HAF File Information

Contents

Huntron HAF File Description

Section 1 - General Rules and Conventions of HAF

1) File is to be field-quoted, Comma delimited. Empty fields shall be written with nothing between the two commas (,,).
No spaces shall exist between quotes and commas between fields. E.g. "abc", "123" is illegal. "abc","123" is legal.

2) No field length restriction

3) The only illegal character is a "(quote) character. This will be handled automatically by the exporter.

4) CAMCAD CC files must contain panel information (at least a 1-up panel) before HAF export.

5) For data preparation before export, Board origin must be set at lower left corner of board, panel origin must be set at lower left corner of panel.
All XY locations are relative to origins at lower left corner. Huntron software will recalculate XYs relative to their desired origin point.

6) Comp Class Utility used to assign these attributes: **HAF_DEVICECLASS, HAF_NETPOTENTIAL.**

7) Huntron specific HAF attributes: **HAF_DEVICECLASS, HAF_COMPHEIGHT, HAF_REFNAME, HAF_BOUNDARYSCAN, HAF_TEST, HAF_NETPOTENTIAL, HAF_PACKAGE, HAF_PINFUNCTION, HAF_PINDIRECTION, HAF_COMMENT**

8) Where applicable, attributes should be analyzed in the following order: HAF-specific attributes, CAMCAD internal attributes, .out file rules. For example, if a component has a COMPHEIGHT attribute and a HAF_COMPHEIGHT attribute, the second attribute's value would be taken

9) Where applicable, HAF attributes will be created and placed on features during the export process. For example, a component with COMPHEIGHT will be assigned a HAF_COMPHEIGHT attribute after the first export.

10) Record Information Line Field Headers will be written in all capital letters

Section 2 - File Creation Order

The HAF file will be created in this order:

Line 1) File Information Line Header

Line 2) File Information Line Data

Line 3) Empty line

Line 4) Empty line

Line 5) Record Information Line Header

Line 6) Empty line

Fiducial Records at the PANEL level

Hole Records at the PANEL level

Board Records at the PANEL level

Empty line

Record Information Lines for Board Level Features

Fiducial Records at the BOARD level

Hole Records at the BOARD level

Component Records at the BOARD level

Pin Records at the BOARD level

Via Records at the BOARD level

Testpoint Records at the BOARD level

Probe Records at the BOARD level

Empty line

This sequence is repeated for all different Board Names found on panel

Last line in file) EOF

Section 3 - File Information Line

The first two lines in the HAF file are File Information Lines. These lines contain information about the program that generated the HAF file and some basic information about the panel.

In the table below the first row represents the data fields found for the File Information Line. The second row represents the actual information that would be written.

File Type	Program	Version	Panel Name	Source Filename	Panel Length	Panel Width	Date	Time	Units
HAF ASCII CAD	CAMCAD	CC Version	Panel Name	CAMCAD Filename	X size of panel	Y size of panel	Date	Time	Units of measurement

Sample **File Information Lines**
"File Type","Program","Version","Panel Name","Source Filename","Panel Length","Panel Width","Date","Time","Units"
"HAF ASCII CAD","CAMCAD","V.3.9.5a","4X4 Panel","job1234.cc","12","8","October 10, 2001","10:30am","inches"

Field Descriptions for File Information Line

These are the descriptions for the fields defined for the File Information Line.

- **File Type** - This announces the file format, and shall be written as HAF ASCII CAD
- **Program** - This is the application that created the file
- **Version** - This is the version of the application that created the file
- **Panel Name** - This is the panel name as shown in the CAMCAD File List dialog
- **Source Filename** - This is the CAMCAD filename used to make the HAF file
- **Panel Length** - This is the X dimension of the panel size
- **Panel Width** - This is the Y dimension of the panel size
- **Date** - The date the HAF file was created
- **Time** - The time the HAF file was created
- **Units** - The units of measurement that the file was created in. Values can be "Inches", "Mils", "MM"

After the File Information Lines, there will be two blank rows.

Section 4 - Record Information Line

Different features in the ECAD dataset populate the Record Information Line fields differently, depending on the feature in question.

Components = ECAD features that are type PCB Component
Pins = ECAD features that are type PIN
Fiducials = ECAD features that are type FIDUCIAL
Vias = ECAD features that are type VIA
Boards = Instances of Boards on the Panel
Holes = ECAD features that are type TOOLING
Testpoints = ECAD features that have a TEST attribute keyword
Probes = CAMCAD probes, after performing access analysis and probe placement using the CAMCAD DFT module

Sample **Record Information Lines**

"RECORD IDENTIFIER","BOARD NAME ","REFDES","DEVICE CLASS","GEOMETRY NAME","PARTNUMBER","BOUNDRY SCAN","PACKAGE","VALUE","PTOL","NTOL","NUMBER OF PINS ","X LOC","Y LOC","ROTATION","SIDE","HEIGHT","TEST","PIN NUM ","PIN NAME","ACCESS SURFACE","NET NAME ","NET POTENTIAL","PIN FUNCTION","PIN DIRECTION ","PIN XLOC(ACCESS X)","PIN YLOC(ACCESS Y)","XSIZE","YSIZE","PAD SHAPE","TECHNOLOGY","DRILL SIZE","COMMENT"

"COMP","Board Name ABC","R12","Resistor","RES1206","ABCD1234-GHI","BS","1206","7K","10","10","2","2.394","5.193","90","TOP",".010","TRUE",,,,,,,,,,,,,,,
"PIN","Board Name ABC","U16",,,,,,,,,,,"TOP",,,"2","2","TOP","/N$987234","Potential","Pin Function","Pin Direction","2.345","9.123",".025",".045","Rectangle","SMD",,,
"FIDUCIAL","Board Name ABC","FID1",,"Fiducal Geometry",,,,,,,,,"2.345","9.843",,,"BOTTOM",,,,,,,,,".035",".035","Round",,,
"VIA", "Board Name ABC","Via1",,"StandardVia",,,,,,,,,"Both",,,,,"Bottom","/N$1289302","NetPotential",,,"6.234","8.933",".030",".030","Round","Blind",".010" ,

This field holds the feature type

FEATURE TYPE	Record Identifier
Components	COMP
Pins	PIN
Fiducials	FIDUCIAL
Vias	VIA

Boards	BOARD
Holes	HOLE
Testpoints	TESTPOINT
Probes	PROBE

Section 5 - Record Information Line Summaries

COMP records are to create components in the Huntron Workstation database.

Record Identifier – COMP (Used only to verify record)
Board ID – Used in Ref Des below and to verify the panel
Ref Des – Used for Component Name. If multiple panels and All in One section, the Ref Des is preceded by B*Board ID* **DeviceClass** – Used for Component Type
Name – Not Used
Part Number – Used for Component Replacement and Component Part Number
BScan – Not Used
Package – Used for Component Part Package
Value – Used for Component Part Value
PTOL – Used for Component Part Tolerance with NTOL
NTOL – Used for Component Part Tolerance with PTOL
Number Of Pins – Used for Number Of Pins
Center X – Used for Component Top X or Component Bottom X
Center Y – Used for Component Top Y or Component Bottom Y
Rotation – Not Used
Height – Not Used
Test – If false the component is not added to the database
Side – Use with Technology to determine which side of the board to probe
Technology – Use with Side to determine which side of the board to probe, If Technology is SMD then access side equals Side. If technology THRU HOLE then Access side equals Both.

PIN records are used to create pin records for components and nets in the Huntron Workstation database.

Record Identifier - PIN

Board ID – Used only to determine which panel.

Ref Des – Used only to determine which component.

Pin - Pin number

Pin Name - Pin Name

Pin Direction – Not Used

Net Name- Pin Net Name

Net Level – Not Used

Pin X – Pin Test Probe X or Z1 X and possibly Pin Z2 X with Access DH or can be used for Sequence Align Top1 X or Sequence Align Top2 X or Sequence Align Bottom1 X or Sequence Align Bottom2 X

Pin Y – Pin Test Probe X or Z1 Y and possibly Pin Z2 Y with Access DH or can be used for Sequence Align Top1 Y or Sequence Align Top2 Y or Sequence Align Bottom1 Y or Sequence Align Bottom2 Y

Pad X – Not Used

Pad Y - Not Used

Pad Shape – Not Used

Drill Size – Not Used

FIDUCIAL records can be used to create alignment points in the Huntron Workstation database.

Record Identifier – FIDUCIAL

Board ID – Used only to determine which panel.

Ref Des – Not Used

Type - Not Used

Name – Not Used

Center X – Can be used for Sequence Align Top1 X or Sequence Align Top2 X or Sequence Align Bottom1 X or Sequence Align Bottom2 X

Center Y – Can be used for Sequence Align Top1 Y or Sequence Align Top2 Y or Sequence Align Bottom1 Y or Sequence Align Bottom2 Y

Rotation – Not Used

Side – Used to determine if can be used for side of board

VIA records can be used to create NET format pins in the Huntron Workstation database.

Record Identifier –VIA

Board ID – Used only to determine which panel

Ref Des – Net Pin Name

Type – Not Used

Name – Not Used

Net – Used determine the net to become a pin of

Net Level – Not Used

Pin X – Net Pin X location or can be used for Sequence Align Top1 X or Sequence Align Top2 X or Sequence Align Bottom1 X or Sequence Align Bottom2 X

Pin Y – Net Pin Y location or can be used for Sequence Align Top1 Y or Sequence Align Top2 Y or Sequence Align Bottom1 Y or Sequence Align Bottom2 Y

Pad X – Not Used

Pad Y – Not Used

Pad Shape – Not Used

Drill Size – Not Used

BOARD records are used to determine when a new panel starts

Record Identifier – PANEL

Board ID – Used only to determine which panel

Ref Des – Used only to determine which panel

Center X – Used to calculate other feature XY

Center Y – Used to calculate other feature XY

Rotation – Used to calculate other feature XY

Side – Used to calculate other feature XY

HOLE records are not used

Record Identifier – HOLE

Board ID – Used only to determine which panel

Ref Des - Not Used

Type - Not Used

Pin X – Can be used for Sequence Align Top1 X or Sequence Align Top2 X or Sequence Align Bottom1 X or Sequence Align Bottom2 X

Pin Y – Can be used for Sequence Align Top1 Y or Sequence Align Top2 Y or Sequence Align Bottom1 Y or Sequence Align Bottom2 Y

Pad X – Not Used

Pad Y – Not Used

Pad Shape – Not Used

Drill Size – Not Used

TESTPOINT can be used to create net test pins or 1 pin components in the Huntron Workstation database.

Record Identifier – TEST POINT

Board ID – Used only to determine which panel
Ref Des – Used as Component Name or Net Pin Name
Type - Component Type
Name – Not Used
Net – Net Pin Net Name
Net Level – Not Used
Pin X – Pin Test Probe X or Z1 Y and possibly Pin Z2 Y with Access DH or can be used for Sequence Align Top1 Y or Sequence Align Top2 Y or Sequence Align Bottom1 Y or Sequence Align Bottom2 Y
Pin Y - Pin Test Probe X or Z1 Y and possibly Pin Z2 Y with Access DH or can be used for Sequence Align Top1 Y or Sequence Align Top2 Y or Sequence Align Bottom1 Y or Sequence Align Bottom2 Y
Pad X - Not Used
Pad Y - Not Used
Pad Shape – Not Used
Drill Size - Not Used

PROBE can be used to create net test pins in the Huntron Workstation database.

Record Identifier = PROBE
Board ID – Used only to determine which panel.
Ref Des – Not Used
Pin - Not Used
Pin Name – Net Pin Name
Pin Direction – Not Used
Net - Net Pin Net Name
Net Level – Not Used
Pin X - Pin Test Probe X or Z1 Y and possibly Pin Z2 Y with Access DH or can be used for Sequence Align Top1 Y or Sequence Align Top2 Y or Sequence Align Bottom1 Y or Sequence Align Bottom2 Y
Pin Y - Pin Test Probe X or Z1 Y and possibly Pin Z2 Y with Access DH or can be used for Sequence Align Top1 Y or Sequence Align Top2 Y or Sequence Align Bottom1 Y or Sequence Align Bottom2 Y
Pad X – Not Used
Pad Y - Not Used
Pad Shape – Not Used
Drill Size – Not Used

Section 6 - Record Information Line, Board Name Field

This is the board "name", which identifies the types of boards on the panel.

FEATURE TYPE	Board Name
Comps	Board Name
Pins	Board Name
Fiducials	Board Name or "PANEL"
Via	Board Name
Board	Board Name
Hole	Board Name or "PANEL"
Testpoint	Board Name
Probe	Board Name

Board name is the same as the string we list for the board in the "File List". We also use this string for the "Board Name" column in the panelization dialog.

Fiducials or holes may be at the "board" level or "panel" level. Board level features are written normally; panel level features written as "PANEL"

Section 7 - Record Information Line, Ref Des Field

This is the reference designator for features

FEATURE TYPE	Ref Des
Comps	Component Ref Des
Pins	Component Ref Des
Fiducials	Fiducial Ref Des

Via	VIA1, VIA2, etc…
Board	Board Ref name
Hole	Hole Ref Des
Testpoint	Ref Des of Feature
Probe	Probe Ref Des

Every feature must have a reference designator. For features without a Ref Des, we will create an attribute called "**HAF_REFNAME**" with a value of "Fid1", "Fid2", "VIA1", "VIA2".

The HAF_REFNAME must be attached to the feature during the first export so the data is traceable back to the CC file.

Section 8 - Record Information Line, Device Class Field

This is the Device Class (capacitor, resistor) for the component in question

FEATURE TYPE	Device Class
Comps	Resistor, Capacitor, Inductor, Diode, etc…
Pins	N/A
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A
Testpoint	N/A
Probe	N/A

Components need to create a Huntron attribute called "**HAF_DEVICECLASS**". If no attribute is found, a simple mapping in the haf.out file can assist in device typing; i.e. C = cap, R = res, etc…

Section 9 - Record Information Line, Geometry Name Field

This is the ECAD geometry name

FEATURE TYPE	Geometry Name
Comps	Geometry Name
Pins	Pad Stack
Fiducials	Geometry Name
Via	Geometry Name
Board	N/A
Hole	Geometry Name
Testpoint	Geometry Name
Probe	Geometry Name

This is the name of the ECAD geometry, otherwise known as the geometry symbol name

Section 10 - Record Information Line, Part Number Field

This is the value for attribute keyword "PARTNUMBER"

FEATURE TYPE	Part Number
Comps	PARTNUMBER
Pins	N/A
Fiducials	N/A

Via	N/A
Board	N/A
Hole	N/A
Testpoint	N/A
Probe	N/A

Part Number comes from ECAD data, in a keyword called "PARTNUMBER".

ECAD data can also contain another attribute field of any name that can be mapped to "PARTNUMBER", i.e. COMP_PN, COMPONENT_PARTNUMBER. This is done manually before HAF export.

The most likely case is a BOM containing a PARTNUMBER – in this case users would need to use Mentor BOM Explorer to parse the BOM and get the data into a format that can be merged with the ECAD data.

Section 11 - Record Information Line, Boundary Scan Field

This field is a 'True' or blank depending on the value of the HAF_BOUNDARYSCAN attribute

FEATURE TYPE	Boundary Scan
Comps	True / Blank
Pins	N/A
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A
Testpoint	N/A

| Probe | N/A |

A small utility was created to allow users to assign the HAF_BOUNDARYSCAN attribute. Components identified with the HAF_BOUNDARYSCAN "True" attribute will come through as True in the HAF file.

This field is left blank otherwise.

Section 12 - Record Information Line, Package Field

This is the value of the attribute keyword "HAF_PACAKGE"

FEATURE TYPE	Package
Comps	PACKAGE value
Pins	N/A
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A
Testpoint	N/A
Probe	N/A

This field is populated with values from HAF_PACKAGE. This information can exist in the Bill of Materials and be brought in using BOM Explorer. This attribute can also be assigned with a utility like DFM_PACKAGE Attribute Assigner

Section 13 - Record Information Line, Value Field

This is the value of the attribute keyword "VALUE"

FEATURE TYPE	Value

Comps	VALUE
Pins	N/A
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A
Testpoint	N/A
Probe	N/A

Data for this field most probably comes from parsed BOM information using MENTOR BOM Explorer. If BOM not available other attributes present in the ECAD file can be mapped to VALUE by the user.

i.e. "comp_val" or "component-value" can be mapped to VALUE by the user

Section 14 - Record Information Line, PTOL Field

FEATURE TYPE	PTOL
Comps	Tolerance value
Pins	N/A
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A

Testpoint	N/A
Probe	N/A

PTOL is positive tolerance and comes from BOM data using MENTOR BOM Explorer. If N TOL is not available, write the TOLERANCE into both PTOL and NTOL

Tolerances that are in the ECAD file but not in a recognized keyword, like comp_tol, can be mapped by the user to TOLERANCE, or even specifically to PTOL or NTOL.

Attribute keywords automatically recognized are: TOLERANCE, TOL, +TOL, TOL+

Section 15 - Record Information Line, NTOL Field

FEATURE TYPE	NTOL
Comps	Tolerance value
Pins	N/A
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A
Testpoint	N/A
Probe	N/A

NTOL is negative tolerances and comes from BOM data using MENTOR BOM Explorer. If NTOL is not available, write the TOLERANCE into both PTOL and NTOL

Tolerances that are in the ECAD file but not in a recognized keyword, like comp_tol, can be mapped by the user to TOLERANCE, or even specifically to PTOL or NTOL.

Attribute keywords automatically recognized are TOLERANCE, TOL, -TOL, TOL-

Section 16 - Record Information Line, Number of Pins Field

This is the number of pins for the component

FEATURE TYPE	Number of Pins
Comps	Pin Record Count
Pins	N/A
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A
Testpoint	N/A
Probe	N/A

The pin count will be the same as the number of pin records

Section 17 - Record Information Line, XLOC Field

FEATURE TYPE	XLOC
Comps	Centroid X
Pins	N/A

Fiducials	Centroid X
Via	N/A
Board	Insertion Point X
Hole	N/A
Testpoint	N/A
Probe	N/A

For Component and Fiducial records, put in the Centroid X location. For Board records, put in the insertion point.

Section 18 - Record Information Line, YLOC Field

FEATURE TYPE	YLOC
Comps	Centroid Y
Pins	N/A
Fiducials	Centroid Y
Via	N/A
Board	Insertion Point Y
Hole	N/A
Testpoint	N/A
Probe	N/A

For Component and Fiducial records, put in the Centroid Y location. For Board records, put in the insertion point.

Section 19 - Record Information Line, Rotation Field

FEATURE TYPE	Rotation
Comps	Rotation of component
Pins	Rotation of pin
Fiducials	N/A
Via	N/A
Board	Rotation of board on panel
Hole	N/A
Testpoint	N/A
Probe	N/A

Rotation is relative to pad X and Y. Any rotation, including non-orthogonal rotation, is acceptable. Rotation does not need to adjust the X, Y locations except for the Board rotation which causes the need to have the other X, Y locations to be calculated for actual location.

Section 20 - Record Information Line, Side Field

This is the insertion side of the feature

FEATURE TYPE	Side
Comps	Insertion side
Pins	Outer Surfaces with pads
Fiducials	Insertion side
Via	Outer Surfaces with pads

Board	Insertion side of board on panel
Hole	Both (default)
Testpoint	Outer surfaces with pads
Probe	Insertion side of probe

Side can be Top, Bottom, Both, None. This is the insertion side of the feature for Comps, Fiducials, Boards, and Probes. It is the surfaces that have pads for Pins, Vias, and Testpoints.

Section 21 - Record Information Line, Height Field

This is the value of the "COMPHEIGHT" attribute keyword

FEATURE TYPE	Height
Comps	COMPHEIGHT
Pins	N/A
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A
Testpoint	N/A
Probe	N/A

Not normally populated in ECAD or BOM data, but sometimes can be found in ASCII component description files. Users can add this information dynamically with Automated Attribute Assignment.

We first look for "**HAF_COMPHEIGHT**", then "COMPHEIGHT". If not present, we make this field blank.

Component height values are written as a literal string. We know the units of measure for the board, but we don't know in what units these attribute values are written.

Section 22 - Record Information Line, Test Field

This is the value of the "HAF_TEST" attribute keyword, TRUE or FALSE

FEATURE TYPE	Test
Comps	TRUE / FALSE
Pins	N/A
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A
Testpoint	N/A
Probe	N/A

By default all components come through as TRUE. New attribute **HAF_TEST** with a value of True or False will show whether to test these devices or not.

All components are included in the exported file, but those with "HAF_TEST" False will be exported as False in the TEST column.

Section 23 - Record Information Line, Pin Number Field

This is the PINNO field in CAMCAD; is always an integer

FEATURE TYPE	Pin Number
Comps	N/A

Pins	Pin Number
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A
Testpoint	Pin Number
Probe	N/A

If not found in the ECAD data, CAMCAD will populate this field automatically.

Section 24 - Record Information Line, Pin Name Field

This field is a name for the inserts of the pins; can be alpha-numeric

FEATURE TYPE	Pin Name
Comps	N/A
Pins	Pin Name
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A
Testpoint	Pin Name
Probe	N/A

Section 25 - Record Information Line, Access Surface Field

Access Surface – This is the result of MENTOR DFT analysis on the design.

FEATURE TYPE	Access Surface
Comps	N/A
Pins	Top, Bottom, None, Both
Fiducials	N/A
Via	Top, Bottom, None, Both
Board	N/A
Hole	N/A
Testpoint	Top, Bottom, None, Both
Probe	N/A

Access Surface is populated with access results from DFT access analysis using the MENTOR DFT module. If no DFT analysis has been performed, leave this field blank "".

Value can be TOP, BOTTOM, BOTH, NONE

Section 26 - Record Information Line, Net Name Field

FEATURE TYPE	Net Name
Comps	N/A
Pins	Net name
Fiducials	N/A

Via	Net name
Board	N/A
Hole	N/A
Testpoint	Net name
Probe	Net name

This field holds the net name for the features. If the feature does not have a Net Name, it will be set to "NC__refdes.pin" where the Ref Des is the REFDES field and the pin is the PIN NAME field.

Section 27 - Record Information Line, Net Potential Field

FEATURE TYPE	Net Potential
Comps	N/A
Pins	Net Potential
Fiducials	N/A
Via	Net Potential
Board	N/A
Hole	N/A
Testpoint	Net Potential
Probe	Net Potential

NET POTENTIALS are "Important" nets to be identified on the board.

For example, there can be multiple ground or power nets, which can be identified more clearly when users leverage the NET POTENTIAL field. The MENTOR application Comp Class allows users to easily identify which NET POTENTIALS need to be matched with net names in the ECAD data.

A **HAF_NETPOTENTIAL** attribute will be assigned to the nets that are identified in this manner. This field will otherwise be blank.

Section 28 - Record Information Line, Pin Function Field

FEATURE TYPE	Pin Function
Comps	N/A
Pins	Pin Function
Fiducials	N/A
Via	N/A
Board	N/A
Hole	N/A
Testpoint	N/A
Probe	N/A

This field is left blank unless the user sets the HAF_PINFUNCTION attribute

Section 29 - Record Information Line, Pin Direction Field

FEATURE TYPE	Pin Direction
Comps	N/A
Pins	Pin Direction
Fiducials	N/A
Via	N/A
Board	N/A

Hole	N/A
Testpoint	N/A
Probe	N/A

This field is left blank unless the user sets the HAF_PINDIRECTION attribute

Section 30 - Record Information Line, Pin XLOC (Access X) Field

FEATURE TYPE	Pin XLOC (Access X)
Comps	N/A
Pins	Access X
Fiducials	N/A
Via	Access X
Board	N/A
Hole	Access X
Testpoint	Access X
Probe	Access X

This is the Pin X insertion point (usually the center of the pin). If MENTOR CAMCAD Access Analysis and/or pin offset functions have been performed, this modified X location access point is exported.

Section 31 - Record Information Line, Pin YLOC (Access Y) Field

FEATURE TYPE	Pin YLOC (Access Y)
Comps	N/A

Pins	Access Y
Fiducials	N/A
Via	Access Y
Board	N/A
Hole	Access Y
Testpoint	Access Y
Probe	Access Y

This is the Pin Y insertion point (usually the center of the pin). If CAMCAD Access Analysis and/or pin offset functions have been performed, this modified Y location access point is exported.

Section 32 - Record Information Line, X Size Field

FEATURE TYPE	Pad X Size
Comps	DFT Outline X Size
Pins	X Size
Fiducials	X Size
Via	X Size
Board	X Size of Board
Hole	N/A
Testpoint	X Size
Probe	X Size

This holds the X size of the pad. For a complex pad shape calculate the extents of the graphics of the pad

For symmetrical pads list specific X, Y sizes; i.e. Round X size =.025 Y size =.025

For components, the X Size of the DFT Outline is used.

Section 33 - Record Information Line, Y Size Field

FEATURE TYPE	Pad Y Size
Comps	DFT Outline Y Size
Pins	Y Size
Fiducials	Y Size
Via	Y Size
Board	Y Size of Board
Hole	N/A
Testpoint	Y Size
Probe	Y Size

This holds the Y size of the pad. For a complex pad shape calculate the extents of the graphics of the pad

For symmetrical pads list specific X, Y sizes; i.e. Round X size =.025 Y size =.025

For components, the Y Size of the DFT Outline is used.

Section 34 - Record Information Line, Pad Shape Field

This is the aperture shape for the accessible pads

FEATURE TYPE	Pad Shape

Comps	N/A
Pins	Aperture Shape
Fiducials	Aperture Shape
Via	Aperture Shape
Board	N/A
Hole	N/A
Testpoint	Aperture Shape
Probe	N/A

Exported pad shapes will be one of the following: ROUND, SQUEARE, RECTANGLE, OBLONG, COMPLEX. If pad stack is accessible from both surfaces and pad shapes are different for each surface, export the pad on PAD TOP.

Section 35 - Record Information Line, Technology Field

This is the pad stack technology for the feature

FEATURE TYPE	Technology
Comps	SMD / THRU
Pins	SMD / THRU
Fiducials	N/A
Via	THRU / BLIND / BURIED
Board	N/A
Hole	N/A
Testpoint	SMD / THRU

Probe	N/A

This is derived by looking at the pad stack and determining if pads exist on top, bottom, or both.

The exported syntax will be one of the following: SMD, THRU, BLIND, BURIED

Section 36 - Record Information Line, Drill Size Field

This is the drill size for any drill hole included in a pad stack

FEATURE TYPE	Drill Size
Comps	N/A
Pins	Hole size
Fiducials	N/A
Via	Hole size
Board	N/A
Hole	Hole size
Testpoint	Hole size
Probe	Drilled probe receptacle size

Section 37 - Record Information Line, Comment Field

This is an extra field populated from the value of HAF_COMMENT

FEATURE TYPE	Comment
Comps	X
Pins	X

Fiducials	X
Via	X
Board	X
Hole	X
Testpoint	X
Probe	X

This is an extra field for all records. This field can be set by the user to contain any additional information needed. The value of HAF_COMMENT is placed in this field when attached to the different Feature Types.

Alignments points are marked by placing TopAlign1, TopAlign2, BottomAlign1 and BottomAlign2 in the comment filed of the feature used for the alignment point. The PinX and PinY fields of the feature are used for the Alignment Point positions.