The builder's manual covers most of what is needed to build a Shagmatic Fucking Machine. It does not cover the building of the control board. If you choose to build your own, this document provides the needed information.

The Shagmatic is controlled by a Teensy microcontroller. It has been tested with versions 3.1 and 3.2 and also version 3.5 but using the 3.5 requires some modifications to the board and firmware so this document will only cover the use of a 3.1 or 3.2.

this page of my blog shows where to get the breakout board you will need. There are other sources as well. http://shagmatic.com/couple-bargains-fucking-machine/

The control board is little more than a "breakout board" for the microcontroller input and output pins. It also has three RJ connectors for interface devices such as the joystick and three knob controller as well as an output used to control another machine in a master/slave configuration. There is also a bank of configuration switches. Depending on the features you want, some of these parts will not be needed. The default configuration has all configuration switches set to off. Jumpering inputs to ground can be done in case any switches are needed or the firmware can be modified to achieve the same effect.

There are also resistor and capacitor pairs used to debounce the limit switch lines. These are probably not needed as there is also software debouncing. However the capacitor for each limit switch line is a one mf tantalum connected between the limit switch pin (pins 9 and 10) and ground and the resistor is a 4.7 k from each limit switch pin to signal voltage. this is 5 volts if you are using a teensy with 5 volt tolerant inputs or the 3.3 volt output pin if you are using a teensy that does not have 5 volt tolerant inputs.

The Jumpers on the right side of the board are used to select 3.5 or 5 volts for the joystick encoder and to select logic voltage for the slave out connector. Since this is not likely to change, these jumpers can be eliminated as well. Any changes that would be set by config switches can be changed in the firmware instead. The system reads the config switches at various times to get the relevant values and these reads can be replaced with fixed values instead.

The following chart shows all the connections to the Teensy that are needed. If using a joystick controller, logic power needs to be provided that is appropriate

for the encoder chosen. If you are using a Teensy that does not have 5 volt tolerant inputs, be sure to select an encoder that will run on 3.3 volts. Most of my machines use the Teensy 3.2 which is 5 volt tolerant.

If you are building a three knob controller you will need to follow the instructions in the builder's manual but since your board will not have the RJ connectors mounted on it you will need to figure out how to make the needed connections for the encoders including a ground connection. You can use any type of connector that is convenient and has the right number of pins and is keyed so it cannot be connected backwards.

pins are numbered counter clockwise from ground pin

board #	arduino #	shag function	
1	GND		
2	0	reserved	
3	1	estop	
4	2	config 7	ratio bit 0
5	3	step signal out	
6	4	direction signal out	
7	5	joystick A	
8	6	joystick B	
9	7	knob encoder 2 A	
10	8	config 6	ratio bit 1
11	9	limit A	
12	10	limit B	
13	11	config 4	seek home option
14	12	joy speed choice A	
15	13	onboard LED	
16	14	joy speed choice B	
17	15	knob encoder 3 A	
18	16	reserved	
19	17	knob encoder 2 B	
20	18	knob encoder 1 A	
21	19	test mode switch?	
22	20	knob encoder 1 B	
23	21	knob encoder 3 B	
24	22	Slave outA	
25	23	Slave out B	
26	3.3v out		
27	AGND		
28	VCC +5		