

# 2019

# First steps to create a placement job



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#### Step 1 Add PCB to PCB holder

Put a PCB inside the PCB holder. Open the hex screws on the black slider blocks and adjust the PCB holder width to your PCB size. Move the black slider a bit forward to compress the springs half way and fix the screws. Now you're able to release the PCB holder by moving the bottom bar back and insert or remove PCB.





#### **Step 2 PCB settings**

Next steps to create a placement job start in the PCB settings.



You open the PCB Job Menu using this toolbar button.

You receive this empty dialog:



Open the PCB settings by clicking the PCB Edit button in toolbar.

PCB Settings and P ile Impor	t			×
Pdb PCB->	Pdb			
Add Delete Paste	Panelize PCB! Row 0 Row Space 0	Y CY Select All Pcb Panels	Import Pcb File	
	Col 0 Col Space 0	X CX Pcb Panel Number £º0	OK	
			Pcb Properties	Mark Camera Parameter
			Height 1.6 mm	Visual Zoom 39
			Origin X 0 X CX	Detect Precision 30 %
			Origin Y 0 Y CY	Invert Image
			Mark detection!	Visual Box 3
				Mark Diameter 1
				Contrast 120
			MARKIY	Brightness 255
			MARK2 X 0 X CX	Visual Times 3
			MARK2 Y 0 Y CY	Collect Time 300
			Using manual Mark point set!	Special Mark2
			MarK1 X Offset 0 mm CX	Mark2 Contrast 150
			MarK1 Y Offset 0 mm CY	Mark2 Brightness 100
			MarK2 X Offset 0 mm CX	Each PCB Mark
			MarK2 Y Offset 0 mm CY	

The empty dialog appears. Now we need to type the PCB name in left top text field and press "ADD" button.



PCB Settings and PNP File Impo	rt			×
PCB Settings and PNP File Impo Pdb FirstPCB Add Delete Paste ØFirstPCB	rt Pcb Panelize PCB! Row 1 * Row Space 0 Col 1 * Col Space 0 Row C 1 1 1	Y CY Select All Pcb Panels X CX Pcb Panel Number £°1	Import Pcb File     Ok       Pcb Properties     Height 1.6 mm       Origin X     0 X       Origin Y     0 Y       Mark detection!       MARK1 X     0 X	Mark Camera Parameter Visual Zoom 39 Detect Precision 30 % Invert Image Visual Box 3 Mark Diameter 1 Contrast 120
			MARK1 Y 0 Y CY MARK2 X 0 X CX MARK2 Y 0 Y CY Using manual Mark point set! MarK1 X Offset 0 mm CX MarK1 Y Offset 0 mm CY MarK2 X Offset 0 mm CX MarK2 Y Offset 0 mm CY	Brightness 255 Visual Times 3 Collect Time 300 Special Mark2 Mark2 Contrast 150 Mark2 Brightness 100 Each PCB Mark

Our First PCB is added and row / col count set to one PCB or panel. If you add row or column count now we are able to repeat the placement job on each PCB inside a panel. The distances set by "Row Space" and "Col Space".

Take care Y axis has always negative values!

PCB Settings and PNP File Impor	t	10110 - 10110 - 10110 - 10110 - 10110 - 10110 - 10110 - 10110 - 10110 - 10110 - 10110 - 10110 - 10110 - 10110 -	×
Pd FirstPCB Add Delete Paste	Pcb Panelize PCB! Row 2 ♣Row Space -80 ¥ CY Select All Pcb Panels Col 2 ♣ Col Space 56 ¥ CX Pcb Panel Number £º4 Row C 1 2	Import Pcb File Ok Pcb Properties Height 1.6 mm	Mark Camera Parameter Visual Zoom 39
	<ul> <li>1</li> <li>2</li> </ul>	Origin X         0         X         CX           Origin Y         0         Y         CY           Mark detection!         X         CX           MARK1 X         0         X         CX           MARK1 Y         0         Y         CY           MARK2 X         0         X         CX           MARK2 Y         0         Y         CY	Detect Precision 30 % Invert Image Visual Box 3 Mark Diameter 1 Contrast 120 Brightness 255 Visual Times 3 Collect Time 300
		Using manual Mark point set! MarK1 X Offset 0 mm CX MarK1 Y Offset 0 mm CY MarK2 X Offset 0 mm CX MarK2 Y Offset 0 mm CY	Special Mark2 Mark2 Contrast 150 Mark2 Brightness 100 Each PCB Mark

This example shows a panel setup containing 4 PCB in -80mm Y / 56mm X distance and all PCB are selected for placement. By clicking on the blue grid fields the PCB gets disabled for placement. The placement start always on the first selected PCB from left to right and top to bottom.



### Step 3 Import pick and place file

Next step we import the PNP file:

mport File						>
Import File	Protel99SE.txt	~	Open Pcb File	Import A	ll To Project t Value	Ok
Part Number £º						0%
Part Name	Part Packing	X Coordinates	Y Coordinates	Rotation A	Note	Mark

First we need to select the coordinate file type using the dropdown box "Import File"

Import File		
Import File	Protel99SE.txt	$\sim$
Part Number£º	Protel99SE.txt Protel99SE.PIK Altium Designer.txt PowerPCB.txt	
Part Name	ALLEGRO.txt Eagle.mnt KiCad.pos Excel.csv Proteus.pkp Mentor.txt PADS.txt PADS.txt PADS.stvt_New PADS.stv PADS.318 GerbCam.tsv GerbCam.tst ALLEGRO_csv.csv	ites

If your CAD system not listed use the CSV file option.

For detailed file format description refer to Visionplacer manual.

Then use the "Open PCB File" button to open the coordinate file.



After openening the pnp import file the coordinates are shown in the dialog.

nport File	Protel99SE.txt	~	Open Pcb File	Import A	II To Project		Ľ
		[	Fit Part Packing	Fit Par	t Value	Ok	
art Number£º	160					0%	
Part Name	Part Packing	X Coordinates	Y Coordinates	Rotation A	Note	Mark	1
LED1	WL-SMDC	78.975mm	-57.925mm	180.00	Red	В	
S1	PEC11-401	15.225mm	-24.37mm	180.00		в	1
R37	0603	107.046mm	-51.552mm	90.00	470R	т	
C1	CC0603	108.697mm	-6.213mm	270.00	1n	т	
C2	CC0603	108.697mm	-12.309mm	270.00	100n	т	
C3	1923-6103	113.015mm	-2.53mm	180.00	100n	т	
C4	CC0603	117.206mm	-9.388mm	90.00	1n	т	
C5	CC0603	30.5mm	-53.965mm	360.00	33p	т	
C6	CC0603	30.465mm	-52.568mm	0.00	100n	т	
C7	CC1206	87.615mm	-15.865mm	270.00	10uF	т	
C8	SMDF_RU	93.584mm	-15.992mm	90.00	220uF/35V	т	
C9	SMDF_RU	103.236mm	-15.865mm	270.00	220uF/35V	т	
C10	1923-6103	26.055mm	-66.03mm	270.00	1n	т	
C11	CC0603	75.296mm	-15.484mm	90.00	220p	т	
C12	1923-6103	24.15mm	-63.49mm	360.00	1uF	т	
C13	1923-2332	24.15mm	-62.22mm	360.00	33p	т	
C14	1923-2332	24.15mm	-68.57mm	180.00	33p	т	
C15	CC0603	75.677mm	-35.677mm	180.00	100n	т	

We are now able to import the coordinates in our PCB project but first need to decide if feeder should get matched by Part Value or Part Packing. The automatic feeder assignment can only match one pair of fields.

The button "Import All To Project" will start the matching process and add each line as placement or dispenser point to the PCB project.



## Step 4 PNP data loaded to new PNP project file

Pcb Edit	Strate	igy S	tart	<b>II</b> Pause	<b>I</b> Regain	Stop		Q Find	Com	pare	Update					
FirstPCB/	Array:Row	1 Col 1		Smt Count	£º4 × 160	Progres	s						Smt Tir	me£°		
Number	x	Y	Angle	Part Na	Туре	Package	Мо	unt	Value	Feede	er Number	Visua	al	Feeder	Nozzle	^
1	78.9750	-57.9250	180	LED1		WL-SM	-	No	Red			G.	No			201
1 2	15.2250	-24.3700	180	S1		PEC11	-	No				-	No			201
3	107.0460	-51.5520	90	R37		0603	-	No	470R			•	No			201
4	108.6970	-6.2130	270	C1		CC0603	-	No	1n			•	No			201
5	108.6970	-12.3090	270	C2		CC0603	-	No	100n			•	No			201
6	113.0150	-2.5300	180	C3		1923-6	-	No	100n			•	No			201
17	117.2060	-9.3880	90	C4		CC0603	-	No	1n			•	No			201
8	30.5000	-53.9650	0	C5		CC0603	-	No	33p			•	No			201
9	30.4650	-52.5680	0	C6		CC0603	-	No	100n			•	No			201
10	87.6150	-15.8650	270	C7		CC1206	-	No	10uF			•	No			201
11	93.5840	-15.9920	90	C8		SMDF_RU	-	No	220uF/			<b>⊡</b> ⊀	No			201
12	103.2360	-15.8650	270	C9		SMDF_RU	-	No	220uF/			•	No			201
13	26.0550	-66.0300	270	C10		1923-6	-	No	1n			<b>-</b>	No			201
14	75.2960	-15.4840	90	C11		CC0603	-	No	220p			<mark>⊡</mark> ⊀	No			201
15	24.1500	-63.4900	0	C12		1923-6	-	No	1uF			<mark>-</mark>	No			201
16	24.1500	-62.2200	0	C13		1923-2	-	No	33p			•	No			201
17	24.1500	-68.5700	180	C14		1923-2	-	No	33p			<mark>-</mark>	No			201
18	75.6770	-35.6770	180	C15		CC0603	-	No	100n			<mark>⊡</mark> ⊀	No			201
19	103.4900	-31.7400	90	C16		CC0603	-	No	100n			<mark>-</mark>	No			201
20	104.7600	-31.7400	270	C17		CC0603	-	No	33p			•	No			201
21	22.2450	-66.0300	270	C18		1923-6	-	No	1n			<mark>⊡</mark> ⊀	No			201
22	30.4650	-49.7740	180	C19		1923-2	-	No	33p			•	No			201
23	87.6150	-31.1050	270	C20		CC1206	-	No	10uF			<mark>⊡</mark> ⊀	No			201
24	78.7250	-41.0110	0	C21		SMDF_RU	-	No	220uF/			<b>-</b>	No			201
25	31.7700	-57.1400	270	C22		CC0603	-	No	100n			<mark>9</mark> .	No			201
26	93.3300	-29.2000	270	C23		SMDF_RU	-	No	220uF/			•	No			201
27	75.2960	-30.5970	90	C24		1923-3	-	No	220p			•	No			201
28	18.0540	-52.6950	0	C25		CC0603	-	No	100n			•	No			201' 🗸
-		_														22.16

The most important step now is to save the file first before applying next settings!

In this case all PNP lines got imported but no matching feeders assigned.

Feeder assignment need to be done first.



I show mass editing of feeder assignment in the next step.

Manually sort and select a range of lines and edit the assignment using right click menu "Part Edit" function. You can start sorting by clicking on the row headers!

Pcb Edit	Strate	gy Si	► tart	<b>II</b> Pause	<b>I</b> Regain	Stop	Q Find	E I Cor	] mpare	Update						
FirstPCB	Array:Row	1 Col 1		Smt Coun	t£º4 × 160	Progress	5					Smt	Time£°			
Number	x	Y	Angle	Part Na	Туре	Package	Mount	Value	Feede	r Number	Visu	al	Feeder	Nozzle	-	•
100	78.7250	-35.5500	180	R 10		0603	- No	0.15R			<b>⊡</b> ⊀	No			201	
1	108.6970	-12 3090	270	<i>C</i> 2		CC0603	No	100n			<b>B</b>	No			201	
16	113.0	Part Add				1923-6	No				Ŗ				201	
9	30.4	Part Edit				CC0603	No				R				201	
18	75.6	Part Delet	e			CC0603	No				R				201	
19	103.4	Part Copy				CC0603	No				R				201	
1 25	31.7	Part Paste				CC0603	No				R				201	
28	18.0	Copy to p	aste			CC0603	No				R				201	
36	19.3	Move Noz	zzle to par	t coordinate		CC0603	No				R				201	
37	89.3	Move Car	nera to pa	rt coordinate		CC0603	No				R				201	
135	30.4	Start Mou	nting her	el		CC0603	No				R				201	
136	18.0	Mount Se	lection!			CC0603	No				9				201	
137	107.1					CC0603	No				9				201	
138	15.2	PCB Settir	ngs and Pl	NP File Impor	t >	CC0603	No				9				201	
139	62.2	Double Gr	rout XY Co	ontrol	>	CC0603	No				9				201	
140	66.7870	-34.4070		C49		CC0603	No	100n			<u>-</u>				201	
141	72.1210	-52.1870		C51		CC0603	No	100n			4				201	
142	82.2810	-62.8550		C52		CC0603	No				<u></u>				201	
143	82.6620	-48.1230		C53		CC0603	No				4				201	
144	50.7850	-49.1390		C56		CC0603	No				4				201	
152	95.7430	-40.5030		C41		CC0603	No				4				201	
153	90.6630	-65.0140	270	C55		CC0603	No	100n				No			201	
95	27.9600	-50.2820	90	R4		0603	No	10K			<u><u></u></u>	No			201	
99	30.4650	-51.1710	0	R9		0603	No	10K			*	No			201	
104	103.4900	-24.7550	90	R14		0603	No	10K				No			201	
105	15.5140	-50.2820	90	R15		0603	No	10K			*	No			201	
111	18.0190	-51.2980	0	R22		0603	No	10K			ä	No			201	
113	43.8000	-55.2350	90	R24		0603	No	10K			<b>-</b> *	No			201 \	٢

			-			
Part Index	0					
Part Name		~	•			
Part Type		~	-			
Part Packing		~	•			
X Coordinates	0	mm X	CX	Offset X	0	mm
Y Coordinates	0	mm Y	CY	Offset Y	0	mm
Part Angle		~	•			
Part Value						
Select Feed		~	Open	Feed>>		
	Mount P	art				
	Special I	Mark				~
Ok		Cano	el			

Be careful change only the fields you want to update because all selected lines get updated and individual data may get overridden if you change coordinates here!

Select the Feeder by opening dropdown box



	Regain	W17-BAW56 W18-PESD0603-2		Find	Com
ount	£º4 × 16	W19-120R			
	Type	W1-FB2K2		+	Value
	Type	W20-4/0R			value
		W2-100nF63V		No	0.15R
		W21-1K			
ertie	s	W22-1K2			
		W23-			
		W24-3K3			
Par	rt Index	W25-3K6			
		W26-4K7			
Da	et Nama	W27-10K			
Fa	ruivanie	W28-MCP9802			
		W29-MCP1801T-3			
Pa	art Type	W30-744231091			
		W3-100n			
Part	Packing	W31-ZXCT1081E5			
		W32-11K			
C		W33-0R15			Officety
C00	rdinates	W34-10R		CX	Unset X
		W35-			
Cool	rdinates	W4-33n		CY	Offset Y
		W5-220p			
Pa	rt Angle	W5-10			
	i craigic	W7-10E			
	at Value	WO CT DA			
Pa	rt value	W8-51_2A			
		w9- <del>4</del> ,/u⊢	~		
Sele	ect Feed	W2-100nF63V	~	Open	Feed>>

And select a matching feeder.

Part Properties				×
Part Index	0			
Part Name	~			
Part Type	~			
Part Packing	~			
X Coordinates	mm X	CX	Offset X 0	mm
Y Coordinates	0 mm Y	CY	Offset Y 0	mm
Part Angle	~			
Part Value				
Select Feed	W2-100nF63V ~	Ope	n Feed>>	
	Mount Part			
	Special Mark			$\sim$
Ok	Cance	I		

Check the mount flag in Part Properties dialog and click ok button.



#### And receive this result:

cb Edit	Strate	igy S	► tart	Pause	<b>IÞ</b> Regain	Stop		Q Find	Com	npare	Update					
FirstPCB	Array:Row	1 Col 1		Smt Coun	t£º4 × 160	Progres	s						Smt	Time£°		
umber	x	Y	Angle	Part Na	Туре	Package	Мо	unt	Value	Feeder	Number	Visu	lau	Feeder	Nozzle	
100	78.7250	-35.5500	180	R 10		0603	-	No	0.15R			o,	No			201
5	108.6970	-12.3090	270	C2		CC0603	~	Yes	100n	v	V2	D,	No	100nF63V	2	201
6	113.0150	-2.5300	180	C3		1923-6	~	Yes	100n	v	V2	G,	No	100nF63V	2	201
9	30.4650	-52.5680	0	C6		CC0603	~	Yes	100n	v	V2	⊡ <b>x</b>	No	100nF63V	2	201
18	75.6770	-35.6770	180	C15		CC0603	~	Yes	100n	v	V2	<b>⊡</b> ∢	No	100nF63V	2	201
19	103.4900	-31.7400	90	C16		CC0603	~	Yes	100n	v	V2	o,	No	100nF63V	2	201
25	31.7700	-57.1400	270	C22		CC0603	~	Yes	100n	v	V2	⊡ <b>x</b>	No	100nF63V	2	201
28	18.0540	-52.6950	0	C25		CC0603	~	Yes	100n	v	V2	•	No	100nF63V	2	201
36	19.3240	-57.1400	270	C35		CC0603	~	Yes	100n	v	V2	<b>⊡</b> ∢	No	100nF63V	2	201
37	89.3930	-42.0270	270	C40		CC0603	~	Yes	100n	v	V2	⊡ <b>x</b>	No	100nF63V	2	201
135	30.4650	-48.3770	180	C29		CC0603	~	Yes	100n	v	V2	<b>R</b>	No	100nF63V	2	201
136	18.0190	-48.3770	0	C34		CC0603	~	Yes	100n	v	V2	G,	No	100nF63V	2	201
137	107.1730	-28.1840	90	C38		CC0603	~	Yes	100n	v	V2	⊡ <b>x</b>	No	100nF63V	2	201
138	15.2250	-14.5950	0	C39		CC0603	~	Yes	100n	v	V2	<b>⊡</b> ∕	No	100nF63V	2	201
139	62.2150	-38.2170	0	C48		CC0603	~	Yes	100n	v	V2	•	No	100nF63V	2	201
140	66.7870	-34.4070	180	C49		CC0603	~	Yes	100n	v	V2	⊡ <b>x</b>	No	100nF63V	2	201
141	72.1210	-52.1870	0	C51		CC0603	~	Yes	100n	v	V2	<b>⊡</b> ∕	No	100nF63V	2	201
142	82.2810	-62.8550	0	C52		CC0603	~	Yes	100n	v	V2	⊡ <b>x</b>	No	100nF63V	2	201
143	82.6620	-48.1230	180	C53		CC0603	~	Yes	100n	v	V2	<b>⊡</b> ∢	No	100nF63V	2	201
144	50.7850	-49.1390	0	C56		CC0603	~	Yes	100n	v	V2	<b>⊡</b> ⊀	No	100nF63V	2	201
152	95.7430	-40.5030	180	C41		CC0603	~	Yes	100n	v	V2	<b>⊡</b> ∕	No	100nF63V	2	201
153	90.6630	-65.0140	270	C55		CC0603	~	Yes	100n	v	V2	<b>R</b>	No	100nF63V	2	201
95	27.9600	-50.2820	90	R4		0603	-	No	10K			Q,	No			201
99	30.4650	-51.1710	0	R9		0603	-	No	10K			<b>B</b>	No			201
104	103.4900	-24.7550	90	R14		0603	-	No	10K			₽ <b>x</b>	No			201
105	15.5140	-50.2820	90	R15		0603	-	No	10K			-	No			201
111	18.0190	-51.2980	0	R22		0603	-	No	10K			-	No			201
113	43.8000	-55.2350	90	R24		0603	-	No	10K				No			201

All selected lines now have feeder assigned and enabled for mounting.

You should repeat this procedure until all feeders got assigned.



#### **Step 5 Assigning PCB origin and check coordinates**

Now we need to setup the PCB origin. Move the machine top camera to PCB placement data origin and take over the position using CX and CY button in PCB settings.

Pcb Properties						
Height	1.6	mm				
Origin X	0	X CX				
Origin Y	0	Y CY				

Save your PCB job and check if PCB origin is well adjusted by using an IC to test for center position.

SOD-123 SOD-123 SOD323_BZX38 SOD323_BZX38 SOD323_BZX38	Part Add Part Edit Part Delete Part Copy	
SOIC16_N SOT-23-3_BA SOT-23-OT5 SOT-23-TT5	Part Paste Copy to paste Move Nozzle to part coordinate	
SOT 23-11 SOT 143_HSMS SOT 23-3 SOT 23-5	Start Mounting here! Mount Selection!	
SOT23-5 TQFP44_dsPIC33FJ WF-CNSW-0805	PCB Settings and PNP File Import > Double Grout XY Control > No. 744231	

Measure the deviation and adjust the PCB origin. Save PCB file and check component position again until everything matches. On some PCB maybe you find deviation in produced PCB and can't adjust the placement position well. Try to set the PNP data origin to the middle of the PCB to compensate.



For the first placement test we should use a double-sided scotch tape to keep the parts in position after placement. We prefer X-Film because it's transparent and easy to remove.

Next step we need to adjust the PCB thickness to (PCB height -0.1mm).

Pcb Properties						
Height	1.5	mm				
Origin X	15.7	X CX				
Origin Y	-13.5	Y CY				

Use simple parts for your first placement test like resistors.

#### **Step 6 Placement Strategy settings**

Adjust the placement strategy settings like this if you use a 4 head machine:

MT Placement Strategy			
Smt Sort order	Head Placement Mode	Placement mode	
O Part Number	Single Head	Mount Parts     Cover Set	0
OY	O 2 Head different	H2 Disp. H1 Inject	0
○ Angle	Change A1A2	O H2 Disp. and Place	0
○ Name	O No Change A1	○ Nozzle Simulate	
○ Туре	O No Change A2	🔿 Camera Simulate	
<ul> <li>Part Packing</li> <li>Part Height</li> </ul>	<ul> <li>4 Head same</li> <li>4 Head different</li> </ul>	<ul> <li>Simulate Feed-&gt;Part</li> <li>AutoFeed-&gt;Camera Simu</li> </ul>	Drop Poin 1
	O Designation 4 Hear	Camera Simulate Feed	
U Nozzie Number	Auto nozzle changer	After Disp. Delay 50 ms	Dispenser dose 0 0 mm After Close 0 0 ms



#### And like this if you use nozzle changer.

SMT Placement Strategy			×
Smt Sort order	Head Placement Mode	Placement mode	
O Part Number	Single Head	Mount Parts	O
Ox	O 2 Head same	Cover Set	O
OY	O 2 Head different	◯ H2 Disp. ◯ H1 Inject	O
○ Angle	Change A1A2	O H2 Disp. and Place	O
○ Name	O No Change A1	O Nozzle Simulate	
ОТуре	O No Change A2	O Camera Simulate	
O Part Packing	O 4 Head same	◯ Simulate Feed->Part	
Part Height	0 4 Head different	O AutoFeed->Camera Simu	Drop Poin 1
O Feeder Number	O Designation 4 Head	O Camera Simulate Feed	Weld Distance 0 0 mm
O Nozzle Number		Time Interval 2000 ms	Dispenser open 0 0 mm
	✓ Auto nozzle changer	After Disp. Delay 50 ms	Dispenser close 0 0 mm
	Head 2 avoid camera 1		After Close 0 0 ms
Reset Number S	Show All Show Smt	Show No Smt Ok	Cancel

If you only want to check the placement positions by top camera switch the placement mode to "Camera Simulate" and the machine will move to each placement position and wait for time interval.

Click ok button and save the settings.

If no nozzle changer enabled, you need to install nozzles in your placement heads.

You have three options to start the placement job:

1. Start Pause Regain Stop Use the toolbar start button. If this button is greyed out use reset function to initialize the	2. Start Mounting here! Select placement line and use right click function to start placement from line X.	3. Select some lines and use right click function to start placement of selection.
machine again.		

If placed parts not in position check the following things:

- Check if PCB origin is ok and top camera on part center. If not adjust the PCB origin.
- Move nozzle to bottom camera center and check if it's in the middle.
- Check part height settings if parts placed randomly wrong.
- Adjust the PCB height setting if all parts placed wrong.
- Use lower speed setting especially for Z axis.
- Check the brightness and contrast settings for part alignment.