F8 key :Teaching mode
In this mode, the pick up head moves to specified data coordinates.
On the screen, current status is shown as X=*** Y=*** A=*** U=*** I=*
where X, Y are coordinates, A is angle, U is stroke and I is increment step
for teaching and right end sign shows which coordinate is displayed,
EYE/CAM(era), NoZzLe or dispenser NeeDle.
Following keys are used for teaching.

Arrow keys	:	To move X and Y.
A, a key	:	To rotate Z(Theta) axis. "A" rotates shaft CCW looking from top and "a"(SHIFT+A if Caps Lock is activated.) rotates CW.
U, u key	:	Up and down head shaft. Even I>10, U/u increment stays at 10.
*, /, +, -	:	Change value of I(Teaching Increment).
7, 9, 5, 6	:	Moves head to eye sensor, nozzle and dispenser/CAM respectively.
Space, R	:	Space bar moves back head at U=0 position and R repeats remembered stroke. It can toggle.
V, 0	:	V turns on vacuum and 0 shut off vacuum. V can toggle.
ESC	:	Quit teaching. If the last stroke is not zero, system asks if you want to change stroke value.
N	:	Nozzle exchange. ***** press PageDwn ****
I key	:	To test feeder advancing hammer. At lower right of screen Feeder, index are asked so input as 4, 1. (#4 feeder and 1 index) To test stick feeder, use 10 as dummy index and adequate hammer operation is obtained.
S	:	Search center of EYE sensor mark. Position on the mark and press S, then eye sensor scans mark and position head to the center.
1, 2, 3, 4, C	:	To determin the center of 2/4 points, set eye to the first point and press 1 (beep) and then set to the second point (beep) and press C. The head moves to the center point. This feature is usefull to determine a center of lands. To determine QFP center 4 point method is usefull. Set X direction by 1 and 2 and set Y direction by 3 and 4 and press center.
T	:	With auto tray feeder, exchange tray.

********** CAUTION **********
When to check nozzle exchanger position, note current angle value. Since it may be changed during test and if you do not return it to original value, the nozzle exchange operation may be malfunction. So unless otherwise you want to modify it causing reassemble of head etc., do not change angle value.
END

Vibratory feeder numbered 121 → in placing data.

Press F1 for help files, press F1 again for contents.

5 = CAM 9 = NOZZLE

Part type data for Laser-Align system
The part type data is basically prepared for vision system but it is also used for laser align system.(2nd description appears without vision)

Nozzle # :Assign nozzle # for each part type.A nozzle # can be assigned to several part type.

Lead #(yl) :Laser align does not use this.

X,Y :For small chip,QFP and SOP these values are used to tell the size of component to Laser align system.
To pick up from tape feeder #1 thru 48 (or 96 for ECM98P) usually input longer length of a component in X and narrower in Y.
More details refer X12 Laser align system.

Thickness :Component thickness.Using this data placement Z stroke is adjusted.This value is very important for accurate measuring by Laser align system.Refer X12 Laser align system.

※ YL/t :Usually laser beam scans the portion of 1/2 of the thickness but some case requires offset of beam position so use W for offset of above thickness data.+W raises nozzle higher.

LV :0=Self alignment at pick up position for small chips .
1=Use of Laser Align centering system.

Remark :Start with CHI,~~TR~~,SOP,~~QFP~~.If the first 3 characters are CHI then unproper pick up such as tomb stone is checked by Laser beam and error 300 is returned. slower operation if Rem = SOP.
Value under TS specifies X/Y size tolerance.75=+/-25% OK

****** Part type data for vision or bottom LASER system ******

Lead #(yl) :Total lead numbers.(POS1 Y offset)

Btm/Rgt/Lft :# of leads on the bottom/right/left of the screen.

(y2/scn/ang):scan offset/acan pitch/angle offset

X/Y :Contour dimension of the component.Horizontal=X & vertical=Y.

Pt(XL/YL :Lead pitch of the component.(top lead to side lead)

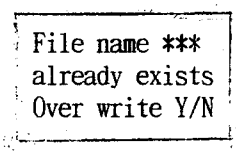
Thickness :Component thickness.Using this data placement Z stroke is adjusted.

LV :Refer X5 LV values for vision system.

Rem :Remark should start with 3 digit part abbreviation.
CHI=small chip TR =transister SOP=SOP QFP=QFP
VAC at the tail:Option Vac sensor for miniature chip

END

Quit and save
To terminate editing and save changed data and back to the top menu.
When this command is executed, current file name is displayed on input frame.
If you want overwite, just press Enter key or input new file name without extension ".SEQ". Drive and directory canbe changed by pressing ESC key and inputting new drive (plus :) and directory. Example A:, A:ATA
If you change mind and do not want to save input Q to quit operation.
If input file name already exists, the system warns.



If you input Y the the file is overwote and if you input N then
[Input another file name] is displayed. So input new name then
[Data Saving. Pls wait a while.] is blinks short period on the screen.

Upper case and lower case characters are not recognized.
*** PRESS PgDown for more info. ***

Note
You can save current data as BAK(BAcKup) file any time simply pressing F2 key while you are in edit mode. This case, however, the system does not ask over write or not but always over write on the BAK file.

About File name
A file name consists of alphabetic or numeric characters up to 8, period and extension up to three characters such as BAK. SEQ= BAK + . + SEQ.
You do not input the period and extention to save a file but system automatically attaches period and necessary extensions.
The extensions are;

- .SEQ Placement data on PCB
- .TAP Tape feeder data
- .TRY Tray feeder data
- .FDR Bulk feeder data
- .DAT Data for nozzle exchanger, positioner, part type and system constants.

You can use alphabetic and numeric characters up to 8 for file name but DO NOT insert SPACE, period between characters. TEST 1 is saved as TEST.
This case use underline _ instead of space as TEST_1.
END

Laser Align system
The machine installs CYBER OPTIC's LAHD unit which is class 1 laser beam measuring system. During placement travel, the nozzle spins and component sucked is also rotated in the laser beam. The LAHD returns data when the minimum width of the component is obtained and the component rotates further and when it rotates 90 deg after the first minimum was obtained the width and center data are returned again. So using both data offset of component is corrected.
LAHD can returns accurate data if the first minimum is obtained from narrower side of the component. The configuration of LAHD in ECM's is designed as when component picks up fron basic tape feeder, the narrower width can be checked first. If the narrower side can not set as the 1st minimum then set feeder angle as 90 or -90 degrees. This case placement angle is angle in PCB data + angle of feeder.
Usually the laser beam scans the middle portion of the component thickness but leaded component may need to shift scan position depends on the shape of leads. The U value in the part type can offset the position of laser beam.

---------- PgDn ----------

Setting of Laser Align system
1. Center position of the nozzle.
   Attache nozzle on the head and go in teach mode. Press shift+U to raise nozzle several times and press shift+H to measure nozzle position.
   If display width is approx nozzle dia then note the center value.
   The value is in millimeter so multiply 100 and input it in k45 first and second values. For example if it is 12.732 then k45 is 1273/1273.
2. Laser beam height
   The nozzle tip must be set above the laser beam. So go in teach mode and raise nozzle as item 1 above until the width becomes zero and note the U value and input in k6. The first value of k6 is for small chip nozzle and the 2nd value is for large nozzle.
3. Part type
   Set proper part type data for Lase Align. Refer F6 part type data.
4. Error code for laser align (displayed at low center of screen)
   64: No part 67:Can not find min width 300:Pick up error (tomb stone)
   200: Y dimension exceeds the TS limit.
   201: X dimension exceeds the TS limit.

END

To check laser scanning.

At DOS prompt type LA ↵

If successful, a curve is plotted, showing the nozzle at centre.

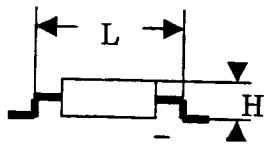
Raise head from laser path, then a smooth trace results.

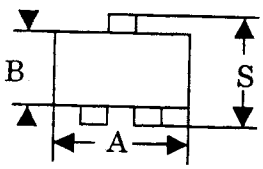
If any dips, then clean glass.

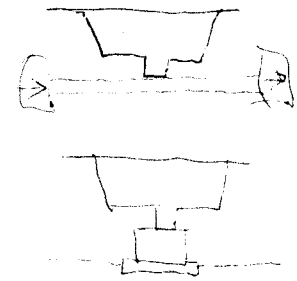
Laser alignment of Transistors

rev1

1. Preparation
   a) Transistor data registration
   Open part type data and select one line for a transistor. Check transistor(SOT) data from a data book or measure it by scale or using "I" command in teaching mode.
   You should get following data A,B,L,H and S (S is not used in part type data).







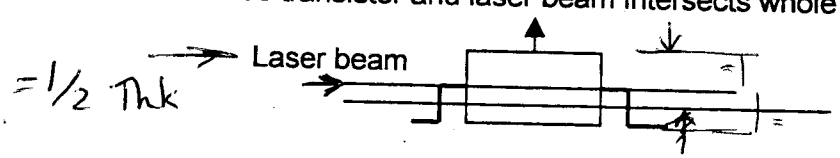
For example SOT23 has following data
A=2.9mm B=1.3mm L=1.8mm H=0.95mm and S=2.4mm

Usually transistor is supplied in tape reel and in the pocket of tape and legs are located at tape edge so in the most of tape feeder configuration of ECM machines A is Y direction and B and L (and S) are X direction of machine X/Y coordinates.
So part type data for SOT23 looks like;

P#Nzl	y1	y2	Scn	Ang	X	Y	XL	YL/t	Thk	Iv	Rem**********TS***+++
(P# Nzl	L#	Btm	Rgt	Lft	X	Y	Pt	W	Thk	Iv	Rem**********TS*+++)
* 2	0	0	0	0	1.8	2.9	.0	.0	1.0	1	CHIP TR 70

Note: The second label in the bracket is for vision installed machine.

YL/t (W) is height offset of Laser measurement and usually zero but some case the intersection of laser beam is just border of bent leg you may better to input 0.1 or 0.2 to raise transistor and laser beam intersects whole legs.



   b) Nozzle up position check
   In teach mode raise nozzle until it reaches the value set in system constant k6 and press Shift+H and Center=0 must be displayed.If OK press / (increment=1) and press U to down nozzle 0.05mm step and press Shift+H to see when Center=**** is displayed and note absolute U value (other word disregard minus sign). System constant k6 first value (for small nozzles) must be set +1 to +5 of this U value.

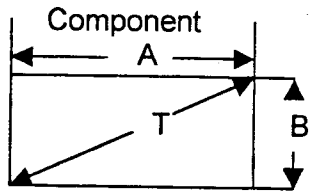
2. Assembly
   Make sure part type is specified correctly in PCB data and run. If error code displayed other than zero, (0=OK)
   64: No part or nozzle height is too high
   67: Can not find minimum width. Part has no corner or nozzle height is too low and measures nozzle it self (round, no sharp corner. **See appendix)**
   200: Y dimension is out of limit and shows actual measured value. If display shows 200 25 it is the same as error 67 and means the system can not find the minimum width. **(See appendix)**
   210: X dimension is out of limit and shows actual measured value.

Appendix

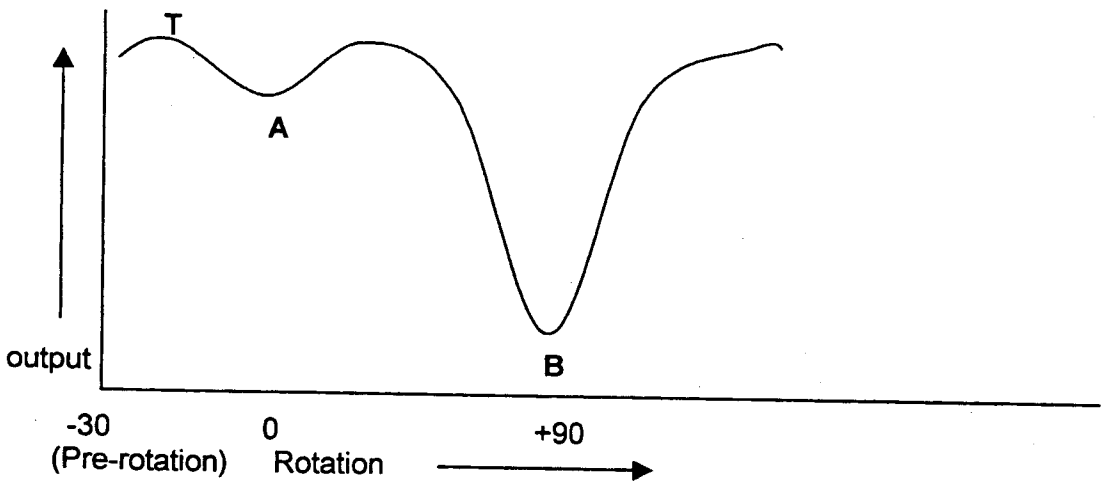
Error 67 or Error 200 25

In our system, component Y dimension in part type is measured first by Laser align system and after rotates 90 degrees X dimension is measured.

Y dimension measurement is done knowing the minimum width rotating component as shown below.



T is the maximum width of the component and A and B are rectangular width of the component. and when the component is rotated in the Laser beam, the out put looks like below chart.



The component is rotated –30 degrees as pre-rotation first and then rotated 120 degrees.

Pre rotation is an offset of random angle when the component is picked up so that the **first minimum** width can be obtained within 90 degrees rotation.

The dip at A is much smaller than the dip at B because T/A ratio is much smaller than T/B.

Specially, component corners are rounded the T becomes smaller or B is narrower then the dip at A becomes smaller and some time the dip can not be detected by Laser system and results Error 67 or Error 200 25. This case, simple solution is to exchange A and B, adding 90degrees on feeder data so that when the component is picked up, the orientation changes 90 degrees at 0 angle. Also swap X and Y data in part type so the above example becomes as follows.

P#	Nzl	y1	y2	Scn	Ang	X	Y	XL	YL/t	Thk	Iv	Rem**********	TS***+++
*	2	0	0	0	0	**2.9**	**1.8**	.0	.0	1.0	1	CHIP	TR 70

And add 90 degree on tape feeder data as;

Type	#	X	Y	A	Strk	Rem**********
tape	23	285.25	2.58	**90.00**	300	SOT23

Adding 90 degrees on tape feeder data does not affect on placement angle of PCB data.

8mmテープ　取付方法