



AMD Instinct™ MI200 Accelerator IFWI Update Tool - AMD FW Flash

User Guide

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I Introduction

This document provides step-by-step instructions for updating IFWI (Integrated Firmware Image) using the AMD FW Flash tool (`amdfwflash`) on the AMD Instinct™ MI200 server platforms.

This user guide is for users who have the following AMD Instinct™ MI200 GPUs and want to upgrade IFWI.

- AMD Instinct™ MI210
- AMD Instinct™ MI250/MI250X

This version of the tool ships with three update versions of IFWI: mu1 (maintenance update1), mu2 (maintenance update2), mu3 (maintenance update3) and the ga version. mu3 is the latest IFWI and the tool by default updates the IFWI to mu3.

The tool also provides capability to update your IFWI to a desired level. For example if there is a need to update your MI200 platform to mu1 or mu2 from the ga, then this can also be done. Steps to do so are documented below.

Caution:

The AMD FW Flash tool may behave differently when used in a virtual machine or guest Operating System, and its configuration may not be supported.

2 Getting Started

Prior to updating the IFWI, follow the instructions below:

- Identify the server with the AMD Instinct™ MI200 accelerator(s) requiring an IFWI update or GPU replacement.
- Ensure that you have the appropriate login credentials for the server.
Note: To execute the firmware update tool, you **must** have `sudo` or `root` permissions on the server.
- To access the system console, make sure you have access to the BMC/IPMI interface.
- Ensure network access to the AMD FW Flash tool repository, "repo.radeon.com".
- Ensure that all applications are closed prior to launching the tool and that no Operating System (OS) updates are pending in the background. Notify server users about the server maintenance for IFWI update.

Note: It is strongly recommended to run the IFWI tool update from the system console, and not on the network. This prevents any network interruption and loss of connection.

3 Commands

AMD FW Flash utility supports multiple flags and options to update the FWs.

3.1 Help

Flag/Option

`--help/-h [switch]`

Description

Displays the help text for all switches along with the description of the tool.

`[switch]` is optional.

- When `[switch]` is specified, the help for the specified switch is displayed.
- When `[switch]` is not specified, the complete help is displayed.

Figure 3–1 SUDO/AMD FW Flash `--help` Generic Options

```
Generic options:
--version                Show the version of the binary.
                        Usage:
                        --version

-h [ --help ] [=arg(=ALL)] Displays this help text if no argument is
                        specified. If an argument is specified
                        then the help for the specified command
                        is shown.
                        Usage:
                        --help/h/?
                        --help/h/? <command>: --help
                        debug-log-filepolicy

--? [=arg(=ALL)]         Displays this help text if no argument is
                        specified. If an argument is specified
                        then the help for the specified command
                        is shown.
                        Usage:
                        --help/h/?
                        --help/h/? <command>: --help
                        debug-log-filepolicy

--quiet                  Work silently without showing any
                        information on the console. Can be used
                        along with any command.
                        Usage:
                        --quiet

--accept-EULA            Accept the EULA agreement. You can see
                        the EULA by --show-EULA.
                        Usage:
                        --accept-EULA

-e [ --show-EULA ]       Shows the EULA for the tool
                        Usage:
                        --show-EULA
```

Figure 3–2 SUDO/AMD FW Flash `--help` Common Tool Options

```
Common tool Options:
-l [ --list-devices ] [=arg(=1 )] Lists all devices

Command line switches for the flash capability:
-u [ --update-ifwi ]      This flag instructs the tool to update
                        IFWI of all applicable ASICs to the
                        latest IFWI provided along-with the tool.
                        Usage:
                        -u/--update-ifwi

-r [ --rollback-ifwi ]   This flag instructs the tool to roll back
                        the IFWI of all applicable ASICs to the
                        last known good IFWI provided along-with
                        the tool.
                        Usage:
                        -r/--rollback-ifwi
```

3.2 List Devices

Flag/Option

`--list-devices/-l`

Description

This command performs the following functions:

- Informs the tool to show the available ASICs along with the SPIROM model and respective part numbers.
- Indicates whether an IFWI update is available or not.
- When the tool is executed without a command line, the switches display the devices by default.

The following figure lists the dGPU device information whether an appropriate IFWI update is available or not.

Figure 3–3 SUDO/AMD FW Flash --list-devices

SNo	BDF	DIO	ASIC	SPIROM	Size	Test	BIOS P/N	IFWI Update Available
0	0000:29:00.0	740c	MI200 (H)	SST26VF016B	0x200000	Pass	113-D65209-063	Yes
1	0000:2c:00.0	740c	MI200 (S)	SST26VF016B	0x200000	Pass	113-D65209-063	Yes
2	0000:2f:00.0	740c	MI200 (H)	SST26VF016B	0x200000	Pass	113-D65209-063	Yes
3	0000:32:00.0	740c	MI200 (S)	SST26VF016B	0x200000	Pass	113-D65209-063	Yes
4	0000:ad:00.0	740c	MI200 (H)	SST26VF016B	0x200000	Pass	113-D65209-063	Yes
5	0000:b0:00.0	740c	MI200 (S)	SST26VF016B	0x200000	Pass	113-D65209-063	Yes
6	0000:b3:00.0	740c	MI200 (H)	SST26VF016B	0x200000	Pass	113-D65209-063	Yes
7	0000:b6:00.0	740c	MI200 (S)	SST26VF016B	0x200000	Pass	113-D65209-063	Yes

Note: If the amdgpu driver is loaded, the following message is displayed:

The tool has detected that the amdgpu driver is loaded. You need to unload the amdgpu driver before using this application. Kindly refer to the README.txt for steps to unload/blacklist the amdgpu driver.

4 Instructions

To update the IFWI on AMD Instinct™ MI200 Accelerator(s) or when replacing the AMD Instinct™ MI200 Accelerator(s) on a server, configure the system for the IFWI maintenance. Once the system is configured for firmware maintenance, execute the `amdfwflash` command to update or rollback the IFWI to a desired version.

4.1 Configuring the System for IFWI Maintenance or AMD Instinct™ MI200 Replacement

4.1.1 Installing the AMD FW Flash Tool

1. The AMD FW Flash tool repository for Linux is located at:
(repo.radeon.com/fwupdator/amdfwflash/latest).
2. Login to the server with the MI200 GPUs requiring an IFWI update.
\$ ssh user@mi200_server
3. Setup the AMD FW Flash tool package repository.
Setup Ubuntu OS apt repo

```
wget -q -O - https://repo.radeon.com/fwupdator/amdfw.gpg.key | sudo apt-key add -
```

```
echo 'deb [arch=amd64] https://repo.radeon.com/fwupdator/amdfwflash/latest/deb/ ubuntu main' | sudo tee /etc/apt/sources.list.d/amdfwflash.list
```

Setup RHEL 8 or RHEL 9 yum repo

```
echo -e '[amdfwflash]\nname=amdfwflash\nenabled=1\nautorefresh=0\ngpgkey=https://repo.radeon.com/fwupdator/amdfw.gpg.key\nbaseurl=https://repo.radeon.com/fwupdator/amdfwflash/latest/rpm\ngpgcheck=1' | sudo tee /etc/yum.repos.d/amdfwflash.repo
```

Setup SLES 15 SP3 or SP4 zypper repo

```
echo -e '[amdfwflash]\nenabled=1\nautorefresh=0\ngpgkey=https://repo.radeon.com/fwupdator/amdfw.gpg.key\nbaseurl=https://repo.radeon.com/fwupdator/amdfwflash/latest/rpm\ntype=rpm-md\ngpgcheck=1' | sudo tee /etc/zypp/repos.d/amdfwflash.repo
```
4. Update the AMD FW Flash tool package repository.
Ubuntu OS

```
sudo apt update
```

To verify, search **amdfwflash** package:

```
sudo apt search amdfwflash
```

RHEL 8 or RHEL 9

```
sudo yum update
```

To verify, search **amdfwflash** package:

```
sudo yum search amdfwflash
```

SLES 15 SP3 or SP4

```
sudo zypper update
```

To verify, search **amdfwflash** package:

```
sudo zypper search amdfwflash
```

5. Install the AMD FW Flash tool package.

Ubuntu OS

```
sudo apt install amdfwflash
```

RHEL 8 or RHEL 9

```
sudo yum install amdfwflash
```

SLES 15 SP3 or SP4

```
sudo zypper install amdfwflash
```

6. Verify the AMD FW Flash tool package installation.

Ubuntu OS

```
dpkg -l | grep amdfwflash
```

RHEL 8, RHEL 9

```
rpm -qa | grep amdfwflash
```

SLES 15 SP3, or SLES 15 SP4

```
rpm -qa | grep amdfwflash
```

4.1.2 Configuring the System to Blacklist amdgpu Driver

1. Add the amdgpu driver to the blacklist.

Ubuntu OS

- `echo blacklist amdgpu | sudo tee /etc/modprobe.d/blacklist-amdgpu.conf`
- `sudo update-initramfs -u`

RHEL 8 or RHEL 9 Use grubby [2]

- `echo blacklist amdgpu | sudo tee /etc/modprobe.d/blacklist-amdgpu.conf`
- `sudo grubby --args "amdgpu.blacklist=1 rd.driver.blacklist=amdgpu" --update-kernel ALL`

For CentOS, use `modprobe.blacklist` instead of `rd.driver.blacklist` boot option in the above `grubby` command.

SLES 15 SP3 or SLES 15 SP4 (blacklist amdgpu, add iomem=relaxed param)

- `echo blacklist amdgpu | sudo tee /etc/modprobe.d/60-blacklist-amdgpu.conf`
- Append `iomem=relaxed` to the kernel boot parameters in `etc/default/grub/` file:

- `sudo sed -i 's/^GRUB_CMDLINE_LINUX_DEFAULT="/GRUB_CMDLINE_LINUX_DEFAULT="io mem=relaxed /' /etc/default/grub`
- Update the boot parameters and rebuild kernels to blacklist amdgpu driver:
 - `sudo grub2-mkconfig -o /boot/grub2/grub.cfg`
 - `sudo /usr/bin/dracut --force --regenerate-all`
- 2. Reboot the server for IFWI maintenance update or power off to replace the MI200 GPUs.


```
sudo reboot
```

or

```
sudo poweroff
```

Note: If there is a replacement of the AMD Instinct™ MI200 Accelerator in the system, power off the system.

Refer to the section [Updating and Rolling Back the AMD Instinct™ MI200 IFWI Version \(p. 12\)](#) to update or rollback the AMD Instinct™ MI200 IFWI to a desired version.

4.2 Updating and Rolling Back the AMD Instinct™ MI200 IFWI Version

Follow the below steps to update or rollback the AMD Instinct™ MI200 IFWI to a desired version.

4.2.1 Updating to the MI200 IFWI Maintenance Version

1. Login to the server's BMC/IPMI interface identified for IFWI update.
2. Launch the remote/virtual console on the server.
3. Login to the server.
4. Ensure that the amdgpu driver is not loaded.


```
lsmod | grep amdgpu
```
5. Run the amdfwflash utility to list the GPU devices.


```
sudo /opt/amdfwflash/sbin/amdfwflash --list-devices
```

Note: The output should list all the GPU devices in the system. If the output does not list all the GPU devices, contact customer care ([Customer Care \(p. 16\)](#)).
6. Execute the amdfwflash command to update the IFWI of all GPUs in the system to the MI200 IFWI Maintenance Update 2 (latest) version.


```
sudo /opt/amdfwflash/sbin/amdfwflash --update-ifwi or
sudo /opt/amdfwflash/sbin/amdfwflash --update-ifwi mu3
```
7. To update the IFWI of all GPU in the system to the MI200 IFWI Maintenance Update 2 version, do the following:


```
sudo /opt/amdfwflash/sbin/amdfwflash --update-ifwi mu2
```

-
- 8.** To update the IFWI of all GPU in the system to the MI200 IFWI Maintenance Update 1 version, do the following:

```
sudo /opt/amdfwflash/sbin/amdfwflash --update-ifwi mu1
```
 - 9.** Save the system log and console output to a file.

- 10.** The `amdfwflash` tool saves a copy of the old IFWI images under `/tmp` before updating the IFWI. Archive the generated IFWI images from `/tmp` folder for later reference.

```
tar cvf ifwi-backup.tar /tmp/amdfwflash/ifwi/backup
```

- 11.** Remove the `amdgpu` driver from blacklist.

Ubuntu OS

- `sudo rm /etc/modprobe.d/blacklist-amdgpu.conf`

RHEL 8 or RHEL 9 [2]

- `sudo rm /etc/modprobe.d/blacklist-amdgpu.conf`
- `sudo grubby --remove-args "amdgpu.blacklist=1 rd.driver.blacklist=amdgpu" --update-kernel ALL`

For CentOS, use `modprobe.blacklist` instead of `rd.driver.blacklist` boot option in the above `grubby` command.

SLES 15 SP3 or SLES 15 SP4

- `sudo rm /etc/modprobe.d/60-blacklist-amdgpu.conf`

Remove `iomem=relaxed` from the kernel boot parameters in `etc/default/grub/` file:

- `sudo sed -i 's/iomem=relaxed //' /etc/default/grub`

Update the boot parameters and rebuild kernels to remove blacklist:

- `sudo grub2-mkconfig -o /boot/grub2/grub.cfg`
- `sudo /usr/bin/dracut --force --regenerate-all`

- 12.** Reboot the server (an AC power cycle is recommended) to make the IFWI update effective.

```
sudo reboot
```

or

```
sudo ipmitool power cycle
```

- 13.** Refer to the section [Verifying the AMD Instinct™ MI200 IFWI Version \(p. 15\)](#) to complete the IFWI update. After a successful verification of the IFWI update, the server may resume normal operation.

4.2.2 Rolling Back to the MI200 GA IFWI Version

1. Login to the server's BMC/IPMI interface identified for IFWI update.
2. Launch the remote/virtual console on the server.
3. Login to the server.
4. Ensure that the `amdgpu` driver is not loaded.

```
lsmod | grep amdgpu
```

NOTE: If the output of the above command shows amdgpu listed, then stop and do not proceed. Check the OS settings to ensure amdgpu driver is blacklisted correctly and reboot the system. Repeat step 4.

5. Run the `amdfwflash` utility to list the GPU devices.

```
sudo /opt/amdfwflash/sbin/amdfwflash --list-devices
```

Note: The output should list all the GPU devices in the system. If the output does not list all the GPU devices, contact customer care [Customer Care \(p. 16\)](#).

6. Execute the `amdfwflash` command to roll back the IFWI of all GPUs to the GA version.

```
sudo /opt/amdfwflash/sbin/amdfwflash --rollback-ifwi
```

7. Run the `amdfwflash` to rollback to IFWI of all GPU to the mu2 version from mu3 version

```
sudo /opt/amdfwflash/sbin/amdfwflash --rollback-ifwi mu2
```

8. Run the `amdfwflash` to rollback to IFWI of all GPU to the mu1 version from mu2 version

```
sudo /opt/amdfwflash/sbin/amdfwflash --rollback-ifwi mu1
```

9. Save the system log and console output to a file.

10. The `amdfwflash` tool saves a copy of the old IFWI images under `/tmp` before updating the IFWI. Archive the generated IFWI images from `/tmp` folder for later reference.

```
tar cvf ifwi-backup.tar /tmp/amdfwflash/ifwi/backup
```

11. Remove the `amdgpu` driver from blacklist.

Ubuntu OS

- `sudo rm /etc/modprobe.d/blacklist-amdgpu.conf`

RHEL 8 or RHEL 9 [2]

- `sudo rm /etc/modprobe.d/blacklist-amdgpu.conf`
- `sudo grubby --remove-args "amdgpu.blacklist=1 rd.driver.blacklist=amdgpu" --update-kernel ALL`

For CentOS, use `modprobe.blacklist` instead of `rd.driver.blacklist` boot option in the above `grubby` command.

SLES 15 SP3 or SLES 15 SP4

- `sudo rm /etc/modprobe.d/60-blacklist-amdgpu.conf`
- Remove `iomem=relaxed` from the kernel boot parameters in `etc/default/grub` file:
 - `sudo sed -i 's/iomem=relaxed //' /etc/default/grub`
- Update the boot parameters and rebuild kernels to remove blacklist:
 - `sudo grub2-mkconfig -o /boot/grub2/grub.cfg`
 - `sudo /usr/bin/dracut --force --regenerate-all`

12. Reboot the server (an AC power cycle is recommended) to make the IFWI

update effective.

`sudo reboot`

or

`sudo ipmitool power cycle`

- 13.** Refer to the section [Verifying the AMD Instinct™ MI200 IFWI Version \(p. 15\)](#) to complete the IFWI update. After a successful verification of the IFWI update, the server may resume normal operation.

4.3 Verifying the AMD Instinct™ MI200 IFWI Version

1. Login to the system.
2. If the ROCm software is installed, run `rocm-smi --showhw` command to display the IFWI version under VBIOS column. The output should list all the GPU devices in the system. If the output does not list all the GPU devices, contact customer care [Customer Care \(p. 16\)](#).

```
/opt/rocm/bin/rocm-smi --showhw
```

Note: If your environment has backlisted the `amdgpu` driver for normal operation, run the following command to load the driver before executing `rocm-smi`.

```
sudo modprobe amdgpu
```

3. If the `amdgpu` driver is blacklisted, run the `amdfwflash` utility to list all the GPU devices.

```
sudo /opt/amdfwflash/sbin/amdfwflash --list-devices
```

Note: Please refer to the command [List Devices \(p. 9\)](#) section.

4. Ensure that all MI200 GPUs have the same updated IFWI version.

Note: In the event of a console output error, contact customer care [Customer Care \(p. 16\)](#).

After a successful verification of the IFWI update, the server may resume normal operation.

4.4 Uninstalling the AMD FW Flash Tool

- Uninstall the AMD FW Flash `amdfwflash` tool package.

Ubuntu OS

```
sudo apt remove amdfwflash
```

RHEL 8 or RHEL 9

```
sudo yum remove amdfwflash
```

SLES15 SP3 or SP4

```
sudo zypper rm amdfwflash
```

4.5 Replacing the AMD Instinct™ MI200 GPU (RMA)

The IFWI version of all AMD Instinct™ MI200 Accelerators within a system must be identical for the system to work properly.

1. When replacing the AMD Instinct™ MI200 Accelerator(s) in a system, the system must be configured for the AMD Instinct™ MI200 Replacement.

Refer to the section [Configuring the System to Blacklist amdgpu Driver \(p. 11\)](#) for steps on how to configure the system.

2. Once the system is configured for the AMD Instinct™ MI200 replacement, power off the system and replace the AMD Instinct™ MI200 Accelerator(s) according to the assembly instruction manual.
3. After replacing the AMD Instinct™ MI200 Accelerator, power on the system and follow the steps in [Updating and Rolling Back the AMD Instinct™ MI200 IFWI Version \(p. 12\)](#) to update or rollback the IFWI on all AMD Instinct™ MI200 Accelerator(s) to a desired version.

5 References

For additional information, please refer to the following web sites:

- System Administration Guide: <https://documentation.suse.com/sles/15-SP4/html/SLES-all/cha-mod.html>
- Knowledgebase site: <https://access.redhat.com/solutions/41278>

6 Customer Care

If you have questions or need additional information, please contact your AMD Representative. You may also submit a question at [Online Service Request](#) using keyword amdfwflash in the subject line.

7 FAQ

1. **Q:** Can I use the AMD FW Flash tool with `amdgpu` driver loaded?

A: No. The below error is displayed if you run the tool with the `amdgpu` driver loaded. The AMD FW Flash tool is designed to operate only when `amdgpu` driver is blacklisted. Please see the User Guide instructions on how to blacklist `amdgpu` driver for the OS distribution in your environment.

```
sudo /opt/amdfwflash/sbin/amdfwflash --list-devices
```

The tool has detected that the `amdgpu` driver is loaded. You need to unload the `amdgpu` driver before using this application. Kindly refer to the `README.txt` for steps to unload/blacklist the `amdgpu` driver.

2. **Q:** Can GPU cards in the same hive (using XGMI / Infinity Fabric) have different IFWI versions?

A: No. This is an unsupported configuration and may result in an undefined behaviour. Please refer to Chapter 4 for additional information.

3. **Q:** While executing a `sudo update-initramfs -u` command, does the warning message indicate an error?

A: No. The following message is a reference to the warning message and shows no errors. Please ignore the warning message as they are expected.

```
sudo update-initramfs -u
update-initramfs: Generating /boot/initrd.img-5.15.0-52-generic
w:                Possible                missing                firmware
/lib/firmware/amdgpu/ip_discovery.bin for module amdgpu
```

4. **Q:** Does the message `ERROR: VBIOS image already flashed` indicate an error when the `-rollback-ifwi` option is used to update the IFWIs in all GPUs to GA version?

```
ERROR: VBIOS image already flashed
```

A: No. The message does not indicate an error.

5. **Q:** What is GA version?

A: GA version is the version of the IFWI that shipped from the factory.

6. **Q:** What is RMA?

A: RMA refers to when a new card is added to a system with existing cards. This could be for field replacements or adding additional units to a server.

7. **Q:** Does the message from `rocm-smi` command after the IFWI update indicate an error?

```
WARNING: NO AMD GPUS specified
```

A: No. Please ensure that the `amdgpu` driver is installed for the booted kernel.

Verify that the output of `dkms status` and `uname -a` have the same kernel versions. Otherwise, please boot the correct kernel with the `amdgpu` driver installed.

