

PartSync – Part List Manager

---

[www.partsync.com](http://www.partsync.com)

# PartSync User Guide

# PartSync User Guide

©2022 by Robert Kondner  
 Baltimore MD 21286 USA  
[bob@partsync.com](mailto:bob@partsync.com)  
[www.partsync.com](http://www.partsync.com)

## PartSync Main Screen

The screenshot displays the PartSync Main Screen interface. The top-left pane shows search results for 'con 9 pin d'. The top-right pane shows a list of files for 'Con 9 Pin D Female Right Angle .318 Inch Bracket PCB Mount'. The bottom-left pane shows the details for part 'IND-613-314'. The bottom-right pane shows technical drawings for 'RIA - 0.318 - MALE - ECONOMY - D SUB'.

**Part Search Results:**

| Part Number         | Description   |
|---------------------|---|
| IND-613-314         | Con 9 Pin D Female Right Angle .318 Inch Bracket PCB Mount    |
| IND-749-691         | Con 9 Pin D Female Solder Cup No Mounting Hardware            |
| IND-890-261         | Con 9 Pin D Female Straight Pins PCB Mount                    |
| IND-469-124         | Con 9 Pin D Female Straight Wire Wrap Pins PCB Mount          |
| IND-264-290         | Con 9 Pin D Male Right Angle .318 Inch Bracket PCB Mount      |
| IND-045-750         | Con 9 Pin D Male Straight Pins PCB Mount                      |
| IND-249-017         | Con 9 Pin D Shell with Hardware                               |
| ASMPCB-NAV_DC_CON_D | ASMPCB-NAV_DC_CON Rev D                                       |
| IND-569-420         | Con 15 Pin D Male Right Angle .318 Inch Bracket THT PCB Mount |
| IND-254-453         | Con 25 Pin D Female Right Angle .318 Inch Bracket PCB Mount   |
| IND-017-610         | Con 25 Pin D Male Right Angle .318 Inch Bracket PCB Mount     |
| IND-459-781         | Con 25 Pin D Male Right Angle SMT PCB Mount                   |
| IND-906-661         | Con D High Density 44 Pin Right Angle PCB Mount               |

**Part Details for IND-613-314:**

Desc: Con 9 Pin D Female Right Angle .318 Inch Bracket PCB Mount

Decal: CON-009-2.77-30.8X18.5/DB9-RA-FEMALE  
 Packs: CON-009-2.77-30.8X18.5/DB9-RA-FEMALE  
 S CD: CON-D(9 Pin Female RA)V7  
 On Hand: 0  
 Cost: 1.290  
 Rev: A Date: 5/17/2018

**Vendor/Manufacturer Table:**

| Vendor | Vendor PN           | Manf.   | Manf. PN        |
|--------|---------------------|---------|-----------------|
| Mouser | 636-182-009-213R531 | Norcomp | 182-009-213R531 |

**Technical Drawing Details:**

DESCRIPTION: RIA - 0.318 - MALE - ECONOMY - D SUB

25-PIN SHOWN

MATERIAL: SPCC, NICKEL PLATED

SHIELD: 0.0018 INCH THICK, 0.0018 INCH WIDE

# Table of Contents

|                                     |    |
|-------------------------------------|----|
| Introduction.....                   | 1  |
| PartSync Purpose .....              | 1  |
| Implementation Details.....         | 2  |
| Searching .....                     | 3  |
| Search Panel .....                  | 3  |
| Part List / Vendor Info Panel ..... | 7  |
| Control Tabs.....                   | 9  |
| Part Info Tab .....                 | 9  |
| Description Edit.....               | 10 |
| Part Info Sort Codes .....          | 12 |
| Part Info Made From.....            | 13 |
| Part Info Part Storage .....        | 14 |
| Package Tab.....                    | 16 |
| Data Sheet Tab.....                 | 17 |
| Vendor Detail Tab .....             | 18 |
| Engineering & CAD Tab.....          | 20 |
| Job Directories .....               | 20 |
| BOM Builder.....                    | 21 |
| BOM Scrubbing.....                  | 22 |
| PN Assignment .....                 | 24 |
| Assembly Cost Calculation .....     | 24 |
| Kits & Purchasing.....              | 25 |
| Ref. DB Tab .....                   | 27 |
| Config Tab .....                    | 28 |
| Repository Synchronization .....    | 29 |
| Label Printer Selection.....        | 30 |
| Check Box and Functions.....        | 30 |
| Printers.....                       | 33 |
| Search Engine Operation.....        | 34 |
| Good Consistent Descriptions .....  | 34 |
| Numeric Ranges & Examples.....      | 37 |
| Package Search Examples.....        | 39 |
| PartSync .INI Configuration.....    | 41 |

---

## Introduction

### PartSync Purpose

**P**artSync is a Windows database application used to manage information about electronic components and lists of components. Included with component data are datasheets, physical packages, and part storage information. From the physical package data, PCB footprints can be extracted and fed into PCB design tools. Tools exist for extracting Bills of Material (BOMs) from Excel, .csv files and CAD tool reports. Output BOMs and purchasing reports are generated by merging BOMs with database part vendor data.

PartSync is used by hardware designers, PCB designers, production personnel and purchasing departments to track part data. Hardware designers need to know what part types and values are already contained in company libraries and where various components are stored. Parts are stored in various types of containers and a container could be in previous kits, reels, shelves or dry storage. PCB designers need access to a library of PCB footprints for all PCB-mounted components. Purchasing needs access to lists of approved manufacturers, along with vendor information and pricing. Kits of components are used by production to build a given quantity of assemblies from generated kit lists. PartSync provides all of these features.

Additionally, PartSync's integration with BOM Builder allows assembly houses to visualize where specific packaged parts will be placed on a printed circuit board. An assembly house's production equipment, such as robotic Pick and Place (PnP) assembly machines, requires information about the physical part to be placed. For example, the assembly house needs to verify for each package, information such as lead types (i.e. pin land geometry) and the center pick-up location of the part. Footprint models are not sufficient. Package models need to be provided, as these machines need lead types and sizes so that component leads can be accurately placed. PartSync includes physical 2D package models which detail exactly where the package leads should sit down on a footprint's pads.

All users require labels for marking containers of parts. PartSync generates such labels which include storage location and container type. Included on these labels are barcodes. PartSync interfaces directly with a variety of USB-connected barcode

scanners for reading labels. When a barcode is scanned, PartSync pulls up the part record and displays the information stored about that part.

#### **Implementation Details**

Given the large number of possible different components, physical packages, and datasheets, several search engines are required inside of PartSync. While database links provide associations between a part record and these various additional parameters, PartSync also provides more general searching functions with knowledge about electronic parts.

Components in PartSync are divided into two types, parts that have outside Sources (PS parts) and Part Lists (PL parts). Either data structure can be used as a record in a part list (i.e. nested part lists are possible). Most electronic components have associated datasheets. Datasheets in PartSync can be managed in two ways. First, every PS part can be assigned both notes and web links. Using web links eliminates the need for locally storing the datasheet, but web links can change or disappear over time. PartSync's second method for dealing with datasheets is to simply save copies of .pdf datasheets in a local or shared directory. This simple scheme makes datasheets available to all users, archives the datasheet, and eliminates the possibility of broken web links. A built-in datasheet librarian allows users to assign descriptions to each datasheet, and the datasheet search engine can be used to search through these descriptions. The first page of each .pdf is read and converted to a .jpeg. This allows rapid viewing and scanning of datasheet first pages. Datasheet first pages are good part summaries. Without these datasheet librarian tools, a large directory of files would be a mess.

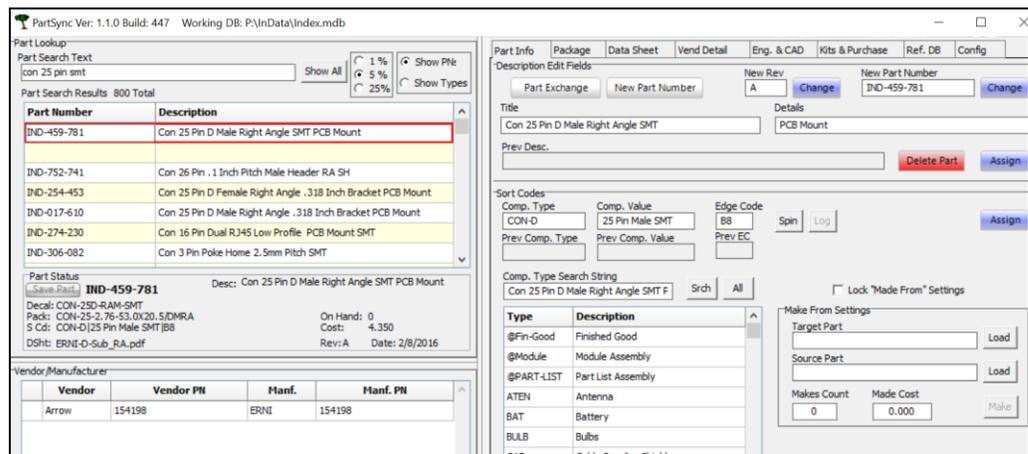
Under the hood, PartSync's database schemas are built using the Windows JET (Joint Engine Technology) database engine (i.e. the engine underlying Microsoft Access and Visual Basic) running on Windows networks or on Linux SAMBA servers. The key requirement is use of the SMB (Server Message Block) network protocol which provides file and record locking. This multiuser Microsoft Access type of database does not use Access nor does it require any server installation. Instead, Windows WinDAC components are used under Delphi using ADO interfaces. The result of these choices is that PartSync is a license-free application built on 20+ years of stable database tools. (WinDAC tools are built into every copy of Windows since Window 7 and prior to Win 7, these tools existed within the Microsoft MDAC tools.) Many other file and operating systems support the JET engine and its .mdb or .accdb file structures. These file types are identical to Microsoft Access files, and they can be used in a variety of Access-compatible tools on various platforms.

PartSync's settings are maintained in a PartSync.ini configuration file. This .ini file stores file names, directory pointers, form sizes and option settings. PartSync.ini is read when PartSync starts, and is written when PartSync closes. If PartSync.ini is to be edited by hand (it's a simple text file), be certain PartSync is not running.

# Searching

## Search Panel

PartSync's main screen is divided into lefthand and righthand sides. The Part Lookup region on the left includes a Parts Search Text field along with a Parts Search Results grid below it. Enter a text string into the Part Search Text field. PartSync will search through all part descriptions and the Part Search Results grid will display matching part records with the best matches shown first. As more characters are entered into the Part Search Text field, additional searches through the part descriptions are automatically performed and the results grid updates. Clicking on a record in the results grid selects that database record, and information for that part is displayed on both the lefthand and righthand sides of the main screen. Pay particular attention to the Part Status region shown below the results grid, as the Part Status region displays a summary of the part's main attributes previously entered on various tabs on the right. Below the Part Status region is a Vendor/Manufacturer grid which lists distributor and manufacturer part number information which had been entered into the Vend Detail tab on the right.

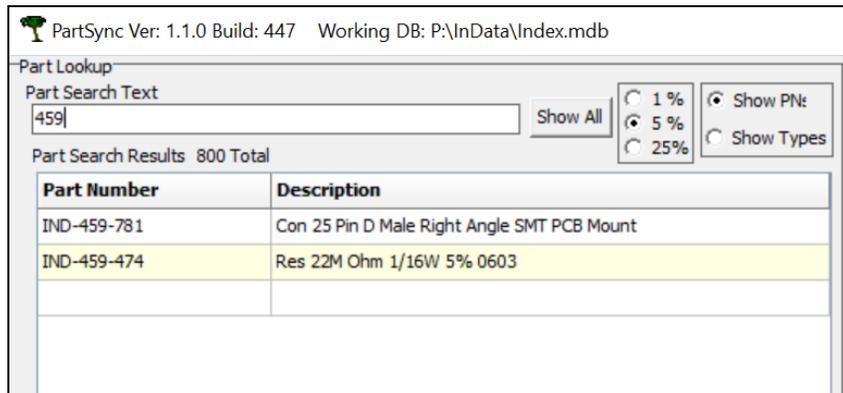


Radio buttons to the right of the Part Search Text field adjust component part search engine numeric comparisons and display styles (e.g. internal part number vs. component type). In the figure above, the text search string entered in the Part Search Text field was 'con 25 pin smt'. PartSync's component part search engine found a single part with a very good match (red-outlined record) and other next-best matches listed below that first match. On the righthand side, the Part Info tab is displayed, and lists attributes of the chosen part. PartSync's component part search engine works very well when part descriptions are extensive and/or contain certain known vocabulary keywords programmed into PartSync.

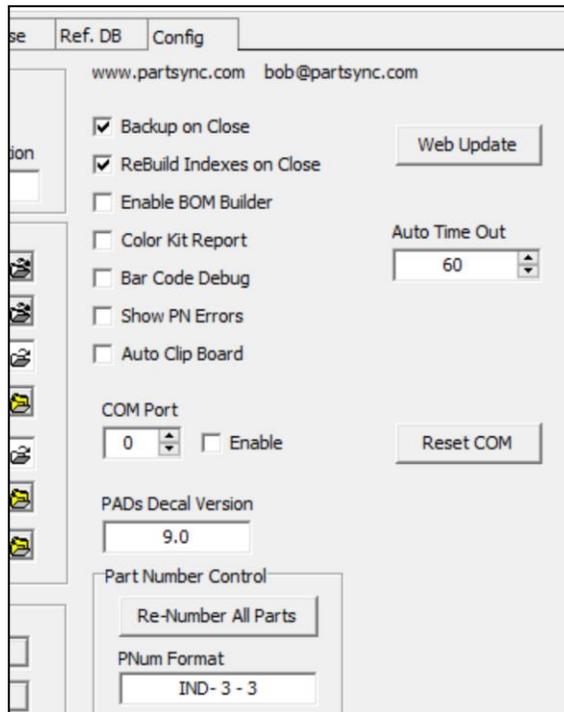
Additional component part search methods are available which use surrogate keys rather than a text string. If the user has no knowledge of how a part might have been

described, then these additional keys can be used in place of the descriptive text (i.e. in place of ‘con 25 pin smt’).

The first surrogate key option for component part searching is to use the Part Number (PN) surrogate key as shown in the figure below, where the string ‘459’ has been typed into the Part Search Text field.

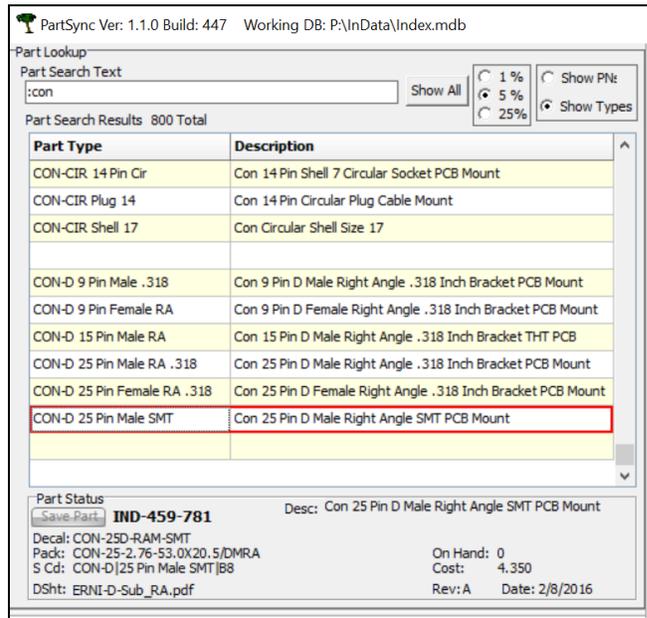


The PN can be considered an in-house unique part number, separate from a Manufacturer or Vendor part number (VendPN or ManfPN). In fact, a single PN can point to several VendPNs and/or several ManfPNs, each of which would be considered acceptable for use in a design which specified this PN. The structure of a PN is configurable in the Config tab’s PNum Format field, which is located at PartSync’s far right:



The part number format shown in the PNum Format field is ‘IND- 3 3’ where there are spaces around the ‘3’; characters. This format identifies a PN structure as the letters ‘IND-’ (short for Index Designs) followed by two groups of 3 digits, separated by a - character. When this format of PN is created, the 6 digits are set to a random, but unique, number. This random and unique format simplifies component searching when a PN is known. Often a PN is contained in a report, and simply entering the first two or three digits can quickly locate the part and its details.

The second surrogate key option for component part searching is to use the Comp Type surrogate key, which is the colon operator. Adding a ‘:’ character at the start of the beginning of the Part Search Text field switches to searching on the component type, as opposed to the text in a part’s description. Notice in the screenshot below that the Show Types radio button has been selected and that the search string entered is ‘:con’ (for connector):



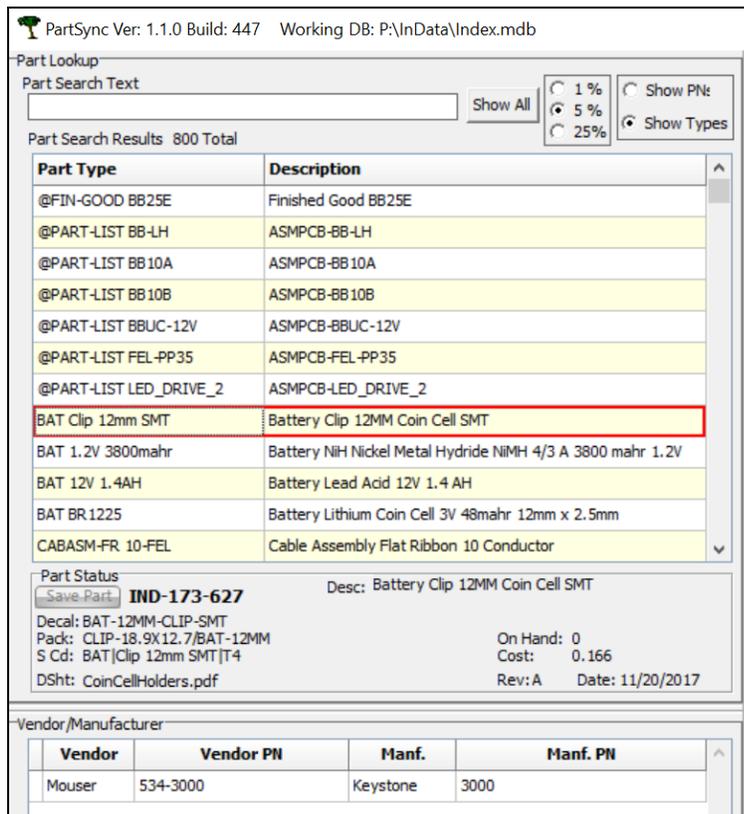
When the Show Types button is selected, Comp Type strings are displayed along the lefthand side of the search results grid (i.e. the column labeled with ‘Part Type’). Scrolling down through the grid with the vertical scroll bar lets us find the same component as before (i.e. the red-outlined record for the 25-pin male D connector).

Note that the same PN, IND-459-781, has now been found via three different component part search methods. PartSync has other search engines besides this component part search engine. They are separate search engines for PartSync’s datasheets, packages, and reference parts database. Each PartSync search engine has built-in smarts about the types of search string words likely to be used in those searches.

In these three previous component part search examples, the first two displayed the PN listed along the lefthand side, while this third example displayed the Comp Type along the lefthand side. In all three cases, the search results are sorted alphabetically by Comp Type (i.e. even when the PN is displayed, rather than the Comp Type). As illustrated in the figure below, sorting alphabetically by Comp Type enables the separation of Finished Goods, Part Lists, and Purchase Spec parts in the results grid. Comp Types are defined in a text file, and users can add their own component types if they desire additional component categories. The CompType.txt definition file can be found in the folder:

C:\ProgramData\IndexDesigns\PartSync\Data\

As a last resort for finding component parts, the Show All button can be used to display all parts in the database. The vertical scroll bar enables scrolling through all parts in the database, while the PgDn and PgUp keys enable provide viewing the database a page at a time. This full database list is again sorted alphabetically by Comp Type, so using the Show Types radio button helps in reviewing the list.

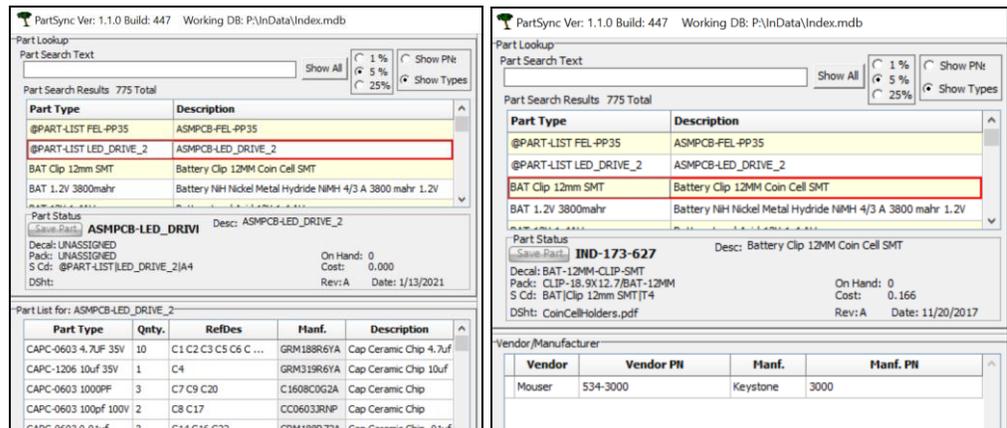


In the screen shot above, with the Show Types radio button selected, the Show All button was clicked. In the Search Results grid, Finished Goods items are shown first followed by printed circuit board Part Lists, followed by Purchase Spec parts.

As mentioned previously, there are two types of part data structures in PartSync, the PS structure (e.g. a single part) and a PL structure (e.g. a parts list). Assigning a Comp Type label has nothing to do with creating a PS part vs. a PL part. New PS parts are created via the Part Info tab, while new PL parts lists are created via the Eng & CAD tab. A parts list is most often used to hold the list of parts to be stuffed into a printed circuit board and the so the Eng & CAD tab has provisions for reading in various types of BOMs generated in a schematic tool. However, the PL data structure can be more general, and one can manually create a parts list on the Eng & CAD tab by selecting various parts in the database (e.g. if you wanted to create a shopping list). Since Comp Type name definitions are merely labels to provide control of result grid sorting, and because users can edit the CompType.txt file to add new categories, users can create custom categories for parts lists. In the example above, the @ sign at the beginning of the @FIN-GOOD and @PART-LIST Comp Types is simply a way to group these types of parts lists above the rest of the PS parts in the database. One could similarly define a Comp Type of #SHOP-LIST, etc.

**Part List / Vendor Info Panel**

At the bottom left of PartSync’s main screen is a panel labeled as either Vendor / Manufacturer or Part List for: xxxxxx. This panel’s title is controlled by the type of part selected in the Part Search Result grid. When a PS (a Purchase Spec) part is selected, the Vendor and Manufacturer info is displayed. When a PL (Part List) type part is selected, the part list is displayed.



In the Part List for: grid, either PNs or Comp Types are displayed, depending on the setting of the Show PNs radio button. Display of PNs is useful, as PNs are short unique IDs of individual parts. Comp Types are also useful, as they are often used when placing parts into storage. If a user clicks on a line item in the Part List for: grid, the line drops down showing the details for the vendor and manufacturer.

Part List for: ASMPCB-LED\_DRIVE\_2

| Part Type            | Qty. | RefDes         | Manf.             | Description                      |
|----------------------|------|----------------|-------------------|----------------------------------|
| CAPC-0603 4.7uF 35V  | 10   | C1 C2 C3 C5 C6 | GRM188R6YA475     | Cap Ceramic Chip 4.7uF 35V       |
| CAPC-1206 10uF 35V   | 1    | C4             | GRM319R6YA106     | Cap Ceramic Chip 10uF 35V        |
|                      |      | <b>Vendor</b>  | <b>Vend PN</b>    | <b>Manf</b>                      |
|                      |      | Mouser         | 81-GRM319R6YA106K | Murata                           |
|                      |      | <b>Manf PN</b> |                   |                                  |
|                      |      |                |                   | GRM319R6YA106KA12                |
| CAPC-0603 1000PF     | 3    | C7 C9 C20      | C1608C0G2A102     | Cap Ceramic Chip 1000pf 100V     |
| CAPC-0603 100pf 100V | 2    | C8 C17         | CC0603JRNPO0B     | Cap Ceramic Chip 100pf 100V      |
| CAPC-0603 0.01uF     | 3    | C14 C16 C22    | GRM188R72A103     | Cap Ceramic Chip .01uF 100V      |
| TACT-RT 33V 600W     | 1    | D1             | SMR132CA          | Transient Absorber Silicon BiDir |

In the Vendor / Manufacturer mode, multiple row-pairs of web links and notes can be entered for a PS part as shown in the figure below. If a row is right-clicked, a pop-up menu appears offering to insert or delete a row-pair. The user can then edit these row-pairs with any text desired. A double-click on the File/URL string will open the link or file. For example, double-clicking on [www.partsync.com](http://www.partsync.com) opens that web page:

Vendor/Manufacturer

| Vendor   | Vendor PN  | Manf.    | Manf. PN |
|----------|--|----------|----------|
| Mouser   | 534-3000   | Keystone | 3000     |
| File/URL | <a href="http://www.partsync.com">www.partsync.com</a> |          |          |
| Note:    | Created by Bob K.                                      |          |          |

## Control Tabs

On the right side of the main screen is a list of tabs used to control many functions in PartSync, as shown in this figure:

The screenshot shows the 'Part Info' tab selected in the software interface. The main content area is divided into several functional sections:

- Description Edit Fields:** Includes buttons for 'Part Exchange' and 'New Part Number', and input fields for 'New Rev' (A) and 'New Part Number' (IND-173-627).
- Title and Details:** Input fields for 'Title' (Battery Clip 12MM Coin Cell SMT New) and 'Details' (New).
- Sort Codes:** Fields for 'Comp. Type' (BAT), 'Comp. Value' (Clip 12mm SMT), and 'Edge Code' (T4). Includes 'Spin' and 'Log' buttons.
- Type Search Grid:** A table with columns 'Type' and 'Description'.
 

| Type     | Description    |
|----------|----------------|
| BAT      | Battery        |
| HDW-CLIP | Hardware Clips |
- Make From Settings:** Fields for 'Target Part' and 'Source Part', and 'Makes Count' (0) and 'Made Cost' (0.000).
- Create New Storage:** Radio buttons for 'Eng.', 'Reel', 'Shelf', 'Cut Tape', 'Tube', and 'Dry Box'. Includes 'Save' and 'Print Label' (checked) buttons.
- Existing Part Storage:** A table showing storage locations and quantities.
 

| Location | Qty. | Date       | Notes             |
|----------|------|------------|-------------------|
| Eng      | 69   | 11/11/2017 | BAT Clip 12mm SMT |
| Reel     | 0    | 11/10/2017 | BAT Clip 12mm SMT |
| Kit      | 3    | 11/13/2021 | BB-LH A/001       |
| Cut Tape | 0    | 10/21/2017 | BAT Clip 12mm SMT |
| Used In  | 1    |            | BB-LH             |
| Used In  | 1    |            | BBUC-12V          |

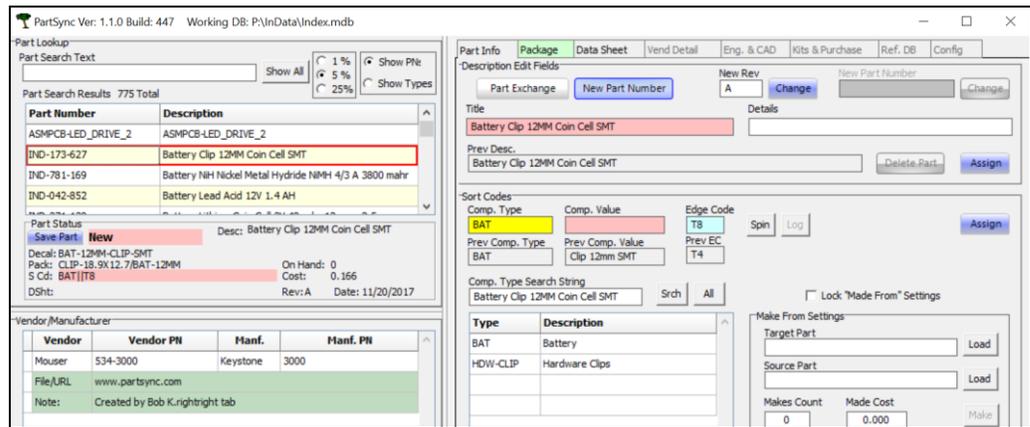
Most tab functions will operate on the component selected on the lefthand side's Part Search Results grid. Normal operation is to select a component on the left (after using search functions to find the component), and then operate using righthand side functions, which have been divided into a sequence of tabs. Make certain the width of the righthand tab area is wide enough to show all the tabs. There is a right / left splitter in the screen's center.

### Part Info Tab

In the above screen shot, the Part Info tab has been selected for IND-173-627. The Part Info tab enables editing the component description. There are also fields to

change the part Revision, Part Number (PN) and to delete the part. Part Exchange is used to read and write all information about a part from or to a .psp (PartSync Part) file.

A new part number can be created starting with content from an existing part. With a part selected in the lefthand side's Part Search Results grid, the New Part Number button on the Part Info tab will copy existing data into the various fields labeled 'Prev'. Title and Details will become red, warning that the existing descriptions are still identical to the Prev fields. Using existing part information when creating a new part will save a lot of time, but edits are required. Selecting an existing part and starting with that data saves typing and errors. The red color identifies fields that have not yet been updated. Comp Type will show in yellow, as it is common for a new parts to share the same Comp Type as the part from which i. Edge Codes are random and are auto-generated.



In the above screen shot, part IND-173-627 was selected on the left. Then the New Part Number button was clicked. In the Part Status region at lower left, the 'New' next to the blue Save Part button indicates that a new unique PN will eventually be generated. The Sort Code (S Cd) line has been initialized, but it is not yet complete, so its background has been colored red. This S Cd line will get updated later when we update the the Sort Codes section of the Part Info tab. Besides the Part Info tab, only the Package and Data Sheet tabs on the righthand side are enabled (i.e. not greyed out), as these tabs will be used to complete the Part Status section for the new part.

### Description Edit

Descriptions are broken into two fields, Title and Details. This convention of two separate fields carries over from the old Parts & Vendors program (which has been end-of-lifed, and replaced by PartSync), where the Title field was similar to a Comp Type and the Details field contained the remaining pieces of part information. PartSync has its own Comp Type structures and surrogate keys, so PartSync simply combines the Title and Details fields into a single Description.

When editing the Title or Details fields, the backgrounds will change color. As soon as a new character is entered, the background turns light cyan. There is an Assign button on the right which is used to copy the new data into the Part Status area on the lefthand side of the main screen. Once Assign has been clicked, the background colors turn green, indicating that the field has been changed and its text has been copied to the Part Status area.

In addition to holding the new data, each field in the Part Status area will be highlighted in red and the Save Part button turns light blue and is enabled. At this point, the new description HAS NOT yet been written into the database. Once all part data has been edited, and this includes edits from other tabs (i.e. the Package tab and the Data Sheet tab), the Save Part button can be clicked, which saves data to the database. Data from multiple tabs, each with their own set of Assign buttons, will be collected into the Part Status area where everything can be reviewed prior to clicking Save Part. There is no UNDO button when creating a new part, so verify content prior to clicking Save Part.

A step-by-step example of changing a description is shown in the screenshots below. We start with the Part Info tab and Part Status after selecting IND-173-627, a 12mm SMT battery clip.

|             |                         |                                       |
|-------------|-------------------------|---------------------------------------|
| Part Status |                         | Desc: Battery Clip 12MM Coin Cell SMT |
| Save Part   | <b>IND-173-627</b>      |                                       |
| Decal:      | BAT-12MM-CLIP-SMT       |                                       |
| Pack:       | CLIP-18.9X12.7/BAT-12MM | On Hand: 0                            |
| S Cd:       | BAT Clip 12mm SMT T4    | Cost: 0.166                           |
| DShst:      | CoinCellHolders.pdf     | Rev: A Date: 11/20/2017               |

|                                 |         |                 |             |             |                 |         |        |
|---------------------------------|---------|-----------------|-------------|-------------|-----------------|---------|--------|
| Part Info                       | Package | Data Sheet      | Vend Detail | Eng. & CAD  | Kits & Purchase | Ref. DB | Config |
| Description Edit Fields         |         |                 |             |             |                 |         |        |
| Part Exchange                   |         | New Part Number |             | New Rev     | New Part Number |         |        |
|                                 |         |                 |             | A           | IND-173-627     |         |        |
|                                 |         |                 |             | Change      | Change          |         |        |
| Title                           |         |                 |             | Details     |                 |         |        |
| Battery Clip 12MM Coin Cell SMT |         |                 |             |             |                 |         |        |
| Prev Desc.                      |         |                 |             |             |                 |         |        |
|                                 |         |                 |             | Delete Part |                 | Assign  |        |

The first step is to enter the text 'New' into Title and Details. These fields turn cyan.

|                                     |         |                 |             |             |                 |         |        |
|-------------------------------------|---------|-----------------|-------------|-------------|-----------------|---------|--------|
| Part Info                           | Package | Data Sheet      | Vend Detail | Eng. & CAD  | Kits & Purchase | Ref. DB | Config |
| Description Edit Fields             |         |                 |             |             |                 |         |        |
| Part Exchange                       |         | New Part Number |             | New Rev     | New Part Number |         |        |
|                                     |         |                 |             | A           | IND-173-627     |         |        |
|                                     |         |                 |             | Change      | Change          |         |        |
| Title                               |         |                 |             | Details     |                 |         |        |
| Battery Clip 12MM Coin Cell SMT New |         |                 |             | New         |                 |         |        |
| Prev Desc.                          |         |                 |             |             |                 |         |        |
|                                     |         |                 |             | Delete Part |                 | Assign  |        |

The next step is to click the Assign button in the Description Edit Fields region. The Part Status area changes:

|                               |             |   |
|-------------------------------|-------------|---|
| Part Status                   | IND-173-627 | Desc: Battery Clip 12MM Coin Cell SMT New |
| <a href="#">Save Part</a>     |             |   |
| Decal: BAT-12MM-CLIP-SMT      |             | On Hand: 0                                |
| Pack: CLIP-18.9X12.7/BAT-12MM |             | Cost: 0.166                               |
| S Cd: BAT Clip 12mm SMT T4    |             | Rev: A                                    |
| DSht: CoinCellHolders.pdf     |             | Date: 11/20/2017                          |

If additional changes are required in Sort Codes, or on the Package or Vend Detail tabs, we make those using the Assign buttons in those areas. When the Part Status area is complete, we can review the changes (shown in red background) and click the blue Save Part button. The database is now updated with this new part record, and the Part Status area's background is returned to grey:

|                               |             |   |
|-------------------------------|-------------|---|
| Part Status                   | IND-173-627 | Desc: Battery Clip 12MM Coin Cell SMT New |
| <a href="#">Save Part</a>     |             |   |
| Decal: BAT-12MM-CLIP-SMT      |             | On Hand: 0                                |
| Pack: CLIP-18.9X12.7/BAT-12MM |             | Cost: 0.166                               |
| S Cd: BAT Clip 12mm SMT T4    |             | Rev: A                                    |
| DSht: CoinCellHolders.pdf     |             | Date: 11/20/2017                          |

### Part Info Sort Codes

Sort Codes are strings built from three pieces of information about a part. Together these three sub-strings form a type of description that can be printed on small labels used to identify various parts. While Sort Codes could be used as a type of part number, the PN serves this purpose better. Sort Codes do not need to be unique, though that is suggested where possible. The three sub-parts of a sort code are:

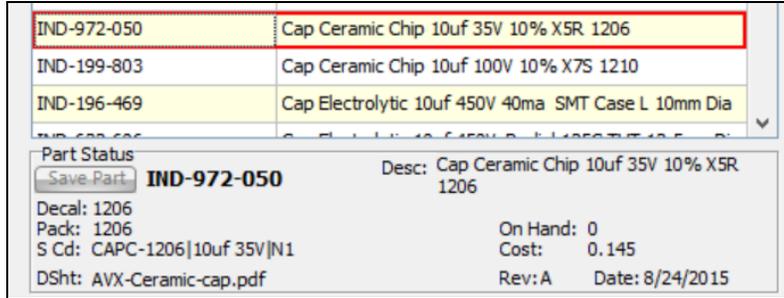
1. Component Type      Functional category for a part.
2. Part Value            Numeric value of part if any.
3. Edge Code             Two-character storage bin ID.

Component Types are short strings that identify the functional nature of a part. These strings are defined in CompType.txt along with MinLog, MaxLog and descriptions. The component type descriptions are used to drive a Comp Type search engine which helps locate component type short strings. MinLog and MaxLog are used process the Part Value into a Edge Code as a bin ID.

Part Value provides numeric info about a part. For example 10uf 35V is not useful as either a description or part number, but it is plenty to assist arranging parts in a bin when used with the Comp Type and the Edge Code. Only the first numeric field is used, along with any units. The 10uf converts to 10\*\*14 picofarads. Numeric sorting of Comp Types uses the converted value, providing true numeric sorts.

The Edge Code is a two-character code consisting of a simple letter (excludes letters such as G I J O Q S U V) followed by a single digit. These come in two styles, either a completely random sequence (Spin Button) or a logarithmically coded sequence based on the first numeric sequence in the Part Value. In the 10uf 35V example, the 10uf is converted into picofarads and the log of that number is scaled

into a number that is represented by the Edge Code. The result of this is that all components placed on a shelf are organized numerically. As an example:



The Sort Code (the S Cd line in the Part Status area) is composed of three strings separated by | characters. The part is a CAPC-1206 (Ceramic cap of size 1206) with a value of 10uf at 35V. The bin ID is N1. This is plenty to define a storage location, but it is insufficient as a general description.

When the Sort Code is completely set up, the Assign button can be used to load the result into the Part Status area in preparation for saving to the database. If a different Comp Type is required, the Comp Type Search String and the Srch button can be used. The All button will show all available Comp Types, and one of these can be selected.

**Part Info Made From**

Some purchased parts are often used to make other types of parts. For example, header posts are often purchased in long strips and then cut down to a required length. A dual-row strip of 36 positions (72 pins total) can be cut down into 18 pieces of dual-row pieces of 2 positions (4 pins total). The cost of the part made is 1/18 of the full strip plus cutting costs.

The Made From setting area normally displays made-from settings whenever a part in the lefthand side's Part Search Results grid is selected. This is good for display, but does not allow setup of the two parts required to create a Made From part. A check box 'Lock Made From Settings' can be checked which preserves the Made From setting as result grid parts are selected. Load buttons can then be used to set up Target and Source Parts. Once both Target and Source parts are selected, the Makes Count and Made Cost can be manually set. Clicking the Make button updates the database.

In the above example, the Lock box has been checked. Part IND-480-319 was selected in the results grid and the Load button for the target part was clicked. The main screen was opened wide to show entire descriptions. Next, part IND-300-914 was selected in the results grid and the Load button for the Source part was clicked. Make Count was set to 18 pieces, a total cost of 0.20 was entered and Make was clicked. When finished, the Lock checkbox should be cleared.

Part IND-480-319 is now made from IND-300-914. The Vend Details tab shows:

| Vendor | Vendor PN | Manf | Manf PN |
|--------|-----------|------|---------|
|        |           |      |         |
|        |           |      |         |

**Part Info Part Storage**

A major function of the Part Info tab is to assist with component storage systems, along with barcode support. There are 6 types of storage types that can be defined, each with specific label styles:

Parts exist in containers and containers are placed in a storage area. Engineering stock is typically for prototype components maintained by engineers. Reel storage is used for components in reels, typically for small SMT components. Shelves are used for large components or large quantities of parts. Cut Tape holders are small snap-together containers that work well for holding strips of tape cut from reels. Tubes refers to components in plastic tubes. These tend to be long and are often stored in a large drawer system. Dry Box storage is used for components that are moisture sensitive and must be stored in a low humidity enclosure.

Once a storage check box is selected, the Save button is enabled. If the Print Label checkbox is checked, and the Save button is clicked, the storage item selected is created and a label with a barcode is printed. See the Printers section for more details on printers and label sizes.

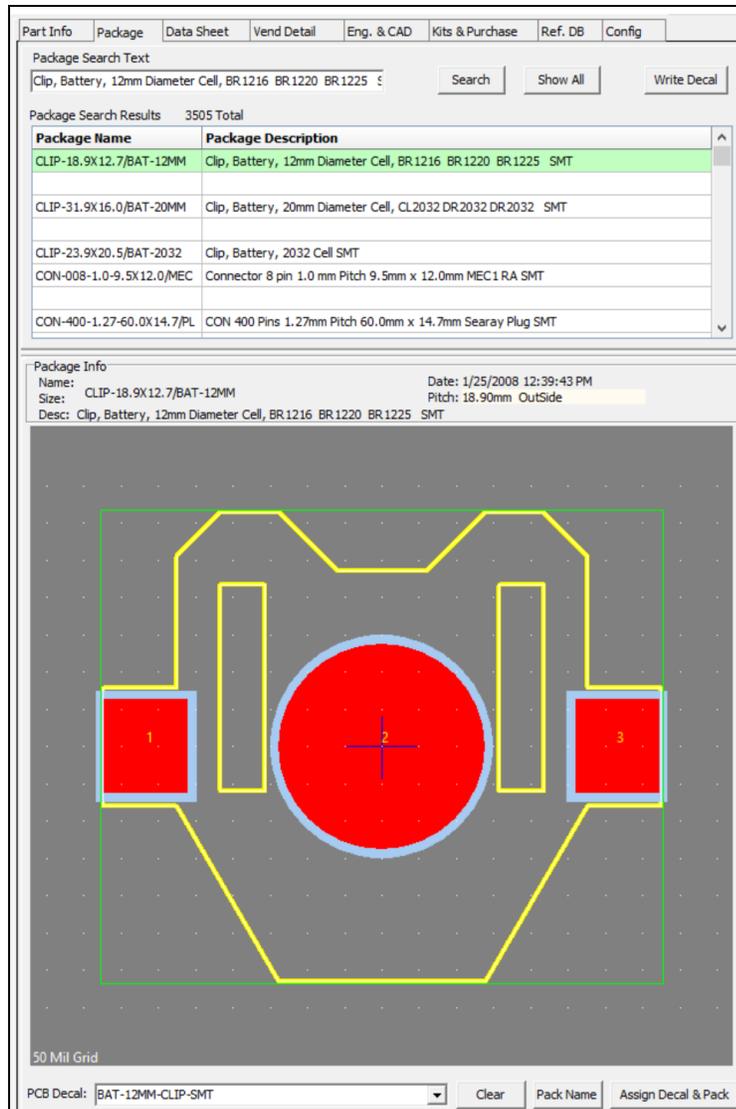
Whenever a part is selected in the Part Search Results grid, the storage for that part is shown in the Part Info tab within the Existing Part Storage region. In addition to storage types, the presence of this component within a previous part kit is identified. It is very common for components to be left over in previous kits, and finding those parts left in kits can be important. For example, part IND-459-781 is in storage at:

| Location | Qty. | Date      | Notes                 |
|----------|------|-----------|-----------------------|
| Shelf    | 0    | 3/7/2016  | CON-D 25 Pin Male SMT |
| Used In  | 1    | 9/15/2015 | BB25E                 |
| Used In  | 1    |           | BB10B                 |

Buttons are provided to Delete container info, re-print a label, or to print a Tape Tag. Tape Tags are very narrow labels that can be placed on SMT tape or other small containers.

**Package Tab**

Packages are the 2D physical models of electronic components. These models can be converted to PCB footprints in a .d file format for both PADs and Altium PCB design tools. As in the previous examples of component searching, there is a search engine for packages, along with a Package Search Results grid. When a package is selected in the Package Search Results grid, a graphic image is rendered and package attributes are shown in the Package Info region.

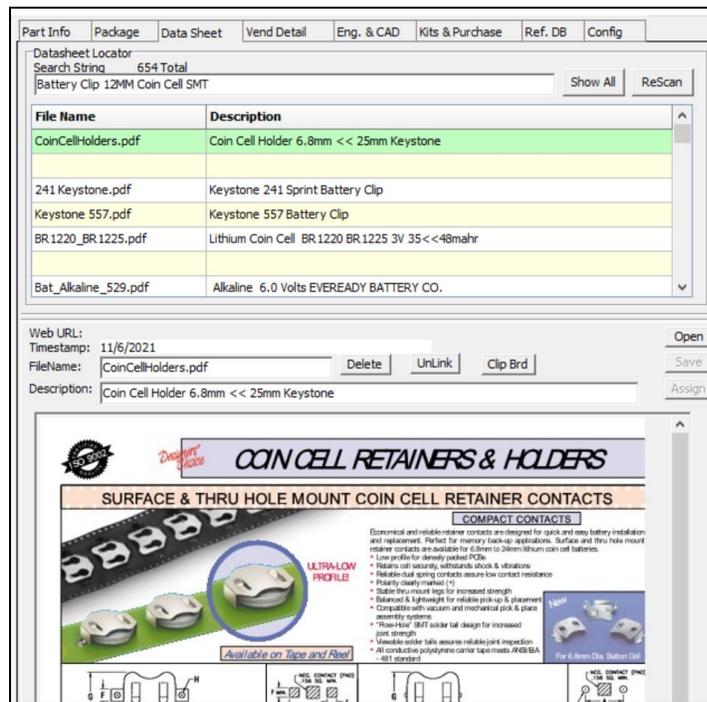


All the package data is created using the PackEdit application, a separate tool provided by Index Designs. A large package model database created by Index Designs, PackData.mdb, is accessible from inside PartSync. At the bottom of PartSync's Package tab are options for associating a PCB Decal name (i.e. footprint name) with the currently selected part record. The Clear button will clear the PCB Decal name. The Pack Name button will fill in the package name into the PCB

Decal field for the footprint name (i.e. to that this part will use the same name for both the footprint and the package model) . When a package has been selected in the Package Search Results grid and the PCB Decal field has been filled in, the Assign Decal and Pack button will write the package name and PCB Decal name to the lefthand side’s Part Status area.

**Data Sheet Tab**

The Data Sheet tab provides an interface to the datasheet librarian. A datasheet directory is defined in the Config tab and all datasheets are contained in that directory. All datasheets must be .pdf files. A search engine for datasheets is provided in PartSync and it will search on datasheet descriptions. The datasheet search results grid shows matching results, and if a datasheet is already assigned to the selected part, that row in the grid will be shown in light green:



Part IND-173-627 has been selected and the datasheet was found. The Open button will open the .pdf in Windows’ default PDF viewer. A double-click in the row in the Data Sheet Results grid will do the same. There are 6 buttons. Delete will delete the .pdf. UnLink will remove the link between the selected part and the datasheet. Clip Brd will copy the .pdf file to the clipboard. Open will Open the .pdf. Save will save any changes to the librarian, and Assign will form a link to the lefthand side’s Part Status area.

Descriptions for each datasheet are important but they take a little time and care to create. There is logic within PartSync to assist in forming datasheet descriptions from text in the .pdf file. If a user clicks on the datasheet image, small blue

rectangles will be drawn around text. Clicking on a small blue rectangle will copy that text to the description area.



In the screenshot above, a click on the .pdf image created blue rectangles around text in the .pdf file. Then the topmost blue rectangle was clicked. The text COIN CELL RETAINERS & HOLDERS was copied into the description field. If no description exists, the file name will be used.

Also supported in the datasheet librarian is the ability to drag and drop .pdf files. It is often useful to adjust the name of the file (after dropping) to assist with sorting in File Explorer. Many file names off the web have randomized names and the large datasheet directory becomes very hard to browse. Once the datasheet info is setup, the Save button will save the file in the datasheet directory using the file name provided.

When datasheets are stored in the librarian, the first page of the datasheet is rasterized and stored. Unlike opening of a .pdf file, the first page renderings can be displayed very quickly. Scrolling down though the Data Sheet results grid is very quick and a glance at the first page is useful when trying to find a specific file if the search engine does not help.

Since descriptions are important when searching for datasheets, try to use good descriptions. Start with the part description and/or build up using the text from the displayed first page.

#### **Vendor Detail Tab**

Vendor and Manufacturer data for the part selected in the lefthand side's Part Search Results grid is displayed in the Vend Detail tab. At the top of the Vend Details tab, there is a list of Approved Vendors for the selected part. Both vendor and manufacturer part numbers are displayed. Each part in the database has a list of approved vendors and each approved vendor has a list of prices for various quantities. Clicking on an Approved Vendor List item displays vendor, manufacturer, part numbers and prices.

| Vendor             | Vendor PN | Manf     | Manf PN |
|--------------------|-----------|----------|---------|
| Mouser Electronics | 534-3000  | Keystone | 3000    |
|                    |           |          |         |
|                    |           |          |         |
|                    |           |          |         |

Vendor: Mouser Electronics      Manufacturer: Keystone      Clear

Vendor PN: 534-3000      Manf PN: 3000      Save

Qty Costs (Ctrl-Del = Delete Row)

| Qty | Cost Each | At Qty Total Cost |
|-----|-----------|-------------------|
| 1   | \$0.2900  | \$0.2900          |
| 10  | \$0.2100  | \$2.1000          |
| 50  | \$0.1870  | \$9.3500          |
| 100 | \$0.1660  | \$16.6000         |
| 200 | \$0.1500  | \$30.0000         |

Retain Costs

Clear      Push Costs      Pop Costs

The Vend Detail tab is used to edit and create the Approved Vendor List items. To edit an existing item, click on that row in the top list. Three areas of item data will show on the screen. The Vendor and Manufacturer can be selected from drop down lists, and Vendor PN and Manf PN can be edited. To create a new Approved Vendor item, click on a blank row in the Approved Vendor List which will clear various fields.

When creating a new item, the order of creation is important. First the Vendor, Manufacturer, VendPN and ManfPN must be defined, and then the Save button to the right of Manf PN must be clicked. After that, the Qty Costs area must be completed and saved. Finally, any changes to the Vendor and Manufacturer info can be edited and saved. Note that there are three Save buttons, one for each area.

The Qty Costs area has some extra features to make part setup easier. The Retain Costs check box is used to preserve quantity cost information whenever the Vendor PN is changed. Typically, a change in Vendor, Manf, VendPN or ManfPN will clear the Qty Costs info when the Save button is clicked. Cost info can be retained if the Retain Cost box is checked. Current Qty Costs info can be saved using the Push Costs button. Many parts, such as resistors and capacitors, have the same Qty Costs breakdowns, so saving a set of Qty Costs records is useful when setting up a new vendor. Once costs are pushed, they can be recalled later using the Pop Costs button. Costs can be cleared using the Clear button.

When editing Qty Costs, start with the cursor in the Qty column. Enter a number and press tab. There are two options for entering prices. First, the Cost Each can be defined, followed by a tab. The Qty will be multiplied by the Cost Each and the result sets the At Qty Total Cost. The cursor moves to the At Qty Total Cost column. The second option is to enter a number in the At Qty Total Cost field and

press tab. This will result in setting the Cost Each column. This is useful, as vendors often specify costs in one manner or the other.

Once the Qty Costs data section is complete, the Save button for the Qty Costs area can be pressed to update the database. If a mistake was made in data entry, the Refresh button will reload the grid from the database. There is NO UNDO once the save button is pressed.

The Vendor and Manufacturer areas are used to set up Vendor and Manf data. There is an extra feature in the Web address for each area. If a pipe character | is included in the web URL, the Vendor (or Manufacturer) part number will be inserted into the URL at that point. Double-clicking on the Web address field launches a web browser with the filled-in part number, which will bring up the part in the Vendor or Manf's web site. See the file VendorWebSearchSyntax.pdf for details. Very often shortcut names are used for vendor names, see the file VendorMatchList.txt.

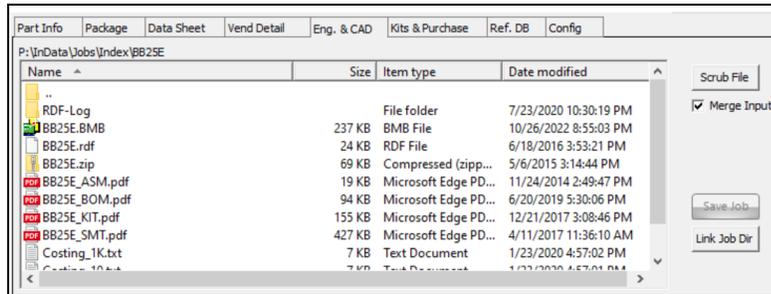
#### **Engineering & CAD Tab**

A key function of a BOM manager is to support the reading of part lists from various CAD tools and then constructing a BOM within an MRP (Material Requirements Planning) environment. Most MRP systems require the CAD tool output to be pre-coded in terms of MRP part numbers, which is a considerable task for the schematic designer and library manager. PartSync minimizes this effort by using the component search engines to map schematic parts to PartSync parts without using schematic libraries or part attributes.

#### **Job Directories**

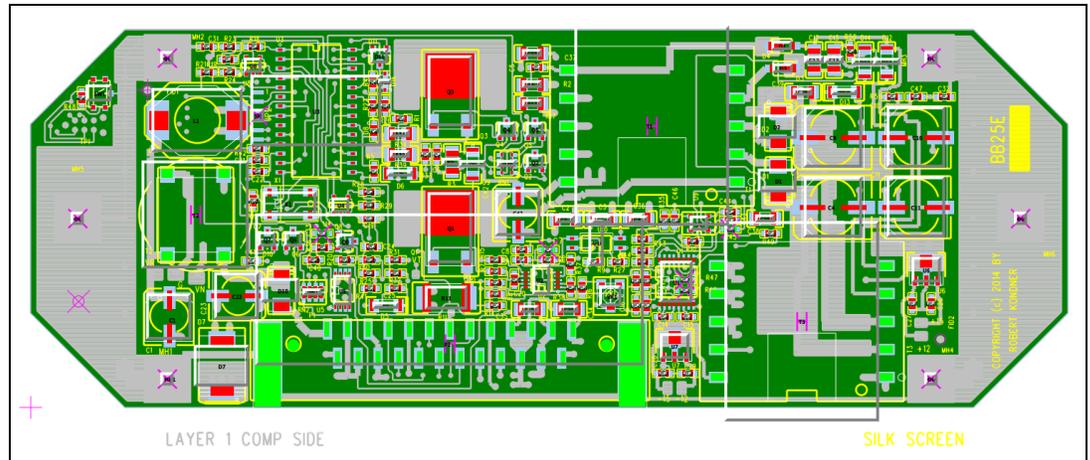
The Eng & CAD tab provides tools for reading PCB CAD data and mapping job parts to PartSync parts. To support this process, PartSync assumes a directory has been assigned for each Parts List (PL) part to be built. This directory is used for input files, output reports and various working files. Typically, there is a single directory defined (a Jobs Directory) that contains a number of sub-directories, one for each PL part in PartSync. When a new PL record is to be created, this directory is created first and the input file from the CAD tool is placed in this directory. Files from CAD tools can be .csv, .xls, .xlsx or .bmb files. The BOM Builder application produces the .bmb file, and .bmb files work very well with PartSync.

At the top of the Eng & CAD tab is a 'shell browser' area which is a type of Windows Explorer shell for viewing the content of the Jobs Directory and all its sub-directories:



At Index Designs, we use an NAS (Network Appliance Storage) drive for saving production data. There is a shared directory that is mapped to the P:\ drive (Production) on engineering client machines. On this P:\ drive is a Jobs directory that holds all PartSync engineering data organized in a set of sub-directories. Under the Jobs directory, there is an Index directory used for Index Designs products. There are a number of directories under Jobs from decades of consulting work. One product under Index is the BB25E design, where the entire path of P:\Jobs\Index\BB25E can be seen. Within this directory is a BB25E.bmb file which is the output of the BOM Builder application. The BB25E\_SMT.pdf file shows the BOM Builder Smart PDF output file shown in the figure below:

### BOM Builder



A major advantage of using BOM Builder is this Smart PDF output showing how well part package pins, which are colored red, fit and match the copper and paste patterns contained in board Gerber files. When reading a .bmb file into the PartSync scrubber, all data is identified and properly coded. Properly coded means all parts already have PartSync PN numbers and No Stuff components have been identified. BOM Builder connects to the PartSync database and includes tools for matching schematic parts to PN parts. Other tools help prepare a schematic output for feeding PCB design.

**BOM Scrubbing**

Input files read into PartSync for creation of a PL-type record must be scrubbed to create a proper database entry. PartSync’s scrubbing logic extracts BOM data from .bmb, .xls, .xlsx or other types of input files. Selecting a file in the Jobs directory, then clicking the Scrub File button will read the file and place content into a spreadsheet-like grid where all the rows and columns have drop-down selectable headers. Column headers can be defined as:

|          |   |
|----------|---|
| Not Used | Column Ignored                          |
| RefDes   | Reference Designators                   |
| Count    | Count of parts in line item             |
| Find#    | Sequential number used to ID line items |
| Desc     | Description                             |
| Value    | Value of part                           |
| Cust PN  | Customer or Company PN                  |
| DNI      | Do Not Insert                           |
| Void     | Not Used                                |
| Vend     | Vendor of part (Change to Desc.)        |
| VendPN   | Vendor PN                               |
| Manf     | Manufacturer of part                    |
| ManfPN   | Manufacturer PN                         |

Column types are assigned when the data is read in, and the default assignments need to be checked and re-assigned as required. A Value column should be changed to Desc and all Desc columns will be merged. All other column types are not used. If such columns exist in the input file, they should be changed to Not Used. When a .bmb file is scrubbed, row and column headers are set automatically, but they need checking and possible editing.

|   |              |                                   |                 |                                    |            |
|---|--------------|-----------------------------------|-----------------|------------------------------------|------------|
| BOM Edit File: C:\ProgramData\IndexDesigns\PartSync\Data\TempBMBFile.bmb Job: BOM: C:\ProgramData\I |              |                                   |                 |                                    |            |
| <b>BOM Row &amp; Column Assignment</b>  |              |                                   |                 |                                    |            |
| <b>No Errors</b>  | <b>Count</b> | <b>RefDes</b>                     | <b>Cust-P/N</b> | <b>Desc</b>                        | <b>DNI</b> |
| Heading   | Count        | RefDes                            | Part Num        | Description                        | DNI        |
| BOM LI  | 2            | C1 C42                            | IND-064-531     | Cap Electrolytic 100uf 35V .34 Ohm |            |
| BOM LI  | 10           | C2 C3 C12 C13 C34 C35 C36 C37 C38 | IND-972-050     | Cap Ceramic Chip 10uf 35V 10% X5R  |            |
| BOM LI  | 2            | C4 C9                             | IND-413-313     | Cap Elec Solid Polymer 220uf 6.3V  |            |
| BOM LI  | 1            | C5                                | IND-310-407     | Cap Ceramic Chip 330pf 100V 5%     |            |
| BOM LI  | 11           | C6 C14 C15 C16 C17 C19 C20 C27    | IND-019-434     | Cap Ceramic Chip .1uf 50V 10% X7R  |            |
| BOM LI  | 1            | C8                                | IND-578-916     | Cap Ceramic Chip 100pf 100V 5%     |            |

Row Headers are:

|         |                       |
|---------|-----------------------|
| Invalid | Invalid input         |
| BOM LI  | Valid input line item |

|            |  |
|------------|--|
| RefDes SU  | Extra line of RefDes for previous line item      |
| Error      | Auto generated error from previous line item     |
| Heading    | Ignored text that precedes line item information |
| PartNum SU | Extra part numbers for previous line item        |
| DNI        | Do Not Insert items                              |

When row and column types are correct, the Done button can be clicked to return all line items to the Eng & CAD tab. All the settings for scrubber setup are saved in a .rdf file by clicking the Save Job button. When the line items are returned to the Eng & CAD tab (click on the Done button), they are placed in the Scrubbed Input List with status counts displayed in the Line Item Status region.

The screenshot shows the 'Line Item Status' window. At the top, there are summary statistics: Coded LI (70), Open LI (0), Errors (0), Manual (0), and Total LI (70). A green 'Compare & Save to BOM' button is visible, along with a 'Calc. Cost' button and quantity indicators (xxx @Qty 10 and xxx @Qty 1K). Below this is the 'Scrubbed Input List' table:

| Man | Part #      | Count | RefDes         | Description   |
|-----|-------------|-------|----------------|---|
|     | IND-064-531 | 2     | C1 C42         | Cap Electrolytic 100uf 35V .34 Ohm SMT Case D8 6.3mm Dia 7.7 High |
|     | IND-972-050 | 10    | C2 C3 C12 C13  | Cap Ceramic Chip 10uf 35V 10% X5R 1206                            |
|     | IND-413-313 | 2     | C4 C9          | Cap Elec Solid Polymer 220uf 6.3V .025 Ohm SMT Case E 8mm Dia     |
|     | IND-310-407 | 1     | C5             | Cap Ceramic Chip 330pf 100V 5% NPO 0603                           |
|     | IND-019-434 | 11    | C6 C14 C15 C16 | Cap Ceramic Chip .1uf 50V 10% X7R 0603                            |
|     | IND-578-916 | 1     | C8             | Cap Ceramic Chip 100pf 100V 5% NPO 0603                           |
|     | IND-372-185 | 2     | C10 C11        | Cap Electrolytic 47uf 35V General Purpose SMT Case E 8mm Dia      |
|     | IND-084-150 | 7     | C18 C25 C26    | Cap Ceramic Chip 1.0uf 50V 10% X5R 0603                           |

On the right side of the window, there are buttons for 'Read BOM', 'Clear Part List', 'Re-Color List', and a 'Sort By' dropdown menu with options for 'Ref Des' and 'In List'.

In the image above, there are 70 line items and all 70 are coded to PN parts in the PartSync database. Since everything is coded to a PN, the Compare and Save button goes green indicating it is active. Pressing this button will compare the Scrubbed Input List to the currently selected Parts List (PL) part shown in the lefthand side's Part Search Results grid. Any difference will be shown and there is an option to replace the content of the selected PL.

To show an example, the difference in the first row in the Scrubbed Input List (C1 C42) was deleted, then the Compare and Save button was clicked. Clicking the Save to DB button will replace the content for part list ASMPCB-BB25E

The screenshot shows the 'Save Parts List to DB' dialog box. It features a dropdown menu with 'ASMPCB-BB25E' selected, and 'Compare' and 'Save to DB' buttons. Below the buttons, the file path is shown: P:\InData\Jobs\Index\BB25E\PL\_DiffReport\_002.txt. The main content area displays the following text:

```
Compare of Part List: ASMPCB-BB25E to Database. 10/28/2022 11:29:10 PM
Difference File: P:\InData\Jobs\Index\BB25E\PL_DiffReport_002.txt

Deleted Part: IND-064-531
Cap Electrolytic 100uf 35V .34 Ohm SMT Case D8 6.3mm Dia 7.7 High
C1 C42
```

When a row is selected in the Scrubbed Input List, there might be information shown below this list. If Vendor or Manufacturer info had been collected for this

line item, and if that content matched a part in the part database, it would be shown in orange. A click would assign that PN to the Scrubbed Input List line item.

**PN Assignment**

The major goal of forming the Scrubbed Input List is to facilitate the matching/merging of PNs in a PartSync record to input line items from the given BOM. The previous example used a BOM Builder file as a source file, and all line items already had assigned PNs. BOM Builder can access the PartSync database and enables the designer to make such assignments in the BOM Builder’s .bmb file. This enables import into PartSync in a very straightforward manner. On the other hand, when trying to read a BOM into PartSync from an .xls or .csv file which had been read from some other CAD system, all the part number fields would be blank. PartSync’s scrubbing logic allows the user to click on a line item in the Scrubbed Input List, and PartSync’s component part search engine will search the PartSync database using the description from the Scrubbed Input List. When the user sees the required part on the left, they can double-click that part, and the PN from the left will be written to the Part # column in the Scrubbed Input List. The Line Item Status counts will change when an uncoded part is matched to a database PN using the left side double-click.

Parts can be added to the Scrubbed Input List using the Add Part button. The currently selected part in the lefthand side’s Part Search Results grid will be added to the Scrubbed Input List. An ‘M’ for manual will be shown in the Man column. Parts can be deleted from the Scrubbed Input List by selecting a part and clicking Delete.

**Assembly Cost Calculation**

When the Save Job button highlights, the Scrubbed Input list has changed. Press Save Job to save the list. When a PL item is selected on the left side, a quick calculation of costs can be done using the Calc Cost button. Two .txt files, Costing\_1K.txt and Costing\_10.txt will be generated. These give an idea of component costs at quantity 1000 and 10.

| Need  | Extra | Part Number | BuyAt | Cost       | Description  |
|-------|-------|-------------|-------|------------|--|
| 2000  | 0     | IND-064-531 | 900   | \$334.00   | Cap Electrolytic 100uf 35V .34 Ohm SMT Case D8 6.3mm Dia 7.7 High        |
| 10000 | 0     | IND-972-050 | 4000  | \$600.00   | Cap Ceramic Chip 10uf 35V 10% XSR 1206                                   |
| 2000  | 0     | IND-413-313 | 1000  | \$1,164.00 | Cap Elec Solid Polymer 220uf 6.3V .025 Ohm SMT Case E 8mm Dia 6.5mm High |
| 1000  | 0     | IND-310-407 | 1000  | \$19.00    | Cap Ceramic Chip 330pf 100V 5% NPO 0603                                  |
| 11000 | 0     | IND-019-434 | 4000  | \$176.00   | Cap Ceramic Chip .1uf 50V 10% X7R 0603                                   |
| 1000  | 0     | IND-578-916 | 1000  | \$15.00    | Cap Ceramic Chip 100nf 100V 5% NPO 0603                                  |

|                         |
|-------------------------|
| -----                   |
| Total Cost: \$30,293.40 |
| Unit Cost: \$30.29      |

Calculations will use the lowest cost vendor and vendor quantities to meet the required part count.

**Kits & Purchasing**

The Kits & Purchasing tab is used to create BOM reports, Kit reports and Purchasing Reports for part list items (PL) in the database. A BOM is always for a single assembly, while kits are basically a BOM multiplied up by the quantity of assemblies to be built. Line items in kits are considered as container labels for a part used in a kit. Kit items get their own unique barcode. Scanning a kit item barcode will identify a Bom Builder file (.bmb) in the Jobs directory. If BOM Builder is enabled in the Config tab, then the board loading and placement for the line item components will be displayed.

With a PL record selected on the lefthand side, a click on the BOM Report button generates a .pdf file report along with a .csv file for the parts list:

**BOM List: ASMPCB-BB25E** Printed : 10/29/2022 8:05:55 PM

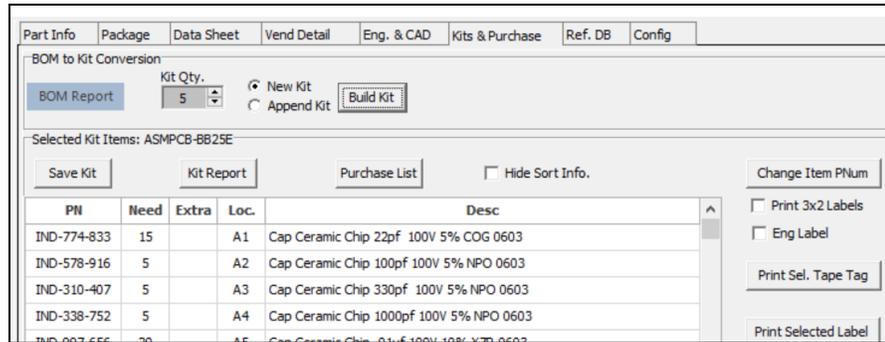
**ASMPCB-BB25E**  
 Finished Good BB25E  
 P:\InData\Index.mdb

Quantity to Build: 1  
 Part List Revision: A  
 BOM Date: 03/30/2016

| Item Loc | Qty | Part Number<br>Sort Code              | Description   | Reference                                |
|----------|-----|---------------------------------------|---|--|
|          |     | Vendor Name                           | Vendor Part Number  | Manf Name                                |
| 1        | 2   | IND-064-531<br>CAPE-AL-LZ 100uf 35V   | Cap Electrolytic 100uf 35V .34 Ohm SMT<br>Case D8 6.3mm Dia 7.7 High        | C1 C42                                   |
|          |     | Mouser Electroni 667-EEE-FK1V101XP    | Panasonic EEE-FK1V101XP   |  |
| 2        | 10  | IND-972-050<br>CAPC-1206 10uf 35V     | Cap Ceramic Chip 10uf 35V 10% X5R 1206                                      | C2 C3 C12 C13 C34 C35 C36<br>C37 C38 C39 |
|          |     | Mouser Electroni 81-GRM319R6YA106KA2D | Murata GRM319R6YA106KA12D   |  |
| 3        | 2   | IND-413-313<br>CAPE-AL-SP 220uf 6.3V  | Cap Elec Solid Polymer 220uf 6.3V .025 Ohm SMT<br>Case E 8mm Dia 6.5mm High | C4 C9                                    |
|          |     | Mouser Electroni APXA6R3ARA221MH70G   | United Chem Co APXA6R3ARA221MH70G   |  |

| Find# | Part Num  | Count | RefDes    | Package  | Decal    | Desc       | Vend      | VendPN    | Manf       | ManfPN             | PSID |
|-------|-----------|-------|-----------|----------|----------|------------|-----------|-----------|------------|--------------------|------|
| 1     | IND-064-5 | 2     | C1 C42    | CAP-SMT- | CAP-SMT- | Cap Electr | Mouser El | 667-EEE-F | Panasonic  | EEE-FK1V101XP      |      |
| 2     | IND-972-0 | 10    | C2 C3 C12 | 1206     | 1206     | Cap Ceran  | Mouser El | 81-GRM31  | Murata     | GRM319R6YA106KA12D |      |
| 3     | IND-413-3 | 2     | C4 C9     | CAP-SMT- | CAP-SMT- | Cap Elec S | Mouser El | APXA6R3A  | United Ch  | APXA6R3ARA221MH70G |      |
| 4     | IND-310-4 | 1     | C5        | 603      | 603      | Cap Ceran  | Mouser El | 81-GRM18  | Murata     | GRM1885C2A331JA01D |      |
| 5     | IND-019-4 | 11    | C6 C14 C1 | 603      | 603      | Cap Ceran  | Mouser El | 581-06035 | AVX        | 06035C104KAT2A     |      |
| 6     | IND-578-9 | 1     | C8        | 603      | 603      | Cap Ceran  | Mouser El | 603-CC60  | Yageo      | CC0603JRNPO0BN101  |      |
| 7     | IND-372-1 | 2     | C10 C11   | CAP-SMT- | CAP-SMT- | Cap Electr | Mouser El | 667-EEE-F | Panasonic  | EEE-FC1V470AP      |      |
| 8     | IND-084-1 | 7     | C18 C25 C | 603      | 603      | Cap Ceran  | Mouser El | 963-UMK1  | Taiyo Yudi | UMK107BJ105KA-T    |      |
| 9     | IND-774-8 | 3     | C21 C22 C | 603      | 603      | Cap Ceran  | Mouser El | 581-06031 | AVX        | 06031A220JAT2A     |      |

Entering a Kit Qty followed by a click on Build Kit will generate a kit for the required Kit Quantity. The kit contents are displayed in the Selected Kit grid.



Three buttons allow either the kit to be saved, a kit report generated, or a purchase report generated. The Extra column is used to specify an additional quantity to purchase to cover loss of parts during assembly. A sequential two-character mnemonic is assigned to each line item in the Loc column. This code is placed on each kit container, which aids in locating individual line items within a physical kit. A physical kit is typically a large box, and if parts are placed in that box by their Loc Code, retrieving individual line items from the kit box is simplified.

A Kit Report is used to identify the parts in a kit along with information that helps locate components in storage.

| Kit List: ASMPCB-BB25E |     |  |   |                           |                  | Printed : 10/29/2022 8:38:36 PM |  |
|------------------------|-----|--|---|---------------------------|------------------|---------------------------------|--|
| ASMPCB-BB25E           |     |  |   |                           |                  | Quantity to Build: 5            |  |
| Finished Good BB25E    |     |  |   |                           |                  | Part List Revision: A           |  |
| P:\InData\Index.mdb    |     |  |   |                           |                  | Kit Release Number: 001         |  |
|                        |     |  |   |                           |                  | Kit Release Date: 10/29/2022    |  |
| Item Loc               | Qty | Part Number<br>Sort Code               | Description                             | Reference                 |                  |                                 |  |
|                        |     | Vendor Name                            | Vendor Part Number                      | Manf Name                 | Manf Part Number |                                 |  |
| 1                      | 15  | IND-774-833<br>CAPC-0603 22pf 100V T2  | Cap Ceramic Chip 22pf 100V 5% COG 0603  |                           | C21 C22 C46      |                                 |  |
|                        |     | Mouser Electroni 581-06031A220J        |   | AVX 06031A220JAT2A        |                  |                                 |  |
| 2                      | 5   | IND-578-916<br>CAPC-0603 100pf 100V J5 | Cap Ceramic Chip 100pf 100V 5% NPO 0603 |                           | C8               |                                 |  |
|                        |     | Mouser Electroni 603-CC603JRNPO08N101  |   | Yageo CC603JRNPO08N101    |                  |                                 |  |
| 3                      | 5   | IND-310-407<br>CAPC-0603 330pf 100V J3 | Cap Ceramic Chip 330pf 100V 5% NPO 0603 |                           | C5               |                                 |  |
|                        |     | Mouser Electroni 81-GRM185C2A331JA01D  |   | Murata GRM1885C2A331JA01D |                  |                                 |  |

The Item number on the left is color coded by the color assigned to the Comp Type in file CompColors.txt. These colors will also be printed on kit labels when using a color label printer (for example, the Epson TM-C3500). Color-coded labels are a big help when dealing with many different types of components. The Kit Report includes full Sort Codes which also help identify component locations. Vendor, Manufacturer, VendPN and ManfPN information help identify components, reducing pick error from inventory. Kit items are sorted by Comp Type, which helps reduce movements when picking kit line items. Along with the Kit Report is an association between Kit Location IDs and reference designators. A table shows the Kit ID and its first RefDes. One scheme that is often used for line item IDs is the first RefDes used in a line item. Since the RefDes are sorted, the first RefDes is easy to locate in the report.

BB25E\_IDList.txt - Notepad  
File Edit Format View Help

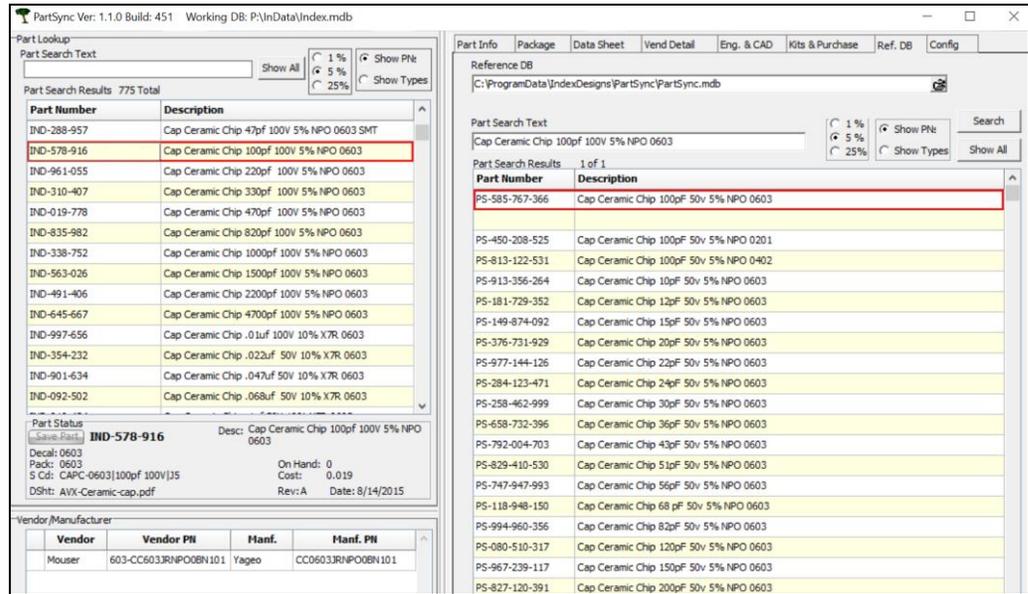
RefDes to CompID Reference List  
ASMPCB-BB25E 10/29/2022

| RefDes | ID   |
|--------|------|--------|------|--------|------|--------|------|--------|------|
| C1     | = B3 | C2     | = A8 | C4     | = B4 | C5     | = A3 | C6     | = A6 |
| C8     | = A2 | C10    | = B2 | C18    | = A7 | C21    | = A1 | C23    | = B1 |
| C24    | = A4 | C31    | = A5 | D1     | = C2 | D3     | = C4 | D5     | = C5 |
| D6     | = C8 | D7     | = C3 | D8     | = E5 | D9     | = B7 | D11    | = B8 |
| D12    | = D1 | D13    | = C6 | D14    | = C7 | D16    | = C1 | L1     | = E3 |
| P1     | = B5 | Q1     | = E7 | Q2     | = F2 | Q4     | = F1 | Q8     | = E8 |
| R1     | = H5 | R2     | = H8 | R3     | = J1 | R4     | = H1 | R6     | = F5 |
| R7     | = G3 | R8     | = G4 | R9     | = G7 | R10    | = G6 | R11    | = G2 |
| R15    | = H3 | R18    | = F3 | R19    | = F8 | R20    | = F4 | R22    | = G5 |
| R25    | = H2 | R29    | = G1 | R34    | = H7 | R37    | = F7 | R41    | = H6 |

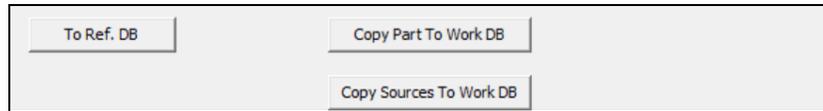
In the bottom section of the Kits & Purchase tab is a Saved Kits grid area where existing kits are displayed. The Kits to Show radio buttons can be set to show all kits or just kits for the selected PL in the Part Search Results grid. When a kit is displayed in the Save Kit grid, it can be selected, and then either opened or deleted. Opening a kit simply displays the kit contents in the above Selected Kit Items grid. A kit can also be selected using a double-click on a kit in the Saved Kits grid.

**Ref. DB Tab**

The most time-intensive task in maintaining a component library is entering new components. PartSync provides a Part Exchange function in the Part Info tab, but there is another full database provided in the Ref. DB tab. This additional database is called the Reference DB and its location and name is set at the top of the Ref. DB tab. Whenever a part is selected in the lefthand side's Part Search Results grid, the description for that part is copied to the Part Search Text field in the Ref. DB tab. Clicking Search in the Ref. DB tab will execute a component part search on the descriptions in the reference database.



Any PartSync .mdb database file can be used as a reference database. The same search syntax used on the lefthand side can be used in the Ref. DB tab's Part Search Text field. When a part in the Ref. DB Search Results grid is selected, three buttons will be enabled at the tab's bottom:



Copy Part to Work DB will copy the Ref. DB selected part to the lefthand side as a new part. (The lefthand side is known as the 'Working DB'.) Copy Sources to Work DB will copy Vendor, Manufacturer and Cost info from the Ref. DB part to the selected part on the lefthand side, the Working DB. The new sources info can be seen in the Vend. Tab for the Working DB part.

The reference database, called PartSync.mdb here, contains about 6000 parts, so when pressing Show All, it might take 5 seconds to show all the parts. Once the grid is filled in, the vertical scroll bar is very fast and there is no need to request additions pages.

### Config Tab

The Config tab is used to control PartSync operating parameters. The main section includes Company Information, Directory Setup and Label Printers. PartSync also includes logic to synchronize the local working database with an external database referred to as a repository database or simply a repo.

The screenshot shows the PartSync configuration window with the following details:

| Part Info   | Package | Data Sheet | Vend Detail | Eng. & CAD | Kits & Purchase | Ref. DB | Config |
|---|---------|------------|-------------|------------|-----------------|---------|--------|
| <b>Company Information</b><br>Name: Index Designs www.Parts<br>Address: 635 Coventry Rd. Baltimore<br>Phone/Email: bob@partsync.com<br>Stock Location: Baltimore<br>www.partsync.com bob@partsync.com   |         |            |             |            |                 |         |        |
| <b>Directory Setup</b><br>Working DB: P:\InData\Index.mdb<br>Repo. DB: P:\InData\Index_Repos.mdb<br>Comp. Type: P:\InData\CompType.txt<br>Jobs Dir: P:\InData\Jobs\<br>Package DB: P:\InData\PackData.mdb<br>PCB Decals: P:\InData\PCB Decals<br>Data Sheet: P:\InData\DataSheets\<br><input checked="" type="checkbox"/> Backup on Close<br><input checked="" type="checkbox"/> ReBuild Indexes on Close<br><input checked="" type="checkbox"/> Enable BOM Builder<br><input checked="" type="checkbox"/> Color Kit Report<br><input type="checkbox"/> Bar Code Debug<br><input checked="" type="checkbox"/> Show PN Errors<br><input type="checkbox"/> Auto Clip Board<br>COM Port: 1 <input checked="" type="checkbox"/> Enable<br>PADs Decal Version: 9.0<br><input type="checkbox"/> Part Number Control |         |            |             |            |                 |         |        |

In the Company Information section, the Name, Address and Contact information for your company is used for BOM and Kit reports. The Stock Location field can assist if parts are stored in different locations. Working and Repo databases are defined for overall operation. Component Type definitions are read from a CompType.txt file. In the above example P:\InData\ is a shared folder on a company NAS storage device. (e.g. a QNAP box.). The local P:\ drive is simply a 'Production' folder on the QNAP box. All PartSync data resides in the 'InData' folder (short for Index Designs Data) within the P:\ drive.

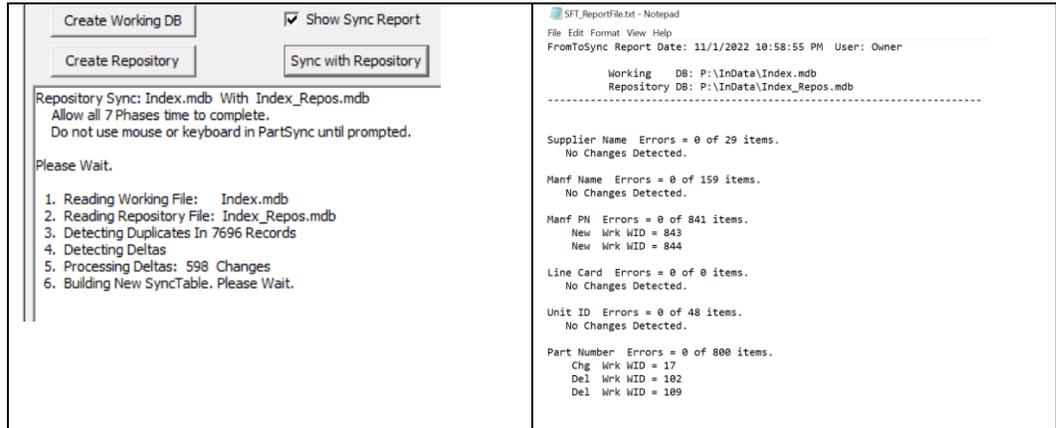
The Jobs directory is also within P:\InData and all the Eng & CAD directories are located here. While these could be mapped to engineering CAD folders, the separation of PartSync data from true engineering files helps to formalize the transfer of data. Engineering data typically changes often while the release of BOMs and kit data is done less frequently.

### Repository Synchronization

PartSync includes logic to synchronize the local PartSync database (Working DB) with an external database referred to as a repository or simply a repo. The repo is also a .mdb database file, identical in structure to the local working .mdb database file. When synchronizing the Work DB to the Repo DB, several tables within these .mdb files are used to detect differences and to direct how updates are applied across the two .mdb files. It is important that these sync tables are initialized correctly so that changes can be detected and updates applied. Two buttons are provided to create and initialize Work and Repo .mdb files.

The Sync with Repository button is used to start the synchronization process between the Working and Repo database .mdb files. Synchronization requires that database logic execute on the client machine, as this guarantees that the SMB protocol is available (required for Access or JET engine operation), and that read and write access to files will avoid network delays. Synchronization generates significant disk traffic, and operation over a network takes time. Both Repo and

Working .mdb files are copied into a spare local directory before synchronization starts. After synchronization, a report is generated. This report is a little cryptic, but it gives a good idea of what happened during the synchronization process. The user is given a chance to discard the synchronization results or to continue and write the synchronization results back to the Working and Repo .mdb files.



The figure above illustrates PartSync messages after the Sync with Repository button has been hit, along with the ensuing synchronization report.

**Label Printer Selection**

PartSync provides for four different label printers. The differences are based on the size of the label stock installed in the printer. Each PartSync printer field examines the description of the selected Windows printer to adjust certain settings, sizes and operating modes. For example, using a GC-420T as a 3x2 printer will assume a die-cut label with a small righthand side label. These small labels fit on tubes and reels supporting different container size and shapes. A QL-710 is only 2.4 inches wide, so the format switches to a smaller font with a small tape tag label at the bottom. The QL-710 is detected by searching for the keywords of Brother and QL-710 in the printer description. The cut-tape printer uses keywords such as QL-710, PT-P700, PT-P2430 and C3500. If something is printed to a Eng. Stock printer (2.2 x .75 inch), but no printer is defined, the content will be printed on the closest printer size possible. See the section on Printers and Bar Code Scanners.

**Check Box and Functions**

When PartSync closes, there are checkbox options for close logic. When the Backup on Close checkbox is checked, PartSync will backup the working database on close. Assuming no other users are connected, PartSync will backup the working database, then compress it. Backups are placed in a subdirectory named Backup in the same directory as the .mdb file. A sequence of backups are made with file names of the .mdb with \_00x appended. The x is between 1 and 4. If the database has not changed, then no backup is made. When a backup is made, the \_001 is always written. This provides the most recent state of the database. Before \_001 is written, a check is made to see if \_001 is 2 days older than any \_002. If so, \_002

needs to be written with \_001 data, but before that, a check is made if \_002 is 7 days older than \_003. The recursive logic is repeated, resulting with a backup always made (\_001), but backups for 2 days, 7 days and 30 days are kept. After backup, an internal Compact Database function is run to keep databases lean and mean.

If the Rebuild Indexes on Close checkbox is checked, a quick check is made of search engine indexes. This ensures that new and deleted items within a database are present or removed from index engine indexes. This process is very fast compared to a Full Rebuild, where all search engine indexes are completely rebuilt from scratch.

Checking the Enable BOM Builder checkbox allows PartSync to automatically invoke the BOM Builder application when a barcode label is scanned by the barcode scanner. The BOM Builder app must be set to the location of the BOM Builder application field.

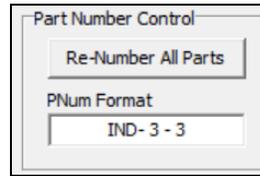
The Color Kit Report Enable checkbox provides for the use of component colors in Kit Reports. These colors are assigned to Comp Types in the file CompColors.txt.

When the Bar Code Debug checkbox is checked, this tool becomes active and is used to help debug barcode scanner operation. Checking this box copies output from the barcode scanner to the text area under the Create Repository button. The COM port used for the barcode scanner is defined in the COM Port field. The COM Port can be reset using the Reset COM Port button. Beware of Bluetooth scanners, as battery-powered devices will automatically power down. Not all Bluetooth software drivers on PCs will remain operating or will wake up when such a device wakes up. The delays associated with Bluetooth resets can be considerable.

The Auto Time Out function will cause PartSync to automatically close after the displayed number of minutes. Any application usage will reset this timer.

Remote Print will display and print labels generated from other users, If a user enters a printer name of 'PARTSYNC' (in all capital letters), the printing of that barcode label is marked for printing later. A remote user can click Remote Print to bring up a screen of all such queued prints. Queued prints can then be printed directly on a remote client machine where the required printers are attached.

The Part Number Control region provides the user with a means of defining part number formats, along with the ability to renumber all PNs. The format field is a series of characters separated with spaces. Below is 'IND-' and '3' and '-' and '3', all separated by a space character.



Non-numeric characters are used directly. The IND- string sets the first 4 characters of a part number PN. The digit characters represent the number of random digits. The - character is copied directly. When such a PN is generated, it is first verified to be a unique PN. If not unique, the process repeats. New random digits are generated, and a unique PN is soon found. A final PN looks like: IND-459-781.

The Re-Number All Parts will delete all PNs and replace them with freshly generated PNs. PartSync has internal master part numbers that operate in parallel with PN keys which will preserve internal lists. This only applies to purchased parts (PS parts), as part list parts (PL parts) will not be re-numbered. A backup of the old working .mdb file is created in the same directory as the current working .mdb file. The name of the backup is the same working file name with a \_xxx appended. The xxx will be 001 if no such file exists. If \_001 exists, the next free sequential \_xxx appended name is used.

The Search Engine Rebuild region enables a user to force the rebuild of search engine indexes. A Full Build deletes current indexes, while a Quick Build only scans through looking for differences. A Full Build can take a couple minutes. These rebuilds can help recover from software or hardware crashes. The most common crash relates to short power losses. Using an uninterruptible power supply (UPS) on client machines is highly recommended. When using a file server, a UPS is very important.

In the Work DB Functions region, the Write CSV button will write the Working database to a .csv file. The columns written are:

'PartNum,Manf,ManfPN,Vend,VendPN,CompType,CompValue,Description,Package,Decal,Date,Qty:Cost'

The bottom right of the Config tab shows a table of reference designators letters with associated component descriptions. This table is used when searching scrub results in the Eng & CAD tab, since not all CAD tool schematics have good descriptions. Converting a reference designator starting letter to a component description is useful in speeding the search process.

## Printers

PartSync provides support for various types of labels and printing on various types of printers. All printers must use Windows printer drivers. EPL, an early language used in Zebra printers, is not supported, though converters are available. A single printer can hold various types of labels, assuming the printer supports the label width, but changing the label type is a tedious process, so we usually consider a label type and printer as a fixed printer. The Brother line of printers are very low cost (e.g. P-Touch versions using TZ tape), but the label material is of limited width and is expensive. The small printers have limited resolution, and smaller fonts used on the smaller labels can become hard to read. In general, there are Brother printers, 4-inch wide 'standard' printers (e.g. Zebra), and color Epson TM-C3500 printers.

When driving printers, PartSync uses key words in the Windows Printer Description to help fine-tune text scale and positions. These descriptions can be changed in the printer configuration settings. Unlike standard 8.5 x 11 inch desktop printers, label printers tend to have many configurable options that require setup for correct printing. Most of these are fine-tuned in the Windows Printer Drivers for the printer. When using the same printer type (multiple printers) using different label sizes, be certain to set up multiple copies for the same printer driver, but use different printer descriptions.

Printing on BOPP plastic film label material with thermal transfer provides the best image. Resin-coated thermal material also prints very well. The plastic film is strong and is available with removeable adhesive backings. Color inkjet printers require a paper base label for proper smudge-free drying. Index Design has several materials in stock as custom die-cut labels. See the [partsync.com](http://partsync.com) products web page.

Brother printers are low cost and can be purchased at most office supply stores. The unit we used was the older QL-710W, but various QL printers seem very compatible. Newer models have higher resolution (and prices), but there are also USB models at < \$100.00. Keywords for some Brother printers include QL-710, QL-700, PT-P700, PT-2430, COLOR, C3500, Zebra, ZDesigner, GP-3120, Brother, TTP-343C, GC420T. The QL710 devices use the DK-2205 tape, 2.4 inch wide continuous length. Also check the Brother QL-600 low cost printer that uses the DK-2205 tape.

Epson TM-C3500 color inkjet printers are excellent printers that produce good labels (not as sharp as the thermal transfer printers, but good, and the color coding of component types is very useful). If I was to buy a single label printer, I would buy the TM-C3500 (a little expensive, but a great printer). Small Brother printers using TZ tape are ok to start, but the Epson TM-C3500 is the way to go.

Getting a label printer working for the first time can be a challenge, but remember it can work. After changing printer driver preferences, be sure to restart the computer

and verify that the preferences stick. There seems to be some hidden logic with how printers get initialized before the first job. It is not well explained, and it might take some experimentation.

#### **Search Engine Operation**

PartSync provides four search engines for finding electronic components (two component part search engines for both the Working DB and the Reference DB, a package search engine, and a component type search engine). Each search engine is a feature-extracted reverse indexer sitting over top of a  $256^8$ -location, hierarchical functionally organized table. Multiple raw indexes of 240 bits each are generated from search strings (i.e. typically descriptions of some type) and are used to locate target part numbers. Weights are applied to located parts and final results are sorted such that the highest weights (i.e. best matches) are shown first. This final sorted list of part numbers and descriptions is presented to the user for final selection.

The search engine is supplied as a single .dll in various Index Designs programs. Runtime configuration is controlled by three files for each configuration. The .dll is typically executed within a separate thread to enhance response time for a better user experience. Several small internal in-memory tables are used for speed, but no application database connection is required. All database and control data is passed through a built-in API.

Part descriptions and part numbers are inserted and deleted during normal database operations. Engine content can be re-scanned for a quick index rebuild or the contents can be deleted followed by a full rebuild. Full rebuilds take time, as index generation is a complex process, and every database record must be processed.

There are three indexer configurations, one for the component part search engine, one for the package search engine and one for the Comp Type search engine. These are named IndexK\_K1, IndexK\_P1 and IndexK\_CT1. The component part configuration is used twice, once for the Working DB and another for the Reference DB. Each indexer configuration consists of 3 files, <name>.cfg, <name>.mjf and <name>.mjl, where <name> is the configuration name. Each of the four search engine instances consist of the configuration files, and files dbname.jfd and dbname.jsd, where dbname is the name of the database being indexed. Should any of the configuration files change, the .jfd and .jsd must be rebuilt, because how parts map into the  $256^8$ -array may have also changed.

Code in PartSync monitors the date of the IndexK\_K1.cfg file. If this date changes (or a .jsd or .jfd file is missing), all indexes do a full rebuild. If there is any question as to indexer version, a Full Rebuild can be started on the Config tab.

#### **Good Consistent Descriptions**

Crucial to the ability of finding items with the search engine is having complete and consistent descriptions. Complete and consistent includes matching some internals

of the indexer reference tables. There is no free lunch. Many software systems today require the building of ‘Parameter Tables’ in a relational format and often require SQL-like query builders for searches. The PartSync engine does these internally, but it does require a few keywords. A large number of abbreviations for keywords along with automatic unit conversion makes searching much easier.

Keywords are used to define functionality. For example, ‘cap cer’ is internally expanded to Capacitor Ceramic. The order of the words or case is not important. A list of these keywords for the Index\_K1 (component part) indexer looks something like:

| First Level           | Second Level                             | Third Level                        |
|-----------------------|--|------------------------------------|
| Antenna Atn Attn Ant  | Freq in Hz Khz Mhz Ghz                   |                                    |
| Battery Bat Batt Cell | Mercury NiCd Li ...                      | Volts                              |
| Breaker               | Thermal Magnetic                         | Amps ...                           |
| Capacitor Cap         | Value in pf nf uf ...                    |                                    |
| Resistor Res          | Value in Ohm                             | Inrush Network Ntwk ...            |
| Transistor            | Array NPN PNP IGBT<br>UniJunction MOSFET | Volts NPhan PChan Pfet<br>Nfet ... |
| Wire                  | Coax Solid Stranded                      |                                    |

These are just a few samples from the component part classification table.

For packages, there is another totally different table:

|  |                        |                    |
|--|------------------------|--------------------|
| Capacitor Cap  | Tantalum Tant Elec ... |                    |
| Gull Wing GW GWT<br>SOIC TSSOP SO ,,,                  | Value of Pitch         | Value of Pin Count |
| Inductor Ind Choke                                     | Value of Pitch         | Value of Pins      |
| Connector Con Conn<br>Connect Clip Sckt Socket<br>Plug | Value of Pin Count     |                    |

There are a large number of additional key words and abbreviations. Just as an example, here are some of the knowledge-about-parts words built into PartSync:

PCT for %, zero one two ... ten 1pst 1p1t 2pst ... , AL for Aluminum, ASM for Assembly bidir bare blank bumper rubber foot bumpon bussed bus buzzer bell buz alarm audio speaker spkr piezo sonalert wire cable chemical chm chem circular cir circle crystal cry xtal electrolytic elect electro elect elec enh enhancement flash flsh IC integ integrated infrared ir infarred lithium li lead lmax milmax module mod optoisolator optocoupler oscillator osc photodiode polyester poly regulator reg relay rly rely resistor resist res resonator crystal TestPoint Testpad TP Tin Sn thru through unidirectional unidir variable var vari trim trimmer

These are a fair number of keywords and not all have positions in the large function table, but search engine matching also uses string compares. The function table in the paragraph above helps to reduce the number of items selected for matching

compares, and string compares add some additional weight to the final match sorting.

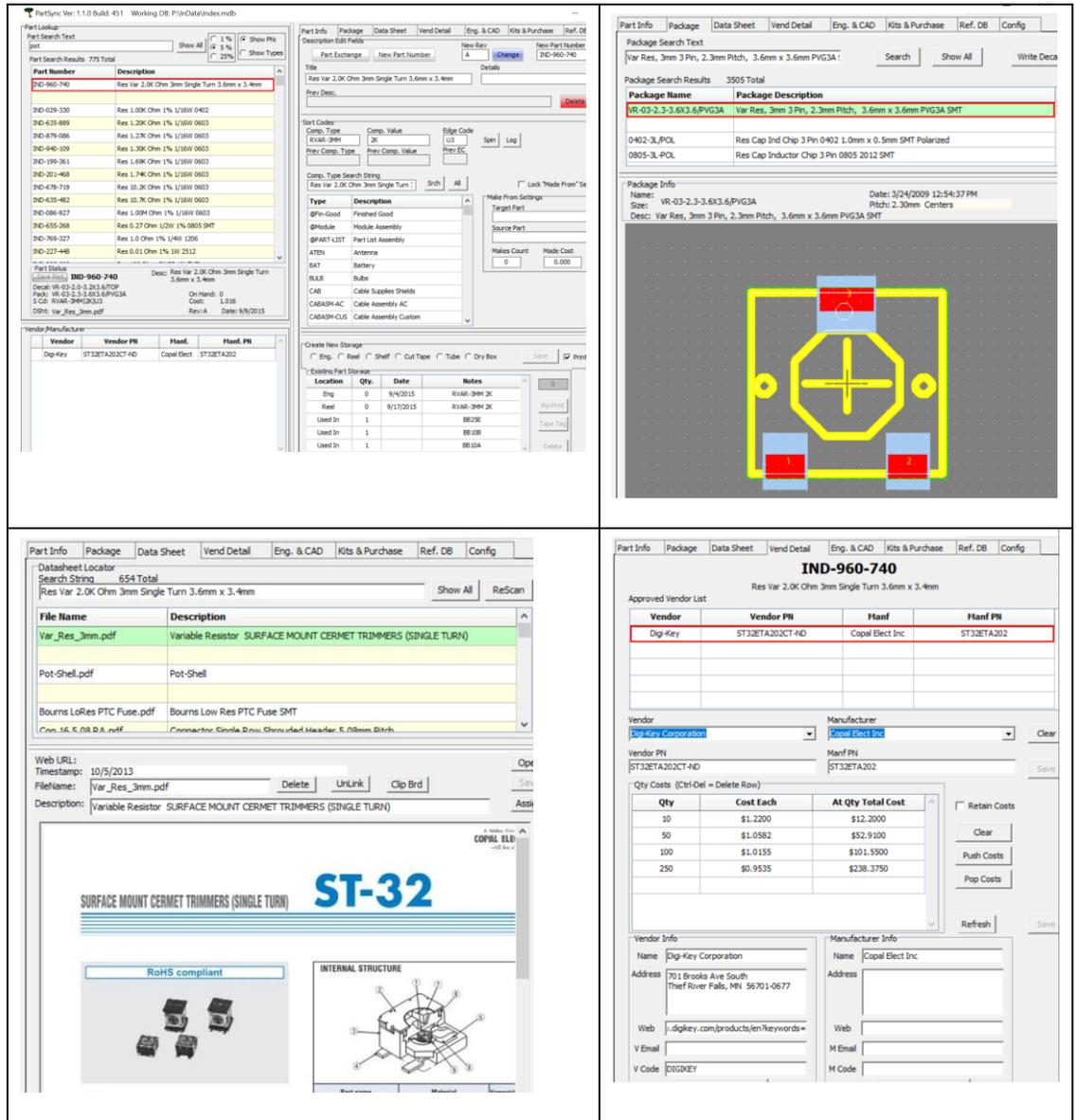
### Numeric Ranges & Examples

Searches for numeric values (such as ohms and uf) can be performed for a single value or for a range of values. Greater than and less than characters are used to specify ranges. Text using 'Res <2 ohm' (values less than 2 ohms) and 'Res > 2 ohm' (values greater than 2 ohms) will search the database content as described. Another form of command uses '<<' syntax to search a range. A search of 'Res 10K<<12K ohm' will find all resistors between 10K and 12K. Note that the actual search range will be slightly larger depending on the radio button setting for 1%, 5% or 25%. These radio buttons DO NOT select the resistor tolerance, only the numeric ranges around 10K or 12K to be returned by the search engine. Tolerance of components can be specified explicitly using text such '5%' in the search description.

Resistors are unique in that the unit Ohm starts with a letter that looks like a zero, and this is visually confusing. If a resistor is being searched and there is no Ohm unit, then the search engine applies the Ohm unit to the first numeric value. The same idea is used for pins (i.e. pin count) when searching connectors. Con 25 searches for 25 pin connectors.

A search for Variable Resistor can use strings such as 'Res Var', 'Res Pot' or simply 'Pot'. The word Pot is an abbreviation for potentiometer, which is associated with variable resistor. All these shortcuts simplify finding items and they compensate for difference in database descriptions and user search descriptions.

For example, as shown in the figure below, a search in database index.mdb on 'Pot' finds: 'Res Var 2.0K Ohm 3mm Single Turn 3.6mm x 3.4mm'. The database part number found is IND-960-740. Clicking on the top part search result, IND-960-740, selects that part (a PS part), and makes part info available in the Part Info, Package, Datasheet and Vend Detail tabs:

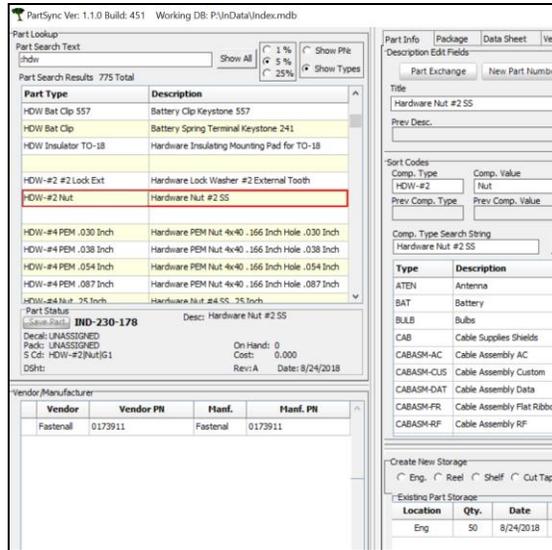


The most common description problems we see are for connectors and ICs. Connectors need to include a pin count ('8 pins') and a pitch (2.0mm pitch) in their description. IC descriptions should start with 'IC' and include a part number.

Con 25 Pin D Male Right Angle SMT PCB Mount  
IC AM26LS31 Quad Diff Line Driver SOIC-16

Note I did not follow my own advice for the D connector, as they have a rather uncommon pitch that only a few folks really know. But the 'D' syntax is well known and a search on 'Con D 25pin' finds the part easily. Searching on 'Con D' will show all such parts. Adding 'pin' and 'pitch' helps improve search results.

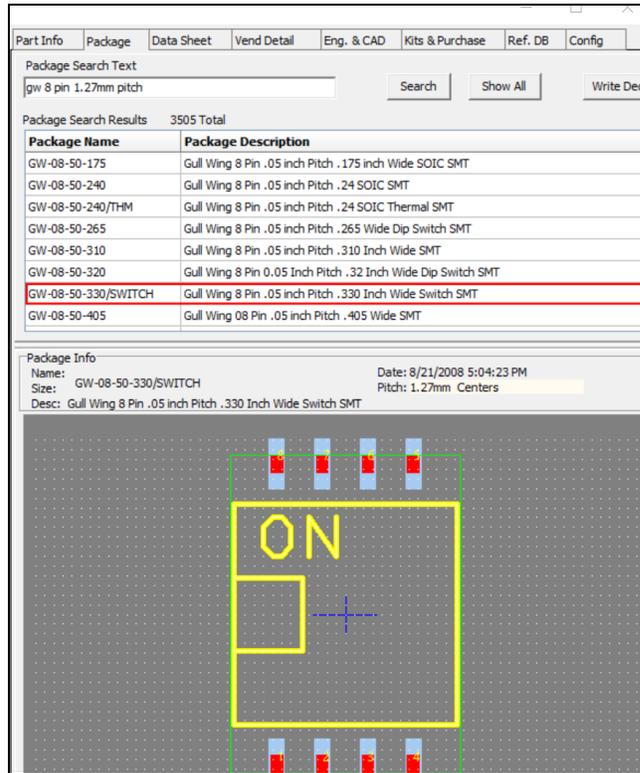
Another common keyword is ‘Tool’. We use Tool for hand tools, power tools and soldering tips. Various types of mechanical hardware can be found using Hardware or simply HDW, Searching ‘:hdw’ as in the figure below, will show various hardware component type categories and the parts associated with those categories. This example illustrates the power of assigning and searching for component types:



### Package Search Examples

When searching for packages, three basic items are required: style, pin count and pitch. Pitch has three elements: numeric value, units and the keyword ‘pitch’.

For example, search on: GW 8 pin 1.27mm pitch. Partial results are shown below:



GW is a shortcut for Gull Wing, which corresponds to a package style with flat leads exiting in two rows. SSOP, SOP TSOP and SO will give the same basic results. THM and Thermal can be used to prioritize packages with a Thermal Pad.

|      |   |
|------|---|
| LCC  | Leadless Component. Pins on two sides                     |
| LCCT | Leadless Component. Pins on two sides, with Thermal Pad.  |
| LCQ  | Leadless Component. Pins on four sides.                   |
| LCQT | Leadless Component. Pins on four sides, with Thermal Pad. |
| QFN  | Quad Flat Pack  |
| RAD  | Radial Part (Through Hole)                                |
| RN   | Resistor Network  |

Many parts have pin counts which are included immediately after the style. For example, BGA 064, for a 64-pin BGA. Always use three characters with leading zeros which forces easy-to-view sorting in the results grid. Connectors also need 3-digit pin numbers after the CON type.

The best way to learn the package naming syntax is to click Show All in the Package tab and scroll down through the various packages. The current package list has been built over many years by different users. It is far from perfect. Practice searching for parts with various search syntax and observe the results grid.

**PartSync .INI Configuration**

PartSync uses a .ini file to store operating parameters between runs. See file:

C:\ProgramData\IndexDesigns\PartSync\PartSync.ini

The various settings are fairly well defined using comments in the .ini file and in the variable names. The [Forms] section contains the default window positions and sizes. When large changes are made to a Windows PC display screen, some windows can become positioned off screen. The setting for that window, or the entire [Forms] section can be deleted. Default settings will be reset to forms.

When editing the .ini file, be certain PartSync is not running. When PartSync is closed, it rewrites the .ini file from values kept in memory. Any .ini file edits while the app is running would be lost as the app closes.