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How to generate BOM and Pick and Place File in Sprint-Layout 6

In this tutorial, let's see how to generate BOM (Bill of Materials) and CPL (Component Placement List)[Also known as a Centroid file, Pick and Place File, XY File, etc.] for JLCPCB SMT and hand soldering service in Sprint Layout 6.

A very simple PCB that contains only 4 components is used for this tutorial, but the idea is the same for boards have many components.

Set properties for components

News



Before generating the BOM and CPL files, we need to add some meta data for components, this information will be used in BOM and CPL files.

For example, in the following screenshot, we set ID, Value, Comment and Package for the microcontroller ATmega328P-AU.

Pay attention to the value for Comment, we use this field for a special purpose: Every part available for assembly at JLCPCB has a unique "LCSC Part #", its format is Cxxxx, please visit <u>JLCPCB Part Library</u> to find the parts. If the BOM has this "LCSC Part #", this part will be 100% hit when the system executes the BOM matching operation.

	Component	? ×
	ID: Layer: Visible	ОК
U1	U1 S1 V	Cancel
A, B, A,	Value: Layer: Visible	
1 1 1 1 1 1 1 1 1 1 1	ATMEGA328P	Disintegrate
	Textheight:	Component
ATMega48 <u>/88</u> /168/328	1.3 mm Narrow	
	Align text automatically	
	Comment	
<u> </u>	C14877	
	Hide Pick + Place Data	
	Rotation:	
	0.0 ii mm 0° 90° 180° 270°	
	Package:	
	TQFP-32_7x7x08P	
	Center:	
	Center Copper Center Silkscreen Center Copper + Silk	0/0 mm

Figure 2. Component's properties

Jec	JLCPCB	c14877

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TT -	

EMBEDDED PROCESSORS & CONTROLLERS (1)

ATMEL & AVR (1)

Part

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CM

Basic Parts In Stock

t	Description			Manufacturer
ATMEGA328P-AU	1.8V ~ 5.5V 8-BIT AV	R 20MHZ FLAS	Basic Part	MICROCHIP TECH
	Part Info	Attributes		
	Manufacturer	Microchip Tech		
	MFR.Part #	ATMEGA328P-AU		
	JLCPCB Part #	C14877		
A COLORADOR	Package	TQFP-32_7.0x7.0x0.8P		
	Description	1.8V ~ 5.5V 8-Bit AVR 20MHz FLASH TQFF	-32_7x7x08	P ATMEL & AVR ROHS
Oca Oca	Datasheet	Download		
	Source	JLCPCB		
	Assembly Type	SMT Assembly		
	EasyEDA Libraries	PCB Footprint or Symbol		

Figure 3. LCSC Part # of the part (also called JLCPCB Part #)

Set meta data for every component.

Export the raw data

To export the data, first we need to make the Components Panel visible, just select Options \rightarrow Components-Panel.



Figure 4. Make Components Panel Visible

Now, click the **Export** button on the **Components Panel**.



Figure 5. The Export button

The Component-Data Export window appears. Check the options as per the screenshot below.

Component-Data Expo	rt		? ×
Exported Data	Sort sequence per drag&drop ID Value Layer Position Rotation Package Comment	Separator © Comma Semicolon Tab X/Y - Position Unit: mm Rotation Rotation with Filter	Text for Layer side Top: Top Bottom: Bottom Default Decimals: 2
Preview: C1,0.1uF 50V,Top,32 CONN1,USB-Mini-B,To J1,2.54-header-2x3, U1, ATMEGA328P-AU	2.60, 14.30,0,0603,С 14663 эр,6.54, 12.65, 180,USB-Mini-E Тор,41.91, 11.76,0,НЕАDER2 ,Тор,24.39, 11.95,0, TQFP-32	SMD-Compone Throughhole- Only compone 3,C91144 x3,C65114 2_7x7x08P,C14877	ents I Top Components I Bottom ents with Pick+Place data
			Export Close

Figure 6. The Component-Data Export window

Click the **Export** button, Sprint-Layout will ask you to specify the filename and file type. Select **All files** for **Save as type**, in this way we can use CSV as the filename extension.

Note The reason we use CSV as the filename extension is because if a spreadsheet program is installed, the CSV will be opened automatically in some Operating Systems.

Save in:	sprint-layout Name gerbers sample.lay6	^	~	0	Date modifie 8/9/2021 6:1	ed 2 PM	1
Quick access	Name gerbers] sample.lay6	^			Date modifie 8/9/2021 6:1	ed 2 PM	F
Libraries This PC					8/10/2021 5:	22 PM	L
Network 4	<						>
F	File <u>n</u> ame:	sample-bom-cpl.cs	sv		~	<u>S</u> ave	

Figure 7. Save the file

Edit the raw data to a CPL file

Make two copies of file sample-bom-cpl.csv and rename them to sample-bom.csv and sample-cpl.csv.

Double click sample-cpl.csv, LibreOffice will bring up the following dialog. Click OK.

Text Import - [sample-cpl.csv]	×
Import	
Ch <u>a</u> racter set: Unicode (UTF-8) ▼	
Language: Default - English (USA)	
From row: 1	
Separator Options	
🗖 <u>T</u> ab 🖉 <u>C</u> omma 🔲 S <u>e</u> micolon 🔲 S <u>p</u> ace 💭 Othe <u>r</u>	
Merge <u>d</u> elimiters Tr <u>i</u> m spaces String delim	iter: " 💌
Other Options	
☐ Format quoted field as text	
Fields Column type:	
Standard	Star 🔺
1 * Partlist from file: sample.lay6" / 8/10/2021 6:03:49	PM
3 * All coordinates in mm	
4 *	E III
5 ^ Name	vali
7 C1	0.1
8 CONN1	USB 🚽
III	4
<u>H</u> elp	<u>C</u> ancel

Figure 8. Import CPL

 \sim

Now, CPL has been imported.

	A	В	С	D	E	F	G	Н
1	* Partlist from file: sample.lay6" / 8/10/2021 6:21:31 PM							
2	*							
3	* All coordinates in mm							
4	*							
5	* Name	Value	Layer	Pos-X	Pos-Y	Rot	Package	Comment
6	*							
7	C1	0.1uF 50V	Тор	32.6	14.3	0	603	C14663
8	CONN1	USB-Mini-B	Тор	6.54	12.65	180	USB-Mini-B	C91144
9	J1	2.54-header-2x3	Тор	41.91	11.76	0	HEADER2x3	C65114
10	U1	ATMEGA328P-A	Тор	24.39	11.95	0	TQFP-32_7x7x08P	C14877
11								

Figure 9. CPL in LibreOffice Calc

Delete the not needed lines and modify the file accoring to <u>JLCPCB's CPL specification</u>.

Now we get the clean file.

	Α	В	С	D	E	F
1	Designator	Layer	Mid X	Mid Y	Rotation	
2	C1	Тор	32.6	14.3	0	
3	CONN1	Тор	6.54	12.65	180	
4	J1	Тор	41.91	11.76	0	
5	U1	Тор	24.39	11.95	0	
6						
7						

Figure 10. CPL file is done

Click **Ctrl+S** to save the file, keep using text CSV format.

		Α	В	С	D	E	F	G	н	I		
1	Desi	gnator	Layer	Mid X	Mid Y	Rotation						
2	C1		Тор	32.6	14.3	0						
3	CON	N1	Тор	6.54	12.65	180						
4	J1		Тор	41.91	11.76	0						
5	U1		Тор	24.39	11.95	0						
6												
7	C	onfirm	File For	mat					_	x		
8		~ •										
9	(This document may contain formatting or content that cannot be saved in the currently selected file format "Text CSV".										
10												
11												
12												
13		Use the default ODF file format to be sure that the document is saved correctly.										
14		0	Ack y	uhan not	cavina		default format					
15		Ľ	- Osk v	mennot	saving		default forma					
16												
17							<u>U</u> se Text CSV I	Formati Us	se ODF <u>F</u> ormat	¢		
18										_		
19												

Figure 11. Save CPL file

Edit the raw data to a BOM file

Double click sample-bom.csv, LibreOffice will bring up the following dialog. Scroll to **Package** column and select **Text** as the **Column type** to keep the leading 0s for 0603, 0402, etc.

Text Import - [sample-bom.csv]							
Import							
Ch <u>a</u> racter set:	(UTF-8)	TF-8)					
Language:	Default -	English (l	JSA)		-		
From ro <u>w</u> :	1						
Separator Optior	Separator Options						
○ <u>Fixed width</u>							
🗖 <u>T</u> ab 📝	<u>C</u> omma	Sem	nicolon	Space	Othe <u>r</u>	:	
🔲 Merge <u>d</u> el	imiters	🔳 Tr <u>i</u> n	n spaces		Strin <u>g</u> de	elimiter:	• 💌
Other Options							
Format quot	ed field as	text	V	Detect speci	ial <u>n</u> umbe	rs	
Fields							
Column type:	Column type: Text						
Standard	Standard	Standard	Standard	Text		Standard	
1							
2							
3							E
5 Layer	Pos-X	Pos-Y	Rot	Package		Comment	
6			_				
7 Top	32.60	14.30	0	0603 UCD_Mini	0	C14663	
8 100	0.54	12.05	~	050-0101-	D	005444	.
•							•
<u>H</u> elp				<u> </u>	<u>о</u> к	<u>C</u> ance	el

Figure 12. Import BOM

Click OK.

Edit the import file to a clean BOM according to <u>JLCPCB's BOM specification</u>. Like this:

	A	В	С	D	
1	Designator	Comment	Package	LCSC Part #	
2	C1	0.1uF 50V	0603	C14663	
3	CONN1	USB-Mini-B	USB-Mini-B	C91144	
4	J1	2.54-header-2x3	HEADER2x3	C65114	
5	U1	ATMEGA328P-AU	TQFP-32_7x7x08P	C14877	
6					
7					

Figure 13. BOM file is done

Click Ctrl+S to save the file, keep using text CSV format.

	Α	В	С	D	E	F	
1	Designator	Comment	Package	LCSC Part #			
2	C1	0.1uF 50V	0603	C14663			
3	CONN1	USB-Mini-B	USB-Mini-B	C91144			
4	J1	2.54-header-2x3	HEADER2x3	C65114			
5	U1	ATMEGA328P-AU	TQFP-32_7x7x08P	C14877			
6							
7	Confirm	Confirm File Format					
8							
		This document may contain formatting or content that cannot be					
9		I his document ma	y contain formattin	g or content	that cannot	be	
9 10		saved in the curren	y contain formattin itly selected file for	g or content mat "Text C	that cannot SV″.	be	
9 10 11		saved in the curren	y contain formattin ty selected file for	g or content mat "Text C	that cannot SV" .	be	
9 10 11 12		saved in the curren	y contain formattin itly selected file for	ig or content mat "Text C	that cannot SV″.	be	
9 10 11 12 13		saved in the curren	y contain formattin itly selected file for file format to be sure	ng or content mat "Text C that the docum	that cannot SV". nent is saved c	orrectly.	
9 10 11 12 13 14		Use the default ODF f	file format to be sure	ng or content mat "Text C that the docum	that cannot SV". nent is saved c	orrectly.	
9 10 11 12 13 14 15		Use the default ODF	y contain formattin itly selected file for file format to be sure ng in ODF or default f	ng or content mat "Text C that the docum format	that cannot SV". nent is saved c	orrectly.	
9 10 11 12 13 14 15 16		Use the default ODF	file format to be sure ng in ODF or default f	ig or content mat "Text C that the docum ormat	that cannot SV" .	orrectly.	
9 10 11 12 13 14 15 16 17		Use the default ODF	y contain formattin itly selected file for file format to be sure ng in ODF or default f	ig or content mat "Text C that the docum ormat CSV Format	that cannot SV". nent is saved c Use ODF <u>F</u> c	orrectly.	
9 10 11 12 13 14 15 16 17 18		Use the default ODF	y contain formattin itly selected file for file format to be sure ng in ODF or default f	ig or content mat "Text C that the docum ormat CSV Format	that cannot SV". nent is saved c Use ODF <u>F</u> c	orrectly.	

Figure 14. Save BOM

The rotation problem

After uploading Gerbers, BOM and Pick and Place files, if everything goes well, you'll see a preview window which has a rendered PCB with components on it.

Review Parts Placement

Figure 15. Preview

In the above screenshot you can see the orientation of U1 (ATmega328P) is wrong: The correct pin 1 should be the topmost pin on the left side. We check the **Rotation** value in the CPL file and found the current value is 180 degree, if we rotate it 90 deg more we'll get the right rotation. Now, change the rotation in the CPL to 270 deg and upload it again, the orientation has been fixed in the new image (This is a workaround though, JLCPCB will solve this problem in the new future)

Review Parts Placement



Figure 16. The rotation of U1 has been fixed

Sometimes you may see other issues in this review page: for example, parts are not correctly aligned with the footprint, this is because the preview system is still not good enough. You may ignore this when you place the order, all files will be reviewed by engineers, they'll correct the position and make a high-resolution DFM image for you to confirm.

Last updated on July 25, 2023

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