

## SLC Free Manual

## Important Stuff:

- SLC Free A and SLC Free B is compatible with the LSU 4.9 Sensor only
- SLC Free C is compatible with the LSU 4.2 Sensor only

## Parts List:

Item #	Qty needed	Qty Provided by 14Point7 kit	Description	PCB Name	Note
1	1	1	28 Pin IC Socket - Narrow	IC2	
2	1	1	5 Pin .100 Right-Angle Male Polarized Headers	JP1	
3	1	1	6 Pin .100 Right-Angle Male Polarized Headers	JP2	
4	1	1	5 Pin .100 Polarized Header Connector		
5	1	1	6 Pin .100 Polarized Header Connector		
6	11	15	Crimp Pin for Header Connector		
7	1	1	40 Pin .100 Straight Male Headers	JP3,JP5	Break into 5 pin,6 pin, and 16 pin, sections. Use 16 pin on 16x2 character LCD, Item #26
8	1	1	16 Pin .100 Straight Female Single Headers	JP4	
9	4	4	10mm M3 Round Standoff + Screws		
10	1	1	IRF3710 MOSFET N Channel Transistor	IC3	Bend pins 90 degree before soldering. Solder tab to PCB is optional
11	1	1	7805T - 5V 1A Positive Regulator (LM7805)	IC1	Bend pins 90 degree before soldering. Solder tab to PCB is optional
12	2	2	1N4004 400V 1A General Purpose Diode	D1,D2	
13	1	1	P6KE24A - 20.5V Standoff Voltage - TVS 600W DC	D3	
14	2	3	47uF 50V Radial Electrolytic Capacitor	C2,C3	Additional Capacitor supplied
15	8	9	0.1uF 50V Ceramic Capacitors	C1,C4,C5,C7,C8, C9,C10,C11	Additional Capacitor supplied
16	1	1	100ohm 1/4W 1% Metal Film Resistor	R16	
17	2	2	10kohm 1/4W 1% Metal Film Resistor	R4,R10	
18	1	1	10ohm 1/2W 5% Carbon Film Resistor	R1	
19	1	1	4.7kohm 1/4W 1% Metal Film Resistor	R14	
20	8	9	1kohm 1/4W 1% Metal Film Resistor	R2,R5,R6,R8,R9, R11,R12, R13	Additional resistor supplied, you might need this for R15 to set the LCD contrast



CUTTING EDGE IN MOTION

21	1	1	1.2kohm 1/4W 1% Metal Film Resistor	R15	Depending on the tolerance of the LCD, R15 may need to be adjusted, 1.2k is the nominal resistance. An additional 1k resistor is included for you to experiment with.
22	1	1	120kohm 1/4W 1% Metal Film Resistor	R7	For LSU 4.9 sensor, populate R7 with a 120K resistor. For LSU 4.2 sensor, leave empty.
23	1	1	61.9 ohm 1/4W 1% Metal Film Resistor	R3	
24	1	1	1uf 50V Ceramic Capacitor	C6	
25	1	1	Printed Circuit Board		
26	1	1	16x2 character LCD		Solder 16 pin section, item #7
27	1	1	CY8C24423A-24PXI	IC2	Use Socket; Item #1
28	1	1	Lambda Sensor Connector		
29	6	6	Lambda Sensor Connector Pins		
30	1	1	Small Heat Shrink		
31	1	1	Large Heat Shrink		LSU 4.2 only
32	1	1	Orange LSU Rubber Gasket		LSU 4.9 only
33	1	1	Purple LSU Lock Connector		LSU 4.9 only
34	1	1	Fuse		Use fuse on 12v supply
35	1	2	5 Amp fuse		Replacement Fuse is included

## PCB Assembly:

### Read First:

- Read the last column in the Parts List table for special instructions and notes
- For the LSU 4.9 sensor R7 has to be populated with a 120k resistor, only SLC Free A and SLC Free B is compatible with the LSU 4.9
- For the LSU 4.2 sensor leave R7 empty, only SLC Free C is compatible with the LSU 4.9 sensor
- R15 sets the contrast of the LCD, depending on the tolerance of the supplied LCD R15 may need to be changed from its nominal 1.2k value. If the contrast is too light, you will need to change R15 to a lower value. An extra 1k resistor is included for you to experiment with. If the contrast is still too light with a 1k resistor then you must get a hold of lower value resistors and experiment.
- Bend the pins on IC1 and IC3 90 degrees and test to make sure everything looks good before you solder the pins.
- It is optional to solder the tab on IC1 and IC3 to the PCB, it is suggested that you solder the tabs to the PCB only if you notice the ICs getting hot to the touch, otherwise leave the tab unsoldered as this will make replacing the ICs easier if they ever develop a problem.
- An additional 0.1uF ceramic has been included just in case you lose one of them during assembly
- An additional 47uF electrolytic capacitor has been included in case you need to change the capacitor. I hate using electrolytic capacitors in an automotive environment, I only use them for the SLC Free design because they are cheap and the through-hole variety is easy to replace.

### PCB Assembly Instructions:

Assembly is straight-forward, all components except R7 are marked with the component value.

The best technique for assembly is to solder the components lowest in height first:

1. Resistors
2. Diodes
3. IC1, IC3, IC2 socket
4. Ceramic capacitors
5. JP1, JP2
6. JP3,JP4,JP5

On the LCD you must solder a 16 pin male header to it.

## Pinout:



### JP1 Pinout, Power + Output

Pin # Beige Molex	Connects to	Note
1 (top)	12v	Use 5A Fuse
2	Electronics Ground	Ground where Linear Output interfacing device is grounded
3	Heater Ground	Ground to chasis
4	Linear Output	0.68 Lambda @ 0v linear to 1.36 Lambda @ 5v
5 (bottom)	Simulated Narrowband Output	Switch point @ 1 Lambda

### JP2 Pinout, Lambda Cable

Pin # Beige Molex	Connects to Pin # LSU Connector	Note
1 (top)	4	On LSU connector pin # is marked
2	3	On LSU connector pin # is marked
3	5	On LSU connector pin # is marked
4	1	On LSU connector pin # is marked
5	2	On LSU connector pin # is marked
6 (bottom)	6	On LSU connector pin # is marked

## Power + Output Cable Construction:

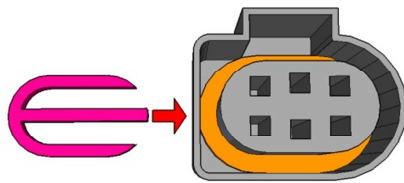
Use the 5 Pin beige Molex connector and contacts to construct the Power + Output Cable. It is recommended that you use 20 AWG cable, any thicker of a cable and you may have problems fitting it into the Molex connector. You can either crimp or solder the cable to the contacts, if you solder you may need to trim the insulation tab to fit into the connector.

## LSU 4.2 Lambda Cable Construction:

Use the 6 Pin beige Molex connector, Molex contacts, black LSU connector, LSU contacts, small heat shrink, and large heat shrink to construct the Lambda Cable. It is recommended that you use 20 AWG wire, any thicker of a wire and you may have problems fitting it into the Molex connector. Connect the LSU connector to the Molex connector according to table “**JP2 Pinout, Lambda Cable**”. Use the large heat shrink where the wires enter the LSU connector, then use the small heat shrink to seal the large heat shrink to the cable, it is very important to have a good seal against dirt and water. You can either crimp or solder your wire to the contacts, if you use solder you may need to trim the insulation tab to fit into the connectors.

## LSU 4.9 Lambda Cable Construction:

Use the 6 Pin beige Molex connector, Molex contacts, black LSU connector, LSU contacts, and heat shrink, to construct the Lambda Cable. It is recommended that you use 20 AWG wire, any thicker of a wire and you may have problems fitting it into the Molex connector. Connect the LSU connector to the Molex connector according to table “**JP2 Pinout, Lambda Cable**”. Use the heat shrink where the wires enter the LSU connector, it is very important to have a good seal against dirt and water. You can either crimp or solder your wire to the contacts, if you use solder you may need to trim the insulation tab to fit into the connectors.



The Final step is to insert the orange rubber gasket, and the purple locking mechanism. This will ensure that the plug is waterproof and the contacts stay in place.