Appendix A - Configuring the WiFi Module Option

The WiFi module as shipped is pre-configured with Soft-AP enabled and the baud rate set to 9600. This should allow anyone with a WiFi enabled computer or laptop and a web browser to configure the WiFi module for your network. The procedure to use for that is shown below.

Configuration is necessary to let the WiFi Module join your WiFi network. Before starting, you will need the following information:
- Your Access Point's SSID and passkey
- The encryption method used by the access point (WPA2PSK/AES is recommended)
- A method for obtaining an IP address to operate on your network.

The WiFi module offers two standard ways to obtain an IP address:
1) you can tell the WiFi module which IP address to use (called a "fixed IP address"). You would normally obtain an IP address (including subnet mask and gateway information) from your network administrator, or
2) you can tell the WiFi module to obtain an IP address automatically using the DHCP protocol.

Please note that the DHCP protocol does not guaranty that the WiFi Module will always get the same address, as this is dependent on your router. Using DHCP may be convenient to verify that the WiFi module is working, but for an operational system, a fixed IP address is recommended.

If something goes wrong during configuration, it is possible that the Soft-AP feature of the WiFi module may have been turned off, which would make it impossible to regain control via the web browser. In this case, the Thunderbolt Kit has a special function ("Reset WiFi") accessible via the menu that returns the WiFi module to its factory default settings, including enabling the Soft-AP feature. When that function is activated, a second procedure should be used to return the module to a state where it can be configured for your network. This second procedure is shown below the first procedure.

Notes:

1) These steps have been tested with a computer running Windows 7. I believe it should work the same under Windows 8 and 10 and other operating systems but I have not tried. I welcome feedback (positive or negative) with your experience in that regard.

2) The WiFi module's web page has a tab named Update FW. You should not try to update the firmware on the WiFi module for the following reason: The firmware update feature, when required, must only be done in concert with a Thunderbolt Monitor kit firmware upgrade, and only when advised to do so in the Thunderbolt Monitor kit firmware upgrade procedure. Failure to yield to this important point may result in the WiFi module becoming inoperative.

Configuration steps (with WiFi module pre-configured as received):

1) Using the Thunderbolt Kit menu, go to "Enable WiFi" and select Yes, save the settings.

2) Using a WiFi equipped computer or tablet, open the Network and Sharing Center (or equivalent) and list the visible Access Points.
After a few seconds, you should see an access point named "TBMon". Connect to it (the access point is open.) Your computer may complain that there is no Internet access through this access point. This is normal.

2) Once your computer is connected to the "TBMon" access point, open your browser to "http://10.10.100.254/index_en.html". A login window similar to Figure 1 below will open, asking you for a login and password. As shipped, the login is "admin" and the password is "admin". This can be changed later.
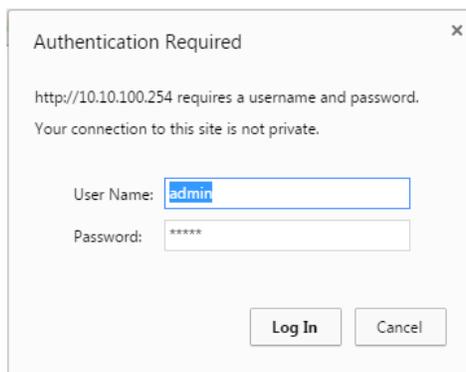

Figure 1: login page

3) Click "OK". A page similar to Figure 2 will load.

Figure 2: Fast Loading page (Chinese)

4) Click on "English" at the top right of the page. The page will change to Figure 3
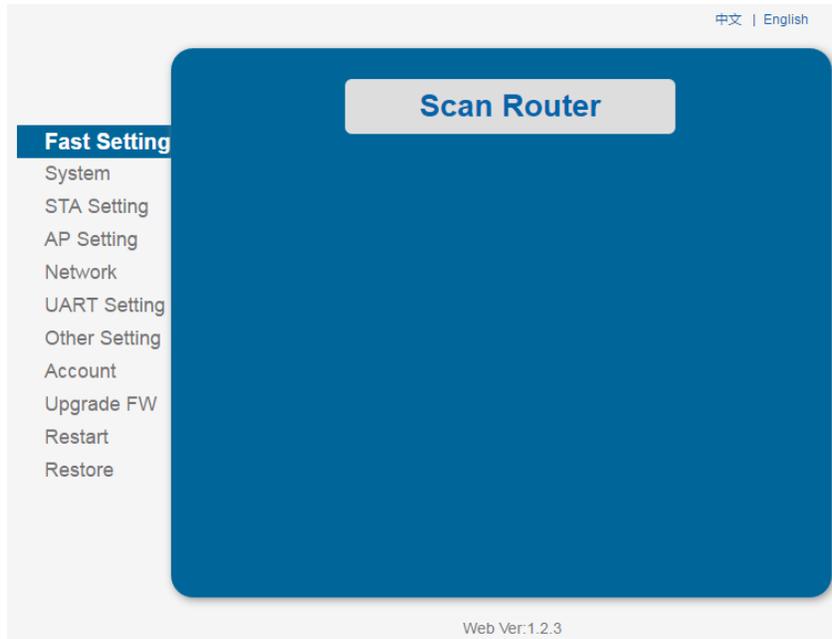

Figure 3: Fast Setting page (English)

Note: do not use the Fast Setting option, as this will turn off the SoftAP mode and make it more difficult to change any setting later.

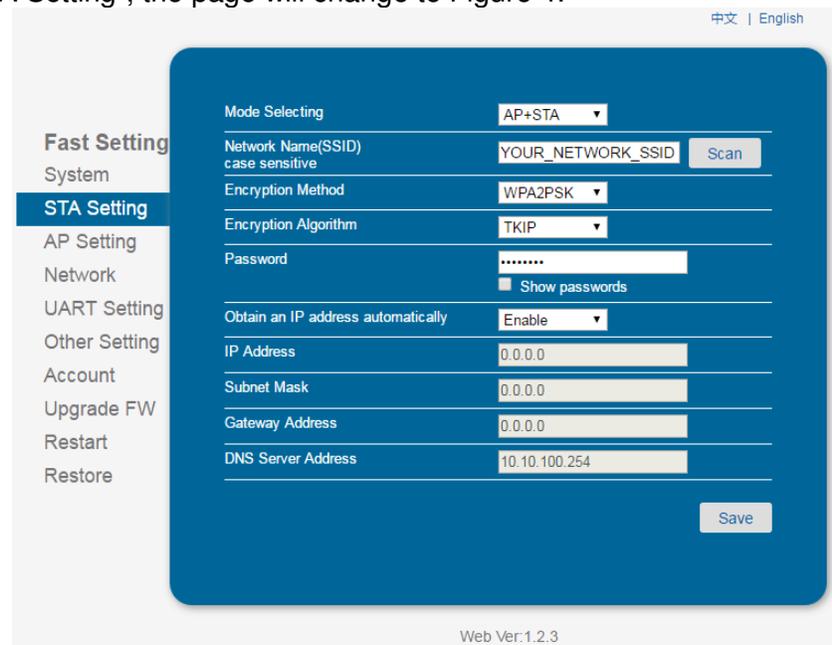5) Click on "STA Setting", the page will change to Figure 4:

Figure 4: STA Setting

Change the Mode Selection to "AP+STA", enter your router's SSID in the Network Name (SSID) box, select an Encryption Method ("WPA2PSK recommended, supported by all recent routers) and enter your router's password as shown in Figure 4. Leave other fields untouched.
Note: if you want later to set your Thunderbolt Monitor to a fixed (static) IP address, you will need to go back to this page and select "Disable" in the box named "Obtain an IP address automatically", and fill the other fields as desired.

6) Once you have verified that all the fields are as desired, click the "Save" button. The page will change to Figure 5.
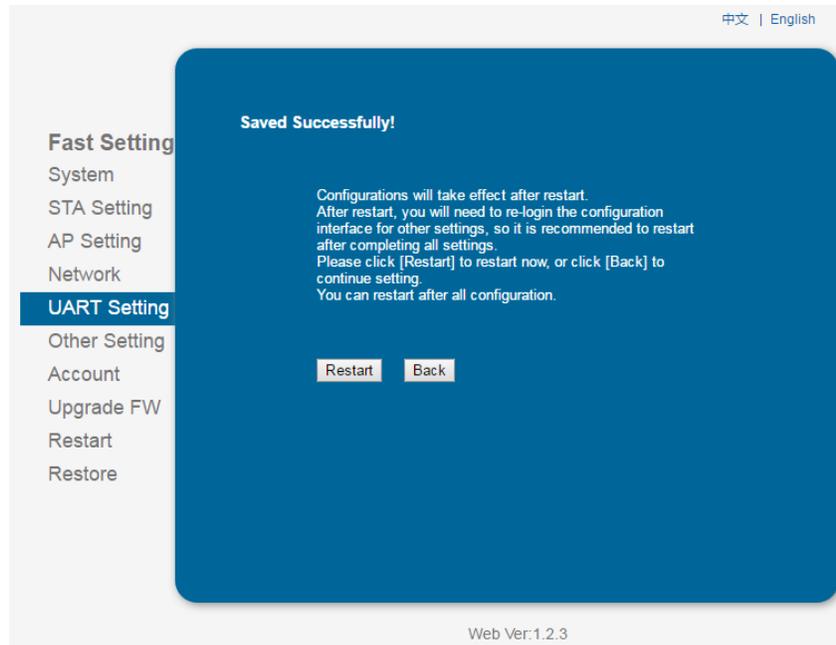

Figure 5: STA Settings changed

Click the "Restart" button, wait a few seconds and recycle power to the Thunderbolt Monitor kit to ensure a clean reboot.

As the kit reboots, the LCD display should show the WiFi module attempting to connect to your router and after a few seconds obtaining an IP address. The very first time, it may fail. This is not unusual as the first time a WiFi device is connected to a router, there is a fair amount of interaction taking place and the connection may time out before the setup completes. If so, simply recycle power again and the second time it should connect. If it does not, redo the steps from the beginning and verify all the information you enter. If you cannot get into the WiFi module Soft-AP web page, return the WiFi module to factory default (Reset WiFi via the menu) and perform the second procedure in this document.

Connecting the Thunderbolt Monitor kit to a WiFi access point:

The normal sequence when the WiFi module is enabled and properly configured is as follows: LCD indicates "Waiting for WiFi", then "Associating", then it displays the IP address.

If the LCD indicates "Command not OK" when booting and WiFi is enabled, this usually indicates that the WiFi module is not set for 9600 bauds.

The module may indicate "Waiting for WiFi" and "Associating" but displays "No IP address" but then "No IP from" followed by the SSID that is currently programmed into the WiFi module. That means that the WiFi module is not able to access that SSID. If so, verify logging info as described above.

> *Note: as of September 2017, the WiFi module that was used has become obsolete. The new module is a slightly different model that works largely the same way with a small difference: even if the module does not associate with your router, it may report obtaining an IP address of 10.10.10.254. If you see this address and yet the WiFi LED is not turned on, the module is not associated and most likely, the network settings are wrong. Therefore the only solid indication that the module is associated with your router is the WiFi LED. If the WiFi LED is not on, the IP address is bogus.*

The WiFi LED on the kit's main board should turn on when the WiFi module is connected to your router, and the AUX LED will turn on when the Thunderbolt kit has acquired the IP address. If the WiFi LED is ON, but the AUX LED does not turn ON after a few seconds (15 seconds at the most) and you do not see the IP address information, recycle power to the Thunderbolt Monitor kit.

Connecting the Thunderbolt Monitor kit to LadyHeather:

Please note that the WiFi module listens to TCP port 8899 for connections. This is the port number you will have to use with Lady Heather.

A typical shortcut to start LadyHeather as a TCP client is:
`""C:\Program Files\Heather\heather.exe" /ip=192.168.1.24:8899"`
Simply replace the IP address as needed.

When the kit is being accessed by a Lady Heather client via WiFi, the AUX LED will blink at the rate of data sent to the WiFi module. Note that the rate may seem to be irregular. This is normal.

Also note that the kit supports only one connection from Lady Heather clients at a time. The main reason is that Lady Heather sends commands in addition to listening to the default packets sent by the Thunderbolt. More than one client sending commands will overwhelm the serial port connecting the WiFi module to the microcontroller on the Thunderbolt Monitor kit.

You can use the kit's menu to view the IP address that was assigned to the Thunderbolt Monitor. The details of operation of the Lady Heather software is beyond the scope of this manual.

Resetting the WiFi module:

In case of persistent problem, the WiFi module may need to be reset to factory settings using the kit's menu ("Reset WiFi") , then re-initialized using the steps described in the second part of this document.

Configuration steps (with WiFi module factory reset):

After a WiFi Reset command, you need to redo steps 1 through 6 above with the following changes and additions:

In step 2, the WiFi module comes up as USR-WIFI232-T, connect to it and perform steps 1 through 5 as above.

Once the module has rebooted, reconnect to it and now go to the "UART Setting" page and change the Baud Rate to 9600 per Figure 6
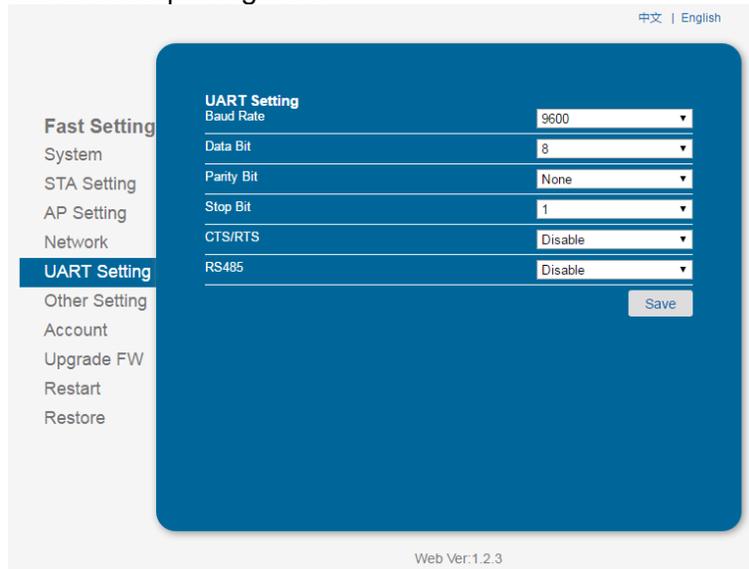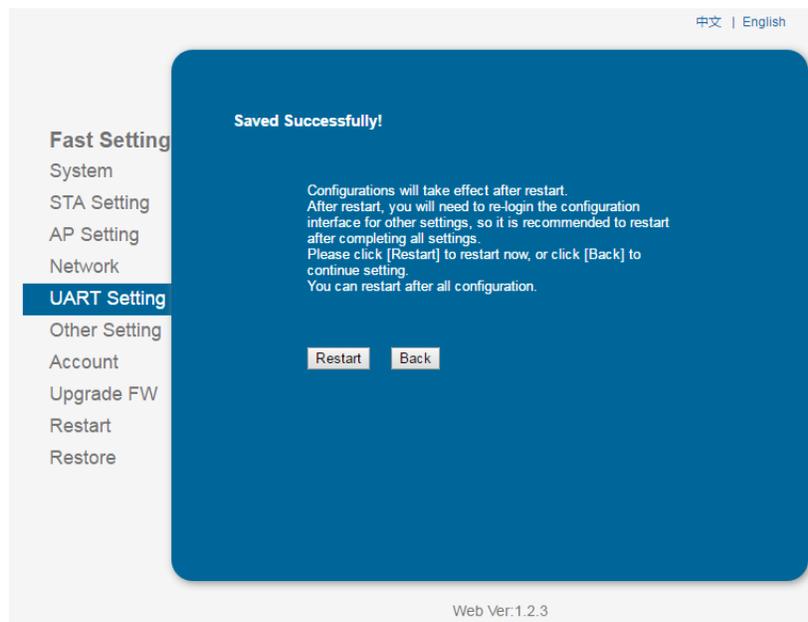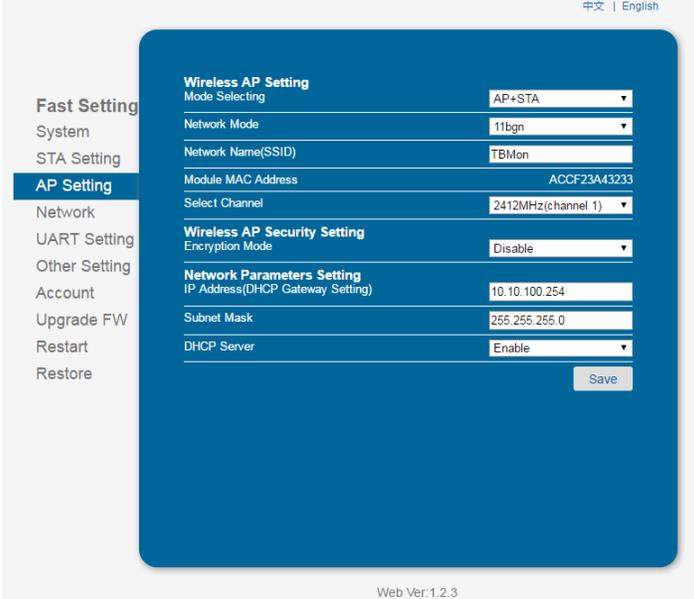

Figure 6: UART Settings

Click Save

Figure 7: Saved Settings

When the web page changes (Figure 7), click Back

Change to the "AP Setting" page.

Figure 8: AP Settings

In "Wireless AP Setting", make sure that "AP+STA" is selected. Change "Network Name" to "TBMon"

Click Save

Recycle power to the TboltMon kit. After a few seconds, the Associated LED should be lit and the LCD display will display the IP address assigned to the WiFi module. That is the information you will need to setup the Lady Heather software.

Note: When the WiFi module is powered up the first time after configuration, it may take 30 seconds or more before the Associated LED turns ON. This is a function of the WiFi router.

Manual versions

V4.2.2 (August 27, 2017): Fix issue with GPS Week rollover and issue with WiFi module