

THE EASTMAN®
Command Reference Manual
for Easicut CMD Files

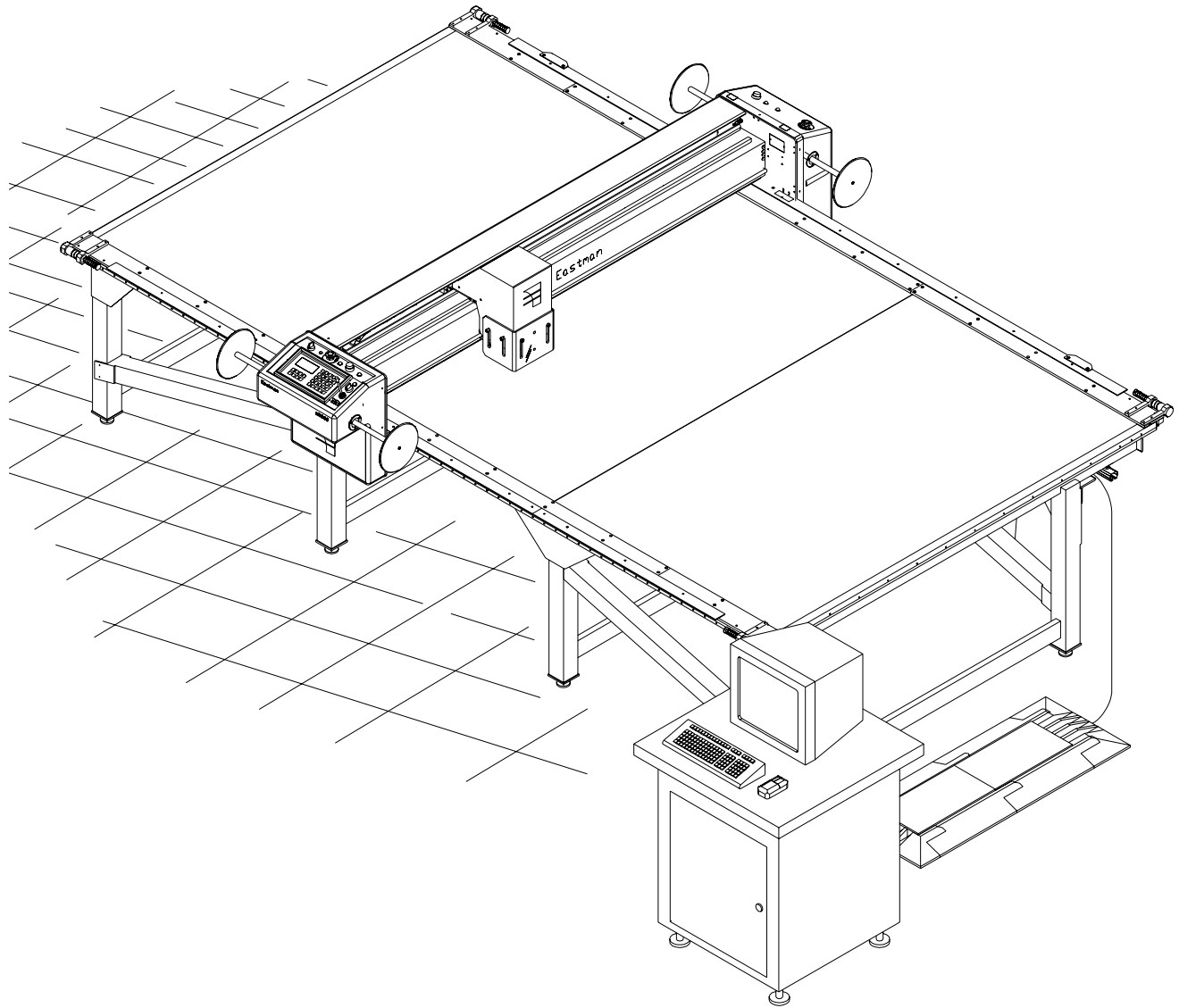


Table of Contents

File Description, CMD files 3**CMD Commands Introduction 3**

Keywords (<---->) 3

Display 3

Format 3

Global Origin 3

Local Origin 4

Table Origin 4

Keyboard 4

Keypad 4

Units 4

General Commands 4

<HEAD> (Headline) 4

<VERS> (Version) 5

<ENDS> (End CMD) 5

<HOME> (Panel Home) 5

<PAUS> (Pause) 5

<BYTE> (Port) 6

<WORD> (Port) 6

<BITN> (Port) 6

<BITF> (Port) 6

<WAIT> (Wait Time) 6

<NOTE> (Note) 6

<COMM> (comment) 6

<CUTN> (Cut On) 7

<CUTF> (Cut Off) 7

<CUTD> (Cut Down) 7

<CUTU> (Cut Up) 7

<TEXT> (Text) 7

Entities Specific Commands 8

<ZEPR> (Zero Reference Panel) 8

<MOVE> (Absolute Panel) 8

<MOVR> (Relative) 8

<MOVT> (Table Coordinates) 8

<PANO> (Panel Number) 8

<CURP> (Point Curve) 9

<CURO> (Offset Curve) 10

<SEGP> (Segments) 11

<SEGA> (Segments) 11

<SEGO> (Segments) 11

<CIRC> (Circle) 12

<DRIL> (Drill) 12

<SKIP> (Skip) 12

<DRAR> (Draw relative) 12

<MARK> (plot V mark) 13

<BEZI> (Bezier curve) 13

<PNCH> (Punch) 13

<PULL> (Pull) 13

<STOP> (OpStop) 13

Nesting Specific Commands 14

<FACE> (Face) 14

<WARP> (Warp Vector) 14

<GRUP> (Group) 14

<MTRL> (Material) 14

File Description, CMD files

CMD files contain the information that maps your design onto the Cartesian system of X and Y coordinates.

Eastman Technology Systems machines employ the CMD format as it offers a high level of versatility. Since the CMD format uses simple ASCII text, any text editor can be used to edit CMD files. Most computer systems have an ASCII text editor, and many CAD packages can convert their code to ASCII.

CMD Commands Introduction

Keywords(<---->)

The left brace '<' is located at the left margin (first column). The keyword is 4 uppercase characters in length.

Display

This refers to the computer display.

Format

Each line of the file is broken into columns 10 characters wide. This format is used throughout the file.

The first column is for keywords and any related integers. The following is an example for panel marker.

```
123456789012345678901234567890123456789012345678901234567890123456  
<PANO> 16
```

The remaining columns are for other values and are explained in the text.

The row of numbers (12345678901234 . . .) found in each example is used to indicate the data fields and does not appear in an actual CMD file.

Global Origin

The global origin relates the position of the carriage to the table in its entirety. Zeroing the global counters from the keyboard or the carriage keypad sets the global origin. If zeroing is not performed, the global origin is set to the position of the carriage when the machine is turned on.

Local Origin

The local origin is the reference point established for each different panel in a given file. All panel descriptions and motion commands are measured from the local origin. This point may be selected with the ZEPR command, typed in on your keyboard or on the keypad (ZERO PANEL). Normally, the ZEPR command automatically zeroes the local origin counters each time a panel is started. For a marker, however, the ZEPR command may be omitted and all references will be made from the local origin.

Table Origin

Used in the same manner as Global Origin.

Keyboard

This refers to the computer keyboard.

Keypad

This refers to the User Interface Terminal keypad as part of the Control Panel.

Units

All units are in centimeters and angles are in degrees.

General Commands

<HEAD> (Headline)

Sets a maximum 70 characters of ASCII text data. This line is stored and presented on the display prior to the first panel being executed.

```
123456789012345678901234567890123456789012345678901234567890123456  
<HEAD> Inv # 12345, customer= ACME Industry 1/20/90
```

<VERS> (Version)

Establishes the version of the DESIGN.CMD format. If this is not in the file, the computer will assume that the DESIGN.CMD file is version 3.

```
123456789012345678901234567890123456789012345678901234567890123456
<VERS> 5
```

To date the following versions exist:

VERS 1 - Kamkor pool plotter in Toronto

VERS 2 - One design digitizing (Marblehead, S.D.)

VERS 3 - Includes the U1,U2 coordinates at the end of each entity from the original layout.

VERS 4 - Added size field in TEXT command.

VERS 5 - Most recent version, supports for 32 character layer names.

<ENDS> (End CMD)

Exits the DESIGN.CMD file, and returns control to MS-DOS or the calling program. Before termination a zero value is sent to the output port.

```
123456789012345678901234567890123456789012345678901234567890123456
<ENDS>
```

Plotter Specific Commands

The following commands are to be executed at the plotterw command prompt.

<HOME> (Panel Home)

Moves the carriage to the local (panel) origin point.

```
123456789012345678901234567890123456789012345678901234567890123456
<HOME>
```

<PAUS> (Pause)

Halts the automatic execution of the DESIGN.CMD file. The M9000 system comes to a stop after executing the current command and returns control to both the PC keyboard and the control panel keypad (1 or PAUSE).

<BYTE> (Port)

Sends a byte of data on the PC bus to the assigned port number.

<WORD> (Port)

Sends a word (16 bits) of data on the PC bus to the assigned port number.

<BITN> (Port)

Turns on the bits contained in the data byte on the specified port. All other bits are left unchanged.

<BITF> (Port)

Turns off the bits contained in the data byte on the specified port. All other bits are unchanged.

<WAIT> (Wait Time)

Pauses the DESIGN.CMD file for the specified amount of time (seconds).

<NOTE> (Note)

Marks up to 4 Characters of ASCII text on the cutting surface.

```
123456789012345678901234567890123456789012345678901234567890123456
<NOTE>ABCD           X1           Y1
```

Where X1 and Y1 are the X and Y coordinates of the NOTE location.

<COMM> (comment)

Sends the 55 Characters of ASCII text to the screen then halts program execution until the operator responds by pressing the return key. The following is an example.

```
123456789012345678901234567890123456789012345678901234567890123456
<COMM>      This is a test message, change the material.
```

<CUTN> (Cut On)

Sets the primary cutter as the current tool.

<CUTF> (Cut Off)

Sets the marking device as the current device.

<CUTD> (Cut Down)

Turns on cutting tool.

Waits for the cut on delay.

Drops cutting tool.

Waits for the cut down delay.

<CUTU> (Cut Up)

Lifts cutting tool.

Waits for the cut up delay.

Turns cutting tool off.

Waits for the cut off delay.

<TEXT> (Text)

Draws characters (up to 40) at the specified location. The following is an example.

Default size and shape set in PLOTTER.TXT, size can be adjusted in PLOTTER.MAG.

```
123456789012345678901234567890123456789012345678901234567890123456
<TEXT>          X1          Y1          Z1          SAAA
  <NAMES                                >
```

The following is an example.

```
123456789012345678901234567890123456789012345678901234567890123456
<TEXT>          15.261      39.589      0.000      2.000PLY-4  0°
  <NAMES                                >
```

X1 and Y1 are the coordinate location. Z1 is the rotation in degrees. S is the text size and AAA is the text value.

<NAMES> this is a 32 character ASCII text label for this entity. The name may or may not be used by the plotter or other program to reference this entity.

Entities Specific Commands

<ZEPR> (Zero Reference Panel)

Establishes the current position as the origin point (0.00, 0.00) for all motion commands (5 or ZERO PANEL on the control panel keypad.)

<MOVE> (Absolute Panel)

Moves the carriage to the specified point in local (panel) coordinates.

```
123456789012345678901234567890123456789012345678901234567890123456
<MOVE>           X1           Y1
```

X1 and Y1 are the new coordinate position to move to.

<MOVR> (Relative)

Moves the carriage relative to the current position. Same format as <MOVE>.

<MOVT> (Table Coordinates)

Same as a <MOVE> with the exception that the position is in table coordinates. Same format as <MOVE>.

<PANO> (Panel Number)

Signals the start of a new panel. The panel number is displayed on the screen.

This is only used as a marker to the location in the file of the beginning of that panel. An example of how this could be used is during scanning for a specific panel.

```
123456789012345678901234567890123456789012345678901234567890123456
<PANO>  16
```

<CURP> (Point Curve)

(Entity) List of X and Y coordinates defining a line or curve. The 2 points form a straight line, 3 points form a parabolic, and 4 or more points form a cubic spline. The following is an example.

```
123456789012345678901234567890123456789012345678901234567890123456
<CURP>          X1          Y1          LEAD1          U1a          U2a
  <NAMES
          X2          Y2
          X3          Y3
          .
          .
          .
<CURP>          XN          YN          LEAD2          U1b          U2b
123456789012345678901234567890123456789012345678901234567890123456
<CURP>          0.00          0.00          10.00          5.00          5.00
  <NAMES
          3.45          1.25
          4.50          10.21
          .
          .
          .
          12.60          123.00          0.000          2.35          1.23
```

X1 and Y1 to XN and YN are the coordinate pairs along the curve relative to the local origin.

LEAD-1 and LEAD-2 are the entry and exit extensions to the curve. These are straight portions tangent to their respective ends that are added to the curve.

U1a, U2a, U1b, and U2b are the positions of the curve end point on the original panel layout. Their primary function is to rejoin or rewrap the panels to allow Global Surgery on the complete structure.

<NAMES>(Layer name)

Up to a 32 character ASCII label for this entity. The name may or may not be used by the plotter or other program to reference this entity. The layer name must be referenced to a device in PLOTTER.CUT for the plotter to act upon the layer.

<CURO> (Offset Curve)

List (Entity) of chord positions and offset values defining a line or curve. The 2 points for a straight line, 3 points for a parabolic, and 4 or more points for a cubic spline. The following is an example.

```

123456789012345678901234567890123456789012345678901234567890123456
<CURO>          X1          Y1          LEAD1          U1a          U2a
  <NAMES
          C2          O2
          C3          O3
          .          .
          .          .
          CN          ON
          X2          Y2          LEAD2          U1b          U2b
123456789012345678901234567890123456789012345678901234567890123456
<CURO>          27.000    250.000    10.00    5.00    5.00
  <NAMES
          0.125    0.250
          0.250    0.650
          .          .
          .          .
          32.600    423.00    0.000    2.35    1.23

```

X1, Y1, X2, and Y2 are the start and end points of the curve. C1 through CN are the chord positions between X1 and Y1 & X2 and Y2. They are measured along the chord relative to the chord length (for example 0.0 to 1.0). O1 through ON are the offset distances from the chord line, normal to the chord line.

Given that the panel is facing up (FACE is equal to 0) the following applies. Looking from the curve start point (X1 and Y1) positive values are to the right of the end point (X2 and Y2) or rather clockwise. This is reversed if the panel is face down (FACE is equal to 1).

<NAMES> this is a 32-character ASCII text label for this entity. The name may or may not be used by the plotter or other program to reference this entity.

<SEGP> (Segments)

This entity has the same format as <CURP>, but it will run the plotter through the sequence of points by joining them with straight-line segments.

```
123456789012345678901234567890123456789012345678901234567890123456
<SEGP>          X1          Y1          LEAD1          U1a          U2a
  <NAMES
          X2          Y2
          X3          Y3
          .           .
          .           .
<SEGP>          XN          YN          LEAD2          U1b          U2b

123456789012345678901234567890123456789012345678901234567890123456
<SEGP>          0.00          0.00          10.00          5.00          5.00
  <NAMES
          3.45          1.25
          4.50          10.21
          .             .
          .             .
          12.60          123.00          0.000          2.35          1.23
```

<NAMES> this is a 32-character ASCII text label for this entity. The name may or may not be used by the plotter or other program to reference this entity.

<SEGA> (Segments)

This entity has the same format as <CURP>. Used to specify a polyline with fillets at each corner point. The software determines the radius of the fillet by fitting a circle that is tangent to the lines connecting the points of the polyline at this specified distance from the corner point. Circle size for filleting is determined by the value in PLOTTER.MAG for SEGA DISTANCE

<SEGO> (Segments)

The entity has the same format as <CURO>, but it will run the plotter through the sequence of points by joining them with straight line segments.

<CIRC> (Circle)

This entity is a circle or an arc to be drawn or cut.

```
12345678901234567890123456789012345678901234567890123456
<CIRC>          CX          CY          L1          L2
  <NAMES                >
                A1          A2          R

12345678901234567890123456789012345678901234567890123456
<CIRC>          14.34      22.78      0.00      0.00
  <NAMES                >
                0.00      360.00      10.00
```

CX and CY are the coordinates of the center point.

A1 and A2 are the starting and stopping angles of the circle or arc.

R is the radius of the circle or arc. R also has a sign (+ve or -ve) that determines the direction of rotation. +ve being counter clockwise from A1 to A2, -ve is clockwise from A1 to A2.

L-1 and L-2 are the entry and exit extensions to the curve. These are straight portions tangent to their respective ends that are added to the curve.

<NAMES> this is a 32-character ASCII text label for this entity. The name may or may not be used by the plotter or other program to reference this entity.

<DRIL> (Drill)

DRIL moves the carriage to the specified point in local coordinates and drills a hole using the drilling device or by pulsing the laser. Parameters for drilling duration are contained in PLOTTER.DRL.

```
12345678901234567890123456789012345678901234567890123456
<DRIL>          X1          X2
```

<SKIP> (Skip)

Moves plotter carriage to the global origin.

<DRAR> (Draw relative)

Not available in Version 5.

Draws a line relative to the current position using coordinates given. Same format as CURP.

<MARK> (plot V mark)

Draws a V mark at the 0,0 coordinate position. Size of mark is controlled in PLOTTER.INI as variable VMARK_SCALE.

<BEZI> (Bezier curve)

Same format as CURP. Draws a Bezier curve. Curve may not necessarily go through coordinate points.

<PNCH> (Punch)

Activates the punch device at the specified X, Y coordinate location. The third column sets punch rotation. A second line denoting layer name is optional. If not specified the default is layer name is PUNCH

```
123456789012345678901234567890123456789012345678901234567890123456
<PNCH>          X1          x2          Z1
<NAMES                                >
```

```
123456789012345678901234567890123456789012345678901234567890123456
<PNCH>          12.23      341.78      180.00
<NAMES                                >
```

<NAMES> this is a 32 character ASCII text label for this entity. The name may or may not be used by the plotter or other program to reference this entity.

<PULL> (Pull)

Activates the conveyer pull with a length and velocity, X is the length and Vel is the Velocity.

```
123456789012345678901234567890123456789012345678901234567890123456
<PULL>          X1          Vel
```

```
123456789012345678901234567890123456789012345678901234567890123456
<PULL>          12.23      341.78
```

<STOP> (OpStop)

Operational stop. Functions as a pause. User needs to press next on UIT to continue.

```
123456789012345678901234567890123456789012345678901234567890123456
<STOP>
```

Nesting Specific Commands

<FACE> (Face)

This is a flag to indicate the exposed side of the panel as it is currently oriented compared to when it was originally created.

FACE values are only valid for the immediate panel, all the following panels are assumed to be face up (FACE equal to 0) unless specified.

0 is equal to original face up and 1 is equal to face down (flipped). Programs that perform manipulations on the panel use this. It allows control of which side of the panel is facing up.

<WARP> (Warp Vector)

This vector indicates the original longitudinal axis of the panel material with respect to the current panel orientation.

X is equal to the x component of the warp vector.

Y is equal to the y component of the warp vector.

The vector may have any length.

Programs that perform manipulations on the panel affecting rotation use this.

<GRUP> (Group)

A five ASCII character label naming the group to which the panel belongs. This stays in effect until the next GRUP label appears.

Group is used by other programs to keep track of panels that make up subassemblies.

<MTRL> (Material)

A five ASCII character label for the material that the panel is to be cut from. This stays in effect until the next MTRL label appears. MTRL may be used to collect panels that are to be cut from the same material.

MEMO

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