CAM DESIGNER INSTALLATION AND INSTRUCTION MANUAL

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SECTION 5 : FILE DESCRIPTIONS

\ DENFORD
\ ORIGINAL

SUPERVISORS SECTION.

- NOTEPAD — Metric thread table P200-21

LADESIGN .OPT — customise
.LDF — mild steel standard

* .THR
* .OPT
* .LDF
.LSH

SPACE — highlight from menu bar.

CTRL → ← — to select - enter editing cursor key to size

RTN — accept cursor to highlight

DEL — delete

F5 — Info — ESC — clear

highlight — RTN — edit — cursor keys — RTN

F9 — Settings Menu

F10 — Main menu — ESC

Tools 1 - facing
- roughing - finishing

3 - Threading

5 - grooving — P28
parting off

CTL T — toggle thread cylinders

F1 - help

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Certain system parameters can be changed by the Supervisor so the system is correctly setup for the pupil.

Screen Rulers

The screen rulers should be set to the size of the metal part, used for the design. See Options File, Section 5.1

If the Design is less than the size of the Ruler, on Diameter, all excess metal will be removed by the program.

A Design above the size of the rulers will not be possible.This ensures that any Design can be safely machined.

Units Of Measurement.

There are two units of measurement allowed, Metric and Imperial. Set the Default in the Options File, Section 5.1

The software comes with Metric set as standard.

Materials File.

The Default material file can be set in the Options File. This is set for Mild Steel when you receive the software. See Lathe Data Files, Section

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SECTION 1

- INSTALLATION

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1.1 INSTALLATION ONTO A HARD DISC SYSTEM

To install the software onto your hard disc use the following sequence:

- 1) Switch on the computer and wait for the C> prompt.
- 2) Make a Directory in the root directory of the Hard

  Disc "\DENFORD" by typing **MD \DENFORD**.
- 3) Insert the CAM DESIGNER SYSTEM DISC into drive A:
- 4) Type **COPY A:*.* C:\DENFORD**
- 5) Insert the POST PROCESSOR DISC and repeat step 4.
- 6) Insert the DRIVERS DISC and repeat step 4.

The software is run by executing the **LDESIGN.EXE** file in the DENFORD directory, a batch file can be placed in the root directory to achieve this.

To generate the batch type the following:-

COPY CON \LDESIGN.BAT

CD \DENFORD

LDESIGN

CD (Ctrl Z) (Enter)

Type **LDESIGN** to run the program.

(remember to have your security key connected).

IMPORTANT! MAKE BACKUP COPIES OF YOUR SOFTWARE BEFORE INSTALLATION.

Use the DOS DISKCOPY Command as follows:

- 1) Place your Dos disc in drive A
- 2) Type **DISKCOPY** followed by **RETURN**
- 3) Place the source disk in drive A
- 4) When the computer prompts for the destination disk, insert a blank disk. The disc will be formatted and an exact copy made.

1.2 INSTALLATION ONTO A FLOPPY DISC

LDESIGN OR SYSTEM DISC	Contains the program files
DRIVERS DISC	Contains files needed only when re-configuring the software.
POST PROCESSOR DISC	Contains the routines that convert DESIGNER files into machine files (Eg. Starturn). This disc may also be used as a Data Disc.

- 1) Boot up the computer and wait for the **A>** prompt.
- 2) Insert the **LDESIGN DISC** into drive A and type **LDESIGN.**

If the disc is being run for the first time, a configure menu will appear (this may have already been done at Denford's). The **DRIVERS DISC** is required when using the configure menu.

For dual disc systems:-

The **POST PROCESSOR DISC** should be placed in Drive B.

All data should be saved to Drive B.

(i.e. The "Change Path" option should be set to **B:**)

For Single Disc Drive Systems:-

The **POST PROCESSOR DISC** should be placed in Drive A

when selecting Make Part, Disc Save and Load operations.

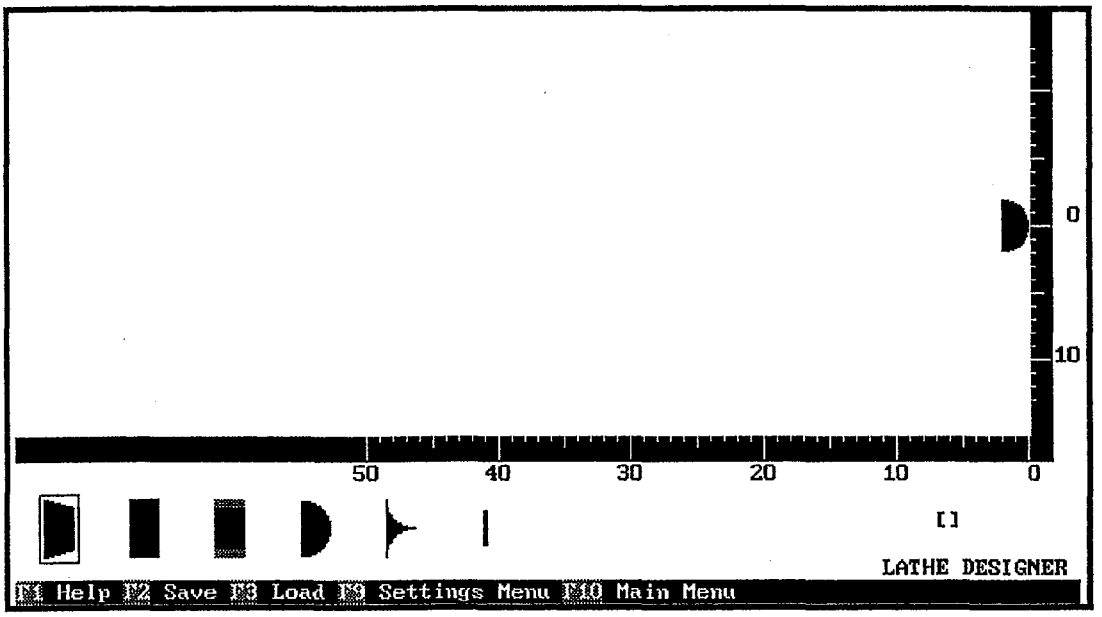
NOTE:

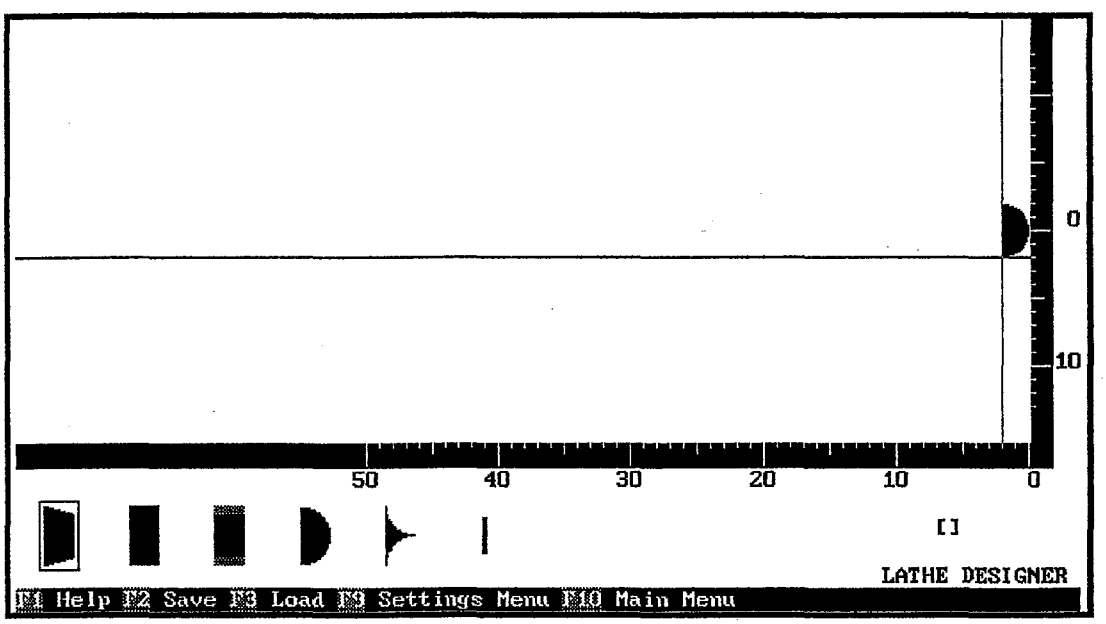
The **LDESIGN DISC** must be in Drive A when selecting the **RESET** option.

SECTION 2

- USING CAM DESIGNER

INITIAL SCREEN DISPLAY AND SCREEN SHOWING DISPLAY WITH CROSS HAIRS ON





2.1 STARTING A DESIGN

On running the software the first screen presents the main editor and a start shape, see diagram opposite.

- Highlight the shape you wish to place at the far right of the profile. This is done by positioning the red box around the shape displayed at the bottom of the screen using the space bar.
- Select the shape by pressing CTRL →

  This puts the program into block editing mode.
- Use the cursor key to position the cross hairs on the rulers at the required size.

  Remember there are some limitations put on the movements of the cursor by the software (See Section 2)
- Press RETURN to accept the size of shape

  You should see the shape chosen appear on the screen.
- The shape you have just inserted appears in light blue and the start block is moved to the left.

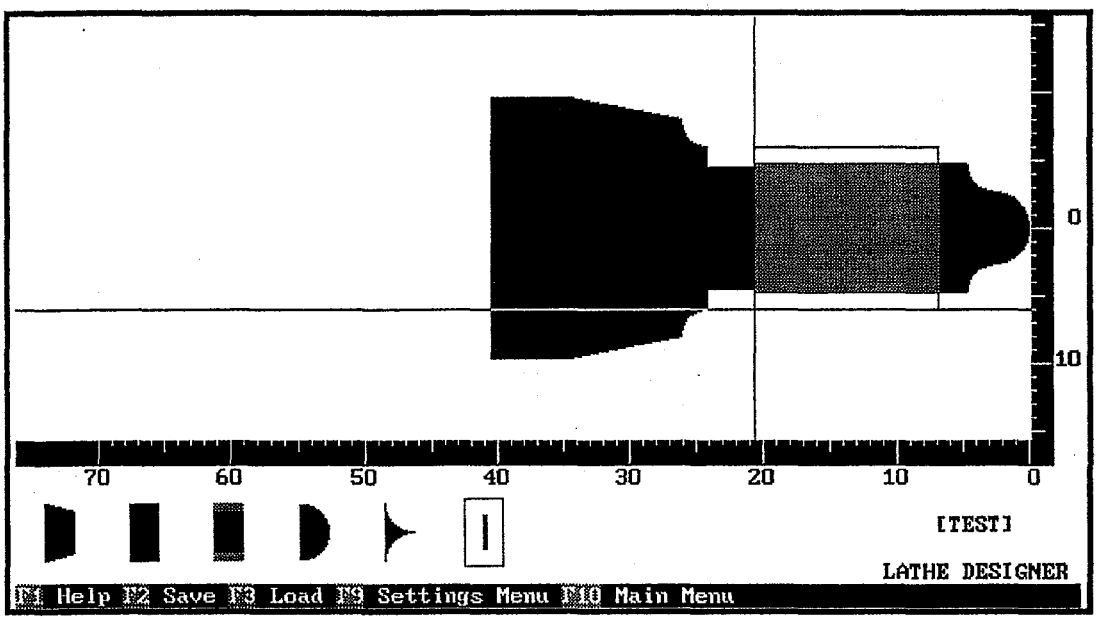
  To enter another block to the right of the start block
- Move the highlighted (light blue) block to the left using the cursor key, so highlighting the start block.
- Choose the next shape to insert using the space bar.
- Select the shape using CTRL →
- Use the cursor keys to again move the cross hairs on the rulers at the required size.
- Press RETURN to accept the size chosen.

Notes:

1. The start shape can be deleted by inserting another shape to the left or right, highlighting the start shape and pressing DELETE. Note, one shape must always be displayed.

2. To change the speed of movement of the cross hairs between fast and slow, release the cursor keys, press the space bar and resume movement.

SCREEN SHOWING SCREW THREAD HIGHLIGHTED, WITH CROSS HAIRS DISPLAYED



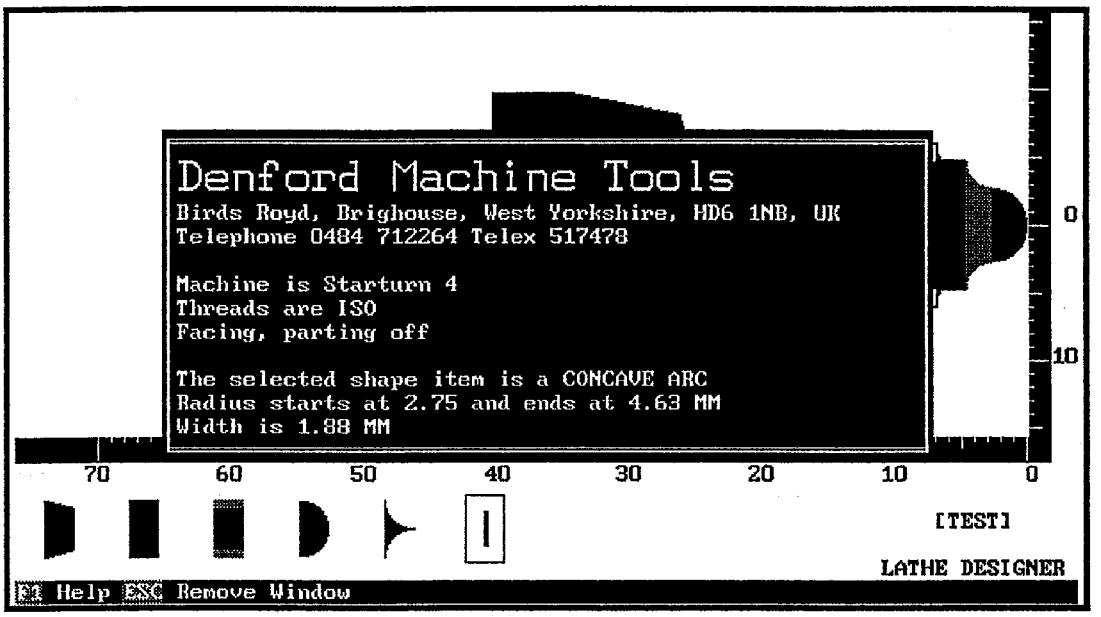
2.2 INSERTING A NEW SHAPE TO EITHER SIDE OF A HIGHLIGHTED SHAPE.

A new shape can be inserted to either side of any shape that makes up the profile. (See diagram on opposite page)

To do this use the following steps:

- Use the left and right cursor keys to highlight a block.
- Choose the shape you wish to insert using the space bar.
- If you wish to insert the shape to the left of the highlighted block, Press CTRL ←
- If you wish to insert the shape to the right of the highlighted block, Press CTRL →
- Use the cursor keys to move the cross hairs to the correct ruler size.
- Press RETURN to draw the shape.

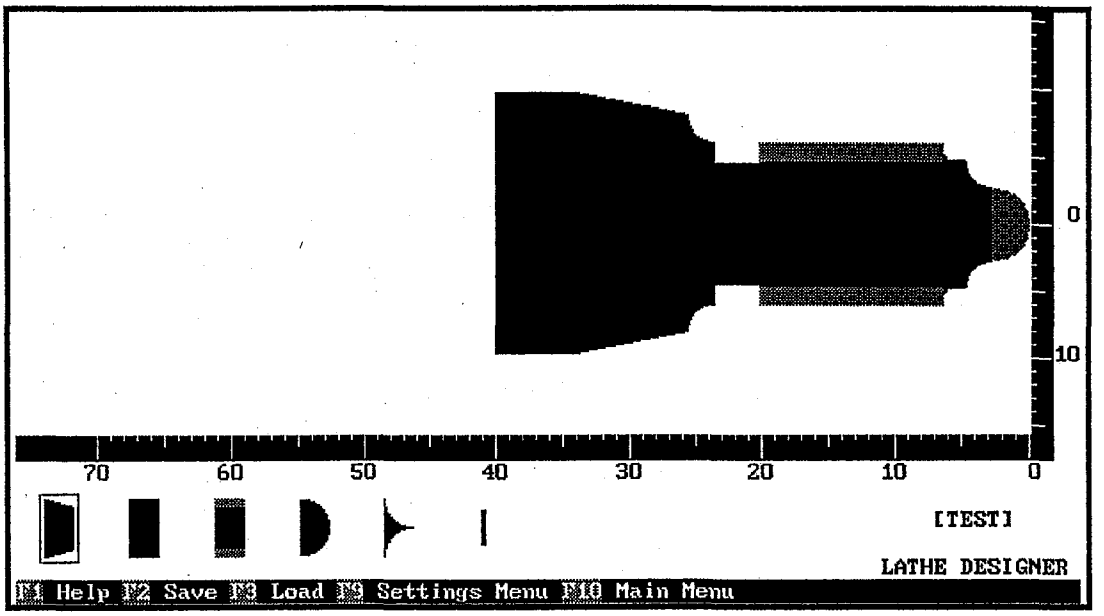
2.3 INFORMATION ABOUT THE CURRENT SHAPE



Information on any shape can be obtained by:

- Highlighting the shape using the left and right cursor keys
- Pressing F5 to display an information window.
- Press ESCAPE to clear the window.

2.4 EDITING A CHOSEN SHAPE



Any shape can be edited by the following steps.

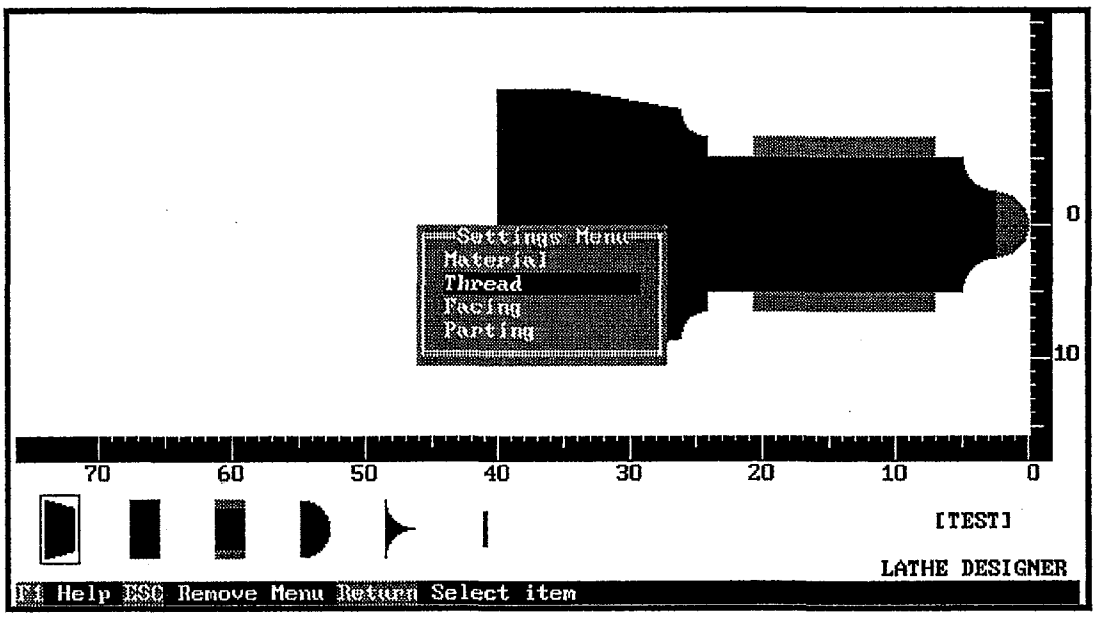
- Highlight the shape to be edited using the left and right cursor keys.
- To delete the shape, Press the DELETE key.
- To change the size of a highlighted shape

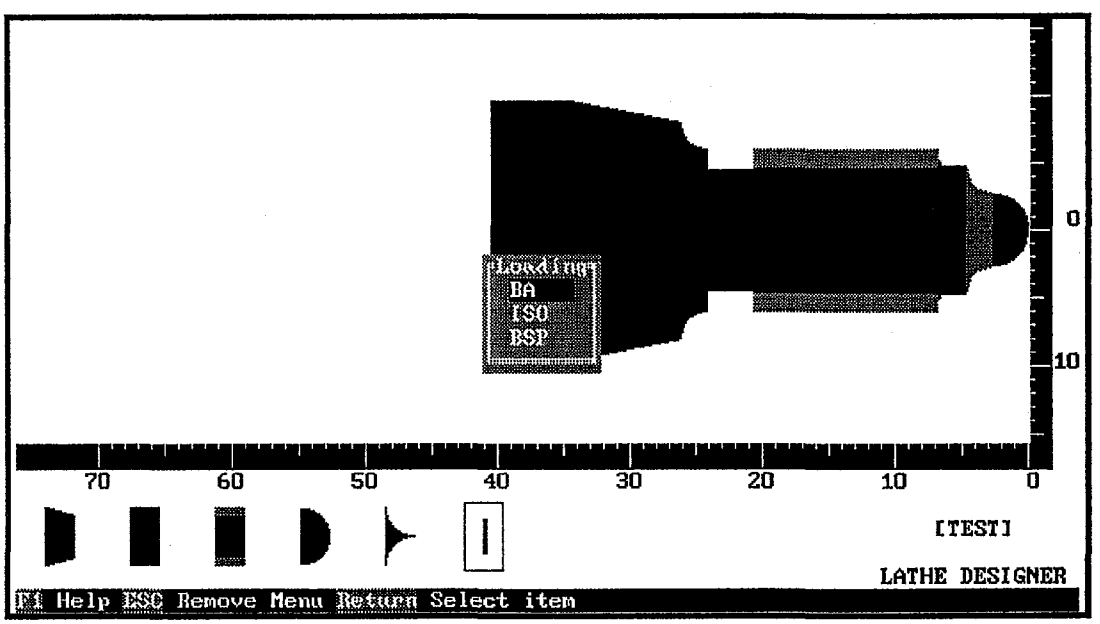
  a) Press RETURN, this displays the cross hairs.

  b) Move the crosshairs to the new ruler position for the highlighted shape.

- Press RETURN to accept the changes.

SCREENS SHOWING SETTINGS MENU AND SELECTION TABLE FOR TYPE OF THREAD





2.5 THREADING

To insert a thread follow the instructions to insert a shape making sure to choose the thread option.

(This is the "two colour" rectangle.)

To see how the threading parameters are set at the moment:

- Highlight the threaded shape and Press F5.
- Press ESCAPE to return to edit mode.

Altering threading parameters.

To alter the Threading Parameters:

- Press F9 to display the Settings Menu
- Select Thread by using the cursor key to highlight the option
- Press RETURN.
- Select the type of thread from the list given:-

i.e. BA, ISO, BSP by highlighting your selection and pressing RETURN.

(This selection can be made at any time during the design)

The threading tables used for calculating threads are as described on the following pages.

New threading tables can be created following the same format as on page 17

2.6 THREADING TABLE EXAMPLE

I.S.O. METRIC COURSE THREADS

(all dimensions in mm)

Number	O. Dia.	Core	Pitch
01	1.6	1.1706	0.35
02	3.0	2.3866	0.5
03	4.0	3.1412	0.70
04	5.0	4.0184	0.80
05	6.0	4.7732	1.00
06	7.0	5.7732	1.00
07	8.0	6.4664	1.25
08	10.0	8.1596	1.50
09	12.0	9.8530	1.75
10	14.0	11.5462	2.00
11	16.0	13.5462	2.00
12	18.0	14.9328	2.50
13	20.0	16.9328	2.50
14	22.0	18.9328	2.50
15	24.0	20.3194	3.00
16	27.0	23.3194	3.00
17	30.0	25.7060	3.50
18	33.0	28.7060	3.50

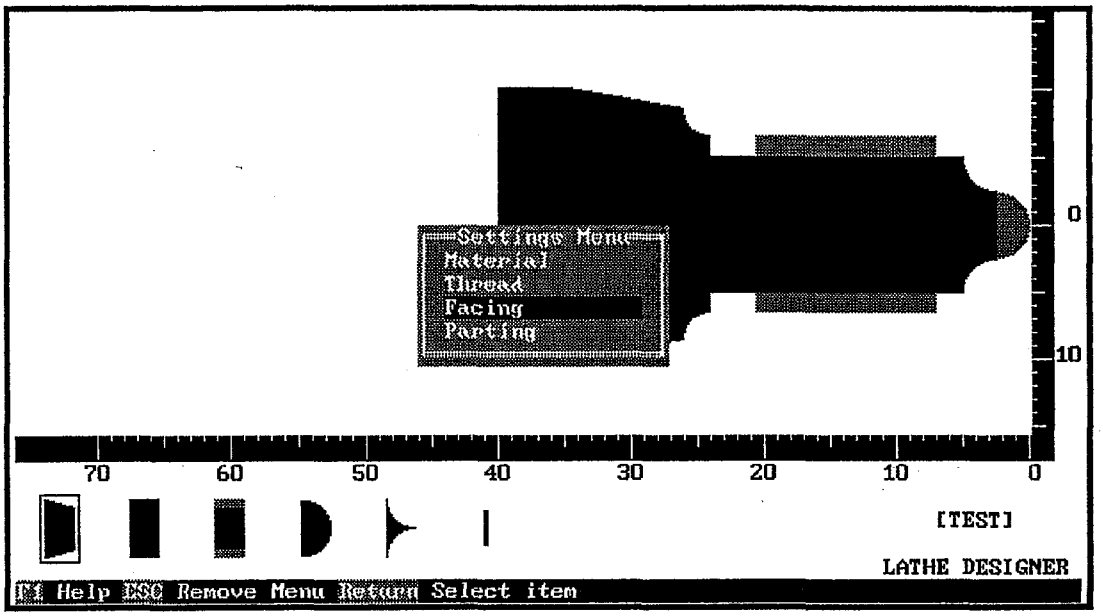
THREADING FILE EXAMPLE (ISO.THR)

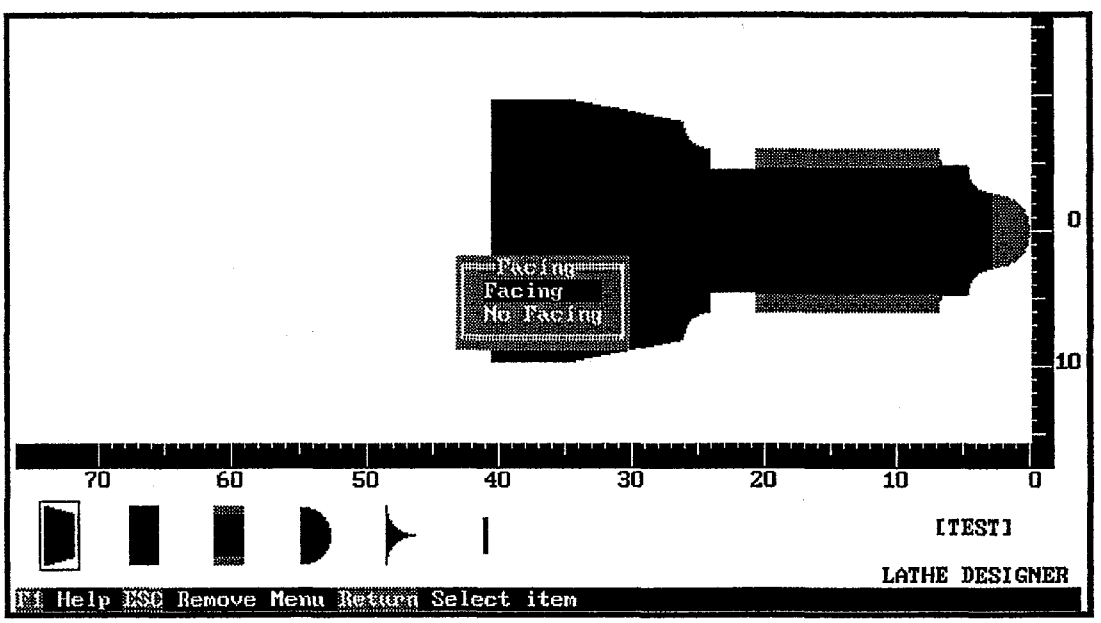
```
# ISO
METRIC
O_01   1.6
O_02   3.0
O_03   4.0
O_04   5.0
O_05   6.0
O_06   7.0
O_07   8.0
O_08   10.0
O_09   12.0
O_10   14.0
O_11   16.0
O_12   18.0
O_13   20.0
O_14   22.0
O_15   24.0
O_16   27.0
O_17   30.0
O_18   999.0
C_01   1.1706
C_02   2.3866
C_03   3.1412
C_04   4.0184
C_05   4.7732
C_06   5.7732
C_07   6.4664
C_08   8.1596
C_09   9.853
C_10   11.5462
C_11   13.5462
C_12   14.9328
C_13   16.9328
C_14   18.9328
C_15   20.3194
C_16   23.3192
C_17   25.706
C_18   28.706
P_01   0.35
P_02   0.5
P_03   0.7
P_04   0.8
P_05   1.0
P_06   1.0
P_07   1.25
P_08   1.5
P_09   1.75
P_10   2.0
P_11   2.0
P_12   2.5
P_13   2.5
P_14   2.5
P_15   3.0
P_16   3.0
P_17   3.5
P_18   3.5
```

Format as follows:

"Name of thread"
METRIC or IMPERIAL
O (outside diameter) Number Value
C (core diameter) Number Value
P (pitch) Number Value

SCREENS SHOWING SETTINGS MENU AND FACING OPTION





2.7 FACING OPTION

Using CAM designer it is possible to select whether or not you wish the blank to be faced off before starting to machine the component.

The selection of the facing option is made as follows:-

- Press F9 to display the Settings Menu
- Select Facing Option by highlighting the option using the cursor keys and Pressing RETURN.
- The options available will appear in "white" text highlight the Facing Option.

NOTE:

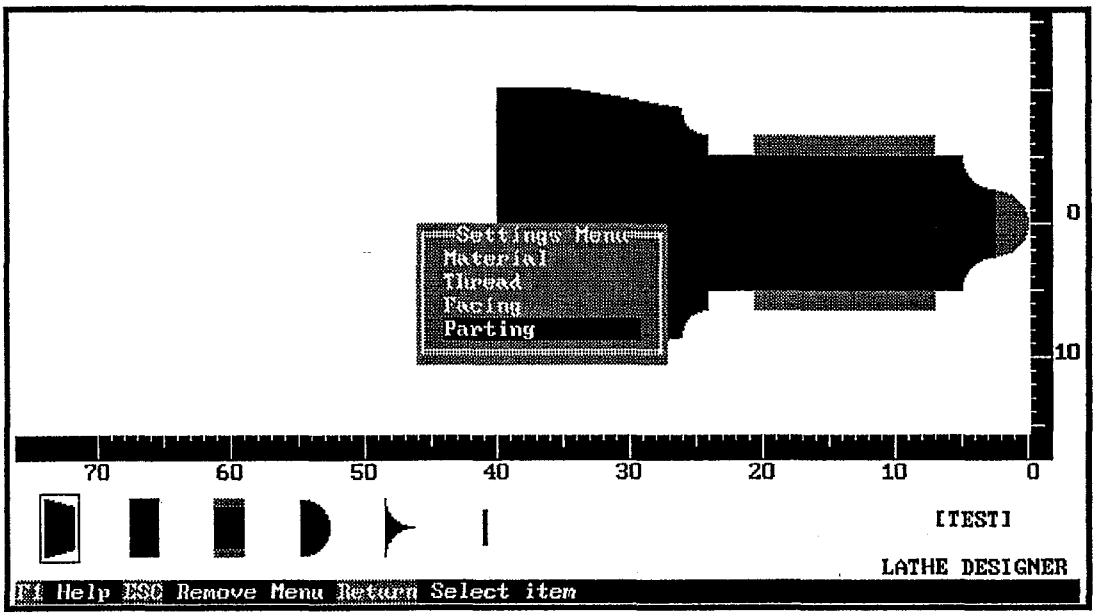
The option already set will appear as dimmed text

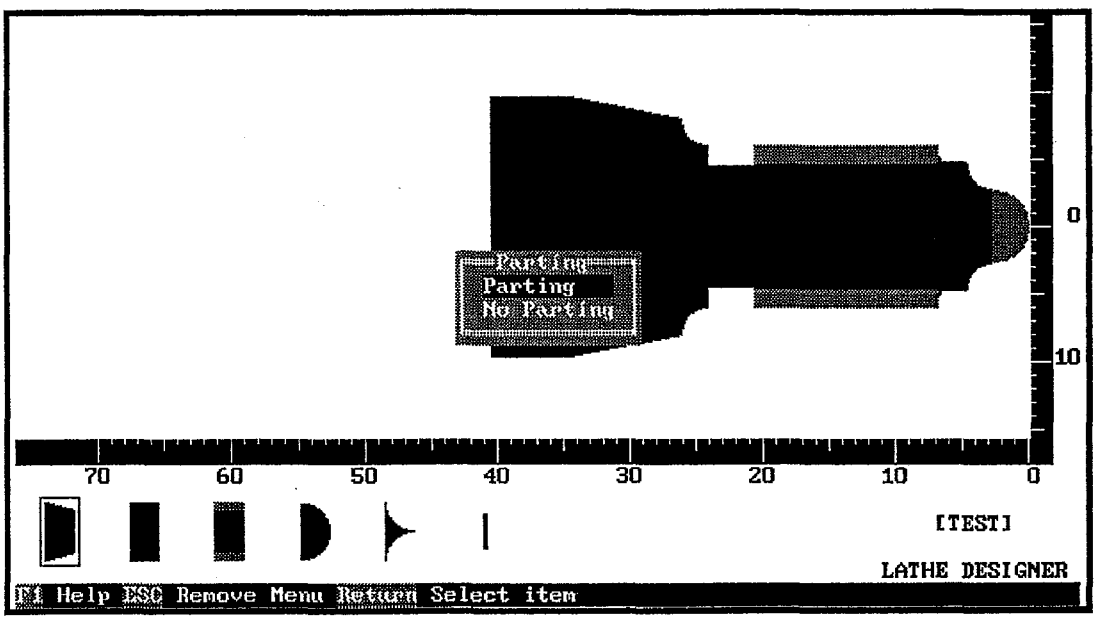
- Select the option by pressing RETURN

NOTE:

The default value for facing or not facing can be set in the LDESIGN.OPT file. See Section 5 for more detail.

SCREENS SHOWING SETTINGS MENU AND PARTING OPTION





2.8 PARTING OPTION

CAM Designer allows you to select whether or not you wish the final turned profile to be parted off.

This is done by using the following procedure:-

- Press F9 to display the Settings Menu
- Select parting by highlighting the option using the cursor keys and pressing return.

  The options available will appear in "white" text.
- Highlight the facing option.

NOTE:

The option already set will appear as dimmed.

- Select the option by pressing RETURN

Important:

Parting off can only be successfully achieved if the following points are adhered to:

1. The distance from the chuck should be as small as possible.

2. The Feeds and Speeds should be correct for the material being cut.

3. The tool height should be set JUST ABOVE centre height.

Note:

The Feeds & Speeds can be set by editing LDF (Lathe Data Files) or creating new ones. See section 5.2

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SECTION 3

- RULES FOR SHAPE DEFINITION

3.1 RULES FOR SHAPE DEFINITION

Each shape has to adhere to certain rules and the software checks to make sure the designed component can actually be machined.

SIZES

This rule applies to all the shapes except grooves:-

The diameter of a shape cannot be smaller that the previous shape. Therefore all shapes moving from right to left must be the same diameter or bigger.

The cursors can only be moved to a position that is allowed. The cursor stops moving when:-

a) Trying to define an arc that is not 90 degrees.

b) Trying to move the diameter cursor to a position below the previous shape.

FACING

Facing, if selected will be the first operation and Tool 1 will be used.

ROUGHING AND FINISHING

Tool Number 1 will be placed in the CNC program for all roughing and finishing work' so be sure to fit the Tool in the correct position if you have a programmable toolpost. The depth of cut for roughing is worked out automatically with a change in spindle speeds at certain diameters. All feed rates are calculated by the software. All shapes except the groove and thread have roughing and finishing operations.

GROOVING

The right most shape defines a groove and is the width of our standard grooving and parting off Tool (1.5mm). You can insert any number of grooves. Setting a groove width to more than 1.5mm will result in several grooving cuts being programmed.

Tool number 5 will be placed in the CNC program for all grooving work, so be sure to fit the Grooving Tool into the correct position if you have a Programmable Toolpost.

All grooves will be machined after the roughing and finishing profiles but before the threading.

THREADING

Shape Number 2 is the Threading Shape, defined by two colours. You can have any number of threads and the pitch, root diameter, speed and feed are all automatically inserted in the program.

The start of Threading will be 3mm to the right of the defined thread and if there is a groove at the end of the thread 0.5mm will be added allowing the threading tool to run into the groove.

Tool number 3 will be placed in the CNC program for all grooving work, so be sure to fit the Grooving Tool into the correct position if you have a Programmable Toolpost.

PARTING

Parting Off, if selected will be the last operation and Tool Number 5 will be used.

Note:

Speeds and Feeds are set by the LDF (Lathe Data Files). See Sectio 5.2.

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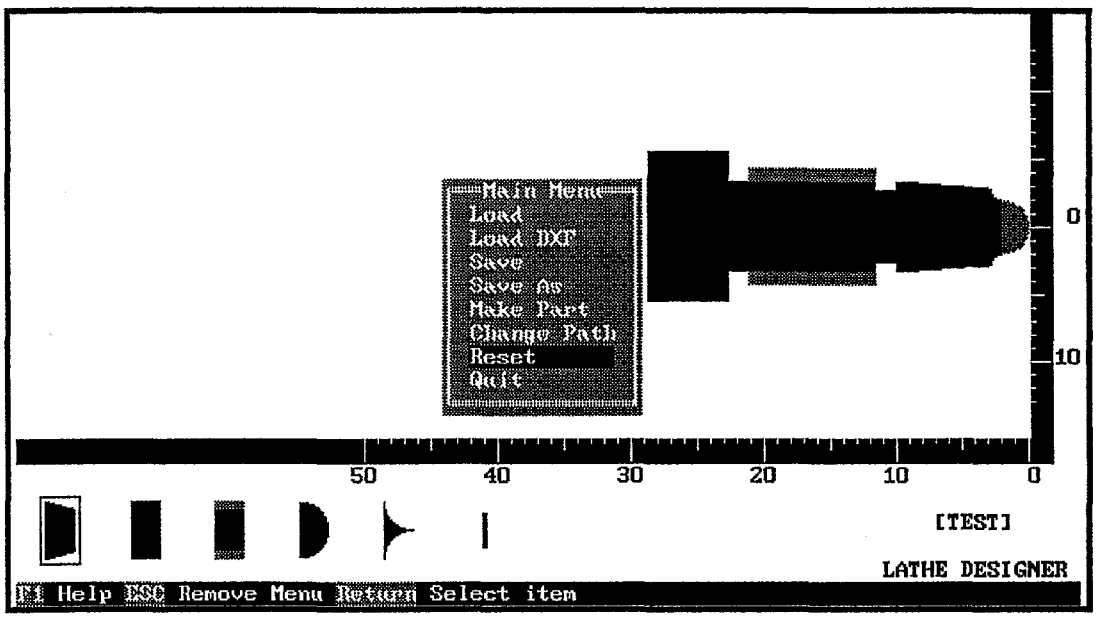
SECTION 4

- OTHER FUNCTIONS

4.1 RESETING AND STARTING A NEW DESIGN

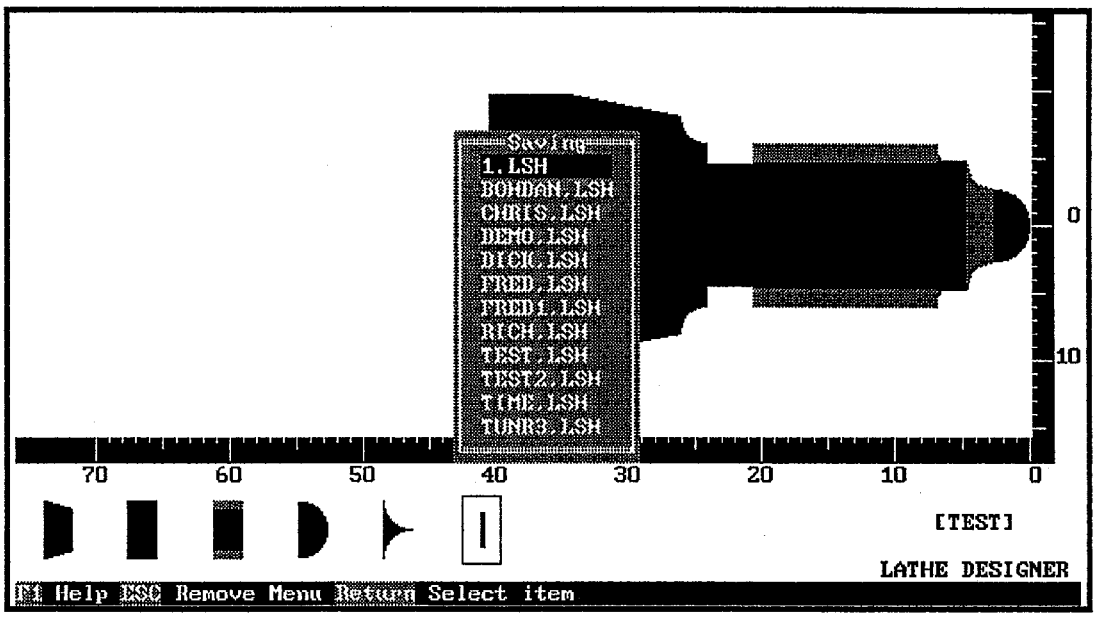


To start a new design you need to clear the current design.

This is done by using the following procedures.

- Press F10 to display the Main Menu.
- Select the Reset option by highlighting the option and pressing RETURN.
- Return to edit mode by pressing ESCAPE.

4.2 SAVING A DESIGN USING "SAVE AS"



This option must be used when saving a new design for the first time or to change the name of a saved design.

To save a finished profile use the following procedure:-

- Press F10 to display the Main Menu
- Select the SAVE AS option by highlighting the option and pressing RETURN.
- Either type in the filename or press the space bar and then RETURN to see a list of the profiles already saved in the current directory. You can then save the profile under an existing filename

NOTE:

This will overwrite the old profile.

- Press ESCAPE to return to edit mode. The filename is displayed in the bottom right of the screen . Once a design has been saved for the first time, or loaded, it has been given a file name.
- "Save as" is used to give a new design a name or to save an existing design under a new filename.

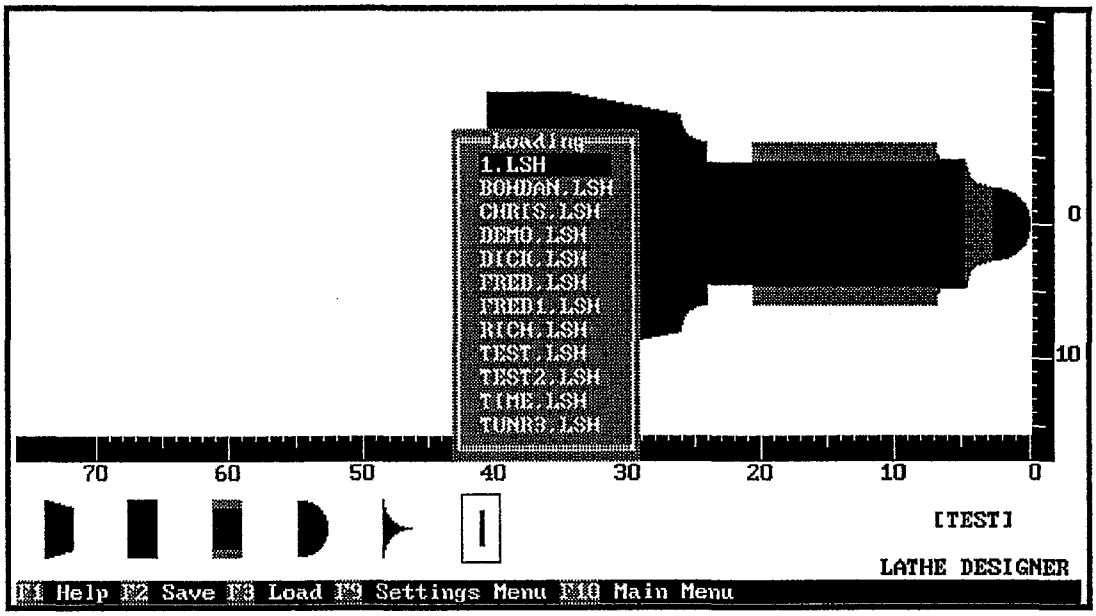
4.3 SAVING A DESIGN USING SAVE

To save a profile under its existing file name use the following procedure:-

- Press F10 to display the Main Menu
- Select the SAVE option by highlighting the option and pressing RETURN.
- Return to edit mode by pressing ESCAPE.

This differs from Save as by not prompting for a filename

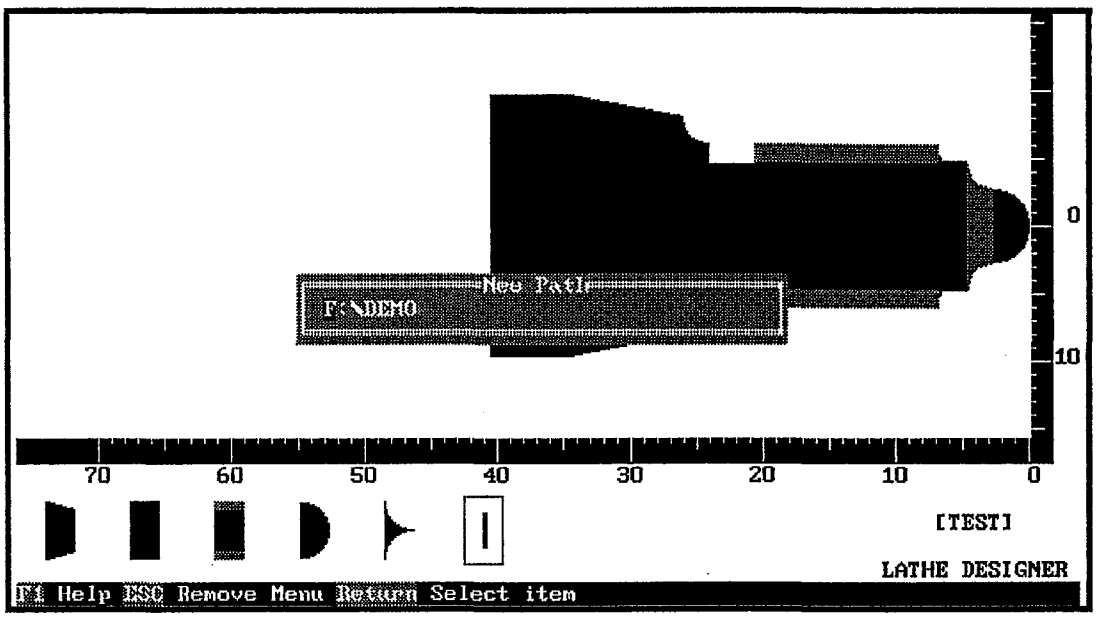
4.4 LOADING A DESIGN



To load a design use the following procedure.

- Press F10 to display the main menu
- Select the LOAD option by highlighting the option and pressing RETURN.
- Either type in the file name you wish to load or press the space bar to clear the option and then RETURN to see a list of the profiles in the current directory. Any design can then be loaded by highlighting the name and pressing RETURN.
- Return to edit mode by pressing ESCAPE.

4.5 CHANGING THE PATH



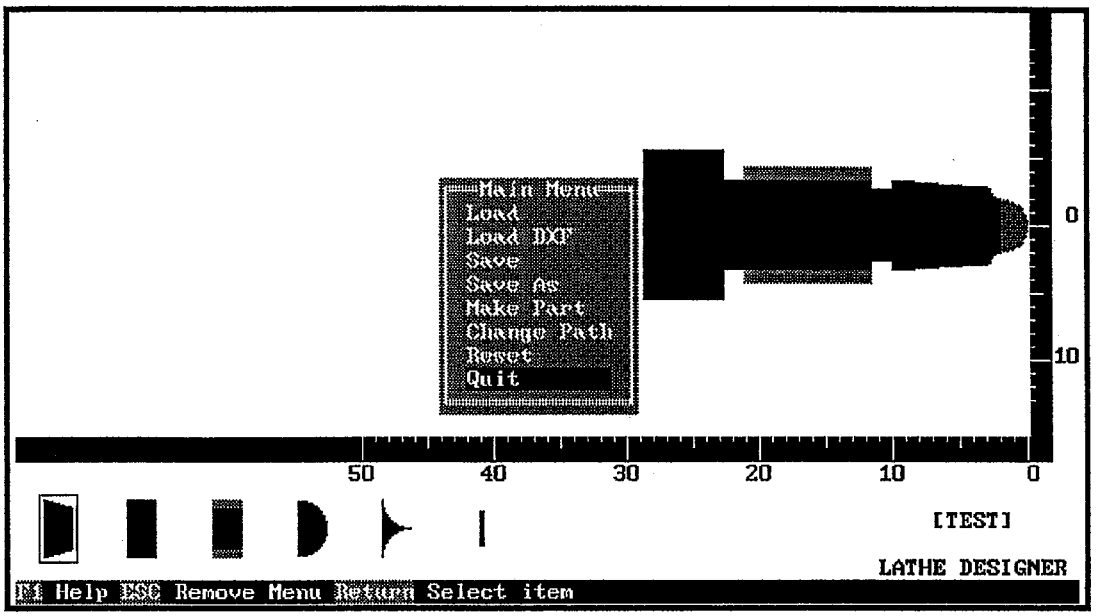
To change the current path, use the following procedure:-

- Press F10 to display the Main Menu.
- Select the CHANGE PATH option by highlighting the option and pressing RETURN.
- Use the DELETE key to delete the present path.
- Type in a new path
- Press RETURN to accept the new path.
- Press escape to return to edit mode.

Note:

Path is another name for Directory.

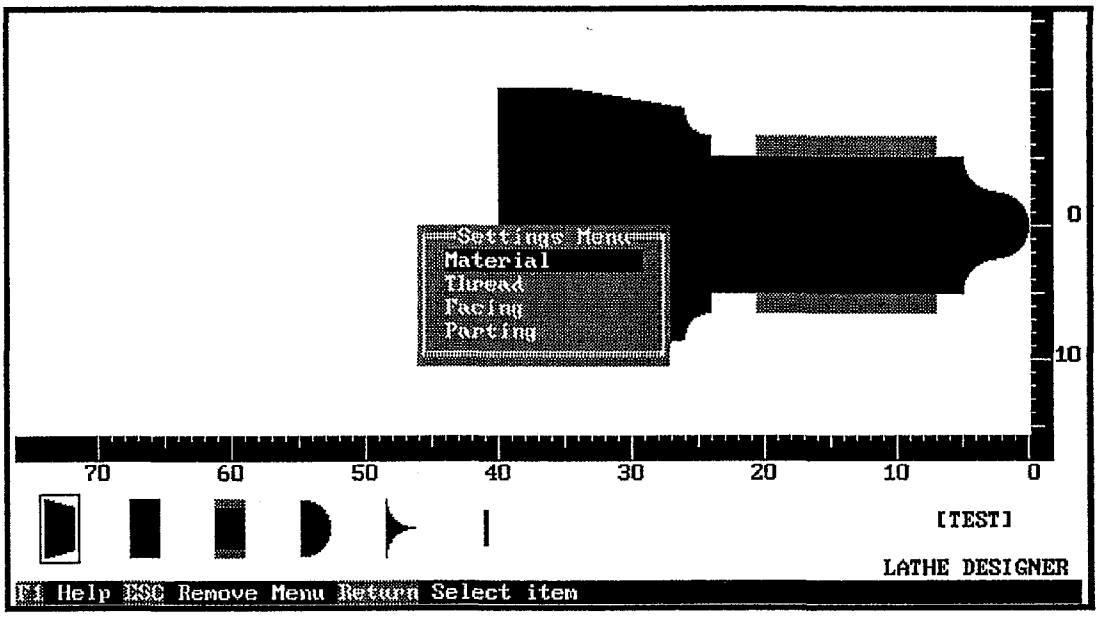
4.6 QUITTING CAM DESIGNER

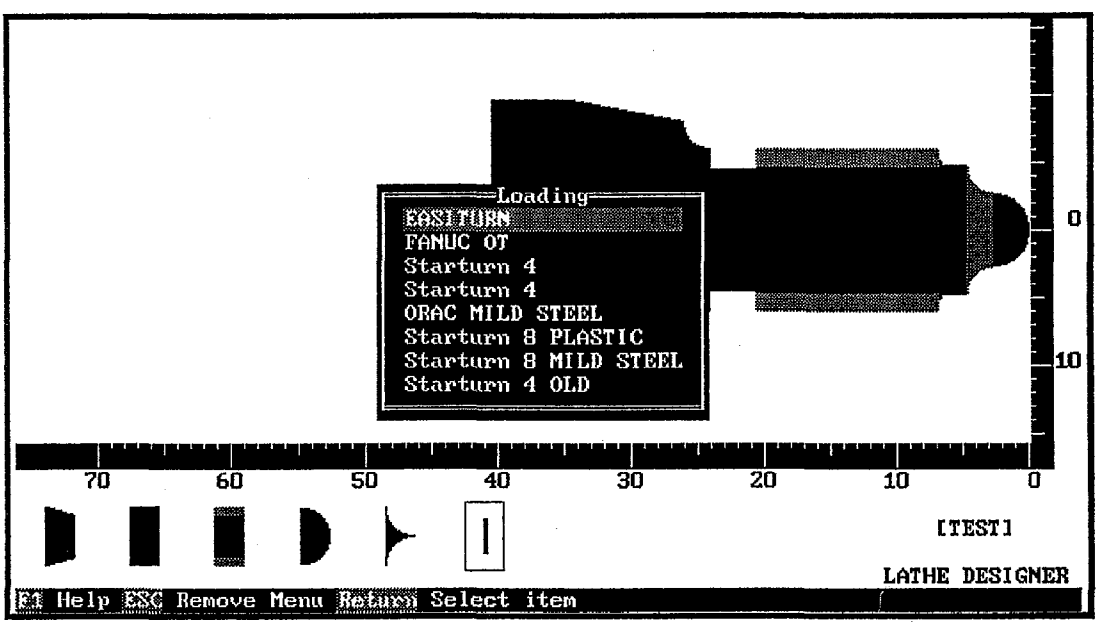


To quit from CAM Designer:-

- Press F10 to display the Main Menu.
- Select the QUIT option by highlighting QUIT and pressing RETURN.
- This will quit the program and return to DOS.

SCREENS FOR SETTING THE MATERIAL TO BE USED





4.7 SETTING THE MATERIAL BEING USED

Setting the machine selects the active LDF (Lathe Design File) contains all cutting information to be used sets a number of values to be used when you come to post process the profile ready for manufacture.

This selection must therefore be made before selecting the MAKE PART option.

NOTE:

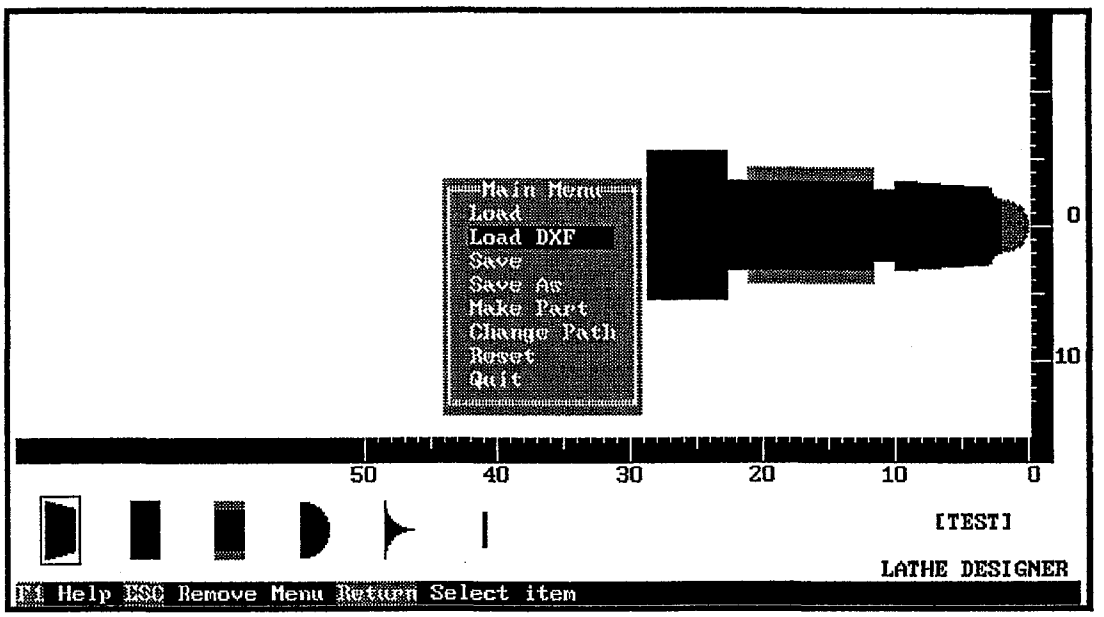
The settings are different for different machines and different materials.

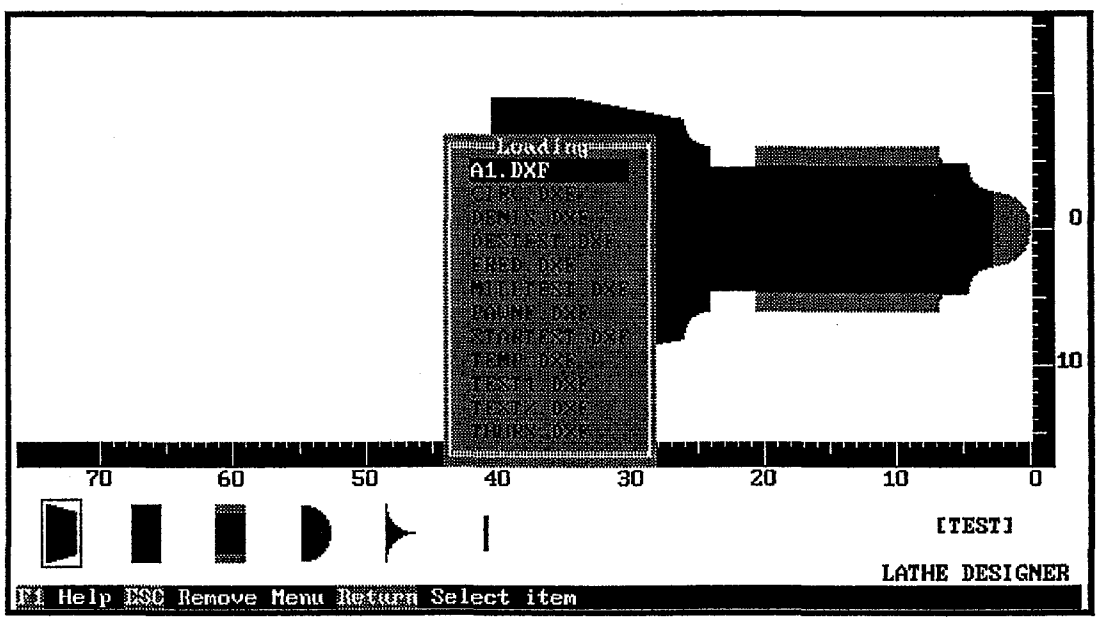
These settings can be altered by editing the Lathe Data File. See Section 5.2

To set the machine to be use the following procedure.

- Press F9 to display the settings Menu.
- Select machine by highlighting the machine option and pressing RETURN.
- Return to the EDIT mode by pressing ESCAPE.

SCREENS FOR LOADING DXF FILES





4.8 LOAD DXF OPTION

This option allows you to load in a DXF file from a CAD system such as AUTOCAD. To be able to drawn profiles in a CAD system and then load them into CAM Designer there are a number of restrictions that must be adhered to.

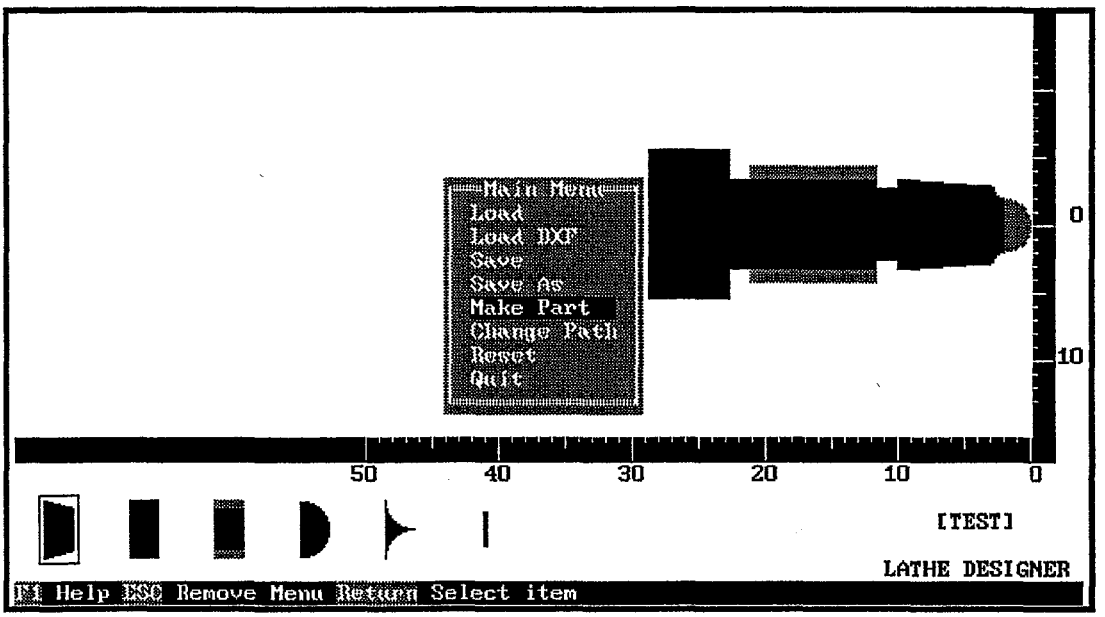
The restrictions are are follows:-

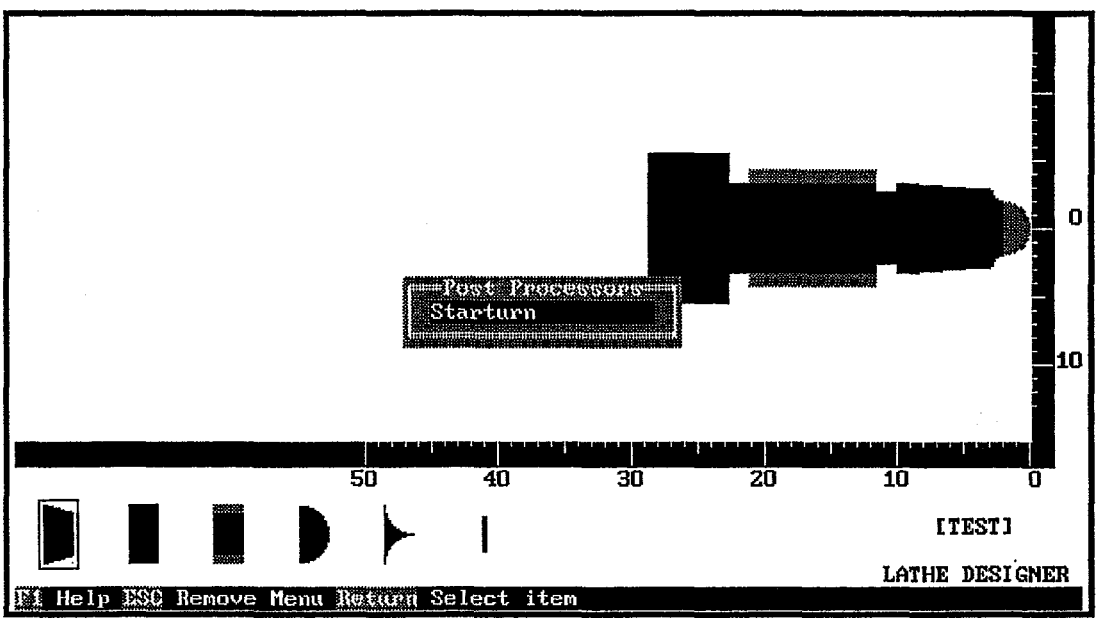
- The CAD drawing must be of the correct scale to fit onto the CAM Designer screen once loaded.
- When drawing the design 0,0 must be at the centre and right most part of the CAD drawing.
- Only shapes that can be drawn in CAM designer are possible.
- Draw threads as cylinders using CAD system. Once loading is complete change these blocks to threads by highlighting the block and pressing CTRL T to toggle between threading and cylinders.

To load a DXF file use the following steps:

- Press F10 to display the Main Menu
- Select the load DXF option by highlighting the option and pressing RETURN.
- Either type in the file name or press the space bar and then RETURN for a list of available files.
- Select the file to load and press RETURN.
- Press escape to return to the main menu.

SCREENS FOR MAKING A PART





4.9 MAKING A PART

Before a profile can be machined or simulated a program for the appropriate machine has to be built. To do this select the make part option on the Main Menu.

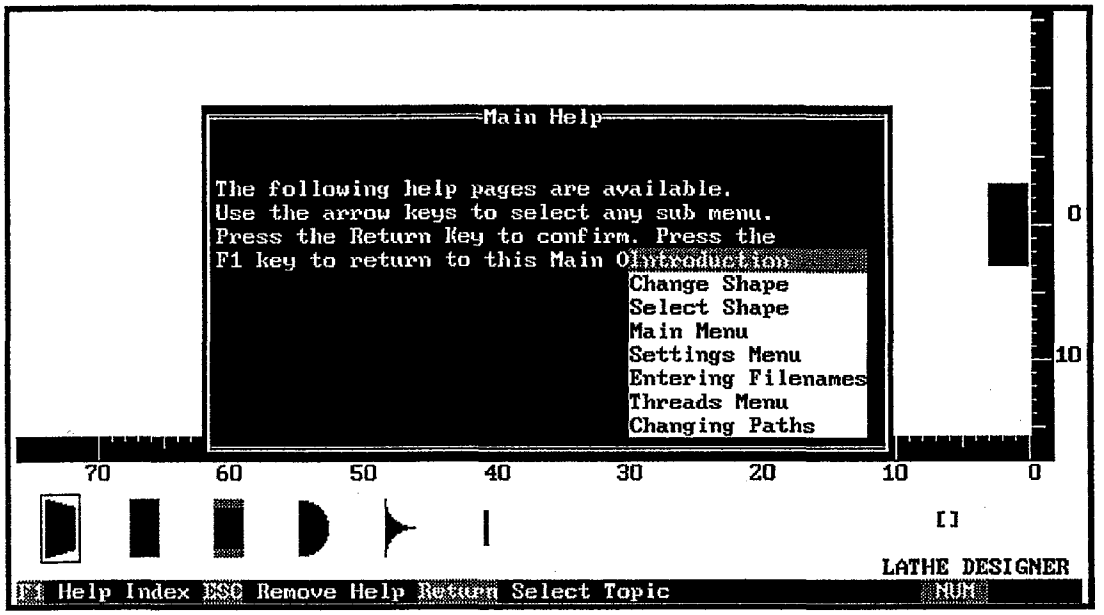
To make a part use the following steps:-

- Press F10 to display the Main Menu
- Select the MAKE PART option by highlighting the option and pressing RETURN.
- Select the machine option by highlighting the machine type and pressing RETURN.
- Once the program has been written to disk press RETURN.
- Press ESCAPE to go back to edit mode.

Note:

To save the program on a different drive to the current one use the change path option.

4.10 HELP



The help file can be called up at any point in the program by pressing F1

Can be pressed at any time to give help either generally when in edit mode, or specific to a command if pressed when that command is highlighted.

Pressing F1 twice, displays the Help Menu from which any option can be selected by highlighting the section and pressing return.

Exit the help file by pressing the ESCAPE key.

4.11 QUICK KEYS

Quick Keys are displayed at the bottom of the screen, they are used to bypass menu selection

F1 - HELP

This can be pressed at any time to give help either generally when in edit mode, or specific to a command if pressed when that command is highlighted.

Pressing F1 twice, displays the Help Menu from which any option can be selected by highlighting the section and pressing return.

Exit the help file by pressing the ESCAPE key.

F2 - SAVE

Has the same effect as the save option on the main menu.

F3 - LOAD

Has the same effect as the load option on the main menu.

F5 - INFO

Gives information on the currently highlighted block as well as other information such as Thread Type, Facing and Parting Off.

F9 - SETTINGS MENU

Allows the setting of the various options such as Material Type, Thread Type etc.

F10 - MAIN MENU

Allows the selection of the Main options in the program such as loading, saving etc.

ESCAPE

Clears current displayed menu.

SPACE BAR

1. Steps through the various shapes shown at the bottom left of the screen, when in block edit mode

2. Used to speed up the movement of the cross hairs.

CURSOR KEYS - LEFT AND RIGHT

1. Used in edit mode to highlight a particular block.

2. Used in conjunction with the CTRL key to position a new block to the left or right of the highlighted block respectively.

DELETE KEY

Used to delete a highlighted block

PAGE UP, PAGE DOWN

Used to page through the Help File

CURSOR LEFT, RIGHT, UP AND DOWN

Used to control the position of the cross hairs when in SHAPE EDIT mode.

CTRL T

When a cylinder or thread is highlighted toggles between the two shapes.

CTRL M

Toggles between edit mode and edit block mode

CTRL F10

Quits from CAM Designer.

4.12 FILENAME EXTENSIONS

Description of file types.

LDESIGN.TXT . . . . . .Help, Menu, Prompt Messages

LDESIGN.OPT . . . . . .Default Options used by Software

* .LSH . . . . . .Shape File

* .LDF . . . . . .CAM Information File contains Feeds, Speeds etc.

* .LGP . . . . . .CAM Output File

* .THR . . . . . .Threading Information Files

SECTION 5

- FILE DESCRIPTIONS

This page is intentionally blank.

5.1 THE OPTIONS FILE

The OPTIONS FILE contains a number of default variables used by the program. The values in this file can be changed to customise the program to the users specific needs. This is done by loading this file into an editor, altering the values and then saving the file again.

It is advised that the user make a copy of this file before making any alterations. Any of the values can be changed, however it is a good idea only to alter the values shown here without first consulting Denfords.

Default Settings.

displaysize 1	Sets 28 column text but can be changed to 43 by typing '0'
metric 1	0 for Imperial
facing 1	0 for No facing
parting 1	0 for No parting
MACHINE startrn4	Default LDF file
thread iso	Default threading info. file
diameter 26	
length 50	
skd com1	not used yet
skb 9600	not used yet

POSTP_MENU_1 Starturn

POSTP_GO_1 PPSTURN

NOTE:

Post Processors for all DENFORD machines can be purchased and then activated by inserting the filename in the .OPT file.

5.2 THE LATHE DATA FILE

```
# Starturn 4
METRIC 1
RADIUS_A 0
RADIUS_B 4
RADIUS_C 8
TOOLCHANGE_X 0
TOOLCHANGE_Z 0
R_STEP 1
R_FEED 75
R_SPINDLE_A 1700
R_SPINDLE_B 1600
R_SPINDLE_C 1500
F_FEED 120
F_SPINDLE_A 1800
F_SPINDLE_B 1700
F_SPINDLE_C 1400
G_FEED 90
G_SPINDLE_A 260
T_SPINDLE_A 235
T_SPINDLE_C 205
```

Format for LDF file: (values in mm)

(name)

METRIC (1 = metric, 0 = imperial)

RADIUS (A...Z steps in mm for rest of data)

TOOLCHANGE (X & Z positions for tool change)

R (roughing- step for clearing, feed,

spindle speed-r.p.m. for radius stated and above,)

F (finishing- feed, spindle speed-r.p.m. for radius stated and above,)

G (grooving (& parting)- feed, spindle speed-r.p.m. for radius stated and above)

T (tapping- spindle speed-r.p.m. for radius stated and above,)

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