

CS 400E ***COMPONENT LOCATOR***

PROGRAMMING MANUAL REV. I
Supports Software Version 3.4.2 (9/3/97)

The CS-400E Component Locator is a programmable P.C. board assembly machine.

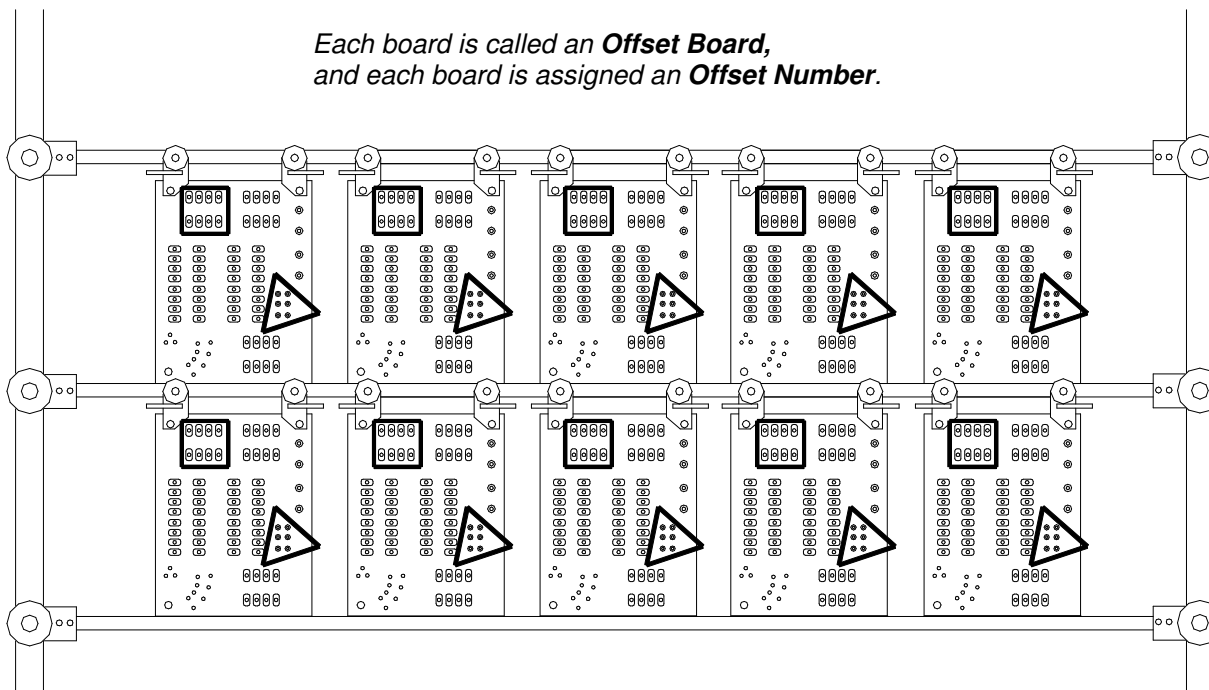


It was designed to perform three basic functions:

1. Direct the operator to the component locations.
2. Prompt the Part Delivery Devices to present components to the operator.
3. Cut and Clinch component leads to the programmed specifications.

GUIDELINES: Keep foreign objects away from the machine during operation; power down before attempting to dislodge any object; keep your hands clear of the Work Fixture before pressing the Footswitch. Perform general PC maintenance as required - data backup, scandisk, defragmenter and anti-virus routines.

The machine can run ten identical boards at once without additional programming.



Each board is called an **Offset Board**, and each board is assigned an **Offset Number**.

The entire Part Group is inserted into **every** Offset Board, **before** advancing to the next Part Group.

```

CS-400E PROGRAM MODE
Current Program: C:\N400ENPCB1201.dn1
Seq 4 D=6 Q=21 X=0.000 Y=0.000 DX=0.000 DY=0.000 Ref
Seq 5 D=6 Q=23 X=0.000 Y=0.000 DX=0.000 DY=0.000 Ref
Seq 6 D=1 Q=0 X=5.000 Y=5.000 DX=5.000 DY=5.000 Ref
Seq 7 D=4 Q=15 X=2.000 Y=0.000 DX=0.000 DY=0.000 Ref 103EEa2
>Seq 8 D=0 Q=0 X=2.105 Y=2.703 DX=0.000 DY=-0.500 Ref R1

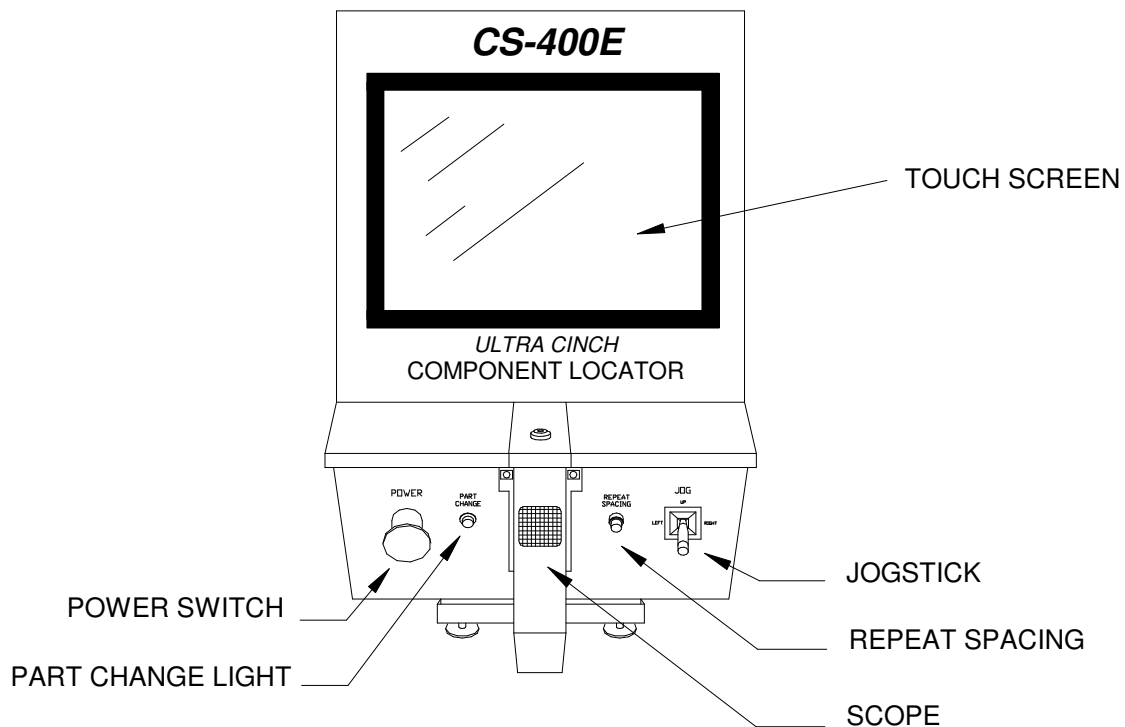
Component Insertion: Inward Clinch

Dialog

ESC HELP
F1 F1
  
```

Programs are written as a series of **Sequence Lines**, which are saved to an executable file.

Commands and variables are stored as machine codes: **D & Q; X,Y,DX,Dy & Ref.**



To power up, twist the POWER SWITCH clockwise.

To power down, depress the POWER SWITCH until it locks down.

CONTENTS

WRITING PROGRAMS

Programming Logic	2
Typical Program Structure	3
Sample Program	4
Programming Commands	5
Program Screen	8
New Program	9
Load a Program	10
Save a Program	11
Component Name (<i>circuit ref., component insertion</i>)	12
Messages	13
Delivery Devices	14
Polarity	18
Cut/Clinch	19
Images	25
Insert a Sequence Line	34
Delete a Sequence Line	36
No Operation	37
End of Program	38

MACHINE CODES & PROGRAM VARIABLES

Machine Codes	39
Program Variables	44

SETTING OFFSETS & SKEW POINTS

Offsets	45
Skew	49
Setting Points in Auto Mode	54

DIGITIZING COMPONENT LOCATIONS

Digitizing	58
Polarized Components	60
Multi-leaded Components	62
Odd Number of Leads	63
Manually Entering Coordinates	64
Repeat Spacing Button	65
Edit Mode	66

CONFIGURE SYSTEM

71

INDEX

81

WRITING PROGRAMS

PROGRAMMER

Create Program



Set Offsets



Correct Skew



Digitize

Configure System

Save Program

Save your program frequently.

OPERATOR

Set Offsets



Correct Skew



Run Program

The Offsets and Skew Points must be set every time a board is fixtured on the table.

The Programmer and Operator must use the same points.

PROGRAMMING LOGIC

- Before beginning, compile a list of the components to be inserted. Include component values, part numbers, polarity, bin locations, circuit references, number of leads and cut clinch parameters.
- Separate the list into Part Groups.
- Separate look-alike parts. For example, do not list the 22 ohm resistors next to the 220 ohm resistors.
- Arrange the Part Groups by size. When possible, insert the smallest components first.
- The components are inserted in the same order which they are programmed. Keep table movements to a minimum.
- The 400E is a sequential machine. It executes programs top to bottom (Sequence 0 to End of Program). Part Groups generally begin with a Delivery Device command and end with the next Part Group's Delivery Device command. Adopt a modular style of programming. Each Part Group should contain all the information pertinent to that group. Do not rely on commands external to the group. Example: Even though it may seem redundant, reset the polarity for each Part Group separately.
- Current run time functions which *demand* modular programming :
 1. ALT "S" random sequence access
 2. Bin Shortages
 3. JIT Part Profiling
 4. Resume
 5. Backup

TYPICAL PROGRAM STRUCTURE

COMMAND	KEY STROKES
ACTIVE MESSAGE - <i>PROGRAM OR BOARD NAME</i>	"M"; "A"; "message"
RESET PART DELIVERY DEVICE	F2 or F3 or F4 or F5; "reset number (0)"

BODY OF PROGRAM

----- →	PART DELIVERY DEVICE	F2 or F3 or F4 or F5; "bin number"
	POLARITY	F6 or F7 or F8
	PASSIVE MESSAGE - <i>COMPONENT NAME</i>	"M"; "P"; "message"
	PART NUMBER	"P"; "part number"
REPEAT FOR EACH PART GROUP	CUT/CLINCH PARAMETERS	"W"; (see CUT/CLINCH page)
	COMPONENT IMAGE	ALT "I"; (see IMAGE page)

COMPONENT INSERTION

----- REPEAT FOR EACH PART	COMPONENT NAME.	"C" or "A" (multiple); "circuit reference"
----- -----	CLINCH DIRECTION	(t); "K"; (l)n, (O)ut, (E)nable, (D)isable

RESET PART DELIVERY DEVICE	F2 or F3 or F4 or F5; "reset number (0)"
END OF PROGRAM	"E"

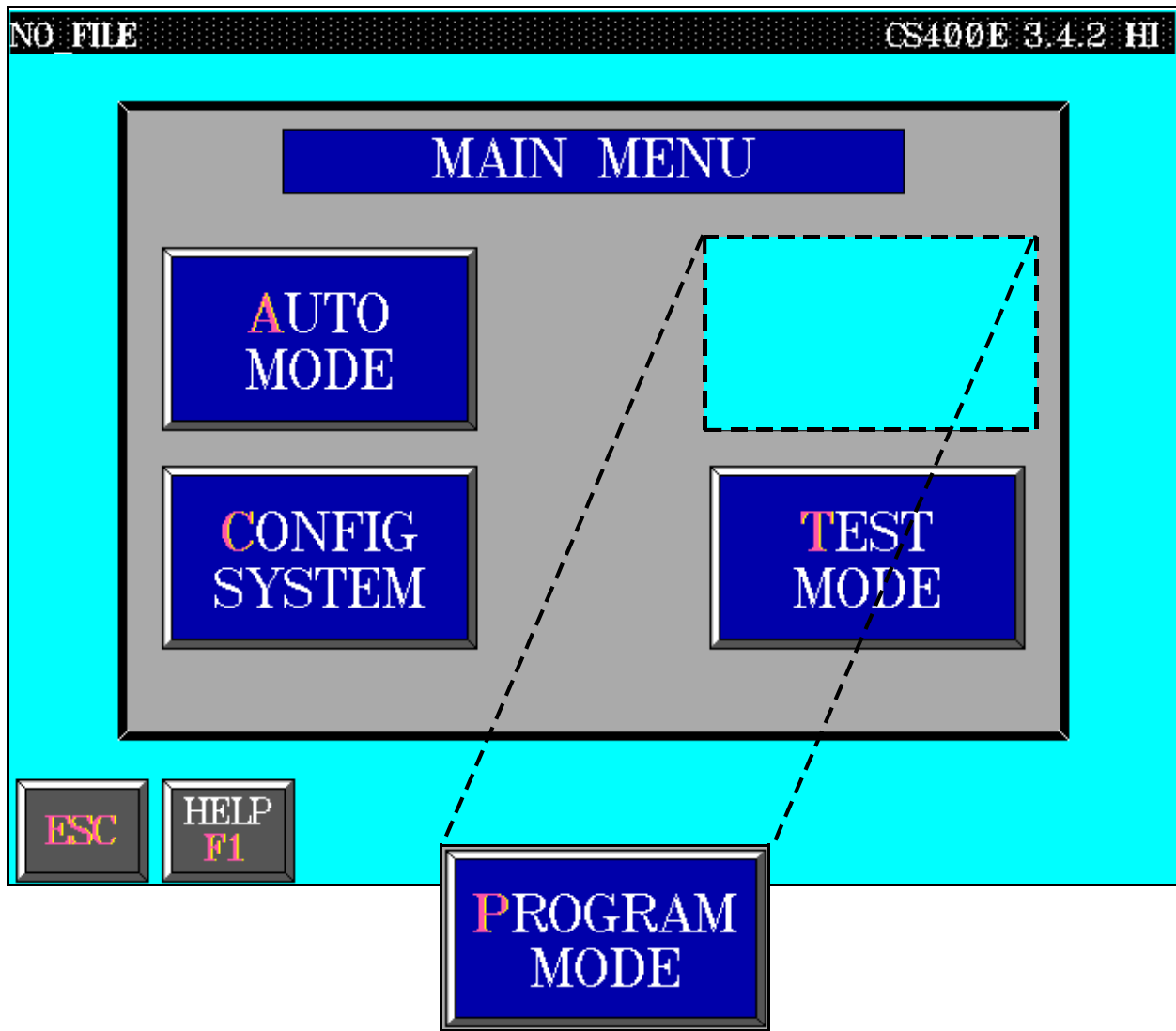
SAVE PROGRAM

SAMPLE PROGRAM

Seq.	Instruction List	Part Number	Bin
__0	"M" ACTIVE MESSAGE "A" ("SAMPLE PROGRAM")		
__1	F2 ROTARY BIN (RESET "0")		0
→ __2	F2 ROTARY BIN (SET BIN "1")		1
__3	F7 NO POLARITY		
__4	"M" PASSIVE MESSAGE "P" ("RESISTOR 10K")		
__5	"P" PART NUMBER	12345-ABC-678910	
__6	"W" CUT/CLINCH PARAMETERS (SEE <i>CUT/CLINCH PAGE</i>)		
__7	ALT "I" COMPONENT IMAGE (SEE <i>IMAGE PAGE</i>)		
__8	"C" COMPONENT NAME (CIRCUIT REFERENCE "R1"; INWARD CLINCH)		
__9	"C" COMPONENT NAME (CIRCUIT REFERENCE "R2"; INWARD CLINCH)		
__10	"C" COMPONENT NAME (CIRCUIT REFERENCE "R3"; OUTWARD CLINCH)		
→ __11	F2 ROTARY BIN (SET BIN "2")		2
__12	F6 POLARITY		
__13	"M" PASSIVE MESSAGE "P" ("DIODE")		
__14	"P" PART NUMBER	123XYZ	
__15	"W" CUT/CLINCH PARAMETERS (SEE <i>CUT/CLINCH PAGE</i>)		
__16	ALT "I" COMPONENT IMAGE (SEE <i>IMAGE PAGE</i>)		
__17	"C" COMPONENT NAME (CIRCUIT REFERENCE "D1"; INWARD CLINCH)		
__18	"C" COMPONENT NAME (CIRCUIT REFERENCE "D2"; INWARD CLINCH)		
__19	F2 ROTARY BIN (SET BIN "3")		3
→ __20	"M" PASSIVE MESSAGE "P" ("IC")		
__21	"P" PART NUMBER	000000	
__22	"W" CUT/CLINCH PARAMETERS (SEE <i>CUT/CLINCH PAGE</i>)		
__23	ALT "I" COMPONENT IMAGE (SEE <i>IMAGE PAGE</i>)		
__24	"C" COMPONENT NAME (CIRCUIT REFERENCE "U1"; OUTWARD CLINCH)		
__25	"C" COMPONENT NAME (CIRCUIT REFERENCE "U2"; OUTWARD CLINCH)		
__26	F2 ROTARY BIN (SET BIN "4")		4
→ __27	"M" PASSIVE MESSAGE "P" ("TRANSISTOR")		
__28	"P" PART NUMBER	999999	
__29	"W" CUT/CLINCH PARAMETERS (SEE <i>CUT/CLINCH PAGE</i>)		
__30	ALT "I" COMPONENT IMAGE (SEE <i>IMAGE PAGE</i>)		
__31	"A" (F)IRST, MULTIPLE; OUTWARD CLINCH (CIRCUIT REFERENCE "Q1")		
__32	"A" (A)UTO, MULTIPLE; OUTWARD CLINCH (CIRCUIT REFERENCE "Q1")		
__33	F2 ROTARY BIN (RESET "0")		0
→ __34	"E" END OF PROGRAM		

PROGRAMMING COMMANDS

KEY	COMMAND	DESCRIPTION	page
"A"	MULTIPLE CUT/CLINCH	MORE THAN TWO LEADS	22
"C"	COMPONENT NAME	INSERTION/CIRCUIT REFERENCE	12
"E"	END OF PROGRAM	FINAL PROGRAM LINE	38
"F"	NEW PROGRAM	CREATE NEW PROGRAM	9
"I"	INSERT SEQUENCE	INSERT SEQUENCE	34
"K"	CLINCH	IN/OUT/ENABLE/DISABLE	20
"M"	MESSAGE	ACTIVE/ PASSIVE/OFF	13
"N"	NO OPERATION	BLANK SEQUENCE LINE	37
"P"	PART NUMBER	PART NUMBER	4
"S"	SEQUENCE NUMBER	MOVE TO SEQUENCE LINE	8
"W"	CUT/CLINCH PARAMETERS	LEAD LENGTH/CLINCH ANGLE	21
ALT "D"	DELETE SEQUENCE	DELETE SEQUENCE	36
ALT "I"	IMAGE	GRAPHICAL COMPONENT IMAGE	25
ALT "O"	BOARD OFFSETS	SET OFFSET POINT	45
ALT "S"	BOARD SKEW	SET SKEW POINTS	49
CTRL "D"	DIGITIZE	DIGITIZE	58
CTRL "H"	OFFLINE PROGRAMMING	<i>CONSULT YOUR OFFLINE PACKAGE</i>	
CTRL "T"	FILE CHOOSER	LOAD/SAVE PROGRAMS	10
F2	ROTARY BIN	DESIGNATE BIN TO PICK FROM	14
F3	CS-740 JIT	DESIGNATE BIN TO PICK FROM	14
F4	LOGPOINT BIN	DESIGNATE BIN TO PICK FROM	14
F5	CS-241 DIP	DESIGNATE TUBE TO PICK FROM	14
F6	POLARITY	BLINK OVER FIXED CUTTER	18
F7	NO POLARITY	TWO CONTINUOUS BEAMS	18
F8	BOTH BLINK	BLINK OVER BOTH CUTTERS	18



Touch the button on the screen, or from the keyboard press "P".

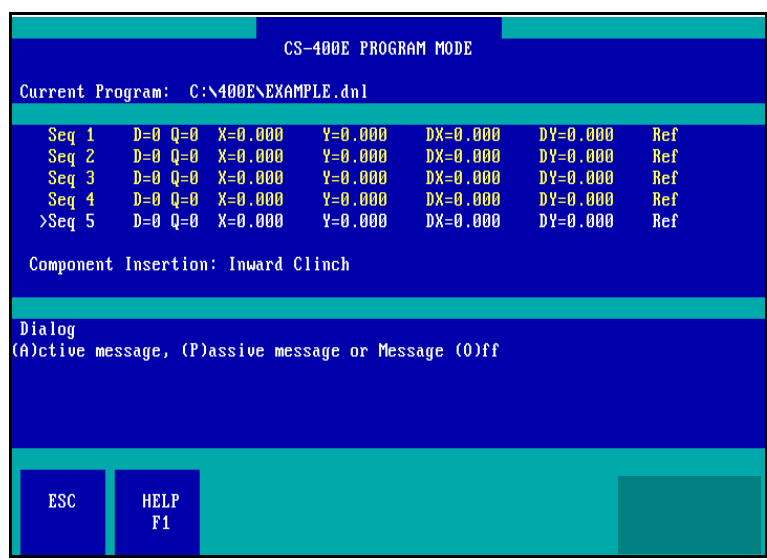
F1 for a list of current programming options.

PROGRAM NAME _____

CURRENT SEQUENCE _____
HIGHLIGHTED IN WHITE

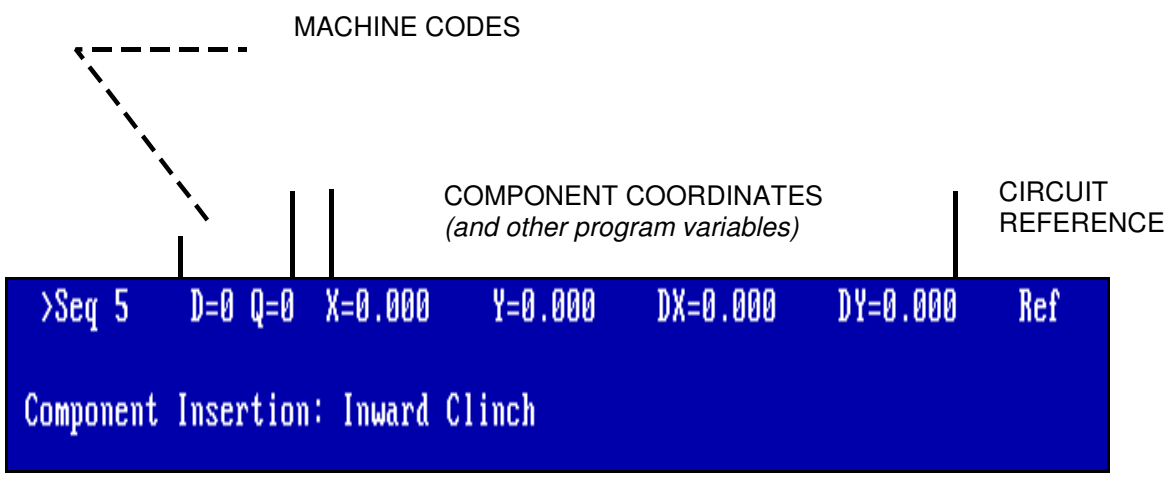
COMMAND/OPTIONS _____

EXIT SCREEN _____



MOVING AROUND THE PROGRAM:

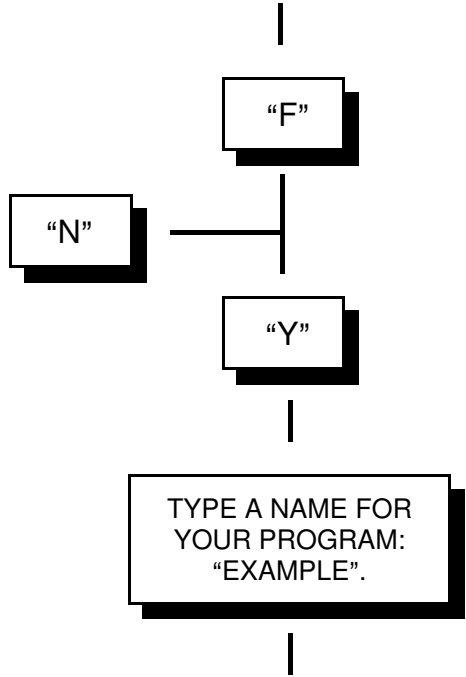
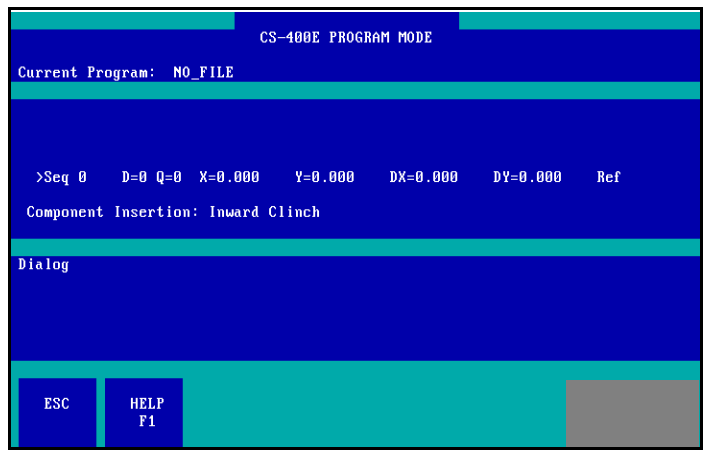
(↑)(↓) or +/- up or down one sequence line
PgUp/Dn up or down five sequence lines
Home/End beginning or end of program
"S" directly to sequence line



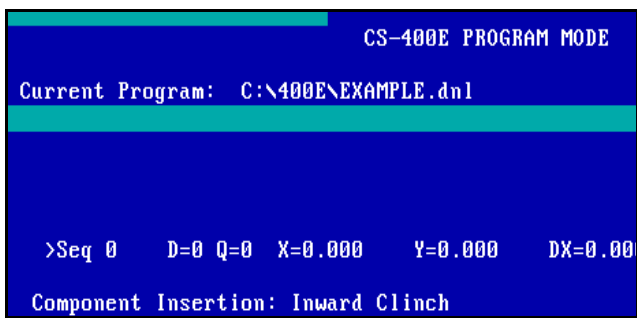
COMMAND DESCRIPTION

Defaults to "**Component Insertion: Inward Clinch**" because D=0 & Q=0 are the machine codes for that command.

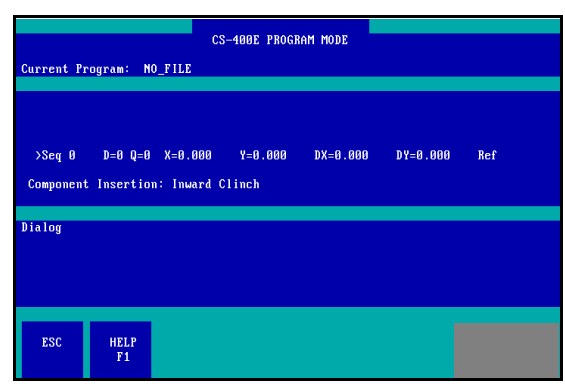
NEW PROGRAM "F"



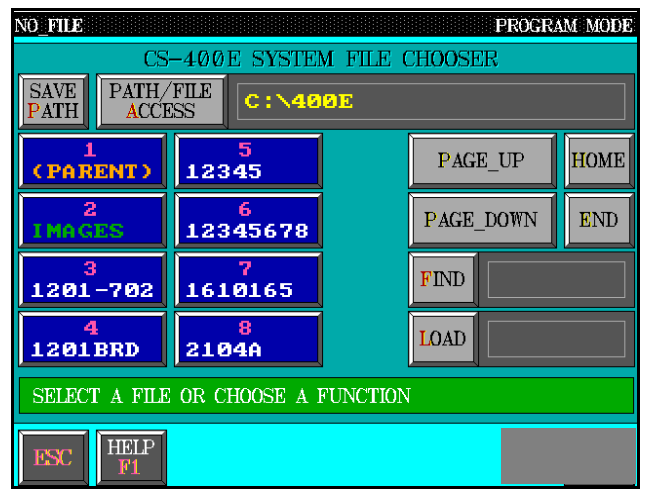
New File name →



LOAD A PROGRAM CTRL "T"



CTRL "T"



**"F"
FIND**

or

USE PAGE-UP, PAGE-DOWN, HOME & END TO MOVE THROUGH THE FILES.

TYPE PROGRAM NAME: "EXAMPLE".

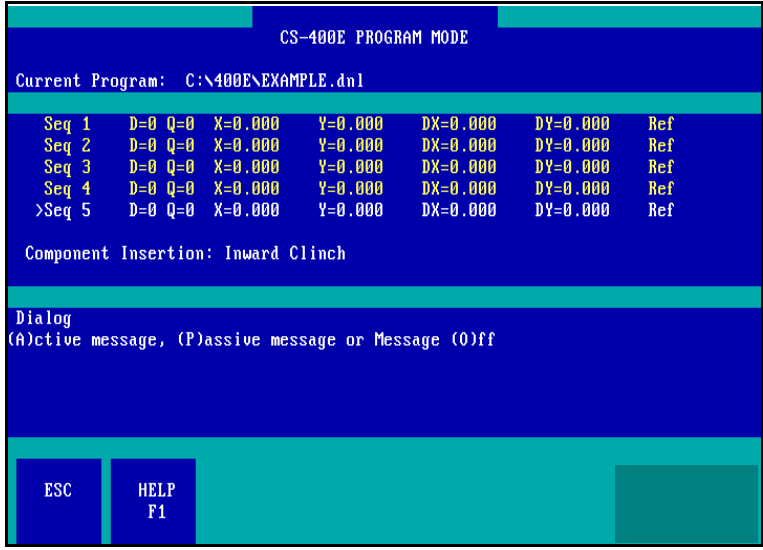
SELECT YOUR PROGRAM BY TOUCHING THE BUTTON ON THE SCREEN OR BY PRESSING THE APPROPRIATE NUMBER (1-8) ON YOUR KEYBOARD.

ENTER

**"L"
LOAD**



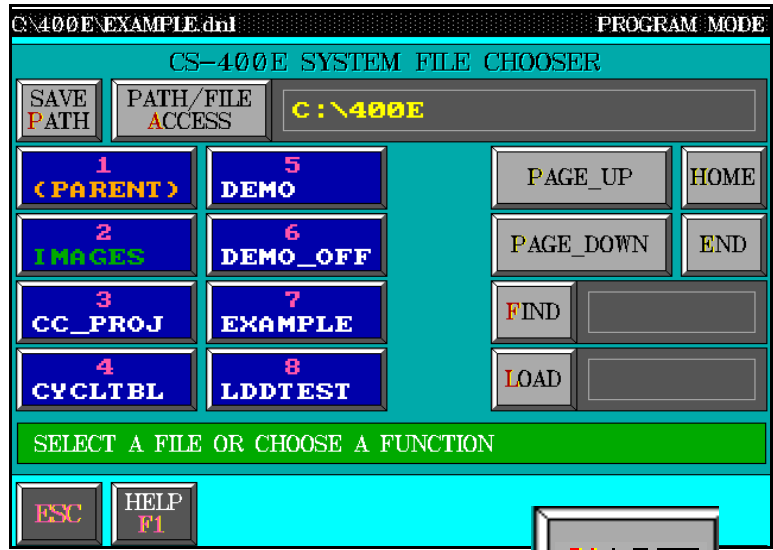
SAVE PROGRAM CTRL "T"



CTRL "T"

NAME OF FILE TO SAVE →

SAVE YOUR PROGRAM AFTER EVERY CHANGE!!



SAVE

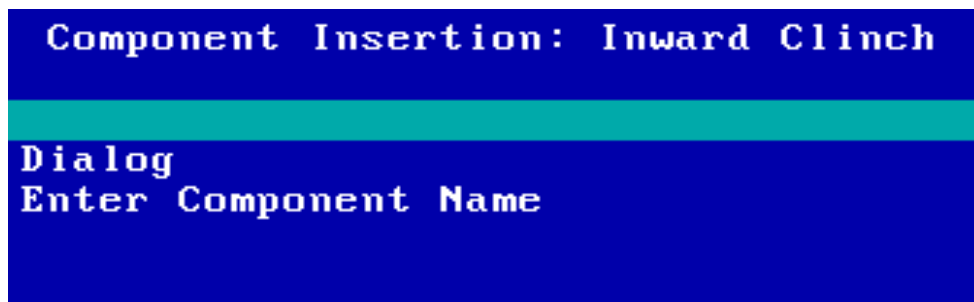


"Enter" - twice

OVERWRITE EXISTING FILE? <Y>ES OR <N>O...

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COMPONENT NAME "C"



Component Name *is the component's circuit reference. For example:*

R1, R2, R3... D5, D6... Q12, Q13...

This sequence line also indicates the component's clinch direction.

Typical program lines might look like this:

CIRCUIT REFERENCE	SEQUENCE NUMBER	D	Q	X	Y	dX	dY	INSTRUCTION
R4	15	0	00	2.305	2.900	0.500	0.000	Normal Inward
R3	16	0	90	2.280	2.800	0.430	-0.255	Normal Outward
R1	17	0	00	2.105	2.700	0.000	-0.500	Normal Inward
R2	18	0	01	2.205	2.720	0.260	-0.425	Normal In- Last Pt



COMPONENT NAME

CLINCH DIRECTION



To change the clinch direction, see CLINCH DIRECTION "K".

MESSAGE "M"

```
>Seq 0      D=0 Q=0      X=0.000      Y=0.000      DX=0.000  
Component Insertion: Inward Clinch  
Dialog  
(A)ctive message, (P)assive message or Message (O)ff
```

"A"

Active messages **STOP** the program run. The operator must press the footswitch to resume the run.

"P"

Passive messages are displayed to the operator but **do not** inhibit the program run.

"O"

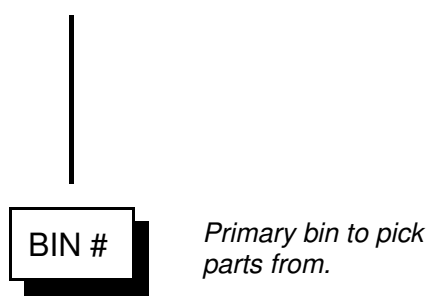
Cancel the most recent message displayed during a program run.

Type your "message"; then press "Enter".

Messages may be up to 80 characters long.

DELIVERY DEVICES

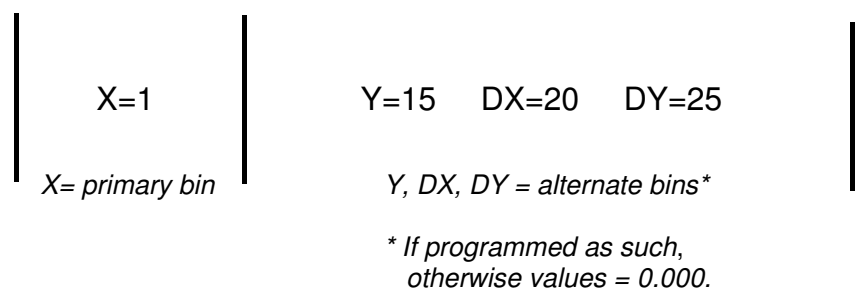
KEY	DEVICE
F2	ROTARY BIN
F3	CS-740 JIT
F4	LOGPOINT BIN
F5	CS-241 DIP



EXAMPLE SEQUENCE:

```

Seq 4  D=2 Q=3  X=0.000  Y=0.000  DX=0.000  DY=0.000  Ref
>Seq 5  D=2 Q=3  X=1.000  Y=15.000  DX=20.000  DY=25.000  Ref
    
```



ALTERNATE BINS

MOVE TO THE DELIVERY DEVICE SEQUENCE LINE

variable	designation	keys	input
X	PRIMARY BIN	F2 or F3 or F4 or F5	"n" bin number
Y	FIRST ALTERNATE	Y	"n" bin number
DX	SECOND ALTERNATE	CTRL X	"n" bin number
DY	THIRD ALTERNATE	CTRL Y	"n" bin number

```
>Seq 5   D=2 Q=3   X=1.000   Y=0.000   DX=0.000   DY=0.000
Rotary Bin Move
Dialog
Enter Y coordinates in Inches :15
```

*The dialog will prompt you to enter a coordinate in Inches. Ignore this. Simply enter the alternate **Bin Number** from which you wish to pick parts.*

Example: X/ PRIMARY BIN = 1
 Y/ FIRST ALTERNATE = 15
 DX/ SECOND ALTERNATE = 20
 DY/ THIRD ALTERNATE = 25

```
>Seq 5   D=2 Q=3   X=1.000   Y=15.000   DX=20.000   DY=25.000   Ref
```

To call up an alternate bin during a program run, the operator must put the empty bin on the Shortage List (see the operators manual).

JIT PART PROFILING

(used only with CS-740)

PROGRAMMING TIP

- ▶ When two machines require the same JIT bin at the same time (and there are no alternate bins programmed or available) the second machine must wait until the first machine is finished with the bin.
- ▶ PROFILING forces the waiting machine to skip the disputed bin.
- ▶ That bin is placed on the Profile List.
- ▶ At the end of each subsequent part group, the machine will attempt to retrieve the profiled bin.
- ▶ If the machine reaches the End of Program before the Profile List is resolved, it will wait until all profile bins become available before ending the program.
- ▶ The machine is capable of profiling six bins at one time.
- ▶ This feature must be activated in **Configure System**:

L JIT PART PROFILING

The programmer may force the machine to resolve the Profile List at any selected Part Group. See the next page, **RESOLVING THE PROFILE LIST**.

RESOLVING THE PROFILE LIST

INSERT A SEQUENCE LINE AT THE END OF THE PART GROUP

CIRCUIT REFERENCE	SEQUENCE NUMBER	D	Q	X	Y	dX	dY	INSTRUCTION
R4	15	0	00	2.305	2.900	0.500	0.000	Normal Inward
R3	16	0	90	2.280	2.800	0.430	-0.255	Normal Outward
R1	17	0	00	2.105	2.700	0.000	-0.500	Normal Inward
R2	18	0	01	2.205	2.720	0.260	-0.425	Normal In- Last Pt
	19	0	00	0.000	0.000	0.000	0.000	



F3

```

Dialog
Programming JIT #1
Generate a (P)rofile code or enter a bin number :
    
```

P

The machine will wait until the Profile List is resolved before continuing past this Part Group. You may profile six bins at one time.

L JIT PART PROFILING

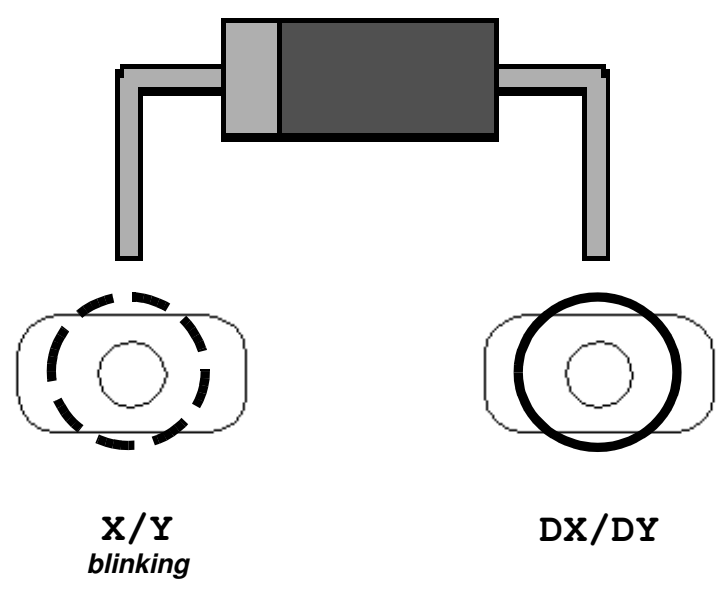
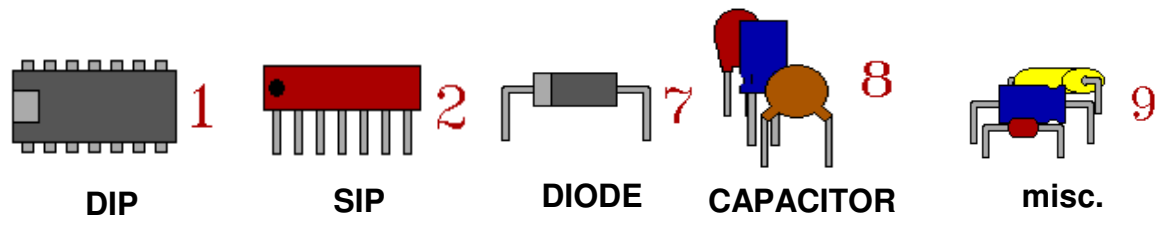
THIS FEATURE MUST BE ACTIVATED IN CONFIGURE SYSTEM.

POLARITY

F6	POLARITY	BLINK OVER FIXED CUTTER
F7	NO POLARITY	TWO CONTINUOUS BEAMS
F8	BOTH BLINK	BLINK OVER BOTH CUTTERS

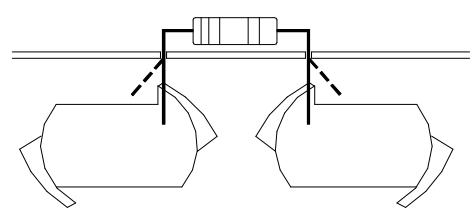
F6 - Projector light will blink over the fixed cutter, which is the X/Y point, the first point digitized.

Be consistent. Inform the operator of your methods. We recommend that you digitize the X/Y point as the hole where the marked side of the component is to be inserted.

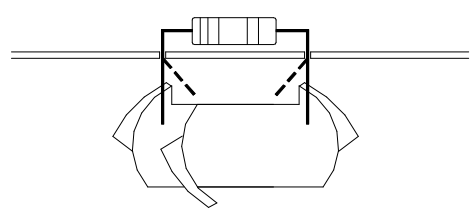


Remains in effect until a new polarity command is reached in the program.

OUTWARD CLINCH



INWARD CLINCH



LEAD LENGTH = 1 - 10 ONE (1) = SHORTEST TEN (10) = LONGEST

CLINCH ANGLE = 1 - 10 ONE (1) = LEAST CLINCH TEN (10) = MOST CLINCH

CUT/CLINCH PARAMETERS ARE DETERMINED BY BOARD DENSITY, LEAD MATERIAL, LEAD HOLE DIAMETERS AND THE LOCATION OF TRACES ON YOUR BOARD.

RULES OF THUMB: (1) INCREASE THE SETTINGS FOR THICK LEADS.
 (2) DECREASE THE LENGTH FOR POPULATED BOARDS.

BOTH LEAD LENGTH AND CLINCH ANGLE DEFAULT TO (5).

TYPE OF OUTER CUTTER*	SETTING	LEAD LENGTH (approx.)
Minimum Bend P/N 400-1036	1	.020"
Minimum Bend	2	.026"
Standard P/N 400-1206	3	.032"
Standard	4	.038"
Standard/Heavy Duty P/N 400-1170	5	.044"
Standard/Heavy Duty	6	.050"
Standard/Heavy Duty	7	.056"
Standard/Heavy Duty	8	.062"
Standard/Heavy Duty	9	.068"
Standard/Heavy Duty	10	.074"

- *There is only one type of inner cutter; you may choose between three types of outer cutters. Machines are shipped with Standard outer cutters.*

CLINCH DIRECTION "K"

THIS COMMAND DOES **NOT** GET ITS OWN SEQUENCE LINE.

MOVE TO THE APPROPRIATE INSERTION LINE:
Component Insertion: "?????" Clinch

```

CS-400E PROGRAM MODE
Current Program: C:\400E\PCB1201.dnl
Seq 4  D=6 Q=21 X=0.000  Y=0.000  DX=0.000  DY=0.000  Ref
Seq 5  D=6 Q=23 X=0.000  Y=0.000  DX=0.000  DY=0.000  Ref
Seq 6  D=1 Q=0  X=5.000  Y=5.000  DX=5.000  DY=5.000  Ref
Seq 7  D=4 Q=15 X=2.000  Y=0.000  DX=0.000  DY=0.000  Ref 103EEA2
>Seq 8  D=0 Q=0  X=2.105  Y=2.703  DX=0.000  DY=-0.500  Ref R1

Component Insertion: Inward Clinch

Dialog

ESC  HELP
      F1
    
```

"K"

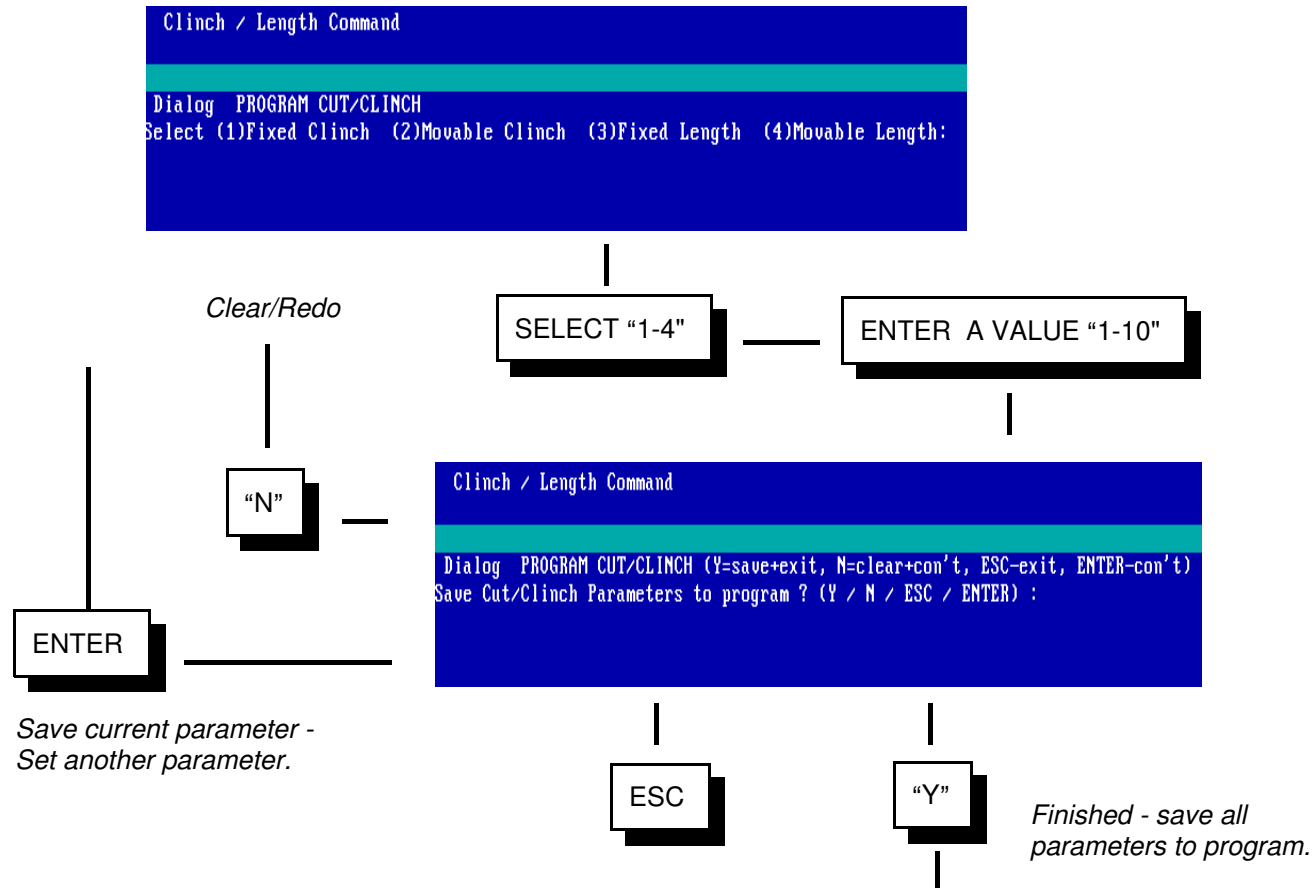
```

Component Insertion: Inward Clinch

Dialog
Cut Clinch (I)n, (O)ut, (E)nable (D)isable :
    
```

If you (D)isable this command, Cut/Clinch will remained disabled until an (E)nable line is reached in the program.

CUT/CLINCH PARAMETERS "W"



Seq 5	D=6	Q=23	X=0.000	Y=0.000	DX=0.000	DY=0.000	Ref
Seq 6	D=1	Q=0	X=5.000	Y=5.000	DX=5.000	DY=5.000	Ref
Seq 7	D=4	Q=15	X=2.000	Y=0.000	DX=0.000	DY=0.000	Ref

EXAMPLE: Seq. 6

D=1 & Q=0 are the machine codes for Length/Clinch Angle

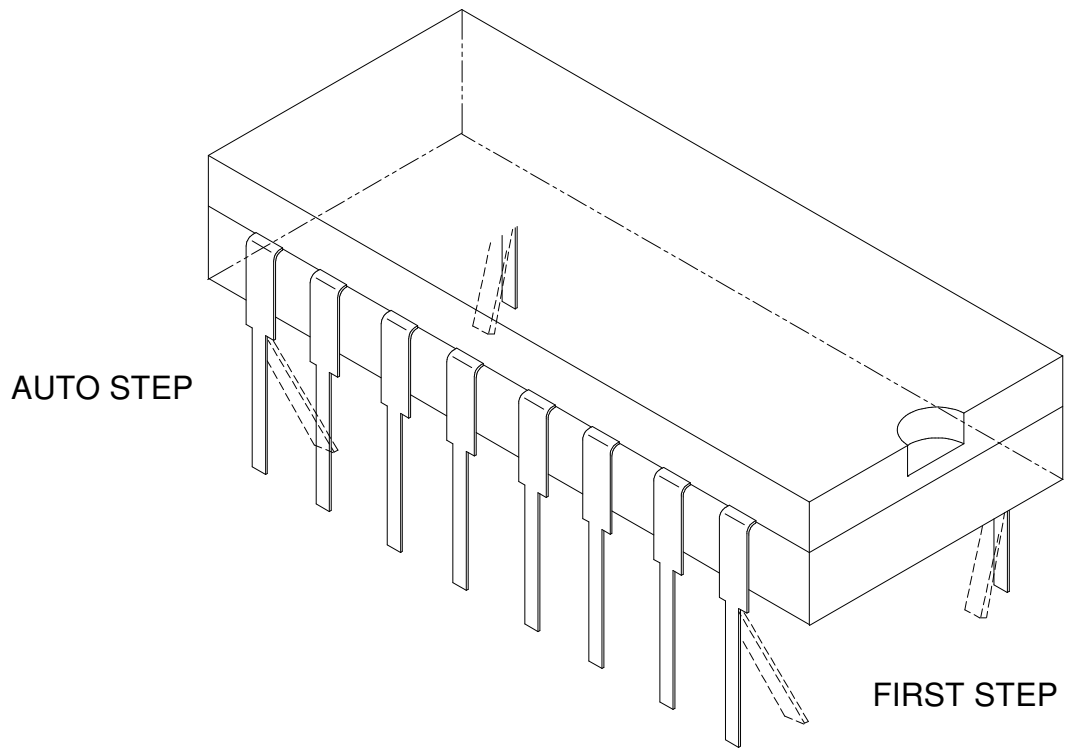
X = FIXED CLINCH; DX = FIXED LENGTH

Y = MOVABLE CLINCH; DY = MOVABLE LENGTH

Cut/Clinch Parameters default to (5)

Remain in effect until a new Cut/Clinch command is reached in the program.

MULTIPLE CUT/CLINCH



Cut/Clinches multi-leaded components without waiting for the operator to press the footswitch before moving from one set of leads to the next.

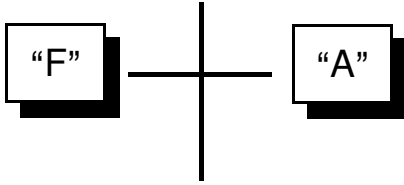
(F)IRST STEP	(A)UTOMATIC STEP (1)	(A)UTOMATIC STEP (2)	(A)UTO...3...4...5...
(I)NWARD or (O)UTWARD CLINCH	(I)NWARD or (O)UTWARD CLINCH	(I)NWARD or (O)UTWARD CLINCH	...repeat... as many AUTO steps as necessary
COMPONENT NAME (CIRCUIT REFERENCE)	COMPONENT NAME (CIRCUIT REFERENCE)*	COMPONENT NAME (CIRCUIT REFERENCE)*	

* *The Circuit Reference should be the same for each step.*

MULTIPLE CUT/CLINCH "A"

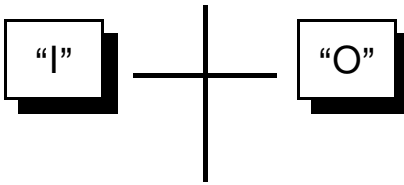
```
>Seq 3   D=0 Q=0 X=0.000 Y=0.000
Component Insertion: Inward Clinch
Dialog
(F)irst (A)utomatic or (S)ingle :
```

(S)ingle is seldom used. It's result is identical to that of the insertion command, Component Name "C".



```
>Seq 3   D=0 Q=0 X=0.000 Y=0.000
Component Insertion: Inward Clinch
Dialog
(F)irst (A)utomatic or (S)ingle :F
(I)ward or (O)utward clinch :
```

Select clinch direction.



```
>Seq 3   D=0 Q=0 X=0.000 Y=0.000
Component Insertion: Inward Clinch
Dialog
(F)irst (A)utomatic or (S)ingle :F
(I)ward or (O)utward clinch :I
Enter Component Name
```

The Component Name should be the same for each step.

Repeat for each Automatic Step. You may cut/clinch as many lead pairs as you wish.

COMPONENT IMAGES

- This feature displays to the operator an image which closely represents the component which is being inserted into the board.
- Each image occupies one sequence line.
- Newly programmed images erase any previously generated images.
- Use the “NO IMAGE” selection only when there is no reasonable selection which depicts your part.
- Feedback messages (*9 pin sip, 10 Kohm 5%*) are displayed only to the programmer. To display information to the operator at run time, program an active or passive message.
- Black (0) is unavailable for display of POLY and TUBULAR axial caps.
- An odd number of legs for DIPS and DIP SOCKETS will not be accepted.

ALLOWABLE RANGES

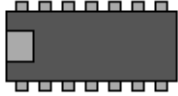
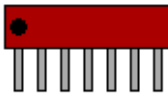





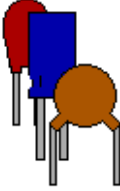

DIPS	0.3" WIDTH	4 - 28	PINS
	0.4" WIDTH	10 - 38	PINS
	0.6" WIDTH	20 - 40	PINS

SOCKETS *(same)*

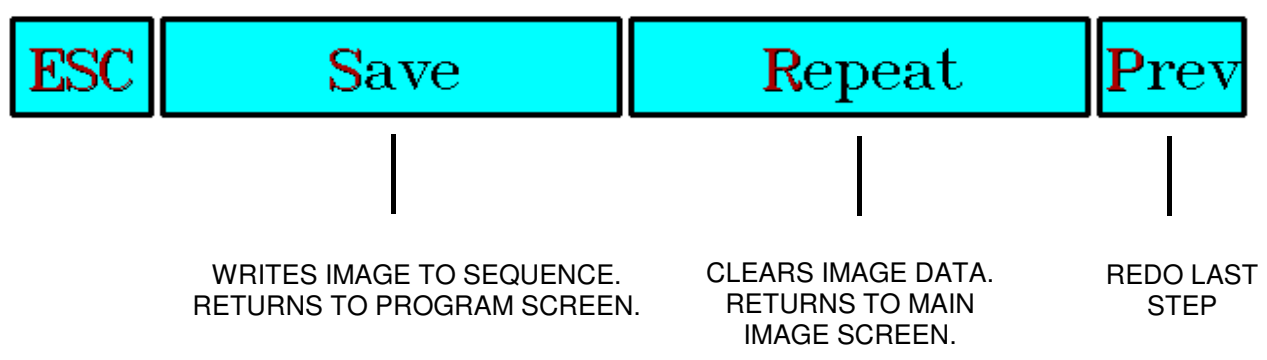
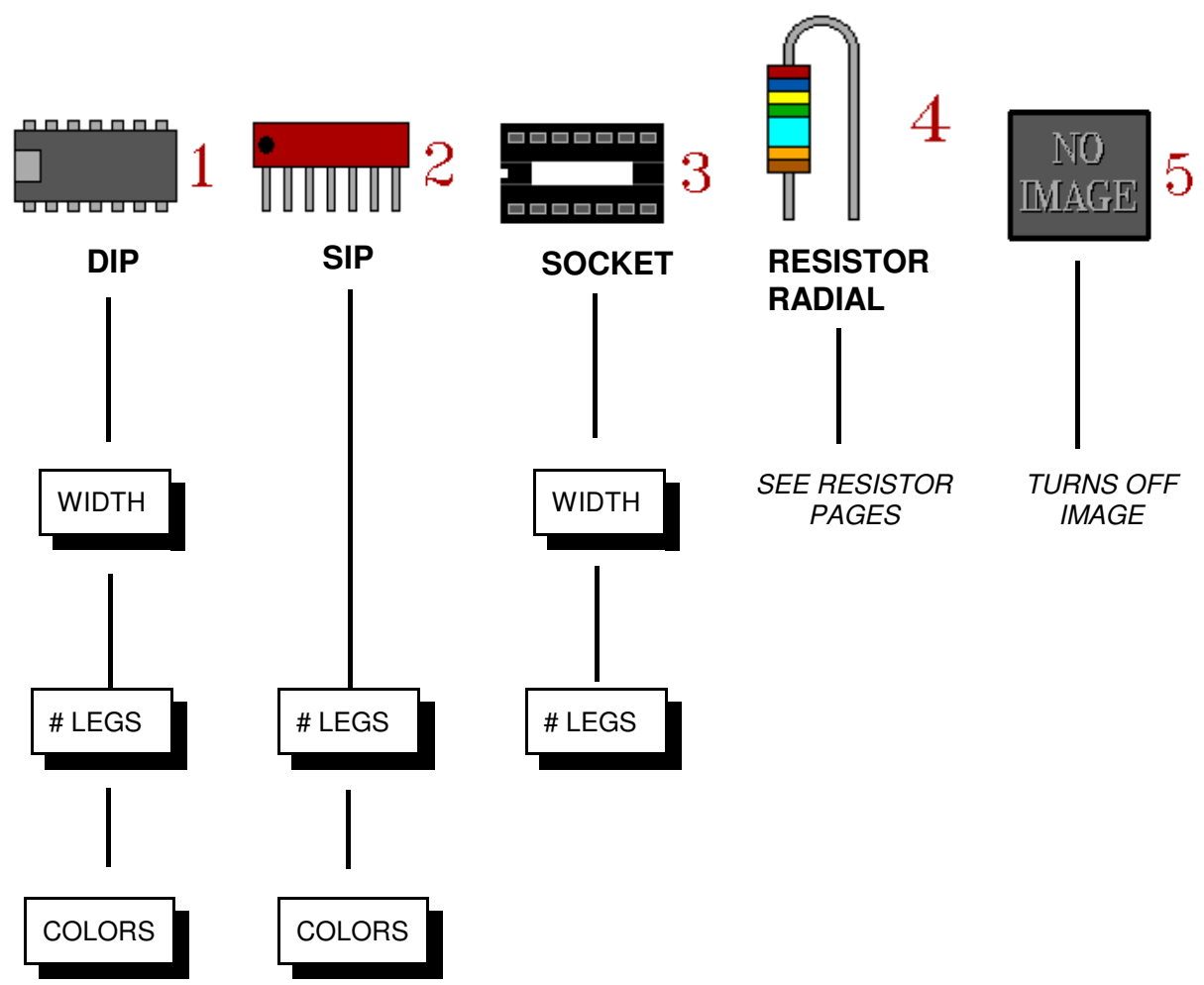
SIPS	5-19	PINS
------	------	------

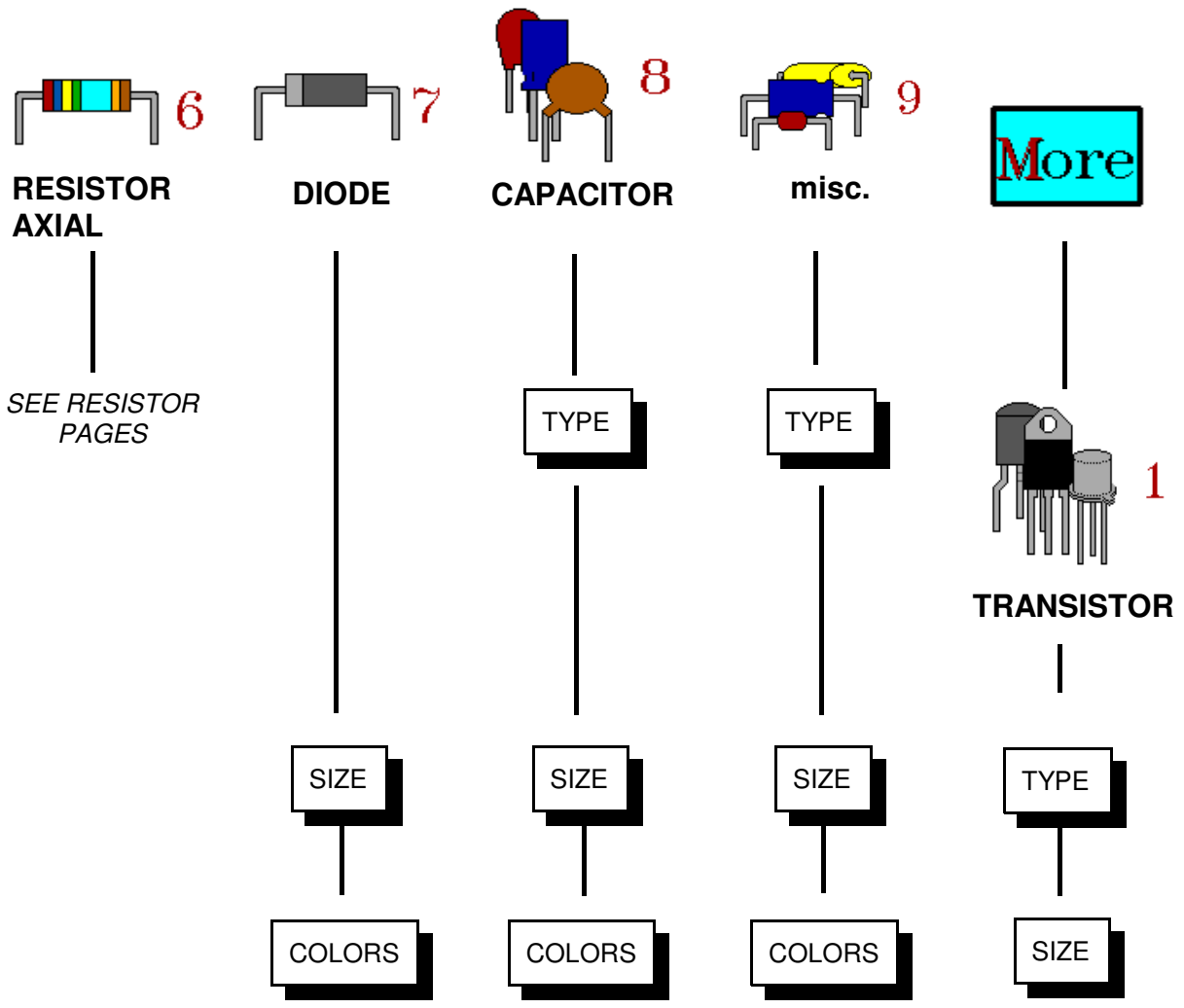
COMPONENT IMAGES ALT "I"

ESC SELECT COMPONENT TYPE **More**

 1	 2	 3
 4	 5	 6
 7	 8	 9

THESE ARE NOT TOUCH SCREENS!!
USE THE KEYBOARD.
PRESS THE APPROPRIATE NUMBER OR "HOT" KEY.



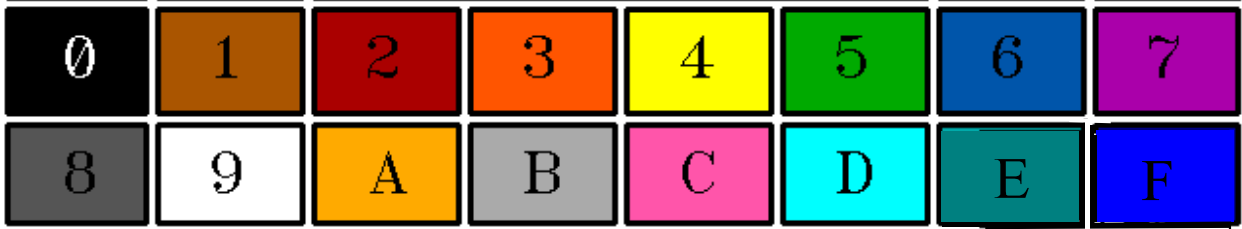


ESC **Save** **Repeat** **Prev**

WRITES IMAGE TO SEQUENCE.
RETURNS TO PROGRAM SCREEN.

CLEARs IMAGE DATA.
RETURNS TO MAIN
IMAGE SCREEN.

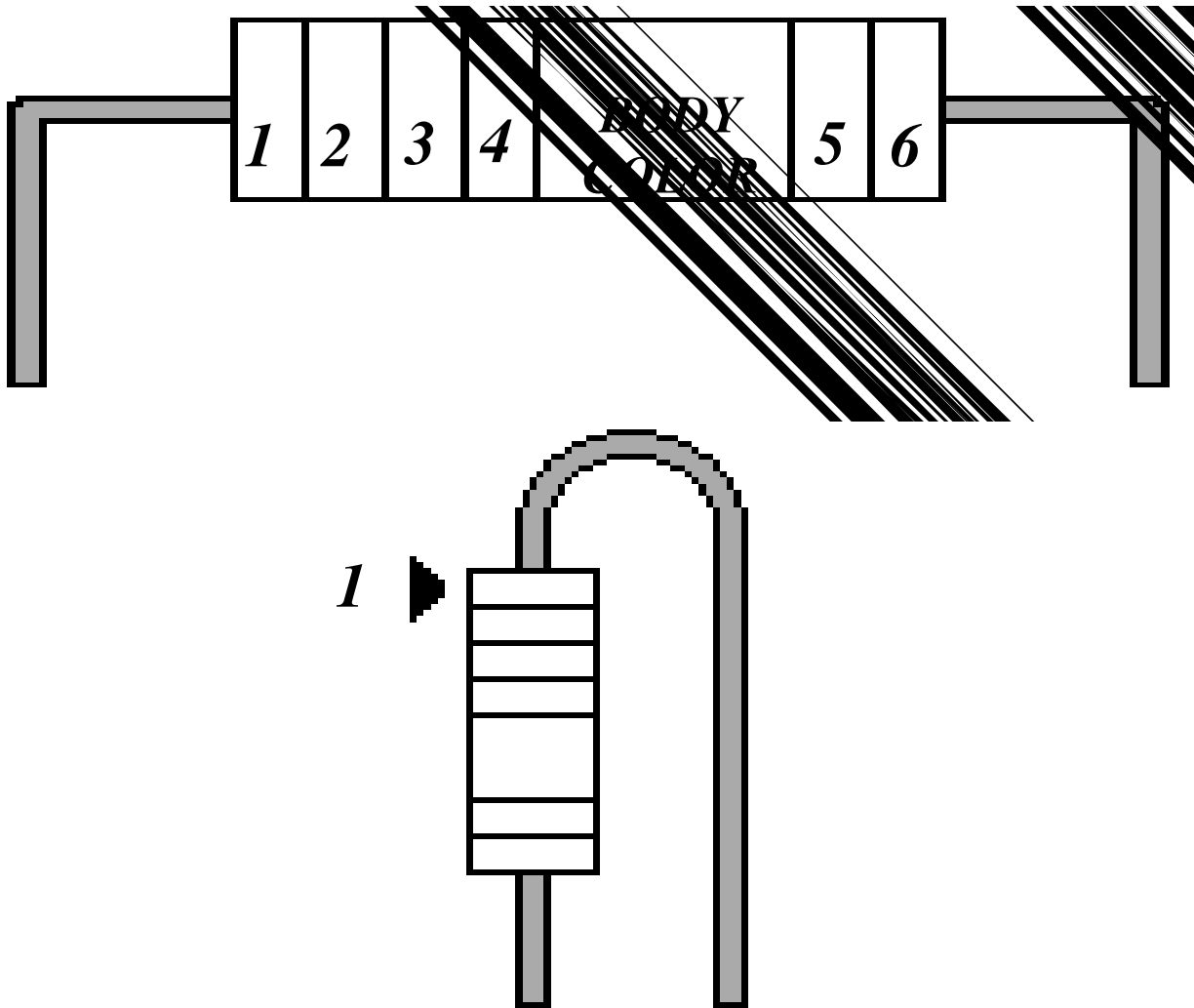
REDO LAST
STEP



0	BLACK	8	GRAY
1	BROWN	9	WHITE
2	RED	A	GOLD
3	ORANGE	B	SILVER
4	YELLOW	C	PINK
5	GREEN	D	LIGHT BLUE
6	BLUE	E	CYAN
7	VIOLET	F	DARK BLUE

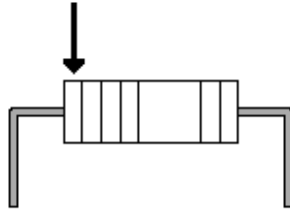
RECOMMENDED BODY COLORS		TOLERANCE COLOR CODE			RELIABILITY COLOR CODE		
C	PINK	1	BROWN	1 %	1	BROWN	1 %
D	LIGHT BLUE	2	RED	2 %	2	RED	0.1 %
E	CYAN	A	GOLD	5 %	3	ORANGE	0.01 %
F	DARK BLUE	B	SILVER	10 %	4	YELLOW	0.001 %

*For **Non-Resistor Parts**, choose colors which best resemble the colors of the component.*



BAND	COLOR	STANDARD RESISTOR	PRECISION RESISTOR
1	0-9	FIRST SIGNIFICANT DIGIT	FIRST SIGNIFICANT DIGIT
2	0-9	SECOND SIGNIFICANT DIGIT	SECOND SIGNIFICANT DIGIT
3	0-9	MULTIPLIER BAND	THIRD SIGNIFICANT DIGIT
4	0-9	(SAME AS BODY COLOR)	MULTIPLIER BAND
BODY	C-F *	(MUST CONTRAST MULTIPLIER)	(MUST CONTRAST MULTIPLIER)
5	1,2,A,B	TOLERANCE BAND	TOLERANCE BAND
6	1-4	RELIABILITY **	RELIABILITY **

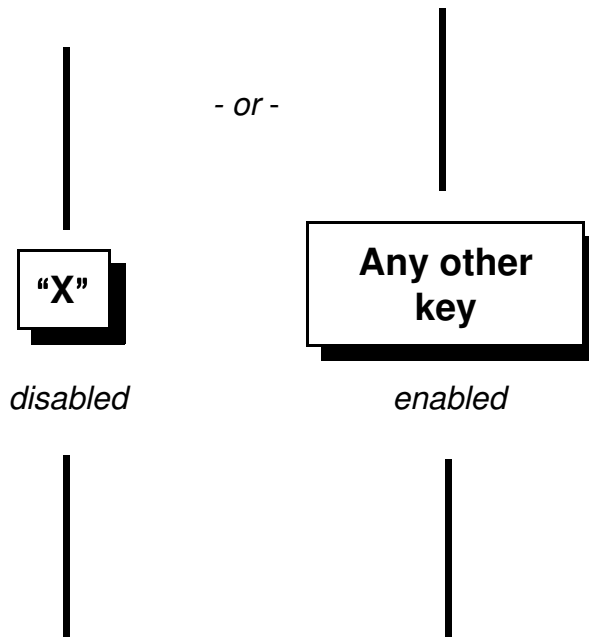
* Recommended colors; others may be used, but body color should contrast other bands.
 ** Reliability (% failure after 1000 hours of use.); if this band is not present, use body color.



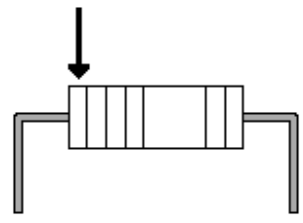
**PRESS X TO
DISABLE ERROR CHECKING**



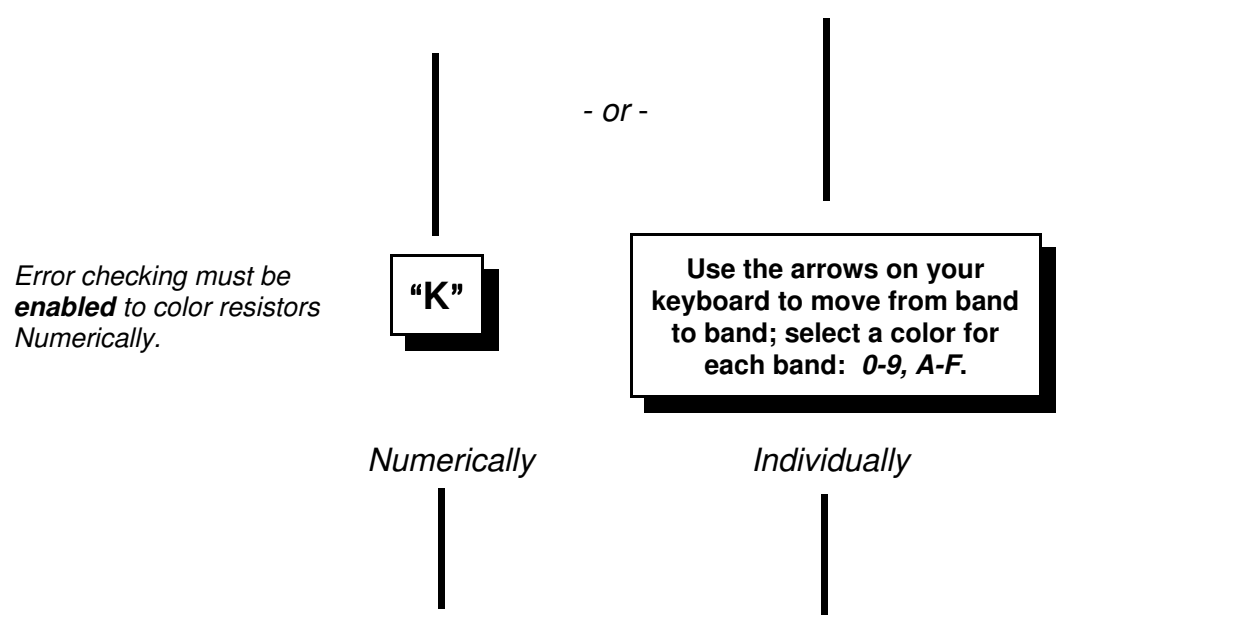
Error checking forces you to comply with resistor coloring conventions. With error checking *enabled*, you will be forced to correct your coloring errors before continuing.



RESISTORS



There are two methods of coloring resistors: **Individually**, by manually selecting a color for each band; or **Numerically**, by entering the actual resistor value and allowing the machine to select the appropriate colors.



RESISTORS

ESC

ENTER RESISTOR VALUE

value band1, 2, 3:4
xO ohms
xK kilohms
xM megohms
x denotes 2 or 3 significant digits

body color band5
0-FB :bands4, 6, 7

percent tol band6
1P brown
2P red
5P gold
10P silver
20P same as body

reliability band7
MR 1.0% brown
PR 0.1% red
RR .01% orange
SR .001% yellow

Key

←

|

→

RET

Type in the resistor's value; then press "Enter"

4.70K 5P MR DB (example)

<p style="font-size: 1.5em; margin: 0;">4.70K</p> <p style="margin: 0;">SIGNIFICANT DIGITS/ MULTPLIER.</p>	<p style="font-size: 1.5em; margin: 0;">5P</p> <p style="margin: 0;">TOLERANCE % (1,2,5,10,20) P</p>	<p style="font-size: 1.5em; margin: 0;">MR</p> <p style="margin: 0;">RELIABILITY</p>	<p style="font-size: 1.5em; margin: 0;">DB</p> <p style="margin: 0;">BODY COLOR: (color) B</p>
<p>value band1, 2, 3:4 xO ohms xK kilohms xM megohms x denotes 2 or 3 significant digits</p>	<p>percent tol band6 1P brown 2P red 5P gold 10P silver 20P same as body</p>	<p>reliability band7 MR 1.0% brown PR 0.1% red RR .01% orange SR .001% yellow</p>	<p>body color band5 0-FB :bands4, 6, 7</p>

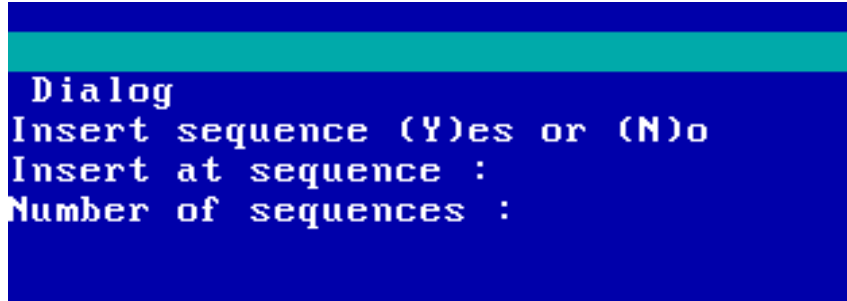
- ▶ *Standard Resistor = 2 digits (.10-990M); Precision Resistor = 3 digits (1-999M).*
- ▶ *If no tolerance is entered: band = body color; defaults to 20% .*
- ▶ *If no reliability is entered: band = body color.*
- ▶ *Body color must contrast multiplier color.*
- ▶ **There must be a space between each item: 4.70K_5P_MR_DB.**
- ▶ *"End" from keyboard to exit; then "S" to save image.*

IMAGE VARIABLES

IMAGE	D	Q	X	Y	C REF
DIP	4	10	# LEGS/10 (4-40)	BODY WIDTH (.3 or .4 or .6)	COLORS (body & notch)
SIP	4	11	# LEGS/10 (5-19)	0.000	COLORS (body & polarity)
DIP SOCKET	4	12	# LEGS/10 (4-40)	BODY WIDTH (.3 or .4 or .6)	COLORS (black & gray)
RADIAL RES.	4	13	SMALL BODY (1 only)	0.000	COLORS (bands)
AXIAL RES.	4	15	BODY SIZE (1 or 2 or 3)	0.000	COLORS (bands)
DIODES	4	16	BODY SIZE (1 or 2 or 3)	0.000	COLORS (body & polarity)
RADIAL CAPS.	4	17	BODY TYPE (1-5)	BODY SIZE (1-3)	COLORS (body)
AXIAL CAPS.	4	18	BODY TYPE (1-5)	BODY SIZE (1-3)	COLORS (body)
TRANS.	4	19	TYPE (1-4)	STYLE/SIZE (1-2)	0.000 (no coloring)

	1	2	3	4	5
BODY SIZE	SMALL	MEDIUM	LARGE
RADIAL CAPS.	CERAMIC DISK	TEARDROP	ELECTROLYTIC	TOMBSTONE	BOX
AXIAL CAPS.	POLY	ELECTROLYTIC	TUBULAR	MOLDED	BYPASS
TRANS.	TO92 (3 legs)	TO220 (round top)	TO5 (3 legs)	TO220 (square)
	Y= 1 (bent legs) Y= 2 (straight legs)	Y= 1 (small) Y= 2 (large)	Y= 1 (small) Y= 2 (large)	Y= 1 (small) Y= 2 (large)	

INSERT SEQUENCE "I"



*Pushes the sequence lines **downward** from the insertion point.*

*Example: Insert at sequence: **17**
 Number of sequences: **3***



CIRCUIT REFERENCE	SEQUENCE NUMBER	D	Q	X	Y	dX	dY	INSTRUCTION
R4	15	0	00	2.305	2.900	0.500	0.000	Normal Inward
R3	16	0	90	2.280	2.800	0.430	-0.255	Normal Outward
R1	17	0	00	2.105	2.700	0.000	-0.500	Normal Inward
R2	18	0	01	2.205	2.720	0.260	-0.425	Normal In- Last Pt

CIRCUIT REFERENCE	SEQUENCE NUMBER	D	Q	X	Y	dX	dY	INSTRUCTION
R4	15	0	00	2.305	2.900	0.500	0.000	Normal Inward
R3	16	0	90	2.280	2.800	0.430	-0.255	Normal Outward
	17							
	18							
	19							
R1	20	0	00	2.105	2.700	0.000	-0.500	Normal Inward
R2	21	0	01	2.205	2.720	0.260	-0.425	Normal In- Last Pt

INSERTION - LAST PART

PROGRAMMING TIP

A Delivery Device move - such as a Rotary Bin move - marks the end of one part group and the beginning of the next. When you enter a bin move, the machine automatically changes the machine codes of the preceding line to tag it as the last part in the group.

R1	17	0	00	2.105	2.700	0.000	-0.500	Normal Inward
R2	18	0	01	2.205	2.720	0.260	-0.425	Normal In- Last Pt
	19	2	03	4.000	0.000	0.000	0.000	Rotary Bin Move



If, after writing the program, you insert a line after the last part, the machine will not recognize the new part as the last part in the group.

R1	17	0	00	2.105	2.700	0.000	-0.500	Normal Inward
R2	18	0	00	2.205	2.720	0.260	-0.425	Normal Inward
R8	19	0	00	2.300	2.800	0.560	-0.550	Normal Inward
	20	2	03	4.000	0.000	0.000	0.000	Rotary Bin Move

*You must either reenter the Rotary Bin Move, or manually alter the Machine Codes of the last part sequence line - see the **MACHINE CODE** pages.*

R1	17	0	00	2.105	2.700	0.000	-0.500	Normal Inward
R2	18	0	00	2.205	2.720	0.260	-0.425	Normal Inward
R8	19	0	01	2.300	2.800	0.560	-0.550	Normal In- Last Pt
	20	2	03	4.000	0.000	0.000	0.000	Rotary Bin Move



DELETE SEQUENCE ALT "D"

```

Dialog
Delete sequence (Y)es or (N)o
Delete at sequence :
Number of sequences :
    
```

*Deletes indicated sequence line and (n) number of sequence lines **below** that line.*

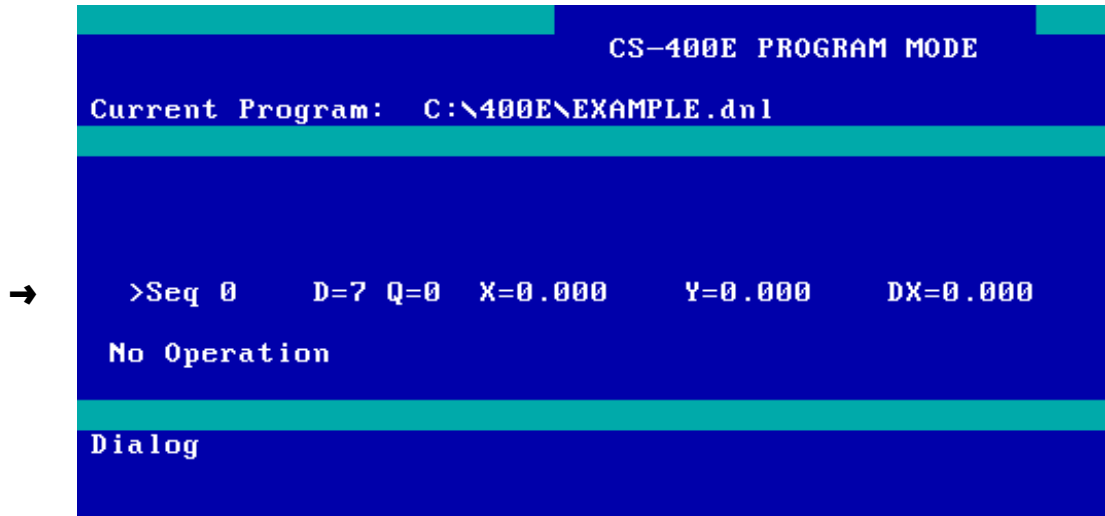
*Example: Delete at sequence: **16**
Number of sequences: **2***



CIRCUIT REFERENCE	SEQUENCE NUMBER	D	Q	X	Y	dX	dY	INSTRUCTION
R4	15	0	00	2.305	2.900	0.500	0.000	Normal Inward
R3	16	0	90	2.280	2.800	0.430	-0.255	Normal Outward
R1	17	0	00	2.105	2.700	0.000	-0.500	Normal Inward
R2	18	0	01	2.205	2.720	0.260	-0.425	Normal In- Last Pt

CIRCUIT REFERENCE	SEQUENCE NUMBER	D	Q	X	Y	dX	dY	INSTRUCTION
R4	15	0	00	2.305	2.900	0.500	0.000	Normal Inward
R2	16	0	01	2.205	2.720	0.260	-0.425	Normal In- Last Pt

NO OPERATION "N"



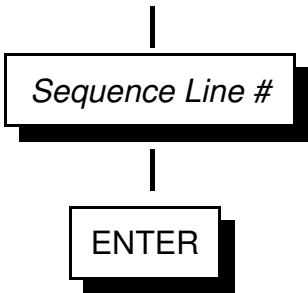
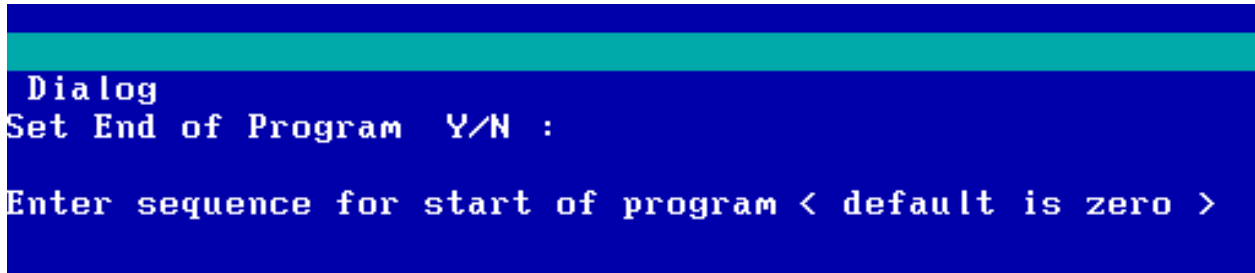
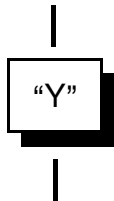
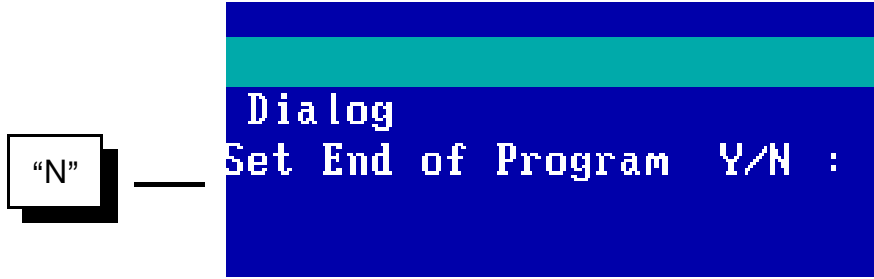
A No-Op command permanently overwrites the existing line.

CIRCUIT REFERENCE	SEQUENCE NUMBER	D	Q	X	Y	dX	dY	INSTRUCTION
R1	17	0	00	2.105	2.700	0.000	-0.500	Normal Inward
R2	18	0	00	2.205	2.720	0.260	-0.425	Normal Inward
R3	19	0	01	2.300	2.800	0.560	-0.550	Normal Inward
	20	2	03	4.000	0.000	0.000	0.000	Rotary Bin Move

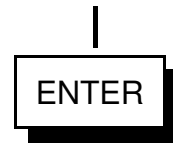
CIRCUIT REFERENCE	SEQUENCE NUMBER	D	Q	X	Y	dX	dY	INSTRUCTION
R1	17	0	00	2.105	2.700	0.000	-0.500	Normal Inward
	18	7	00	0.000	0.000	0.000	0.000	No Operation
R3	19	0	01	2.300	2.800	0.560	-0.550	Normal Inward
	20	2	03	4.000	0.000	0.000	0.000	Rotary Bin Move

END OF PROGRAM "E"

Every Program **must** end with an End of Program command.



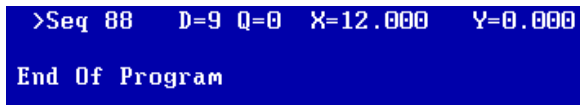
Use EOP Goto to skip over the setup sequences at the beginning of your program on successive program runs. The setup data will be displayed to the operator only on the first run of the day.



Machine defaults to zero(0). Goes to the first Sequence Line.

Machine automatically goes to the indicated Sequence Line.

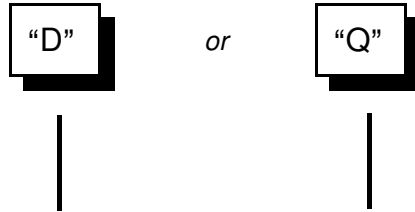
↓ X= goto Sequence Line.



MACHINE CODES & PROGRAM VARIABLES

MACHINE CODES

You can directly edit the machine codes of any sequence:



The machine will force you to reenter both the "D" & "Q" values for that sequence line.

D	Q	FUNCTION	DESCRIPTION
0	00	COMPONENT INSERTION	INWARD CLINCH
0	01	COMPONENT INSERTION	INWARD CLINCH - LAST PART
0	90	COMPONENT INSERTION	OUTWARD CLINCH
0	91	COMPONENT INSERTION	OUTWARD CLINCH - LAST PART
8	02	MULTIPLE CUT/CLINCH	FIRST STEP - INWARD CLINCH
8	00	MULTIPLE CUT/CLINCH	AUTO STEP - INWARD CLINCH
8	01	MULTIPLE CUT/CLINCH	FIRST STEP - INWARD CLINCH - LAST PART
8	99	MULTIPLE CUT/CLINCH	AUTO STEP - INWARD CLINCH - LAST PART
8	92	MULTIPLE CUT/CLINCH	FIRST STEP - OUTWARD CLINCH
8	90	MULTIPLE CUT/CLINCH	AUTO STEP - OUTWARD CLINCH
8	91	MULTIPLE CUT/CLINCH	FIRST STEP - OUTWARD CLINCH - LAST PART
8	98	MULTIPLE CUT/CLINCH	AUTO STEP - OUTWARD CLINCH - LAST PART
4	00	CUT/CLINCH	ENABLE
4	01	CUT/CLINCH	DISABLE
1	00	CUT/CLINCH	LEAD LENGTH/CLINCH ANGLE

MACHINE CODES

D	Q	FUNCTION	DESCRIPTION
1	10	COMPONENT VERIFIER	TEST DISABLED
1	11	COMPONENT VERIFIER	AUTOMATIC RESISTOR TEST
1	12	COMPONENT VERIFIER	AUTOMATIC INDUCTOR TEST
1	13	COMPONENT VERIFIER	AUTOMATIC CAPACITOR TEST
1	14	COMPONENT VERIFIER	AUTOMATIC DIODE TEST
1	20	COMPONENT VERIFIER	TEST ENABLED
1	21	COMPONENT VERIFIER	MANUAL RESISTOR TEST
1	22	COMPONENT VERIFIER	MANUAL INDUCTOR TEST
1	23	COMPONENT VERIFIER	MANUAL CAPACITOR TEST
1	24	COMPONENT VERIFIER	MANUAL DIODE TEST

2	00	ROTARY BIN	RESET
2	01	ROTARY BIN	ADVANCE
2	02	ROTARY BIN	BACKUP
2	03	ROTARY BIN	RANDOM ACCESS (CS-241)
2	71	CS-740 JIT BIN	#1 JIT BIN MOVE
2	72	CS-740 JIT BIN	#2 JIT BIN MOVE
2	90	LOGPOINT BIN	#1 LOGPOINT MOVE
2	91	LOGPOINT BIN	#2 LOGPOINT MOVE
3	00	CS-241 DIP DISPENSER	HORIZONTAL (ROW/COLUMN) INDEX
3	80	CS-241 DIP DISPENSER	VERTICAL INDEX
2	99	CS-241 DIP DISPENSER	LDD OFF

MACHINE CODES

D	Q	FUNCTION	DESCRIPTION
4	10	COMPONENT IMAGE	DIP
4	11	COMPONENT IMAGE	SIP
4	12	COMPONENT IMAGE	DIP SOCKET
4	13	COMPONENT IMAGE	BANDED RADIAL RESISTOR
4	14	COMPONENT IMAGE	REMOVE IMAGE
4	15	COMPONENT IMAGE	BANDED AXIAL RESISTOR
4	16	COMPONENT IMAGE	DIODE
4	17	COMPONENT IMAGE	RADIAL CAPACITOR
			X=1 DISC
			X=2 TEARDROP
			X=3 ELECTROLYTIC
			X=4 TOMBSTONE
			X=5 BOX
4	18	COMPONENT IMAGE	AXIAL CAPACITOR
			X=1 POLY
			X=2 ELECTROLYTIC
			X=3 CYLINDRICAL
			X=4 MOLDED
			X=5 BYPASS
4	19	COMPONENT IMAGE	TRANSISTOR
			X=1 TO92
			X=2 TO220 ROUND
			X=3 TO5
			X=4 TO220 SQUARE
4	20	CSX IMAGE	
4	21	PCX IMAGE	

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MACHINE CODES

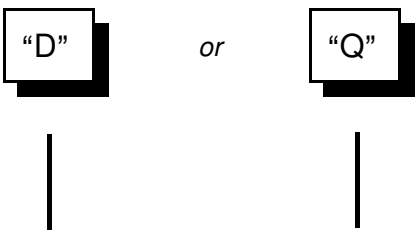
D	Q	FUNCTION	DESCRIPTION
5	01	OFFSET COORDINATE	BOARD #1
5	02	OFFSET COORDINATE	BOARD #2
5	03	OFFSET COORDINATE	BOARD #3
5	04	OFFSET COORDINATE	BOARD #4
5	05	OFFSET COORDINATE	BOARD #5
5	06	OFFSET COORDINATE	BOARD #6
5	07	OFFSET COORDINATE	BOARD #7
5	08	OFFSET COORDINATE	BOARD #8
5	09	OFFSET COORDINATE	BOARD #9
5	10	OFFSET COORDINATE	BOARD #10
5	21	SKEW POINTS	BOARD #1
5	22	SKEW POINTS	BOARD #2
5	23	SKEW POINTS	BOARD #3
5	24	SKEW POINTS	BOARD #4
5	25	SKEW POINTS	BOARD #5
5	26	SKEW POINTS	BOARD #6
5	27	SKEW POINTS	BOARD #7
5	28	SKEW POINTS	BOARD #8
5	29	SKEW POINTS	BOARD #9
5	30	SKEW POINTS	BOARD #10
5	50	JIT PROFILE MARKER	FORCES PROFILE LIST RESOLUTION

MACHINE CODES

D	Q	FUNCTION	DESCRIPTION
6	11	PROGRAM NO POLARITY	PROJECTORS DO NOT BLINK
6	12	PROGRAM POLARITY	FIXED PROJECTOR BLINKS
6	15	PROGRAM BOTH BLINK	BOTH PROJECTORS BLINK

6	20	PROGRAM MESSAGE	ACTIVE MESSAGE
6	21	PROGRAM MESSAGE	PASSIVE MESSAGE
6	22	PROGRAM MESSAGE	CLEAR MESSAGE
6	23	PROGRAM INSTRUCTION	PART NUMBER
7	00	PROGRAM INSTRUCTION	NO OPERATION
9	00	PROGRAM INSTRUCTION	END OF PROGRAM

You can directly edit the machine codes of any sequence:



The machine will force you to reenter both the "D" & "Q" values for that sequence line.

PROGRAM VARIABLES

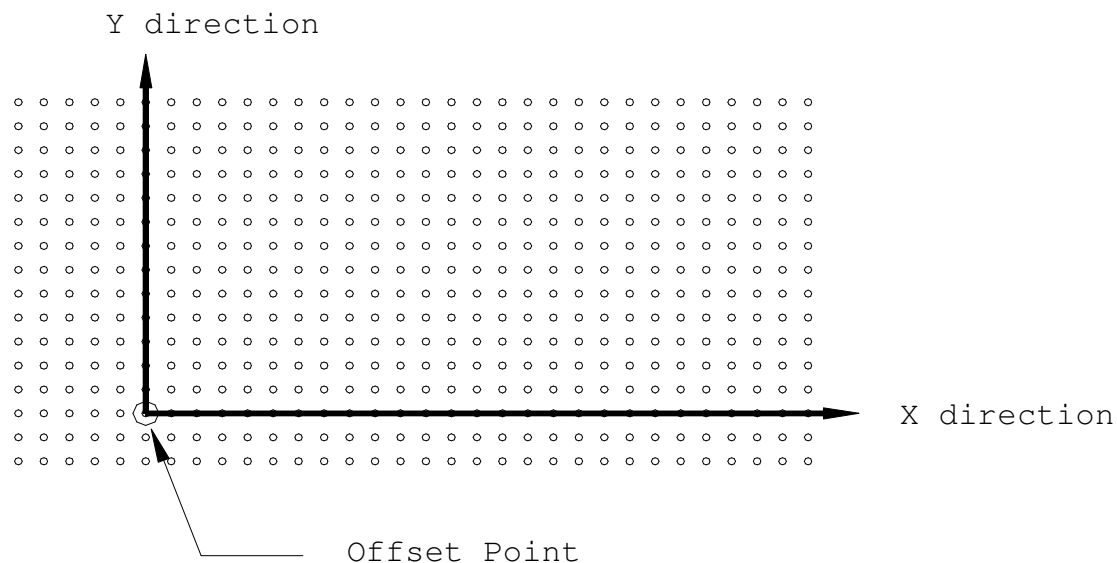
SITUATION	X	Y	DX	DY
MESSAGES	"MESSAGE"	0.000	0.000	0.000
DELIVERY DEVECE	PRIMARY BIN (RESET=0)	FIRST ALTERNATE	SECOND ALTERNATE	THIRD ALTERNATE
COMPONENT INSERTION	FIRST LEAD	FIRST LEAD	SECOND LEAD	SECOND LEAD
CUT/CLINCH	X/Y LENGTH	X/Y ANGLE	DX/DY LENGTH	DX/DY ANGLE
OFFSET	COORDINATE	COORDINATE	0.000	0.000
SKEW POINTS	FIRST POINT	FIRST POINT	SECOND POINT	SECOND POINT
COMPONENT VERIFIER	VALUE	VALUE	VALUE	VALUE
EOP	GOTO SEQUENCE	0.000	0.000	0.000

IMAGES

IMAGE	D	Q	X	Y	C REF
DIP	4	10	# LEGS/10 (4-40)	BODY WIDTH (.3 or .4 or .6)	COLORS (body & notch)
SIP	4	11	# LEGS/10 (5-19)	0.000	COLORS (body & polarity)
DIP SOCKET	4	12	# LEGS/10 (4-40)	BODY WIDTH (.3 or .4 or .6)	COLORS (black & gray)
RADIAL RES.	4	13	0.000	0.000	COLORS (bands)
AXIAL RES.	4	15	BODY SIZE (1 or 2 or 3)	0.000	COLORS (bands)
DIODES	4	16	BODY SIZE (1 or 2 or 3)	0.000	COLORS (body & polarity)
RADIAL CAPS.	4	17	BODY TYPE (1-5)	BODY SIZE (1-3)	COLORS (body)
AXIAL CAPS.	4	18	BODY TYPE (1-5)	BODY SIZE (1-3)	COLORS (body)
TRANS.	4	19	TYPE (1-4)	SIZE (1-2)	0.000 (no coloring)

SETTING OFFSETS & SKEW POINTS

OFFSETS

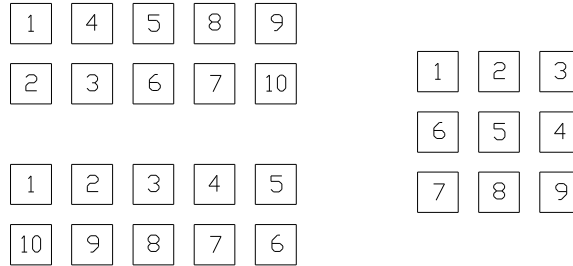


- ▶ Home the machine.
- ▶ Fixture the boards on the table before setting Offsets.
- ▶ The Offset point is a board's zero location. All coordinates will be measured from that point.
- ▶ The Offset must be a hole on the board. If possible, choose an unused component hole. If there are no unused holes, choose one which will be used near the end of your program.
- ▶ You may fixture ten boards at one time. You need a separate Offset for each board (1-10).
- ▶ Offsets must be set *before* skew points and component digitization.
- ▶ Offsets must remain constant. Tell the operator the location of each offset.
- ▶ If you wish to *save* the Offsets to the program, then you *must* set the Offsets from Program Mode.
- ▶ If you do *not* wish to save the Offsets to the program, then you may set them from either Program *or* Auto Mode.
- ▶ *Normally, you save the Offsets to the program only on machines with dedicated fixtures.*

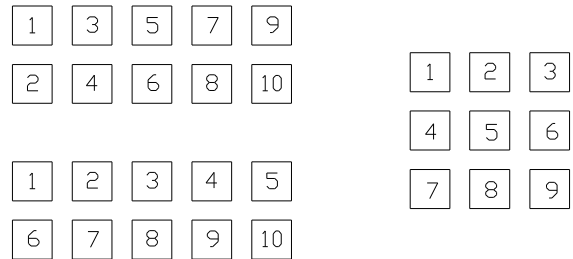
NUMBERING OFFSETS

PROGRAMMING TIP

*You may number your offsets any way that you wish.
But efficient numbering limits machine movements.*



EFFICIENT NUMBERING



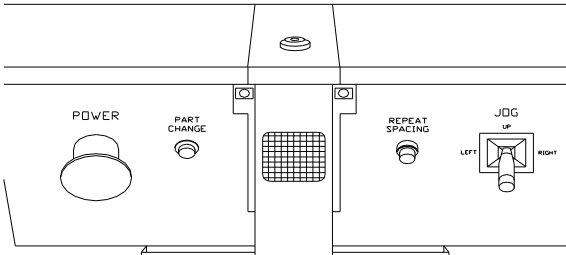
INEFFICIENT NUMBERING

SETTING OFFSETS - PROGRAM MODE

ALT "O"

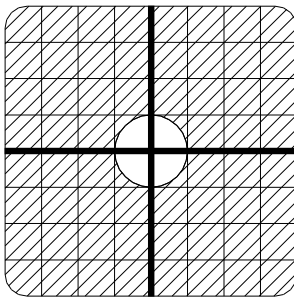
Dialog
Enter Board Offset number :

Dialog
Enter Board Offset number :1
Jog to offset point - press Footswitch



Jog the table using the jogstick on the front panel. The table will move opposite the direction which you deflect the jogstick.

If you need help identifying the Offset point, block the hole with a pencil or other small instrument.

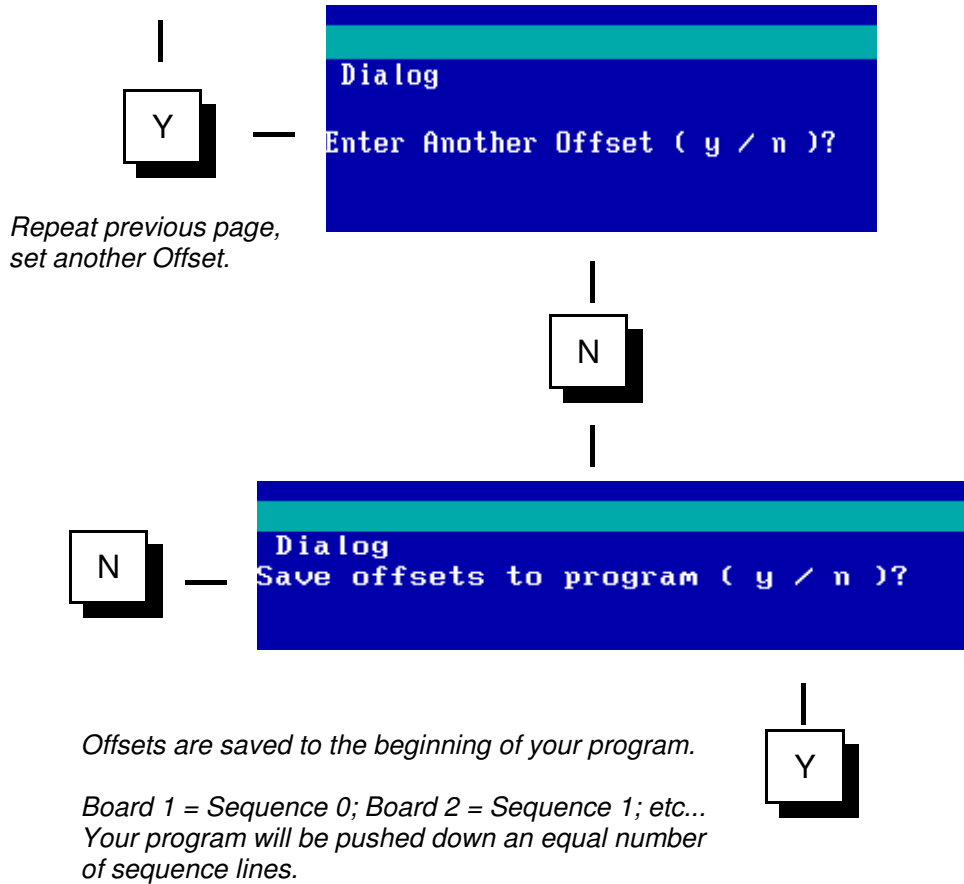


Center the crosshairs of the scope over the Offset point.

Press Footswitch

PROGRAM MODE

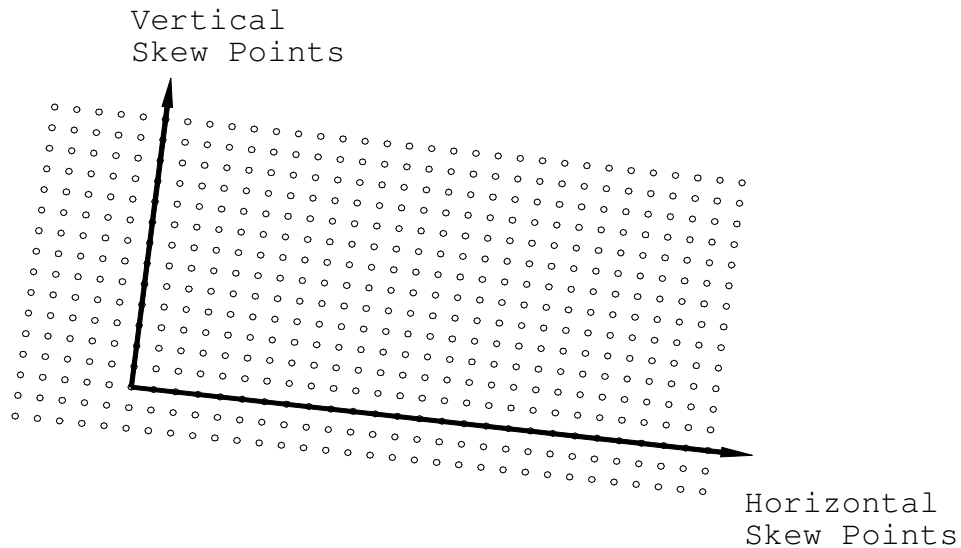
SAVING OFFSETS - PROGRAM MODE



CIRCUIT REFERENCE	SEQUENCE NUMBER	D	Q	X	Y	dX	dY	INSTRUCTION
	0	5	1	1.0440	5.987	0.000	0.000	Offset Coordinates for Board 1
	1	5	2	3.340	8.123	0.000	0.000	Offset Coordinates for Board 2
	2	7	0	0.000	0.000	0.000	0.000	No Operation
	3	7	0	0.000	0.000	0.000	0.000	No Operation
	4	6	20	START				Active Message
	5	2	71	0.000	0.000	0.000	0.000	#1 Jit Bin Move

Normally, only machines with dedicated fixtures save the Offsets to the program.

BOARD SKEW



- ▶ The machine must be Homed and Offset points set before correcting for Board Skew.
- ▶ Skew points should be holes on the board, preferably unused, which are known to be in a straight line from one another.
- ▶ Skew points should be as far apart from one another as possible.
- ▶ You may correct Board Skew either vertically or horizontally.
- ▶ The Offset point may be used as one of the Skew Points.
- ▶ If you wish to *save* the Skew points to the program, then you *must* set them from Program Mode.
- ▶ If you do *not* wish to save the Skew points to the program, then you may set them from either Program *or* Auto Mode.
- ▶ *Normally, you save the Skew points to the program only on machines with dedicated fixtures.*

SETTING SKEW POINTS - PROGRAM MODE

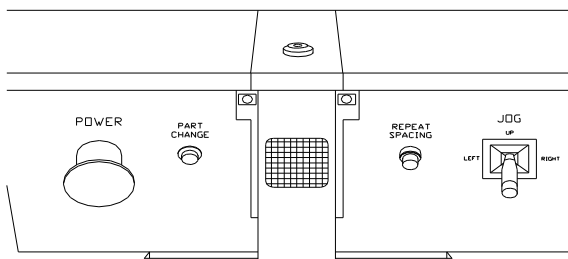
ALT "S"

Dialog
Enter Board Offset number :

*Board Skew must be corrected for **each** Offset Board.*

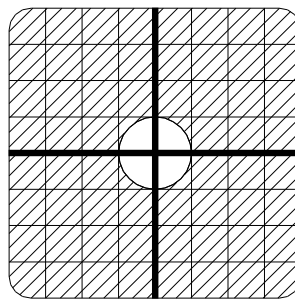
Dialog
Enter Board Offset number:1
Jog to Skew Point 1 - Footswitch

Dialog
Enter Board Offset number:1
Jog to Skew Point 1 - Footswitch
Jog to Skew Point 2 - Footswitch



Jog the table using the jogstick on the front panel. The table will move opposite the direction which you deflect the jogstick.

If you need help identifying the Skew point, block the hole with a pencil or other small instrument.

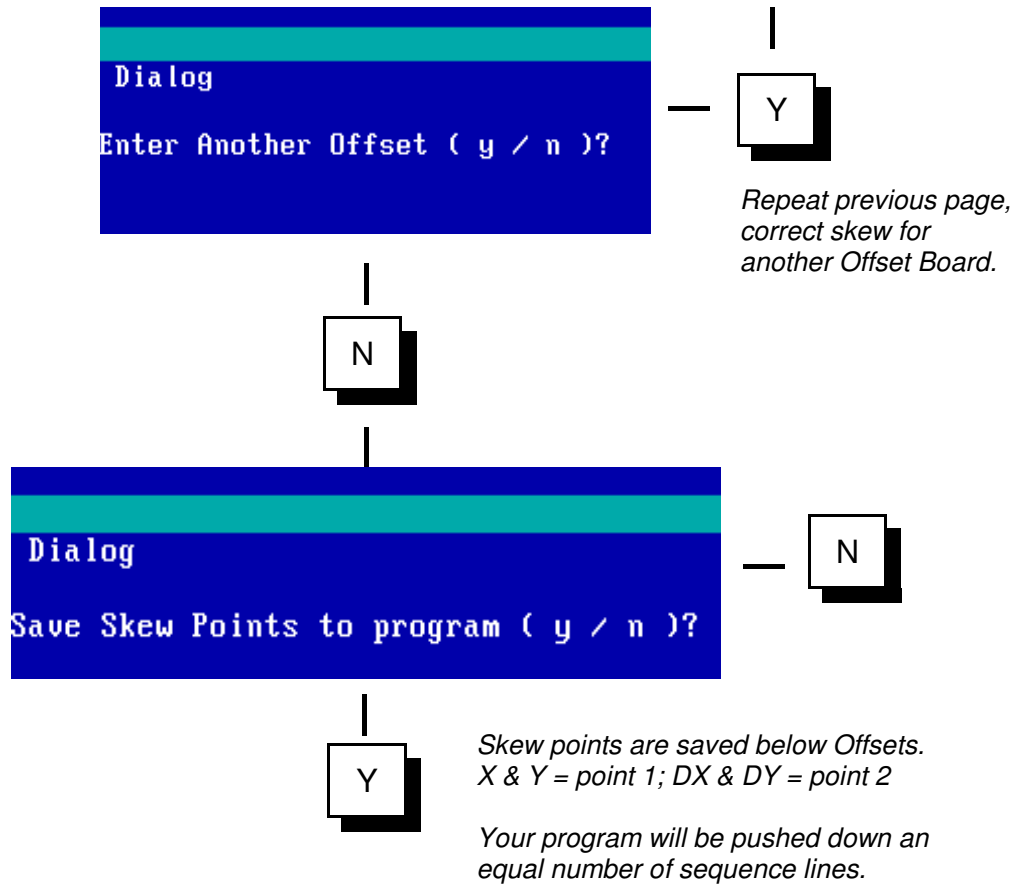


Center the crosshairs of the scope over the Skew point.

Press Footswitch

PROGRAM MODE

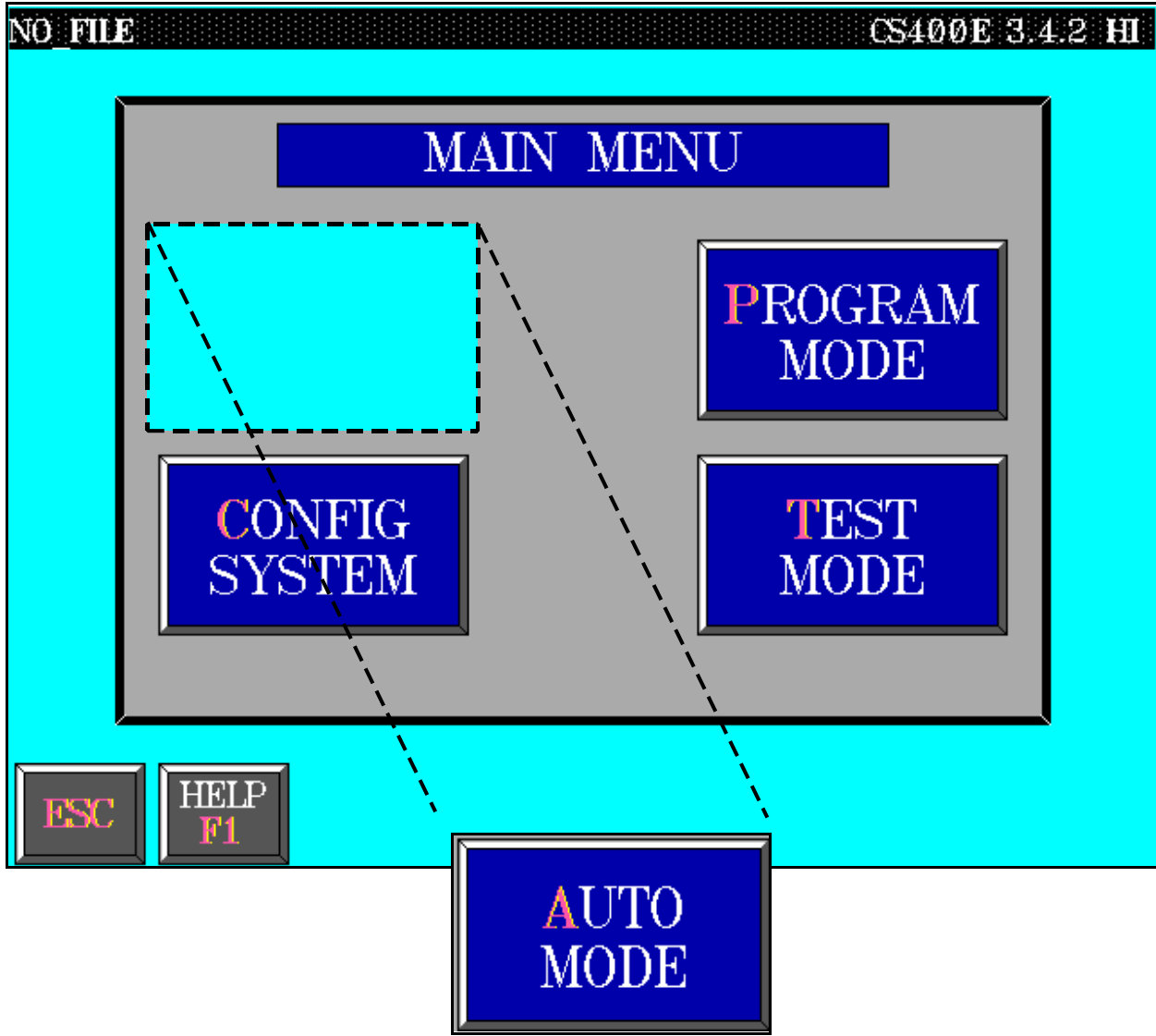
SAVING SKEW POINTS - PROGRAM MODE



CIRCUIT REFERENCE	SEQUENCE NUMBER	D	Q	X	Y	dX	dY	INSTRUCTION
	0	5	1	1.044	5.987	0.000	0.000	Offset Coordinates for Board 1
	1	5	21	1.044	5.987	9.111	5.967	Skew Points for Board 1
	2	7	0	0.000	0.000	0.000	0.000	No Operation
	3	7	0	0.000	0.000	0.000	0.000	No Operation
	4	6	20	START				Active Message
	5	2	71	0.000	0.000	0.000	0.000	#1 Jit Bin Move

Normally, only machines with dedicated fixtures save the Skew points to the program.

PROGRAM MODE



Touch the button on the screen, or from the keyboard press "A".

F1 for a list of current options.

SETTING OFFSETS - AUTO MODE

Enter Offset number; press **Enter**.

OFFSETS SET FROM AUTO
MODE CANNOT BE SAVED
TO THE PROGRAM.

JOG TO OFFSET
STEP ON FOOTSWITCH TO SAVE

The machine will beep and the left half of the circle will turn green to indicate that the Offset has been accepted.

REPEAT FOR EACH OFFSET

OFFSETS / SKEWS SET

SETTING SKEW POINTS - AUTO MODE

NO FILE **SETUP MODE**

STATUS

SYSTEM NOT HOMED
EOP OFFSET CHECK OFF
EOP SKEW CHECK OFF

OFFSETS TO RUN
FIRST OFFSET# 1
LAST OFFSET# 1

OFFSETS / SKEWS SET

1 2 3 4 5
6 7 8 9 10

HOME LOAD PROGRAM
SET OFFSET SET SKEW
AUTOEDIT PROGRAM RESUME
JOG GOTO OFFSET
ESC HELP F1

ENTER OFFSET (1-10)

1 2 3
4 5 6
7 8 9
< 0 ENTR

1

Board Skew must be corrected for **each** Offset Board.

Enter Offset Board; press **Enter**.

SKEW POINTS SET FROM AUTO MODE CANNOT BE SAVED TO THE PROGRAM.

JOG TO SKEW POINT
1
STEP ON FOOTSWITCH TO

JOG TO SKEW POINT
2
STEP ON FOOTSWITCH TO SAVE

The machine will beep and the right half of the circle will turn green to indicate that the Skew points have been accepted.

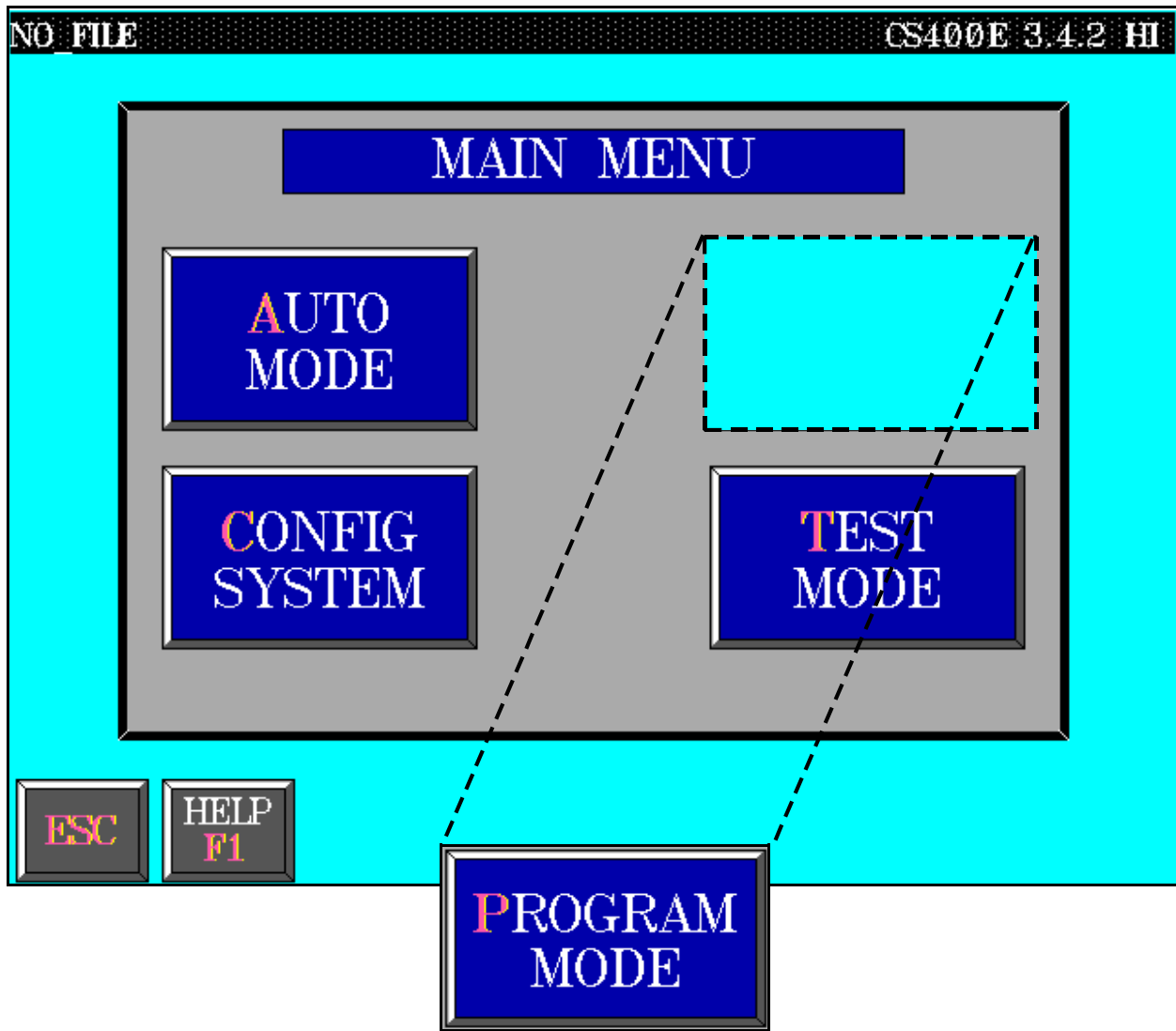
REPEAT FOR EACH OFFSET

OFFSETS / SKEWS SET

1 2 3 4 5
6 7 8 9 10

AUTO MODE

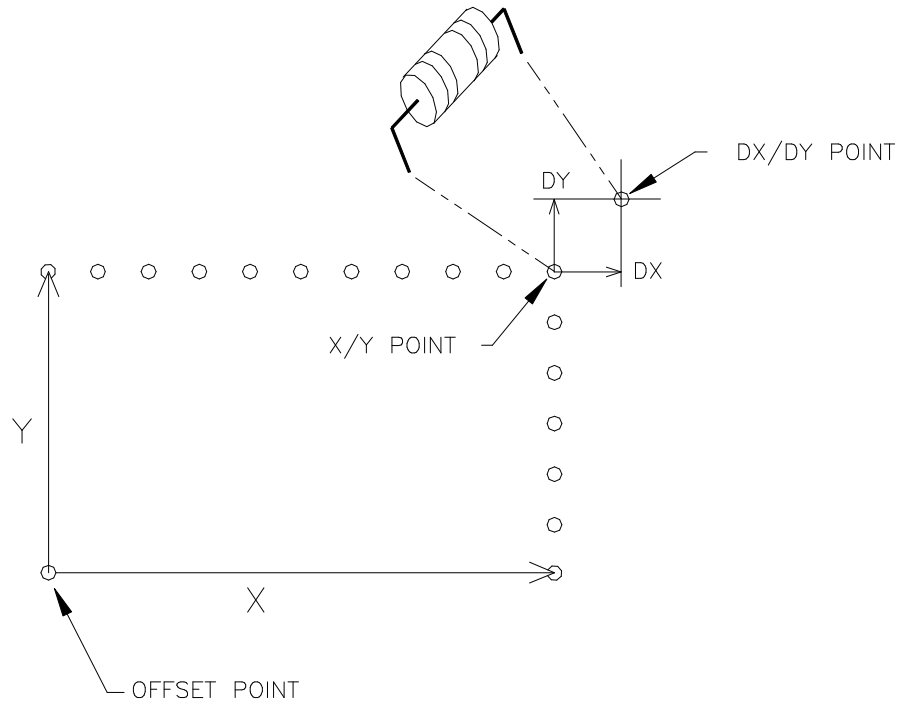
DIGITIZING COMPONENT LOCATIONS



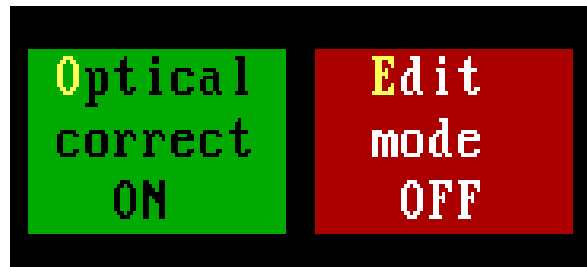
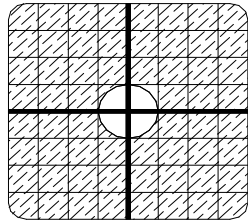
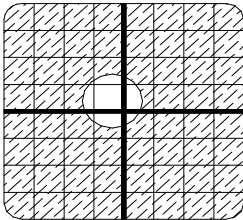
Touch the button on the screen, or from the keyboard press "P".

F1 for a list of current programming options.

DIGITIZING COMPONENT LOCATIONS



- ▶ Begin procedure at Sequence zero (0). The machine must homed, offsets and skew set.
- ▶ Each machine movement cuts and clinches *two* leads at once.
- ▶ X/Y point = fixed cutter; and DX/DY = moveable cutter.
- ▶ The machine automatically moves sequentially through the program, stopping at each component insertion line.



*OPTICAL CORRECT speeds up digitizing.
Jog the crosshairs anywhere inside the hole;
the machine scans the hole and finds its center.*

*EDIT MODE is for editing
programs which have already
been digitized.*

EFFICIENT DIGITIZING

PROGRAMMING TIP

Table movements should always be minimized.

EFFICIENT

- X/Y ○ ○ DX/DY
- X/Y ○ ○ DX/DY
- X/Y ○ ○ DX/DY
- X/Y ○ ○ DX/DY

INEFFICIENT

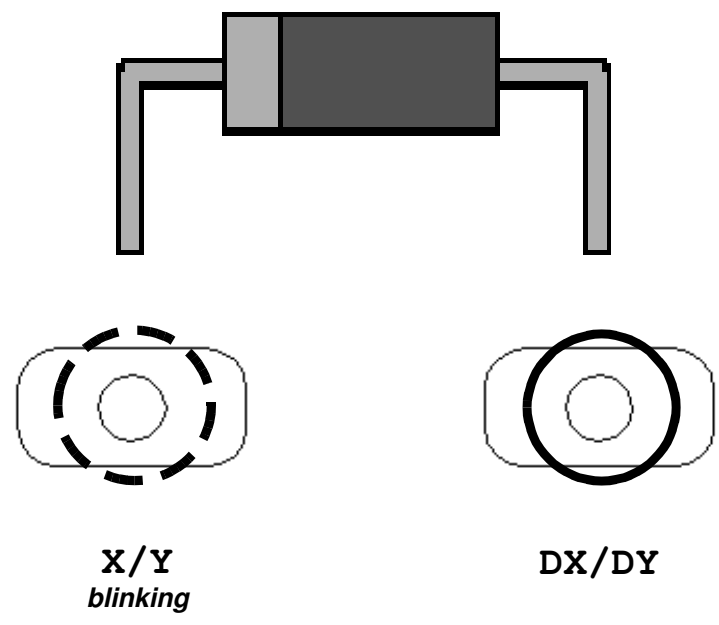
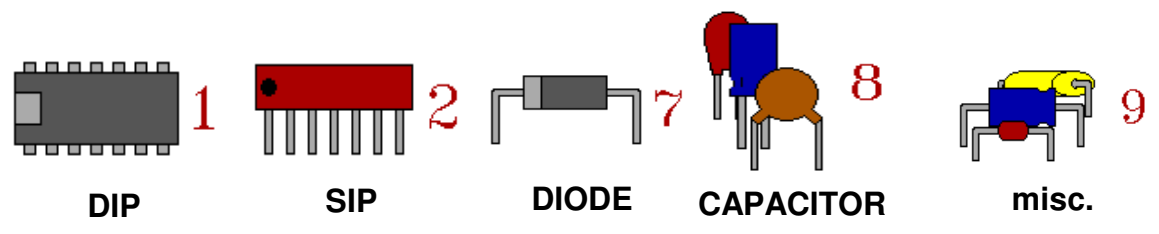
- X/Y ○ ○ DX/DY
- DX/DY ○ ○ X/Y
- X/Y ○ ○ DX/DY
- DX/DY ○ ○ X/Y

Example: A column of resistors. If you alternate X/Y from side to side, then the Cut/Clinch unit will have to rotate 180 degrees between each resistor.

POLARIZED COMPONENTS

PROGRAMMING TIP

*The projector light blinks over the X/Y point, the fixed cutter.
Recommendation: always insert the marked side of the component into X/Y.
Whatever your methods, inform the Operators!*



DIGITIZING CTRL "D"

```
Dialog
Start Digitize procedure ( y/n )
```

|

```
Dialog
Jog to X, Y point and Press FOOTSWITCH
Sequence # 8 Reference PEE
```

|

```
Dialog
Jog to DX, DY point and Press FOOTSWITCH
Sequence # 8 Reference PEE
```

The Sequence # and Reference remain the same.



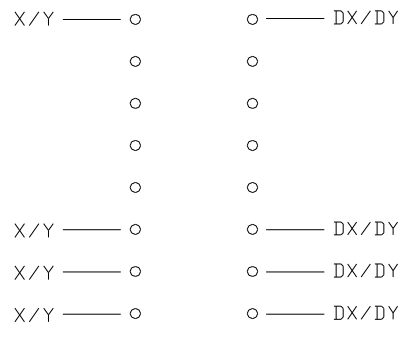
Repeat for each component.

|

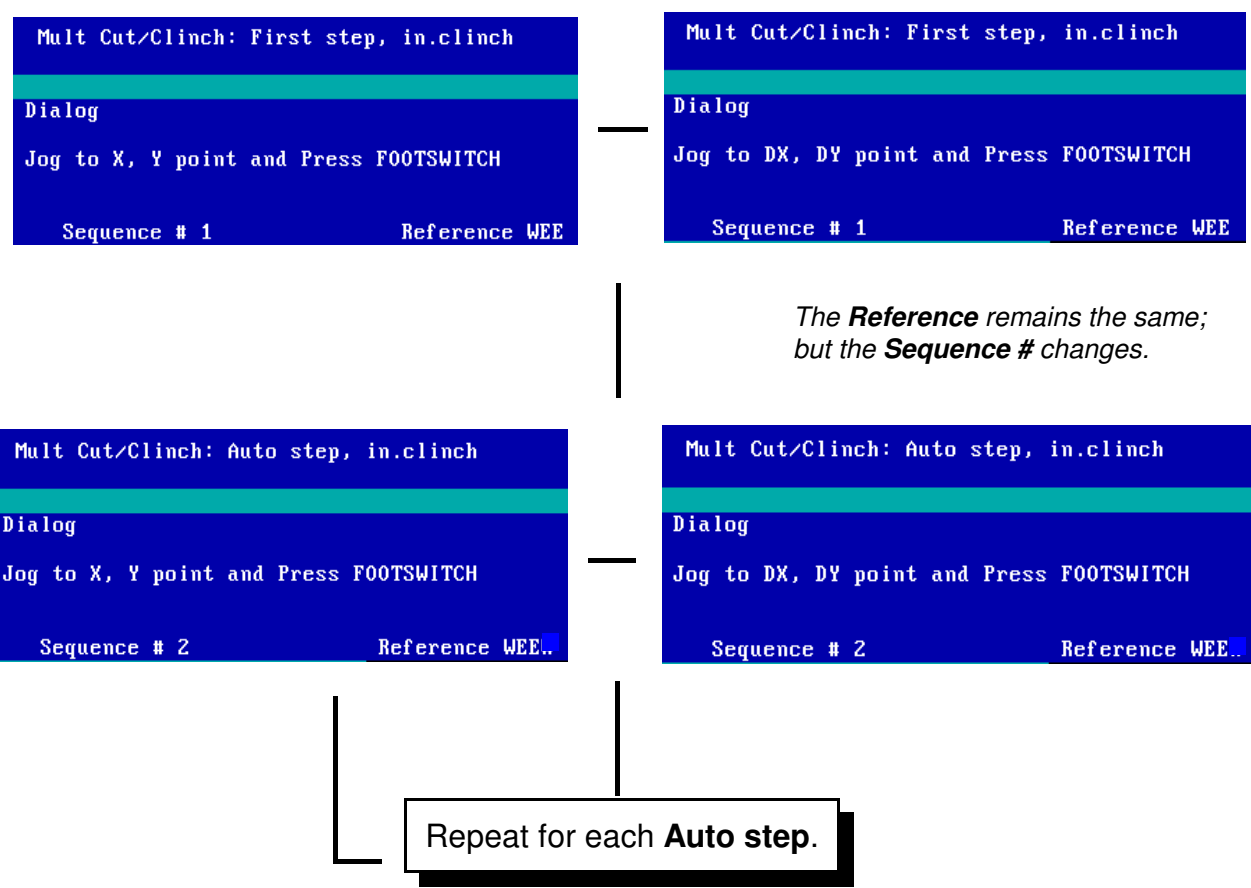
When the last component is digitized, the machine moves to the offset.

MULTI-LEADED COMPONENTS

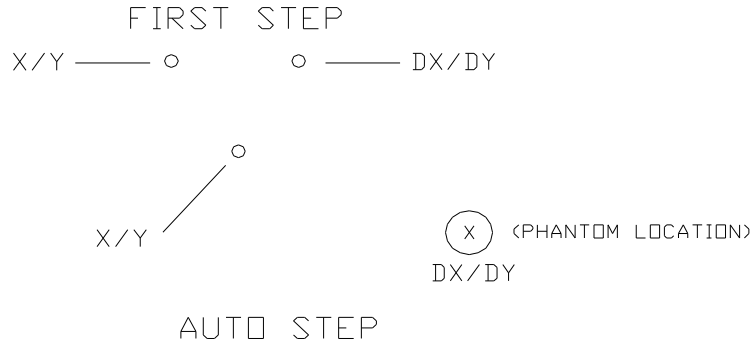
FIRST STEP



AUTO STEP(S)



ODD NUMBER OF LEADS



Mult Cut/Clinch: First step, in.clinch

Dialog

Jog to X, Y point and Press FOOTSWITCH

Sequence # 1 Reference WEE

Mult Cut/Clinch: First step, in.clinch

Dialog

Jog to DX, DY point and Press FOOTSWITCH

Sequence # 1 Reference WEE

*The **Reference** remains the same; but the **Sequence #** change.*

Mult Cut/Clinch: Auto step, in.clinch

Dialog

Jog to X, Y point and Press FOOTSWITCH

Sequence # 2 Reference WEE

Mult Cut/Clinch: Auto step, in.clinch

Dialog

Jog to DX, DY point and Press FOOTSWITCH

Sequence # 2 Reference WEE..

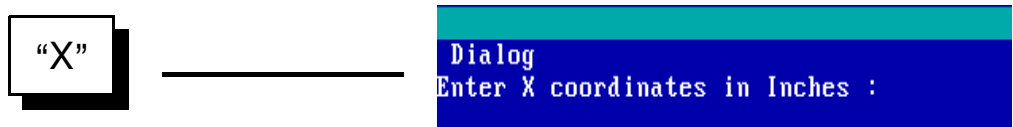
*Repeat **Auto step** as many times as necessary.*

*Digitize the **Phantom** location last.
It's placement should not interfere with other leads.*

MANUALLY ENTERING COORDINATES

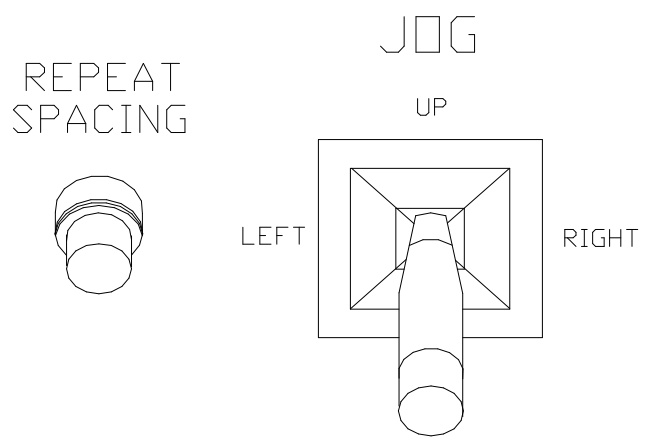
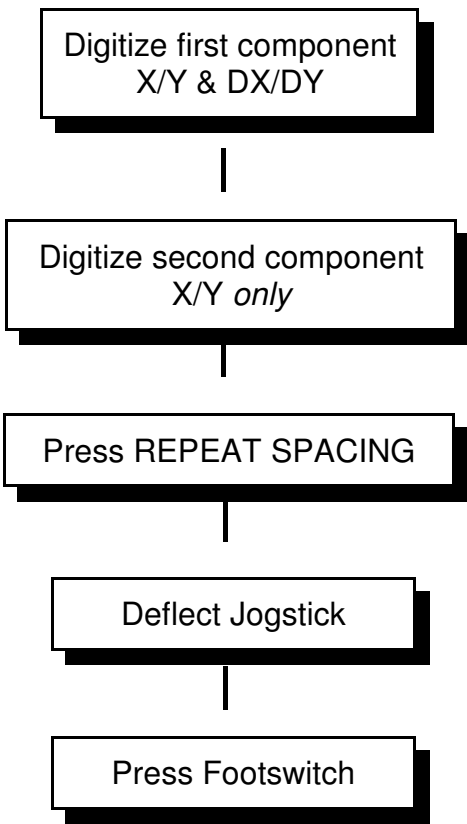
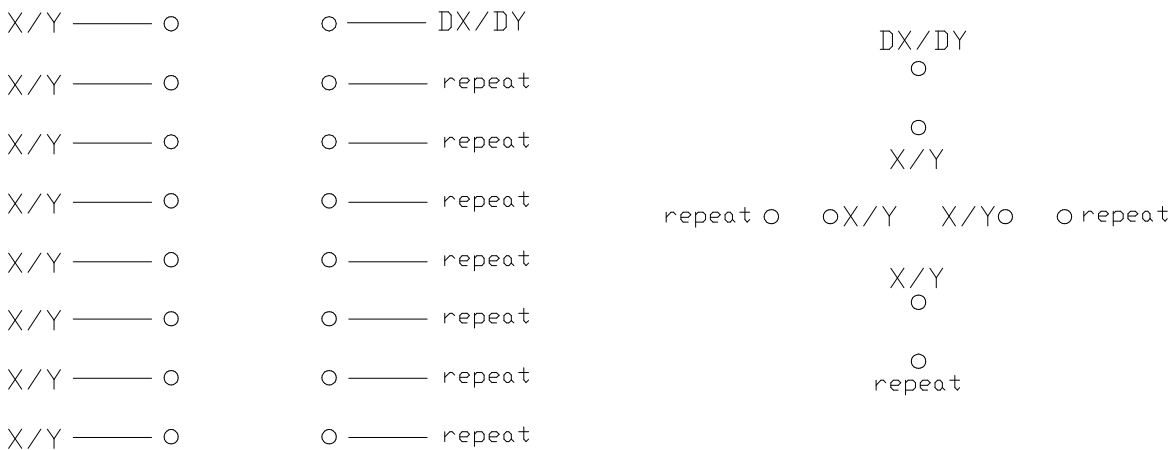
You may manually enter or edit component coordinates.

MOVE TO THE INSERTION LINE



REPEAT SPACING BUTTON

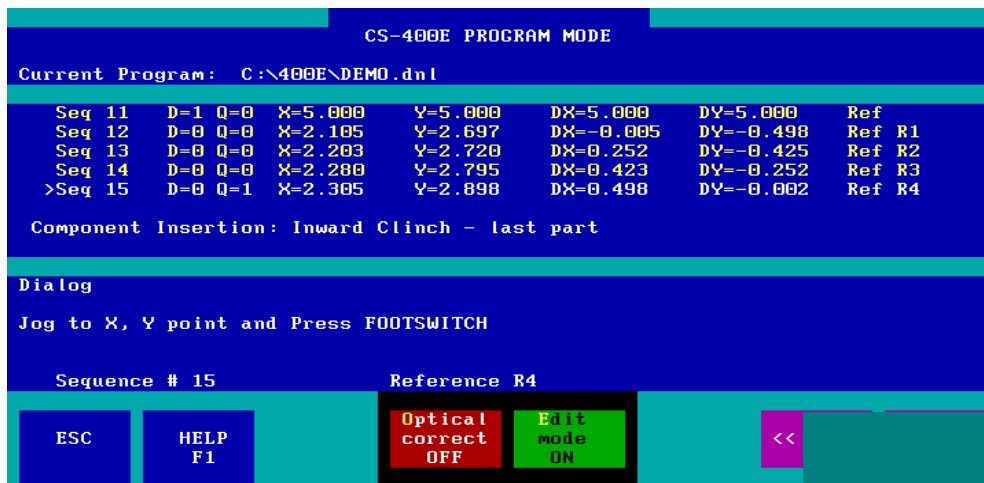
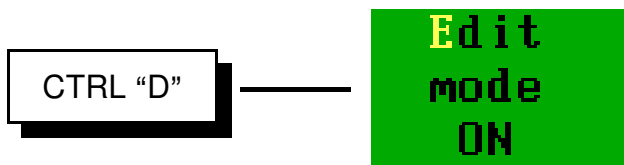
Used to digitize a series of components with **identical** lead spacings.



Component can be placed at 0, 90, 180 or 270.
The projector light will move to indicate the orientation.

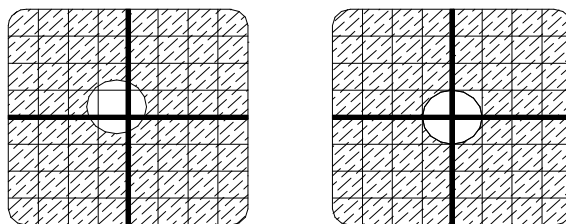
REPEAT FOR EACH COMPONENT

EDIT MODE

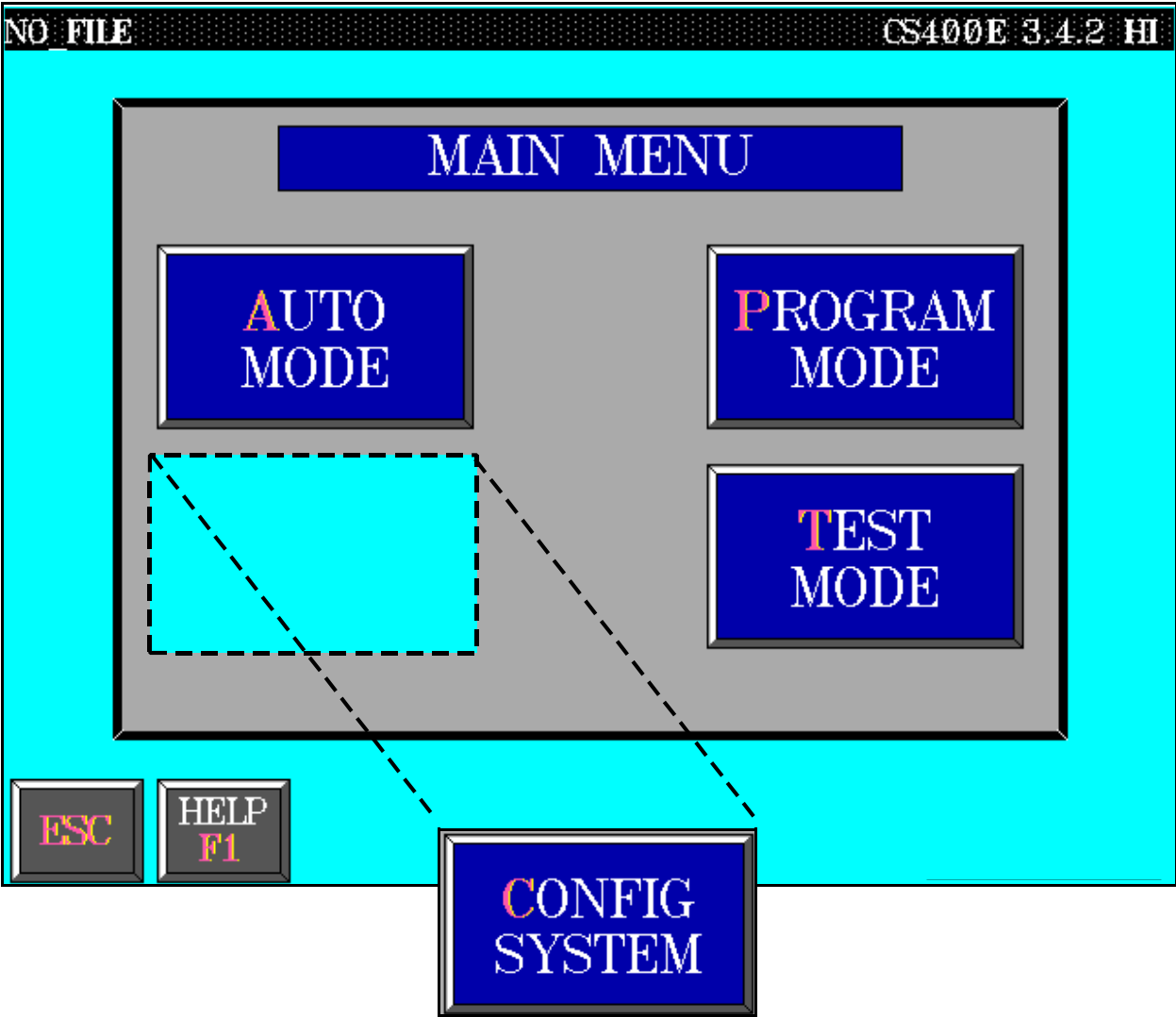


The machine moves sequentially through the insertion lines.

- ▶ *Realign the crosshairs over the hole using the Jogstick.*
- ▶ *Press the Footswitch to save the new X/Y coordinates.*
- ▶ *Repeat for the DX/DY coordinates.*
- ▶ *Use <<Prev Next>> to redo or skip lines.*



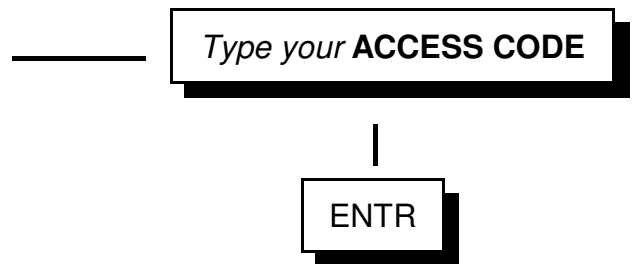
CONFIGURE SYSTEM



Touch the button on the screen, or from the keyboard press "C".

F1 for a list of current options.

CONFIGURE SYSTEM



Use these buttons, or "N" and "P", to page through the options.



Page Up & Down from the keyboard are not valid keys.



Green = enabled.

Red = disabled.

A 400D COMPATIBLE

Converts 400E & 400D programs.
Enable before reading the file.
CAUTION: Save as a different file name
or you will lose the original program.

B DISPENSERS INACTIVE

Disables delivery devices.
Useful for testing machine operator.

C PRG MODE LOCKOUT

Denies operator access to Program
Mode.

D TEST MODE LOCKOUT

Denies operator access to Test Mode.

E VERIFIER OPTION

Component Verifier.

F SAVE/UPLD INCHES

Converts 400E machine motor steps
back to inches before uploading to an
offline programmer.

G STORE HOST FILE

*Stores a downloaded program as **HOST.DNL** in the current directory so that the job may be resumed at startup. Overwrites existing **HOST.DNL**.*

H 400C COMPATIBLE

*Load/edit/run a 400C program. Cannot convert a 400E program to 400C. **CAUTION:** Save as a different file name or you will lose the original program.*

I BASIC FILE ACCESS

Denies operator access to program files. Operator will still have access to current path, including root and sub-directory files.

J EDIT CUT LOCKOUT

Disables ALT "C". Prohibits operator from altering cut/clinck values.

K DISPLAY PART DATA

Displays lead spacing, lead length, clinck direction, insertion orientation and not-digitized warning to operator.

L PRESERVE ORIGIN

Prompts the operator to clear or retain the offset and skew points between program loads.

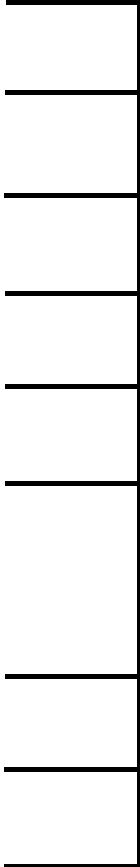
- A** JIT #1 ATTACHED
- B** JIT #2 ATTACHED
- C** LOGPT #1 ATTACHED
- D** LOGPT #2 ATTACHED
- E** ROTARY ATTACHED
- F** LDD ATTACHED

- G** CS-340 ATTACHED
- H** CS-80 #1 ATTACHED
- I** CS-80 #2 ATTACHED

J INVERT SHORTAGES

K SERIES BINS

L JIT PART PROFILING



Delivery Devices available to the 400E.

If you include a device in your program which has not been enabled in Configure System you will receive the error message: "Dispenser is not assigned..."

Runs only those components which have been placed on the shortage list.

Assigns bins 91-180 to a second Delivery Device. (Requires serial bin option & E-prom revision 1.7 or higher.)

*Skips busy JIT bin. (See **JIT Part Profiling**.)*

A DOUBLE FOOTSWITCH

Forces the operator to depress the footswitch once to cut/clinch; and then a second time to move to the next location.

B SHORTAGE WARNING

Warns the operator whenever the machine encounters a shorted component.

C EDI OPTION

KEEP DISABLED UNLESS OTHERWISE INSTRUCTED BY CONTACT SYSTEMS.

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INDEX

- "A" multiple cut/clinch, 22-23
- Access Code, *Configure System*, 71
- Active Message, 13
- Alt "D" delete sequence(s), 36
- Alt "I" image, 25-33
- Alt "O" set offsets, 45-48
- Alt "S" set skew points, 49-51
- Alternate Bins, 15
 - example sequence line, 14
 - program variables, 44
- Angle, clinch
 - program variables, 44
 - setting, 21
 - values for, 19
- Auto Mode
 - setting offsets from, 54
 - setting skew points from, 55
- Auto Step
 - digitizing, multi-leaded, 62
 - digitizing, odd-leaded, 63
 - multiple cut/clinch, 22
- Axial Resistors, *Images*, 25-33
- Bins
 - alternate bins, 15
 - primary bin, 14
 - profiling bins, JIT, 16-17
 - program variables, 44
- Body Colors, *Images*, 25-33
- Body Sizes, *Images*, 25-27, 33
- "C" component name, 12
 - multiple, "A", 22-23
- CAPACITORS, *Images*, 25-33
- Circuit Reference
 - component name "C", 12
 - image variable, colors, 33
 - multiple cut/clinch "A", 22-23
 - program screen, 8
 - program variables, 44
- Clinch Angle
 - program variables, 44
 - setting, 21
 - values for, 19
- Clinch Direction "K", 19-20
- Codes, machine, 39-43
 - cut/clinch, 21
 - image variables, 33
 - program screen, 8
- Coloring
 - color chart, 28
 - images, 25-33
 - resistors, 28, -32
- Colors, chart, 28
- Commands, programming, 5
- Component Coordinates
 - component name, "C", 12
 - digitizing, 45-67
 - program screen, 8
 - program variables, 44
- Component Insertion
 - component name "C", 12
 - digitizing, 45-67
 - multi-leaded "A", 22-23
 - order of, *Programming Logic*, 2
 - polarized components, 18, 60
- Component Name "C", 12
- Configure System, 71
- Coordinates, component
 - component name, "C", 12
 - digitizing, 45-67
 - program screen, 8
 - program variables, 44
- CS-241 Dip Dispenser, 14
- CS-740 JIT, 14
 - alternate bins, 15
 - profiling, 16
 - resolving profile list, 17
- CSX Image, *Machine Codes*, 41
- Ctrl "D", digitize, 58-64
- Ctrl "T", file chooser
 - load a program, 10
 - save a program, 11
- Ctrl "X", delta X, entering manually, 64
- Ctrl "Y", delta Y, entering manually, 64
- Current Sequence
 - program screen, 8
- Cut/Clinch Parameters "W", 21
- Cutters
 - digitizing, 58-65
 - direction, clinch, 20
 - multiple cut/clinch, 22-23
 - parameters, cut/clinch, 21
 - settings, 19
- D
 - image variables, 33
 - machine codes, 39-43
 - program screen, 8
 - program variables, 44
- "D" machine codes, 39-43
- Delete Sequence(s) Alt "D", 36
- Delivery Devices, 14-17
- Delta X, *see DX*
- Delta Y, *see DY*

- Density, board, 19
- Digitizing Ctrl "D", 58-67
 - definition, 58
 - efficient digitizing, 59
 - manually entering coordinates, 64
 - multi-leaded, 62
 - odd-leaded, 63
 - optical correction, 58
 - polarized components, 60
 - repeat spacing button, 65
 - setting offsets & skew points, 45-55
- DIODES, *Images*, 25-33
- DIPS, *Images*, 25-33
 - allowable ranges 24
- Direction, clinch, ""K", 19-20
- Disable, clinch direction, 20
- DX**
 - alternate bins, 14-15
 - digitizing, 58-67
 - cut/clinch parameters, 21
 - machine codes, 39-43
 - program screen, 8
 - program variables, 44
 - skew points, 51
- DY**
 - alternate bins, 14-15
 - digitizing, 58-67
 - cut/clinch parameters, 21
 - machine codes, 39-43
 - program screen, 8
 - program variables, 44
 - skew points, 51
- "E"** end of program, 38
- Edit Mode, 66
- Efficient Digitizing, 59
- Enable, clinch direction, 20
- End of Program "E", 38
- EOP, 38
- Error Checking, *see resistors*, 29-33
- "F"** new program, 9
- F1** Help on-line, 7, 53, 57, 69
- F2** Rotary Bin, 14
- F3** CS-740 JIT, 14
 - profiling, 16-17
- F4** Logpoint Bin, 14
- F5** CS-241 Dip Dispenser, 14
- F6** Polarity, 18
 - insertion, digitizing, 60
- F7** No Polarity, 18
- F8** Both Lamps Blink, 18
- File Chooser Ctrl "T"
 - load a program, 10
 - save a program, 11
- File Name, *see Program Name*
- First Step
 - digitizing, multi-leaded, 62
 - digitizing, odd-leaded, 63
 - multiple cut/clinch, 22
- Fixed Clinch, 58
- Fixed Cutter, 58
- Fixed Length, 58
- Help on-line, **F1**, 7, 53, 57, 69
- "I"** insert sequence(s), 34-35
- Identical Lead Spacing, 65
- Image Alt "I", 25-27
- Images, 25-33
- Inefficient Digitizing, 59
- Insert Sequence(s) "I", 34-35
- Insertion Line, *see Component Insertion*
- Insertion, last part, 35
- "K"** clinch direction, 20
- Last Part, insertion, 35
- Lead Hole Diameters, 19
- Lead Length, 19-21
- Lead Material, 19
- Length, lead, 19-21
- Load Program, 10
- Logic, programming, 2
- Logpoint Bin, 14
- "M"** messages, 13
- Machine Codes, 39-43
 - program screen, 8
- Manually Entering Coordinates, 64
- Messages "M", 13
- Miscellaneous Components, *Images*, 25-33
- Modular Programing, 2
- Movable Clinch, 58
- Moveable Cutter, 58
- Moveable Length, 58
- Moving, around program, 8
- Multi-leaded Components, 62
- Multiple Cut/Clinch "A", 22-23
- Multiplier Band, *see resistors*, 29-33
- "N"** no operation, 37
- Naming, your program, *see New Program "F"*
- New Program "F", 9
- No Image, 24, 26
- No Operation "N", 37
- No Polarity, 18
- Numbering Offsets, 46
- Odd Number of Leads, 63
- Offsets 45-48, 54
 - numbering, 46
 - saving to program, 48
 - setting, from program mode, 47
 - setting, from auto mode, 54
- Optical Correct, 58

- "P" part number
 - programming commands, 5
 - sample, program, 4
 - structure, program, 3
- Part Number "P"
 - programming commands, 5
 - sample, program, 4
 - structure, program, 3
- Part Profiling, JIT, 16-17
- Passive Message, 13
- PCX Image, *Machine Codes*, 41
- Phantom Location, 63
- Polarity, 18
 - digitizing, 60
- Precision Resistors, 29
- Primary Bin
 - delivery devices, 14-15
 - program variables, 44
- Program Mode, 7, 57
- Program Name
 - new program "F", 9
 - program screen, 8
- Programming Commands, 5
- Q
 - image variables, 33
 - machine codes, 39-43
 - program screen, 8
 - program variables, 44
- "Q" machine codes, 39-4
- Radial Resistors, *Images*, 25-33
- Ref
 - component name "C", 12
 - image variable, colors, 33
 - multiple cut/clinch "A", 22-23
 - program screen, 8
 - program variables, 44
- Reliability, *see resistors*, 29-33
- Repeat Spacing Button, 65
- Reset Delivery Devices, 14-15
 - sample, program, 4
 - structure, program, 3
- RESISTORS, *Images*, 25-33
- Resolving Profile List, 17
- Rotary Bin, 14
- "S" move to sequence line
 - commands, programming, 5
 - program screen, 8
- Sample Program, 4
- Saving
 - offsets, from program mode, 48
 - program file, 11
 - skew points, from program mode, 51
- Sequence Line
 - program screen, 8
- Setting Offsets
 - from auto mode, 54
 - from program mode, 47
- Setting Skew Points
 - from auto mode, 55
 - from program mode, 50
- Settings, cut/clinch, 19
- SIPS, *Images*, 25-33
 - allowable ranges, 24
- Skew, 49-51, 55
- SOCKETS, *Images*, 25-33
 - allowable ranges, 24
- Standard Resistors, 29
- Structure, program, 3
- Tables
 - alternate bins, 15
 - body colors, images, 28
 - colors, images, 28
 - commands, programming, 5
 - cut/clinch settings 19
 - delivery devices, 14
 - image variables, 33
 - machine codes, 39-43
 - programmer/operator, 1
 - program variables, 44
 - reliability, resistors, 28
 - resistor conventions, 29
 - resistor values, 32
 - sample program, 4
 - structure, program, 3
 - tolerance, resistors, 28
- Tolerance, *see resistors*, 28-33
- Traces, location on board, 19
- TRANSISTORS, *Images*, 25-33
- Variables, image, 33, 44
- Variables, program, 44
- Verifier, component, *Machine Codes*, 40
- "W" cut/clinch parameters, 21
- X
 - alternate bins, 14-15
 - digitizing, 58-67
 - cut/clinch parameters, 21
 - machine codes, 39-43
 - program screen, 8
 - program variables, 44
 - skew points, 51
- Y
 - alternate bins, 14-15
 - digitizing, 58-67
 - cut/clinch parameters, 21
 - machine codes, 39-43
 - program screen, 8
 - program variables, 44
 - skew points, 51
- Zero, board, 45