B	STANDAF	D OPERATING PROCEDURE
ENVIRONMENTAL HEALTH, SAFETY AND SUSTAINABILITY	VOLTERA ONE	E PCB PROTOTYPE SYSTEM
College/Dept: College of Eng	ineering	Building/Room: RUCH106
Laboratory Name: Idaho Microfab	rication Lab	Revision: A

Revision	Details	Date	Ву
А	Updating original document format	9/14/21	P. Miranda

Approval			
	Pete Miranda, IML Director	Pite Minanda	091421
Authored by: Reviewed and Approved by:	Name, Title	Signature	Date
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Procedure T	уре		
X Process/F	Protocol Chemical	Hazard Class	

Х Process/Protocol

Chemical

Hazard Class

Brief Overview

The Voltera One PCB Prototyping system is designed to provide the user with a quick and easy method for producing PCBs for many different types of applications including R&D, academics, hobby, etc. The system is designed to print conductive traces, dispense solder paste onto printed pads and after components are placed by hand, to reflow the solder paste for component attachment!

Scope

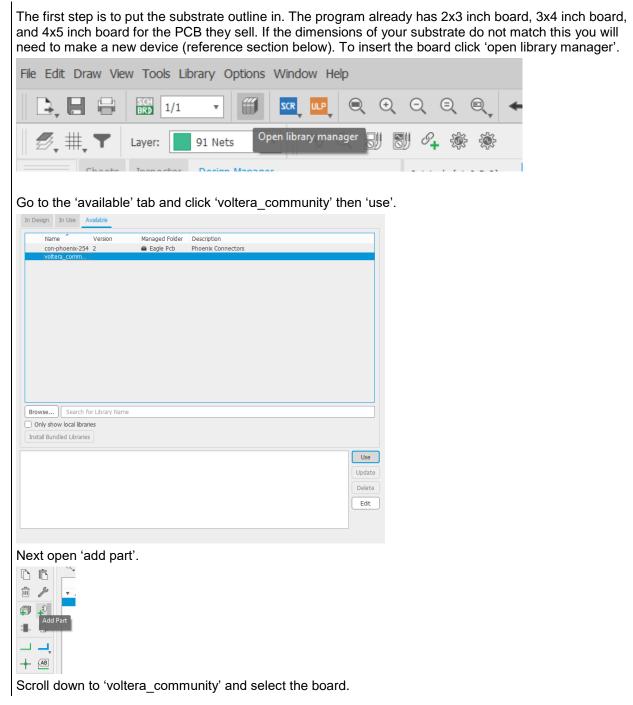
This document covers basic operation of the Voltera used in a typical fashion with commonly printed silver conductive traces and eutectic solders such as Sn60/Pb40 or similar.

Potential Hazards							
X Chemical	X Thermal	Hydraulic	Electrical	Slip/Trip	Biological		
X Mechanical	Radiation	Pneumatic	Fire	🗌 Fall	Other		
Hazard Specifics	: Heated board p handling hazar		pense head, solder pas	ste handling hazards	, conductive silver		

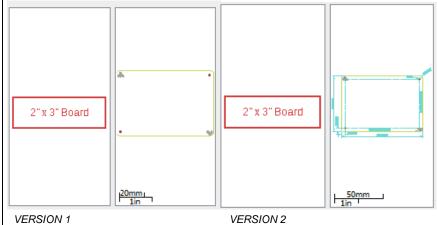
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	Online Safety Topics (specify):			
Х	Lab/Work Group Spec (specify):	ific Training	IML S	Safety Training
	Other (specify):			
	X Safety glasses	Safety	/ goggles	Face shield & safety glasses
	Lab coat	Apron	I	Tyvek suit
	X Gloves	Leg c	overings	Hard hat
	Respirator	□ Shoes	6	Fall protection
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	□ Safety shower	Fire I	olanket	□ Spill kit □
	Drench hose			
	Reference: https://www	v.voltera.io/si	upport/quicksta	art
	1. Draw Circuit	references	to the word bo	ard. If it is written in all lower case letters, it is referring
		g placed into a		file to help with dimensioning. If it is written as "Board"
				uit. There are three software packages that Voltera IML uses Eagle so below are the basics on using the
	The circuit will be draw	n in a Schen	natic and Board	d. These files are located under project folders. You

can use the same project folder for multiple Schematic and Boards, but only one project folder can be open at a time and only one Schematic and Board can be open at a time. If you try to open another one it will close the file that is open.

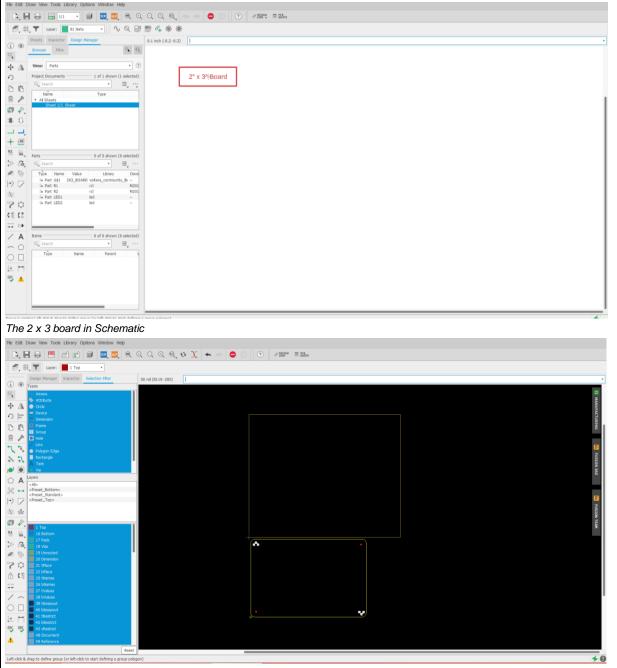
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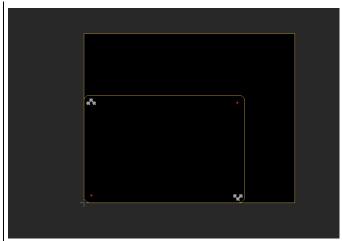


Place the board wherever in the Schematic. The placement of components in the schematic does not affect the Board. The Schematic is used to get an outline and the Board is where things need to be precisely placed. Once you have one board hit the 'esc' button and then press 'cancel'. If you open the Board you should see it is also in there.



The 2 x 3 board in Board

The placement in Board is important. The corner of the board should align with the cross hairs. To move the board click and drag by its crosshairs. Release when it is in the right position. The outside box is the area that will be printed. You can change the size to match the template or just ensure you draw within the designated space.



If there is a component you would like to put in your circuit (i.e. resistor, LED, etc.), place it in like you placed the board, by clicking 'add part'.



The image below is helpful advice on how to optimize your search for components.

Search pattern can be one or more words, separated by blanks. These words are searched case insensitively in the device names and descriptions (if *Description* is checked), and must <u>all</u> match.

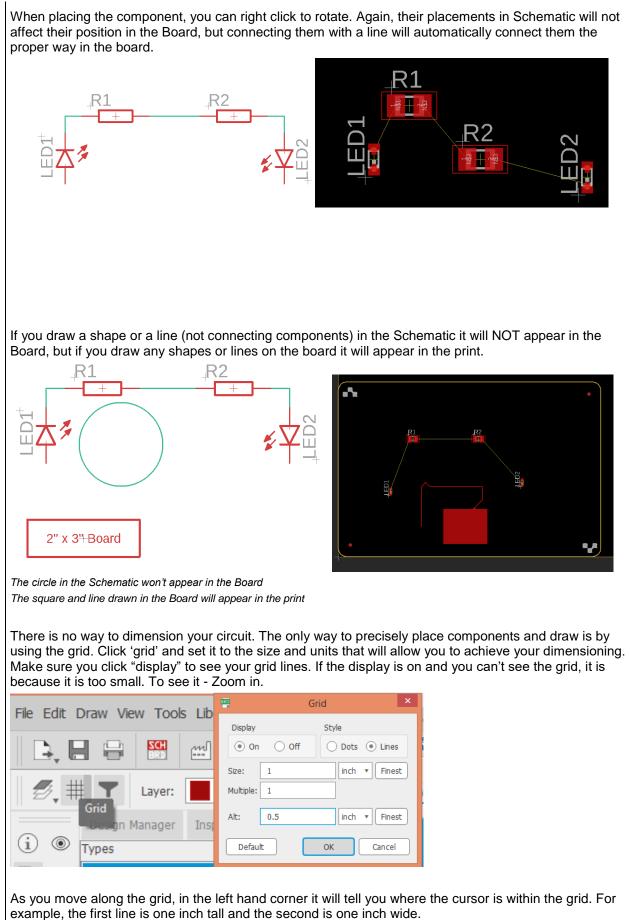
The wildcard character '*' matches any number of non-whitespace characters, while '?' matches exactly <u>one</u> of these characters.

If *Pads* is checked, devices that contain PADs will be included in the search.

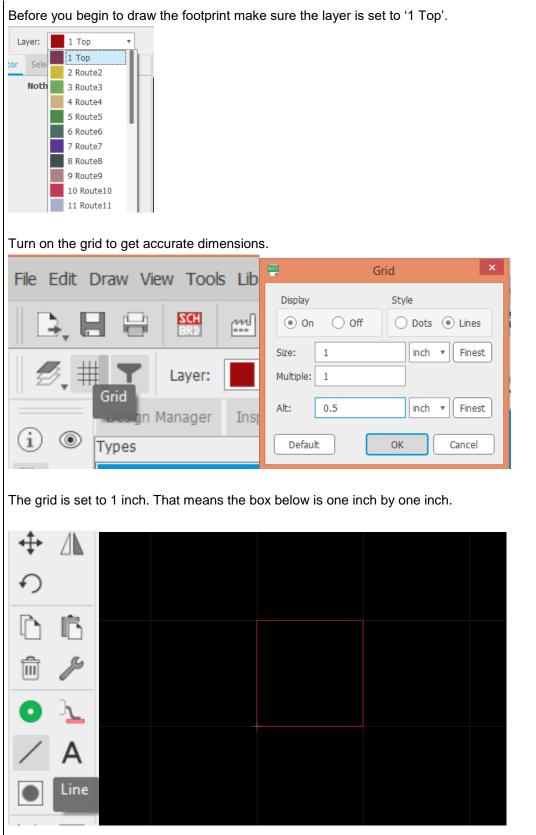
If *Smds* is checked, devices that contain SMDs will be included in the search.

If attribute search patterns 'name=value' (e.g.: tolerance=5%) are given, these patterns have to match additionally. An attribute search pattern without the character '=' is searched in the attribute names and values.

To find all NAND devices from the 74xx series, enter: 74* nand

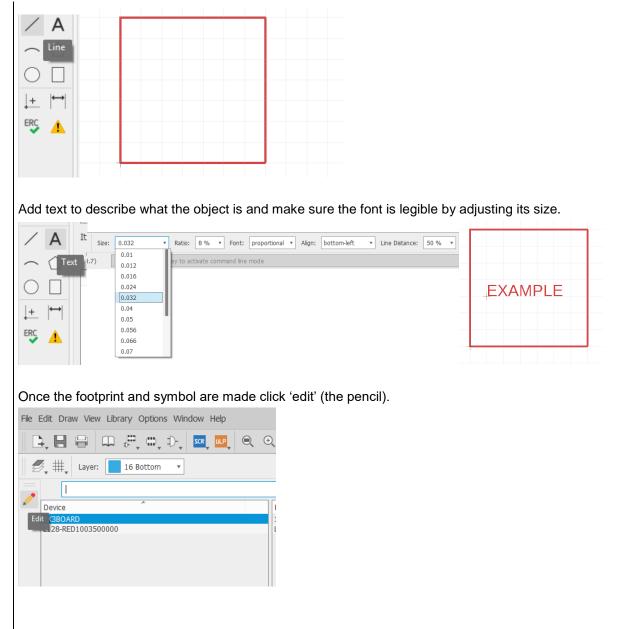


2. Making a Device Note: If you do not need to A device can be made for of a footprint. The symbol is v Board. To make a device, open 'II File View Options Window Help Name Description * Ubaries User Libraries > Oklose-Lynn A > Bail Probect. > Design Blocks > Scripts > CAM Jobs > SPTEL Models > Projects User Projects > E Example Beampl > E Senior Desi > E Senior Desi > E Test > E Test > Test > Test > Test > Test > E Test > E Test > E Test > E Test > Camples > Camples				
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The next step is to make a symbol. Click 'add symbol' and give it the same name as the footprint and click 'ok'

	Add Symbol
N	ew Symbol Name:
	EXAMPLE
	OK Import Cancel
Layer:	94 Symbols 88 SimResults
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	88 SimResults
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Type in the new device name and click 'ok'.

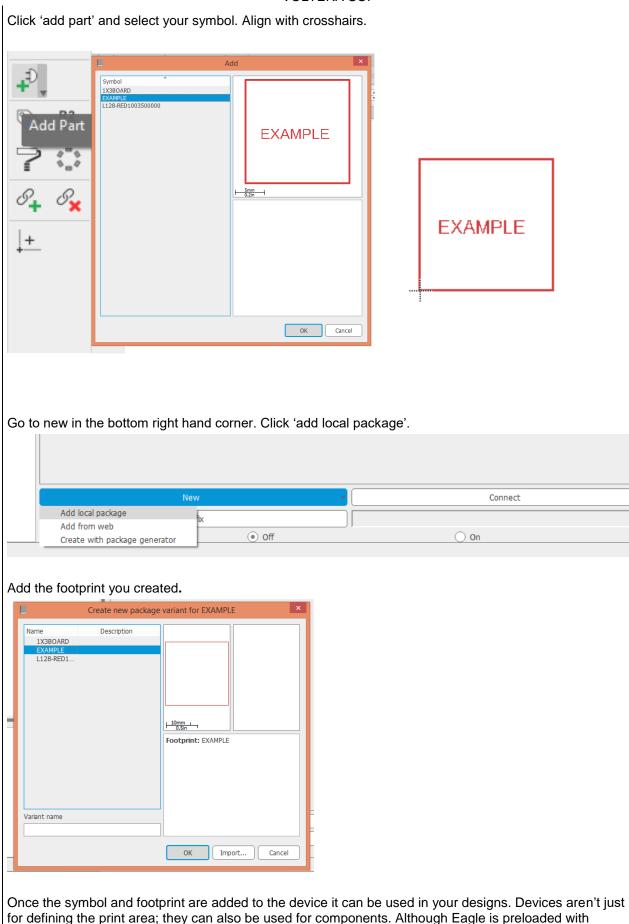
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New Devi	ice Name: _E		
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Click on 'De	escription'	in the blue letters	

Description

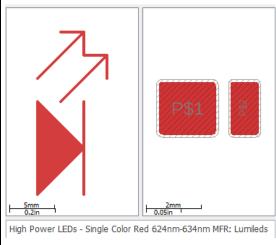
Use the DESCRIPTION command to enter a description of this object.

In the bottom box type your device description and click 'ok'.

	Description of EXAMPLE	×
Headline:	An example of how to make a new devi	ce.
An example	of how to make a new device.	
An example	of how to make a new device.	
ОК	Undo Redo Cancel	



several components, they may not have the one you need. If you know the product dimensions, you can make your own. <u>Most SMT (surface mount technology) components have a recommended pad</u> <u>design and can be found in the part datasheet</u>. Below is an example of a device created for a red LED.

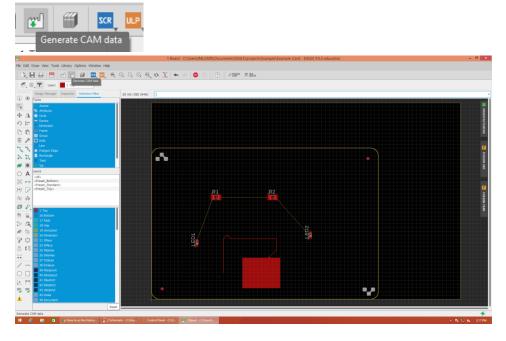


3. Exporting Gerber File

The file needs to be exported to a gerber file. Below are links to instructions on how to export with each software.

- Altium: <u>https://www.voltera.io/support/export/altium#main</u>
- Eagle: <u>https://www.voltera.io/support/export/eagle#main</u>
- KiCad: <u>https://www.voltera.io/support/export/kicad#main</u>

When the board layout is complete, the gerber files can be exported. Click 'generate CAM data'.



		1 Board - C:\Users\IMLUSER\Documents\EAGLE\projects\Example\Example 2.brd - EAGLE 9.5.2 education	- ð ×
File Edit Draw View Tools Library Options Window Help			
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The file will be saved as a zip. Make sure to extract before going to Voltera software.Once you have exported there will be several files. The one titled "copper_top.gbr" will be the pattern for the conductor paste. The one labeled "solderpaste_top.gbr" will be for the solder paste.

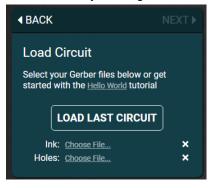
4. USING THE VOLTERA

Take ink out of cold storage 30 minutes prior to use.

Make sure the printer is on before you open the Voltera application. The screen will prompt you with four options. Click "print"



Load the file by clicking "choose file" next to ink.



Your circuit will appear as it will be printed. If anything looks wrong, now is the time to go back to Eagle and fix it (and export again). If your circuit is correct click "next" and the software will walk you through the rest of the process.

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There are three nozzles you can use, the orange is 100 micron, the blue is 150 micron, and the black is 225.

After you have completed your printing, you will need to clean up your area and dispose of any waste as instructed by lab procedures.