

**GUIDELINE FOR PREPARATION
AND SUBMISSION OF
MECHANICAL OUTLINES FOR
PASSIVE ELECTRONIC
COMPONENTS TO
EIA/ECA-PDP-100**

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**GUIDELINE FOR PREPARATION AND SUBMISSION OF MECHANICAL OUTLINES FOR
PASSIVE ELECTRONIC COMPONENTS TO EIA-ECA-PDP-100**

(Formulated under the cognizance of the P-4 Committee on Mechanical Outlines for Passive Components)

PREFACE

This publication contains the procedures necessary to ascertain approval for mechanical outlines to be posted for reference and/or download on the EC-Central Web Site. A mechanical outline for any actively produced passive component may be submitted for Registration by any active ECA Member Company through their Committee Representative for review by the ECA P-4 Passive Electronic Component Mechanical Outline Committee. Acceptance of a Mechanical Outline for posting will be based on successfully complying with a standardized layout, to be determined by the P-4 Committee. All balloting on Mechanical Outlines submitted to the P-4 Committee will be carried out by P-4 Committee members present at spring and fall ECA Engineering Meetings.

Access to Mechanical Outlines that have been accepted by the P-4 Committee and the ECA will not be limited to EIA or ECA Members. These Mechanical Outlines will be available for viewing and download by all visitors to the EC-Central Web Site.

DISCLAIMER

The EIA/ECA is not responsible for changes in component dimensions, dimensional tolerance deviations or availability from a given vendor for passive components referenced in the Mechanical Outlines.

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1. INTRODUCTION

This document is a guide to manufacturers of passive electronic components for the preparation and submission of Mechanical Outlines (Here-in-after referred to as “outlines”) for outline registration.

2. INITIAL AND FINAL DRAWINGS

The initial outline drawings submitted for review by the P-4 Committee are used as working documents and for balloting. They should, therefore, follow the minimum requirements of this section as closely as possible to avoid misunderstandings and to save time after submission to the Committee. It is, however, not necessary for the initial “working copy” drawings to be as neat and clean as the final approved drawings that are used as masters for the Publication.

- 2.1 “Working copy” drawings may be presented to the P-4 Committee in any convenient software format, including the CAD file in which they were generated or a PDF file, provided they are able to be projected using equipment normally made available at the meetings.
- 2.2 “Working copy” drawings that are distributed to members of P-4 for comment via E-Mail shall be provided in PDF file format, or a previously agreed upon CAD format which will permit mark-up of the drawing.
- 2.3 Submission of the final outline for acceptance by the P-4 Committee and posting to the Web Site shall be in a PDF file format generated in Adobe Acrobat 5.0 or later.

2.4 A Working Group shall be established in the P-4 Committee for each type of passive component Mechanical Outline to be submitted for review. These Working Groups shall include, but are not limited to:

- Resistors
- Capacitors
- Inductors
- Fuses
- Integrated Passive Devices (IPD's)

3. PURPOSE OF OUTLINES

3.1 An outline shall provide all dimensions and geometric characteristics of a package necessary to insure mechanical interchangeability with all other packages conforming to the same outline and "Variation".

3.2 An outline is intended to serve the end user by clearly specifying the general package configuration, physical size, location and number of terminals, space required by the package, recommended size and location of surfaces for mounting, body size for mechanical handling equipment, etc.

3.3 Outlines will provide Web links to the EIA/ECA related documents, as well as Web links to specific sources for a given "Variation", for active members of the ECA. Non-members will have access to the outlines for review and download. However, Non-members will not have access to the Web Site linking features provided to active members.

4. DEFINITIONS

The following are category definitions:

Capacitor – Electronic component with two or more terminals that provides capacitance as its intended circuit function. Includes arrays having more than one capacitor.

Fuse - Electronic component with two or more terminals that provides over current protection as its intended circuit function. Includes arrays having more than one fuse.

Inductor - Electronic component with two or more terminals that provides inductance as its intended circuit function. Includes arrays having more than one inductor.

IPD - Integrated Passive Device containing a combination of two or more different passive components (e.g., capacitor and resistor) or a passive component and a diode. Includes arrays having more than one set of diodes.

Resistor - Electronic component with two or more terminals that provides resistance as its intended circuit function. Includes arrays having more than one resistor.

5. OUTLINE PREPARATION (See Appendix A for an explanation of the drawing number and additional information)

Several outline parameters are shown in Figure 1, following. The intent of these outlines is to provide only mechanical information for use by the design engineer without directly supplying the source of the device.

- 5.1 A three-view line drawing showing important dimensions for the device (Figure 1, A) shall be provided at the top of the Mechanical Outline.
- 5.2 A recommended land pattern for surface mount devices, or hole layout and dimensions for leaded devices, shall be located immediately below the three-view line drawing. (Figure 1, B) Note that the dimensions provided are only “recommended”. The end user may elect to deviate from the recommendations, provided they have adequate spacing for their application. Components not intended for surface mount or leaded connections (e.g. cartridge devices to be used in clips or holders) need not have a recommended land pattern.
- 5.3 Dimensions are always provided in a table (Figure 1, C) as letter references to the three-view line drawing. These dimensions will be provided as millimeter and [inch] units. Dimensions for the recommended land patterns, or hole layout, may be provided on the drawings, or in the associated “Variation” table. (Figure 1, B)
- 5.4 Each “Variation” (e.g. AA, AB, AC, etc.) will provide specific component dimensions for an available device type. This is shown in Figure 1, D. The nominal values may be equivalent, but there may be differences in the tolerances. Or, there may be slight differences in the nominal values and tolerances. If the number of “Variations” exceeds the space available on the first page of the Mechanical Outline, an additional page will be added. (Figure 1, J) The EIA Drawing Number (Figure 1, I) will remain the same for all pages of the same Mechanical Outline.
- 5.5 Additional pages shall be added to the first page of the Mechanical Outline, where needed, to provide space for expansion of the “Variations” table. Basic drawings and notes shall not be expanded beyond page 1.
- 5.6 The Notes for each Mechanical Outline will vary somewhat. However, they tend to be used for maintenance of the drawing and general information about the

Mechanical Outline. While the CAD package employed to generate and update the original drawing is called out, all of the Mechanical Outlines shall ultimately be presented to P-4 and to the ECA in Adobe Acrobat 5.0, or later, PDF File format.

- 5.7 The Title (Figure 1, F) shall consist of a brief description (including component type) of the package being presented.
- 5.8 Both the Mechanical Outline Issue (Figure 1, G) and Date (Figure 1, H) will be assigned by the P-4 Committee upon final acceptance at the following ECA P-4 meeting.
- 5.9 Final decisions regarding the adequacy of font type and size for each part of the Mechanical Outline will be left to the discretion of the P4 Committee and appropriate Working Group in each subcommittee. Generally Arial Font shall be used in sizes that vary, but are always sufficient in size and clarity to assure readability.

6. OUTLINE SUBMISSION

Procedures for Registration of Mechanical Outlines are as follows:

STAGE

PROCEDURE (Also See Figure 2)

1 SPONSOR

- 1.1 The Sponsor must initiate the action for registration of an outline.
- 1.2 The Sponsor may be an individual ECA member company, an active ECA Subcommittee, an active ECA working group or any ECA Ad Hoc Group.
- 1.3 The Sponsor must have a printed “Draft” copy of a Mechanical Outline to be proposed, as well as an acceptable file format copy suitable for distribution to members of the P-4 Committee.
- 1.4 The Sponsor must provide an acceptable file format suitable for editing to the P-4 Committee to insure the finished Mechanical Outline can be archived for later use. Preferable formats are DesignCAD, Excel/Visio and AutoCAD.

2 SUBMISSION FOR PROJECT ACCEPTANCE BY P-4 COMMITTEE

- 2.1 A “Draft” copy of a Mechanical Outline to be reviewed will be presented to the P-4 Committee in an acceptable printed and file format.
- 2.2 After review by members of the P-4 Committee, a vote will be taken to determine if the proposed Mechanical Outline fully meets the intent of the Committee.
- 2.3 Upon acceptance by the P-4 Committee, a project number consisting of the Mechanical Outline Drawing Number plus date of submission will be assigned to the proposed outline by the P-4 Committee Chair – or other

designated member of the P-4 Committee – and this number will be recorded in the P-4 Mechanical Outline Status Matrix.

- 2.4 The accepted project will be assigned to the appropriate Working Group for editorial review.

3 EDITORIAL REVIEW

- 3.1 The Working Group members will review the “Draft” Mechanical Outline to insure that no identical Outline and Variation already exists.
- 3.2 If an identical outline and “Variation” is located, the Sponsor will be advised and work on the proposal will cease. This will be reported back to the P-4 Committee and the Project will be formally terminated.
- 3.3 If an equivalent device is not located, the Working Group will proceed with editorial and content confirmation with the Sponsor.
- 3.4 The Working Group will first determine if a Mechanical Outline already exists for a component similar to the device being submitted.
- 3.5 If a Mechanical Outline with a similar “Variation” having different dimensions is found, work will proceed with editing this Mechanical Outline to add a new “Variation”.
- 3.6 Upon completion of editorial and content changes, the Working Group will return the finalized Mechanical Outline to the P-4 Committee for final acceptance.

4 P-4 COMMITTEE FINAL DISPOSITION

- 4.1 Upon submission of a new or modified Mechanical Outline to the P-4 Committee by a Working Group, the Committee will review the outline and a vote will be taken. A simple majority will serve to accept the submission.
- 4.2 Mechanical Outlines may be submitted between P-4 meetings on the ECA Technical Message Board for review and comment. These Outlines will be directed through the P-4 Committee Chair – or other designated member of the P-4 Committee – to ECA Headquarters for posting. While these Outlines can be corrected, arranged in their final format and balloted, actual final acceptance will be conducted at the ECA P-4 meetings.
- 4.3 A P-4 Mechanical Outline Status Matrix will be maintained by the P-4 Committee Chair – or other designated member of the P-4 Committee – to provide a listing of all Outlines that have been presented to the P-4 Committee for review and action. This color-coded spreadsheet will be updated as needed and provided to each member of P-4 periodically between meetings.
- 4.4 Accepted new or changed Mechanical Outlines shall be forwarded to the ECA IT Staff for posting on the EC-Central Web Site. Both the PDF and original CAD drawings shall be forwarded via the P-4 Committee Chair –

or other designated member of the P-4 Committee – to ECA Headquarters for archiving and future use.

- 4.5 Accepted Mechanical Outlines shall be added to a spreadsheet identifying “Approved Mechanical Outline Revision History” organized by Mechanical Outline Drawing Number. This history spreadsheet will permit ongoing traceability of drawing revisions and the reasons for each revision.
- 4.6 The “Approved Mechanical Outline Revision History” spreadsheet shall be maintained by the P-4 Committee Chair, or other designated member of the P-4 Committee. A copy shall be provided periodically to the ECA Headquarters for archiving.

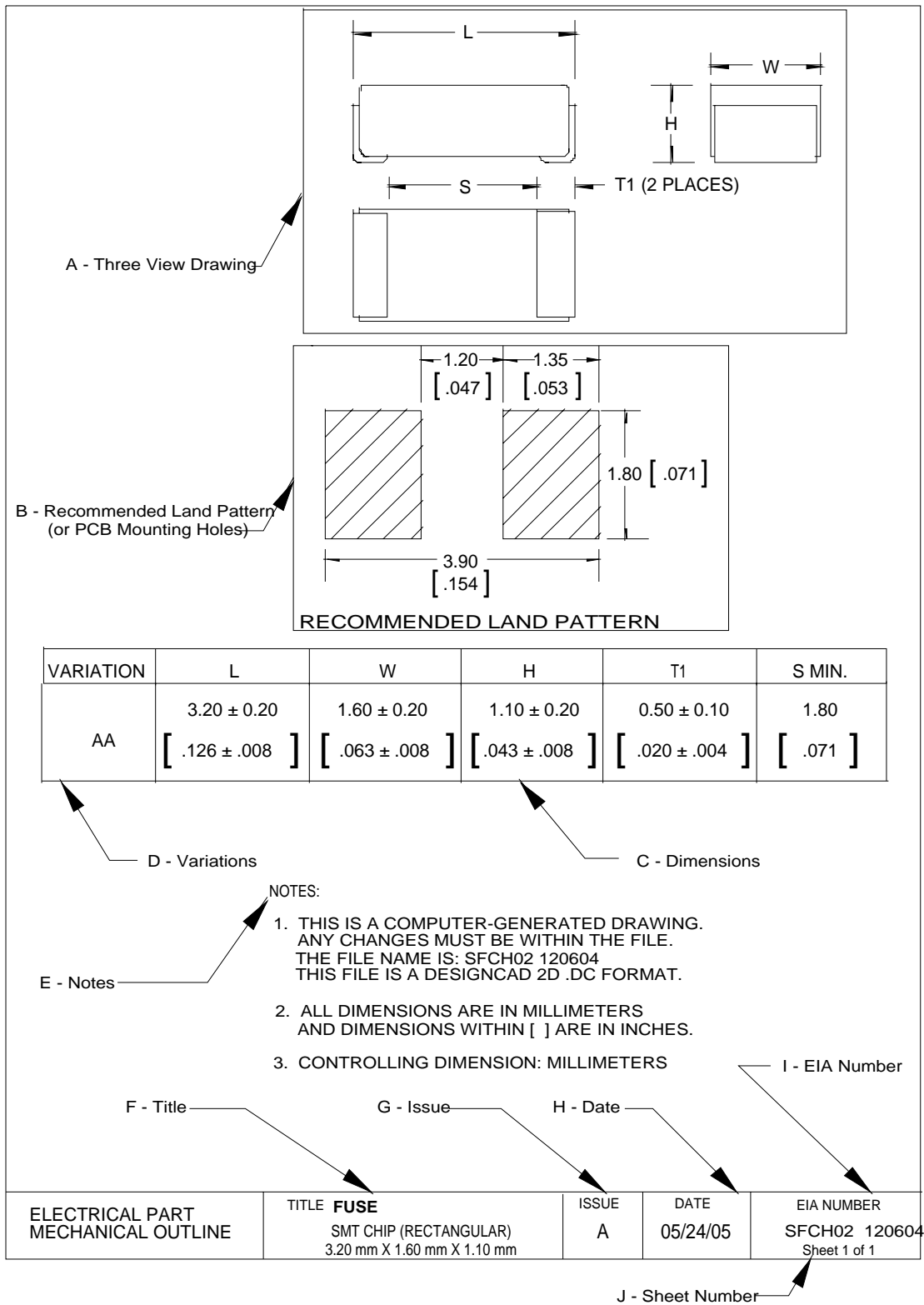


FIGURE 1

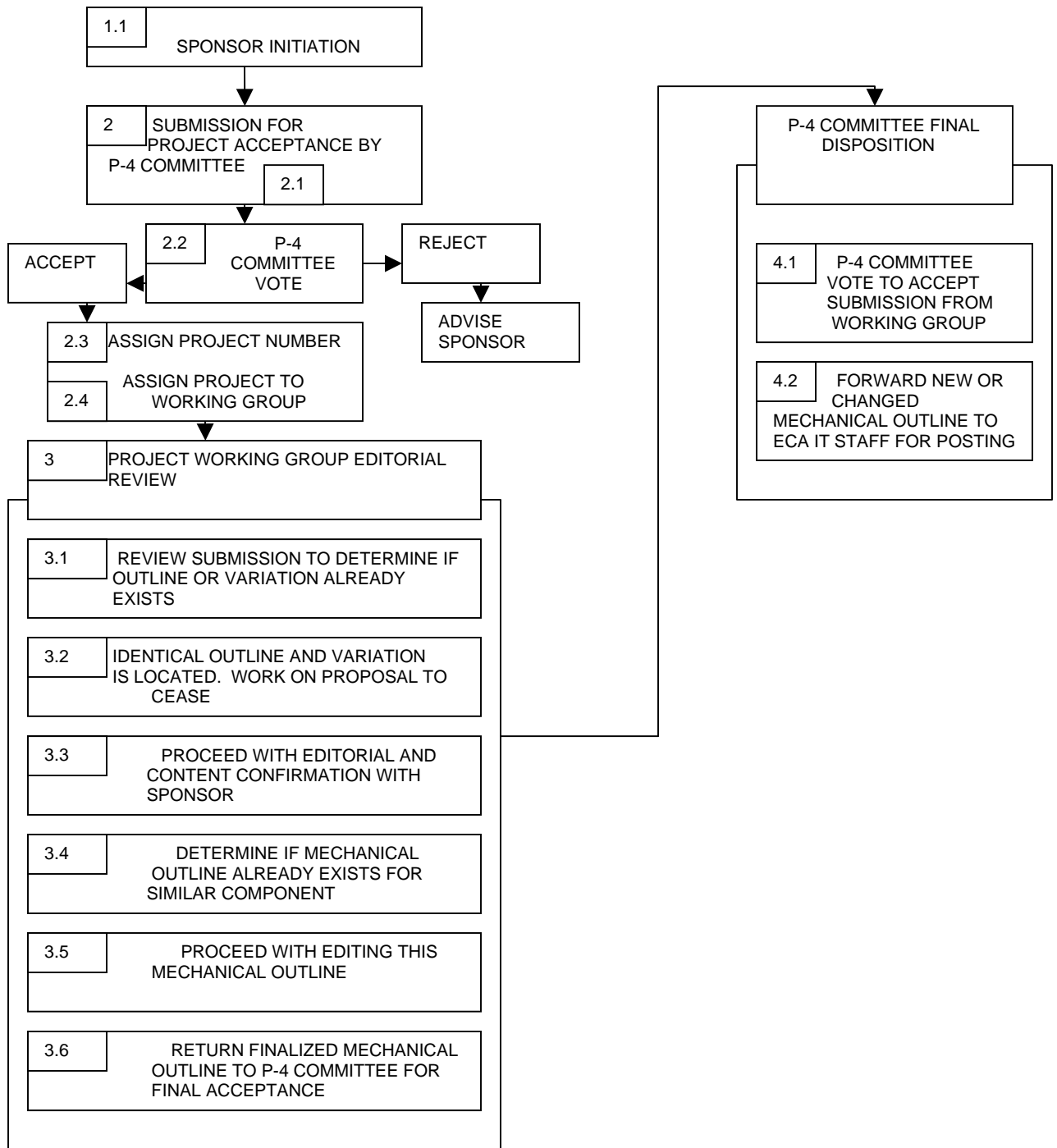


FIGURE 2
 P-4 COMMITTEE PROCEDURE FOR REGISTRATION OF MECHANICAL
 OUTLINES

APPENDIX A

ECA Mechanical Outlines

ECA Mechanical Outlines are defined with a twelve element alphanumeric part number. The first four elements are alphabetical, indicating “Component Mounting”, “Component Type”, “Component Termination”, and “Numerical Multiplier”, respectively. The fifth and sixth elements are numeric, providing the number of contacts for the package. The last six are numeric, with two digits each providing the component physical length, width and height, respectively.

The table, below, provides some examples of the parameters that can be chosen when attempting to locate a passive component with specific characteristics. The last column, “Outline Variations”, will not be used to search for the PDP-100 Mechanical Outline. This parameter will only be used after a specific Mechanical Outline is available for review. These characteristics, and the associated options, will be further described in the sections following the table.

Component Mounting	Component Type	Component Termination	Numerical Multiplier	Number of Terminals	Numerical Descriptor	Outline Variations
S	F	C	H	02	120603	AA
C	F	B	T	02	120201	AA
A	F	E	C	02	200505	AB

General Use Procedures for PDP-100 Mechanical Outlines

A given manufacturer of a component will provide a “PDP-100 Mechanical Outline” reference with a given component data sheet. For instance, in a given surface mount fuse data sheet, a manufacturer will state “Per PDP-100 Mechanical Outline SFCH02 120603, Variation AA”. This will permit the potential user to access the referenced Mechanical Outline and determine if it is compatible with the proposed application. There may be other choices on the Mechanical Outline (e.g. AB, AC, etc.), but there is no assurance that the others will be available from the same manufacturer. There will be a method for the end user to go from the “PDP-100 Mechanical Outline” number and find the source (or manufacturer) of a given “Variation” when the Mechanical Outline is accessed on the EC-Central Web Site by an EIA or ECA member.

When the selection page is entered, there will be choices provided for each of the twelve given alphanumeric characters. If no choices are made, all Mechanical Outlines will be presented in a selection list. If all choices are made, only components meeting these constraints will be included in the search results. It may be desirable to only select the “Component Type”. This will provide a complete listing of all Mechanical outlines associated with this type of device, but eliminate all other types of components. It should be noted that when dimension

selections are made, specific components of that dimension, or smaller, will be provided in a list.

Component Mounting

This character will be an alphabetic designation. It has been expanded beyond those provided in the original PDP-100 to cover more mounting configurations. In the first example, above, we have selected “S”, or surface mount configuration. The second example is a “C”, or cartridge mount configuration, and the third is an “A”, or axial wire lead device. Choices available include:

S = Surface Mount by Soldering or Welding
C = Cartridge for Mounting in Clips or Other Holders
W = Wire Lead (General)
R = Wire Lead (Radial Lead Wire)
A = Wire Lead (Axial Lead Wire)
M = Multiple Lead Array (DIMM, SIMM, etc.)

Component Type

The letter designation of this character describes the specific type of passive component having this package. All three examples given in the table, above, are associated with the “Fuse” component. This will be the first type of component to be included in the new Mechanical Outline database. For the immediate future, selection of any of the other components will result in no data, since we have yet to complete these sections. Choices available will eventually include:

F = Fuse
C = Capacitor
R = Resistor
L = Inductor
M = Integrated Passive Device

Component Termination Type

Termination type appears to be the most complex area to identify. An attempt was made to keep those designations already existing in the previous PDP-100 list. This list will be amended as it is determined which descriptions can be deleted and what new designations are required.

Designations for “Internal” and “External” solder were added specifically for the larger fuses. This parameter becomes important when selecting non-surface mount type fuses for use in European applications. Choices available include:

Surface Mount –

A = Attached mechanically to board
C = Flat Chip with End Band Termination
D = Face down termination
F = Flat Pack
G = “Gull Wing” or “L” Lead
I = “I” Butt Lead
J = “J” Bend Lead
L = Leadless Chip with Multiple Pads
M = Cylindrical Body with End Band Termination (MELF)
P = Right Angle Contact Pads

Cartridge (No Lead), Axial and Radial Lead Devices

B = Internal Solder
E = External Solder

Numerical Format Multipliers

The original two designations, “M” (for tenths of a millimeter) and “C” (for millimeters) were left pretty much in tact, as in the earlier version of PDP-100 Outlines. Three new designations, “K” (for thousandths of an inch), “H” (for hundredths of an inch) and “T” (for tenths of an inch), have been added to cover the need for inch based designations requested by some users. The “N” designation was not originally included because we had hoped to be able to use the new designations to set up a search method that would work for a specific package type and size. However, it was recommended it be retained for the time being to cover any packages that cannot be described with the other designations available. Summarizing, the possible “Numerical Formats are:

M = tenths of a millimeter
C = millimeters
K = thousandths of an inch
H = hundredths of an inch
T = tenths of an inch
N = other

Number of Terminals

This numerical two-digit designation immediately following the “Numerical Format Multiplier” allows for component types with terminal counts from 2 to 99 (Arrays, Networks, etc.). While many discrete passive components will have two terminals, some may have more than two terminals. The examples in the table are all two terminal devices.

Numerical Descriptor

The four digit designation was increased to a six digit designation to permit inclusion of a height dimension. Height becomes a critical factor with “pick & place”, as well as some tape & reel applications. Where the height and width are equal, the second set of numbers will be repeated. (e.g. 120606)

EXAMPLES:

M - The six digit number is used as follows:

The first two digits indicate the approximate length of the part in tenths of a millimeter.

The third and fourth digits indicate the approximate width of the part in tenths of a millimeter.

The fifth and sixth digits indicate the approximate height of the part in tenths of a millimeter

Example: A part 3.2 mm long by 1.6 mm wide and 1.0 mm high has a numerical descriptor of 321610.

Where a part has approximately the same height and width dimensions, a surface mount resistor that is 3.2 mm long by 1.6 mm wide and 1.6 mm high will have a Mechanical Outline Drawing Number of SRCM02 321616.

C - The six digit number is used as follows:

The first two digits indicate the approximate length of the part in millimeters.

The third and fourth digits indicate the approximate width of the part in millimeters.

The fifth and sixth digits indicate the approximate height of the part in millimeters.

Example: A surface mount capacitor 32.8 mm long by 6.35 mm wide and 6.35 mm high will have a Mechanical Outline Number of SCCC02 320606.

K - The six digit number is used as follows:

The first two digits indicate the approximate length of the part in thousandths of an inch.

The second and third digits indicate the approximate length of the part in thousandths of an inch.

The fifth and sixth digits indicate the approximate height of the part in thousandths of an inch.

Example: A surface mount resistor 0.01 inch in length, 0.005 inch wide and 0.005 inch high has a numerical descriptor of SRCK02 100505.

H - The six digit number is used as follows:

The first two digits indicate the approximate length of the part in hundredths of an inch.

The second and third digits indicate the approximate width of the part in hundredths of an inch.

The fifth and sixth digits indicate the approximate height of the part in hundredths of an inch.

Example: A part 0.126 inch in length, 0.063 inch wide and 0.032 inch high has a numerical descriptor of 120603.

Where a part has approximately the same height and width dimensions, the second and third set of figures would be repeats.

Example: A surface mount fuse 0.126 inch long by 0.063 inch wide and 0.063 inch high will have a Mechanical Outline Drawing Number of SFCH02 120606.

T - The six digit number is used as follows:

The first two digits indicate the approximate length of the part in tenths of an inch.

The third and fourth digits indicate the approximate width of the part in tenths of an inch.

The fifth and sixth digits indicate the approximate height of the part in tenths of an inch.

Example: A part 1.25 inch long by 0.25 inch wide and 0.125 inch high has a numerical descriptor of 120201.

Where an axial lead inductor has approximately the same height and width dimensions, for instance, the Mechanical Outline Drawing Number would be ALBT02 120202.

N – The six digits are not sufficient.

The numbers are issued sequentially and indicate a position in a number of designations whose features are otherwise similar.

Outline Variations

The “Outline Variation” procedure remains the same as in the past. Each “Variation” represents a product that is represented by the drawing of the Mechanical Outline, but there is a change of one of the given dimensions. A given “Variation” could represent a slightly modified part provided by a single vendor, or it may represent a slightly different part provided by a different vendor. A slight deviation in tolerances for otherwise identical dimensions would result in a new “Variation”.

Drawings

All Mechanical Outlines will now have recommended land patterns or mounting holes where applicable. Some devices that are used in clips or holders would not normally be mounted directly to a printed wiring board.