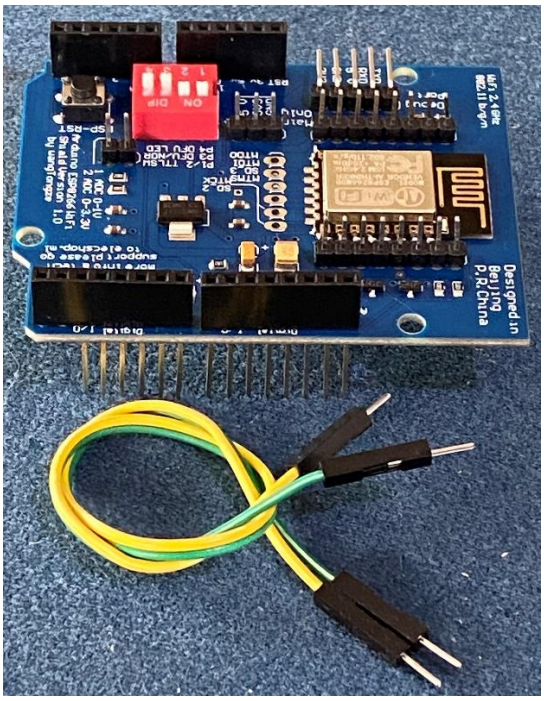
JTElectronics DCC-EX Compatible WiFi Board

Model: JTEWIFI1



The JTEWIFI1 system provides WiFi connectivity to DCC-EX systems in particular the JTEDCC-MEGA DCC module. This will allow you to control a locomotive throttle from your phone or tablet over a wireless WiFi connection to the JTEDCC-MEGA module. The JTEWIFI1 is supplied as a WiFi shield and two jumper wires to connect it to the JTEDCC-MEGA module. Using these WiFi shields is not the most reliable or robust way of driving trains, but some people have asked for WiFi setup so here it is. Bonus is no computer is required to drive trains, it's a totally standalone system!

There are two types of WiFi connection, and the type of connection is configured as part of the EX-CommandStation firmware and uploaded into the JTEDCC-MEGA module using the "EX-Installer" app from www.DCC-EX.com

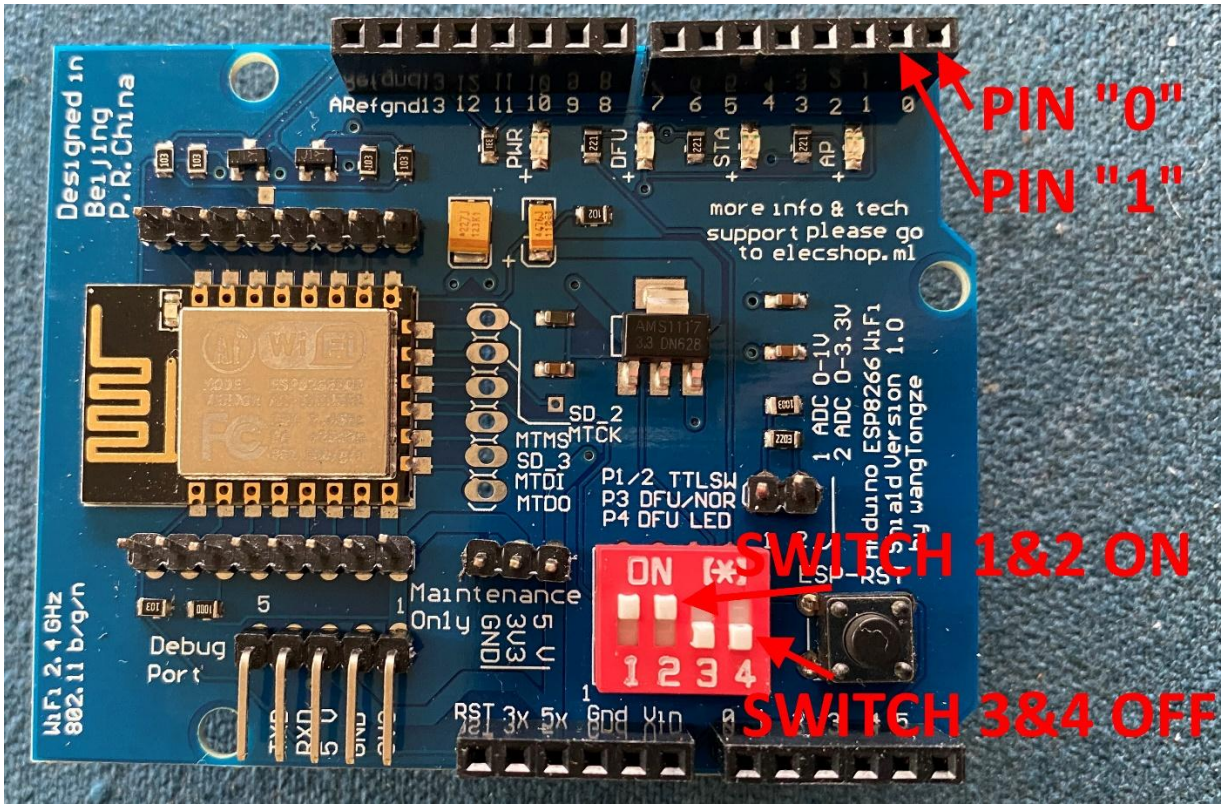
I. Use as a soft Access Point – The JTEWIFI1 module acts as its own WiFi access point and your phone or tablet connects directly to the JTEWIFI1 module. It will have a fairly short WiFi connection range maybe up to 6 meters at most in an open area with no obstructions but is the easiest to setup.
II. Connect To Existing Wireless Network – The JTEWIFI1 connects to your existing WiFi network at home, as does your phone/tablet. The JTEWIFI module and your phone/tablet will communicate over a wide area determined by the range of your home WiFi network.

We have done all programming and testing of the WiFi shield. You will need to carefully plug the WiFi shield into your existing JTEDCC-MEGA controller module, connect the two jumper wires, as detailed later on, and then configure and install the EX-CommandStation firmware onto the MEGA2560 controller system. It's not too hard…

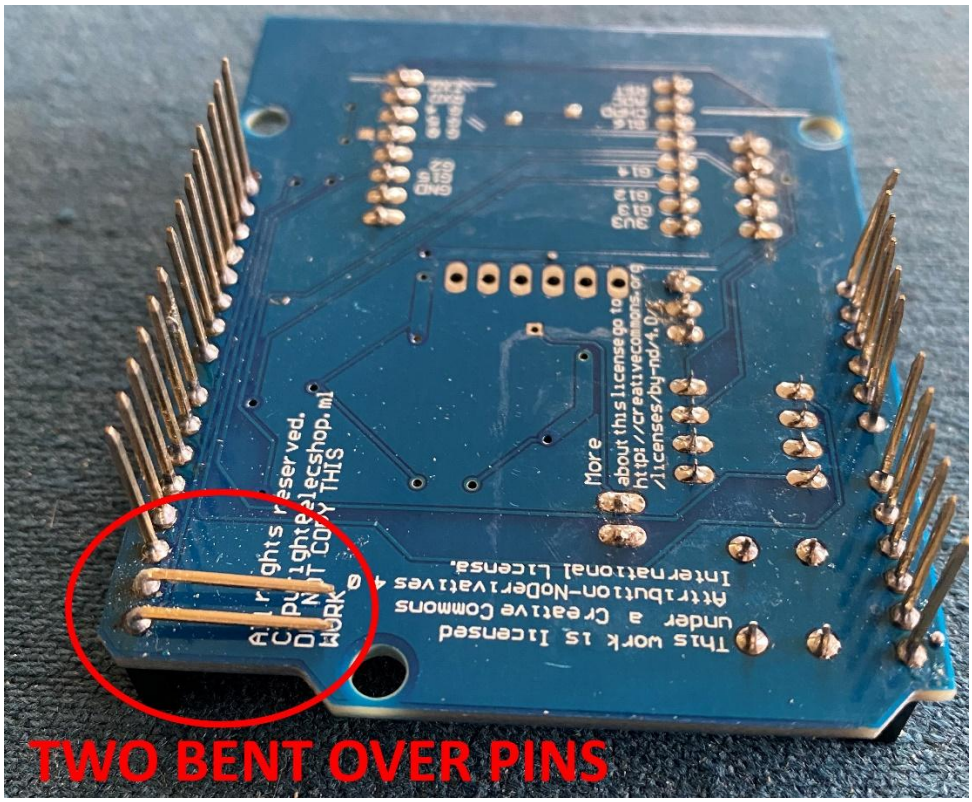
The JTEWIFI1 system uses the "WangTongze" WiFi shield and official instructions from DCC-EX are available at:
https://dcc-ex.com/ex-commandstation/advanced-setup/supported-wifi/wifi-config.html and
https://dcc-ex.com/reference/hardware/wifi-boards/wangtongze-board.html
PLEASE NOTE: the "wangTongze" WIFI boards we supply have been modified to contain the correct components and firmware, and are fully tested to be certain they work properly.

1. INTRODUCING THE WIFI SHIELD

Don't fiddle with the four little switches on the WiFi shield. Switches 1 & 2 must be in the ON position and switches 3 and 4 must be in the OFF position. Also note the LED's won't change state in any way when operating the WiFi shield so just ignore them.



On the underside of the WiFi shield there are two pins (labelled "0" and "1" on the tops side) that are deliberately bent over. Leave them bent over and not touching! The WiFi system WON'T work if you straighten them, or if they touch together…



2. FIRST MAKE SURE YOUR DCC-EX COMMANDSTATION SYSTEM IS WORKING

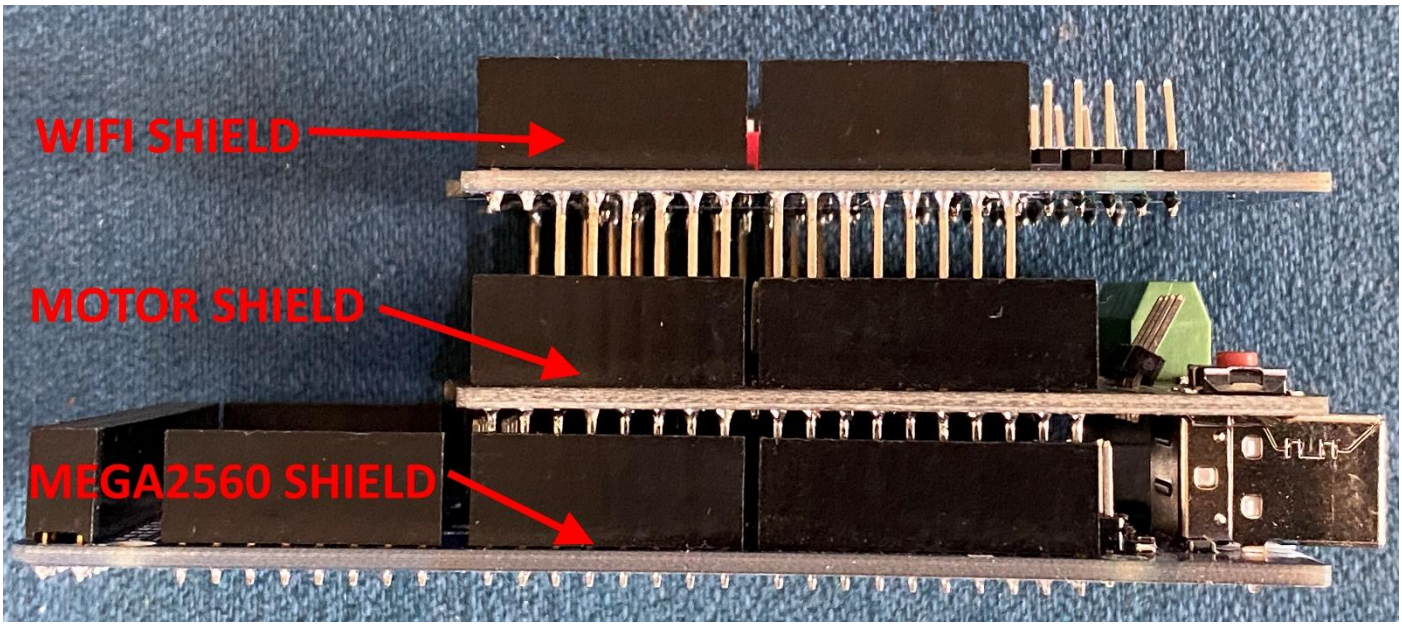
Adding the WiFi shield and reconfiguring and uploading the DCC-EX EX-CommandStation firmware can make troubleshooting a bit more difficult because there will be a few extra layers to your DCC-EX system. Before attempting to install the WiFi shield **MAKE SURE your DCC-EX system works via a USB cable with the JMRI Decoder Pro software** and you can successfully operate throttles and drive the locomotive from JMRI running on a computer.

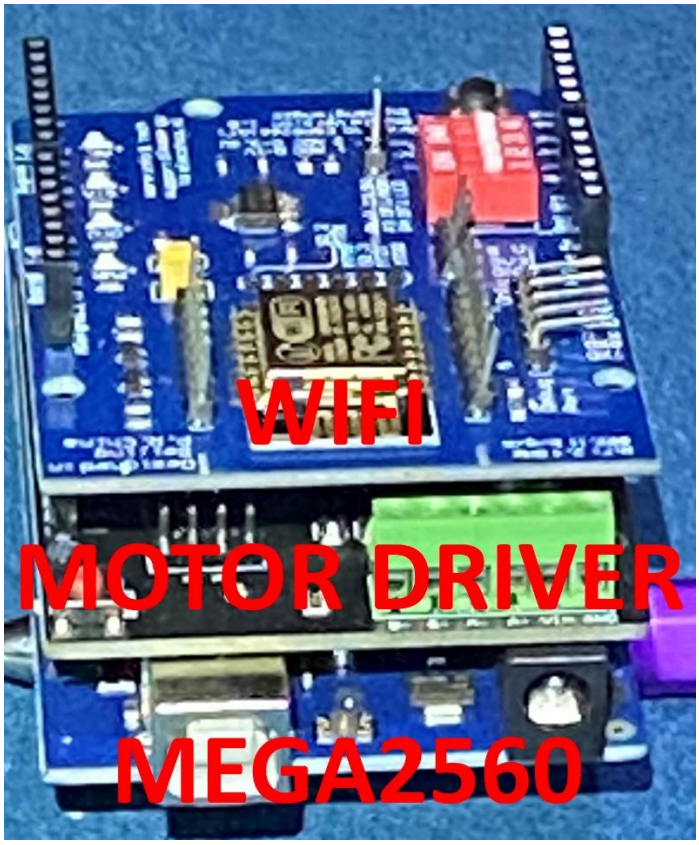
If you get the WiFi shield installed and you've checked ALL configuration and the locomotive won't move, try:

- Removing all power, and USB cable if used.
- Unplug the WiFi shield and jumper cables.
- Power up the DCC-EX system
- Try to run the locomotive from a throttle in JMRI Decoder pro software on a computer.
- Refer to TROUBLESHOOTING section of this document.

3. PLUG THE WIFI SHIELD INTO THE MOTOR DRIVER SHIELD

Sit the WiFi shield on top of the motor driver shield and line up the pins on the WiFi shield with the sockets on the motor shield. Note that there are less pins on the WiFi shield, than corresponding holes on the motor driver shield, so use the "gap" between the black sockets as a guide to exactly where it fits**. Look carefully at all the pins from all directions and sides** as its very easy to have a slightly bent pin miss the black socket and skew off to one side. Once you are happy all pins are lined up correctly into the black socket, gently press the WiFi shield onto the motor driver shield until it is seated. The WiFi shield WON'T necessarily go all the way down to the Motor Driver shield

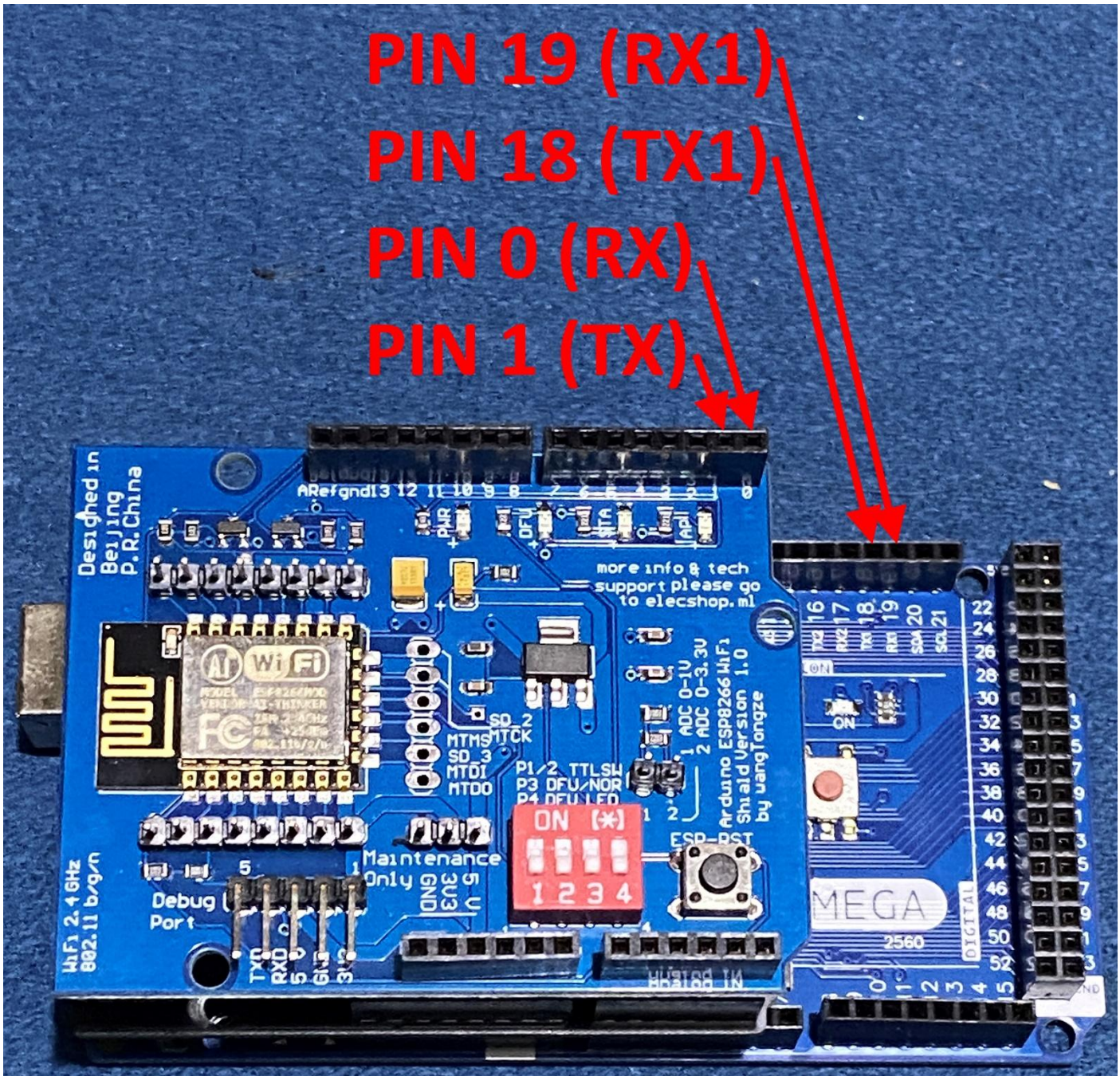




4. IDENTIFY THE JUMPER PINS

The JTEWIFI1 comes with two jumper wires that must be installed correctly as in the pictures below.

Identify the PIN 0 (RX) and PIN 1 (TX) pins on the WiFi shield, then identify the PIN 18 (TX1) and PIN 19 (RX1) on the Mega2560 shield. **The white lettering on the boards is not lined up exactly with the pins! Use the photos to positively identify the pin locations.**

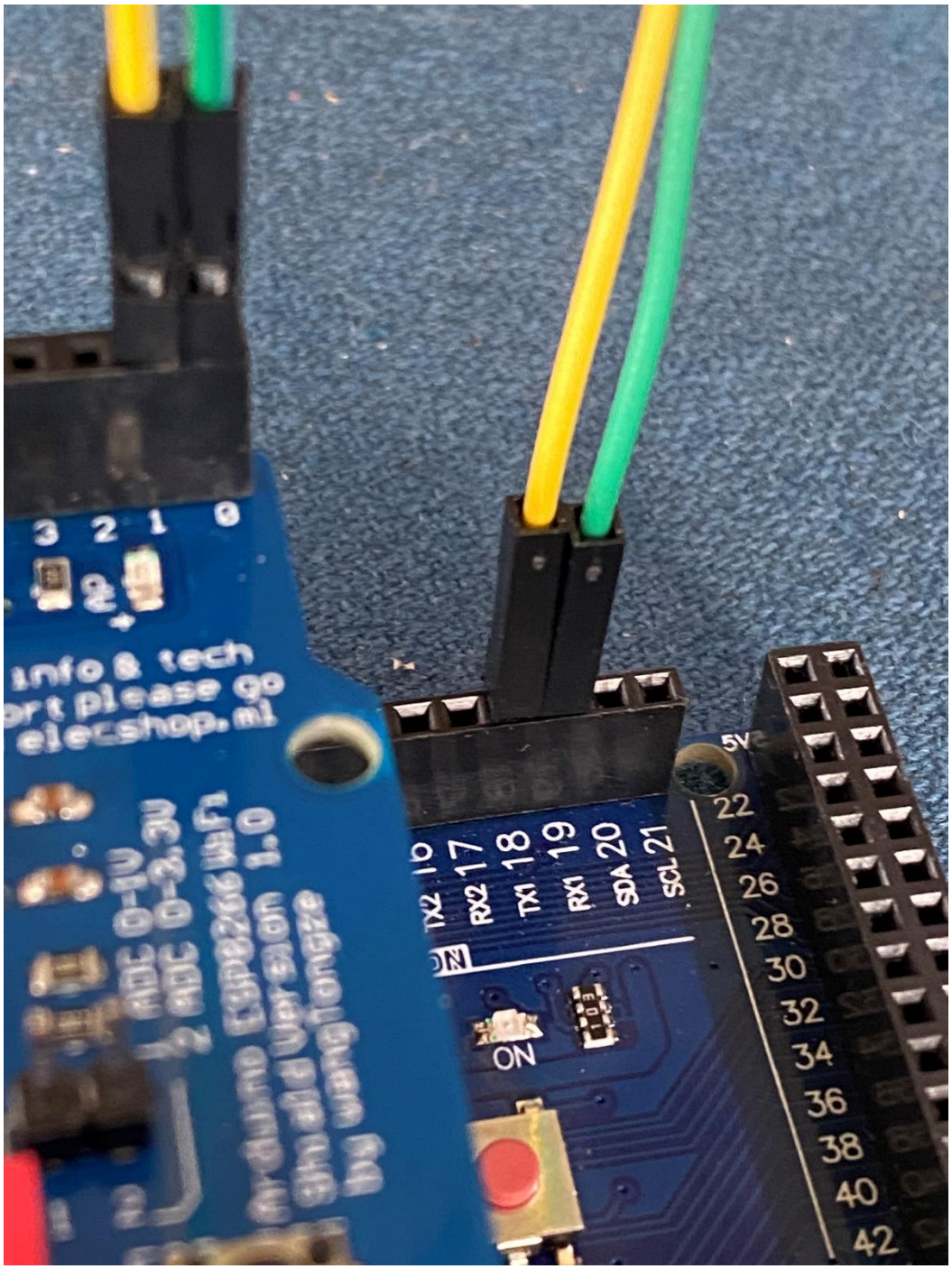


5. PLUG IN THE JUMPER WIRES

Connect one of the jumper wires between PIN 1 on the WiFi shield, and PIN 18 on the Mega2560 shield – the YELLOW wire in the photo below.

Connect the second jumper wire between PIN 0 on the WiFi shield, and PIN 19 on the Mega2560 shield – the GREEN wire in the photo below.

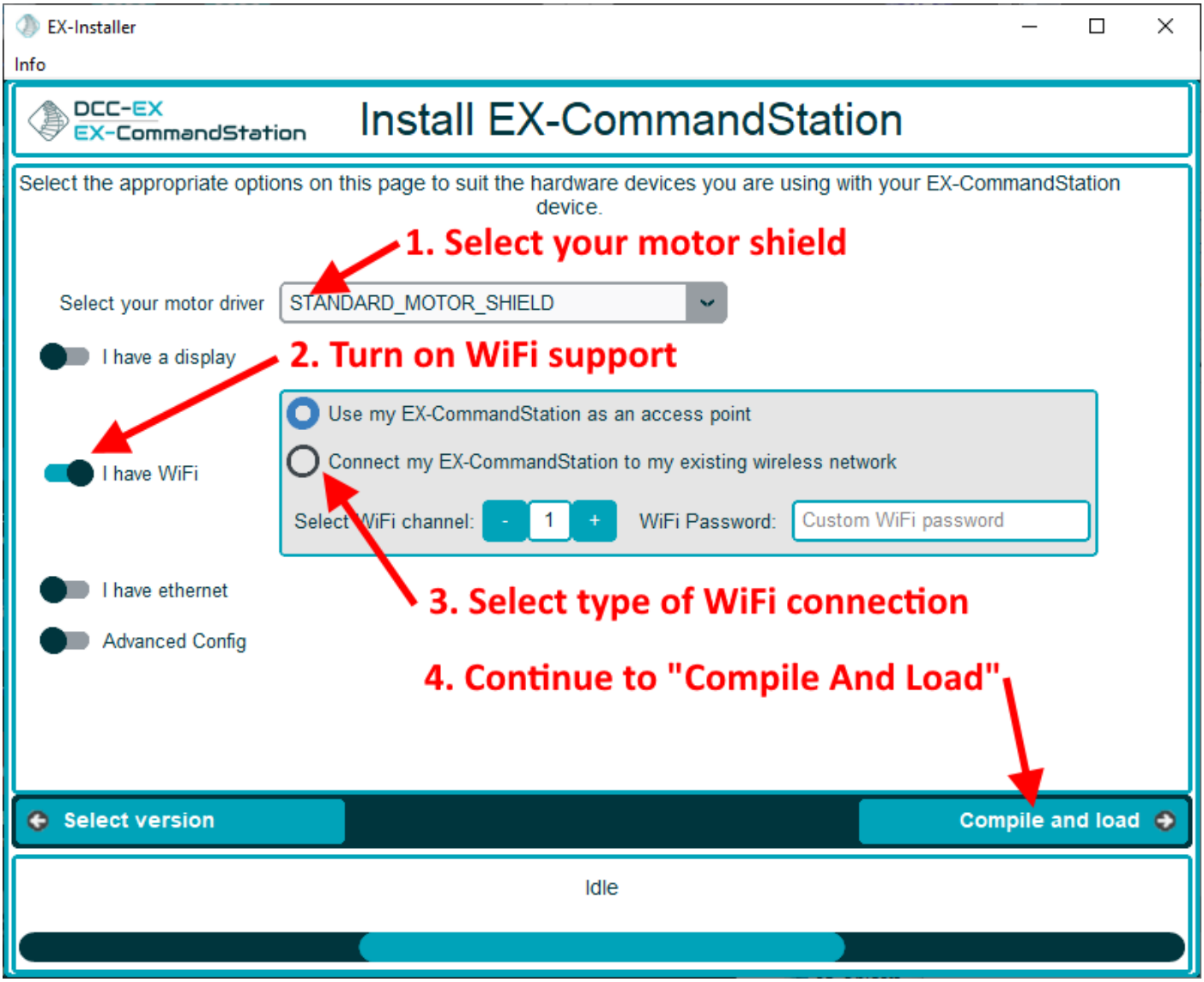
As a final check, one coloured wire should be on the left on both boards and the other coloured wire should be on the right on both boards, when viewed as in the photo.



6. ADDING WIFI SUPPORT TO EX-COMMANDSTATION FIRMWARE

Either type of WiFi connection can be used, and both will have advantages and disadvantages. To change the type of WiFi connection you need to reconfigure the DCC-EX EX-CommandStation firmware and upload it to the Mega2560 shield using the "EX-Installer" app available from www.DCC-EX.com downloads page in the following link: https://dcc-ex.com/download/ex-commandstation.html

Run the EX-Installer app and configure the Motor Shield and WiFi settings as shown below:



7. THROTTLE APP

You can use Train Driver, or WiThrottle app to control your locomotives etc. I have an iPhone and prefer the TrainDriver app as WiThrottle Lite (free) app cannot turn on track power, but Train Driver can. Rather important as you must turn on track power before a throttle will work! But also DCC-EX EX-CommandStation can be configured to automatically turn on track power at startup… see the DCC-EX website for information on setting up startup commands.

If you configured “Access point” (or sometimes called “Soft AP”) type Wi-Fi connection, you connect your tablet/phone directly to default WiFi network “DCCEX_xxxxxx” with default password “PASS_xxxxxx” unless you changed these in the EX-CommandStation configuration. The xxxxxx in the default configuration are 6 letters & digits unique to your WiFi shield. You then configure the app to the DCC-EX system WiFi server on IP address 192.168.4.1 and port 2560.

If you configured “Existing WiFi” type WiFi connection the IP address will vary but the connection settings are automated so try choosing “dccex.local” as the server ip address.

8. TROUBLESHOOTING

8.1. Can't see the WiFi network on my phone.

8.1.1. Wait a bit longer and try again – It can take 30 seconds or more for your phone/tablet to see the WiFi network.

8.1.2. Try turning WiFi off and back on in the settings of your phone/tablet. This will force it to scan for nearby WiFi networks.

8.1.3. "Have you tried turning it off and on again…"
Try removing power from the DCC-EX module (and unplug USB cable if you had used it) wait 10 seconds and apply power again.

8.1.4. Check all jumper wires and pin alignment between shields. The connections have to be correct for you to see the DCC-EX WiFi network.

8.1.5. Check you have updated the firmware in the Mega2560 shield to include WiFi support and you selected the appropriate type of WiFi connection.

8.2. WiFi network shows up as "AI-THINKER-XXXXXX" not "DCCEX_XXXXXX"

8.2.1. If you see a WiFi network called something like "AI-THINKER_123abc" and not the expected WiFi network name of something like "DCCEX_123abc" you haven't connected the two jumper wires correctly, remove power and check these jumper wires again.

8.2.2. Also, the Mega2560 DCC_EX controller needs to have firmware installed with WiFi enabled. If you haven't tweaked the WiFi settings yet, download the "EX-Installer" app from DCC-EX.com downloads page, select your motor controller "STANDARD_MOTOR_SHIELD", enable WiFi, and upload the firmware. Download the EX-Installer app from: https://dcc-ex.com/download/ex-commandstation.html

8.2.3. Once you have corrected these issues, power the DCC-EX controller system off and back on and connect to the WiFi.

8.3. Phone/tablet won't connect to the WiFi.

8.3.1. The password is **case sensitive** so enter it carefully and exactly.

8.3.2. The default password for soft access point WiFi mode is PASS_ and then 6 digits and/or numbers the same as the WiFi network name – something like PASS_1a24c6

8.3.3. If you changed the default WiFi password when configuring and uploading the DCC-EX firmware enter your new password.

8.4. The locomotive won't move.

8.4.1. Try operating the locomotive using a USB cable and JMRI Decoder Pro software on your computer. This will eliminate locomotive, track, power, or wiring issues.

8.4.2. Make sure track power is turned on in your phone app. You should see two red LEDS on the motor driver shield come on when track power is turned on – exactly the same behaviour when using JMRI from a computer.

8.4.3. Make sure you have set the correct DCC address in the phone app to match the DCC address of your locomotive.

8.4.4. Make sure your phone app is connected to the correct DCC-EX WiFi server IP address.

8.5. WiFi distance is not great.

8.5.1. The WiFi range is not great when using these WiFi boards as an access point, maybe up to 6 meters, because these WiFi boards have a fairly weak signal output and an inefficient antenna – when compared to your home internet WiFi access point.

8.5.2. Also, range is affected by the WiFi radio channel selected, local interference on that channel, and different brands of phone/tablet device.

8.5.3. You will probably get better wireless range by attaching the WiFi to an existing WiFi network by reconfiguring/uploading the EX-CommandStation software using the EX-Installer software, but this is more complicated to get working.