How to Build a SuperGun or Arcade at Home Machine

Parts Needed:

Triple Output Power Supply (+5v,+12v,-5v)
1 Fully wired Jamma Harness
RGB to NTSC Video Encoder
Panel Mount Video and Audio Jacks
Enclosure
2 DB15 (2 row, not 3) Panel Mount Socket
2 Momentary Push Buttons, Panel Mount
1 DPST Toggle Switch Panel Mount
1 SPST Toggle Switch Panel Mount

When building a super gun you are basically trying to replicate what you see in a cab. You have the Jamma harness which is like the brain stem of the cab. Everything in the cab is connected to the Jamma harness.

So as in replacement theory the RGB to NTSC video encoder replaces the monitor, your soon to be custom joystick ports replace the joysticks and buttons, and so on. Let's get started.

Wiring the Jamma Harness

First thing to do is inspect your Jamma harness. Make sure it is fully wired. If it isn't fully wired, make sure it is for what you need it to do. I like to make my harness well rounded so I make sure that the wires are there for the extra buttons that the Neo Geo and Atomiswave uses which are pins 25, 26, Ac and Ad. If there are no wires in these spots you can remove wires from spots that you don't need and move them there.

Solder Side			Parts Side
Ground	A	1	Ground
Ground	B	2	Ground
+5v DC	C	3	+5v DC
+5v DC	D	4	+5v DC
-5v DC	E	5	-5v DC
+12v DC	F	6	+12v DC
Key Slot	H	7	Key Slot
Coin Counter #2	J	8	Coin Counter #1
Lock Out #2	K	9	Lock Out #1
Speaker -	L	10	Speaker +
	M	11	
Video GREEN	N	12	Video RED
Video Sync	P	13	Video BLUE
Service Switch	R	14	Video Ground
Tilt Switch	S	15	Test Switch
Coin Switch #2	T	16	Coin Switch #1
(Player 2) Start	U	17	Start (Player 1)
(Player 2) Up	V	18	Up (Player 1)
(Player 2) Down	W	19	Down (Player 1)
(Player 2) Left	X	20	Left (Player 1)
(Player 2) Right	Y	21	Right (Player 1)
(Player 2) Button 1	Z	22	Button 1 (Player 1)
(Player 2) Button 2	Aa	23	Button 2 (Player 1)
(Player 2) Button 3	Ab	24	Button 3 (Player 1)
(Player 2) Button 4	Ac	25	Button 4 (Player 1)
(Player 2) Button 5	Ad	26	Button 5 (Player 1)
Ground	Ae	27	Ground
Ground	Af	28	Ground

Above is a Jamma Plus Pinout which I use all the time. Certain items you do not need are: Lock Out 1 & 2, Tilt Switch, Coin Counter 1 & 2. If your harness has those pins wired and not Pins 25, 26, Ac and Ad remove the ones I listed and put them in those spots. You can of course purchase a fully wired Jamma harness before hand and not worry about moving pins.

In the pinout chart I included you will notice a color scheme. I did this only to show a few things. The BLUE area is what functions you will need for your controllers. PINK is your +5v pins, ORANGE is the +12v pins and yellow is the Key slot.

The Key Slot

The Key Slot on the Jamma board is a notch that is cut out to prevent inserting the Jamma harness the wrong way. Keep in mind that in order for the key slot to serve a purpose your Jamma harness must have the key installed which is a little piece of plastic that slides into where a wire would normally be. The small piece of plastic is able to fit in the notch on the board to ensure you are connecting the Jamma harness properly on the board. If you flip the harness you will be unable to slide it on because of the key installed. You can buy these plastic keys from a couple places and they are all different from one another. A simple marking on your Jamma harness also works. Some people label the top side of the harness with "PARTS SIDE" and the bottom with "SOLDER SIDE".

The Power Supply

When picking your power supply you want to pick something that will provide enough amps to power the board. The Supergun power supply should at least have the following ratings:

+5v @ 6A
+12v @1A
-5v @ 1A

The +5v power the board, the +12v powers the audio amp and other various things and the –5v also powers the audio amp on certain boards and is also known to cause graphical problems if not hooked up.

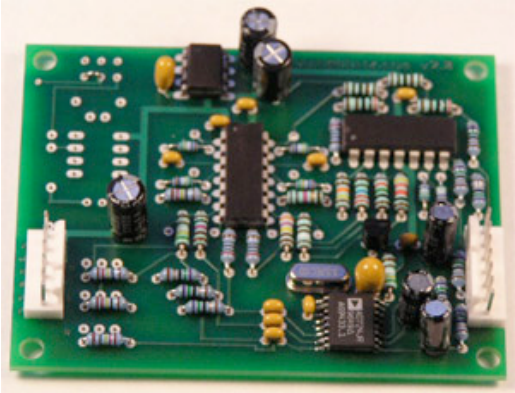
You can get your power supply from numerous places and in numerous styles. Some people get table top, open frame and sometimes a full arcade power supply. If you have the space in your project I would recommend that you get the arcade power supply.

The Video Encoder

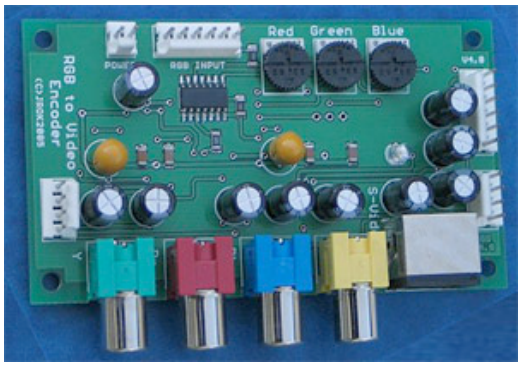
The video encoder is the essential part of your Supergun for those using an NTSC TV. There are many different brands of RGB>NTSC encoders on the market, some also convert RGB to CGA/VGA. The 2 common ones are Jeff Kurtz's Neobitz and James Rowan's JROK.

Both the Neobitz and the JROK are capable of outputting component, s-video and composite video. They both are able to have on board pots for adjusting picture color. If you plan to use mostly the S-video and composite connections, go with the JROK as it's S-video and composite circuit has very high compatibility with many Jamma boards. But if you plan to only use component output then go with the Neobitz. The Neobitz has a better component picture than the JROK. Colors are better and more vibrant and clearer. Also pick up a JROK sync cleaner to use in conjunction with which ever video encoder you choose.

Neobitz Encoder:



JROK Encoder:



Controllers and The Extra Stuff

Would you like your Supergun be able to support Capcom 6 button games? You will need a Capcom kick harness. You can get them from various places on the net. This needs to be added to your controller pinout.

Most people like to use the Neo Geo pinout for their Superguns and add the extra stuff to the pinout. This is a great idea as it lets you use your custom controllers as well as any Neo Geo controller. The Neo Geo pinout has 3 extra pins that aren't used and can be the pins for your kicks. Pins 2, 9 and 10 are unused. Pin 9 is supposed to be D on the Neo but the Neo usually reads pin 4 as D. Pin 9 is sometimes used for Mahjong controllers as well as "possibly" a coding step for using the Kizuna 4 player sub PCB. Because of this we can use it as a kick button since you will not ever need it.

Here is the Neo Geo pinout:

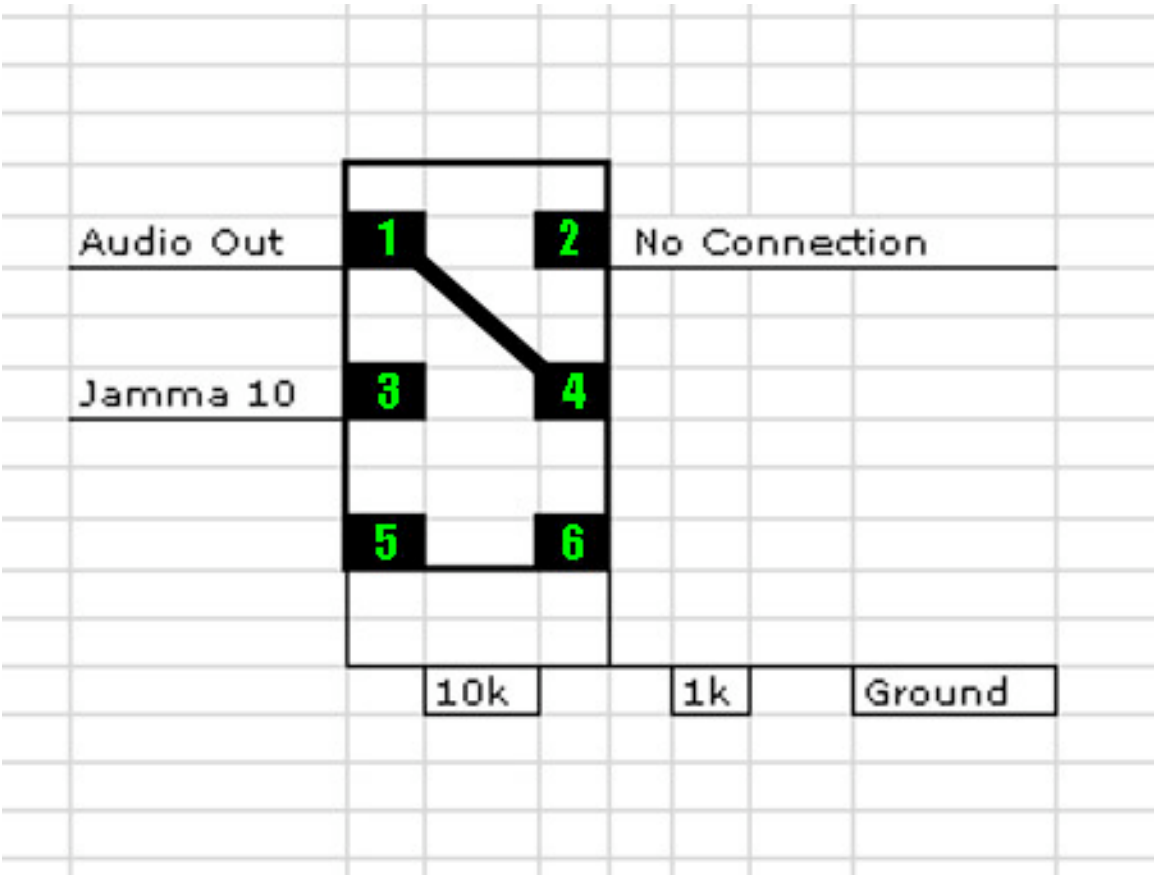
1. Common (GND)
2. NC
3. Select
4. D Button
5. B Button
6. Right
7. Down
8. +5v
9. D button
10. NC
11. Start
12. C Button
13. A button
14. Left
15. Up

I like to add my coin buttons to my controllers as it's just a lot easier than having to get up and push a button then sit back down and not all games have freeplay available. I usually add my coin buttons to the select button on my controller. So as an example I will connect Jamma pin 16 to pin 3 on player one's controller port. Make sure you follow the Jamma pinout so you know where to get the signals from on the Jamma edge.

Audio On Your Supergun

For audio on your Supergun you can do 2 things to get audio down to line level for your stereo input so your stereo doesn't blow up your speakers. You can either turn down the volume on the PCB itself if a volume pot is present, if not you can build yourself a simple audio attenuation circuit.

This is by far the easiest way to look at it:



You are looking at the pins of a DPST switch. I numbered the pins to help better understand them. First bridge pins 5 & 6 with a 10k ohm resistor 1/4 watt. On one side of the 10k resistor connect a 1k ohm 1/4 resistor and connect it to ground.

Connect pin 3 from the switch to Pin 10 on the Jamma harness. Bridge Pin 4 and pin 1 with some wire. Pin 1 is audio output so connect it to the center pin of the RCA jack(s) you are using for audio. Don't forget to ground the outside of the jack.

Test and Service Switches

Adding them are easy but why add them? Well some games need a test switch to get into the game settings or hardware tests while some games use on board dip-switches to do this. Some games require a service switch to navigate the test menu so it is good to have both made.

You will need 2 momentary pushbuttons aka OFF-(ON) meaning that the circuit is normally open and then closed when you press the button. Wiring them up is simple. On the push button you will see 2 pins, connect one of the pins to Jamma pin 15 and the other to ground. You just made the test switch. For the service switch do the same as the test button but instead use Jamma pin R and connect the other pin to ground.

Well that's pretty much all it is, pretty simple huh? Well go and make your Supergun and don't forget to submit pictures of it to Jamma Nation X.

Thanks,

Xian Xi