



Serial Port Drivers and Firmware Upgrade

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Contents

Overview 2

 VCP Driver Installation 2

 Telnet Client Installation 3

Firmware Upgrade 6

 Performing an Upgrade 6

Mac OSX Driver Installation 8

Android Driver Installation 13

Warrantee and Support 16

Document History 16

Overview

Dilithium Design products such as the EVCC and BMSC use a serial port for configuration and for firmware upgrade. These products are supplied with a USB to serial cable which connects to the host computer by USB and to the EVCC or BMSC by a 3.5mm TRS jack (which looks like “headphone jack”).

The host computer requires serial port drivers (otherwise known as “Virtual Comm Port Drivers”). To use the serial port as a terminal requires a terminal application (or “telnet client”). To perform a firmware upgrade requires a separate application, the firmware downloader utility.

The steps to install the necessary software are basically the same regardless of host computer and operating system. Installation instructions are given below for Windows, using the popular “PuTTY” terminal applications. Later sections describe Mac OSX and Android installation instructions.

Note that there are also good tutorials available on the Internet on how to install the Virtual Comm Port Drivers and application software. Search for “ftdi installation”, “putty installation”, etc.

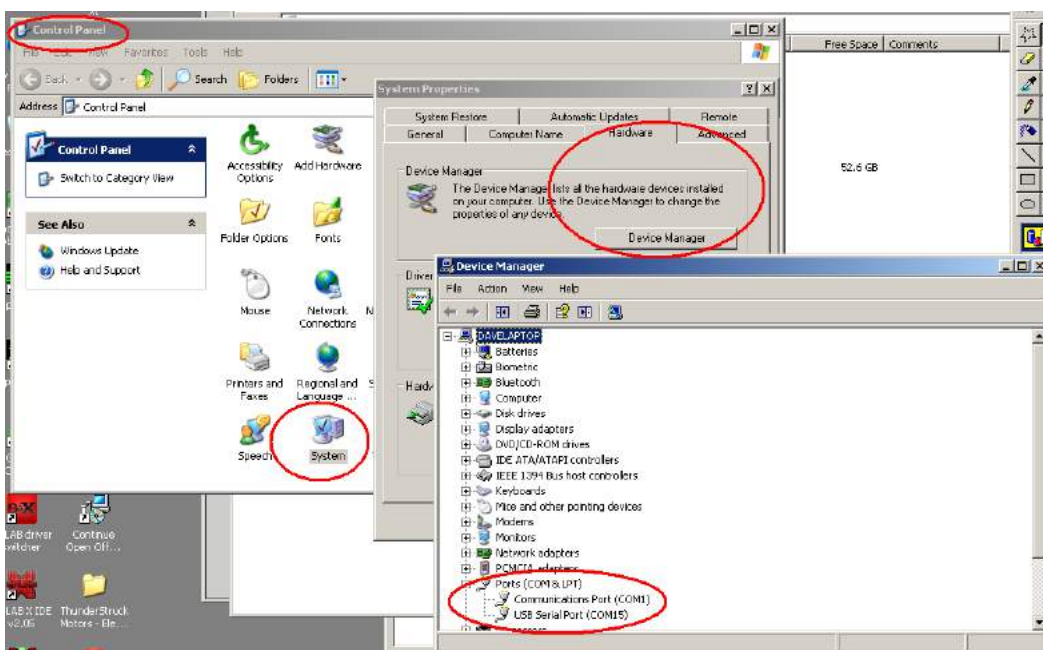
VCP Driver Installation

Step 1: Download and install the Virtual Comm Port (VCP) driver on the host computer. The VCP drivers allow the host computer to treat the USB port as serial port.

- VCP drivers are available at: www.ftdichip.com/Drivers/VCP.htm.
- Installation documentation is available at www.ftdichip.com/Support/Documents/InstallGuides.htm.

Step 2: Plug in the serial port cable and determine its assigned device name.

The serial port cable has a built-in USB to serial converter and a unique serial number. If the VCP drivers are correctly installed, the host computer will recognize the serial port cable when it is first plugged in and assign it a device name. In Windows, the the serial port device name is of the form “COM<n>”, where n is a small number. This number can be determined by looking at “Control Panel -> System -> Device Manager -> Ports”. In the example below, it is “COM15”.



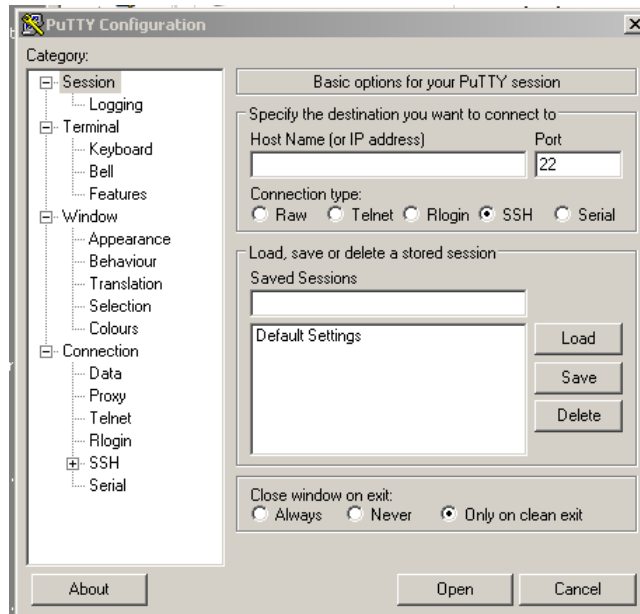
Telnet Client Installation

Step 3: Install a telnet client (e.g., a “terminal application”) on the host computer.

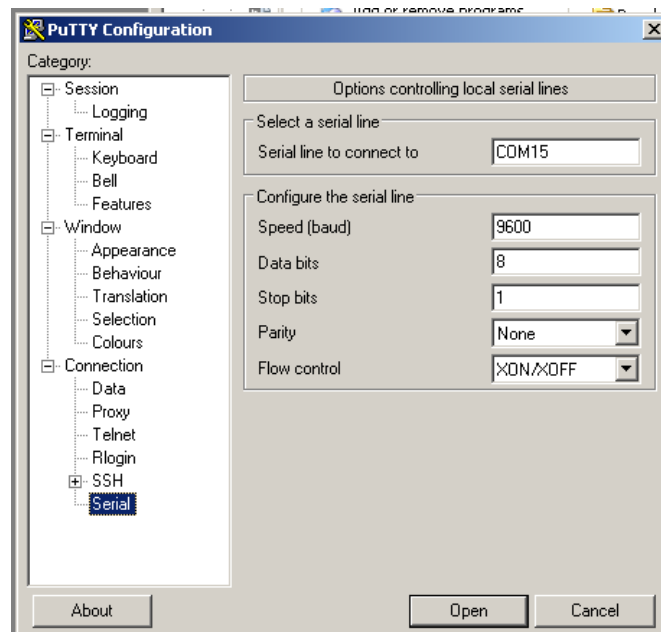
- PuTTY is available for download at <http://www.putty.org/>.
- There are many other suitable telnet clients that may be used.

Step 4: Configure the telnet client for use.

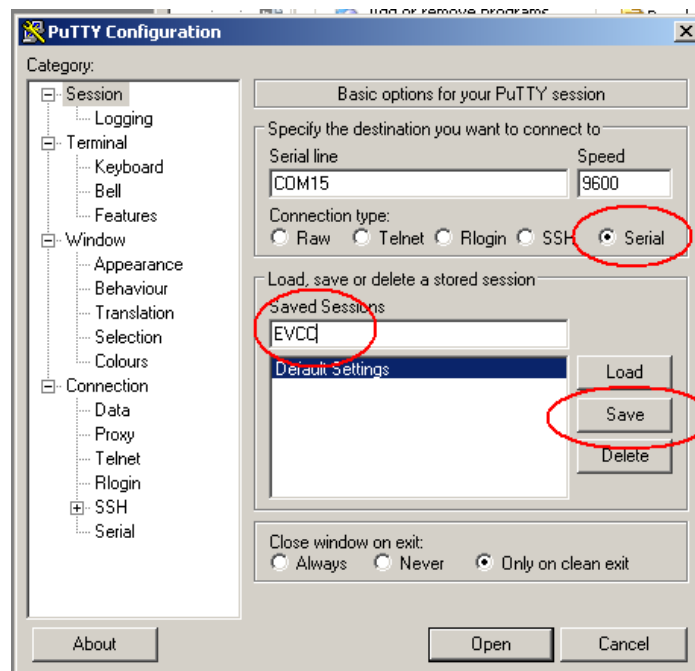
The first time PuTTY is opened, it will present the following:



Click on “Serial” in the Category column. Verify that the Speed is 9600, 8 data bits, 1 stop bit. Enter the “Serial Line” to connect to (in this case, “COM15”).

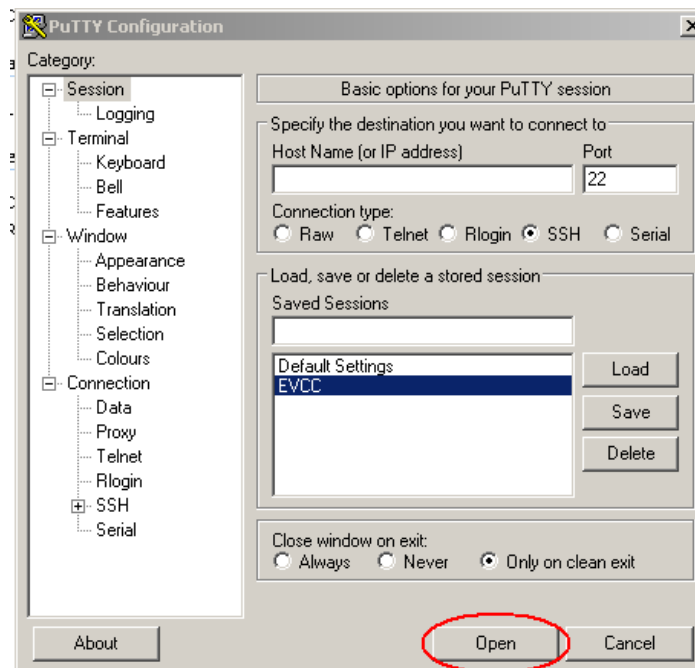


Do not hit “Open” just yet. Go back to “Session” by clicking the word “Session” in the Category window.

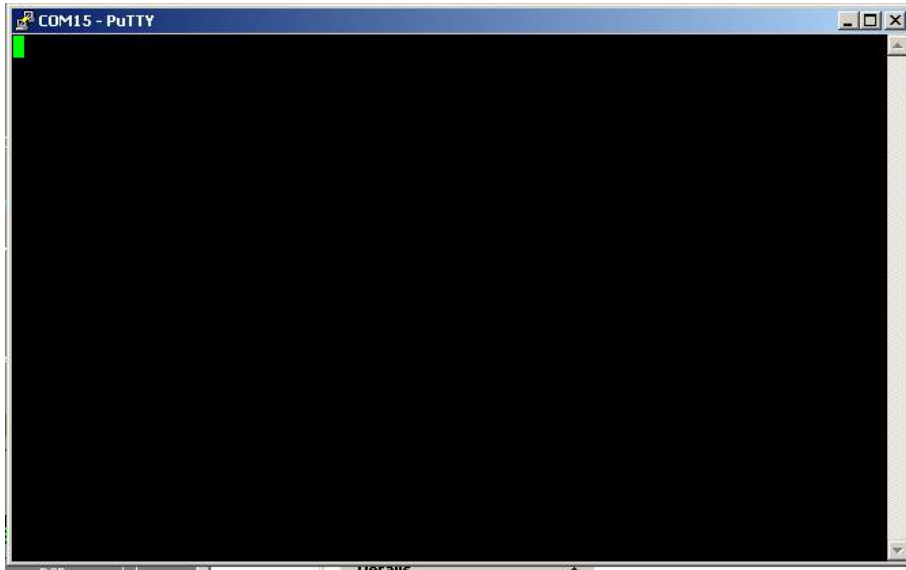


Set the Connection type to Serial. Give the new session a name (in this case “EVCC” in the Saved Sessions window) and press “Save” to save the session. PuTTY is now configured.

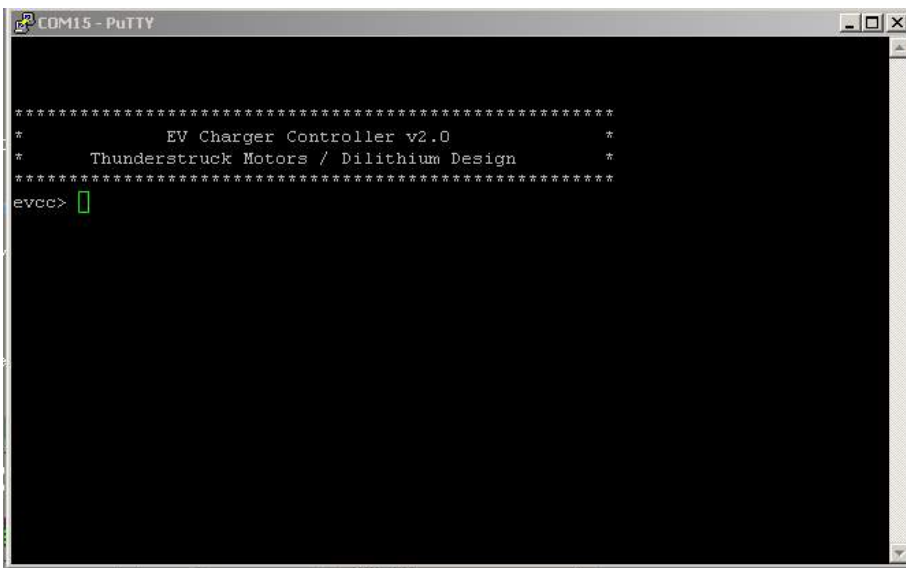
Step 4: Open the comm port. Select the saved session “EVCC” and click Open.



A screen like the following should appear:



Step 5: Connect the serial cable to the device. In this example it is an EVCC. Apply power to the EVCC. A startup banner similar to the following should be displayed:



Step 6: Installation is complete.

Firmware Upgrade

Firmware upgrade is also performed by using the serial port. Firmware upgrade requires the same VCP drivers as serial communications, however firmware upgrade uses a special bootloader application program. The opensource ds30 PIC bootloader is used, distributed under the GNU GPL license. This bootloader is free and the application runs on Windows, MAC and Linux servers. Documentation, screenshots and downloads are available at:

<https://picbootloader.com/forum/>

Use the “Latest Release” link. It is necessary to register with the forum before downloading the application.

Performing an Upgrade

The following example is written assuming the EVCC, however, the process is similar for the BMSC and other Dilithium Devices.

Upgrade Step 1: Place the device into “upgrade mode”. To do this, bring up the console port and type:

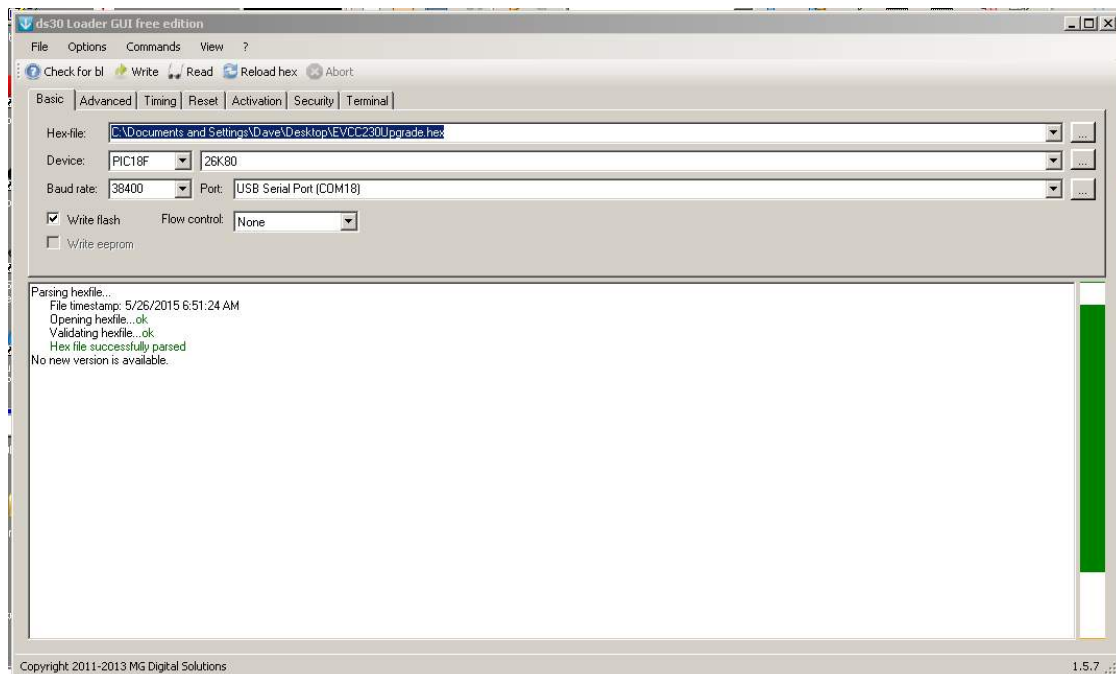
```
evcc> upgrade
```

The EVCC will then print some informational text and will enter the upgrade mode. At this point the EVCC is waiting for an upgrade image. The EVCC LED will blink at a very slow blink (once every 2 seconds). It is then necessary to exit from the the terminal application (e.g., PuTTY) and start the ds0bootloader.

Upgrade Step 2: Start the ds30 bootloader and select the correct options.

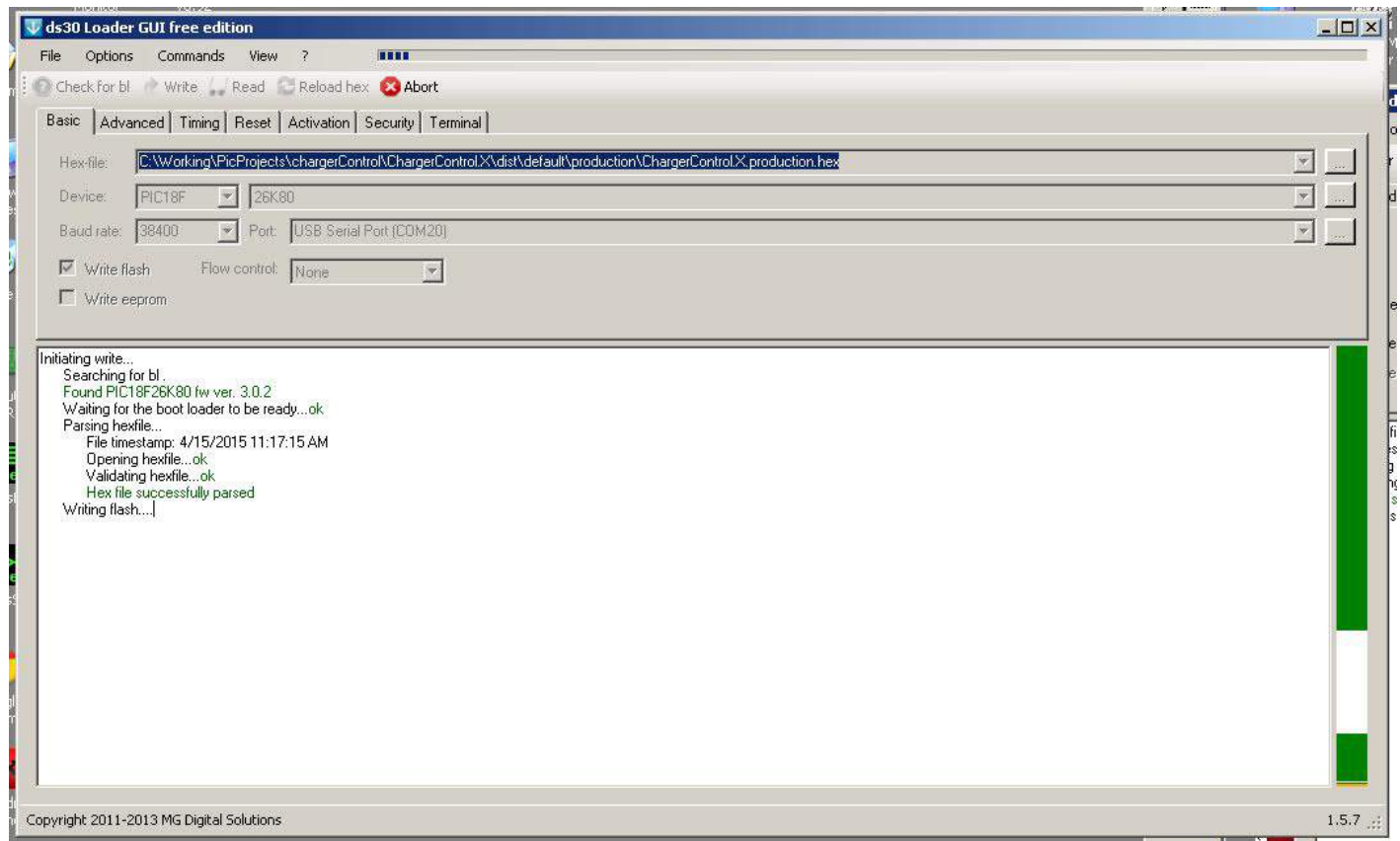
When starting the bootloader utility, set the following options. All of these options are on the “Basic” tab. It is not necessary to set any options on the other tabs

Hex File = Use the “...” button on the far right to browse to the file to download. (**EVCC230Upgrade.hex**).
 Device = Specify **PIC18F** as the device family and **26K80** as the device type.
 Baud Rate = **38400**
 Port = Use the pulldown to choose the serial port device name, **COM18** in this example
 Write Flash “tick” this box



Upgrade Step 3: Once the correct parameters are set, click on the “Write” option (just to the right of “Check for bl”).

The upgrade should start. The ds0bootloader will show a progress bar, and the EVCC LED will blink at a rapid rate to show that the loading has commenced.



Upgrade Step 4: Once the upgrade has completed, it is necessary to exit from the ds0bootloader application, **cycle power** to the EVCC, and start the terminal application.

One can use the **show version** command to verify that the proper version is running.

Mac OSX Driver Installation


Before starting the procedure below, ensure the 12V power is hooked up to EVCC. Finally, insure that the USB to serial cable is plugged into the computer.

For MAC OS X, the virtual serial port device name is of the form “usbserial-<sn> where <sn> is the serial number of the USB to serial device. An example of what the name of the EVCC would look like is the following: usbserial-FTGDTR8M.

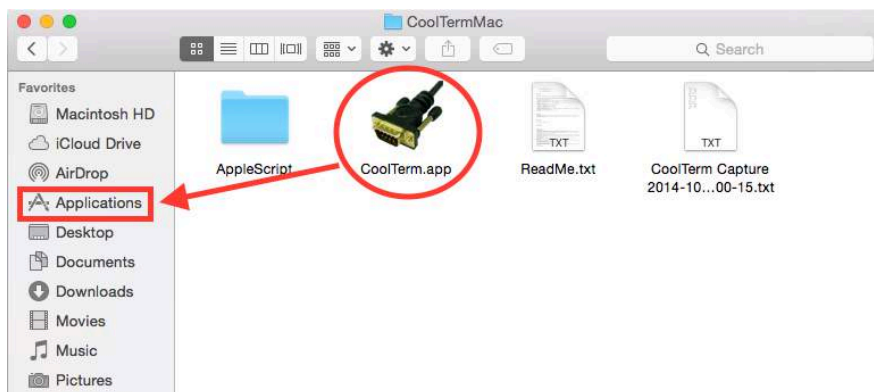
The MAC OSX distribution includes the applications “terminal” and “screen”, which may be used as a telnet client. However, for MAC OSX, we have used and recommend CoolTerm as it is simpler to install and use.

CoolTerm is a program that allows the user to easily access and program the EVCC via OS X.

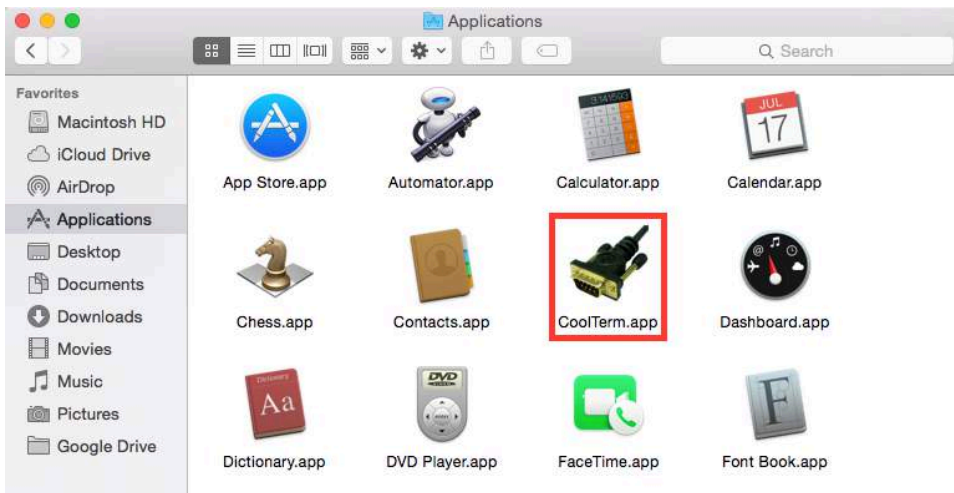
1. Go to <http://freeware.the-meiers.org>
2. Click download for mac

Application	Version	Description
 <p>CoolTerm</p> <p>Mac Win Linux Screenshot Info</p>	1.4.4	<p>CoolTerm is a simple serial port terminal application (no terminal emulation) that is geared towards hobbyists and professionals with a need to exchange data with hardware connected to serial ports such as servo controllers, robotic kits, GPS receivers, microcontrollers, etc. Written in REALBasic.</p> <p>NOTE: Starting with v1.4.4, the official Mac build will only support Intel-based Macs. OS X 10.7 or newer is required. For a universal binary supporting OS X 10.6 or older, click here.</p> <p>NOTE: The LINUX version is not officially supported. While almost everything is expected to work as expected, virtually no testing has been performed to confirm that all the features work properly. I have no LINUX system that I can use for testing and debugging. The LINUX build has been posted here as a courtesy to the users that asked for it. Please use this build at your own risk. Please use the forums to share your experiences with other users.</p> <p>Books that mention CoolTerm:</p> <ul style="list-style-type: none"> • Building Wireless Sensor Networks by Robert Faludi • Making Things Talk, 2nd Edition by Tom Igoe • Arduino Cookbook by Michael Margolis

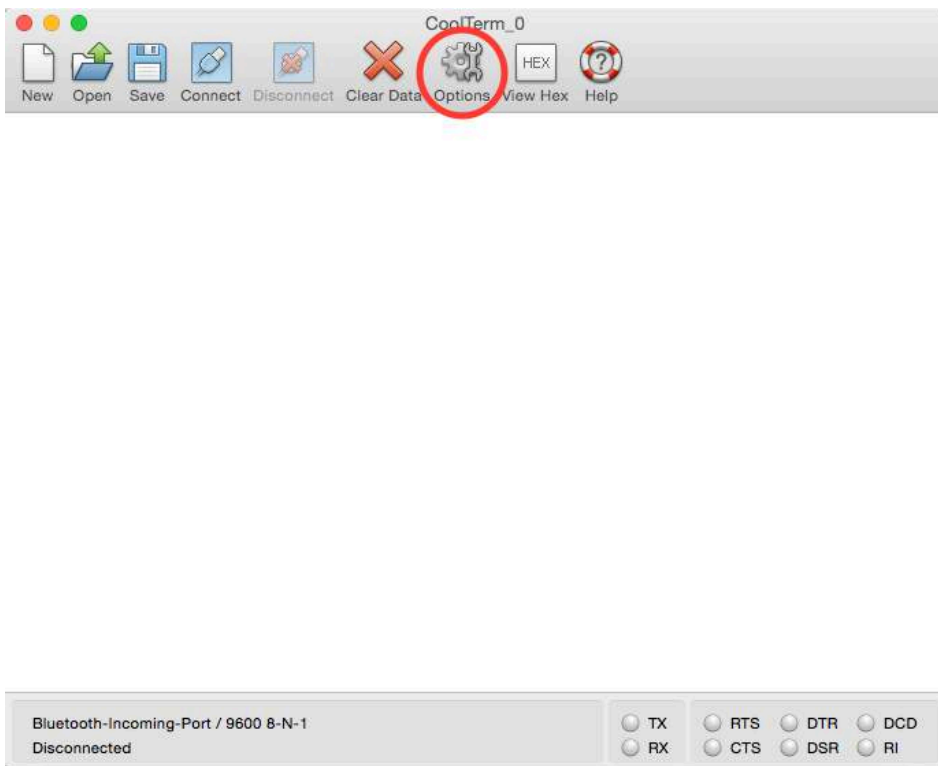
3. Extract the .zip file, open the CoolTermMac folder and drag the CoolTerm app into the applications folder.



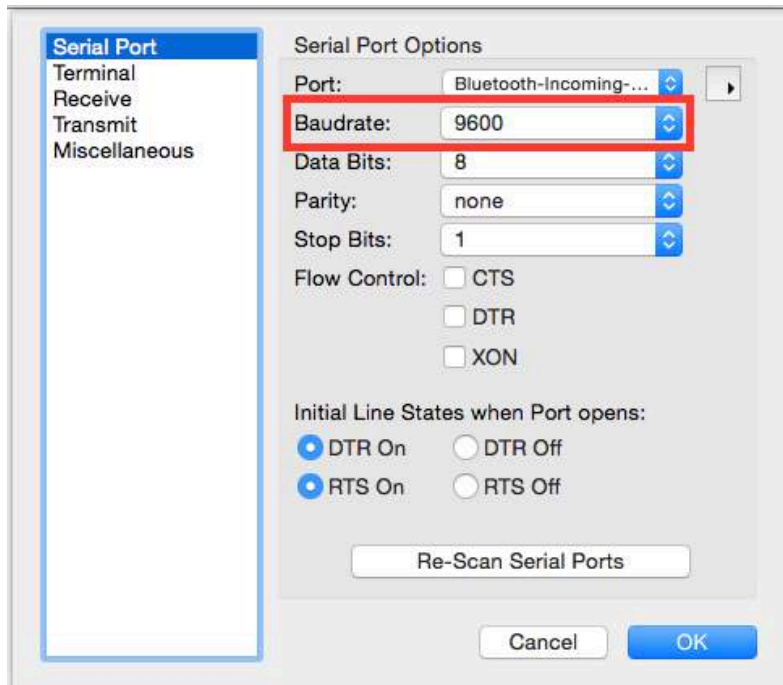
4. Open the applications folder and double click CoolTerm.app



5. Click "Options"

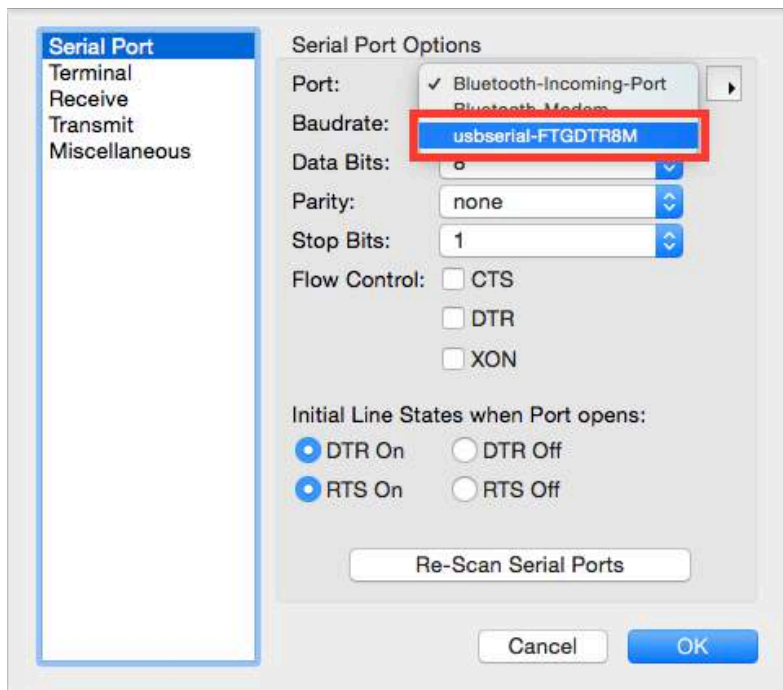


6. Ensure the "baudrate" is set to 9600 (which should already be set by default).

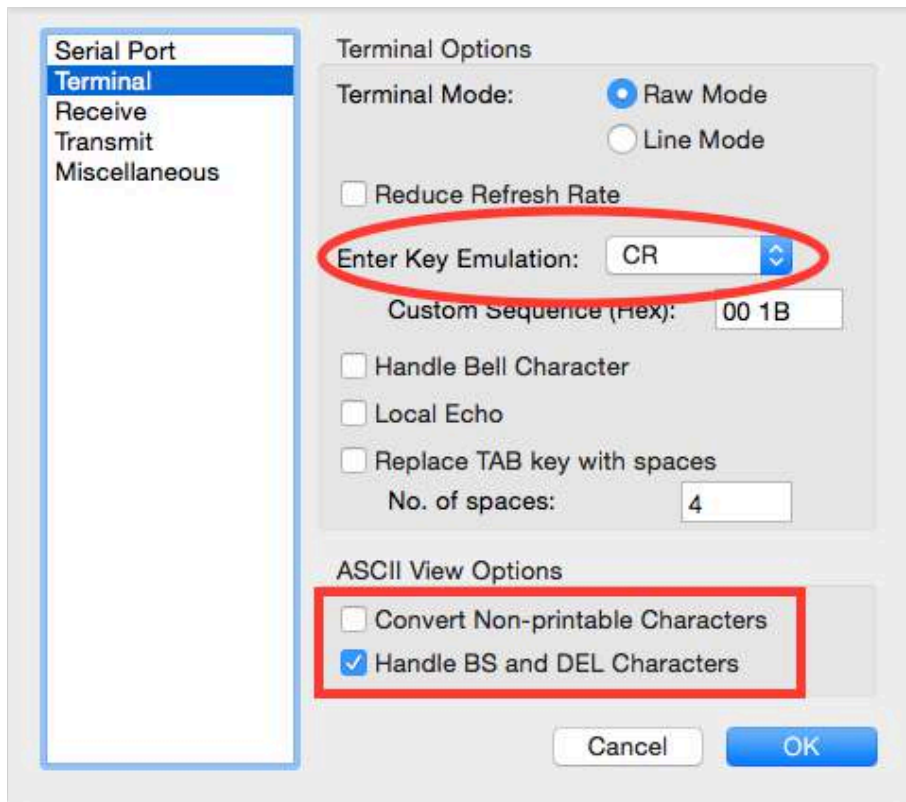


7. Click the drop down menu and select “usbserial-<sn>” where <sn> is the specific serial number of the EVCC as discussed earlier.

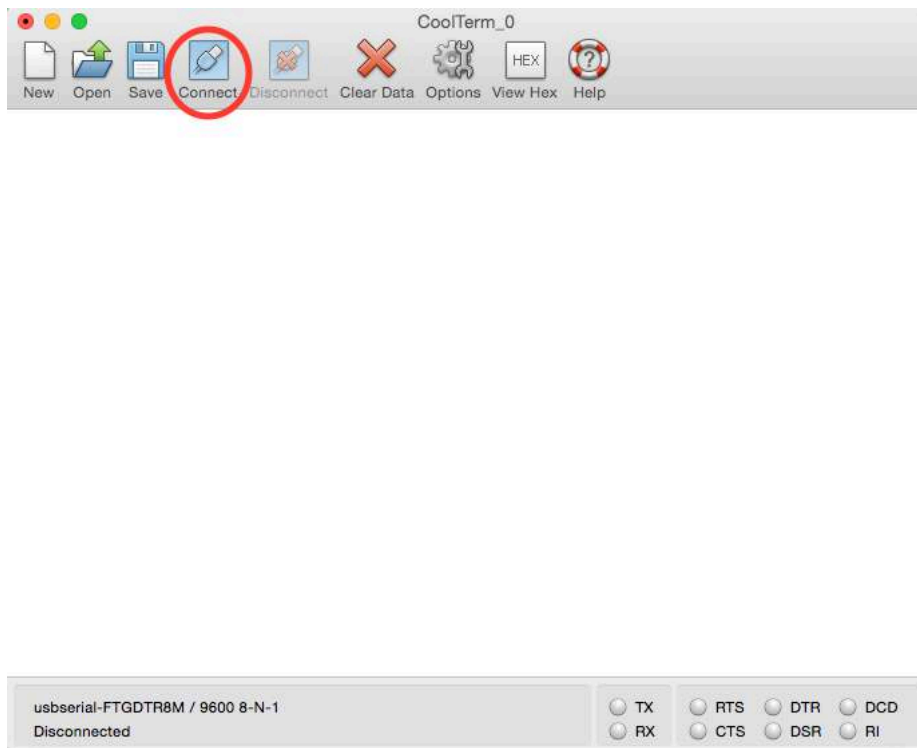
- **Note:** The usbserial-<sn> will not show up in the drop down menu if the USB is not plugged in prior to starting the program. If this occurs, exit CoolTerm, plug in the USB cable and restart CoolTerm.



8. Still in “Options” go to the left hand column and click “terminal.” Then change the window to match the settings below.



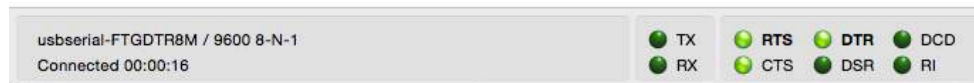
9. Click “Connect”



10. Press the “return” key, the EVCC command prompt should come up.



evcc>



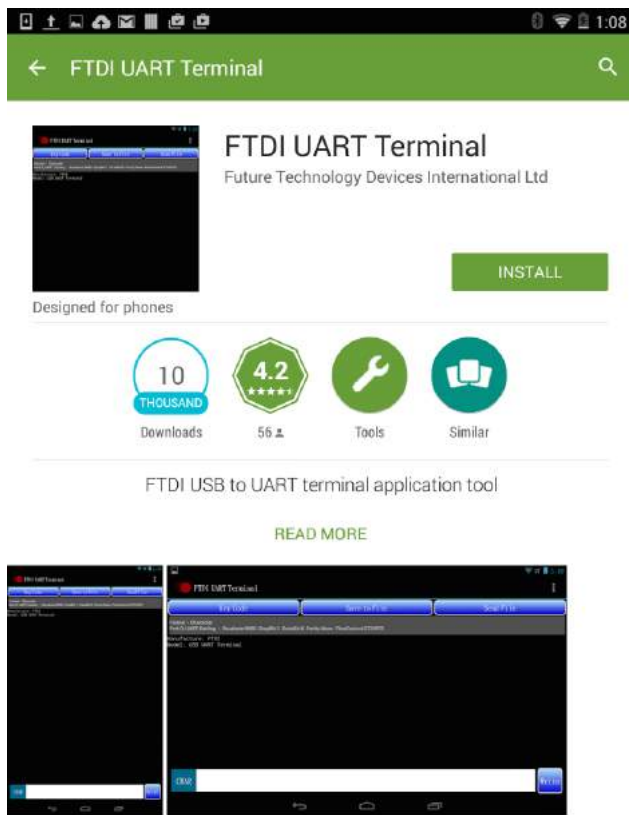
- **Note:** Although the operation of the serial port is very similar to the Windows examples, above, there is one important difference. Windows keyboards generate an ASCII “DEL” character when a “delete” is pressed. MAC keyboards generate an ASCII “BS” character. Current EVCC firmware only interprets the DEL key and the MAC “delete” key may not work as expected. However, the ASCII “DEL” character can usually be generated by MAC keyboards (look for another “delete” key with an “x” or try pressing FN-DEL).

Android Driver Installation

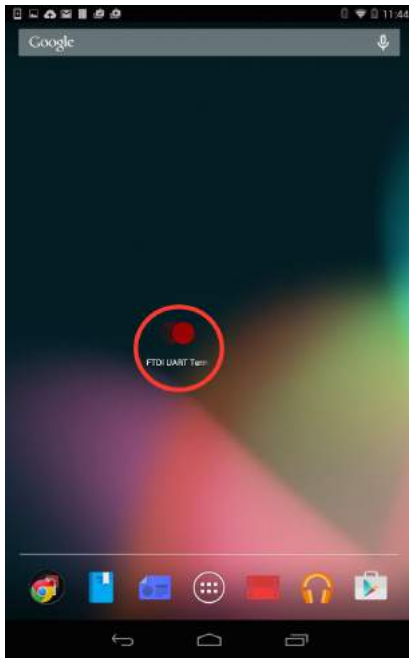
Before starting the procedure below, ensure the 12V power is hooked up to EVCC. Finally, insure that the USB to serial cable is plugged into the OTG cable which is then plugged into the Android device. You will need an “On The Go” (OTG) USB female to USB micro adapter found here: <http://www.amazon.com/IVSO%C2%AE-Nexus-Tablet-Micro-Cable/dp/B00932N46S>

In this guide, we will be using an Asus Nexus 7 Tablet. The same (or very similar) process should follow for smart phones and others.

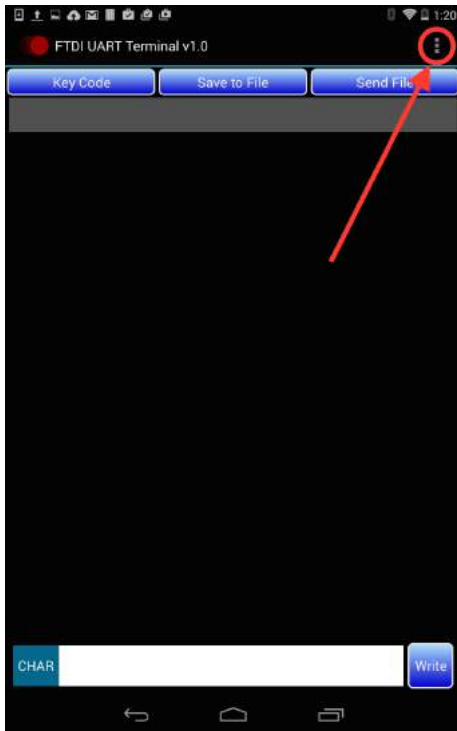
1. Ensure your Android is running 3.2 or later.
2. Download and install the FTDI UART Terminal app from the app store.



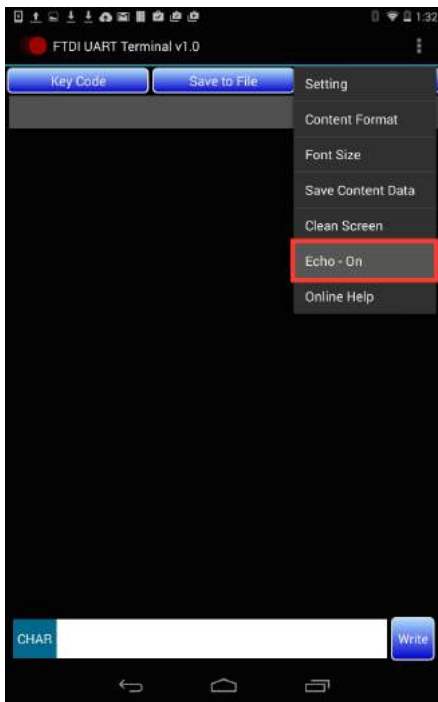
3. It should appear on the homescreen and look like this.



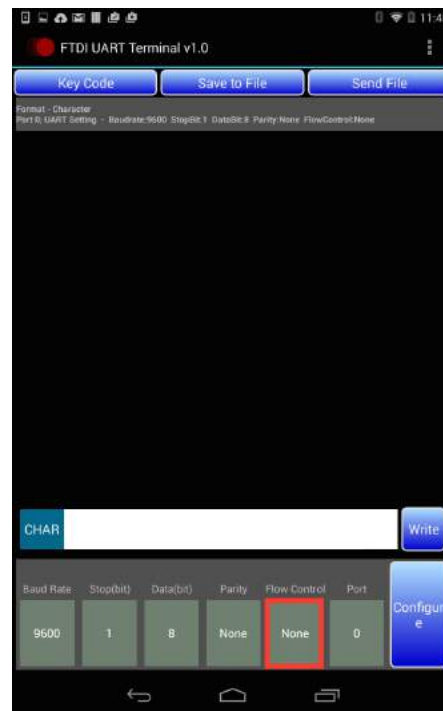
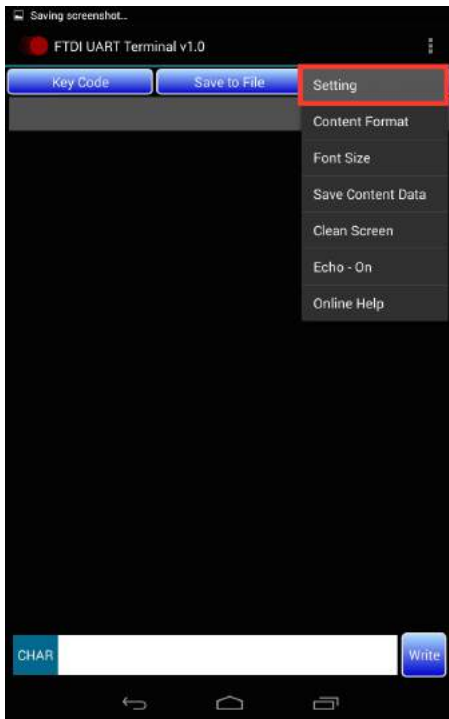
4. You can open the app, or plug in the EVCC and it should auto-detect and prompt you to open it with a program from the list. If this is what you choose to do, select FTDI UART Terminal from the list. (you can also check the box to always open with selected program). Once it is open, push the menu button (this differs from android to android).



5. Turn Echo Off



6. Go to the menu again and this time go to settings. Change “Flow Control” to “None” then press configure. **Note:** It will not allow the settings to be configured if the EVCC is not connected first.



7. The Android Device should now be set up to program the EVCC.

Please Note: because of the way the text data is sent to the device, it is necessary to place a “return” after each command before writing the command. This does what “enter” would do on the PC.

Warranty and Support

Dilithium Design reserve the right to make changes or improvements in design or manufacturing without assuming any obligation to change or improve products previously manufactured and / or sold.

For general support and warranty issues, contact

connect@thunderstruck-ev.com

For errors in this document, or comments about the product, contact

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Document History

Rev 1.0.0	Apr 17, 2014	Initial Version
Rev 1.1	Oct 25, 2017	Updated, made more generic
Rev 1.2	Jul 2018	Renamed, minor updates