# Partlocater by Alkgrove

## Introduction

The distributor Digi-Key provide an API to retrieve the same information that you get when you browse a component page from Digi-Key (https://www.digikey.com) Partlocater is an application written in Python 3 that retrieves the data and puts it into a MariaDB database. It also has rudimentary search and modification of the data.

Digi-Key limits the number of queries per day from an user and therefore uses a mechanism for authentication and a restrictive version of OATH2 for this. The down side is that you need to run a SSL local webserver for the authentication. Fortunately, this is only required for the initial authentication or if the token becomes corrupt. For all other queries, authentication is taken care of without requiring the webserver.

You sign up on Digi-Key and are given a secret key and a client ID. The client ID and redirect URI are used to construct a URL that goes to a Digi-Key server. This will ask for standard Digi-Key login and respond with the redirect URI and response token. The browser takes the redirect URI which must be a https scheme and post to another Digi-Key server, with the response code, client id and client secret. The response to this from Digi-Key is a token good for 24 hours and a refresh token. The refresh token doesn't look like it has a time limit and is sent to acquire a new token. These tokens are required for every query.

Digi-Key provides a solution that uses .net and the Microsoft web server and can be downloaded from Digi-Key. We opted to use the XAMPP package as it provides both the apache webserver and MariaDB in one application install. This works for well for the single user and is scalable to a small company by having apache + SSLwebserver and MariaDB database on an intranet server.

When Altium introduced internet access of parameter data for a schematic symbol over the web, it was amazing. It set Altium apart from the other ECAD tools. Altium has since bought Ciiva and Octopart to displace that feature.

I think Altium was a good starting point but it may be more interesting to adapt this tool to open-source eCAD tools. They need to have the ability to import parameters and to link symbols and footprints.

## Prerequisites

This requires python and xampp to be installed and some setup. For a small business, you may want to use an intranet server that has apache, php, cURL and MariaDB. If you want to use Microsoft server, I'd use the application provided by Digi-Key.

I will describe single user install and provide some guidelines for the intranet server install.

You need the basic ordering Digi-Key account and, you need to sign up for API-Portal account from Digi-Key. To get the API portal account, go to https://api-portal.digikey.com/ Click on "create an account" button, and put in the necessary information. If you are in a small business and using shared servers, the account can be shared and you can invite others to the account.

Once you have an account, login into the API-Portal account. Then click on My Apps and "create new application" button. You can fill in the title, description and the redirect URI. The redirect URI for a single user will be https://localhost/digikey/auth.php. The redirect URI for intranet server would be whatever the domain name and path to the auth.php file. The API Portal allows this to be edited later. You then need to go to the API section standard and subscribe your application. The API this App uses is partsearch/partdetails.

Once you signed up, you will be provided with a secret key and a user ID. Copy the following into a text file and paste in the secret key and client ID number into the appropriate spots.

```
[authentication]
client_secret=<paste client secret here>
client_id=<paste client id here>
redirect_uri=https://localhost/digikey/auth.php
customer=<paste customer id number here>
timezone=<paste timezone here>
```

Save this temporarily. It will be copied later to the partlocater.cfg file.

## Installing

Unzip the partlocater project into the directory you want to run it out of. It can be installed anywhere that windows allows scripts to execute although Program Files(x86) folder is the standard place.

Partlocater is written in python and requires Python 3[1] and PIP. PIP is the package installer and is now bundled with Python 3. If you don't have it already, download Python 3 from https://www.python.org/ as Windows x86-64 executable installer. While installing, make sure PIP, tck/tk wiith idle[2] and Py Launcher are installed and check the boxes to associate files with Python, add python to environment variables and precompile standard libraries.

XAMPP – Single User

For single user (local use), download XAMPP from https://www.apachefriends.org/download.html this contains Apache webserver, OpenSSL, PHP, and MariaDB database.

Run the windows installer for XAMPP. When installing you need Apache, MySQL[3], php, and phpMyAdmin. The other apps can be unchecked. This guide will use the default directory C:\xampp as the path to xampp. If you choose to install it elsewhere, please adjust the path.

In the startup menu, go to XAMPP -> XAMPP Control Panel. For convenience, click on the config button in the top right corner and browse you favorite text editor or notepad. We'll need to edit some files to set it up.

Configure the webserver with SSL. In the XAMPP Control Panel click on the Apache row Config and select Apache (httpd-ssl.conf). Search for <VirtualHost _default_:443> and change the line

```
ServerName www.example.com:443
```

to

```
ServerName localhost:443
```

change the ServerAdmin to admins email address
Save and close

[1] I suggest using Python 3.7.2, rather than Python 3.7.3. 3.7.3 has a small bug that affects the GUI in a minor way.

[2] You can't get tkinter, the UI, without the idle editor.

[3] It says Mysql, but it really is mariaDB

## Adding certificate authority to xampp

With windows explorer. browse into C:\xampp\apache\conf and create a folder ssl.ca

Download a cacert.pem from https://curl.haxx.se/docs/caextract.html into the C:\xampp\apache\conf\ssl.ca directory. This is a large file of CA certificates extracted from Mozilla and is needed by PHP/cURL. You should now have a file cacert.pem in the ssl.ca directory.

In the XAMPP control panel on the Apache row. select config and php.ini.
Find the line with [curl] and change curl.cainfo to:

```
curl.cainfo="C:\xampp\apache\conf\ssl.ca\cacert.pem"
```

Find the line with [openssl] and change openssl.cafile to:

```
openssl.cafile="C:\xampp\apache\conf\ssl.ca\cacert.pem"
```

Save and close

## Generate a Self Signed Certificates for SSL

Run C:\xampp\apache\makecert.bat by going into the C:\xampp\apache folder and double clicking on makecert.bat. It will ask some questions.
You are asked to generate a pass phrase and to enter the same thing again.
You will be asked for distinguished name. It shows up in the certificate. The common name must be localhost.
Enter country name as two letter code (they are from here https://www.ssl.com/country_codes/)
Enter state or province
Enter Locality name (city)
Enter Organization name
Enter Common name-> this must be localhost (or hostname of intranet server)
Enter email address
Leave the challenge password and optional company name blank by hitting enter
You will be asked to enter the pass phrase again.
This generates a self-signed certificate and as with self-signed certificates, they work but they are considered invalid.

To test, start the apache server by going into the XAMPP control panel and clicking the start button in the apache row. After a few seconds the module background for apache should turn green
with a browser, go to https://localhost. If the browser is working properly, it will complain.
In firefox, click Advanced and Accept the Risk and continue
In IE, click Continue to this website (not recommended).
Chrome and Opera may work or they will have issues. If it works, it will pop up a complaint dialog box, just press continue button. One issue I encountered was an antivirus, such as ESET, will actively block https traffic that it considers having a valid certificate. This should show the XAMPP start page.

## MariaDB setup – local machine

Go into the XAMPP control panel and start Apache and MySQL. With a browser go to https://localhost/phpmyadmin/
Click on the User Accounts and then the add user account button. Put in the username (same as the one in the partlocater.cfg file), host name is localhost (or host name of the intranet server), and password (same as in partlocater.cfg). You will need all of the data and structure privileges at a minimum or global privileges.

Then push the go button at the very bottom right to commit the change. Leave MariaDB running for next step,

## Install MariaDB connector

To communicate with the database whether it is on the local machine or a server requires an ODBC connector. The MariaDB connector can be downloaded from https://downloads.MariaDB.org/connector-odbc/ get the mariadb-connector-odbc-x.x.x-win32.msi for 32 bit connector or mariadb-connector-odbc-x.x.x-win64.msi for 64 bit connector.

The connector needs to match with application accessing it. For example, Altium designer 17 and earlier are 32 bit apps and need a 32 bit connector. Altium designer 18 and later are 64 bit apps and require the 64 bit connector. Double click on the msi you downloaded and install the connector.

To configure the 64 bit, go into control panel and administrative tools and start the data sources ODBC. For the 32 bit connector on Win7 64 bit, go to the start->run and paste c:\windows\sysWOW64\odbcad32.exe

In the User DSN tab, click add and choose the MariaDB driver. Give your connection a name and description. The name identifies the connection in the User DSN menu. Click next, and select TCP/IP, Server Name is localhost (or server's host name), Port is set to 3306. If the database is on the local machine, the username and password are the MariaDB credentials you assigned above

If the database is running, you can push the Test DSN to see if the setup is correct. The remaining selections are fine as default, just click next until you get to the finish button and click that. Click ok in the ODBC Source Administrator to finish the installation.

## Setting up partlocater

Double click on setup.bat in the partlocater top directory. It will ask if you are using xampp, an intranet server or if you want to remove partlocater. It will check what has been installed, add the necessary packages to python plus copy files needed by xampp. This also creates a shortcut that can be dragged to the start menu to pin it to the menu. It also creates an user environment variable PARTLOCATER_CFG with a path to the partlocater.cfg file. Stop apache and mariadb if they are running and exit out of the browser you've been using.

Edit the partlocater.cfg file.
If you are using xampp, the partlocater.cfg file is C:\xampp\apache\conf\partlocater.cfg otherwise it is in the toplevel partlocater directory.
Open it with your favorite text editor or notepad. The config file is in the ini style configuration format.

Database credentials are in the database section. The section name starts with database concatenated with a number or identifier ie database0
It has required properties host, username, password and database. host is localhost for database on the local PC, username and password are the database username and password. database is the name assigned to the database.

For the intranet server, host is the domain name of the server, username and password and the login credentials that have access to the database and database is the name assigned to the database. The name should be lower case letters only and can use underscore ('_').

```
[database0]
host=localhost
username=<your username for database>
password=<your password for database>
database=<your name for the database>
```

The authentication section contains the information required for the Digi-Key authentication process. When signing up we suggested filling out the authentication section. If you have done so, copy what you filled into the partlocater replacing the authentication section with your own.

The client_secret and client_id are provided when the application is registered and need to be placed here. The redirect URI must be identical to the one that was registered with Digi-Key. customer is the users Digi-Key customer number. Timezone is the olson timezone format ie America/Los_Angeles, America/Chicago, America/New_York, etc.

```
[authentication]
client_secret=<paste client secret here>
client_id=<paste client id here>
redirect_uri=https://localhost/digikey/auth.php
customer=<paste customer id number here>
timezone=<paste timezone here>
```

You can also edit the preferences section. For debugging, uncomment the line in the preferences section:

```
log=../pl.log
```

If you are using xampp, uncomment the line (modify the path if you didn't do a default install)

```
mysql_path=C:\xampp\mysql\bin
```

This enables export and import for backups of the local database. Do not uncomment this if you are using an intranet server. Next you also need to tell the webserver which database is default for getting the token. default=<section of database to receive the token>

```
default=database0
```

Once complete, save the text file.

## Get the first token

Start apache and MySQL (MariaDB) running from the XAMPP control panel. With a browser go to https://localhost/digikey The browser may complain or downright not work about an insecure connection.

IE says insecure site exit (recommended) -> ignore that and continue

chrome and opera will complain with a pop-up, ignore and continue to website. Some antivirus software will block you (like eset). Turn off the https checking and try again.

Firefox will complain, click advanced and continue to website.

It should bring up a page with a link on it. Take the link and it should ask for Digi-Key credentials. These are the username/password for your Digi-Key ordering username/password. It will ask (only once) to identify the application. Click ok. If all goes well, it should say token stored in database.

This will also create the database for the part and for the token. You can turn off apache and will only need to repeat this if the token is lost or becomes corrupt.

## Running Partlocater

Start up partlocater and connect to your database. It will get the token and check if needs refreshing. If it does it will go to Digi-Key to update it and store that in the database. Partlocater should say Host <hostname> Database <name> connected.

Put a Digi-Key partnumber such as 311-10.0KLRCT-ND in the locate box and click locate. It should bring up all the properties that Digi-Key sent to the part info box. Scrolling in this you will see three parameters which are highlighted: Basename, Library Ref and Footprint Ref. They will contain best guess but probably need editting and must be modified before committing the part. Library ref is the name of the schematic symbol that you have or have generated. For example, my resistors are RES and capacitors are CAP. The Footprint Ref is the footprint name in the PCB library.

To change these click on the parameter, which copies it below to a text field, make the changes and click update. Once the part is updated, click commit.

You can use the search database to change any of the parameters later on. There is a about->system which will show information about the environment that partlocater is working in and there is about->help which is a text guide for using partlocater.

## Connecting to Altium

You still need a schematic library to hold the symbols and reference designator and PCB library for the footprints. We now need a database library. Go into File->New->Library->Database Library

This will bring up a form which needs to be filled out. Click on the button "use connection string", then scroll to the right and click on the build button. This brings up a wizard,

In the provider tab, click on Microsoft OLE DB Provider for ODBC Drivers then next

In the connection tab, click on use a connection string and push the build button.

Yet another wizard pops up, Click on the Machine Data Source tab and the name you gave to a ODBC connector earlier should be there. Double click that name and the wizard to setup the connector will popup. Since this is already set up earlier, you have to click next until finish and finish. This should put the information as text into text box.

Enter the login credentials either as a user for a server or the windows login/password for local access and check the save password box.  Push the test connection button to see if the connector and database is working. Then click OK, this should fill in a text box with a long string of text. In the box marked Schema name put the same name as your database name for the partlocater. Now click the advanced button and replace the left quote character default [ to ` (backtick) and the right quote character default ] to ` (backtick).

Save the database and give it a name. As you add parts to this database with part locater, the number of categories will grow. If you add this file to a project, then all of the categories show up as individual libraries. You select each library and drag a part onto schematic. The parameters and footprint will be automatically set.

## Removing Partlocater

Run setup.bat in the partlocater directory and select remove.

Go the location where partlocater was installed and delete the partlocater folder.

If you are using xampp and Python 3 only for partlocater, you can uninstall the apps with the start -> Control Panel -> Programs and Features panel.