

TM-AC1900 Router Can Be Flashed Over To Asus RT-AC68U To Support 3rd Party Firmware

<https://slickdeals.net/f/7193262-t-mobile-personal-cellspot-ac-router-by-asus-free-for-postpaid-25-deposit?v=1>

https://www.youtube.com/watch?v=E_giMfTYIzI

Please note warranty disclaimers for use of this guide at end of document.

12/03/2016: beginning with T-Mobile firmware 3.0.0.4.376_3169_g21 on T-Mobile AC1900, flashing to the original US CFE for ARM RT-AC68U 1.0.2.0 using MTD-Write v2 and using Rescue/Recovery/Restore Mode and the MiniCFE webpage (image below) to successively flash firmware for T-Mobile 3.0.0.4_376_1703, Asus RT-AC68U 376.3626, and Asus RT-AC68U Merlin 380.63_2. Instructions with ~~strike-through~~ seemed most appropriate for this process, but may be relevant to other configurations.



OUTLINE OF PROCESS

- 1) If you are running T-Mobile firmware version 3.0.0.4.376_3108 or earlier you must DOWNGRADE the firmware to T-Mobile firmware version .1703 (to enable Telnet)
- 2) Extract CFE bootloader and copy/paste MAC addresses and WPS code into Retail Asus CFE. (1.0.2.0 retail is probably the best one to use)
- 3) Flash Asus CFE
- 4) Then flash your choice of firmware using ~~Asus Restore Utility~~ or MiniCFE webpage

PROCESS 1: DOWNGRADING FIRMWARE TO V3.0.0.4 376.1703

- 1) Disconnect the router from the network/internet, only 1 wired Ethernet cable should be plugged into any LAN port, DO NOT do any firmware related flashing via WIRELESS
- 2) Restore FACTORY DEFAULTS of the Router, this should set the IP of the router to 192.168.29.1
- 3) Set your computer to use a static IP of 192.168.29.88
- 4) Place router into Rescue/Recovery/Restore Mode
 - a) Turn power off to the router by disconnecting the power cable
 - b) Wait 10 seconds
 - c) Press and Hold the Reset button
 - d) Restore power to router while continuing to hold Reset button
 - e) Continue to hold Reset button for 8 seconds while entering 192.168.29.1 on browser
 - f) Wait for MiniCFE webpage to appear
- 5) Flash the T-Mobile firmware version 3.0.0.4_376_1703 TRX file using the "~~Asus Firmware Restoration Tool~~" or "MiniCFE webpage." Continue to hold Reset button while flashing custom firmware
 - a) TM-AC1900_3.0.0.4_376_1703-g0ffdbba.trx
- 6) Wait 5 mins
- 7) Perform NVRAM RESET
 - a) Turn power off to the router by disconnecting the power cable
 - b) Wait 10 seconds
 - c) Press and hold the WPS button
 - d) Restore power to router while continuing to hold WPS button
 - e) Continue to hold WPS button for 20 seconds then let go
- 8) Wait 5 mins
- 9) The firmware should now be downgraded and you can verify by logging into the router and checking the firmware version through the web browser interface.

PROCESS 2A: ENABLING TELNET AND FLASHING CFE

- 1) Considering you are on T-Mobile firmware version 1703, RESTORE FACTORY DEFAULTS
- 2) Login to the router using the web browser and navigate to the ADMINISTRATION > SYSTEM> ENABLE TELNET> YES (then apply and save settings)
- 3) Switch to Engineer's CFE Flashing Guide; I recommend using CFE 1.0.2.0 and MTD Write v2.

ENGINEER'S NEW CFE FLASHING GUIDE:

<https://slickdeals.net/forums/showpost.php?p=73690012&postcount=3895>

- ❖ Obtain a USB flash drive and note the name (including case) of the USB drive using a PC
- ❖ Download all necessary CFE files and utilities to edit the and flash the new CFE
 - Copy the uncompressed mtd-write file to the USB flash drive
 - Copy the downloaded uncompressed CFE to the USB flash drive
 - Navigate to the USB flash drive (My Computer) and rename the downloaded CFE.bin file to new_cfe.bin (Right Click - Rename)
- ❖ Manually set a static IP address on the PC and enable the Telnet utility
 - <http://www.howtogeek.com/howto/19249/how-to-assign-a-static-ip-address-in-xp-vista-or-windows-7/>
 - If using T-Mobile firmware: Set PC to 192.168.29.2 (Router will be 192.168.29.1 by default)
 - ~~If using Asus firmware: Set PC to 192.168.1.2 (Router will be 192.168.1.1 by default)~~
 - Telnet 192.168.29.1 <Enter> for TM firmware
 - ~~Telnet 192.168.1.1 <Enter> for Asus firmware~~
 - Enter your login and password for your router (default admin / admin)

PROCESS2B: ENGINEER'S NEW CFE FLASHING GUIDE

- ❖ Connect to router using Telnet and save copy of original CFE from the router to the USB flash drive
 - **cd /mnt/**
 - **ls**
 - **cd <USB NAME>**
 - **cat /dev/mtd0 > original_cfe.bin**
 - **ls**
- ❖ Perform NVRAM Reset
 - Turn power off to the router
 - Wait 10 seconds
 - Press and hold the WPS button
 - Restore power to router while continuing to hold WPS button
 - Continue to hold WPS button for 15-20 seconds

PROCESS2B: ENGINEER'S NEW CFE FLASHING GUIDE

- Plug the USB flash drive into a USB port on the back of router (**NOTE:** black USB 2.0 port recommended)
- Connect PC Ethernet port to one of router's LAN ports using a CAT 5e/6 cable
- Open a browser and navigate to the router's GUI (enter router's respective IP address into browser's address bar). Login to router.
- Enable router Telnet: <Administration><System><Enable Telnet><Apply>
- Open DOS prompt on PC and Telnet into router (see section 3 above for Telnet command syntax)
- Save existing CFE onto USB stick: `cat /dev/mtd0 > /tmp/mnt/USB_NAME/original_cfe.bin`
<Enter> Replace USB_NAME with USB flash drive name noted from Section 1
- Verify original_cfe.bin is stored on USB: `ls /tmp/mnt/USB_NAME/` <Enter>. original_cfe.bin should be listed
- After a 10 second wait, remove USB flash drive from router

PROCESS2B: ENGINEER'S NEW CFE FLASHING GUIDE

- ❖ Edit and save the new CFE version (from step 2) with values from original CFE (from step 4) using a hex editor
 - **NOTE:** There are three (3) MAC addresses in the original CFE that must be copied to the new CFE. Search for 'mac' in the original and new CFE files. Each 'mac' search will respond with XX:XX:XX:XX:XX:XX. The original XX:XX:XX:XX:XX:XX will be copied and pasted over the new CFE's XX:XX:XX:XX:XX:XX at the same point. This will be done three times to copy all entries of the MAC address. The WPS code can be found by searching for 'secret'. Once found in both original and new CFE, the secret code numbers can be copied and pasted over the new CFE file's secret code numbers. **NOTE:** the first two of the MAC addresses may be the same with the third one being different. This is normal.
 - Plug the USB flash drive into a USB port on the PC
 - Navigate to the USB flash drive. At this point, you should have both **original_cfe.bin** and **new_cfe.bin** on your USB flash drive.
 - Open up HxD Hex Editing Software (from Section 2)
 - Open up the **original_cfe.bin** file from the USB flash drive using the HxD software (File - Open)
 - Open up the **new_cfe.bin** file from the USB flash drive using the HxD software (File - Open). You should have two tabs listed on the HxD software, one labeled **new_cfe.bin** and the other labeled **original_cfe.bin**
 - **First MAC search and replace**
 - From the **original_cfe.bin** tab, search (<CTRL><F>) for 'mac' (no quotes). It should find something like this: et0macaddr=XX:XX:XX:XX:XX:XX (XX will be replaced by your mac address)
 - Highlight the XX:XX:XX:XX:XX:XX just found and copy (<CTRL><C>)
 - From the **new_cfe.bin** tab, search (<CTRL><F>) for 'mac' (no quotes). It should find something like this: et0macaddr=XX:XX:XX:XX:XX:XX (XX will be replaced by your mac address)
 - Highlight the XX:XX:XX:XX:XX:XX just found and now paste the value copied above over it (<CTRL><V>). The XX:XX:XX:XX:XX:XX value from copied from the **original_cfe.bin** tab should overwrite the value just found and highlighted in the **new_cfe.bin** tab

PROCESS2B: ENGINEER'S NEW CFE FLASHING GUIDE

➤ **Second MAC search and replace**

- From the **original_cfe.bin** tab, search again (F3>) for 'mac' (no quotes). It should find something like this: **macaddr=XX:XX:XX:XX:XX:XX** (XX will be replaced by your mac address)
- Highlight the XX:XX:XX:XX:XX:XX just found and copy (<CTRL><C>)
- From the **new_cfe.bin** tab, search again (<F3>) for 'mac' (no quotes). It should find something like this: **macaddr=XX:XX:XX:XX:XX:XX** (XX will be replaced by your mac address)
- Highlight the XX:XX:XX:XX:XX:XX just found and now paste the value copied above over it (<CTRL><V>). The XX:XX:XX:XX:XX:XX value from copied from the **original_cfe.bin** tab should overwrite the value just found and highlighted in the **new_cfe.bin** tab

➤ **Third MAC search and replace**

- From the **original_cfe.bin** tab, search again (F3>) for 'mac' (no quotes). It should find something like this: **macaddr=XX:XX:XX:XX:XX:XX** (XX will be replaced by your mac address)
- Highlight the XX:XX:XX:XX:XX:XX just found and copy (<CTRL><C>)
- From the **new_cfe.bin** tab, search again (<F3>) for 'mac' (no quotes). It should find something like this: **macaddr=XX:XX:XX:XX:XX:XX** (XX will be replaced by your mac address)
- Highlight the XX:XX:XX:XX:XX:XX just found and now paste the value copied above over it (<CTRL><V>). The XX:XX:XX:XX:XX:XX value from copied from the **original_cfe.bin** tab should overwrite the value just found and highlighted in the **new_cfe.bin** tab

➤ **Now, a double check for accuracy**

- From each tab, press <F3> (Search again) one more time and verify that HxD displays the window "Can't find mac". This insures that you have copied all three (3) instances of the MAC address from your original CFE to your new CFE. It is recommended to go back to the top of each file and search and compare the three (3) 'mac' address values again for accuracy.

PROCESS2B: ENGINEER'S NEW CFE FLASHING GUIDE

➤ **WPS code (secret code) copy**

- From the **original_cfe.bin** tab, search (<CTRL><F>) for 'secret' (no quotes). It should find something like this: **secret_code=XXXXXXXX** (XXXXXXXX will be replaced by your WPS eight (8) digit code)
- Highlight the XXXXXXXX just found and copy (<CTRL><C>)
- From the **new_cfe.bin** tab, search (<CTRL><F>) for 'secret' (no quotes). It should find something like this: **secret_code=XXXXXXXX** (XXXXXXXX will be replaced by your WPS eight (8) digit code)
- Highlight the XXXXXXXX just found and now paste the value copied above over it (<CTRL><V>). The XXXXXXXX value from copied from the **original_cfe.bin** tab should overwrite the value just found and highlighted in the **new_cfe.bin** tab
- Verify that the secret_code value from the original CFE tab was copied properly to the new CFE tab

➤ **Save the final results**

- From the **new_cfe.bin** tab, save the file (File - Save). Your edited **new_cfe.bin** file should now be saved to the USB flash drive
- Close HxD
- After a 10 second wait, remove the USB flash drive from the PC

PROCESS2B: ENGINEER'S NEW CFE FLASHING GUIDE

- ❖ Flash the newly edited CFE using the flashing utility from the USB flash drive
 - Plug the USB flash drive into a USB port on the back of router (**NOTE:** black USB 2.0 port recommended)
 - Perform NVRAM RESET
 - Turn power off to the router by disconnecting the power cable
 - Wait 10 seconds
 - Press and hold the WPS button
 - Restore power to router while continuing to hold WPS button
 - Continue to hold WPS button for 20 seconds then let go
 - Open a browser and navigate to the router's GUI (enter router's respective IP address into browser's address bar). Login to router.
 - Enable router Telnet: <Administration><System><Enable Telnet><Apply>
 - Open DOS prompt on PC and Telnet into router
 - Navigate to the USB flash drive using the following command: **cd /tmp/mnt/USB_NAME/**
<Enter>
 - Verify that your **new_cfe.bin**, **original_cfe.bin** and **mt-d-write** files are on the USB flash drive by typing: **ls <Enter>**
 - Verify that your MAC Address edits worked with the following command: **grep mac ./original_cfe.bin ./new_cfe.bin**. If the results don't match, STOP and recheck your work (Hex editor)
 - Verify that the WPS Secret Code edits worked with the following command: **grep secret ./original_cfe.bin ./new_cfe.bin**. If the results don't match, STOP and recheck your work (Hex editor)

PROCESS2B: ENGINEER'S NEW CFE FLASHING GUIDE

- Flash the new CFE file with one of the commands depending on version of mtd-write downloaded in Section #2
 - ~~mtd-write version 1: mtd-write new_cfe.bin boot <Enter>~~
 - mtd-write version 2: **mtd-write -i new_cfe.bin -d boot <Enter>**
 - ~~mtd-write version 3: mtd-write new_cfe.bin boot <Enter>~~
 - **NOTE: if all files are listed properly with the ls command but the router responds with "sh: mtd-write: not found" error when typing the mtd-write command, add a ./ in front of the mtd-write command and try again. This has corrected the issue).**
- Wait for the 5 to 10 second pause to complete and come back to the Telnet command prompt
- Reboot the router by typing the following command: **reboot <Enter>**. The router may also be rebooted by turning Off and then back On (about 5 seconds).
- ❖ Reset router defaults and verify new CFE version
 - **Perform NVRAM RESET**
 - Turn power off to the router by disconnecting the power cable
 - Wait 10 seconds
 - Press and hold the WPS button
 - Restore power to router while continuing to hold WPS button
 - Continue to hold WPS button for 20 seconds then let go
 - **Verification of CFE (after reboot)**
 - Open a browser and navigate to the router's GUI (enter router's respective IP address into browser's address bar). Login to router.
 - Enable router Telnet: <Administration><System><Enable Telnet><Apply>
 - Open DOS prompt on PC and Telnet into router
 - Enter the following command to verify CFE version: **nvramp get bl_version <Enter>**. The revision should now match the version that you downloaded in Section #2.

PROCESS 3: FLASHING YOUR CUSTOM FIRMWARE

- 1) Set Static ip of 192.168.29.88 for your PC if router is using T-Mobile firmware (~~or Static IP of 192.168.1.88 if on retail asus firmware or custom firmware~~)
- 2) Perform NVRAM RESET
 - a) Turn power off to the router by disconnecting the power cable
 - b) Wait 10 seconds
 - c) Press and hold the WPS button
 - d) Restore power to router while continuing to hold WPS button
 - e) Continue to hold WPS button for 20 seconds then let go
- 3) Wait 5 mins for router to fully boot
- 4) Place router into Rescue/Recovery/Restore Mode
 - a) Turn power off to the router by disconnecting the power cable
 - b) Wait 10 seconds
 - c) Press and Hold the Reset button
 - d) Restore power to router while continuing to hold Reset button
 - e) Continue to hold Reset button for 8 seconds while entering 192.168.29.1 on browser
 - f) Wait for MiniCFE webpage to appear
- 5) Flash your custom firmware using the "~~Asus Firmware Restoration Tool~~" or "MiniCFE webpage."
Continue to hold Reset button while flashing custom firmware
 - a) MUST flash to a firmware that will expand your rootfs partition from 32M to 64M first
 - b) Asus 376.3626 is recommended
- 6) Wait 5 minutes
- 7) Unplug the power from the router for 10 seconds
- 8) Plug in the power and wait 180 seconds

PROCESS 3: FLASHING YOUR CUSTOM FIRMWARE

- 9) Perform NVRAM RESET
 - a) Turn power off to the router by disconnecting the power cable
 - b) Wait 10 seconds
 - c) Press and hold the WPS button
 - d) Restore power to router while continuing to hold WPS button
 - e) Continue to hold WPS button for 20 seconds then let go
- 10) Wait 5 mins
- 11) Change your computer IP from Static to DHCP
- 12) Login to the router and enjoy your new firmware, the router's IP is now most likely 192.168.1.1.

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