



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

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Chapter 1 Introduction

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

This user guide is for users who have the following AMD Instinct™ GPUs and wants to upgrade IFWI and/or RMFW.

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


The AMD FW Flash tool v2.1 is delivered with four versions of IFWI and RMFW:

- Maintenance Update#1 (mu1)
- Maintenance Update#2 (mu2)
- Maintenance Update#3 (mu3)
- Maintenance Update#4 (mu4)
- General Availability (GA)

By default, the tool updates to the most recent version which is Maintenance Update#4.

The tool also offers the ability to update or rollback your IFWI and/or RMFW to a designated version if available. For instance, the tool has the capability to update your MI200 platform to Maintenance Update#1, #2, #3 or #4 version from the GA version. Since fixes are cumulative in subsequent versions it is recommended to update to the latest version. The GA version defines what was shipped from the vendor factory. It is possible a GA version maybe equivalent to a MU version depending on a GPU's shipdate. The steps to update are outlined in this document.


Note: The AMD FW Flash tool is not intended to be used in a Virtual Machine/Guest Operating System (OS) environment.

 **CAUTION:** Using the AMD FW Flash tool in a Virtual Machine/Guest OS may result in an undefined behavior and unsupported configuration.


Chapter 2 Getting Started

Prior to updating the FW, follow the instructions below:

- Requires installation of the `dmi decode` package on the system. This is applicable for all systems (Ubuntu/CentOS/RHEL/SLES).
- Identify the server with the AMD Instinct™ MI200 accelerator(s) requiring a FW 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 (AMDFWFLASH or amdfwflash) 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 firmware update.

 RMFW updates require the driver being loaded. In previous versions of the tool unloading the driver was required.

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

Chapter 3 Commands

The 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

--show-progress           Shows progress for any long activity the
                        tool does. Can be used along with any
                        command.
                        Usage:
                          --show-progress

--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 ] [=arg(=mu3)]  This option is used to instruct the tool
                                     to update IFWI of all applicable ASICs to
                                     the IFWI provided along-with the tool. By
                                     default the IFWIs are updated to the
                                     latest version. Other applicable values
                                     are mu2, mu1 and ga.
                                     Usage:
                                     -u/--update-ifwi [latest/mu2/mu1/ga

-r [ --rollback-ifwi ] [=arg(=ga)] This option instructs the tool to roll
                                     back the IFWI of all applicable ASICs to
                                     the last known good IFWI provided
                                     along-with the tool. If value is not
                                     specified then the IFWI will be rolled
                                     back to the ga version. Applicable values
                                     are mu1, ga.
                                     Usage:
                                     -r/--rollback-ifwi [ga/mu1]

Command line switches related to RMFW features:
--update-rmfw [=arg(=mu3)]  This option is used to instruct the tool
                             to update the Remote Management Firmware
                             of all applicable ASICs to the IFWI
                             provided along-with the tool. By default
                             the IFWIs are updated to the latest
                             version. Applicable values are mu1 and
                             ga.
                             Usage:
                             --update-rmfw [latest/mu1/ga]

--rollback-rmfw [=arg(=ga)] This option instructs the tool to roll
                             back the Remote Management firmware of
                             all applicable ASICs to the last known
                             good Remote Management firmware provided
                             along-with the tool. If value is not
                             specified then the IFWI will be rolled
                             back to the ga version. Applicable values
                             are ga.
                             Usage:
                             -r/--rollback-ifwi [ga]

```


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 a firmware 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 firmware update is available or not.

Figure 3.3: SUDO/AMDFWFLASH --list-devices

Detecting AMD GPU/APU. Please wait...

SNo	BDF	DID	ASIC	SPIROM	Size	Test	BIOS	P/N	IFWI Update Available	RMFW Update Available
0	0000:29:00.0	740c	MI200 (M)	SST26VF016B	0x200000	Pass	113-D65209-073		No	No
1	0000:2c:00.0	740c	MI200 (S)	SST26VF016B	0x200000	Pass	113-D65209-073		No	No
2	0000:2f:00.0	740c	MI200 (M)	SST26VF016B	0x200000	Pass	113-D65209-073		No	No
3	0000:32:00.0	740c	MI200 (S)	SST26VF016B	0x200000	Pass	113-D65209-073		No	No
4	0000:ad:00.0	740c	MI200 (M)	SST26VF016B	0x200000	Pass	113-D65209-073		No	No
5	0000:b0:00.0	740c	MI200 (S)	SST26VF016B	0x200000	Pass	113-D65209-073		No	No
6	0000:b3:00.0	740c	MI200 (M)	SST26VF016B	0x200000	Pass	113-D65209-073		No	No
7	0000:b6:00.0	740c	MI200 (S)	SST26VF016B	0x200000	Pass	113-D65209-073		No	No

Chapter 4 Instructions

To update the FW on AMD Instinct™ Accelerator(s) or when replacing the AMD Instinct™ Accelerator(s) on a server, configure the system for the FW maintenance. Once the system is configured for firmware maintenance, execute the `amdfwflash` command to update or rollback the FW to a desired version. Additionally, please review the latest Maintenance Release Notes located under Accelerators at the amd.com/support site.

4.1 Configuring the System for FW Maintenance or AMD Instinct™ GPU Replacement

4.1.1 Installing the AMD FW Flash Tool

1. The AMDFWFlash tool repository for Linux is located at: (repo.radeon.com/fwupdater/amdfwflash/latest).
2. Log in to the server with the Instinct™ GPUs requiring a FW update.

```
$ ssh user@mi200_server
```

3. Setup the AMDFWFlash tool package repository.

Setup Ubuntu OS apt repo

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

```
echo 'deb [arch=amd64]
https://repo.radeon.com/fwupdater/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\nngpgkey=https://repo.radeon.com/fwupdater/
amdfw.gpg.key\nbaseurl=https://repo.radeon.com/fwupdater/amdfwflash/latest/rpm\nngpgcheck=1' | sudo tee /etc/
yum.repos.d/amdfwflash.repo
```

Setup SLES 15 SP3 or SP4 zypper repo

```
echo -e '[amdfwflash]\nenabled=1\nautorefresh=0\nngpgkey=https://repo.radeon.com/fwupdater/amdfw.gpg.key
\nbaseurl=https://repo.radeon.com/fwupdater/amdfwflash/latest/rpm\nntype=rpm-md\nngpgcheck=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 for the `amdfwflash` package:

```
sudo apt search amdflash
```

RHEL 8 or RHEL 9

```
sudo yum update
```

To verify, search for the amdflash package:

```
sudo yum search amdflash
```

SLES 15 SP3 or SP4

```
sudo zypper update
```

To verify, search for the amdflash package:

```
sudo zypper search amdflash
```

5. Install the AMD FW Flash tool package.

Ubuntu OS

```
sudo apt install amdflash
```

RHEL 8 or RHEL 9

```
sudo yum install amdflash
```

SLES 15 SP3 or SP4

Prior to installing set iomem=relaxed in the grub and remake the kernel config.

- ```
sudo sed -i 's/^GRUB_CMDLINE_LINUX_DEFAULT="/GRUB_CMDLINE_LINUX_DEFAULT="iomem=relaxed /' /etc/default/grub
```
- ```
sudo grub2-mkconfig -o /boot/grub2/grub.cfg
```
- ```
sudo /usr/bin/dracut --force --regenerate-all
```
- ```
reboot
```

```
sudo zypper install amdflash
```

6. Verify the AMDFWFlash tool package installation.

Ubuntu OS

```
dpkg -l | grep amdflash
```

RHEL 8, RHEL 9

```
rpm -qa | grep amdflash
```

SLES 15 SP3, or SLES 15 SP4


```
rpm -qa | grep amdflash
```

7. Reboot the server for FW maintenance update or power off to replace the GPUs.

```
sudo reboot
```

or

```
sudo poweroff
```

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

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


4.2 Updating and Rolling Back the AMD Instinct™ FW Version

Follow the below steps to update or rollback the AMD Instinct™ FW to a desired version. Not all AMD Instinct™ Accelerators will have an equivalent Maintenance Update.

4.2.1 Updating the FW Maintenance Version

1. Log in to the server's BMC/IPMI interface identified for FW update.
2. Launch the remote/virtual console on the server.
3. Log in to the server.
4. 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](#)).

5. Execute the `amdfwflash` command to update the IFWI and/or RMFW of all GPUs in the system to the latest Maintenance Update#4 version.

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

or

```
sudo /opt/amdfwflash/sbin/amdfwflash --update-ifwi mu4
```

```
sudo /opt/amdfwflash/sbin/amdfwflash --update-rmfw
```

or

```
sudo /opt/amdfwflash/sbin/amdfwflash --update-rmfw mu1
```

6. Follow this step to update the IFWI and/or RMFW of all GPUs in the system to the Maintenance Update#3 version.

```
sudo /opt/amdfwflash/sbin/amdfwflash --update-ifwi mu3
```

```
sudo /opt/amdfwflash/sbin/amdfwflash --update-rmfw mu1
```

7. Steps to update the IFWI and/or RMFW of all GPUs in the system to a previous Maintenance Update version would follow similar commands.
8. Save the system log and console output to a file.
9. The `amdfwflash` tool saves a copy of the old IFWI and/or RMFW images under `/tmp` before updating.

Archive the generated FW images from /tmp folder for later reference.

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

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

10. Reboot the server (an AC power cycle is recommended) to make the FW update effective.

```
sudo reboot
```

or

```
sudo ipmitool power cycle
```

11. Refer to the section [Verifying the AMD Instinct™ MI200 FW Version](#) to complete the FW update. After a successful verification of the FW update, the server may resume normal operation.

4.2.2 Rolling Back to the Accelerator's GA FW Version

1. Log in to the server's BMC/IPMI interface identified for FW update.
2. Launch the remote/virtual console on the server.
3. Log in to the server.
4. 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](#)).

5. Execute the amdfwflash command to rollback the IFWI and/or RMFW of all GPUs to the GA version.

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

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

6. Run the amdfwflash to rollback the IFWI and/or RMFW of all GPUs to the Maintenance Update#3 version from Maintenance Update#4 version.

```
sudo /opt/amdfwflash/sbin/amdfwflash --rollback-ifwi mu3
```

```
sudo /opt/amdfwflash/sbin/amdfwflash --rollback-rmfw mu1 (if available for your gpu)
```

7. Save the system log and console output to a file.
8. The amdfwflash tool saves a copy of the old IFWI and/or RMFW images under /tmp before updating. Archive the generated FW images from /tmp folder for later reference.

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

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

9. Reboot the server (an AC power cycle is recommended) to make the FW update effective.

```
sudo reboot
```

or


```
sudo ipmitool power cycle
```

10. Refer to the section [Verifying the AMD Instinct™ FW Version](#) to complete the FW update. After a successful verification of the FW update, the server may resume normal operation.

4.3 Verifying the AMD Instinct™ FW Version

1. Log in to the system.
2. If the AMD ROCm software is installed, run the showhw command to display the firmware 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](#)).

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

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


```
sudo modprobe amdgpu
```

3. 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](#)) section.

4. Ensure that all AMD Instinct™ GPUs have the same updated IFWI and RMFW versions.

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

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

4.4 Uninstalling the AMD FW Flash Tool

1. Uninstall the AMD FW Flash amdfwflash tool package.

Ubuntu OS

```
sudo apt remove amdfwflash
```

RHEL 8 or RHEL 9

```
sudo yum remove amdflash
```

SLES15 SP3 or SP4

```
sudo zypper rm amdflash
```

4.5 Replacing the AMD Instinct™ GPU (RMA)

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

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

Refer to the section [Configuring the System for FW Maintenance or AMD Instinct™ GPU Replacement](#) 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™ Accelerator, power on the system and follow the steps in [Updating and Rolling Back the AMD Instinct™ FW Version](#) to update or rollback the IFWI and/or RMFW on all AMD Instinct™ Accelerator(s) to a desired version.

Chapter 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>
- Knowledge-base site: <https://access.redhat.com/solutions/41278>

Chapter 6 Customer Care

If you have any questions or need additional information, please contact your AMD Representative. You may also submit a question at Online Service Request (<https://www.amd.com/en/support/contact-email-form>) using the keyword *amdfwflash* in the subject line.

Chapter 7 Frequently Asked Questions (FAQ)

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

A: Yes. From tool version 2.00 onwards, the amdgpu driver can remain loaded.

2. **Q:** Can the GPU cards of the same hive (with XGMI/ Infinity Fabric) have different firmware versions?

A: No. This configuration is not supported and may cause undefined behavior. For more information, please refer to the [Instructions](#).

3. **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.

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

A: GA version refers to the IFWI and RMFW shipped from the factory.

5. **Q:** What is Return Merchandise Authorization (RMA)?

A: RMA means adding a new card into a system that already contains existing cards. This may include field replacements or adding additional GPUs to a server. RMA's are handled by your purchasing source.

6. **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.

Appendix A Notices

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