TFTP Firmware Flash

Requirements

- USB to TTL cable (see picture below for connectivity)
- A working serial interface like PuTTY or Tera Term (set speed to 115200 baud)
  - If using PuTTY, here is a pre-built profile to use for the serial connection
- A TFTP Server running on a client workstation connected to the WRT1900AC via LAN (such as TFTP32
  - A pre-built TFTP32 config file can be found here and must be placed in the TFTP root folder with the executable
    - You will need to customize the *Base Directory* [BaseDirectory=D:\TFTP\FLASH] to reflect your directory where the image file is located
- TFTP Server LAN configured with IP Address 192.168.1.20
- The firmware to load is in the TFTP Server ready for download.
  - Your image file directory must not contain any spaces
    - For example, *D:\TFTP**Image-Directory**\image-name.img*
- The PuTTY pre-built profile is a registry key, so I've also uploaded the same as a text file; all three files (tftp32.ini, serial.reg, serial.txt) can be found here

Instructions

1. With router off, connect USB to TTL cable to router serial port & PC
   - *This assumes you've installed the USB-TTL drivers and set correct COM port & BAUD rate*
2. Manually set your LAN IP to subnet 192.168.1.20/24 [255.255.255.0]
3. Load Serial profile in PuTTY (should be a blank terminal window) & open TFTP server
4. Boot WRT1900AC (should see u-boot output in terminal window)
5. At the 3 second interrupt boot delay, press any key

U-Boot Commands

- *the **exact** name of the firmware image must be input*
- *If you want to be 100% sure you're running a firmware image, flash the firmware to both the primary and secondary image locations by substituting:*
  - **run update_both_images** *in place of* **run flash_pri_image**

```
setenv firmware_name firmware_image_name.img

setenv ipaddr 192.168.1.1

setenv netmask 255.255.255.0

setenv serverip 192.168.1.20

run flash_pri_image

OR

run update_both_images
```

Serial Port

Header

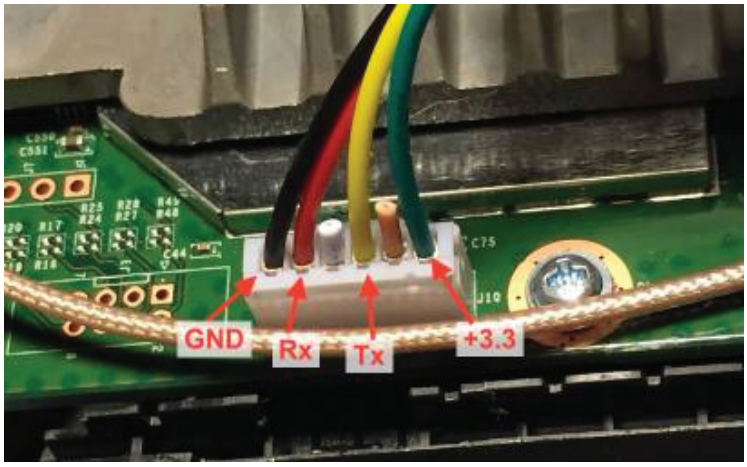
- Serial Port is labeled **J1** on the board and utilizes a **JST PH 6 pin** connector with a **2.0mm pitch**
- The more common 2.54mm pitch connectors will not fit properly - this includes the female connectors on popular USB-TTL adapters; however, removing the plastic casing from 2.54mm female connectors allows for a stable enough connection in a pinch.

Pin Out

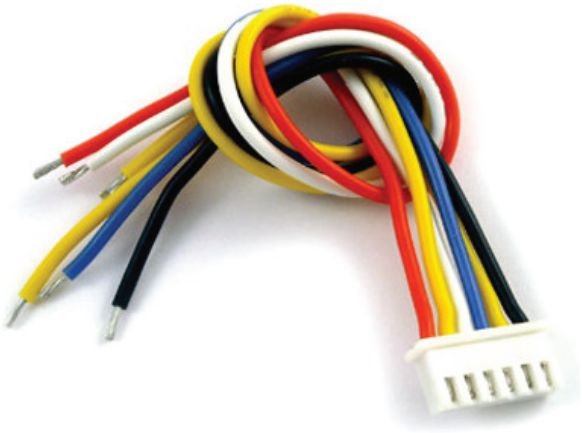
Pin1	Pin2	Pin3	Pin4	Pin5	Pin6
GND	*RX*	*?*	*TX*	*?*	*+3.3v*

Photos

Serial Header w/attached JST PH6 cable



Typical JST PH6 cable



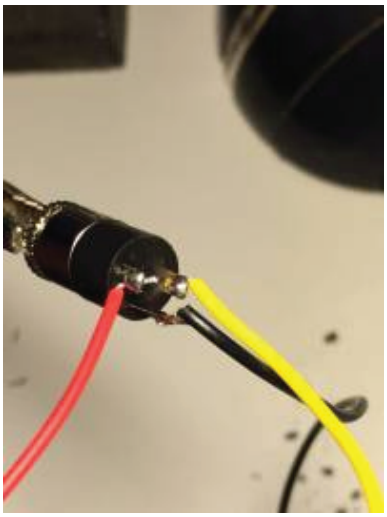
- While the picture above shows leads 3 & 5 cut, it's **not** recommended to do so so. De-pinning the leads would be recommended.
  - De-pinning
    - use a small pick tool or paperclip to release the metal lock tab located on the top or bottom of the pin inside the plastic header. Depending on the stylefo terminal used in the header, the lock tab will accessible either from the back most likely or from (t not common) n of the terminal lead

3.5mm Jack

- One example of a simple connection is the use of a 3.5mm stereo headphone jack, like the Philmore 504K [shown below] or a USB-TTL AJ (Audio Jack) cable. Avoid using any 3.5mm jack smaller than this type, as there will not be sufficient threads for the nut that holds the jack to the casing.
  - *There are number of different versions of the 3.5mm female jack, some are barrel shaped like the Philmore, others are square shaped; some have terminals that point vertically, while others have terminals that point horizontally (it's user preference as to which one to use).*
    - *Female 3.5mm terminal jacks come in 6 types, 1 pin through 6 pin.* ***The one purchased must be at least a 3 pin.***
  - A number of companies sell pre-made USB-TTL AJ cables; of which, Pin 2 (Rx) will be the tip of the 3.5mm jack, and Pin 3 (Tx) will be the ring on the 3.5mm jack, and Pin 5 (Gnd) will be the Ground connector on the 3.5mm.
    - *Inside the upper black housing, next to the antenna connector on the right side (front) of the unit, there is space for the 3.5mm socket.*
    - *On the inside of this housing, there are several ridges top to bottom, using a diagonal cutter you can easily trim one of these off to make space for this connector.*
    - *A 1/4" hole in the housing will let this mount easily.*
  - For final assembly, be sure to insulate your connections on the 3.5mm jack; adhesive lined heat-shrink tubing around the soldered connection would be ideal for this.
    - *While regular shrink tubing will work, adhesive lined provides strong stability to the joint it covers due to the thicker wall & rigidity from the adhesive once cured.*

Photos

Philmore 504K



Finished Connection

Arduino

You can also use a RS-232 Serial to USB-TTL converter (MAX3232 below) or an Arduino.

VCC 3.3v	RX	RX	GND
+3.3v	*Pin0*	*Pin1*	*GND*

- Arduino

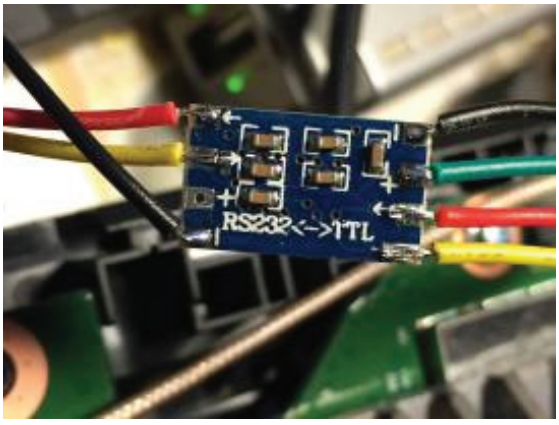
MAX232 RS-232

- The MAX3232 RS-232 Line Driver chip can be purchased as a breakout board from a number of sources, an example of this is shown below.
  - This chip will convert the TTL level RS-232 signals to the standard 12v voltage used by most RS-232 interfaces.

Photos

MAX3232 Board

Underside of MAX3232



- Boards will differ on exact connections, just be sure you connect the TTL side to the WRT1900AC, and the RS-232 side to your external connector.