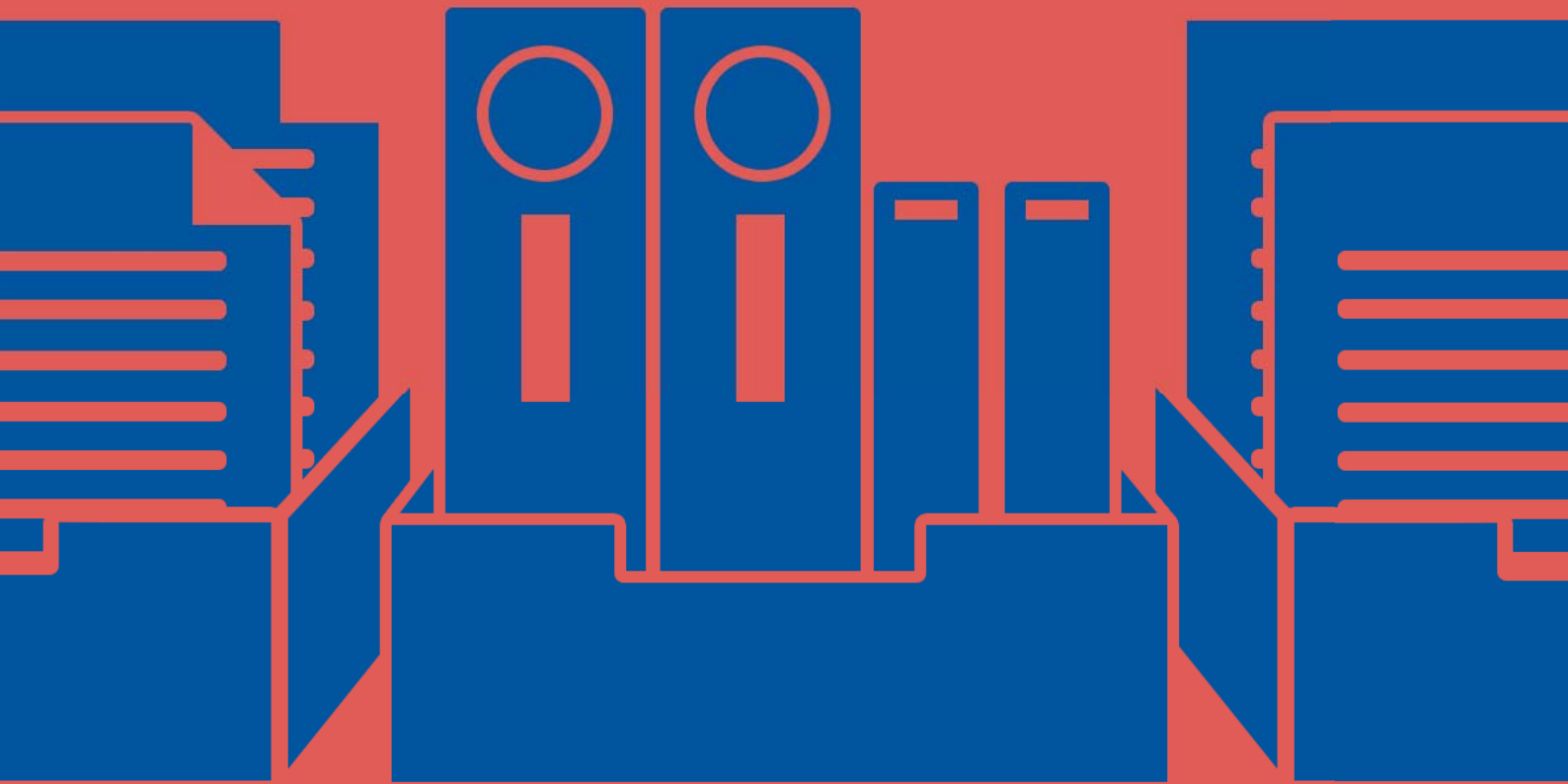


Design Data Management Part 2: The Supply Chain



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DESIGN DATA MANAGEMENT PART 2 — THE SUPPLY CHAIN

Component availability can result in a product being late, missing a market window, or not even producible. Learn now to quickly and easily select components, find pricing, and verify available quantities directly from your design. This second part series will take a look at managing the supplier link, e.g., purchase availability of components for your design.

INTRODUCTION

In part 1, you saw that design engineers spend a minimum of at least 15 to 35% of their time finding and verifying components to use in their designs. In addition to this, there is still the wall that needs to be climbed between engineering and purchasing.

What happens when it is time for re-orders or modifications to an existing design? How do you know that you can still purchase the required components? There are many different databases and methodologies from enterprise solutions to manual spreadsheet tracking. What if live supplier data could be directly added to your components to instantly provide this critical information?

This second part of the data management series looks at the component supply chain. According to The Aberdeen Group, 81% of the best in class companies use a centralized built and managed library system¹. If you have access to a system like this at your company, you can reference your database and make selections based on the information there. However, many companies don't have access to this level of enterprise-based solution.

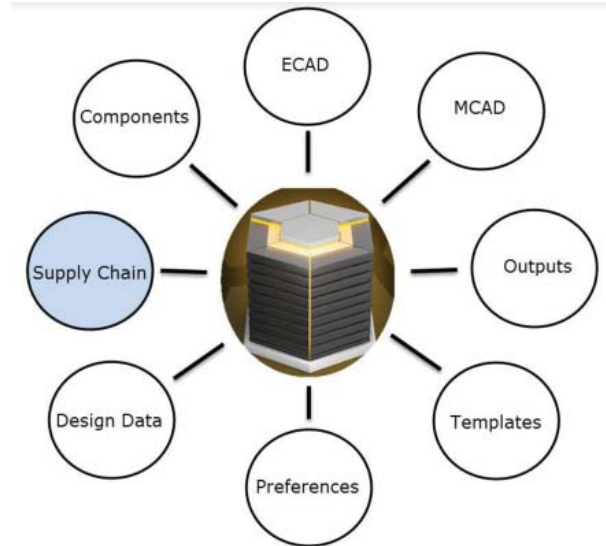


Figure 1. Full compass of Design Data Management with Altium Designer.



Live links to supplier data providing critical data such as availability, pricing, quantity on hand and can be added directly to your components in your design to drive the bill of materials generation.

It is 3pm Friday afternoon. You have just received the new design specs for the next prototype idea. You grab your set of favorite libraries a stack of engineering paper and your favorite mechanical pencil. Time to get to work. It looks like you can reuse an existing power supply, but the rest will need to design from scratch. How can you determine what parts will be available for production, which parts will need to be replaced, and which parts of the existing design can be ordered and in what quantities?

THE SUPPLY CHAIN

The supply chain, also known as **Solutions**, can be used to bring in purchase data directly into a bill of materials. The supply data information is read directly from the distributor, so these are also referred to as **Live Supplier Links**. In Altium Designer®, several suppliers are available that you control over what will be included in your search and can be configured in the preferences under **Data Management » Suppliers**.

From the list of suppliers that you have enabled a set of search results will be returned that includes component pricing, available quantities, etc. Additionally, web links to the manufacturer's page and data sheets are included for each component link. When suitable parts are found, the **Supply Link** can be attached directly to the component.

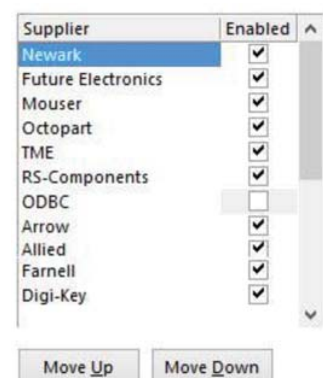


Figure 2: Enable suppliers to search for components.

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This link is used to pull the associated data from the supplier into the bill of materials report. Quantities and pricing can also be seen directly when inspecting the link directly.

Using the **Supplier Panel** to search for components will return results based on the selected suppliers and the best choice can be made by simply dragging the link to the component in your schematic. Open the **Supplier Search** panel from the **System** panel button and then **Supplier Search**.

Additionally, right-clicking on a component and selecting **Supplier Links** will allow you to click **Add** and perform a search directly to add to the component.

There are several ways to add live supplier links to your design. Supplier links can be added to components in the schematic library, directly to components at the schematic level, to components in a database library, or using Altium Vault®. These approaches are outlined in detail in the TechDoc **Live Supplier Data — Managing Supplier Links**, found at <http://techdocs.altium.com/display/ADOH/Live+Supplier+Data+-+Managing+Supplier+Links>

This approach makes adding supplier data to components in your libraries a little more difficult as you need to maintain individual components with the added supplier links. It can be done and managed, but the number of components and library structure can become fairly involved. The better approach is to add the supplier links at the schematic level in the design. This allows more of a generalized approach, e.g., you can reuse a resistor and add configure each placed component in your design. This method still has drawbacks, as you are now out of sync with your libraries and can be more error prone. True, you can select which parameters not to update during library updates, but it puts a lot of pressure on the designer to not make mistakes.

The best approach is to use a database library or Altium Vault. This way, you can reuse a single schematic library component



Manufacturer	Manufacturer Part Number	Supplier	Description	Unit Price
L...	LFE3-17EA-6FN...	Arrow	FPGA LatticeECP3 Family 17000 Cells 65nm Technology 1 70V 484Pin FRFC&	38.38 USD
S...	LFE3-17EA-6FN...	Digi-Key	IC FPGA 222 I/O 484BGA	38.38 USD
C...	LFE3-17EA-7FT...	Digi-Key	IC FPGA 133 I/O 256BGA	38.63 USD
L...	LFE3-17EA-8UM...	Arrow	FPGA LatticeECP3 Family 17000 Cells 65nm Technology 1 70V 378Pin FRFC&	40.79 USD
S...	LFE3-17EA-6FN...	Arrow	FPGA LatticeECP3 Family 17000 Cells 65nm Technology 1 70V 484Pin FRFC&	41.66 USD
C...	LFE3-17EA-7FT...	Digi-Key	IC FPGA 222 I/O	38.38 USD

Quantity	Price
1	38.63
25	33.5824
100	32.4048

Quantity	Availability
202	Immediately

Figure 3: Using the **Supplier Search** panel lets you search for specific components.

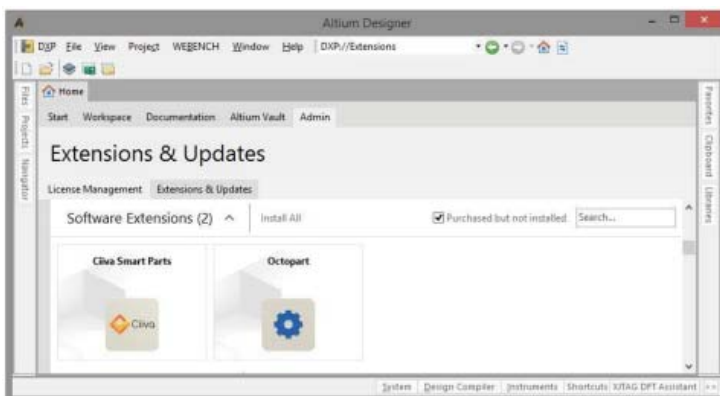


Figure 4: *Civa Small Parts and Octopart are now available for Altium Designer.*

to represent different components which are populated with different data and have their own component name, parameters, and company part number. This way, you can have hundreds or even thousands of resistors and capacitors and various other components and reuse the same base graphical model. Altium Vault takes the database approach one step further by allowing revision and lifecycle management to be assigned to components and even to the supplier links. It is a separately option in Altium Designer. Altium Content Vault is free of charge to access and place components from.

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CIIVA AND OCTOPART

Altium is always looking for ways to improve the supplier interaction with the designer, as we realize that this is one of the most crucial parts of electronic design decision making, knowing what is in stock and available, obsolete, or in obsolescence. Hence the acquisition of Ciiva and Octopart. These supplier search tools are now available within Altium Designer and can be

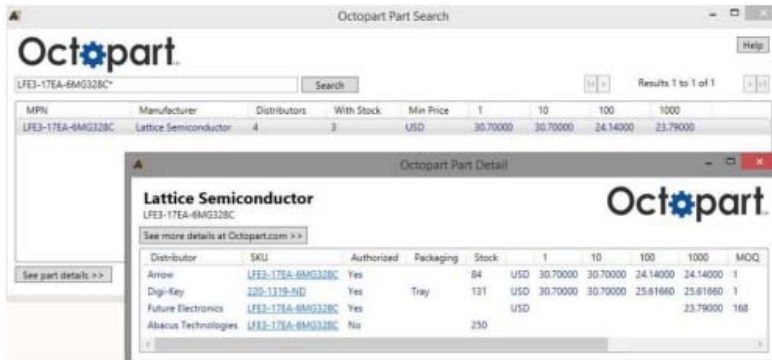


Figure 5: Using Octopart, clicking **See Part Details** brings up a detailed list for the part from each of the suppliers.

installed from **Extensions and Updates**. Both are available at no charge. Ciiva does require registering and has more advanced paid options, such as design analysis and a subscription based vault access, but are not necessary to use the supplier smart search. The advantage is that either of these search tools can be used to find parts and they compare different suppliers side by side in terms of pricing and availability. A separate white paper goes into details on the Ciiva interface and how it can be leveraged with your own Altium Vault, the Altium Content Vault, or a subscribed online Vault.

To perform a search with these tools, once a supplier part is decided upon, copy and use this in the supplier search panel from which you can add links to your components. As time goes on, a more direct relationship between the extensions searches and the supplier search is planned.

With Octopart extension installed, you can instantly get part information by selecting parts in your schematic and selecting **Octopart Part Lookup** from the tools menu. Here, you can see how many suppliers have that part and which ones have stock. Clicking **See Part Details** brings up a detailed list for the part from each of the suppliers.

Use the returned SKU numbers to search in the **Supplier Search Panel**. From the Supplier panel results, add the links directly to components in our design by dragging the result for the desired part onto your component which will copy the supplier link and supplier part number. Multiple supplier links can be added to a part to provide different supplier purchase information. Additionally, with the supplier search result selected, parameter information regarding the result will be displayed. One or more of these can be selected and added to the part using a right-mouse click and selecting the part to add the parameters to. If there is a PDF link in the Documents section, right-clicking allows adding the document link to the part. The document link provides right-click access to the part to the datasheet under References.

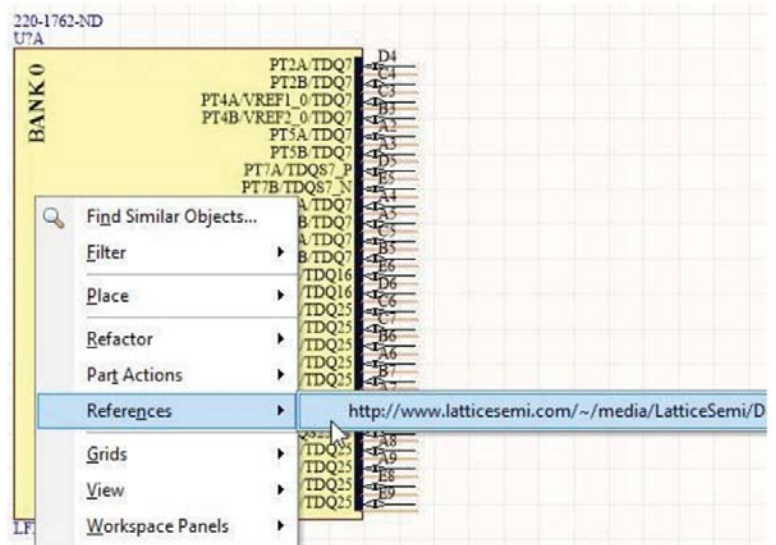


Figure 6: You can access this part's datasheet under **References**.

Ciiva Search allows you to search within the Ciiva search panel, accessible from the system panel access button. The search results are shown in the panel. Clicking on the **Supply Chain** tab at the bottom will reveal different distributors, showing the stock and price. Lowest priced selections will be displayed in green. As with Octopart, the supplier part number can be copied and pasted into the **Supplier Search** and added to a component until a more direct method is enabled.

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When searching for new components that have not yet been placed on the design, Ciiva does have an advantage, as it will provide an icon indicator if the part is found in a configured vault, whether that be the Altium Content Vault, your own Altium Vault, or an online subscribed vault as shown in the image below. If an icon is seen, click the ECAD tab which allows for direct placement of the component onto a focused schematic sheet. The associated vault will need to be configured and a schematic in focus in order to place the component.

The advantage of supplier links added to a component is for the bill of materials generation. If all your components are configured with supplier links, enabling the **Supplier Stock** for the supplier solution will let you see available quantities directly in your BOM setup page. Each **Supplier Solution** contains its supplier related parameters and will be displayed in the column section by checking the **Show** checkbox in the **All Columns** section.

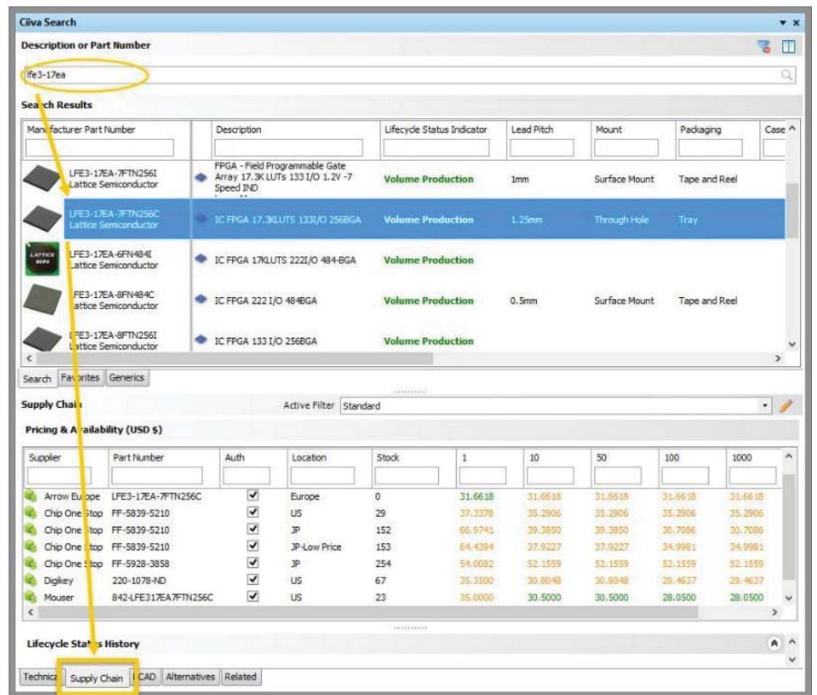


Figure 7: Searching in Ciiva Search.

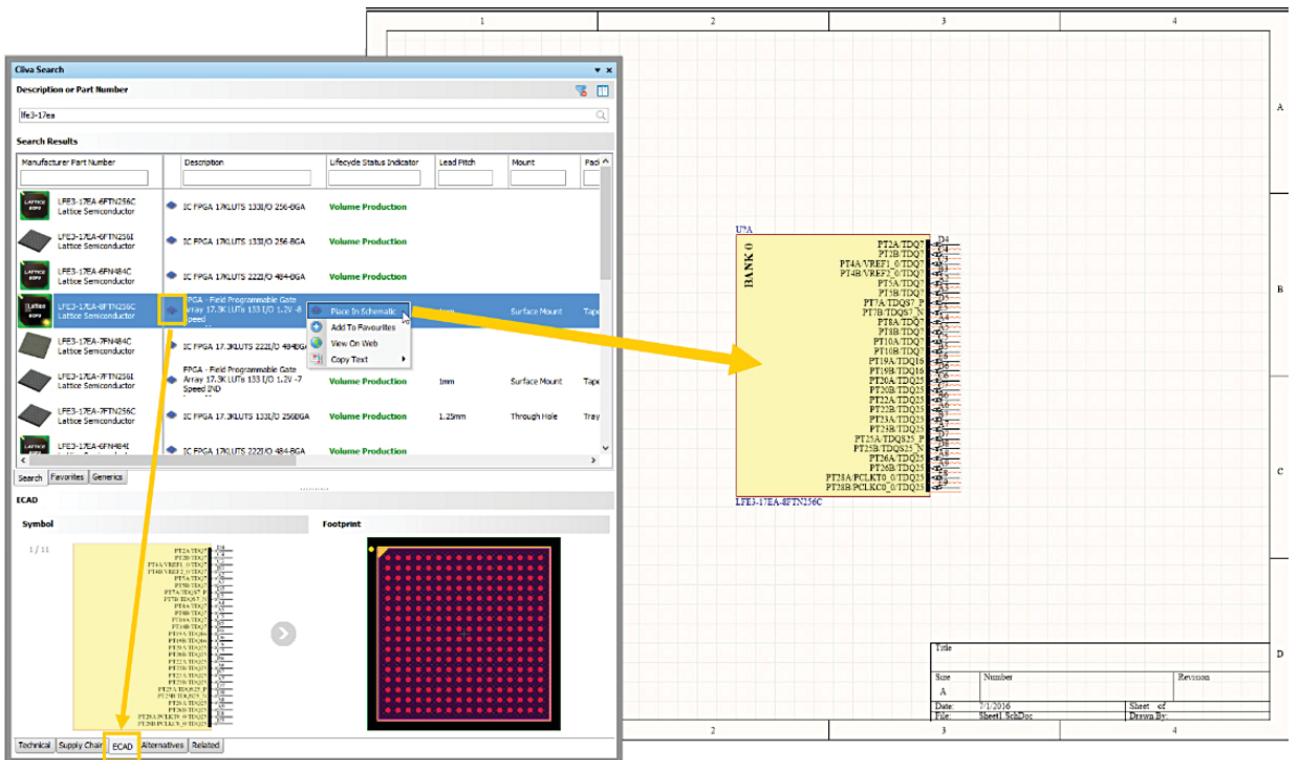


Figure 8: Example of supplier links.

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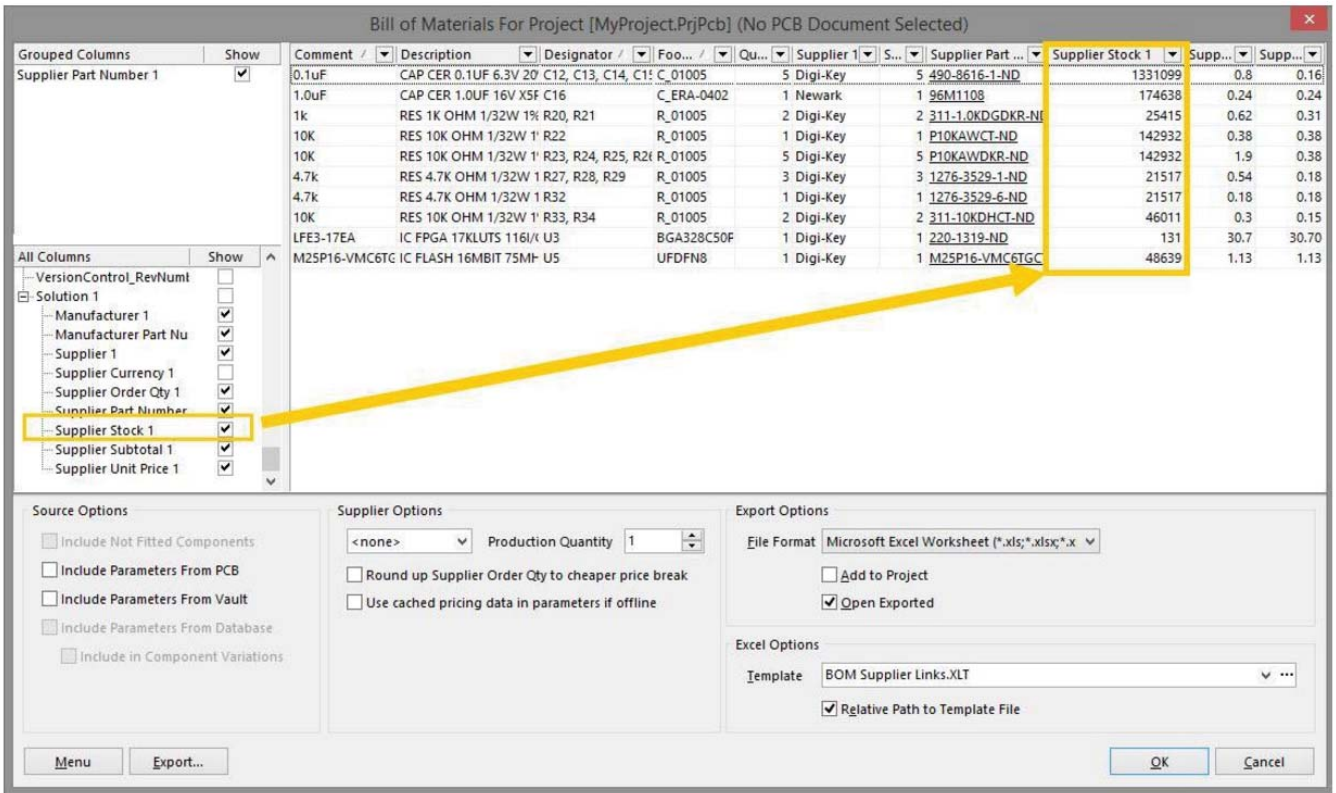


Figure 9: Checking supplier stock.

The default Excel template, "BOM Supplier Links.XLT" does not include the stock in the generated output, only the order quantity, and unit price.

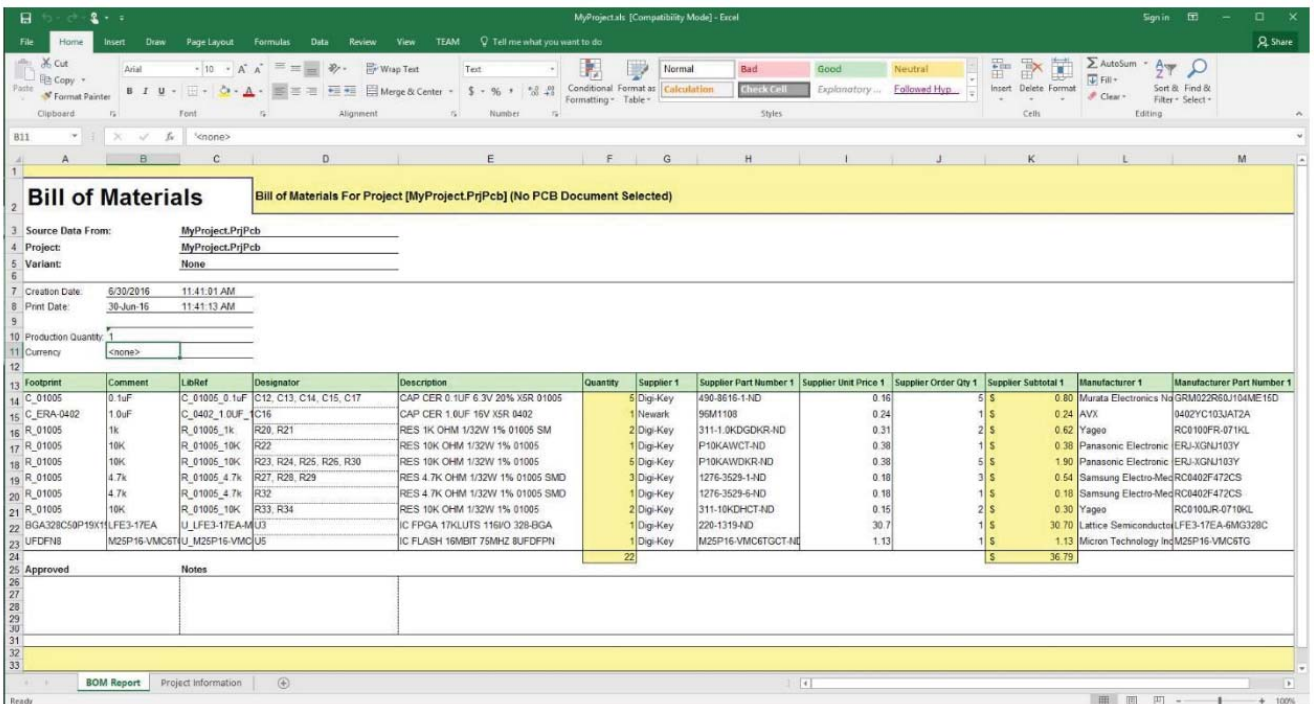


Figure 10: The spreadsheet does not include available stock.

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USING ACTIVEBOM

A document that is useful for providing a real-time listing of all items and processes used in the design is the ActiveBOM document. The ActiveBom document will read in supplier data, but uses the guidelines as described in our technical documents ActiveBOM article:

- For vault-based components (managed, or 'Unified' components), this data are retrieved automatically from the Part Choice List Items defined and associated with the respective Component Items.
- For components that are not placed on a vault (unmanaged components) this information can be:
 - Defined *in situ* within the BOM Catalog, through the addition of manually-configured solutions (or 'manual Part Choices' as it were).
 - Sourced through Supplier Links added to a component.

The ActiveBom document will bring in **Supplier Links** for each component. From a vaulted component, the supplier link data is read from the Vault. The Supplier Links that are brought into the document are called Solutions to which ranking can be assigned from one to three stars, three being the highest and corresponds to solution 1, rank two is solution 2, and one star is the lowest rank or solution 3. The ranking system is useful for determining which solution will be available if there are multiple suppliers but is limited to a total of three solutions. Other non-ranked solutions will not be available in the BOM configuration. For non-Vault components, the components are listed as Core-UnManaged, and vault components listed as Managed. For Managed Vault components, the supplier links are read directly from associated Part Choices in the Vault but additional solutions can only be added within the ActiveBom document. For non-vault components, Core-UnManaged, the supplier choices are read from the supplier links from the components in your design, and addition solutions can be added.

The screenshot shows the Altium Designer interface with the ActiveBOM document open. The main window displays a 'Bill of Materials for Project [MyProject.PrjPch]'. At the top, there are summary statistics: Currency (USD), Actual price per board (37.61974 USD), Target price per board (45.059 USD), and Production Quantity (100). Below this, there are tabs for 'BOM Components' and 'BOM Catalog'. The main table lists components with columns for Item Type, Design Item Id, Description, Co., Note, Rank, Target Price, Actual Price, Manufacturer, Manufacturer PartNo, Supplier, Supplier PartNo, Stock, and Supply risk. The table is filtered to show 'Core-UnManaged' components. Below the table, there are sections for 'All Solutions' and 'Pricing'.

Item Detail	Selected Solutions													
Status	Item Type	Design Item Id	Description	Co...	Note	Rank	Target Price	Actual Price	Manufacturer	Manufacturer PartNo	Supplier	Supplier PartNo	Stock	Supply risk
Core-Managed (2)														
Up to Date	Core-Managed	OMP-0413-00001-1	Socket, PC Jack 8-W 95501-			0.70	0.70		Mollex	91501-2881	Newark	7447919	9540	Clear
Up to Date	Core-Managed	OMP-1260-00001-1	D-SUB Combination I 302W2			9.50	9.486		Conec	302W2CSX156N40X	Digi-Key	626-1096-ND	282	Clear
Core-UnManaged (7)														
Up to Date	Core-UnManaged	C_0402_1.0UF_50V	CAP CER 1.0UF 50V 1.0UF			0.09	0.088		AVX	0402YC1031AT2A	Newark	5041158	174638	Clear
Up to Date	Core-UnManaged	C_01005_0.1UF	CAP CER 0.1UF 6.3V 0.1UF			0.015	0.0140		Samsung Electro-Mech	C102A104Q2WNC	Digi-Key	1276-1210-ND	180000	Clear
Up to Date	Core-UnManaged	R_01005_3k	RES 1K OHM 1/32W 3k			0.11	0.103		Yageo	RC0100FR-073K	Digi-Key	311-1-0KDCDR-ND	25415	Clear
Up to Date	Core-UnManaged	R_01005_4.7k	RES 1K OHM 1/32W 4.7k			0.031	0.03048		Yageo	RC0100FR-074K7L	Digi-Key	311-4-7KDCDR-ND	40000	Clear
Up to Date	Core-UnManaged	R_01005_10K	RES 1K OHM 1/32W 10K			0.20	0.07608		Panasonic Electronic C	ERJ-1GN1103Y	Digi-Key	P10KAWCT-ND	142932	Clear
Up to Date	Core-UnManaged	U_LFE3-17EA-MG32B	IC FPGA 17GLUTS 1:LFE3-1			32.00	25.6166		Lattice Semiconductor	LFE3-17EA-6MG32BC	Digi-Key	220-1319-ND	131	Clear
Up to Date	Core-UnManaged	U_M25P16-VHC5TG	IC FLASH 16MBIT 71M25P1			0.75	0.72048		Micron Technology Inc	M25P16-VHC5TG	Digi-Key	M25P16-VHC6TGR-F-48000		Clear

Below the table, there are sections for 'All Solutions' and 'Pricing'.

Rank	Manufacturer	Manufacturer PartNo	Supplier	Supplier PartNo	Description	Actual Price /
★ ★ ★	Samsung Electro-Mechanics	C102A104HQ2WNC	Digi-Key	1276-1210-2-ND	CAP CER 0.1UF 6.3V XSR 01005	0.01442
★ ★	Muratec Electronics North America	GRM022R60J104ME15D	Digi-Key	490-8616-1-ND	CAP CER 0.1UF 6.3V XSR 01005	0.03786
★	TDK Corporation	CO402K5R01010M020C	Digi-Key	445-10546-1-ND	CAP CER 0.1UF 6.3V XSR 01005	0.1224

The 'Pricing' section shows a price of 0.03786 USD (each) for 1,331,099 (in stock). The 'Availability' section shows 'Coming Soon - Lead time'.

Figure 11: Supplier choices are read from the supplier links from the components in your design, and addition solutions can be added.

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An advantage using the BomDoc, in addition to seeing pricing and quantities for the components, but quantity breakdowns are automatically applied by entering the production quantity of board to be built. Additionally, for each component, a **Target Price** can be set, alerting you if the target is exceeded. From these target prices, the overall target price of the board is also calculated along with the actual component costs of the board.

The ActiveBom is divided into two parts. Above, we saw the BOM catalog, where the supplier links are read in and solutions set. By selecting the **BOM Components**, or right-clicking on a line item detail and selecting **Navigate to BOM**. In the **BOM Components**, the layout is similar to the bill of materials configuration. Here, the columns are enabled to drive the output data for the bill of materials. For BOM generation, the ActiveBom requires the use of an outjob.

To configure your bill of materials you will need an output job file added to your project. In the **OutJob** panel, configuring the bill of materials job to use the ActiveBOM document as the data source will pull the configured supplier solutions from the BomDoc and not directly from the configured components in the schematic pages.

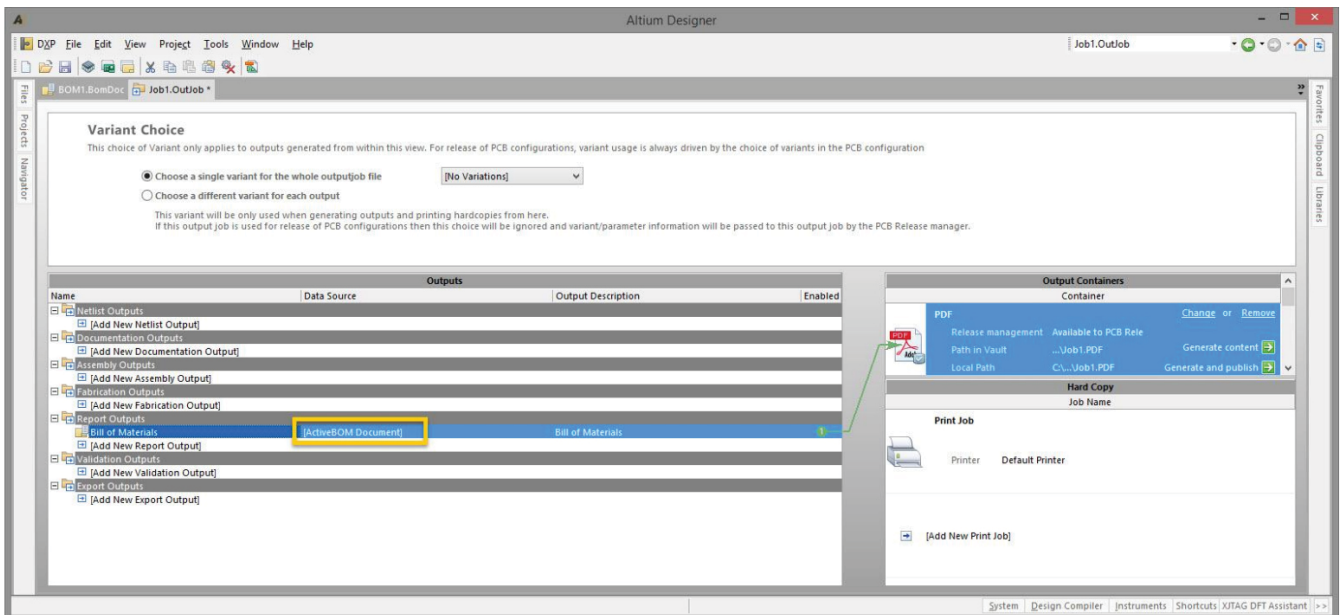


Figure 12: OutJob panel.

USING PART CHOICES IN ALTIUM VAULT

In part one of this series, we saw that components in the Altium Vault consist of what is referred to as a Unified Component Data Model. This means that the part is validated and released with a specific revision, the footprints, models, graphics and parameters are locked with that particular revision and cannot be modified unless a new revision is made. Of course, the supplier data can still change, however, the attached “Part Choice” is the supplier link that has been attached to that particular revision of the Unified Component.

DESIGN DATA MANAGEMENT PART 2 — THE SUPPLY CHAIN

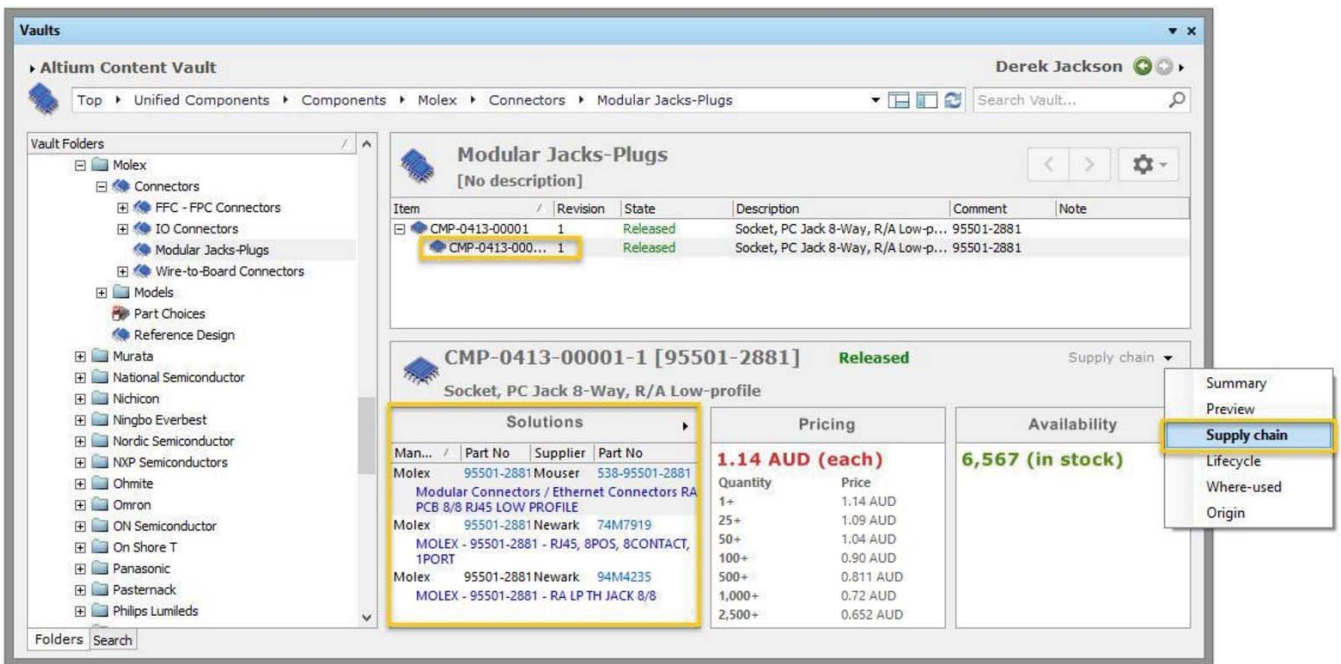


Figure 13: Setting the view to **Supply Chain**, we see the "Part Choice" has three configured solutions.

Part choices behave similarly to live supplier links, just that they cannot be changed, but the data they link to, e.g., price, quantity, and stock can dynamically update. An example of Unified Components configured with a part choice can be seen in the Altium Content Vault. For example, let's take a look at the Molex part 95501-2881. The vault ID for this component is CMP-0413-0001. Selecting the vault item, it has one part choice. Setting the view to **Supply Chain**, we see the "Part Choice" has three configured solutions.

These Supply chain choices are pulled into the ActiveBom document when using it in conjunction with the design. The designer still has the flexibility to configure additional solutions for the Managed component in the ActiveBom document.

CONCLUSION

Hopefully, this document gave a little insight as to the options available for a designer at the start of a design. Additionally, by using Supplier Links to not only help the current design process but to help with future modifications and design reuse.

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REFERENCES:

¹ **Best in Class PCB Design Study**, The Aberdeen Group, 2014, <http://www.aberdeen.com/>

Live Links to supplier data:

<http://techdocs.altium.com/display/ADOH/Live+Links+to+Supplier+Data>

Supplier Preferences:

[http://techdocs.altium.com/display/ADRR/IntegratedLibrary_Dlg-IntLibPrefsForm_Suppliers\(\(Data+Management+-+Suppliers\)\)_AD](http://techdocs.altium.com/display/ADRR/IntegratedLibrary_Dlg-IntLibPrefsForm_Suppliers((Data+Management+-+Suppliers))_AD)

Database DBLibraries:

<http://techdocs.altium.com/display/ADOH/Using+Components+Directly+from+Your+Company+Database>

Supplier Search Panel:

[http://techdocs.altium.com/display/ADRR/IntegratedLibrary_Pnl-SupplierSearch\(\(Supplier+Search\)\)_AD](http://techdocs.altium.com/display/ADRR/IntegratedLibrary_Pnl-SupplierSearch((Supplier+Search))_AD)

ActiveBom documents:

<http://techdocs.altium.com/display/ADOH/ActiveBOM>

Supply Chain in Static BOM:

<http://techdocs.altium.com/display/ADOH/Including+Supply+Chain+Information+in+a+Static+BOM>

Unified Component Data Model:

<http://www.altium.com/video-altium-presents-unified-data-model>

Part Choices:

[http://techdocs.altium.com/display/ADRR/IntegratedLibrary_Dlg-FormUpdatePartlist\(\(Part+Choices\)\)_AD](http://techdocs.altium.com/display/ADRR/IntegratedLibrary_Dlg-FormUpdatePartlist((Part+Choices))_AD)

Altium Vault Benefits:

<http://www.altium.com/altium-vault/benefits>