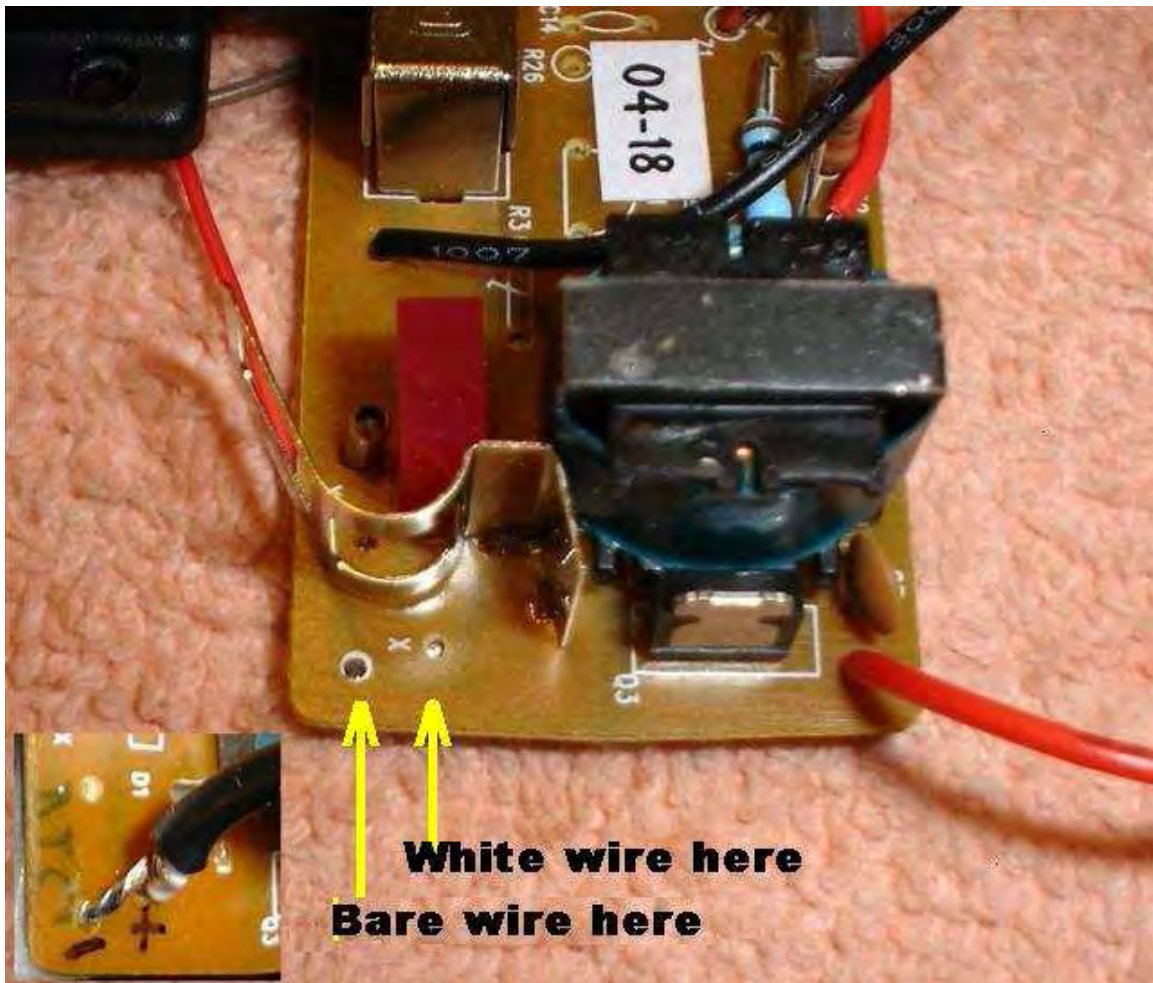
On the top side of the board there is a red LED, a pin and spring thing that is originally used for testing the flash. You can remove all this for a cleaner look, or just leave them there. No resistors or diodes need to be cut from this flash.



The job of the Peanut slave trigger is to see the camera's flash and tell the slave flash when to fire. The Peanut needs to be wired to the slave flash circuit board using the connector included with the flash unit. I cut the connector wire length to about 2½ inches long to keep it neat, but the wires inside are delicate and you may cut them too short when stripping off the insulation. A better choice might be to cut the wire to 4½ inches and loop it around to where the Peanut needs to go.

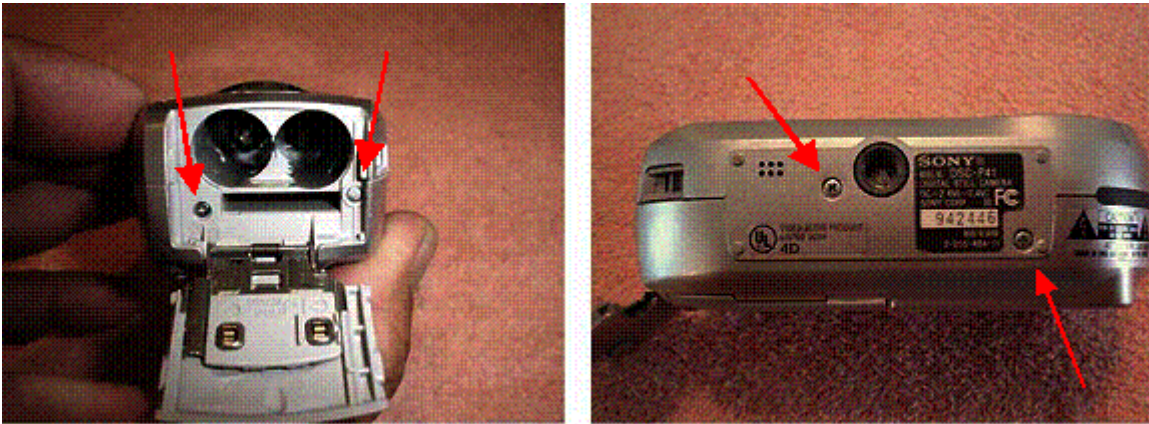
Strip the insulation from the connecting cord about ¾ inch. Inside the black outer insulation you will find a white wire surrounded by tiny bare copper wires. Gather the bare wires together, being very sure not to miss any, and twist them together. Tin the end of this bundle with solder, being careful to not overheat them as this will cause the insulation on the white wire to melt. Strip the white wire about 3/16 of an inch and tin the end. The white wire will need to be soldered into the hole on the right, and the bare ones into the left one. In the picture above this one, see that the white wire will be going where the red one was, and the bare wire will be soldered to the copper trace on the corner. **BE SURE YOU DO NOT BRIDGE THE TWO!**

Another way is to remove the pin beside the LED, and spring contact, and use the holes there for the connection. White to the pin location, and bare to the spring.



Wiring Your Components Together

The BG2 will require a way to control the Sony P41 camera. You will need to open it up and insert a shutter assembly and add a connector to it. Remove the batteries and memory stick before opening the camera! With a small Philips screwdriver, remove the four screws holding the camera cases together and put them where they will not be lost.

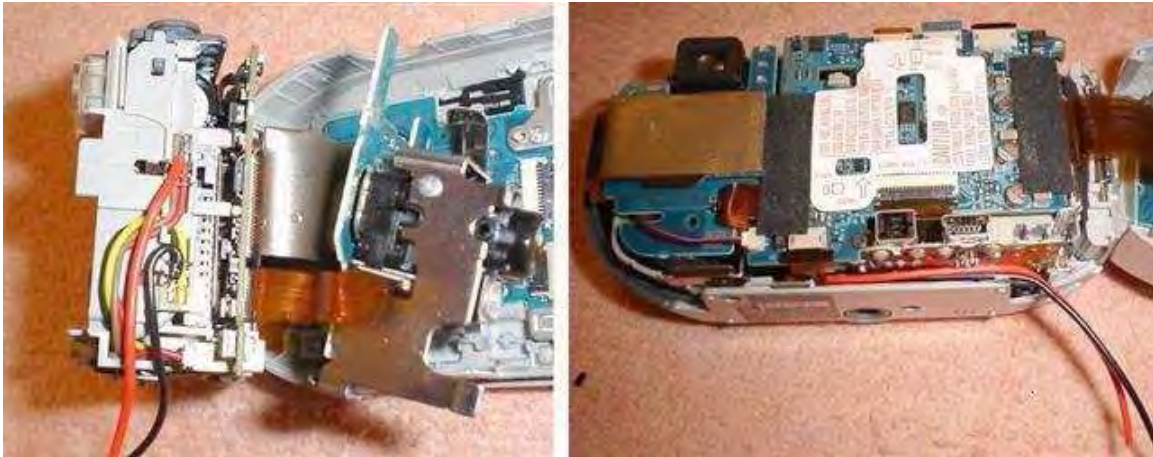


Once removed you can open up the camera easily, starting from the battery side. There is a ribbon between the two sides that you need to be aware of so just be careful.



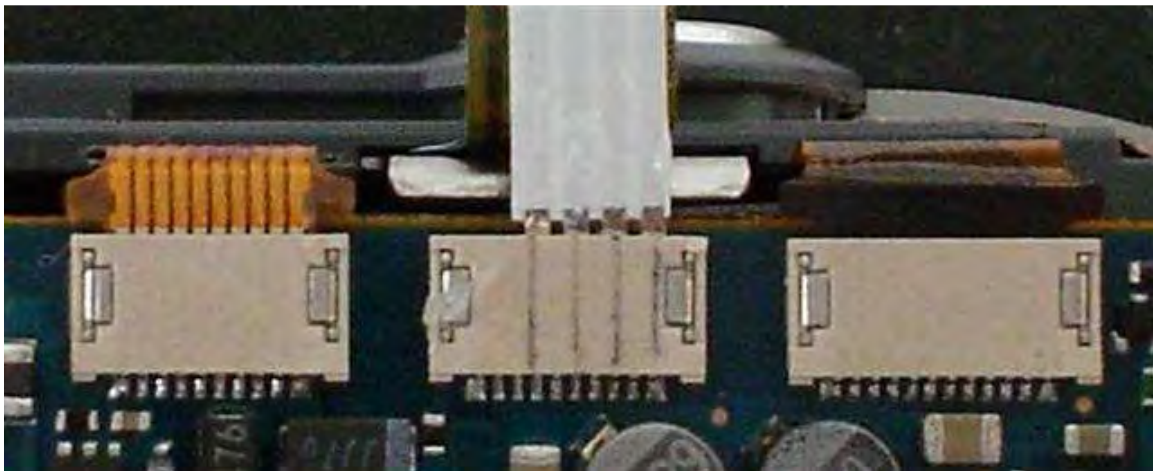
Remove the white sticker from the board and discard.

If you plan to use external batteries for your camera, now is the time to install the wires for them. I strip the insulation from the ends of the wires already going to the batteries and solder to them, and use at least 26 ga wire if you want the best results.



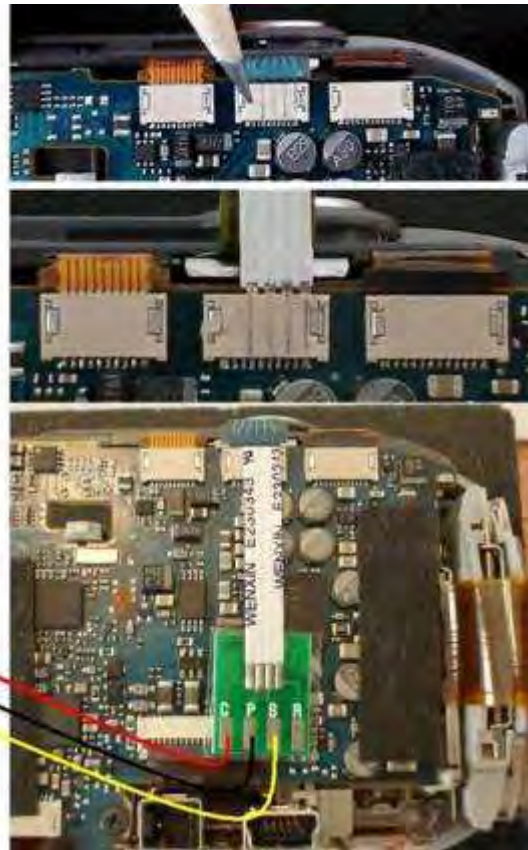
Now with a very sharp pencil or a fine tip marker, mark exactly where the last four traces are on the blue ribbon near the shutter button. Then you need to remove the ribbon. I use a toothpick and hold it tight to the ribbon, then pull it out.

After removing the ribbon from the connector you need to insert the shutter assembly as shown in the picture. The original ribbon will be re-inserted behind this. The solder pads will need to be facing away from you at this time so they will be facing up once the assembly is folded down flat. The alignment of the contacts is critical so if it moves when you put the other one back, then re-do it now.

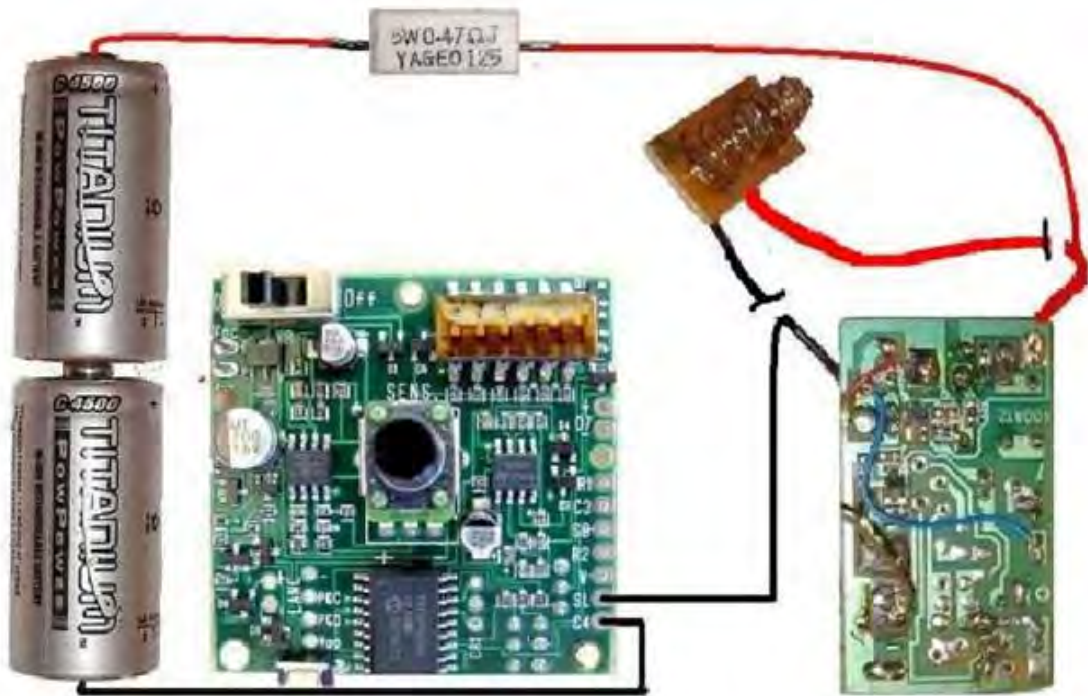


I use some scotch tape to hold the assembly in place while I solder the wires to it, but don't cover the solder pads...duh!

**BG2 and P41
ONLY**



BG2 slave hook-up



Additional notes:

The purpose of a slave flash is to increase the range of your game camera's flash. The Sony P41 already has a decent flash, and you may be happy with it without a slave at all. However, adding a slave to it will increase the range dramatically. If you are going to convert the camera to see infrared light and cover the flash with an IR pass filter, I strongly recommend adding a slave. The IR range of the camera's flash, when covered with the filter, will be reduced to around 15 feet or so without a slave flash.

The new standoffs you will receive with your BG2 are now 1/16 longer than before. If you are going to cover the BG2 like the pictures show, then you will need to drill a suitable hole in the box lid under the 9V battery holder to allow room for the stem on the sensitivity adjustment knob on the BG2.

The red button on the cover of the bottom box marked 'Camera' is connected to the common and power wires going to the BG2 camera connections. This allows the camera to be turned on and off manually to set the menu or view pictures.... neat feature.

The in-line fuse in the parts list is recommended for protection. I would use it in the wire going from the camera's internal batteries to the external C cell battery pack.

I use the aluminum tape on the external battery holders to give a better stick. The battery holders are hard to adhere to, but the tape sticks VERY well to them. I then use the PT1100 tape to attach them to the project box lid. I drill holes in the battery holders that allow access to the screws that hold the box lid on before mounting the holders.