ECM LUNA EXP Series Pick & Place
for Windows
Operational manual
(Compact KPS PCI BUS board version)

INDEX

WARNING!

When open the cover of the main body, or control box,
please make sure the mains switch is off to prevent electrical
** shock.**
** Do not touch on moving parts while running and disconnect**
mains before service. The hand touches inner part of electrical chassis, there
will be danger of the electric shock.
Do not move head arm QUICKLY by hand while mains is off. Generated voltage
by motor may damage motor internal circuit.

This manual is common for all ECM Luna EXP series models to use Compact PCI bus I/O
card .

The software does not support Windows 98/Me

1**. Start up**

Check all connector connections, Mains, Air supply and piping also check air pressure (5kg/mm2)

Connect   three camera cables to PC as shown below.

.

1) Turn on mains switch for controller and display.
2) Turn on Mains switch in the console
    which activates motor control box and
    feeders.
3) The system automatically boots up
    and left image is displayed.

OFF Line	OFF Line is used to edit data without machine running.
ON Line	ON Line is used to connect machine and and run it.
English	Display in English
Japanese	Display in Japanese (or second language) **It is not displayed if the second font is not available.**
MDC	Click mouse on this icon to display version info.
	Click mouse on this icon to terminate program.

ON Line is selected, message as shown left is displayed to perform Homing. If there is no foreign material exists in the working area, then click YES button.

Then data file list is displayed so select a desired file.
Do not click Cancel button it will make error so load some file any way.

If machine does not work properly,

(1) Check mains switch in the console or control box.

(2) Turn off mains and move head to center of working area.

If still error message is displayed,

(3) Check connector connection between control box and computer etc.

When all done properly, following image is displayed.

    ON Line   OFF Line

In OFF Line mode, selectable items are limited. And file list is not displayed automatically as ON Line mode.

So click mouse on "3.File Load button to load" a file.

Until a file is loaded, data edit etc. are not possible in OFF Line mode.

Also OFF Line mode can operate without interface card.

any computer which installs Windows XP/Vista can run software in OFF Line mode.

RETURN	Back to Start up
1.Data List	Display Data list menu
2.Data Input	New data input
3.File Load	Load file first
4.Down Load	Convert CAD data
5.Assemble	Assemble current data
6.Diagnostic	INPUT/OUTPUT check etc.
7.Calibration	Calibration of mechanism etc
8.File Maintenance	File Maintenance
9.Conveyor Pass	Auto PCB Conveyor model only

DATA LIST (LIST MENU)

F1	Display Help file
F2	DATA file back up as file name BAK_____.
ESC	Back to SUB MENU
ENTER	Confirm edited data. Cursor moves to next line.
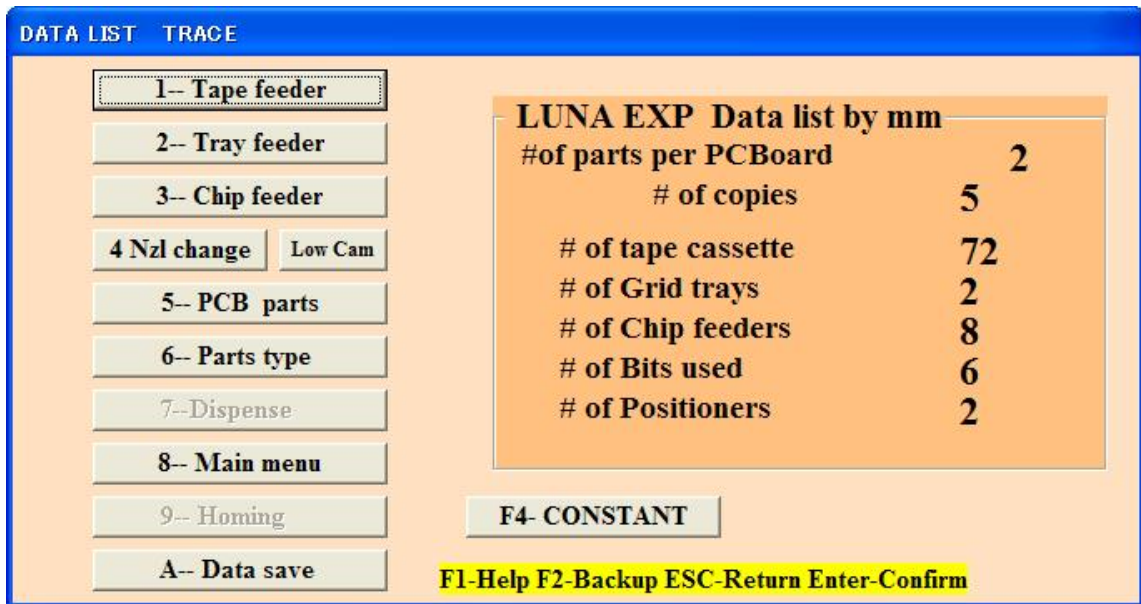
1.Tape feeder	Editing of Tape feeder data
2.Tray feeder	Editing of Tray feeder data
3.Chip feeder	Editing of Chip feeder data
4.Nozle changer	Editing of Nozzle exchanger & Camera position etc. Click **Low Cam** by mouse for quick access to Low camera data
5.PCB Parts	Editing of PCB placement data
6.PartsType	Editing of Part type data
7.Dispense	Editing of Dispenser data
8.Main Menu	Back to Main menu
9.Homing	Select one button of operation.
A Data save	Save current data to hard or floppy disk. Current file name is displayed. To change file name input new name. When the same file name exists then confirmation is prompted so if OK click Y.
F4 CONSTANT	Display or editing of system constants
Log File Check*	Check Pick up miss log file when Pick up miss is set to 13.

Tape feeder list

`1-- Tape feeder`

V1.0.30 or later, refer p60 Appendix 11,1 for display

Click above button (or press 1) then tape feeder data is displayed and it can edit X/Y coordinates, angle etc.

F1	Help windows are displayed
F2	Data back up as file name BAK
F3	Show part type list
F4	Show system constants
F8	Enter in Teaching mode
ESC	Return to List menu
Enter	Confirm revised data

#	Tape feeder number Feeder #1-27= #1 base , Feeder #28-54=#2 base
X	Displays X coordinates. To ensure stable pick up of component, pick up point must be taught correctly. To confirm it, select 2 EDIT in feeder list and select 2 CHANGE. Move cursor on desired line and press F8 key to move head on the coordinates. If necessary adjust position and press ESC key and ENTER key to confirm change.
Y	Displays Y coordinate. See above
A	Displays angle data
Strk	Incorrect stroke value results pick up miss or tombstone. As mentioned above move head to feeder position and press 9 to move nozzle on the pick up point and down nozzle by U key. When it reaches component press V and then space bar, part should be picked up. If OK press R and then V and ESC key. If stroke is changed "stroke change Y/N ?"is asked. So input Y.
Rem	Remark
Prt*	Input part type of the component. It reflects on PCB data automatically.
Index*	Input tape advancing index. It reflects on PCB data automatically.
F	Force control usually zero
DT	When dispensing required input dispenser type #

Note: When barcode reader is active barcode button appears on top left

Skip function by feeder

Assembly skip in assembly mode can be made by skip function in PCB data list and this case, head number in selected range becomes zero.

Skip function by feeder makes zero part type in the selected range.

In feeder data, enter in edit mode and menu list is displayed as below.

Choose [E Skip data] and input range in the window displayed at left below then part type value in the selected range becomes zero and in assembly all sequences use skipped feeders are skipped.

Instead of the use of [E Skip data], [2 Change] and move cursor to desired line and change part type to zero is also possible to skip a feeder.

Use, however, [F Un skip data] to un-skip data always.

This feature is useful to share one PCB data by several machines to increase productivity.
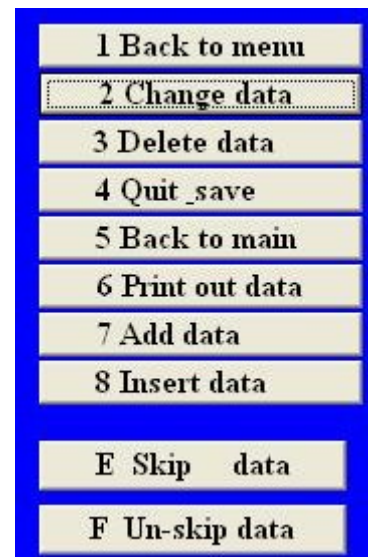
2-- Tray feeder   TRAY FEEDER LIST

V1.0.30 or later, refer p60 Appendix 11,1 for display

F1	Help windows are displayed
F2	Data back up as file name BAK
F3*	Show part type list
F4*	Show system constants
F8	Enter in Teaching mode
ESC	Return to List menu
Enter	Confirm revised data

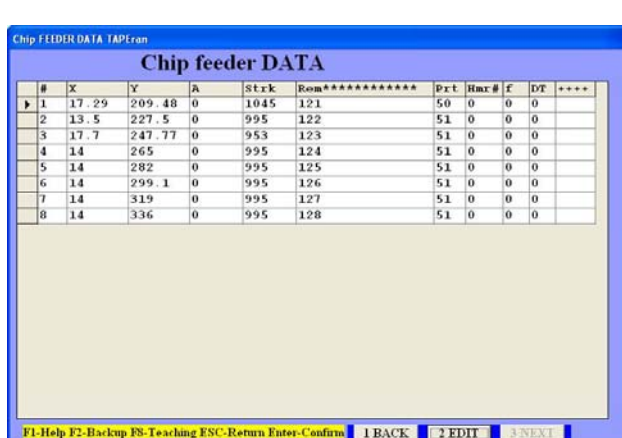| #	Feeder #
	Tray feeder # starts from #201. For example,201,202,203,204 and 205 as five trays.
X	Displays X coordinates.
	To ensure stable pick up of component, pick up point must be taught correctly. To confirm it, select 2 EDIT in feeder list and select 2 CHANGE. Move cursor on desired line and press F8 key to move head on the coordinates. If necessary adjust position and press ESC key and ENTER key to confirm change.
Y	Displays Y coordinate. See above
A	Displays angle.
Strk	Incorrect stroke value results pick up miss or tombstone.
	As mentioned above move head to feeder position and press 9 to move nozzle on the pick up point and down nozzle by U key. When it reaches component press V and then space bar, part should be picked up. If OK press R and then V and ESC key. If stroke is changed "stroke change Y/N ?"is asked. So input Y.
qty x, qty y	Number of IC pockets in X direction and Y direction.
Pitch X pitch Y	Pocket pitch in X direction and Y direction.
Rem	If the last 3 digits of the remark exist and LV=27 then nozzle Z home position is offset by it. Minus value goes down nozzle height so when component top and Laser is close it is useful to increase gap.
Prt*	Input part type of the component. It reflects on PCB data automatically.
f	Force control usually zero
DT	Dispenser type #

Pick up sequence: The component is picked up from the taught point first and then the next pick up point is X pitch in X direction until X quantity reaches. Then it moves to Y pitch in Y direction from taught point and continues the sequence.

3-- Chip feeder   Chip (bulk), Stick tube feeder list

V1.0.30 or later, refer p60 Appendix 11,1 for display

In the list menu when 3 Chip (bulk) & stick tube feeder list is selected, following menu displayed.
You can edit feeder X/Y coordinates and angle data.

F1	Help windows are displayed
F2	Data back up as file name BAK
F3*	Show part type list
F4*	Show system constants
F8	Enter in Teaching mode
ESC	Return to List menu
Enter	Confirm revised data

#	Feeder #
	Chip feeder # starts from
	#121 on PCB List. For example,121,122,123,124,125 as five feeders.
X	Displays X coordinates.
	To ensure stable pick up of component, pick up point must be taught correctly. To confirm it , select 2 EDIT in feeder list and select 2 CHANGE. Move cursor on desired line and press F8 key to move head on the coordinates. If necessary adjust position and press ESC key and ENTER key to confirm change.
Y	Displays Y coordinate. See above
A	Displays angle.
Strk	Incorrect stroke value results pick up miss or tombstone.
	As mentioned above move head to feeder position and press 9 to move nozzle on the pick up point and down nozzle by U key. When it reaches component press V and then space bar, part should be picked up. If OK press R and then V and ESC key. If stroke is changed "stroke change Y/N ?"is asked. So input Y.
REM	Input necessary remark here.
	If first 6 characters of the remarks of continued lanes are the same and one lane becomes empty then it automatically skips to the next lane without PU miss warning.
Prt*	Input part type of the component. It reflects on PCB data automatically.
Hmr	(Option) Input tape feeder # and # of blow as 25,2 Tape #25 and 2 blows.
f	Force control usually zero
DT	Input dispenser type #

NOZZLE EXCHANGER ETC.

4-- Nozzle changer

F1	Help windows are displayed
F2	Data back up as file name BAK
F8	Enter in Teaching mode
ESC	Return to List menu
Enter	Confirm revised data

#	Nozzle number: Prepares 6 nests for various nozzles. Usually finer nozzle is assigned as #1 and larger nozzle is assigned as #2,#3--#6. X/Y coordinates of nozzle exchanger are set in factory so changing it may cause malfunction of nozzle exchange operation.
X	Display X coordinates. Head can be moved on the nest in teach mode.
Y	Display Y coordinate. Head can be moved on the nest in teach mode.
A	Display nozzle angle. Usually 45 degrees.
Strk	Display nozzle stroke. It can be confirmed in teach mode.
REM/**Dia***	Remarks. Input nozzle outer dia .
Posi	Not used for single bottom camera model.
Posi2	Main bottom camera position.
Dumping	Dumping point location when component is not picked up correctly. If system constant 29 second value is zero then bad QFP is dumped in the tray.
Idol shot	Idle shot location when dispenser is used.

PCB LIST

**5-- PCB parts** Selecting this button, data list is displayed.

Feeder #, X/Y coordinates, angle etc. can be edited.

#	Hd	Fdr	X	Y	A	Pt	Nz	Ind	Strk	DT	HA	PF	REMARK-------++
1	1	261	-20	75.09	0	19						0	
2	1	262	120.07	74.89	0	19						0	
3	1	4	0	0	0	3	2	1	250			1	
4	1	7	3.79	0.59	15	5	2	1	250			1	
5	1	4	7.35	2.02	30	3	2	1	250			1	
6	1	7	10.44	4.46	45	5	2	1	250			1	
7	1	4	12.83	7.46	60	3	2	1	250			1	
8	1	7	14.44	11.06	75	5	2	1	250			1	
9	1	4	14.98	14.92	90	3	2	1	250			1	
10	1	7	14.5	18.8	105	5	2	1	250			1	
11	1	4	13.01	22.47	120	3	2	1	250			1	
12	1	7	10.72	25.54	135	5	2	1	250			1	
13	1	4	7.58	27.99	150	3	2	1	250			1	
14	1	7	3.98	29.57	165	5	2	1	250			1	
15	1	4	0.01	30.12	90	3	2	1	250			1	
16	1	7	-3.93	29.63	105	5	2	1	250			1	
17	1	4	-7.58	28.03	120	3	2	1	250			1	
18	1	7	-10.65	25.67	135	5	2	1	250			1	
19	1	4	-13.1	22.57	150	3	2	1	250			2	
20	1	7	-14.59	18.88	165	5	2	1	250			2	

F1-Help F2-Backup F6-Prtl assy F8-Teaching ESC-Return Enter-Confirm

Bias point 84.51 82.92	Bias point of the coordinates. All PCB data are displayed by the offsets from bias point.
#	Sequence # of the data. Actual assembly sequence is sorted by nozzle# (and tape#) so it may differ from this sequence.
Hd#	Head # is usually 1 but 2 head model may use 2.
Fdr	Usually input Feeder # to be used. 1-120 tape feeder,121-199 Chip tube feeder 201-220 Tray feeder 240 height control of Digital dispenser ,261-263 Vision fiducial 271-272 Manual fiducial correction 261 and 271 correct X,Y deviation and 262 and 272 correct tilt of PCB. So 2 fiducial marks should be located as apart as possible in X direction. (or Y direction but X is preferred)See angle data for 261-272 below.
X Y A	X/Y coordinates offset from bias point and angle data. Minimum step is 0.01mm and 0.01 degree. Angle data for fiducial mark. Usually the angle of fiducial mark is zero but if it is set to 0.01 or 0.1 and step repeat data exist then fiducial mark check is performed for each populated copies .
Pt	Input part type # referring part type
Nzl	Selecting part type, automatically set. Can not edit in PCB data.

Ind	Indexing # of tape advance.
	It is not displayed if tape feeder is not selected.
Strk	Input stroke that the nozzle reaches on PCB and then using Thk in part type data, actual stroke in assembly is calculated automatically.
DT	When dispenser is installed DT and HA are displayed. **DT is assigned in feeder data.** Dispensing direction for multi dot dispensing.
HA	0=0deg 1=90deg 2=180deg 3=270deg Refer dispensing procedure
PF	Puffing to release component from nozzle tip.
	Larger value makes longer puff time
rem	Remark.

TRACE   When this button is clicked, following trace window appears. **Luna vision only**
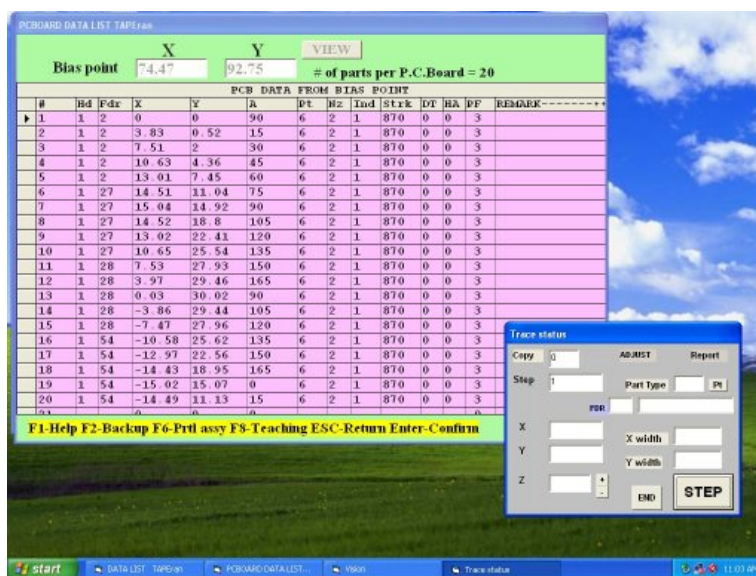

After placement completes go into PCB data and click TRACE and click STEP and camera goes on each placement point with acceptable window so OK/NG is easily checked.

Watching the result to change value of Theta (Z) is possible by input value. In Z window.

New features in Trace mode

1. To check corners of a large component, current camera magnification does not allow to see the corners of a large component.
    To check corners, new software can move camera to a corner by pressing arrow key.
    Moving increment can be changed by *
    and / key.

2. During trace mode, if slight adjustment
of the placement position is required,
click on ADJUST, then it becomes green,
and move camera to the first corner and
align cross line to the edge of the lead or
component corner and press C key then
the step is displayed at the left low corner of
the vision window. Continue alignment at
every 4 corners pressing C key.
After 4 times complete the trace sequence
moves to next and data is rewrite. (After quit
trace mode, PCB data will not show the
changes but escape the list and reload it
then the changes become effective.)
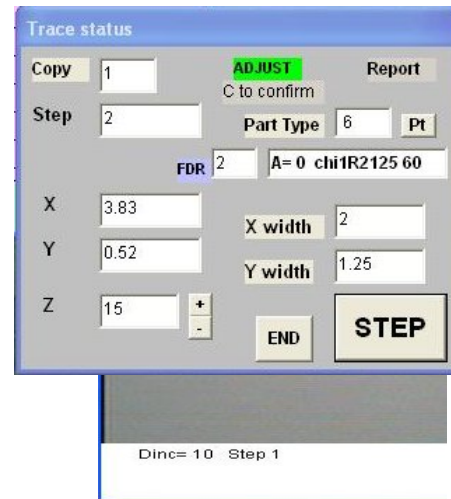
3. If the red rectangle does not match land orientation then click +/- button right of Z
then the red rectangle rotates 90degree each and angle data on PCB list is changed.
(Note: this change is not displayed when end the trace but after esc key pressed and display
again then the change is on the list. Also part type can be changed by input new part type#.)

4. Report
Trace mode can create the inspection report
of the placement deviation data.
Click on Report button, then it becomes green) and move camera to every 4
corners similar to Adjust. Procedure. Report continues until Report button is
clicked again. The report data is stored in EDGE.csv file in C directory so it
can be edited by Microsoft Excel etc.

Align Origin   **Fiducial alignment in teaching mode**

If fiducial marks (261/262 or 271/272) exist in PCB data this button appears. When go into teach
mode if PCB is not located correctly such as X/Y offset or tilt then move cursor on 261 or 271 line
and click on this mark and align first fiducial. S(earch) command is useful to align 261 mark.

1st Aligned   When first fiducial is aligned and the 2nd fiducial exists then the button changes.
Move cursor on 262 or 272 and click on this button and align the 2nd fiducial.

Aligned   After this button appears all PCB data are corrected so just teach using cross
line and F6 (partial assembly) also corrects mounting position. Note that in this mode fiducial
location can not change by teaching. To clear correction move cursor on any placement data (not
fiducial) and click the button then the button display changes to "Align origin".

C. COPY DATA

If a PCB is populated one, it is not necessary to make whole data but make one master and copy it.

When Copy is selected, Step & Repeat=1   Block copy=2   is displayed.

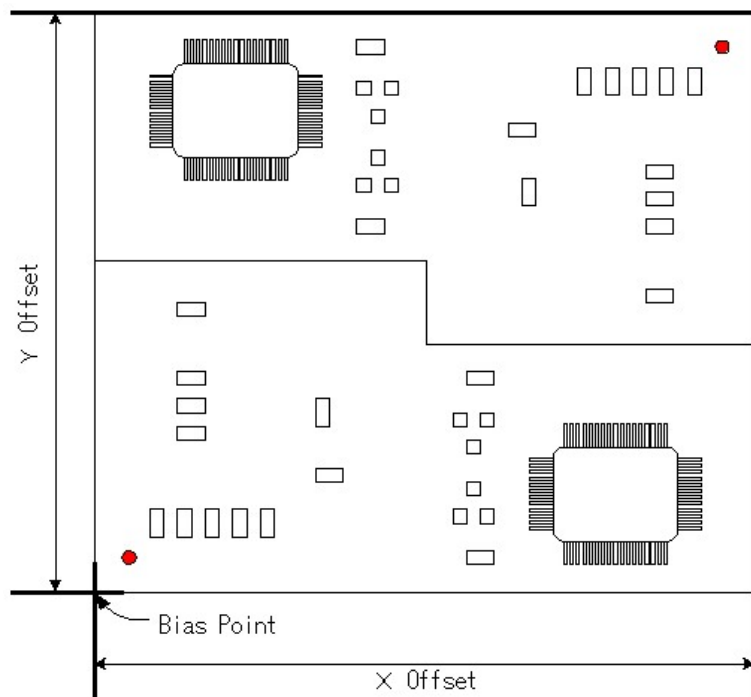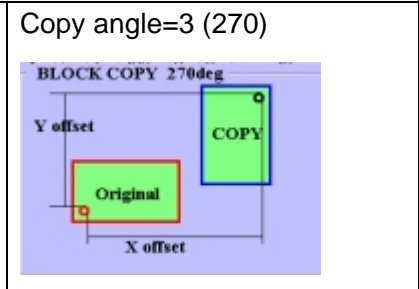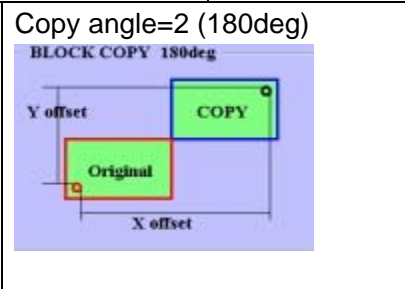| Step & Repeat=1	Block copy =2

<Step & Repeat>	
	Input # of copies in X direction then input pitch of copy in X direction. Input # of copies in Y direction then input pitch of copy in Y direction.
<Block copy>	
	 Input rotation angle of copy and offset in X and Y. Copy angle 1=90 deg. 2=180 deg.3=270 deg.

Copy angle=1 (90deg)	Copy angle=2 (180deg)	Copy angle=3 (270)
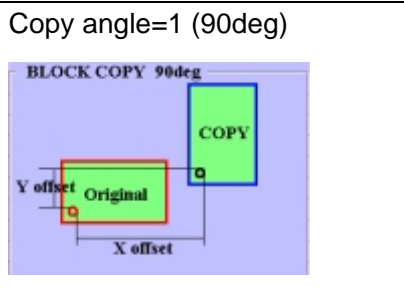
Block copy details

For example if rotation angle=2 (180 deg) as shown left, input X and Y offset referring bias point. The bias coordinates are basic of offset calculation.

Copy of fiducial mark

Usually when copy data is extended, fiducial mark is copied if fiducial mark has an angle data (not zero) then fiducial make is copied but if the angle is zero then it is not copied.

For block copy, however, fiducial mark is copied always but if first

fiducial mark has zero angle data then following fiducial marks are skipped. If the first fiducial mark has non zero such as 1 then all fiducials are active and each block data coordinates after each fiducial mark are corrected by the fiducial mark. If the angle of following fiducial mark is changed to zero then such data is skipped (even the first fiducial has non zero angle).

PART TYPE LIST

6-- Parts type | Pressing this button, part type is displayed.

Refer Sample data for LV=1 for Flying Luna aligns part.

Available part size by Flying Luna check

Part diagonal: 0.3 - 10mm

Part thickness: 0.3 - 6mm

Refer Sample data for LV=25/26/27 for Luna vision

PARTS TYPE DATA BAK

Part type DATA

P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem	dx1	dy1	da1	dx
1	1	0	0	0	0	0.6	0.3	0	0	0.3	1	50		chi	1	c0201	0	0	0	0
2	1	0	0	1	0	1	0.5	0	0	0.35	1	70		chi	1	R0402	0	0	0	0
3	1	0	0	0	0	1	0.5	0	0	0.4	26	70		CHI	1	R0603	0	0	0	0
4	2	0	0	0	0	1.85	1.85	0	0	0.4	226	50		CAP	1	DIE PD	0	0	0	0
5	2	0	0	0	0	2	1.25	0	0	0.5	226	30	0.9	CHI	0	R2125	0	0	0	0
6	2	0	0	1	0	2	1.25	0	0	0.4	1	70		SOP	1	C2125	0	0	0	0
7	2	0	0	0	0	1.5	1.5	0	0	0.4	1	30		CHI	P	bare	0	0	0	0
8	2	0	0	0	0	3.2	1.6	0	0	1	1	20		CHI	1	R3216	0	0	0	0
9	2	0	0	0	0	3.2	1.6	0	0	0.8	1	70		CHI	1	C3216	0	0	0	0
10	2	0	0	0	0	3.2	1.6	0	0	1.1	1	70		CHI	1	C3216	0	0	0	0
11	2	0	0	0	0	3.2	1.6	0	0	1.2	1	70		CHI	1	C3216	0	0	0	0
12	2	0	0	0	0	4	2.5	0	0	0.5	26	50		CHI	1	C3216	0	0	0	0
13	2	0	0	0	0	6.3	3.2	0	0	0.5	1	50		CHI	1	MTR	0	0	0	0
14	2	0	0	0	0	1.5	2.8	0	0	1.1	1	50		TR		TR	0	0	0	0
15	6	0	0	0	0	8	8	0	6	8	1	8		CAP		CAP	0	0	0	0
16	2	0	0	0	0	1.6	0.8	0	0	0.8	26	30	1.6	CHI	1		0	0	0	0
17	2	0	0	0	0	3.2	1.6	0	0	1.2	26	30	1.6	CHI	1		0	0	0	0
18	2	0	0	0	0	2.8	2.8	0	0	1.1	26	30	1.5	TR			0	0	0	0
19	2	0	0	0	0	3	3	0	0	1.5	0.8	30		MARK1			0	0	0	0
20	6	0	0	0	0	2	2	0	0	0	1	70		MARK2			0	0	0	0
21	2	0	0	0	0	3	3	0	0	2	1	70	0.9	MARK1			0	0	0	0

F1-Help F2-Backup ESC-Return Enter-Confirm | 1 BACK | 2 EDIT | 3 NEXT |

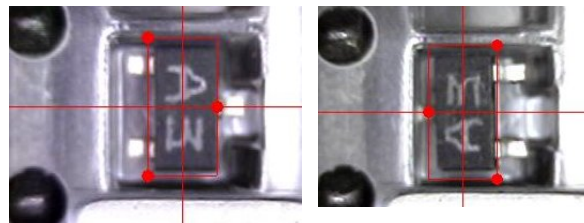| P#	Part type #
Nzl	Select suitable nozzle size to the part.
dx 0x	X offset *0x for newer software version
dy 0y	Y offset. *0y for newer software version
wt	Not used
da 0a	Angle offset 1=0.03deg *0a for newer software version
X,Y,	Refer Sample data for LV=1
Pt,W	Refer Sample data for LV=1 and LV=27
Thk	Part thickness and placement stroke is adjusted by this value to minimize mechanical shock. 6mm max.
Lv	0 : No centering 1 Flying Luna centering 25/26/27: Bottom vision alignment. Refer Sample data for LV25/26/27
TS	Part size tolerance in %. 70 mean 70% or 100/70=142%..
Level	. Threshold of the light level. Default is 1
Type	CHI: for chip part. If LV=1 then 2-step fast flying measurement is done. chi: for chip part. If LV=1 then 3-step flying measurement is done. MELF: for tubular MELF parts TR for Transistor, SOP : for SOIC, QFP : for QFP,CON : for connector and BGA, FLIP chip

	SKIP: Dispenser only no placement.
	Assembly speed and other factors are controlled by above characters.
	Right click on this column opens following pull down window and select one.
Voff	
Rem	Starting 3 characters
	Under +++ of remark
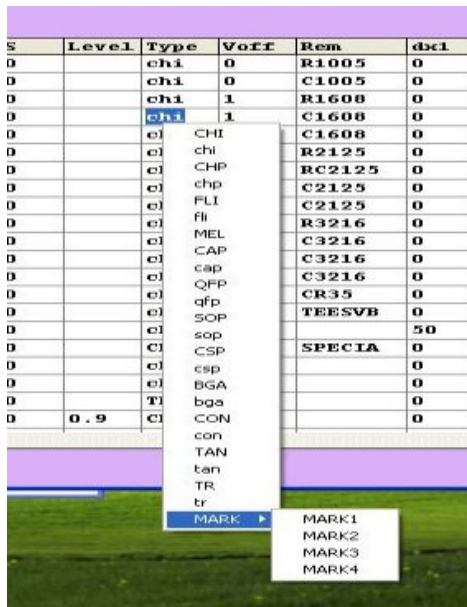
During edit mode, click on Type column then type list is displayed so select one and click.

SOP, QFP and TR etc. have upper and lower cases. These are the same but the orientation mark on red rectangular window changes location so when the mark is not matched with component orientation then change It. **Note: CHI and chi do not change orientation mark but different measuring procedure.**

TR   tr

Individual offsets per every 90 deg in Part type list
The offset value in each part type can set for every 90 deg.
The list can scroll to right using horizontal scroll bar at the bottom of the window and dx1,dy1,da1 etc will be displayed after Remark.
Note: To edit data, do not key in at this stage but press 2.EDIT>2.CHANGE always.
dx1, dy1, da1 (90x,90y,90a)   offset value of X, Y and angle for 90 degrees.
dx2, dy2, da2 (18x,18y,18a) "   "   "   180 degrees
dx3, dy3, da3 (27x,27y,27a) "   "   "   270 degrees

(1 degree is 100 in da,da1,da2 and da3)

If the value is A then vacuum ON when the nozzle goes down to pick up component and vacuum OFF at the middle of the nozzle goes down to place component.
If the value is B then vacuum ON when the nozzle goes down to pick up component and vacuum OFF at the end of the nozzle goes down to place component.
If the value is a then the nozzle down speed decreases at the end to place component to prevent component crack.

SAMPLE DATA FOR LV=1 (Flying Luna vision)
 The most of standard components are listed in part type list.

0402(1005 metric) resistor/capacitor

Part type DATA

P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
1	1	0	0	0	0	1	0.5	0	0	0.35	1	70		chi	0	R1005
2	1	0	0	0	0	1	0.5	0	0	0.5	1	70		chi	0	C1005

Nzl　　　　　:#1 ID=0.5mm OD=0.8mm(P# 074966)

Lv　　　　　: 1

Type　　　: chi

0603(1608 metric) resistor/capacitor

Part type DATA

P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
3	2	0	0	0	0	1.6	0.8	0	0	0.5	1	70		chi	1	R1608
4	2	0	0	0	0	1.6	0.8	0	0	0.85	1	70		chi	1	C1608
5	2	0	0	0	0	1.6	0.8	0	0	1.2	1	70		chi	1	C1608

Nzl　　　　:#2 ID=0.8mm OD=1.2mm （P#074954）

Lv　　　　: 1

Type　　　: chi

0805(2125 metric) resistor/capacitor

Part type DATA

P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
6	2	0	0	0	0	2	1.25	0	0	0.55	1	70		chi	1	R2125
7	2	0	0	0	0	2	1.25	0	0	0.65	1	70		chi	1	C2125
8	2	0	0	0	0	2	1.25	0	0	0.9	1	70		chi	1	C2125
9	2	0	0	0	0	2	1.25	0	0	1.3	1	70		chi	1	C2125

Nzl　　　　:#2 ID=0.8mm OD=1.2mm （P#. 074954）

Lv　　　　: 1
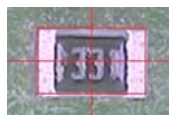
Type　　　: chi

1608(3216 metric) resistor/capacitor

Part type DATA

	P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
▶	10	2	0	0	0	0	3.2	1.6	0	0	0.65	1	70		chi	1	R3216
	11	2	0	0	0	0	3.2	1.6	0	0	0.9	1	70		chi	1	C3216
	12	2	0	0	0	0	3.2	1.6	0	0	1.2	1	70		chi	1	C3216
	13	2	0	0	0	0	3.2	1.6	0	0	1.3	1	70		chi	1	C3216
	14	3	0	0	0	0	3.2	2.6	0	0	0.65	1	70		chi	1	R3226

Nzl   :#2 ID=0.8mm OD=1.2mm（P#．074954）

Lv   : 1

Type   : chi
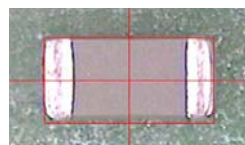
Transistor/Diode

Part type DATA

P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
22	1	0	0	0	0	1.6	1	0	0	0.7	1	50		TR		MMTR
23	2	0	0	0	0	2	1.5	0	0	1	1	50		TR	0	MTR
24	2	0	0	0	0	3	1.5	0	0	1	1	50		TR		TR
25	3	0	0	0	0	4.5	3	0	0	1.5	1	50		tr		PTR
26	3	0	0	0	0	2.5	4.5	0	0	1.5	1	50		TR		ptr

0603 type P#22

Nzl   :#1 ID=0.5mm OD=0.8mm（P#．074966）

Lv   : 1

Type   : TR

da/da1/da2/da3：0/90/180/270deg offset may be required

0805 type P#23

Nzl   :#2 ID=0,8mm OD= 1.2mm （P#074954）

Lv   : 1

Type   : TR or tr

da/da1/da2/da3 0/90/180/270deg offset may be required

Note:part type tr is the same as TR but used to match orientation mark

Power transistor P#25

Nzl   :#3 ID=1.4mm OD=2.0mm（P#074970）

Lv   : 1

Type   : TR or tr

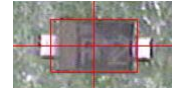da/da1/da2/da3 0/90/180/270deg offset may be required

Diode

	P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
▶	28	1	0	0	0	0	1.3	0.8	0	0	0.6	1	70		TR		

Nzl   :#1 ID=0.5mm OD=0.8mm （P#074966）

Lv   : 1

Type   **: TR**

da/da1/da2/da3 0/90/180/270deg offset may be required

Large resistor/capacitor

	P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
▶	20	3	0	0	0	0	6.35	3.3	0	0	0.55	1	70		chi	0	

Nzl   :#3 ID=1.4mm OD=2.0mm （P#074970）

Lv   : 1

Type   **: chi**

da/da1/da2/da3 0/90/180/270deg offset may be required

MELF

	P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
▶	15	2	0	0	0	200	3.6	1.5	0	0	1.5	1	70		MEL	1	

Nzl   :optional MELF nozzle （P#074965 or 074969）

Lv   : 1

Type   **: MEL**

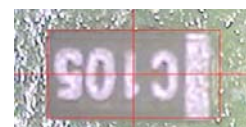da/da1/da2/da3 0/90/180/270deg offset may be required
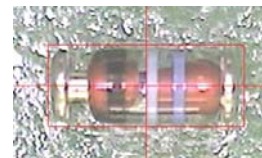
Tantalum capacitor

P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
30	3	0	0	0	0	3.2	1.6	0	0	1.6	1	50		TAN		

Nzl   :#3 ID=1.4mm OD=2.0mm （P#074970）

Lv   : 1

Type   **: TAN.TR**

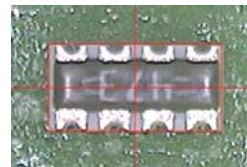da/da1/da2/da3 0/90/180/270deg offset may be required.

Resistor array

	P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
✎	14	2	0	0	0	-200	3.2	1.6	0	0	0.6	1	70		chi	1	3216Rari

Nzl 　　　　:#3 ID=1.4mm OD=2.0mm（P#074970）

Lv 　　　　: 1

Type 　　: chi

da/da1/da2/da3 0/90/180/270deg offset may be required

0201 resistor/capacitor

	P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
▶	17	4	0	4	0	-550	0.6	0.3	0	0	0.3	1	70		chi	0	
	18	4	0	0	0	-550	0.6	0.3	0	0	0.5	1	70		chi	0	

Nzl 　　　　:#4 ID=0.25mm OD= 0.5mm（P#076596）

Lv 　　　　: 1

Type 　　: chi

da/da1/da2/da3 0/90/180/270deg offset may be required

Photo coupler

	P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
▶	27	5	0	-50	0	800	7	5.7	0	-2	4.7	1	50		TR		

Nzl 　　　　:#5 ID=2.0mm OD=4.0mm（P#074955）

Lv 　　　　: 1

Type 　　: TR.TAN

da/da1/da2/da3 0/90/180/270deg offset may be required
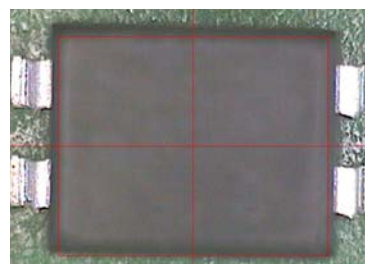
SOIC less than 10mm

	P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
	40	5	0	0	0	0	5.2	5	0	0	1.4	1	50		SOP		

Nzl 　　　　:#5 ID=2.0mm PD=4.0mm（P#074955）

Lv 　　　　: 1

Type 　　: SOP

X ・ Y 　　:Input Molding dimensions of X and Y

da/da1/da2/da3 0/90/180/270deg offset may be required
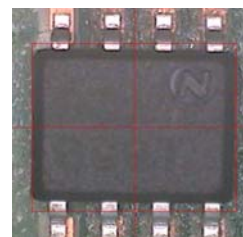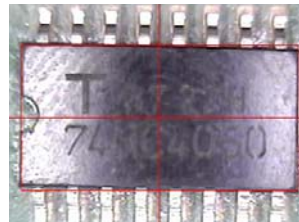
SOIC 14-16pin

Part type DATA

	P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
▶	51	6	0	0	0	0	10.5	5.2	0	0	1.6	1	50		SOP		

Nzl   :#6 ID=4.0mm OD=7.0mm（P#074956）

Lv   : 1

Type   ：SOP（some time TR is usable）

X ・ Y   :Input molding dimensions as X and Y

da/da1/da2/da3 0/90/180/270deg offset may be required

ELECTROLYTE CAPACITOR

Input part thickness in Thk, Flying Luna vision must check rectangular plastic part but not round can, so this case input W as mentioned above. For example if capacitor height is 5mm, then input 4 in W.
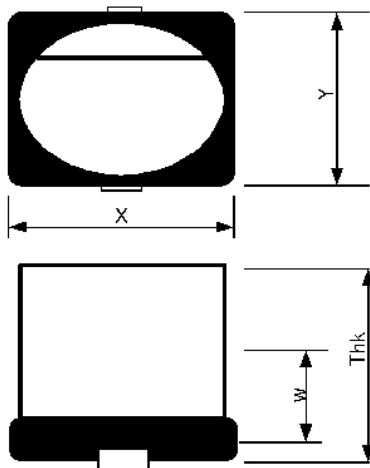
**Electro capacitor can be checked by CAP in LV=26 bottom camera mode.
This case input X as lead length, Y as lead width.**

Data input for clear body LED
Clear body of LED can not check by chi in LV=1 so add w value in part type so Nozzle Z raises up and black part of LED can be checked.
Example

PARTS TYPE DATA Demo_____

Part type DATA

P#	Nz1	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem	dx1	dy1	da1	dx
1	1	0	0	0	0	1	0.5	0	0	0.4	1	70		chi	0	R1005	0	0	0	0
2	1	0	0	0	0	1	0.5	0	0	0.5	1	70		chi	0	C1005	0	0	0	0
3	2	0	0	0	0	1.6	0.8	0	0	0.45	1	70		chi	1	R1608	0	0	0	0
4	2	0	0	0	0	1.6	0.8	0	0	0.8	1	70		chi	1	C1608	0	0	0	0
5	2	0	0	0	0	1.6	0.8	0	0	1.2	1	70		chi	1	C1608	0	0	0	0
6	2	0	0	0	0	2	1.25	0	0	0.6	1	60		chi	1	R2125	0	0	0	0
7	2	0	0	0	0	2	1.25	0	0	0.6	1	70		chi	1	RC2125	0	0	0	0
8	2	0	0	0	0	2	1.25	0	0	0.85	1	70		chi	1	C2125	0	0	0	0
9	2	0	0	0	0	2	1.25	0	0	1.25	1	70		chi	1	C2125	0	0	0	0
10	2	0	0	0	0	3.2	1.6	0	0	0.6	1	70		chi	1	R3216	0	0	0	0
11	2	0	0	0	0	3.3	2.8	0	0	0.85	1	70		chi	1	C3216	0	0	0	0
12	2	0	0	0	0	3.2	1.6	0	0	1.15	1	70		chi	1	C3216	0	0	0	0
13	2	0	0	0	0	3.2	1.6	0	0	1.25	1	70		chi	1	C3216	0	0	0	0
14	3	0	0	0	0	3.8	3	0	0	1	1	70		chi	1	CR35	0	0	0	0
15	3	0	0	0	300	3.8	3	0	0	1.8	1	70		chi	0	TEESVB	0	0	0	0
16	2	0	0	0	0	1.6	1	0	0.2	0.6	1	70		chi	0	LED	0	0	0	0
17	2	0	0	0	0	1.6	1	0	0.4	0.8	1	60		chi	0	LED	0	0	0	0
18	4	0	0	0	0	0.6	0.3	0	0	0.4	1	60		chi	0		0	0	0	0
19	4	0	0	0	0	0.6	0.3	0	0	0.8	1	60		chi	0		0	0	0	0
20	3	0	0	0	0	6.4	3.2	0	0	0.6	1	70		chi	1		0	0	0	0
21	4	0	0	0	0	4.6	2.6	0	1	3.7	126	50		CHP	1		0	0	0	0

F1-Help F2-Backup ESC-Return Enter-Confirm

Part type 16 and 17 are for LED with different thick ness.
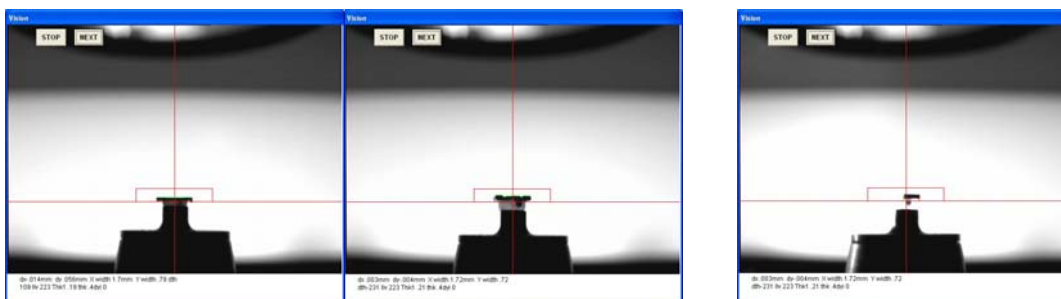
Thin LED   Thick LED   Black part can be checked

2. "CAP" in LV=27

2-lead components are usually measured by "CAP" in LV=26 but longer lead component such as high power LED may exceed image field width (or height). So now part type "CAP" is prepared for LV=27.

For example, power LED data is shown in #31.

PARTS TYPE DATA LED DOME

Part type DATA

P#	Nz1	dx0	dy0	wt	da0	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem	dx1	dy1	da1	dx2	dy
21	4	0	0	0	0	4.6	2.6	0	1	3.7	126	50		CHP	1		0	0	0	0	
22	1	0	0	0	0	1.6	1	0	0	0.7	1	50		TR		MMTR	0	0	0	0	0
23	2	0	0	0	0	2	1.5	0	0	1	1	50		TR	0	MTR	0	0	0	0	0
24	2	0	0	0	0	3	1.5	0	0	1	1	50		TR		TR	0	0	300	0	0
25	3	0	0	0	0	4.5	3	0	0	1.5	1	50		tr		PTR	0	0	0	0	0
26	3	0	0	0	0	2.5	4.5	0	0	1.5	1	50		TR		ptr	0	0	0	0	0
27	3	0	0	0	0	4	3.5	0	0	1.5	26	60	1	CHP			0	0	0	0	0
28	1	0	0	0	0	2.2	1.4	0	0	0.6	26	10		CHP			0	0	0	0	0
29	1	0	0	0	0	1.6	0.8	0	0	0.6	126	70		CAP			0	0	0	0	0
30	6	0	0	0	1100	14	3	0.4	0.1	4	126	50	1	CAP			0	0	1100	0	0
31	6	0	0	0	1100	14	0.5	2	3	4	127	50		CAP			0	0	1100	0	0
32	2	0	0	0	0	2	1.5	0	0	1.1	126	50	3	CHP			0	0	0	0	0
33	2	0	0	0	0	3	3	0	0	2	1	50	0.9	MARK1			0	0	0	0	0
34	2	0	0	0	0	4	4	0	0	2.1	1	50	1	MARK1			0	0	0	0	0
35	3	0	0	0	0	4.5	4.5	0	0	3.1	1	50	1	MARK1			0	0	0	0	0
36	2	0	0	0	0	2.5	2.5	0	0	1.5	1	50	1	MARK1			0	0	0	0	0
37	2	0	0	0	0	3	3	0	0	1	1	50	0.9	MARK1			0	0	0	0	0
38	2	0	0	0	0	4	4	0	0	1.1	1	50	1	MARK1			0	0	0	0	0
39	2	0	0	0	0	2	2	0	0	0.9	-1	50	1.3	MARK1			0	0	0	0	0
40	4	0	0	0	0	5	6	1	1	1	26	50		CHP		14pin	0	0	0	0	0
41	5	0	0	0	0	5	3	1.5	1.5	1.5	127	50	1	SOP		8pin	0	-30	0	0	0

F1-Help F2-Backup ESC-Return Enter-Confirm

Y dimension is not lead width but where to check from lead end.

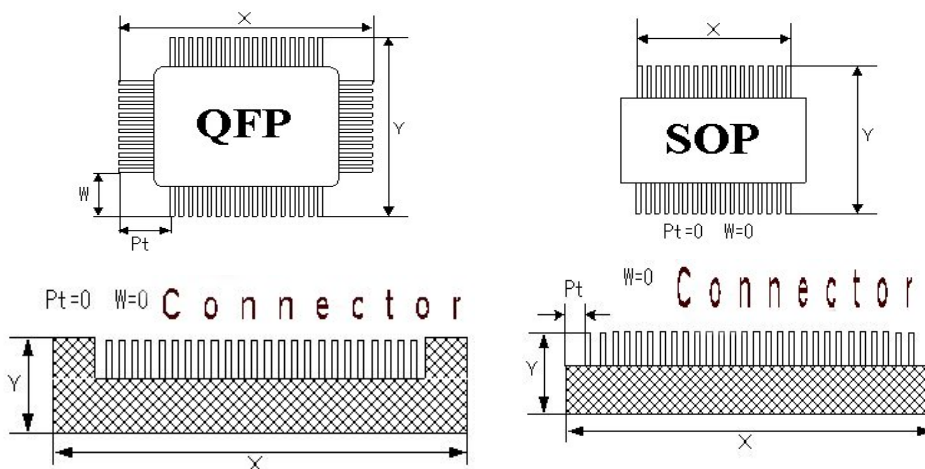**This case it is 0.5mm so lead position is measured (blue vertical line) at 0.5mm inside.**
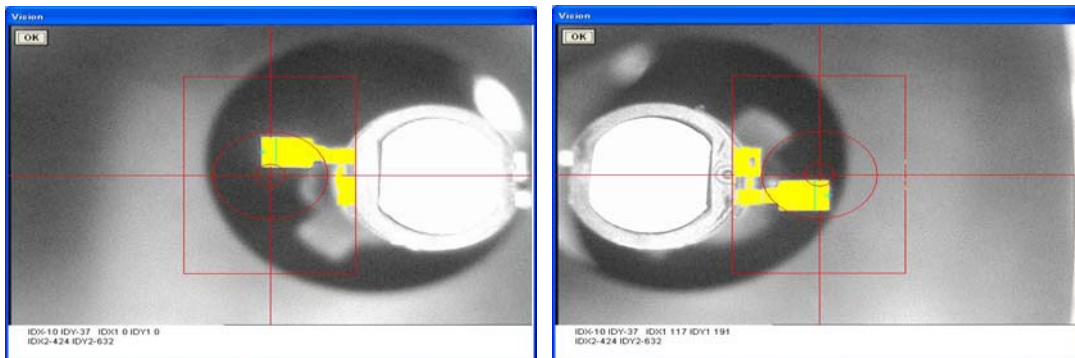
Angle offset of 11deg(1100) is added since both leads is not in-line.

PART TYPE REGISTRATION FOR Luna VISION SYSTEM

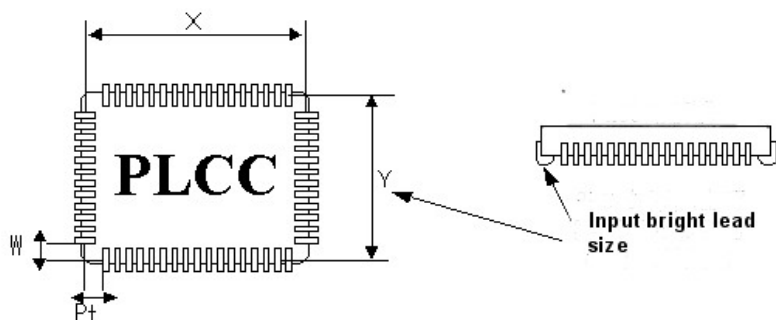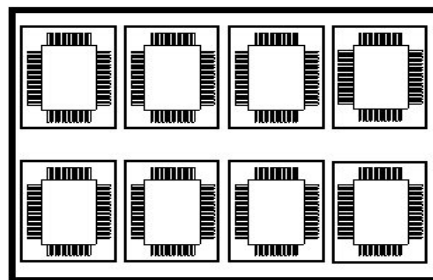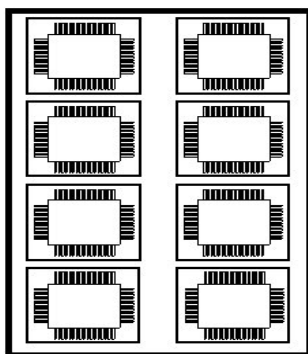Input data as follows.

Assign X as longer side and this case placement angle is zero.

So tray feeder must be set as (A).

(A) Usual   (B) This case, add 90 or 270 in feeder angle data.

Input X/Y size as the width of rounded points of the leads since at LV=27 the shiny image is the target of the vision system.
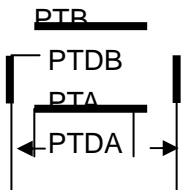
Dispenser Data

F1	Help windows are displayed
F2	Data back up as file name BAK
F8	Enter in Teaching mode
ESC	Return to List menu
Enter	Confirm revised data

Dispcount	When Dispcount is clicked, following window opens.
	Warning of shot count is active when MAX is not zero. Warning is displayed when the counts reach to the MAX count. Now is current counts.
Pc	Dot pattern type from 1 to 11 Click left for more details.
PTA	Dot distance in direction of X (HA=0,2) or Y (HA=1,3)
PTB	Dot distance in direction Y (HA=0,2) or X (HA=1,3) Line draw PC7 or 8, line distance are determined by PTDA and PTDB
PTDA	Line (dots) distance in X (HA=0,2) or Y (HA=1,3)
PTDB	Line (dots) distance in Y (HA=0,2) or X (HA=1,3). When PC=8 PTDB specify total # of dots instead of distance. For digital dispenser, this value determines shot up feature.If this is zero then the needle goes up to home position after shot. If this value is not zero then needle stays on low position where the needle cut the string of dispensinf material so dispensing speed increases
VO	Dispensing time
DW4	Wait time from down to dispense. For digital dispenser, this value is offset of needle stroke from the value obtained by 240 (auto height check).
DW5	Wait time after dispenser shot.
DW6	Wait time to move head after needle goes up.
Rem	Last two digits of the remark can change line draw speed at PC6,7. Usually 10 larger is slower.

Dispense dot (line) Pattern shown in next page

PC	HA=0	HA=1	HA=2	HA=3
1 ONE dot	*	*	*	*
2 TWO dots	* + * PTA	+ PTA	* + * PTA	* + PTA *
3 THREE dots	* + PTB * * PTA	* PTA + * * PTB	* * + PAB * PTA	* * + PTA * PTB
4 FOUR dots	* * + PTB * * PTA	The same as HA=0 swapping PTA and PTB	The same as HA=0	The same as HA=1
6 TWO lines	-------------- + PTA -------------- PTB	The same as HA=0 rotating 90 deg	The same as HA=0 rotating 180 deg	The same as HA=0 rotating 270 deg
7 FOUR lines	PTB PTDB PTA PTDA	The same as HA=0 rotating 90 deg.	The same as HA=0 rotating 180 deg.	The same as HA=0 rotating 270 deg.
PC=9 Draw circle	PTA= Diameter. If PTDA and PTDB are zero then draw full circle. Starts from PTA/2 X+ direction and draw in CCW. Type 9 dispense circle or arc around the current position. Diameter of circle or arc is specified by PTA and PTDA specifies start angle and PTDB specifies end angle. If PTDA and PTDB are zero then it makes circle. Angle starts from X + point and rotates counter clockwise. If the last 4 digits value of the dispenser type remark has minus sign then it rotates clockwise. Scan speed is set by the last 4 digits value. Larger is slower.			
PC=10/11 Draw continuous line and arc.	Draw continuous line. 10= continuous straight line specified vector direction by PTDA and PTDB. Type 10 dispense continuous line from current position to the direction specified by the vector of PTDA (X) and PTDY(Y) .If PTB is not zero then the needle stays down for next draw. **So at the end of continuous lines PTB must be zero to raise needle.** 11= continuous arc. is similar to type 9 except it starts from current position.			

Data reference for Data input

The data list can be changed by three ways, key input, offset input and teaching.

Editing of the list is almost the similar to all data list.

1.   When a data list is displayed, following buttons appear at the right low corner.

1 BACK   1. Back to previous menu

2 EDIT   2.   Edit menu is displayed as follows

3 NEXT   3.   Next page is displayed

1 Back to menu **2 Change data** **3 Delete data** **4 Quit _save** **5 Back to main** **6 Print out data** **7 Add data** **8 Insert data** **9 Goto PCB step** **A Sorting data** **B Exchange data** **C Step repeat** **D Extend copy** **E Skip data** **F Un-skip data**	1. Back to menu	Back to List Menu
	2. Change data	Enter in edit mode
	3. Delete data.	Delete unnecessary data. del #-# is displayed at left low corner of the screen. Input sequence number to be deleted. To delete a sequence, input start #-end #,for example 3-6 will delete sequence #3 to 6. To skip assembly is possible without permanent deletion See partial assembly section
	4. Quit, save	The same as Data Save and save current data as the same name or different name. To save as the current name then just
	5.Back to main	Back to main menu
	6.Print out data	If printer is connected to the computer, prints out current data.
	7.Add data	At the end of current data lines, copies the last line data. When push this button, Add #? is displayed at left low corner of the screen so input required number and edit data,
	8.Insert data	When this button is pushed, Insert step# ? is displayed at the left low corner of the screen so input step # to be inserted. for example, 5 is input then line #5 is copied and #6 is created.
	9.Go to PCB step	While checking long data, press this button and input sequence # then the list jumps to such line.
	A. Sorting data	To increase assembly speed, to decrease nozzle exchange and sliding of tape index hammer operations are effective. Pressing this button, PCB data is sorted by nozzle # and tape feeder #. Sorting of tape feeder # is done grouping in three, 1-4-7--,2-5-8-- and 3-6-9--. When require number of tape is low, insert tapes in every 3 step as 1,4,7,--- then assembly time can be increased since it eliminate the sliding of the hammer.
	B. Exchange Data	Swap 2 data lines. Input to From # and To # and two data are swapped.
	C. Step Repeat	Copy data. See details in Step & Repeat
	D. Extend copy	Step & repeat is useful to make copies but each data in a copied group can not edit. Using this button all copy data are extended in series of data so that each data can be edited.

	E. Skip data	Some placement may be skipped using this button and it is useful to skip a placement causing part shortage etc., Input a skip # or series of skip numbers From# - To# separating by - or :. Skipped data are shown asterisks. When dispense and skip placement then input SKIP to the remark of part type.
	F. Un skip data	Un skip skipped data. To un skip all skipped data, simply press ENTER key. To skip partially, input From# -To# separating - or :.

Key input

Move cursor by mouse or arrow key or Tab key to desired position and change data and press ENTER key.

   Cursor will move to the next line and changed data is confirmed.

In Input mode, when the ENTER key is pressed then the data is copied to next line.

To quit editing, press ESC key or E key and press ENTER key to confirm

Offset input

   Offset input makes global or partial change of X/Y coordinates or angle or stroke.

   Press ¥ key then small window opens.

increment X**/Y**
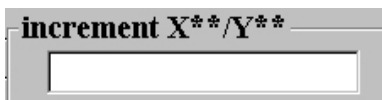
Example

2.5/-5 add 2.5 to X and subtract -5 from Y of cursor data.

1.5 add 1.5 to X

   /2.5 add 2.5 to Y

   Starting from + makes global offset change for X, Y. A and S.

   +S15 add 15 to all stroke data.

   +5:12S-25 subtracts 25 of Stroke from sequence 5 to 12.
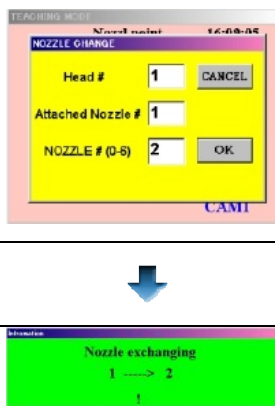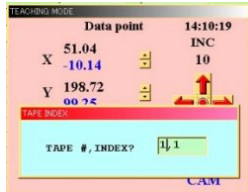
   X Yand Angle can be changed by the same way.

TEACHING MODE

In edit mode, move cursor on desired line and press F8 then head moves on the X/Y coordinates of the data following window opens..

ESC/E	To quit teaching mode.
<- ->	Move head in X (Y) direction
arrow up/dwn	Move head in Y (X) direction
*	Increase increment of X, Y, Z and theta in teaching mode.
/	Decrease increment of X, Y, Z and theta in teaching mode.
A	Rotate theta in CCW direction.
shift + A	Rotate theta in CW direction.
U	Down Z shaft When dispenser is installed, if needle touches on PCB and height sensor senses it then SENSED is displayed. It is useful to set height sensor. The height sensor must be sensed when just after the needle touches on PCB adjusting micrometer.
shift + U	Up Z shaft.
R	Repeat Z up and down current stroke..
V/shift + V	Toggle vacuum ON and OFF. Shift + V for 2nd head
3	Move 2nd head (digital dispenser) to the current X/Y coordinate
6	Move mech. dispenser needle to the current X/Y coordinates.
9	Move nozzle of #1 head to the current X/Y coordinates.
0 (zero)	Start calibration of the offsets between nozzle and camera/dispenser/EYE/2nd head etc. In teaching mode, press 9 and down nozzle and make mark on PCB then press 5 key and watch the mark is centered on cross lines. If not press 0 and align mark just on center and press C. Then CALIB OK? is displayed so input Y ENTER and when CAMERA=1 DISP=2 is displayed, select 1 or 2.The offset in the system constant is changed but it is not stored in hard disk so press F2 to save it.
.	Period is used to calibrate placement X/Y offset of every 90 degrees. make placement of the components at 0,90,180 and 270 degrees then in teaching mode, move camera on the placement. if the component is not centered, press . and move camera on the center of the component and press C key then CALIB Y/N? is displayed so press Y ENTER and the offset is corrected. The offset is not saved in hard disk so press F2 key to save it.
1 +2 +C	To calculate center point from 2 points used to get center of large component.

	1. Align first point to cross line center and press 1key. 2. Align diagonal 2nd point and press 2 key. 3. Press C then head moves to center.
N	Nozzle exchange operation. Input nozzle # (usually 1) and nozzle # which is attached on the head. If there is no nozzle is attached, input zero. Also if to take off nozzle from head, input zero in Nozzle #.
I	Tape indexing operation. Input tape # and # of index separating by comma.
T	Luna Vision system only. The same as TRAY TEST in tray feeder list. To test auto tray feeder operation when it is installed.
Z	Dispense a dot with pneumatic dispenser model. Shut off puffing when puff is activated.
Q	Switching of LED by toggling this key
Shift+P	Confirm data for bottom vision using **LV=26** . Pick up a component to test and press shift+P and input part type and zero such as 35,0<enter> and the test is repeated on the camera. To calibrate camera magnification, pick up a component approx 1mm off center and try ship+P. After more than 11 times of tests and IDX become 0 then press a key and CALIB Y/N ? is asked. Press Y and the system constant k7 is calibrated.
P	Check LV=27 component. Refer Luna vision system page 47
D	With pneumatic dispenser model, dispenser needle goes down and shot glue.
Shift+D	With digital dispenser, stroke to PCB is calibrated and a shot is done and the camera moves on the dot. If necessary needle to nozzle offset is calibrated.
W	Toggle upper and bottom camera and display status. W=1 is for upper camera and W=2 is for bottom camera. Not for Luna.

Note: Refer appendix page 63 for Mouse control

2 Data Input To create new data, click this button. Usually to modify existing data by 1. Data List is easier.

Form1 INPUT STEP # 1	Set PCB on correct position. The sequence number is asked so if you want from beginning then input 1 else input required sequence number and Enter key. Then a data list is displayed so input data accordingly.

If you enter in this mode and want to go back, simply press ESC key or C key and Main menu is displayed.

Bias X 76.5 Y 104 17:01:51 	#	Hd#	Fdr	X	Y	A	Pt	Ind	Strk	DT	HA	REMARK---PF++
1	1	1	0	0	0	1	1	300	1	0	
2											
3											
4											
5											
6													At beginning, input bias point so set bias point by three ways. 1. Key input: Move cursor on the required line and change data. 2. Offset input: Input offset value on current line. 3. Teaching: Move head actually and set data by camera.

Refer Data change for more details.

When Bias point is confirmed then press Enter key and cursor moves down one line and the same data is copied.Each data line consists of feeder #, X/Y coordinates, placement angle, part type, tape index, Z stroke (and with dispenser then dispenser type and angle) and remark.

4 Down Load CAD data conversion converts ASCII CAD data to our format.
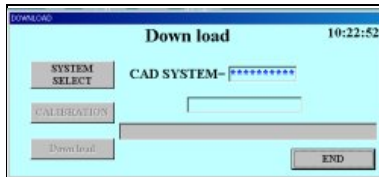
	First of all, load CAD config file. See CAD configuration for more details.
	A config file is loaded, then left message is displayed. If it is OK then click mouse on CAD load/conv. button and select a file.
	During conversion left message is displayed.
	If no registered part name in current feeder data exists , Feeder not found message prompts feeder # input. So input appropriate feeder # and click mouse on OK button. Click mouse on feeder button will display the current usage of feeder.
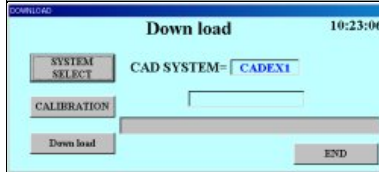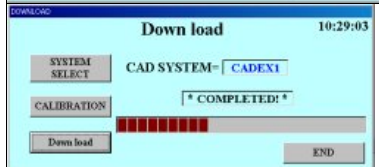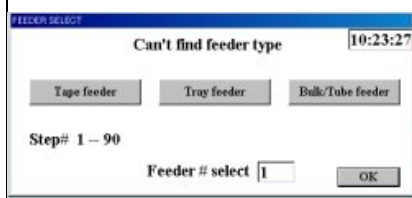
CAD system configuration for data conversion

CAD DOWN CALIBRATION

1-- **CAD SYSTEM**	CADE	
2-- **Unit mm=1,Inch=2,mil=3**	1	
3-- **Separator Comma=1,Space=2**	2	**OK**
4-- **String END CR/LF=1 LF=10**	1	
5-- **Data Start row**	2	
6-- **X data col#**	3	
7-- **Y data col#**	4	
8-- **Angle data col#**	5	
9-- **PART Description col#**	2	
10- **Description length**	10	**SAVE**
11- **Desingnator**	1	
12- **Skip Data**	*	
13- **Data extension**	PRN	
14. **Z Stroke**	200	

This software is prepared to convert CAD ASCII data to our ECM format. Prior to use this routine, CAD data file must be created as ASCII format data.

CAD data is basically the data to create PCB pattern so all information to make PCB pattern are gathered and the Garber format file is made.

However chip placer does not need the most of information in a garber file and only needs X/Y coordinate of component center, placement angle, part description and part designation.

Any CAD system has the feature to export such data as ASCII file thou its output format is not the same. Various CAD system data can be converted to our system format, editing CAD MASTER file. Usually CAD data does not have feeder data so existing ECM data file is loaded first and feeder data is used as reference.

CAD MASTER file specifies X/Y/A data order in ASCII file.

To change data move cursor by arrow key and press ENTER key.

Then data input is prompted at lower end of the screen so input desired value.
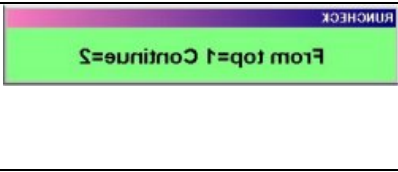
The Z stroke was default value of 250 but now it can be changed by input desired value in 14.Z stroke.

line#10 description length is zero then line#15 is displayed.

So input column# of feeder # then part type is also input automatically .

CAD SYSTEM	CAD config file name. Any name is OK but it is recommended to use DOS file name, up to 8 characters of alphabet and numbers. In general use CAD system name.
Unit mm=1 inch=2 mil=3	Input CAD system unit. If zero is input, system assumes the unit is 0.01mm.
Separator comma=1 space=2 :=3	Usually space is recommended as the data separator. If X/Y/A data is proceeded by X/Y/A then input 2/1 to skip reading Example C1 N0001 X50.25 Y100.00 A90.00 CPQUV8205
Terminator1=CR/LF	The end of data string. Use CR/LF always as the terminator.
Start row #	A data file may starts from comment line. To eliminate such row(s), specify start row #.
Column # of X data	Specify column # of X coordinate data in a data string. If – sign is added then all data signs are inverted.
Column # of Y data	Specify column # of Y coordinate data in a data string. If – sign is added then all data signs are inverted.
Column # of angle data	Specify column # of angle data in a data string. If – sign is added then all data signs are inverted. If angle data is made as the unit of 1/100 degree (90deg=9000), add .01 at the end of column #. Example 5.01 Angle column is 5 and unit is 1/100 deg.
Column # of part information	Specify column # of part information. This data is used to search matched feeder. If matched data does not exist then this data is copied on the remark of the specified feeder.
Length of part information	Specify the length of part information data to be compared with the remark of (tape) feeder. The max length is 13 characters. If there is no remarks on the feeder data, it takes longer time to search. Such case input zero as this data then searching is skipped. And line# 15 is dispayed.
Designator	Specify column # of designator which appears on a PCB. This data is copied on the remark of PCB data.
Skip data	Some case CAD data contains unnecessary data for part placement such as test pin data etc. . to skip it it is possible to skip such data input such designator. For example, input PIN then all data having designator "PIN" can be skipped. If no skip data exists then input * any way.
File extension	Specify file extension, which is used in CAD system up to 3 characters. Other data having other extension will not be displayed during data loading of CAD down load.

5 Assembly

	Scheduled Qty
	Nozzle # attached
	Dispenser NO
	YES
	ONLY
	If dispenser is installed
	Idle shot : # ,direction
	TRAY feeder starting point
	From beginning=1
	If input nozzle # exceeds 6 or tray start # exceeds the total tray pocket # then the left message warns it.
NO PART TYPE in FEEDER# xx	When feeder in PCB data has no part type then warning message is displayed and returns to list menu.
	When previous assembly was interrupted by F10 key, this massage appears.
	1: Start from beginning
	2: Continue from previous sequence.
	For Stand-alone machine, set PCB on the fixture and when the 1st left message is displayed, press ENTER key or START button then assembly starts and display will scroll changing color.
	Instead of ENTER key, if 0 (zero) key is pressed, head moves to bias point and can adjust bias point watching camera and press ESC key to start..
	This feature is useful if a lot of PCB has some offset. Added offset stores until assembly terminates.
	If feeder#0 (auto bad mark) is not specified and step repeat exists and PCB conveyor is not installed then the 2nd messages is displayed and after pressing Enter or 0 key, the 3rd message is displayed and Bad mark? is asked. So input bad copy # and Enter until all bad #'s are input then press Enter and machine start assembly.
	Example
	if a PCB has 10 populated patterns and #3 and #8 have defects then,
	3 Enter and 8 Enter and Enter
To view flying vision operation during assembly, press V key and shift + V key to disable it.	Note: When dispenser is installed then machine waits to start until the temperature is reached to set temperature. During assembly, assembly sequence and graphic pattern change color according to progress.

To stop machine during assembly

Press F10 key and   see following message.

1 to continue and 2 to back to menu.

Warning messages in assembly mode

	Fiducial mark error. 1. Continue without fiducial check 2. Retry 3. Quit assembly Refer mark registration
	Pick up miss exceeds the limit of system constant.
	Menu — Terminates assembly and back to menu
	Index — Tests tape index manually
	G — Go to next sequence
	Sile nt — Shut off buzzer
	Nozzle — Exchange nozzle
	Retry — Check cause and restart
	No part on the tray.
	Dispenser shot reaches to dispenser count. When Max was set to zero, no message appears. Buzzer off: Shut off buzzer. Data change: refer Dispenser count. Count reset: Reset counter.
	When idle wait time is set (the last 4 digits of the remark of system constant k30), this massage warn to clean needle before starting next shot. Values are in second. For example 600 mean 10 minuets idle time.

6 Diagnostic

Input	Check of input ports of KPS & I/O card
KPS Output	Check of output ports of KPS card
I/O OUT	Check of output ports of I/O card
INP/OUT*	Check of input/output

Selecting Input, following window opens and shows status.

See port table for bit assignment.

	KPS	I/O
BIT0	START	
BIT1	STOP	
BIT2	TH HOME	
BIT3	Z HOME	
BIT4	VAC1	
BIT5	EYE	
BIT6	X COIN	
BIT7	Y COIN	
BIT8	SUB HEAD VAC	
BIT9	SUB HEAD UP PART SENSOR	
BITA	VAC2 BIT CHOKE	
BITB	TAPE HAMMER REAFY	
BITC	FIXED LASER	
BITD	INTERLOCK	
BITE	X,Y PRE-HOME	
BITF	EMG STOP	

KPS Output

HD422 Output check		10:34:07
RETURN		
RESET	**Kps OUTPUT**	I/O OUT

HEAD2 JAW OP	ON ○ / OFF ●	Feeder Pulse	ON ○ / OFF ●
HEAD2 JAW CL	ON ○ / OFF ●	Jaw OPEN	ON ○ / OFF ●
HAED1 U/D OK	ON ○ / OFF ●	Jaw CLOSE	ON ○ / OFF ●
HAED2 U/D OK	ON ○ / OFF ●	Vaccume 1	ON ○ / OFF ●
Feeder UP (D)	ON ○ / OFF ●	Vaccume 2	ON ○ / OFF ●
LIGHT 2	ON ○ / OFF ●	HEAD2 U/D	ON ○ / OFF ●
PUFF 1	ON ○ / OFF ●	Light Change	ON ○ / OFF ●
PUFF 2	ON ○ / OFF ●	EMG STOP	ON ○ / OFF ●

RETURN	Back to Menu
Reset	Reset (off) all outputs
I/O OUT	Move to I/O check
ON ○ OFF ●	Click ON or OFF

I/O Output

I/O Output check		13:21:16
RETURN		
RESET	**I/O OUTPUT**	HD422 OUT

Tape# select 1	ON ○ / OFF ●	Ass'y comp	ON ○ / OFF ●
Tape# select 2	ON ○ / OFF ●	Light RED	ON ○ / OFF ●
Tape# select 4	ON ○ / OFF ●	Light YEL	ON ○ / OFF ●
Tape# select 8	ON ○ / OFF ●	Light GRN	ON ○ / OFF ●
Tpae# select 16	ON ○ / OFF ●	Buzzer	ON ○ / OFF ●
Tpae# select 32	ON ○ / OFF ●	Full/Half CH	ON ○ / OFF ●
Tape# select 64	ON ○ / OFF ●	DISABLE	ON ○ / OFF ●
Tape set	ON ○ / OFF ●	DISABLE	ON ○ / OFF ●

RETURN	Back to Menu
Reset	Reset (off) all outputs
KPS OUT	Move to I/O check
ON ○ OFF ●	Click ON or OFF

MOTOR CONSTANT of KPS PCI BUS Board
Max speed 1-4095 Larger>>Higher
Low speed 1-4095 Larger>>Higher   Max>=Low
Slope   1-4095 Larger>>Slower

To set motor speed quickly, press F4 key and enter in system constant and click Quick Set
And click Motor SPEED as shown below and change values.

MOTOR SPEED

Motor Speed

Nomal SPEED

	X axis	Y axis	Theta/tape	Up/Dwn
MAX	800	800	2000	1000
START	20	20	200	120
RATE	100	100	50	50

QFP & Slow SPEED

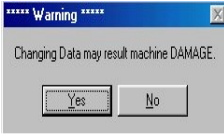|	X axis	Y axis	Theta	Up/Down QFP	SOP
MAX	500	500	100	300	800
START	5	5	10	20	20
RATE	500	500	1000	300	500

O K   **Cancel**

F4- CONSTANT SYSTEM CONSTANT WARNING!!

These values are used to control machine. Improper changes may result machine damage. Consult with authorized service person.

Refer System constant details

Quick Set	Set Machine configuration
Data edit	

	Input 2 or click on2 EDIT button at low right of the screen. Move cursor on desired line and edit it and when press ENTER key, following warning message appears.
	Press YES if OK. No change if NO is pressed. The change is made on memory but not hard disk so permanent change is required, save data pressing F2 key or Data save.

 OK
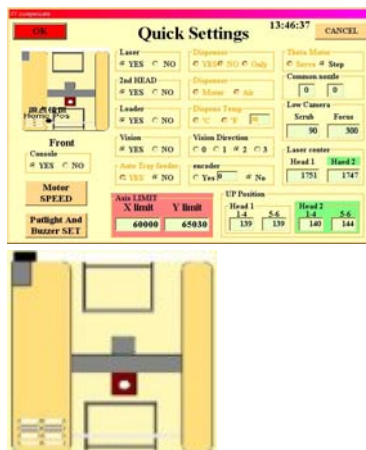
Click mouse on the picture . then it changes machine configuration

Click mouse on each item according to machine configuration. If OK then click OK to back to system constant menu.

Pat lite & buzzer

Selection of Pat-lite color, Blinking and buzzer are available.

100's digit : 1=RED 2=ORANGE 3=GREEN

10's digit : 0=Stays ON 1=Blinking

1's digit : 0=Buzzer OFF 1=Buzzer ON

Example: Emergency Stop: Red light blinking and buzzer ON
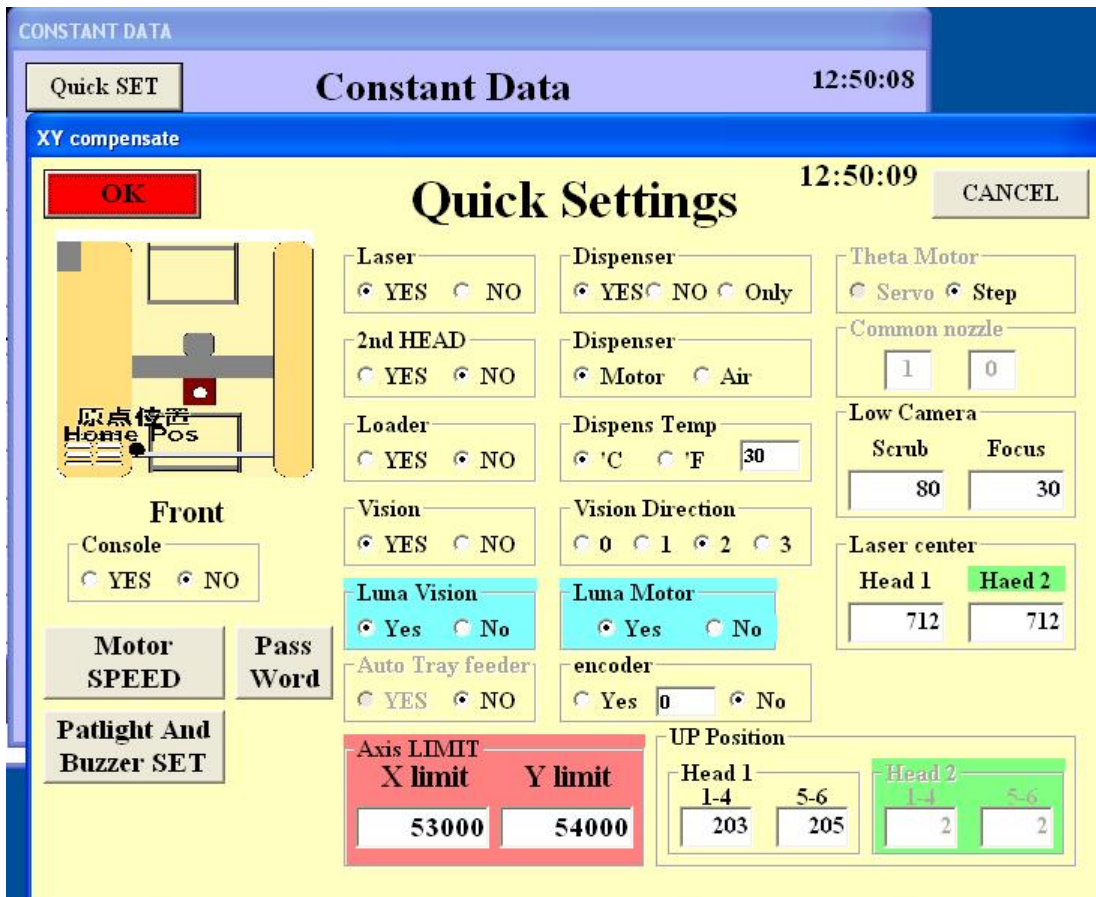
Emergency	Emergency stop
Teaching	Teaching mode
Menu	Menu List display
Auto	Assembly mode
Waiting PCB	Ready for next assembly
Cycle Stop	Intermittent stop
Error	Pick up miss etc.

The system constants are common with every ECM series machines so some constants are not used in LUNA vision system.

k1:HX/DV!	X axis constant approx. 100000
	DV!=100 Metric DV!=2540 English unit
	Rem left 1 Mark for log file record
k2:HY/U/U1limit/U2limit Rem after ser# **FE** Rem must start with 2 **If 2 bottom cameras** are installed, Rem must start as **22**	Y-axis constant approx. 100000. U=1 Metric U=2 English unit U1limit=Max Z stroke of head #1 Default =1500 5 Bar code read end 15 characters max 6 Bar code 0=no bar code 1–14= bar code read start point **Note** Bar code reading of tape reel is option and need bar code reader connected to RS232 port If barcode is not zero, bar code button appears. In tape Feeder list
K3: X limit / ZK!/U1 up limit /U2 up limit	X axis software limit ZK!: Angle constant usually 160 U1 up limit=max up Z stroke for #1 head. U2 up limit=Max up Z stroke for #2 head If servo motor is used for Z then Remark starts as S The last character of the remark shows model number as; The last character of the remark specifies Start key when PCB

	wait window opens. Usually it is space so space key or Enter key are used as start key. **If the second character from the last of the remark is M then mouse is disabled when pick up miss window opens** **To prevent an accidentally move of the head.** **This case two-hand operation is required to prompt so press left shift key always and press some command key** **K3 #5 and #6 are PCB Xmin and PCB Xmax for k37 skew**
K4: Y limit / ,UK!	Y axis software limit UK!: Z stroke constant usually 10 **#5 and #6 are PCB Ymin and PCB Ymax for k37 skew.**
k5:PUMISS/IMARK / LAwait/ ViewOn / MountUp/TR offset	# of pick up miss allowed. If this value is more than 10 such as 13 then actual pick up miss # is 3 but pick up miss log file records the pick up miss status. / EYE mark 0=shiny 1=black Lawait, View On and MountUp are usually set to zero. TR offset is usually zero (V1.0.14 or later) Rem right 3s WLITE *Note right 3s= 3 characters from right
k6:UP POSITION	Flying Luna nozzle position. 1st value=nozzle1-4 2nd value=#5-6, of #1 head. (3rd value=#1-4 4thvalue=#5-6 of #2 head) For digital dispenser, 3rd value is used for the offset to make proper gap between needle and PCB in automatic height control using 240 also it is offset by DW4 in Dispenser data and 4th value is up stroke to cut string usually 50-100.
k7:LOW/UP CAMERA	Vision camera magnification constants. The first value is for bottom vision camera and 2nd value is for upper fiducial camera. If the remark starts without L then fiducial mark check performs closed loop check i.e. vision check is repeated until the mark is aligned on the center of cross lines within 0.01mm. The last two characters of the remark are used for fiducial wait time before image capturing.
k8:TILT2/TILT2(vision)/TILT2 2nd head k9:TILT3/TILT3(vision)/TILT3 2nd head	Angle offset at 180deg /Angle offset at 180 deg for vision/2nd head of vision Angle offset at 270deg /Angle offset at 270 deg for vision/2nd head of vision Refer Teaching for calibration.
k10:Focus/LOCAMFOC	Nozzle height at POS 1/Nozzle height on the bottom camera/**(#5 focus of the 2nd bottom camera)**
k11:DTHC/DTHI	The remark starts from CLOSE, then bottom camera check (LV=26 and LV=27) performs closed loop check i.e. vision check is repeated until the part is aligned on the center of cross lines within DTHC or DTHI. DTHC is for chips and DTHI is for large IC.

	If DTHC=0 then default is 15 (0.015mm) and DTHI's default is 5.
k12:DPX/DPY	Nozzle and dispenser offset. Refer Teaching for calibration. The end of remark tells stamping repeat # for sticky paste.0=3
k13:TILT0/TILT1/TILT0(v)/TILT0(V) 2nd	Angle offset at 0deg/90deg/Vision 0deg/Vision 0deg 2nd head The end of remark specifies stamping height check. 1=Yes
k14:M WT/PUWT/TILT1(v)/TILT1(v) 2nd	Wait time after motor stops/wait time after component is sucked/Angle offset at 90deg (vision)/2nd head The end of remark is 1 then stamping feature is activated.
k15:POSW/TSTOP/POSF/POSG	Wait time for flying Luna check/ Wait time after component is placed/POSF wait time after Z rotation/POSG wait time before vision test
16:WS/WSLM	X motor max speed/X motor QFP max Refer KPS
k17:WSS/XPIC/WSSL	X motor start speed/Auto tray pick up position/X motor QFP start speed Remark starts from AUTO for auto tray. Values after AUTO specify total tray stack. Default is 10.
k18:WSL/WSLQ	X motor slope/X motor QFP slope
k19:WS1/WSLM1	Y motor max speed/Y motor QFP max. Refer KPS
k20:WSS1/XSL1/WSS1L	Y motor start speed/#1 stop position of auto PCB slider (option)/Y motor QFP start speed
k21:WSL1/WSLQ1	Y motor slope/Y motor QFP slope
k22:WS2/MAT/WS2L	Theta motor max speed/Matching factor limit of vision Mark error/Y motor QFP max
k23:WSS/CPU/WSS2L/CPU2	Theta motor start speed/CPU speed/Theta motor QFP start speed/Laser time out
k24:WSL2/Y TRAY/WSL2L	Theta motor slope/Auto tray height/Theta motor QFP slope
k25:WS/WSQ/WS3SLOW /WS3DISP	Z motor max speed/Z motor QFP max/2nd head Z motor max/2nd head Z motor max for dispensing
k26:WSS/WSSQ/WSS3SLOW /WSS3DISP	Z motor start speed/Z motor QFP start speed/2nd head Z motor start speed/2nd head Z motor start speed for dispensing
k27:WSL3/WSLQ3 /WSL3SLOW/WSL3DISP	Z motor slope/Z motor QFP slope/2nd head Z motor slope/2nd head Z motor slope for dispensing
k28:LOADER/CHK/DSLOWMAX	PCB conveyor/Nozzle choke test 0=No 1=Yes/X,Y motors max speed for dispensing Loader has various values and configures PCB conveyor and computer cursor direction in teaching mode. 0=No (table top) 1=Yes (no camera) 11=YES (with camera), also 21,25,26 for conveyor and 20 for no loader to change cursor direction in teaching mode.
k29:ICWAIT/DMP/DSSLOW	QFP wait time after placement/IC dumping point 0=return to tray/X/Y motor start speed for dispenser.

k30:DISPENSER/TEMP/ DSSLSLOW	0=No dispenser　1=With dispenser 11=plus camera 5=Air dispenser only (Celsius) 6=Air dispenser only (Fahrenheit) 7/8=Digital dispenser for MHP 3rd head 15=Digital dispenser only (Celsius) 16=Digital dispenser only (Fahrenheit) 21/22=with Digital dispenser (Celsius/ Fahrenheit) /Setting temperature 0=no control /X/Y motor slope for dispenser. Do not set temperature more than 50 deg. The last 4 digits of the remark specify dispenser idle wait time and when it exceeds, needle cleaning warning message is displayed during assembly. Value is in second so 600=10 minuets
k31:X/Y/XV/YVo ffset90	90deg offset X/Y/X (vision)/Y (vision)
k32:X　　　/Y/XV/YV offset180	180deg offset X/Y/X (vision)/Y (vision)
k33:X　　　/Y/XV/YV offset270	270deg offset X/Y/X (vision)/Y (vision)
k35:X /Y/XV/YV offset0	0 deg offset X/Y/X (vision)/Y (vision)
k34: 5/*/Contrast/Bright Rem*********+++ vISION	Set 5 always when Luna vision is installed and remark starts from v if not vision features are ignored even vision is installed. Contrast is usually 10(0-20) Brightness is usually 0 (-50-+50) The last 3 characters of the remark must be space or 0.
k36:X/Y Camera	Nozzle camera offsets
k37:X/Y Skew	X/Y axis skew correction 1=1/25000 **Skew feature can limit adding value in k3 and k4.** **K3 #5 and #6 are PCB Xmin and PCB Xmax and k4 #5 and #6 are PCB Ymin and PCB Ymax.** **If the values are zero the skew acts as is but adding values (unit is 1/100mm) then skew feature acts only in such area usually PCB area but not feeders or nozzle exchanger etc..**
K38:#2 TILT 0/90	2nd head 0deg angle offset/90deg angle offset
K39:#2 TILT 180/27	2nd head 180deg angle offset/270deg angle offset
k40:#2 X90/Y90/Xv90/Yv90	2nd head X/Y offset
k41:#2 X180/Y180/Xv180/Yv180	2nd head X/Y/Xv/Yv offset
k42:#2 X270/Y270/Xv270/Yv270	2nd head X/Y/Xv/Yv offset
k43:#2 X0/Y0/Xv0/Yv0	2nd head X/Y/Xv/Yv offset
k44:Head Offset/2ND 2,3	Offset between 1st and 2nd nozzle. If 2nd head or digital dispenser is installed, remark must start from

| | | |
|---|---|
| | 2ND and following 2,3 show which nozzles are used for simultaneous pick up. (2nd head model only) |
| K45:O1/O2/O3/O4/o5/O6 | .Luna flying vision offset O1 #1 head nozzle offset/O2 #2 head nozzle offset/O3 #1 head 3rd capture threshold default=30/O4 #2 head 3rd capture threshold default=30/O5 tilt size offset default=.375/O6 SOP tilt offset /REM end LV=1 chip offset |

CONSTANT DATA

Constant Data   Quick SET

		# 1	# 2	# 3	# 4	# 5	# 6	Remark************
	k 35	-3	-14	0	0	0	0	X/Y OFFSET 0
▶	k 36	-40	3183	467	-11534			AMERA
	k 37	0	7	0	0	36500	36600	X/Y SKEW tape0ff
	k 38	0	0	0	0			#2 TILT0/90
	k 39	0	0	0	0			#2 TILT18/27
	k 40	0	0	0	0	0	0	#2 OFFSET 90
	k 41	0	0	0	0	0	0	#2 OFFSET 180
	k 42	0	0	0	0	0	0	#2 OFFSET 270
	k 43	10	-18	0	0			#2 OFFSET 0
	k 44	-4605	4473	0	0	0	0	ND HEADOFFSET 23
	k 45	0	0	20	20	0.4	-360	ASER CENTER -350
	k 46	2	3	0	0			#1 45 deg
	k 47	20	0	0	0	0	0	#1 135 deg
	k 48	-5	30	0	0	0	0	#1 225 deg
	k 49	-5	30	0	0	0	0	#1 315 deg
	k 50	0	0	0	0	0	0	#2 45 deg
	k 51	0	0	0	0	0	0	#2 135 deg
	k 52	0	0	0	0	0	0	#2 225 deg
	k 53	0	0	0	0	0	0	#2 315 deg

K46 45deg offset for #1 head 1=X 2=y for lv=1 3=X 4=Y for lv=26/27
K47 135deg offset for #1 head
K48 225deg offset for #1 head
K49 315deg offset for #1 head
K50 45deg offset for #2 head
K51 135deg offset for #2 head
K52 225deg offset for #2 head
K53 315deg offset for #2 head
(1 is 1/100mm)
The values can calibrate in teaching mode after placement is done using "." And "C" commands.

8 File Maintenance

File Maintenance
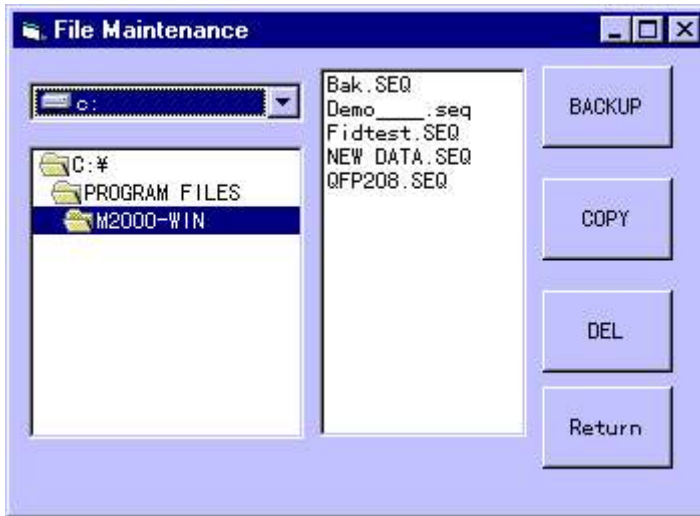
BACK UP : Make back up files for selected file in drive A.

System data files are also backed up.

COPY   : Make copy file to specified destination.

DELETE   : Delete existing file from HD or Floppy disk.

LUNA vision system

Luna vision system needs to input LV and remark in the part type data.

Fiducial mark : LV=1 or –1   Remark starts as MARK1 or MARK2 or MARK 3

Flying Luna: LV=1 similar to Laser align.

Manual alignment: LV=25   Remark starts as QFP,CON and BGA etc.

Small chip: LV=26

Transistor/Small SOP: LV=26 Remark starts as TR ,SOP, BGA and CSP

Large QFP,PLCC,BGA: LV=27 Remark starts as QFP, BGA etc.

From version 5.1 or later, illumination level can be controlled by software too adding 100 and 200

To LV value. For example LV=26 is medium, LV=126 is darker and LV=226 is brighter as factory default.

Each illumination level also controlled by variable resister on I/F PCB in control box.
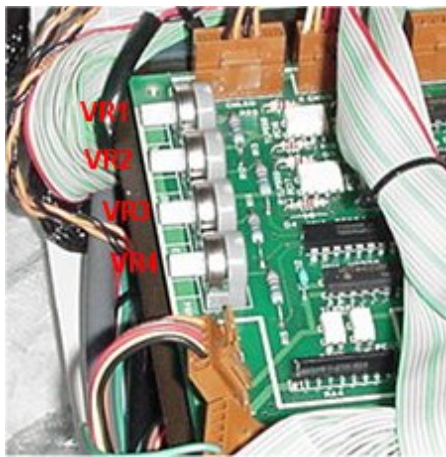
VR1 is for 200 (brighter or darker)

VR2 is for 100 (darker or brighter)

VR3 is for upper camera

And VR4 is for 0 (medium)

The control of each VR is independent so changing the settings the 3 stages are customized.

For example, set VR4 as the most common light level and set VR1 and VR2 to different light levels so the most of case the addition of 100 or 200 to an LV is not necessary.

In teach mode, pressing Q key toggles Light level.

PARTS TYPE DATA Lv26small

Part type DATA   12:21:18

P#	Nzl	L#	Btm	Rgt	Lft	X	Y	Pt	W	Thk	Lv	Rem*******TS*+++
1	1	0	0	0	0	0.6	0.3	5	0	0.25	1	CHI1c0201 60
2	2	0	0	1	0	1	0.5	5	0	0.3	1	CHI1R0402 70
3	2	0	0	1	0	1.6	0.8	5	0	0.5	1	CHI1R0603 70
4	2	0	0	0	0	1.6	0.8	0	0	0.5	26	CHI1C0603 70 1
5	2	0	0	1	0	2	1.25	0	0	0.7	1	CHI0R2125 70
6	2	0	0	1	0	2	1.25	0	0	0.8	1	CHI1C2125 70
7	2	0	0	1	0	2	1.25	0	0	1.2	1	CHI1C2125 70
8	5	0	0	0	0	2.5	2.2	0	0	1.5	1	CHIP Flip 70
9	2	0	0	0	0	3.2	1.6	0	0	1.1	1	CHI1C3216 70
10	2	0	0	0	0	3.2	1.6	0	0	1.2	26	CHI1C3216 50
11	6	0	0	0	0	30	30	2.5	2.5	3	25	QFP 208 70
12	6	0	0	0	0	30	30	2.5	2.5	3	27	QFP 208 70 5
13	2	0	0	0	0	2.5	3	0	0	1.1	26	TR SOT23 70
14	5	0	0	0	0	5	7	0	0	2	26	SOP 8 70
15	3	0	0	0	0	4.8	2.5	0	0	2	1	CHI1 70
16	3	0	0	0	0	7.5	4	0	0	2.8	1	CHI1 70
17	3	0	0	0	0	7	8	0	0	2.8	1	CHI1 70
18	3	0	0	0	0	7	8	0	0	2.8	1	CHI1 70
19	2	0	0	0	0	4	4	0	0	2	1	MARK 70
20	2	0	0	0	0	4	4	0	0	2	-1	MARK1 70
21	2	0	0	0	0	4	4	0	0	0	1	MARK2 70

F1-Help F2-Backup ESC-Return Enter-Confirm   0,1,2 or 3   1 or -1

Fiducial mark set up

Round (cross, triangle or square) mark or hole, pattern edge can be used as fiducial mark but any way the mark is clear and high contrast and there should not be any similar mark in the specified window.

Round mark

Part type 19 is an example as shown the details below. This case search window size is 4mm by 4mm and mark diameter is 2mm in **thk** column. LV=1 which is shiny mark and remark starts as MARK and diameter size tolerance is 70%. Part type #21 is an example of round hole so this case LV=-(minus) 1. MARK or MARK1 is necessary for the remark.

Edge mark

Corner of a pattern etc. can be used as edge mark. Part type #21 is an example. Assign windows size in X and Y and mark edge orientation in **thk** as shown right**.**
LV=1 for shiny edge and –1 for dark edge.
Remark starts as MARK2. Vision system aligns the edge to
The center of cross line.

Edge orientation
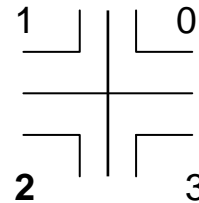
Center of Gravity

Regardless shape of a pattern, center of gravity of a pattern is calculated if the remark starts as MARK3

The test of a mark can be done in teach mode. Align a mark approx. center of a mark.
Press **S** then following window opens.
(Note: In teach mode, press F3 key then part type list is displayed and can review or edit it.
 Esc key to return.)

If part type is already assigned, input P (or p) and type part #.
If part type is not assigned yet or to test it, input mark type 1 or 2, X window, Y window, diameter (**thk**) and threshold level (usually **1**)

For MARK3, if size of pattern (equivalent square mm) is unknown input 0 for size (**thk**) and if necessary check by S command and note calculated size.

When large value such as 2-5 then threshold is set to the max level –10 automatically and it is

**useful when the mark contrast is low.**

Press ENTER and search starts and mark is centered. Double click of mouse left button on the vision window then the light level (red) and threshold (green) are displayed.
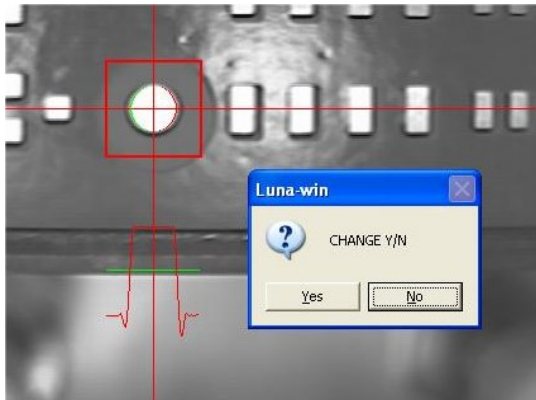
When successful search continues more than 11 times (cnt=11) and press ENTER or click STOP button for normal use press C(alibrate) then upper camera constant change is prompted. Usually just ENTER (No).
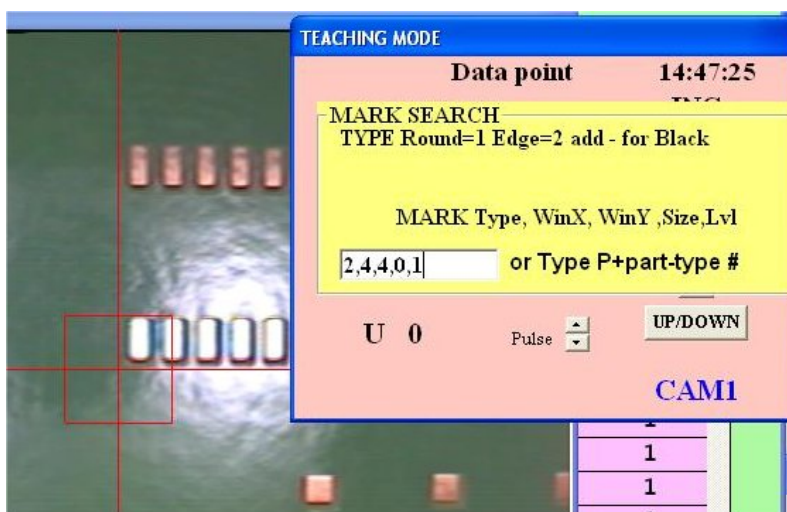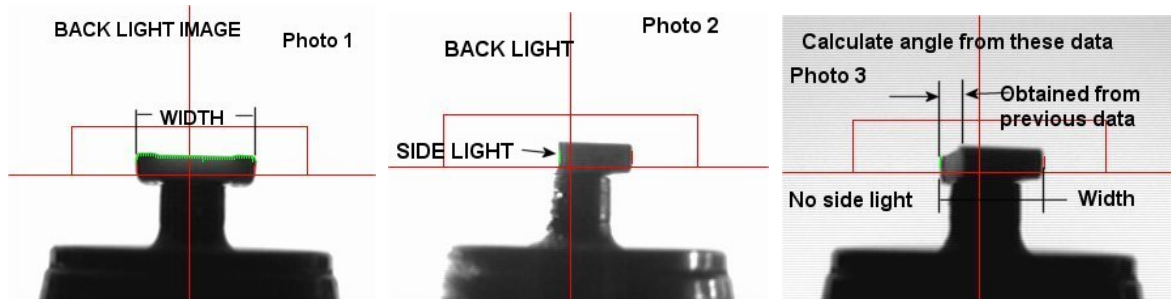

The edge mark is similar way. **Input mark type (2), X window, Y window, edge orientation, and light level.**
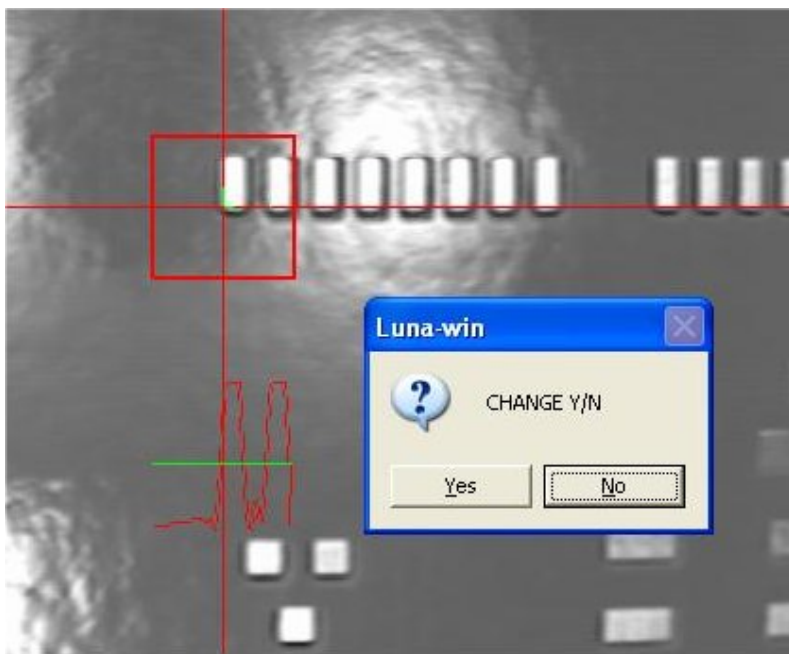
Flying Luna vision LV=1

Flying Luna vision is so called touch less On the Fly component alignment.

It checks component image from side three times rotating it and calculates component X/Y position, width, angle and thickness.


Component parameters are registered in part type list as shown in page 17 as sample data for LV=1

To test nozzle height and operation, use F (shift+F for 2nd head) command in teaching mode.

In teaching mode, move on tape feeder and press 9 (3 for the 2nd head) and pick up component and press F (shift+F for 2nd head).

Then the left window displays so input part type # and angle which is usually zero.
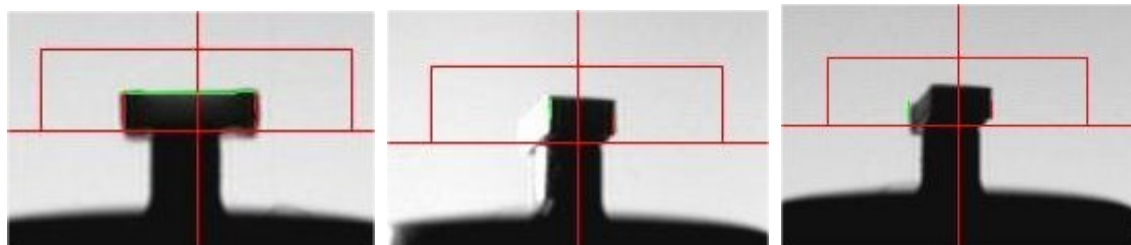
Check the nozzle is aligned on horizontal red line and component side view (left) is surrounded by green and red line. Click **Next** button to rotate component and check red and green vertical lines are on the edge (center) and click again to turn off sidelight and check the red and green lines are on the full width. To repeat continue to click **Next** and to stop checking click **Stop** button.

Software V5.4.4 or later,

To increase placement speed, when the remark of part type starts with **CHI** (upper case) then the second step for side lighted is skipped so click **Next** twice.

If the remark starts with **chi** (lower case), three-step measurement is performed.
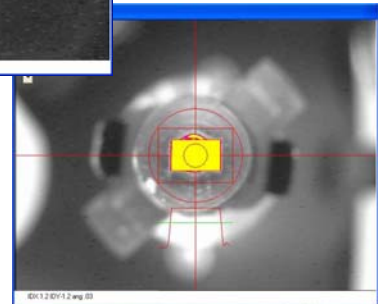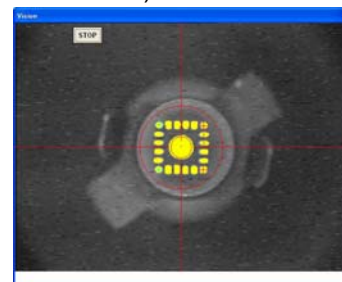
Small chip LV=26

Small chips and small SOIC such as 8 pins can be checked by Laser (LV=1) or by bottom camera (LV=26). In teaching mode, pick up chip and move on POS2 and press shift + P to test it.
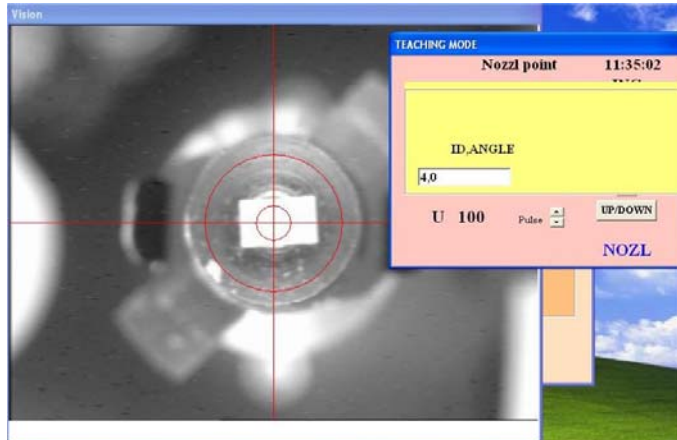
Input part type # (this case is 4) and angle (this case is zero)

If input as 4,0, (end comma) then brightness distribution is displayed.

(Also LV=27 too)

When ENTER key is pressed, chip is centered and part image is separated from noise.

Transistor and small SOIC are the same manner.

Small SOIC, BGA and CSP can use LV=26 specifying Remark as SOP, BGA and CSP respectively.

Filtering

To avoid background light noise or to mask some part, filtering is prepared. For example if ball dia of a small BGA is 0.5mm then input 0.6 in pt column of the part type and 0.2 in W column.

This case an image having pixel length more than 0.6mm or less than 0.2mm is filtered.

CHP LV=26

Select CHP then the most of leaded components can be measured including transistor
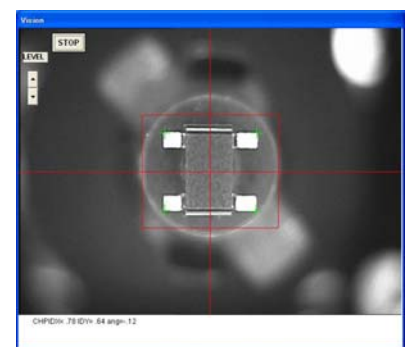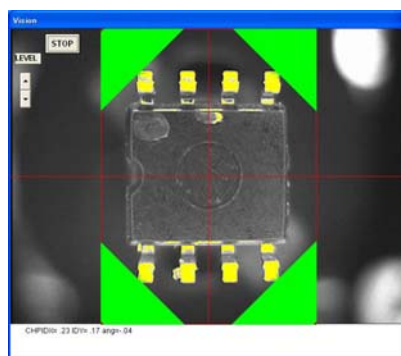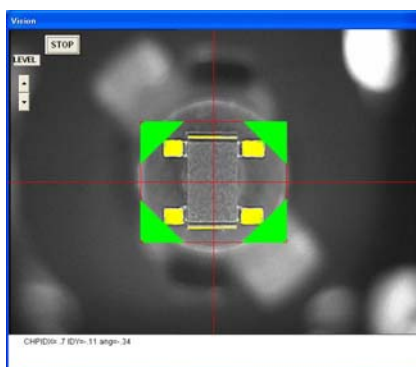
corner green shows measuring area and shown when comma is added at the end of input su ch as 28,0, . If not only cross lines are displayed as right picture.

Large QFP etc.   LV27

Part type data

Component size X/Y etc. should be taught in part type data.

h1, h2 are offset correction but input 0 first time. .

pt and W is placement offset of X and Y.

QFP

An example data for connector and QFP

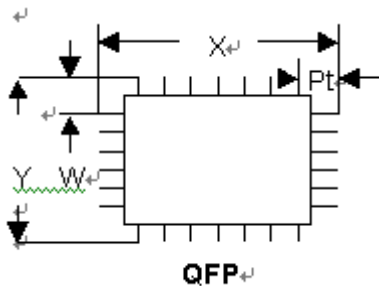| P#	Nzl	dx	dy	wt	da	X	Y	Pt	W	Thk	Lv	Rem*************TS***+++
	6	0	0	0	0	17.2	5.5	0.14	0.5	2.0	27	CON 35P
	6	0	0	0	0	16.00	15.3	2.2	2.2	1.0	27	QFP 168 15mil

This case 35pin connector X/Y is approx 17.2mm and 5.5mm ;and 15mil QFP is
16.0mm and 15.30mm.

To test data use Shift +P in teaching mode and input part type # and zero such as 50,0.

To calibrate camera magnification constant, pick up component with some X offset and go into Shift +P and when press space bar after 11 times of tests, calibration Y/N is asked so press Y then camera calibration of k7 is automatically done. (press F2 to save change)

PCB DATA

To teach component location, align cross line of the camera
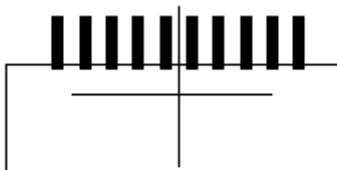
to the center position.

Doing so when a component is placed on a PCB calculating offset .If there is some offset ,adjust

h1, h2 , h3 , and h4.
h1 is X offset, h2 is Y offset and h4 is skew offset.

Large QFP uses LV=27 and check leads at 3 corners. It can be tested pressing P in teach mode.
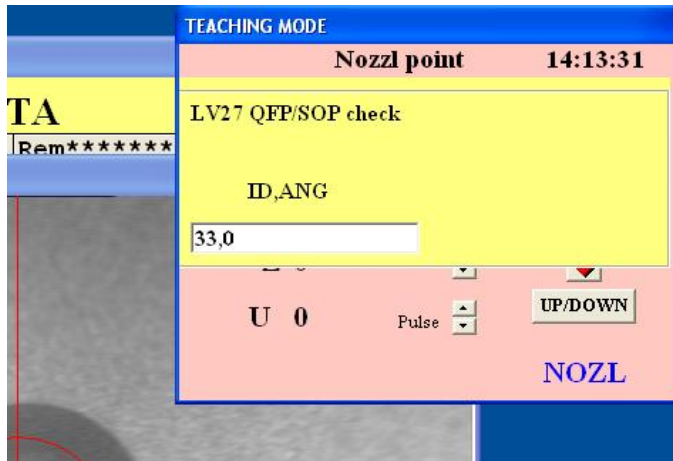
If input as 33,0, then brightness distribution is displayed.
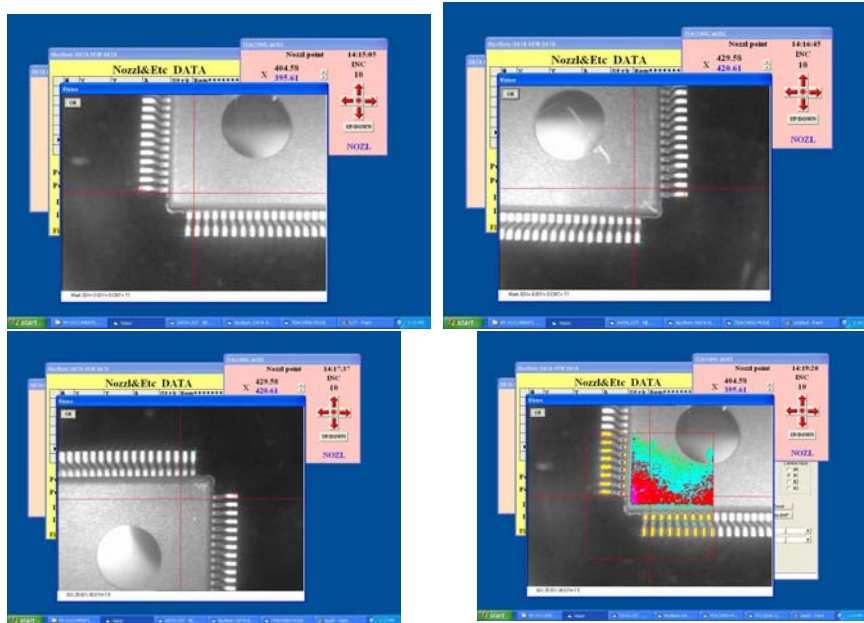
LV=31 SOIC/CONNECTOR

LV=31 is useful for longer component but width is inside of the screen .
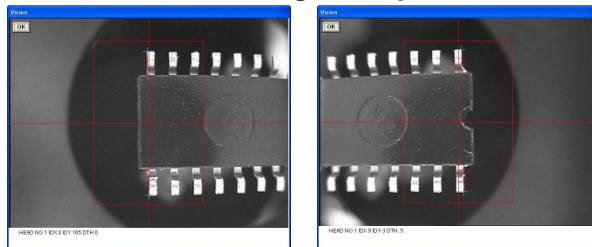
Input component X and Y and   Pt=1-2 w= Y/2

Type is SOP/sop or CON/con

Luna vision error code
Round Mark

3	Mark dia exceeds size limit
9	Image contrast is too low
99	Image not grabbed.
100	Window size exceeds at left X
101	Window size exceeds at left Y
102	Window size exceeds at right X
103	Window size exceeds at right Y
104	Mark dia exceeds window X width
105	Mark dia exceeds window Y width
106	No dia width in X
107	No dia width in Y

Edge Mark

201	No vertical edge
202	No horizontal edge

LV1 Small chip

|	
1	No left vertical edge
2	No right vertical edge
3	No part, Too thin
64	No part
200	Y width exceeds the limit.
201	X width exceeds the limit.
300	Tomb stone

LV26 Small chip

1	No part found
2	Y width exceeds minimum limit
3	X width exceeds minimum limit
4	X or Y width exceeds max limit

Transistor etc.

301	No vertical lead at top left
302	No horizontal lead at top right
303	No vertical lead at bottom left
304	No horizontal lead at bottom right

LV27 Large component

305	No vertical lead at the 1st scan angle 0,180 deg
306	No horizontal lead at the 1st scan angle 0,180 deg
307	No vertical lead at the 1st scan angle 180,270 deg
308	No horizontal lead at the 1st scan angle 180,270 deg
309	No vertical lead at the 2nd scan angle 0,180 deg
310	No horizontal lead at the 2nd scan angle 0,180 deg
311	No vertical lead at the 2nd scan angle 180,270 deg
312	No horizontal lead at the 2nd scan angle 180,270 deg

313	No vertical lead at the 3rd scan angle 0,180 deg
314	No horizontal lead at the 3rd scan angle 0,180 deg
315	No vertical lead at the 3rd scan angle 180,270 deg
316	No horizontal lead at the 3rd scan angle 180,270 deg
400	No lead found
501-505	Basically BGA ball are not recognized as a circle but irregular shape.
	(some case SOIC, PLCC's lead are not sharp lead)

System constant k3 remark has following features.

The last value under *** : Model #

2 ECM93ML	5 Luna mini	d Luna mini Digital Dispenser
3 ECM93L	6 Luna 600	
4 ECM2040	7 Luna 700	
M MHP	8 Luna 800	

The 2nd from the last is   Start key

As a default shift+Y or Enter key is used to start assembly but specifying a alphabet key it is used to start assembly. Space is default and it specify Enter key.

The 3rd value from the last is Mouse control in Pick up miss window.

At Pick up miss window usually mouse is used to select next operation but for safety reason Mouse disable feature is added. If the 3rd value from the last is **M** then mouse is disabled in Pick up miss window and only when left shift key plus symbol alphabet key are pressed by both fingers then machine can start. And display changes as below.
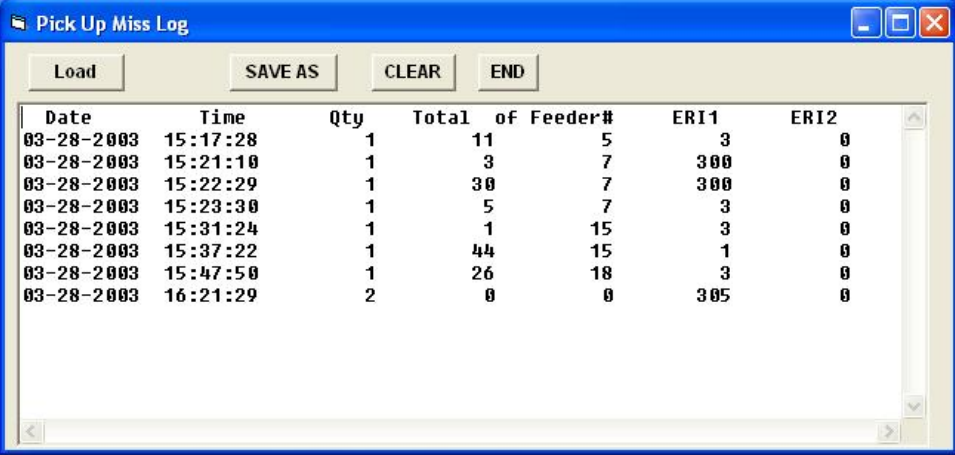
10.Trouble shooting

Problem Action

1.Pick up Miss .Check air pressure. 5kg/cm2 or 80PS. (error 64)

2. Check tape feeder pick up position and stroke. If they are not correct, pick up miss may be resulted.

When tape feeder is exchanged, check pick up position again. (error 64)

3.Check nozzle up position by F command.

 (error 300 or 67 or 98 or 200 25)

4. Check nozzle size. Refer data type for adequate nozzle size.

(error 64)

5. Check   part type . Component size, thickness etc should match with part type.

(error 200 xxx or 201 xxx)

6.Check vacuum sensor setting.

(error 0)

Pick up miss log file is obtained when pick up miss value in system constant is set to 10 plus # of repeat. For example # of repeat is 3 then value must be 10+3=13.

This case when pick up miss happens then date, time, PCB #, Total, feeder # (tape only), error code of head #1 and head #2. Total means one pick up miss happens after total value for example the line #1 of the list means that after 11 pick up one pick up miss happened.

Default log file name is PICKMISS.csv and located in C: directory so it is recommended to save is as some different file name and clear original file to avoid the file becomes huge. The file can be read by commercial spreadsheet software.

Pick Up Miss Log

Load		SAVE AS	CLEAR	END

Date	Time	Qty	Total	of Feeder#	ERI1	ERI2
03-28-2003	15:17:28	1	11	5	3	0
03-28-2003	15:21:10	1	3	7	300	0
03-28-2003	15:22:29	1	30	7	300	0
03-28-2003	15:23:30	1	5	7	3	0
03-28-2003	15:31:24	1	1	15	3	0
03-28-2003	15:37:22	1	44	15	1	0
03-28-2003	15:47:50	1	26	18	3	0
03-28-2003	16:21:29	2	0	0	305	0

Mark error

1. Check X/Y coordinates.

2. Check mark in teach mode using S command. If necessary re-register it.

3. Check camera lens. If it is dirty or out of focus etc. the image may be defective.

4.   Check threshold level.

Installation of software and drivers in new computer

1. Turn on computer without I/O cards and install CD ROM and execute setup.exe
2. After installation completes, **copy Export.jpg and Win_text2.dat from CD ROM to Program files¥Luna-win directory.**
3. Copy Kps and Pxc folders to program files directory.
4. Turn off computer and insert **one*** KPS and image   cards and turn on again.   * Insert one KPS card if the machine is dispenser model.
5. Follow by messages shown on display to install drivers.
   (When video driver is asked input PXC directory)
6. After installation completes execute PXC setup in PXC directory and execute kps345r4mdc.exe in kps directory .
7. Finally execute kpssetup.exe in kps directory and set to PCIA and click check box and all installations are done.
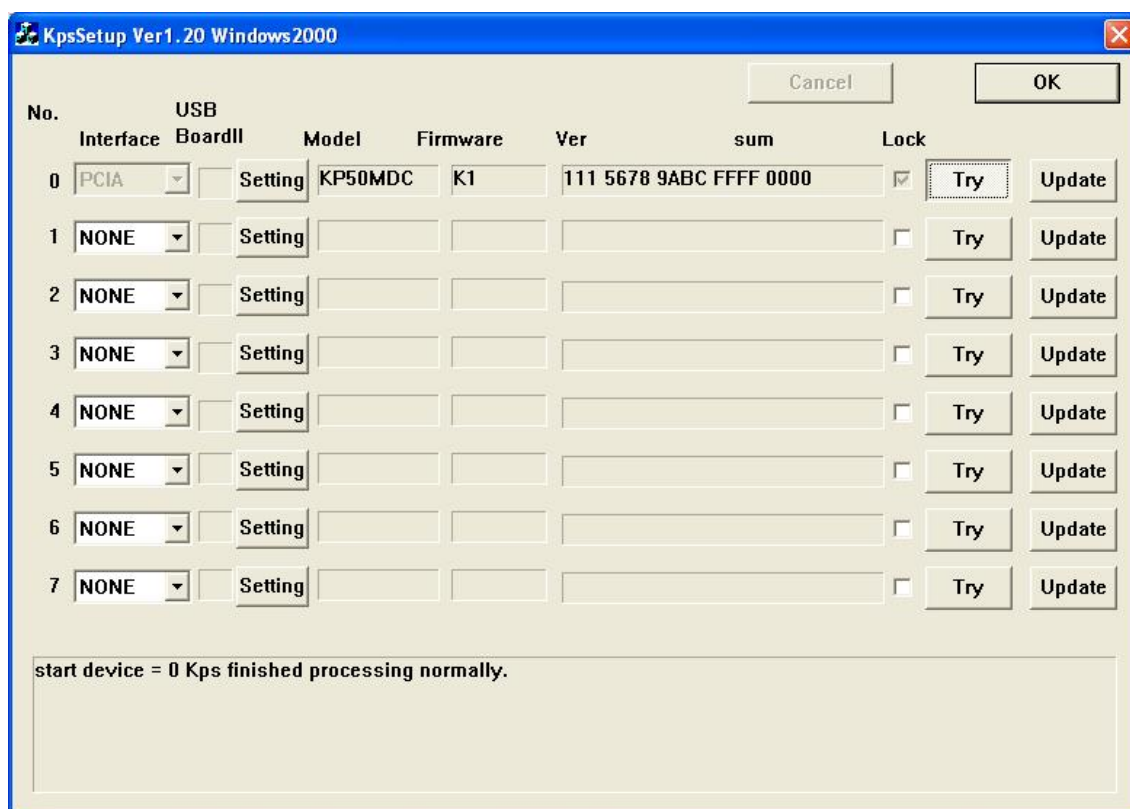
If it is dispenser model you need one more Kps board so shut off computer and insert #2 KPS board and turn on computer.
The wizard checks hardware and may be ask kp5wdm.sys then input C:¥program files¥kps¥driver¥pci¥kp5wdm and wizard will complete installation.
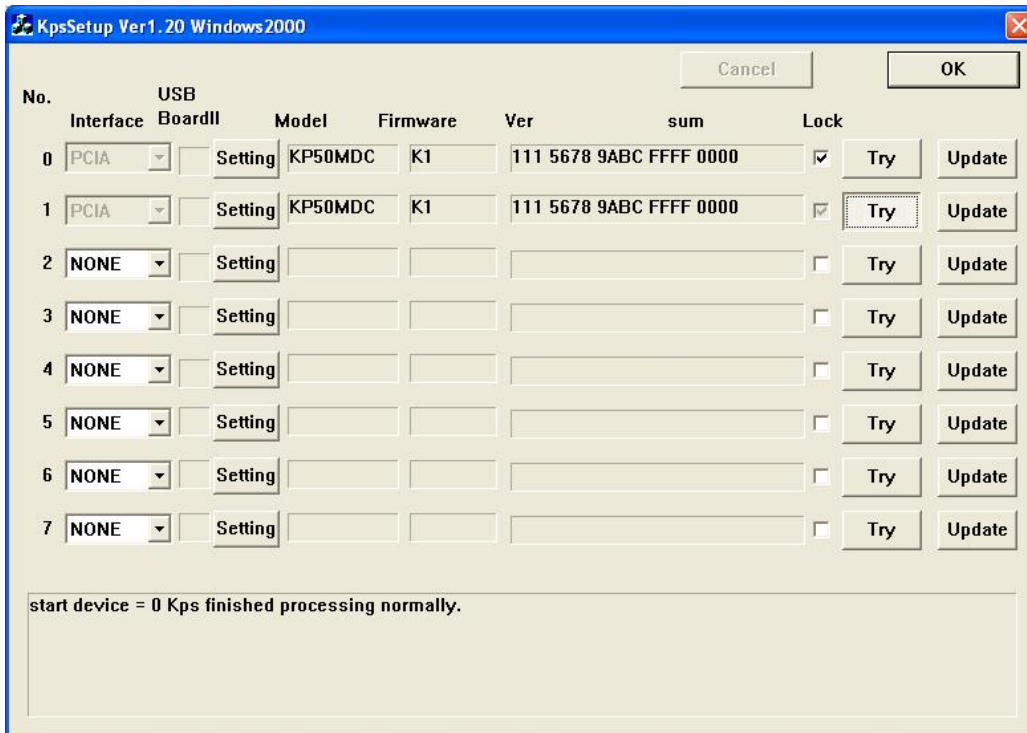
So #0 and #1 boards are installed.

The system driver will show as follows. ? mark on PXC device is OK.
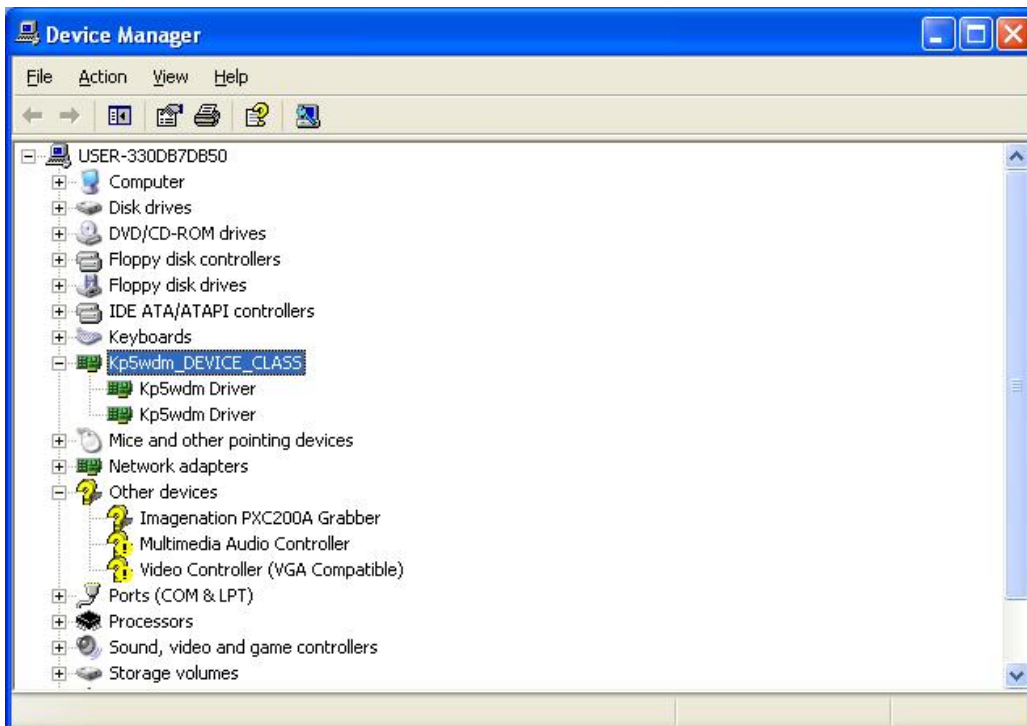
Do not execute KpsUpdate.exe since new software is already installed.

11. Appendix

1) Dedicated Dispenser and 2 dispenser installed machine

Dedicated dispenser model may not need to read chip placement parts and may read only 5.PCB parts, 7.Dispenser data and Teaching mode.
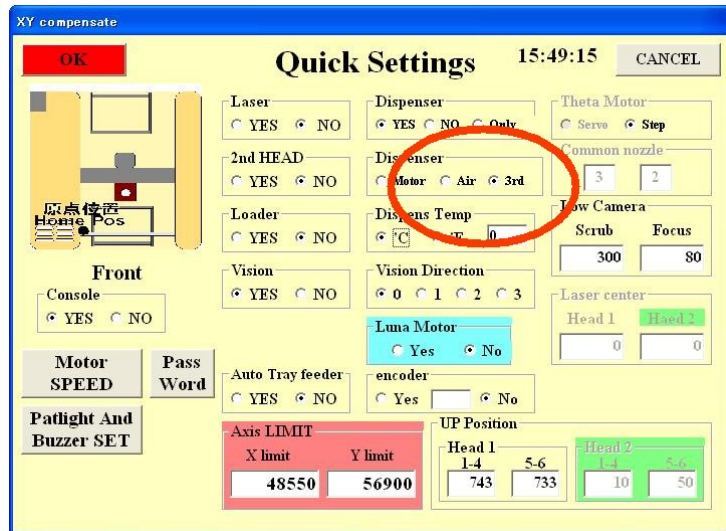
However, machine data is compatible with ECM's pick & place machine so dummy data which are necessary for pick & place machine are created automatically.

2) 2 dispenser installed machine

The machine with 2 5cc syringe dispemsers are used to dispense solder paste and epoxy adhesive etc.
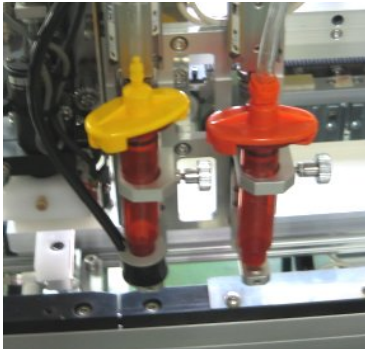
#1 & #2 dispenser

This case click on "3rd" of Quick Setting. Left side is #1 dispenser and right one is 2nd dispenser. The dispenser type used should be input in DT column of the tape feeder data separating by semi colon.

TAPE FEEDER DATA M101A

Tape feeder DATA

| #	X	Y	A	Strk	Rem************	Prt	Indx	f	DT	HA	++++
1	62.48	14.1	0	957		3	1	0	2;3		
2	74.3	16	0	929		3	1	0	4;7		
3	87.13	15.62	0	951		3	1	0	0		
4	100.15	16.04	0	915		3	1	0	0		
5	113.09	15.84	0	929		3	1	0	2;3		
6	126	16.04	0	901		3	1	0	0		
7	141.63	13.93	0	860		3	1	0	5		
8	152.31	16.94	0	929		3	1	0	0		
9	165.3	16.94	0	929		3	1	0	0		
10	180.3	13.94	0	950		28	1	0	0;3	1	
11	191.3	16.94	0	929		3	1	0	0		
12	204.4	16.84	0	929		3	1	0	0		
13	217.3	16.84	0	929		3	1	0	0		
14	230.36	16.85	0	929		3	1	0	0		
15	243.37	16.87	0	929		3	1	0	0		
16	256.37	16.93	0	929		3	1	0	0		
17	270.99	13.54	0	770		10	1	0	0		
18	287.49	35.84	90	929		3	1	0	2		
19	295.39	16.94	0	929		3	1	0	0		
20	308.49	16.94	0	929		3	1	0	2		

F1-Help F2-Backup F8-Teaching ESC-Return Enter-Confirm   **1 BACK**   **2 EDIT**   **3 NEXT**

In this example, #1,2 and 5 tapes specify 2,3   4,7 and 2,3 for #1 and #2 dispenser and #7 tape specify 5 for #1 dispenser and #10 tape specify 3 for #2 dispenser.

V1.0.30 or later, dispenser angle offset HA is specified in feeder data not PCB data.

When 2nd dispenser installed, select check mark which one makes idle shot
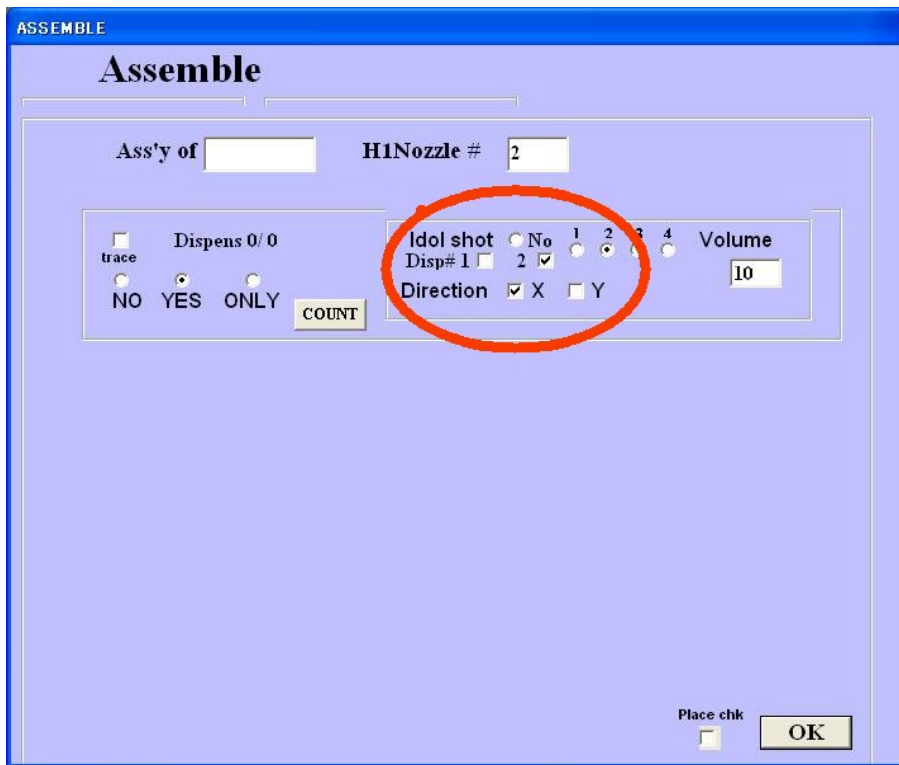
`Idle shot is made by dispenser type1 always.`

Details of dispenser type 9, 10 and 11

Type 9 Circle or arc

Type 9 dispense circle or arc around the current position. Diameter of circle or arc is specified by PTA and PTDA specifies start angle and PTDB specifies end angle. If PTDA and PTDB are zero then it makes circle. Angle starts from X + point and rotates counter clockwise. If the last 4 digits value of the dispenser type remark has minus sign then it rotates clockwise. Scan speed is set by the last 4 digits value. Larger is slower.

Type 10 Continuous Line

Type 11 Continuous Arc

Type 13 SOP dot dispensing
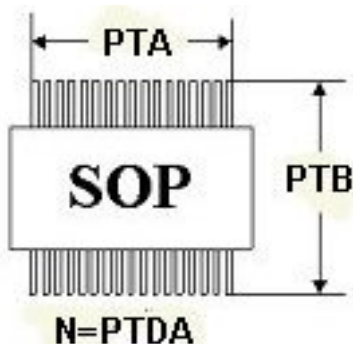
Dot dispensing for SOIC takes time but convenient for proto typing or low volume production.

Input lead to lead (center) in PTA and lead to lead length in PTB,

Input # of leads (one side) in PTDA

Type 14 QFP dot dispensing

DSIPENS TYPE DATA SPEEDTEST

Dispense DATA | Dispcount

#	Pc	PTA	PTB	PTDA	PTDB	VO	DW4	DW5	DW6	Rem****++++++*
6	2	2.5	0	0	0.5	20	20	8	15	805
7	2	4.5	0	0	0.5	20	20	8	15	805
8	4	3	4	0	0.5	20	20	8	15	805
9	3	2	2	0	0.1	20	10	8	8	805
10	4	2	2	0	0.04	20	20	10	20	
11	5	0	0	0	0.04	20	20	10	20	
12	6	10	0	6.5	0	20	20	10	20	10 SOP
13	7	20	13	22	12	20	20	10	20	10 QFP
14	7	20	13	22	12	20	20	10	20	10 QFP
15	2	10	0	0	0.04	12	10	50	5	805
16	1	0	0	0	0.04	10	10	50	5	805
17	2	.5	0	0	0.04	12	10	50	8	805
18	3	2	0	0	0.04	50	10	50	8	805
19	12	8.75	3	8	0.03	20	10	8	8	805
20	13	8.75	6	8	0.03	20	10	8	8	805
21	14	19;24	19;12.5	30;20	0.03	20	10	8	8	805
22	0				0	0	0	0	0	805
23	0				0	0	0	0	0	805
24	0				0	0	0	0	0	805

1 BACK
2 EDIT
3 NEXT

F1-Help F2-Backup ESC-Return Enter-Confirm

X and Y parameters of PTA,PTB and PTDA are separated by semi colon.
**Hints to make continuous lines.**

1. Make placement data for each connecting points.
2. Specify dispenser type for each sequence. Length between point to point must match with PTDA, PTDB (or PTA for arc).
3. PTB except last sequence must be non zero and the last one must be zero nor dispensing will not stop.

2) Paste Stamping feature

Preparing special stamping pin nozzles, tiny dots dispensing for 0603,0402 and even 0201 components is possible.

This stamping needs

1) Dispenser disc cassette(s)
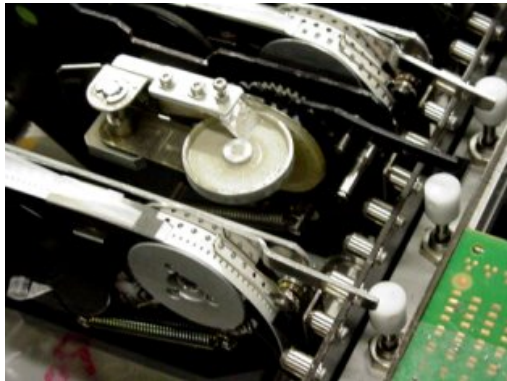
2) stamping pin nozzle(s)

1005   **1608**

(0402)   **(0603) for Imperial system.**

and 3) Software 6.0.7 or later.

b)   Preparation of data

Set stamping pin nozzle to Nozzle #1 or smaller nozzle #. For dedicated 2-head stamping machine use #3 nozzles.

Stamping disc data is taught as tape feeder data. It is recommended to add 90(deg) in its data to avoid 2-pin interfere with previous stamped crater or set 2 index, Set stroke as pins can touch on the surface of the paste.

Prepare part type data for stamping as

PARTS TYPE DATA Liteon2Badmark

Part type DATA   10:58:26

P#	Nzl	h1	h2	h3	h4	X	Y	Pt	W	Thk	Lv	TS	Level	Type	Voff	Rem
1	1	0	0	0	0	1	0.5	0	0	0.3	1	50		chi	1	c0201
2	1	0	12	0	0	1	0.5	0	0	0.5	1	50		chi	1	R0402
3	1	0	0	0	0	1.6	0.8	0	0	0.4	1	50		chi	1	R0603
4	1	0	0	0	-120	1.6	0.8	0	0	0.7	1	50		chi	1	C0603
5	3	0	0	0	0	1	0.5	50	50	0.8	2	50		CHI	1	Stamp
6	2	0	0	0	0	2	1.25	0	0	0.8	1	50		CHI	1	C2125
7	2	0	0	0	0	2	1.25	0	0	1.2	1	50		CHI	1	C2125
8	2	0	0	0	0	3.2	1.6	0	0	0.5	1	50		chi	1	R3216
9	2	0	0	0	0	3.2	1.6	0	0	0.8	1	50		CHI	1	C3216
10	2	0	0	0	0	3.2	1.6	0	0	1.1	1	50		CHI	1	C3216
11	2	0	0	0	0	3.2	1.6	0	0	1.2	1	50		CHI	1	C3216
12	2	0	0	0	0	3.2	1.6	0	0	1.6	1	50		CHI	1	C3216
13	2	0	0	0	300	1.5	2	0	0.1	0.9	1	50		TR		MTR
14	2	0	0	0	300	1.7	3	0	0.1	1.1	1	50		TR		TR
15	3	0	0	0	500	4.6	4	0	0.1	1.5	1	50		TR		PTR
16	2	0	0	0	0	1.55	2.9	0	0	1.1	1	60		TR	1	
17	2	0	0	0	0	3.2	1.6	0	0	1.2	26	30	1.5	CHI	1	
18	2	0	0	0	0	2.8	2.3	0	0	1.1	26	30	1.5	TR		
19	2	0	0	0	0	4	4	0	0	2	1	50	1	MARK1		
20	2	0	0	0	0	5	5	0	0	2	1	50	1	MARK1		
21	2	0	0	0	0	4	4	0	0	2	-1	50	1.4	MARK1		

F1-Help F2-Backup ESC-Return Enter-Confirm   [1 BACK]   2 EDIT   3 NEXT

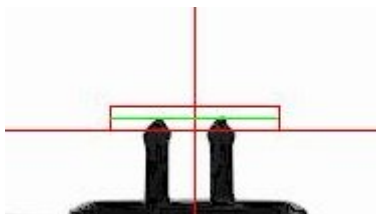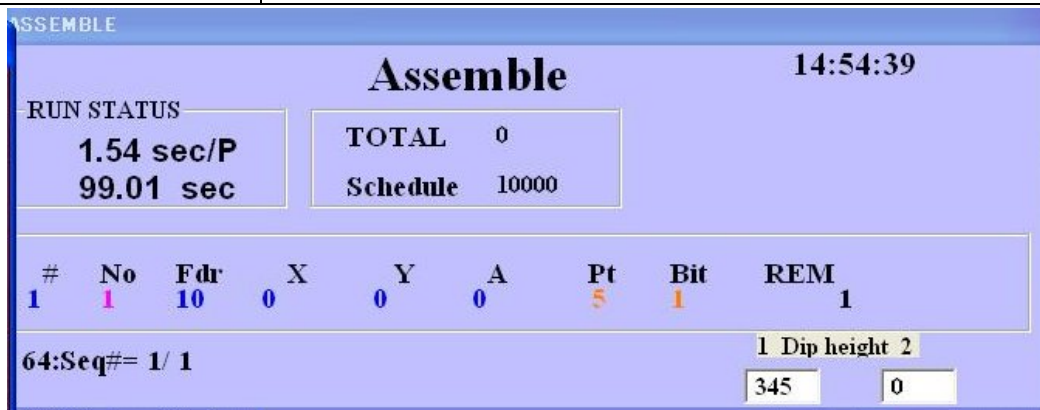Part type #5 is the example of stamping part type for 0402 (1005) component.

X,Y are part size, pt and W are slow up stroke and thk is the desired dispensed dot height.

And LV must be 2.

h1,h2,h4 (0x, 0y and 0a) are used for offset of X,Y and Z

System constant variables for stamping feature.

k12:DPX/DPY	**Nozzle and dispenser offset. Refer Teaching for calibration.** **The end of remark tells stamping repeat # for sticky paste.0=3**
k13:TILT0/TILT1/TILT0(v)/TILT0(V) 2nd	**Angle offset at 0deg/90deg/Vision 0deg/Vision 0deg 2nd head** **The end of remark specifies stamping height check. 1=Yes**
k14:M WT/PUWT/TILT1(v) /TILT1(v) 2nd	**Wait time after motor stops/wait time after component is sucked/Angle offset at 90deg (vision)/2nd head** **The end of remark is 1 then stamping feature is activated.**

When auto stamping height check enabled, nozzle stroke on stamping disc changes according to the amount of the paste on the pins and stroke is displayed on assemble window.

If it changes more than 15 it will be the time to fill or exchange paste. After several retries, if the paste amount does not reach to the green line then the warning window opens and machine stops.

Refill paste or exchange paste or check the causes and click on Y to restart.

3. Prevention of Emergency stop

EXP machine's motor tends to over loaded if the acceleration is too high specially from back to front travel so internally software protection is provided but the value were fixed.

Now the values are variable and can edit system constant 5th and 6th values of k16 thru k19. These values are active when travel distance is more than k19's value.

k16   5th   limits X max speed. Default(0) is 700. Can edit from 1 to 800.
**   6th   limits Y max speed. "" "" ""**

k17   5th   limits X low speed. Default(0) is 10. Can edit from 1 to 20.
**   6th   limits Y low speed. "" """ ""**

k18   5th   limits X slope. Default(0) is 150. Can edit from 150 to 4000.
**   6th   limits Y slope. "" "" ""**

k19   5th   specify minimum distance. default(0) is -30000 (-300mm)
6th   specify minimum distance. default(0) is -30000 (-300mm)

4. MOUSE control

In teaching mode, mouse can be used to measure component size, brightness check etc, and now two more features are added.

a) Angle measurement

When control window is displayed (double click on image window), left click on a desired origin and press shift key and move cursor then angle is displayed.

DO NOT CLICK LEFT BUTTON during pressing down SHIFT key it moves nozzle head .

b) Move nozzle head

Press shift key and align cursor on a desired point of the image and left click then the head moves and the desired point comes on cross line center.