

# Build Instructions

## S-100 Backplane Build Notes

### Step 1

Gather the parts. I use Jameco, Digi-key and Mouser. Unfortunately one source does not have all the parts. I had to place orders at both sources to get all the parts needed. Primary source was Jameco and whatever they did not carry I used Digi-Key. The downside of ordering resistors at Jameco is you have to order in quantities of 100.

I've prepared a Bill-of-materials (BOM) file for use on the Digi-key web site. This makes ordering simple. There are two BOM's. One with the S100 Edge connectors and one without. You have to have a Digi-Key account to use the BOM's. Click on the 'My Digi-Key -> Parts List/BOM Manager -> Create New Parts List (Upload File)' link.

Note: Digi-Key carries everything for this project except the resettable fuses.

[DigiKey\\_S100\\_bom.txt](#) <- Digi-Key BOM with S100 edge connectors

[DigiKey\\_S100\\_withoutEdgeCon\\_bom.txt](#) <- Digi-Key without edge connectors.

As of Jan 2011 the parts with S100 connectors runs about \$149, and \$24.00 without S-100 female connectors.

### Step 2

Get your magnifying glass out and inspect the PCB board. Your are looking for any solder bridges or holes that may have gotten filled by the solder mask.

### Step 3

This may seem like an un-needed step but I can assure you it is well worth it. Inspect the parts that you received very closely. Just because the packaging says it's a specific part it may not be. Errors happen. Installing the incorrect components could result in your project not working which may take hours and hours to fix. Take your time and double check the component when mounting it in the PCB. The extra time is well worth it.






### ECO #1







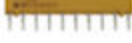










The silkscreen on the Q1 transistor orientation is wrong. Involves a 180 degree rotation.






### ECO #2

Some folks are not installing the F1-F3 fuses. Apparently they only protect the LED's. You can just use a jumper wire in their place.

## Parts List

Component	Qty	Jameco	DigiKey	Notes
S-100 Backplane PCB	1	N/A	N/A	Order from Todd Goodman
S-100 Female Connectors 	8		S3288-ND EDC346102-ND	See doc for sources <a href="#">S-100 Connectors.rtf</a>
R1 		854452	<a href="#">D4AA23-ND</a>	2K POT (DigiKey part is a bit small for the PCB footprint. You will have to stretch the pins a bit to get it to fit.
R2 	1	<a href="#">CF1/4W154JRC</a>	<a href="#">CF14JT150KCT-ND</a>	150K Ohm Carbon Fiber Resistor, 1/4 Watt, 5% Brown-green-Yellow
R3,5 	2	CF1/4W561JRC	<a href="#">CF14JT560RCT-ND</a>	560 Ohm Carbon Fiber Resistor, 1/4 Watt, 5% Green-Blue-Brown
R4,8 	2	CF1/4W102JRC	<a href="#">CF14JT1K00CT-ND</a>	1K Ohm Carbon Fiber Resistor, 1/4 Watt, 5% Brown-Black-Red

R6,7 	2	CF1/4W911JRC	<a href="#">CF14JT910RCT-ND</a>	910 Ohm Carbon Fiber Resistor, 1/4 Watt, 5% White-Brown-Brown
R9,10 	2	CF1/4W182JRC	<a href="#">CF14JT1K80CT-ND</a>	1.8K Ohm Carbon Fiber Resistor, 1/4 Watt, 5% Brown-Grey-Red
R11-14 	4	CF1/4W271JRC	<a href="#">CF14JT270RCT-ND</a>	270 Ohm Carbon Fiber Resistor, 1/4 Watt, 5% Red-Purple-Brown
R15 	1	CF1/4W472JRC	<a href="#">CF14JT4K70CT-ND</a>	4.7K Ohm Carbon Fiber Resistor, 1/4 Watt, 5% Orange-Purple-Red
R16,17 	2	CF1/4W203JRC	<a href="#">CF14JT4K70CT-ND</a>	20K Ohm Carbon Fiber Resistor, 1/4 Watt, 5% Red-Black-Orange
R18 	1	CF1/4W471JRC	<a href="#">CF14JT470RCT-ND</a>	470 Ohm Carbon Fiber Resistor, 1/4 Watt, 5% Yellow-Purple-Brown
RR1-10 	10	4310R-101-271LF	<a href="#">4310R-1-271LF-ND</a>	270 Ohm Resistor network - 10 pins
C1,3-8 	7	UPW1V390MDD	<a href="#">493-1857-ND</a>	39uf Radial Capacitor 35V 5x15mm
C2 	1	UVR2AR47MDD	<a href="#">493-1397-ND</a>	0.47uf Radial Capacitor 100V
D1-3 	3	LTL-307G	<a href="#">160-1702-ND</a>	LED 565nm T1 3/4 Green (Any color will do. Your choice)
F1-3 	3	199938		Resettable Fuse 1.6A
P1 	1		<a href="#">WM4655-ND</a>	CONN HEADER 6POS 5.08MM VERT TIN
P2 	1		WM9126-ND	Molex CONN HOUSING 6POS 5.08MM
p2 Pins 	6	792888	<a href="#">WM18820-ND</a>	CONN TERM FEMALE 18-24AWG TIN You'll need six pins per housing
IC1 	1	51262	<a href="#">BA17805T-ND</a>	<a href="#">Standard Regulator 5 Volt 1A 3-Pin (3+Tab) TO-220</a>
IC2 	1		<a href="#">LM4250CN-ND</a>	IC OP AMP PROGRAM 8-DIP
Q1 	1	38360	<a href="#">2N3904-APCT-ND</a>	TRANSISTOR NPN GP 40V TO92

Q2 	1	783455	2N3906-APCT-ND	TRANSISTOR PNP GP 40V TO92
Q3 	1	33021	497-2580-5-ND	TRANSISTOR NPN 60V 1A TO-220
Q4 	1	33030	TIP30C-ND	TRANS PNP GP 100V 1A TO-220
	3	326596	HS115-ND	TO-220 Heat Sink Low Profile
SW1 	1	162886	SW400-ND	Switch Tactile N.O. SPST Flat Plunger PC Pins

## FAQ

### Calibrating the Trimmer POT

The trimmer pot is used to calibrate the active terminator circuit. Basically you set the pot at mid setting and then power up the circuit. Use your VOM to measure the voltage on the signal pins and adjust the pot so they settle at 2.65V to 2.7V. That is dead center of the TTL “no mans land” between high and low. The active terminator keeps all the signals solidly there until a bus buffer/transceiver pulls them high or low. This really reduces bus ringing and suppresses noise quite a lot.

### What are The P2, P3, P4 and P5 Headers used for?

Those connectors are for the “to be announced” ECB to S-100 bridge board. Once that is done it will allow N8VEM ECB systems to expand to S-100 and vice versa. Until the PCB is done though I would not fill the connectors since it is going to be a while.

### What are The JP1, JP2, and JP3 jumpers for?

These correspond to the IEEE-696 ground pins. Some boards require them and other boards use them for different signals. The early S-100 boards are not fully IEEE-696 standard compliant. You can see these jumpers on the various S-100 boards on the left hand side near the edge connector.

### P12

This is for an external reset switch.

### How do I orient the LED pins?

The pin 1 of LEDs is square. That’s true for all parts so you can easily identify pin #1. You can pick the LED orientation off the schematic once you know pin #1 location. The bar on the LED symbol matches the flat part on the LED so that is also helpful.