ADATA®
INDUSTRIAL

A+ OPAL

User Manual

2023/03/01

Version Control Table

Version	Date	Detail
1.0	2021/12/27	1st release
1.1	2022/2/25	Support NVMe & SATA to USB adapter
1.1.1	2022/8/8	Add EULA
1.1.2	2022/9/15	Change Admin Password at System Disk、Unlock USB

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Overview

ADATA Industrial SSD supports AES encryption and is fully compliant TCG OPAL standard.
Disk encrypted of some software or operating system is designed by using system resource. It may slow down the drive and is time consuming.
A+ OPAL is an application which provides user to do TCG OPAL SED (self-encrypting drive). It enables encrypted feature of SSD controller. Only ADATA Industrial SSD/NVMe is supported.

This tool help user to configure their ADATA Industrial SSD/NVMe with TCG OPAL firmware.
User just need to install A+ OPAL to any Windows 10 system (Not ADATA TCG OPAL SSD), and run A+ OPAL to configure ADATA Industrial SSD/NVMe as 2nd drive.

NOTE: Please follow this user manual to avoid data loss caused by improper usage. ADATA will not accept any responsibility for loss of data.

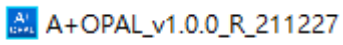
System Requirement

Item	Minimum Requirement
Processor	Intel Core i3 series or same level CPU
Memory	4 GB RAM
Free Disk Space	60 MB available hard disk space
Recommend Operating System	Windows 10 (1809 or above)

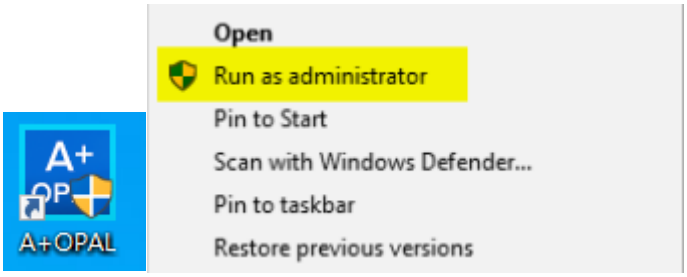
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Installation & Running

1. Double click on A+ OPAL_v1.X.X.X_R_XXX.msi file then follow the instruction on screen to complete the installation.

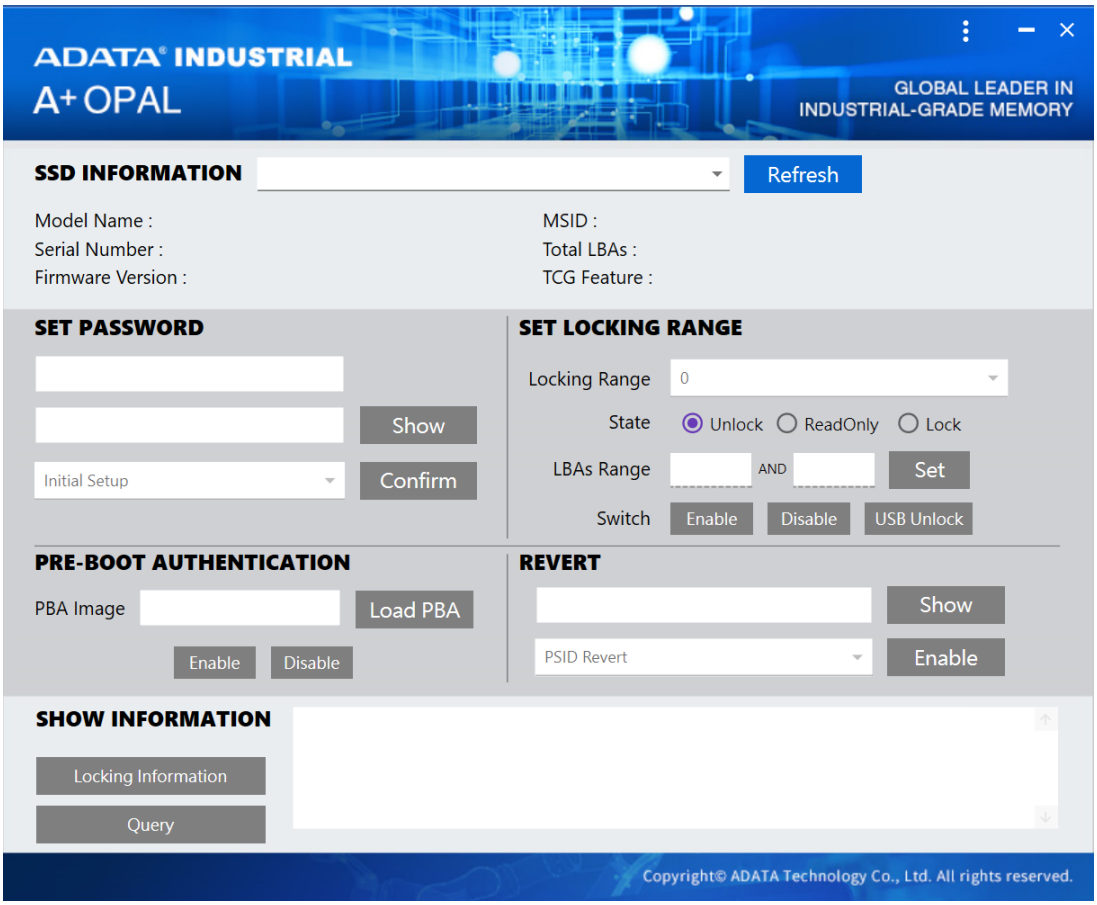


2. After completed installation, use can see there is an A+ OPAL logo on Windows desktop. Right click “A+ OPAL” on Windows Desktop and click Run as administrator.



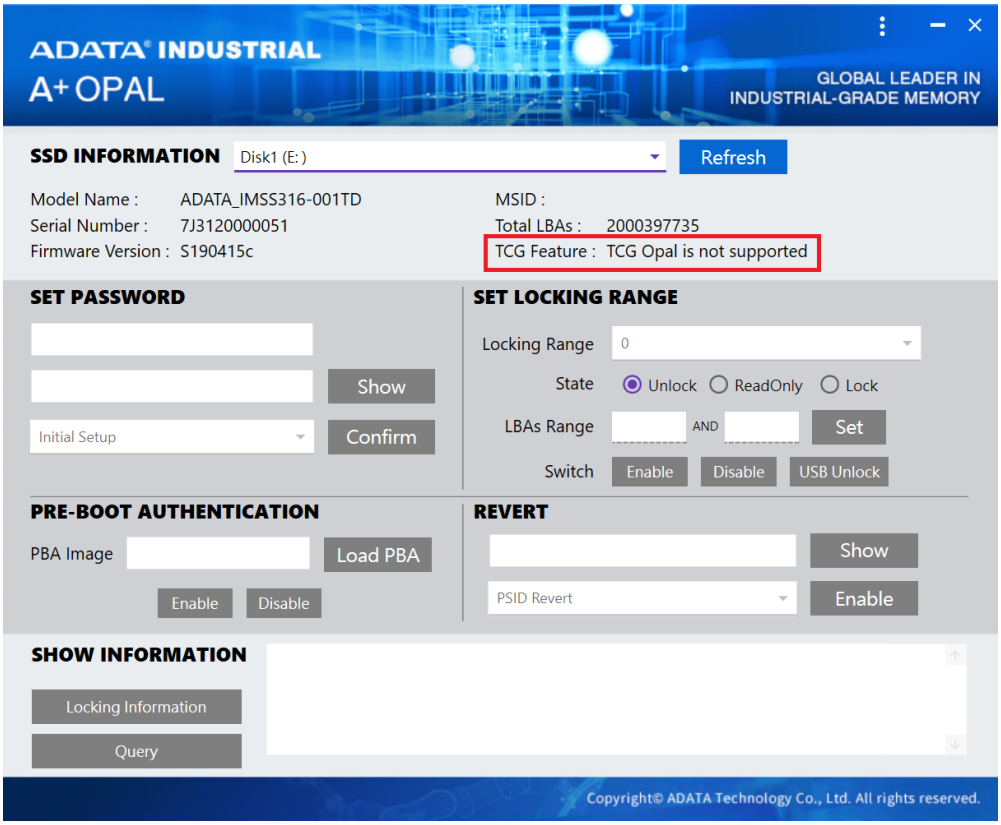
After launched A+ OPAL, there are three situations as shown below:

1. No ADATA Industrial TCG OPAL SSD detected:
   There is no SSD which is listed on SSD INFORMATION

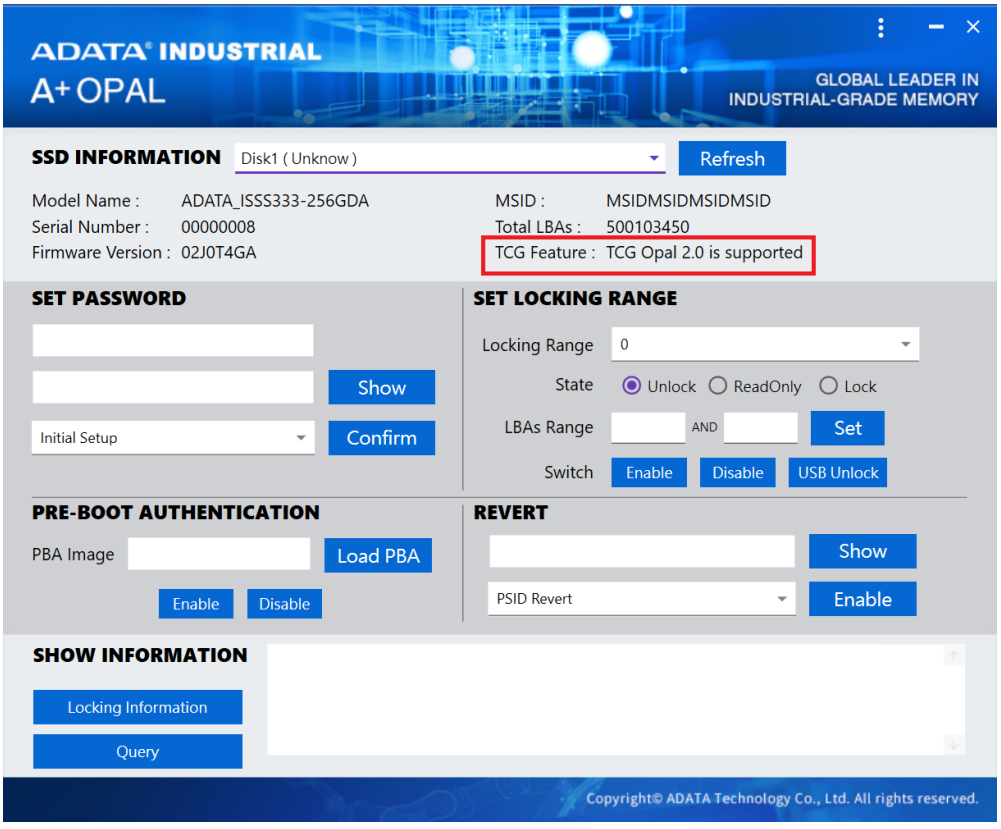


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2. ADATA Industrial SSD with no TCG OPAL supported detected:
   It shows SSD information, but buttons are disabled.



3. ADATA Industrial TCG OPAL SSD detected:



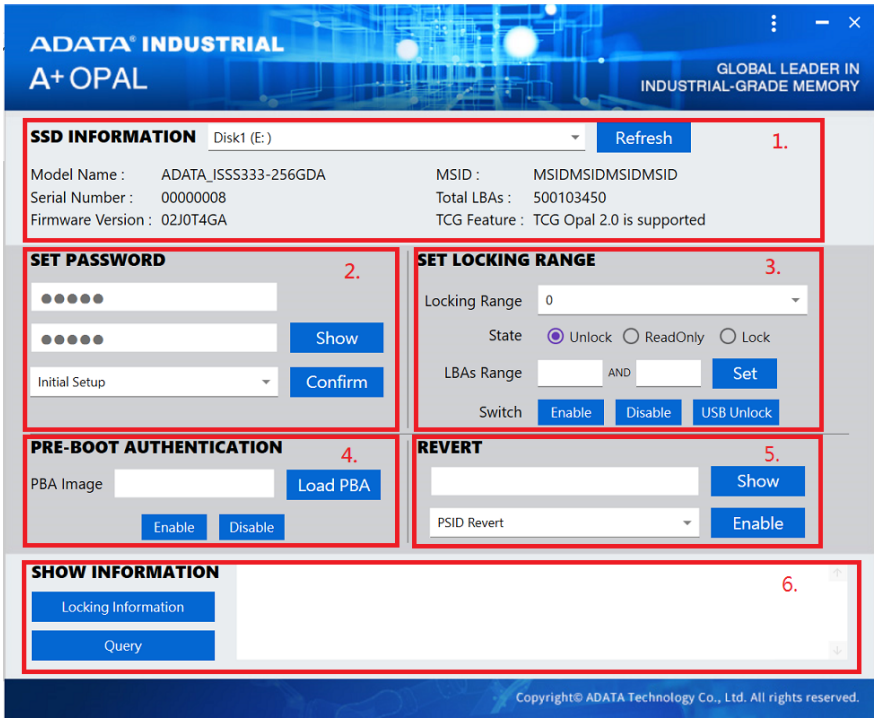
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A+ OPAL Features

A+ OPAL provides several features for user to manage and configure disk which supports TCG OPAL. It includes running initial setup to activate TCG OPAL, set SID/Admin password, the function of loading pre boot image, set the locking range state, reset disk to factory default.

A+ OPAL Utility User Interface

When A+ OPAL is launched, this utility is divided to 6 sections. SSD INFORMATION, SET PASSWORD, SET LOCKING RANGE, PRE-BOOT AUTHENTICATION, REVERT, SHOW INFORMATION.



1. SSD INFORMATION:
   It listed all ADATA SSD devices with and without TCG OPAL Supported.
2. SET PASSWORD:
   TCG OPAL related password setting and first initializes functions.
3. SET LOCKING RANGE:
   TCG OPAL Locking Range setting、LBA range setting and USB Unlock functions
4. PRE-BOOT AUTHENTICATION:
   TCG OPAL Load pre-boot image function.
5. REVERT:
   TCG OPAL Tper revert, revert no erase and revert by PSID functions.
6. SHOW INFORMATION:
   List TCG OPAL Query and locking Information.

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SSD Information

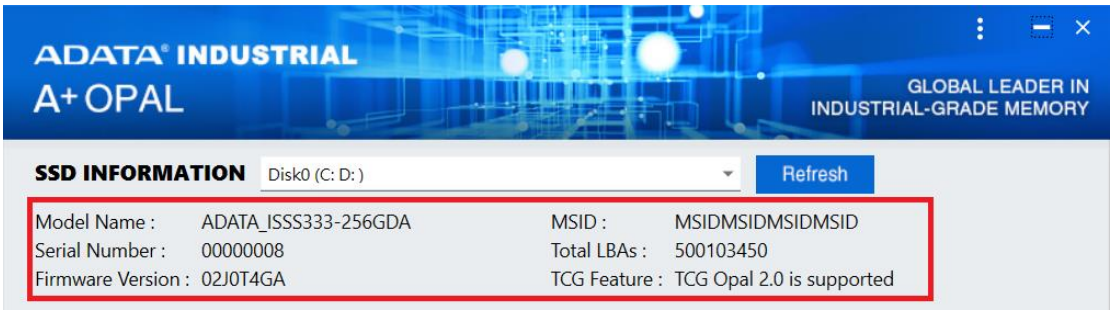
This section shows selected SSD information. User can check disk information by select drop down box.



If user installs a new SSD but it does not list at the list, user can click **Refresh** button to refresh SSD list.



Once user selects correct SSD, SSD related information is listed below.



- Model Name: It displays the model's name of the selected disk.
- MSID: Manufactured Secure ID of the selected disk.
- Serial Number: It displays serial number which prints at SSD label.
- Total LBAs: It displays Logical Block Address of the selected disk.
- Firmware Version: It displays firmware version of the selected disk.
- TCG Feature: It displays TCG OPAL support status of the selected disk.

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NOTE: Only ADATA SSD disk will be listed on SSD INFORMATION list. Only ADATA SSD/NVMe supported TCG OPAL can be used to configure TCG OPAL features.

NOTE: System disk (C:) is not allowed to be configured TCG OPAL, user has to install system SSD as 2nd disk and use A+ OPAL to configure TCG OPAL. After configured TCG OPAL disk, please set TCG OPAL disk as system disk to boot. System disk is only allowed to change **ADMIN** password.

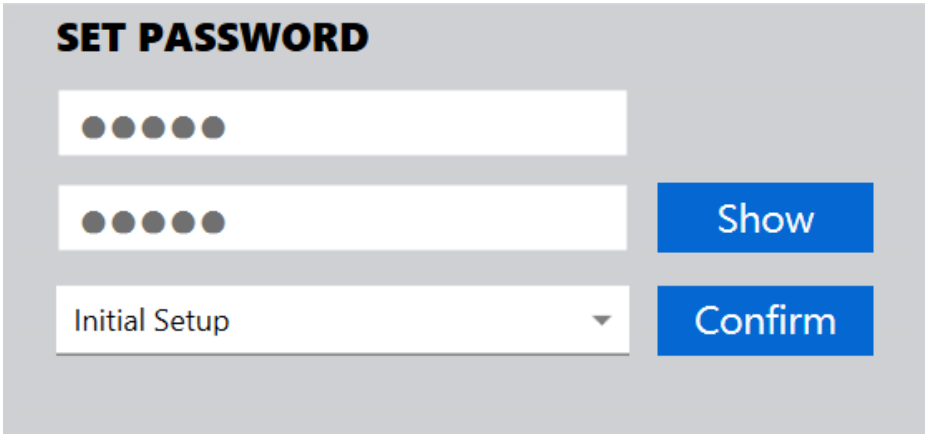
NOTE: A+ OPAL does not require to install at ADATA SSD, it can be installed at any disk. A+ OPAL is only allowed to configure ADATA SSD/NVMe.

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SET PASSWORD

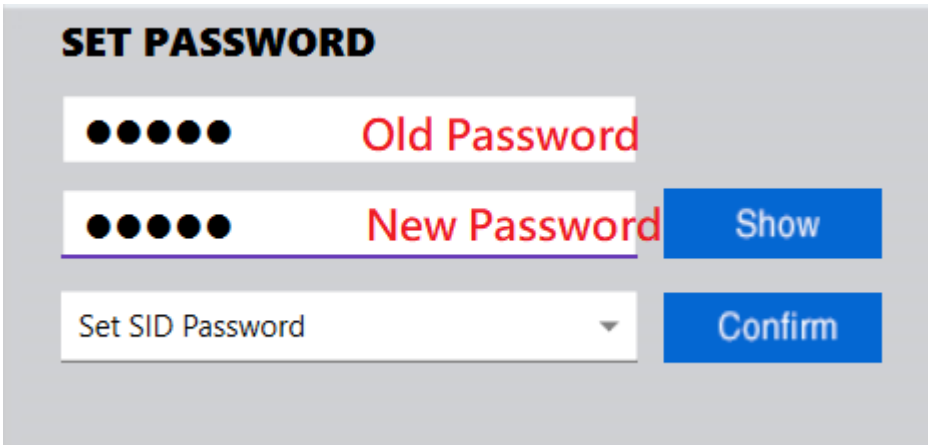
This section allows user to run TCG OPAL initial setup, set SID password, set Admin password.

Initial Setup



Running Initial Setup is **the first step** of TCG OPAL configuration. User just needs to select the disk at SSD INFORMATION and click **Confirm** in SET PASSWORD. There is a caution message appear. Once user clicks OK, TCG OPAL initial process will be started.
The default password of SID/Admin is "**ADATA**".
NOTE: After complete Initial Setup, please DO NOT reboot or POWER OFF the system. It might affect disk cannot be recognized due to TCG OPAL feature has been initialized. Please refer to USAGE CASE section to setup password, locking range, and load pre boot-image step by step.

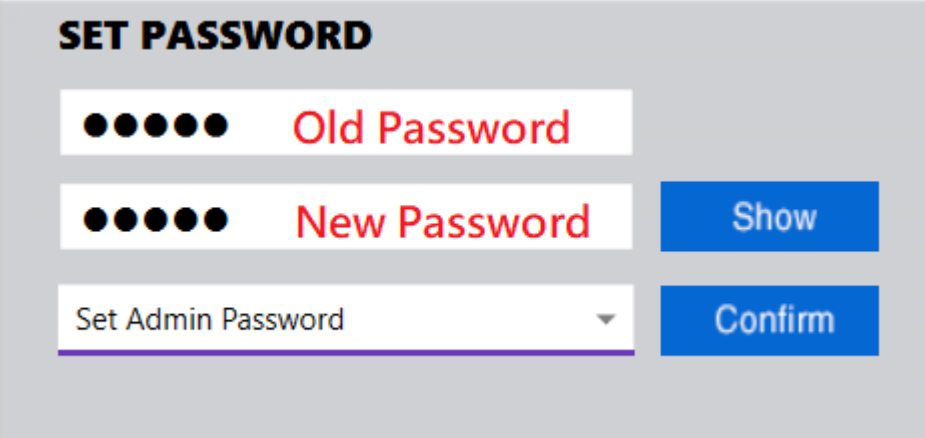
SET SID Password



Perform Set SID Password, user can select dropdown box and select Set SID Password. Please key in old password (Default is ADATA) in the 1st textbox and new SID password in the 2nd textbox, click **Confirm**. The message alert will ask to confirm password change. Maximum SID password length is 16 characters.

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SET ADMIN Password



Perform Set Admin Password, user can select dropdown box and select Set Admin Password. Please key in old password (Default is **ADATA**) in the 1st textbox and new Admin password in the 2nd textbox, click **Confirm**. The message alert will ask to confirm password change. Maximum ADMIN password length is 16 characters. (If A+ OPAL installed at system TCG OPAL disk, only SET ADMIN Password is allowed to use)

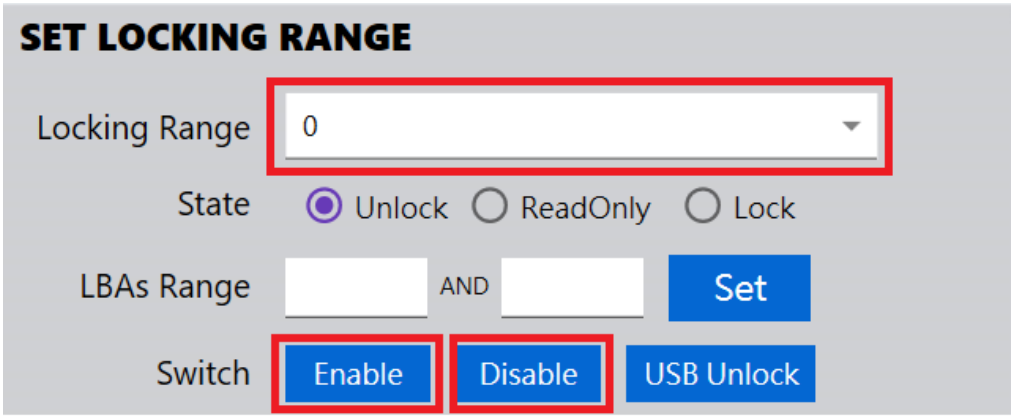
NOTE: Please be reminding if you forgot/lost the Admin/SID password, the data will be lost and cannot be recovered. Please backup your data before using A+ OPAL.

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SET LOCKING RANGE

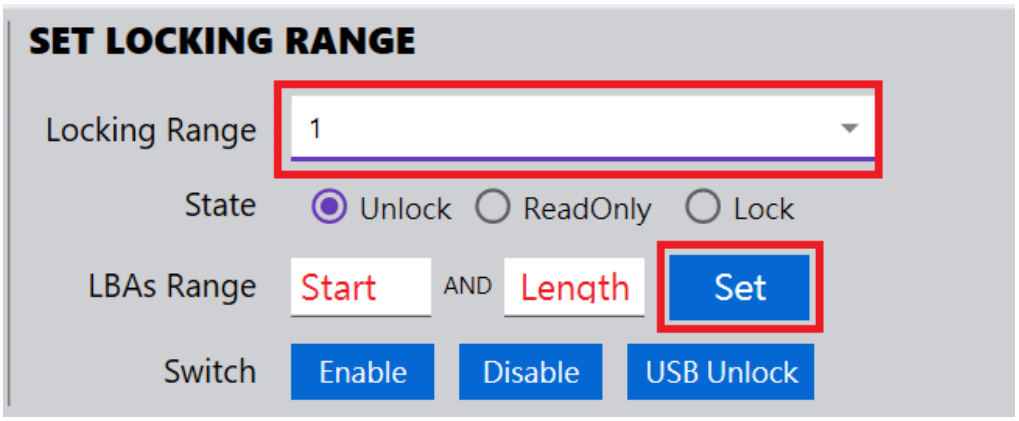
SET LOCKING RANGE section enables user to configure locking range and LBA with locking control access setting.

Enable/Disable Locking Range:



Select Locking Range, (0 means global range (ALL)) and click **Enable**/**Disable**. In the window that appears, enter the **Admin** password and click OK.

Set Locking Range with specified LBA range:

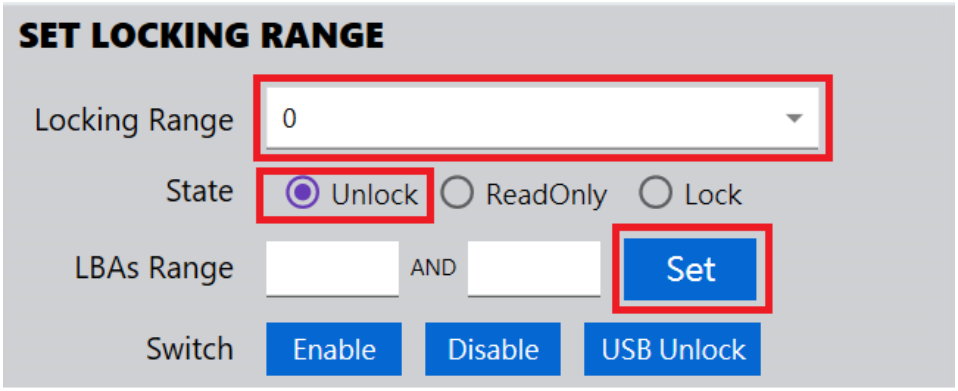


Select the range number from the Locking Range dropdown box except 0. Specify the start and length of the LBA range fields and then click **Set**. In the window that appears, enter the **Admin** password and click OK.

NOTE: Locking Range setting can be used on disk which contains **linux** OS. Suggest to use Locking Range 0 at All **Windows** OS to protect the whole disk.

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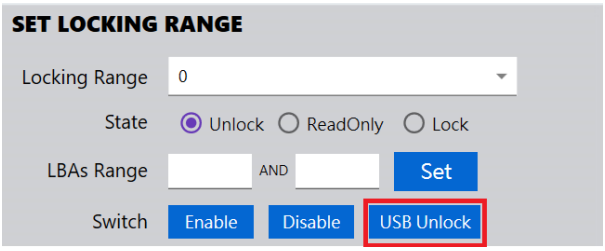
Set Locking Range locking control access:



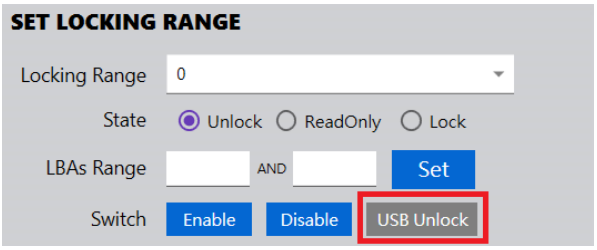
Select the range number from the Locking Range dropdown box. Specify the state of selected Locking Range and then click **Set**. In the window that appears, enter the **Admin** password and click OK.

USB Unlock

USB Unlock is enabled if selected SSD is external USB TCG OPAL SSD.



USB Unlock is disabled on selected SSD is onboard SATA/NVMe TCG OPAL SSD.



This feature is only for unlock USB external locked SSD. Once user plug USB external locked SSD, click Unlock USB. USB external locked SSD is unlocked after entered correct **Admin** password. Refer to **Usage Case** for more information.

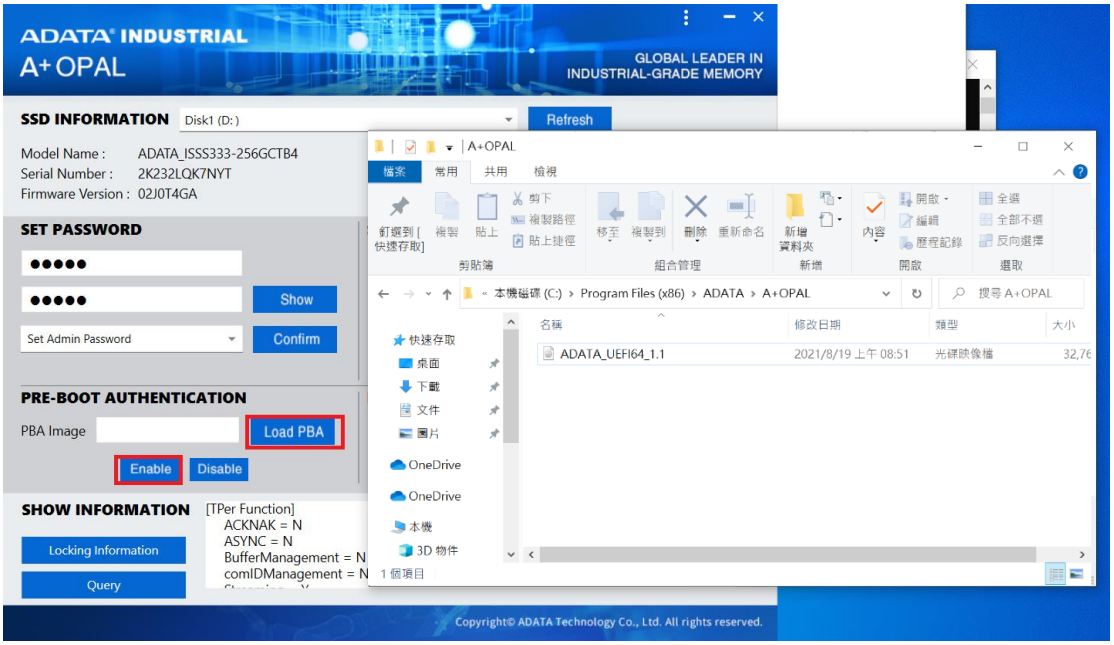
NOTE: USB Unlock also disables Pre-boot authentication image, please refer to Pre-boot authentication section to reload PBA image if you would use TCG OPAL disk to boot.

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PRE-BOOT AUTHENTICATION

Pre-boot authentication is designed to provide to use MBR shadow as a hidden partition. Load the image into partition for user to key **Admin** password to access encrypted disk during Power ON the device

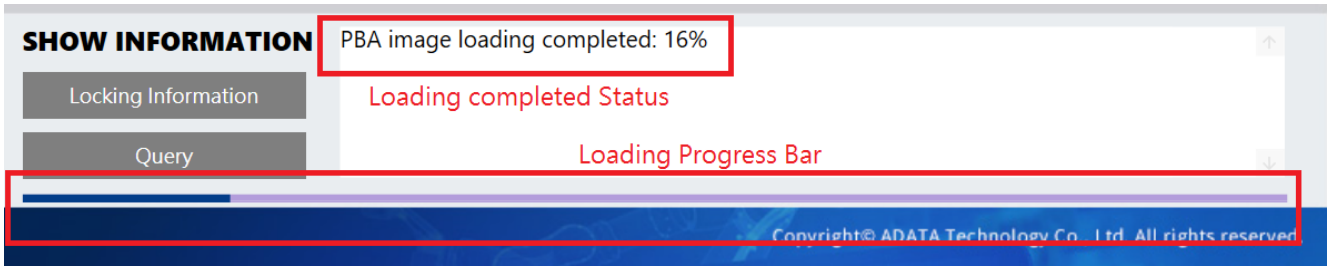
Enable Pre-boot authentication:



User can click **Load PBA** to select supported boot image.

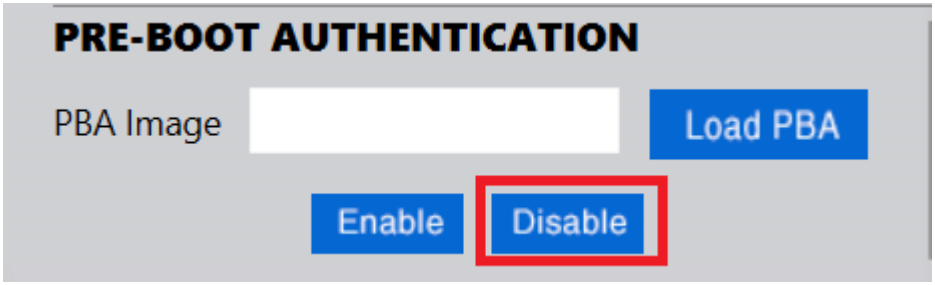
PBA image can be found at installed A+ OPAL location **C:\Program Files (x86)\ADATA\A+OPAL\ ADATA_UEFI64_1.1.img**

Click **Enable**. In the window that appears, enter the **Admin** password and click OK. It will take 1-2 mins to load image into MBR shadow.



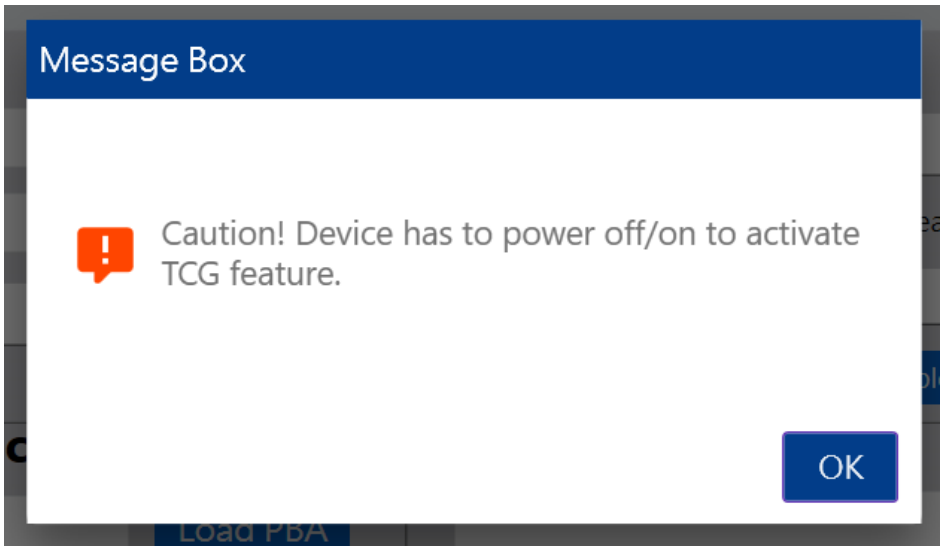
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Disable Pre-boot authentication:

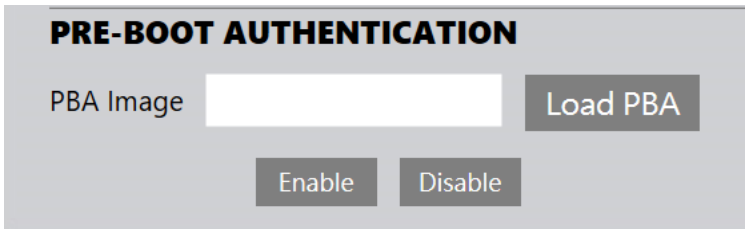


Click **Disable**. In the window that appears, enter the Admin password and click OK.

NOTE: Once you complete load PBA, You now need to **COMPLETELY POWER DOWN YOUR SYSTEM**. This will lock the drive so that when you restart your system it will boot the PBA.



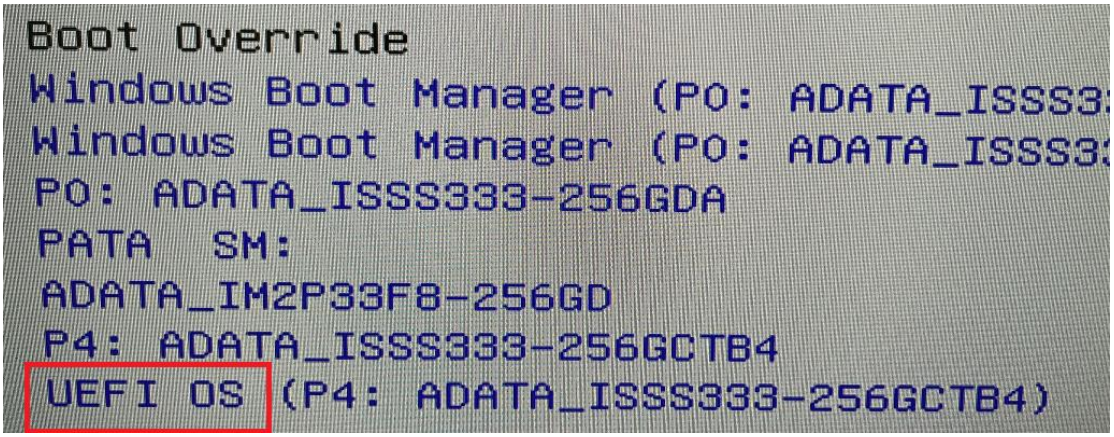
NOTE: Pre-boot authentication does not support on NVMe with USB Adapter, the buttons are displayed disabled if user selected the NVMe which is with USB Adapter.



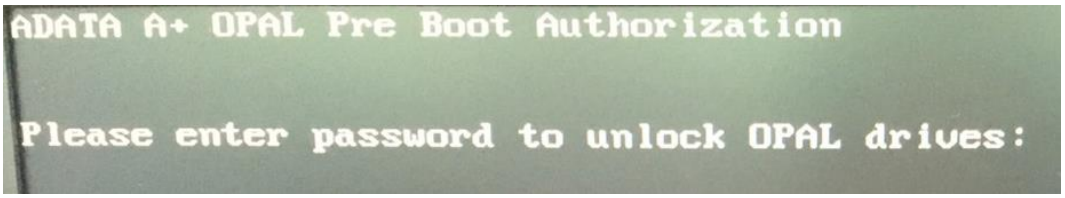
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Reboot to BIOS setting:

NOTE: Some system might not switch boot sequence automatically. Please go to BIOS and switch boot sequence to UEFI OS (ADATA_XXXXXXX)



Here is the screenshot which boot from PBA, please key in your **Admin** password and press Enter.



You can see the SSD list and SSDs' locking status.



And system will start with normal reboot

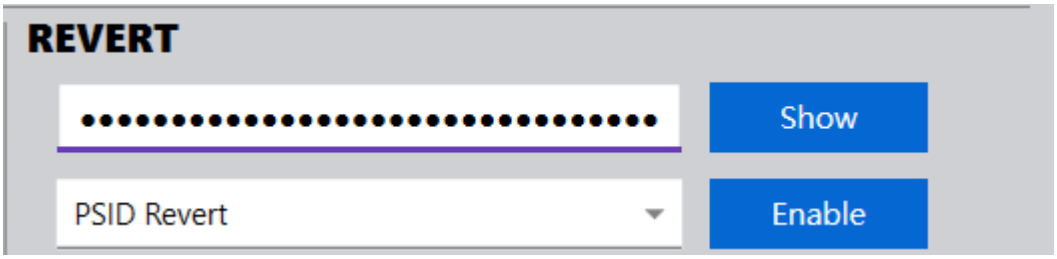
NOTE: Some system might not switch boot sequence automatically. Please go to BIOS and switch boot sequence to correct disk sequence (ADATA_XXXXXXX or Windows Boot Manager)

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REVERT

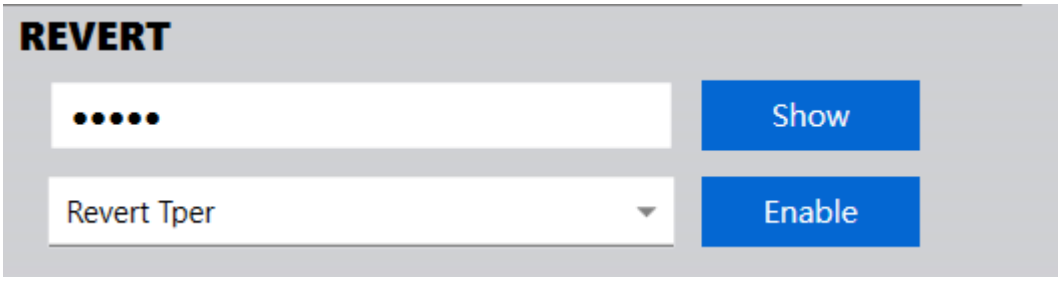
Revert feature is designed to remove TCG OPAL setting from selected disk. Or reset to factory reset by using PSID.

PSID Revert:



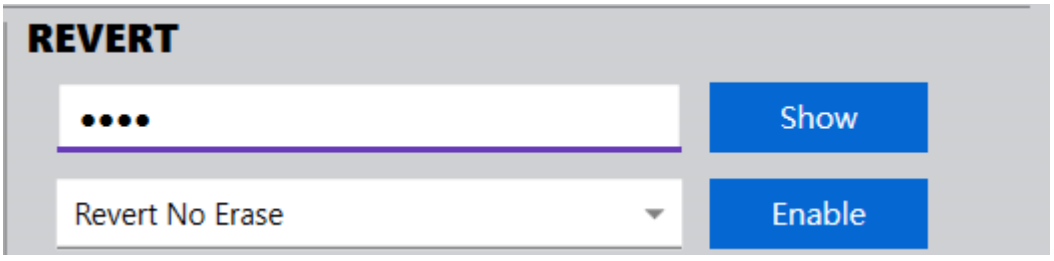
PSID is a 32 digits code which printed at SSD label. Key in **PSID** and click **Enable**. It will clean the whole SSD to be factory rest and clear all TCG OPAL setting.

Revert Tper:



Select Revert Tper and enter **SID** password and click **Enable** to run Revert Tper (Trusted Peripheral). It erases all data on the selected disk and removes TCG OPAL setting.

Revert No Erase:



Select Revert No Erase and enter **Admin** password and click **Enable** to run Revert No Erase. After running Revert No Erase, please run revert Tper if you would remove all TCG OPAL Setting.

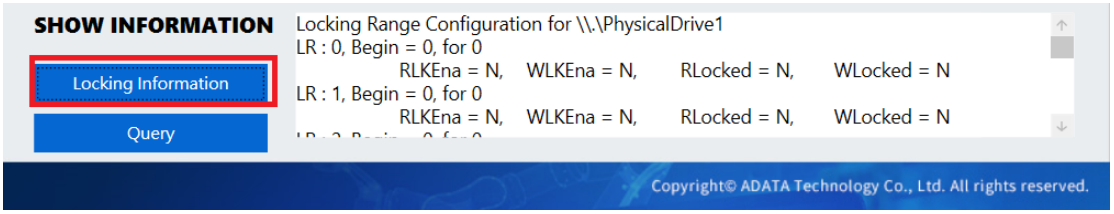
NOTE: After running Revert feature, user has to go to disk management to offline and re-online the reverted disk. To check the TCG OPAL configuration on this disk has been removed or not.

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SHOW INFORMATION

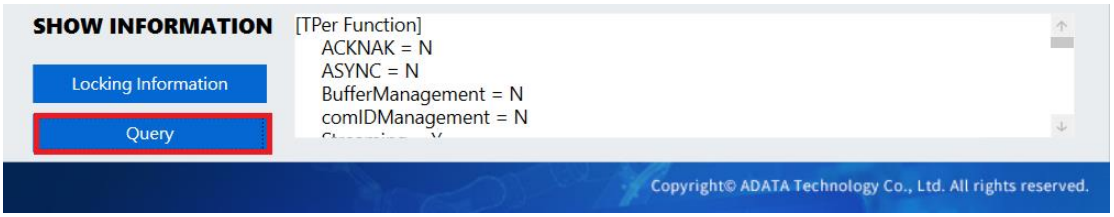
In this section, user can check locking status by click **Locking Information** or check TCG OPAL support detail by click **Query**.

Locking Information:



Click Locking Information displays the locking information of the selected disk.
It shows each locking range status.
Admin password is required for click Locking Information.

Query:



Click Query displays TCG OPAL support features. It lists selected disk support TCG OPAL features. Such as OPAL 2.0, DataStore, SingleUser, Geometry, Tper.
More Information please refer to Trust Computing Group official Website:
https://trustedcomputinggroup.org/resources/?search=OPAL%20feature&

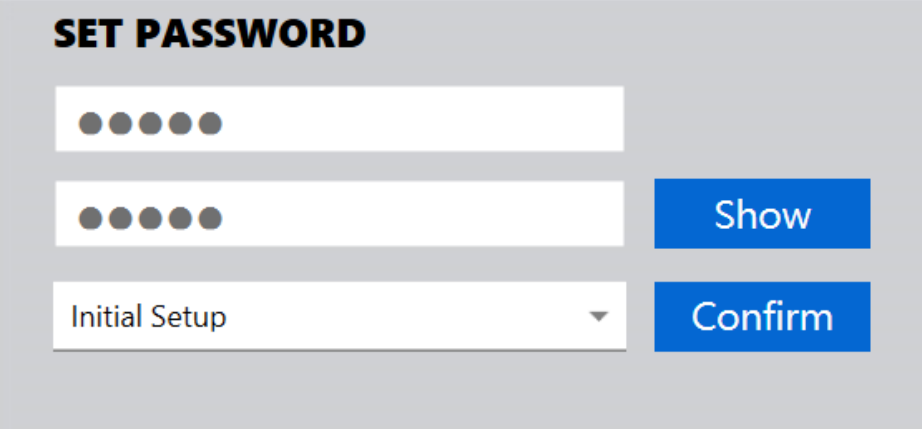
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USAGE CASE

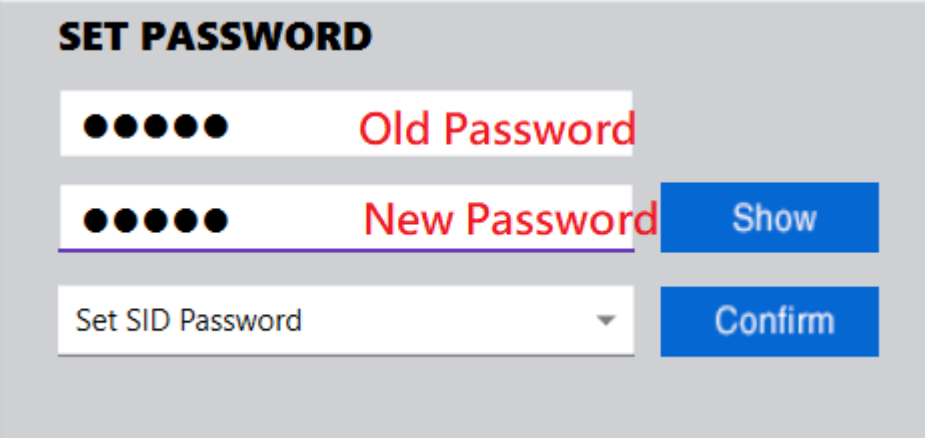
1. Configure TCG OPAL on the SSD:

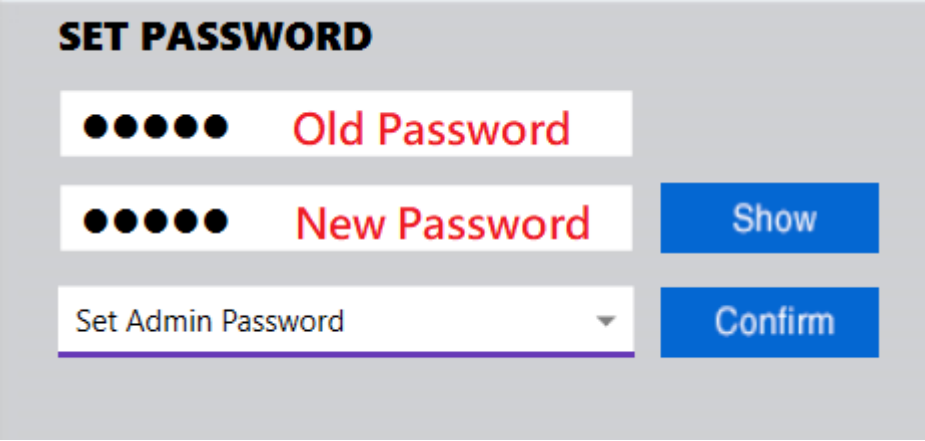
Follow these steps to configure TCG OPAL on a SSD.

1. Select SSD which you would like to configure in SSD Information
2. Run Initial Setup (Click Confirm directly)



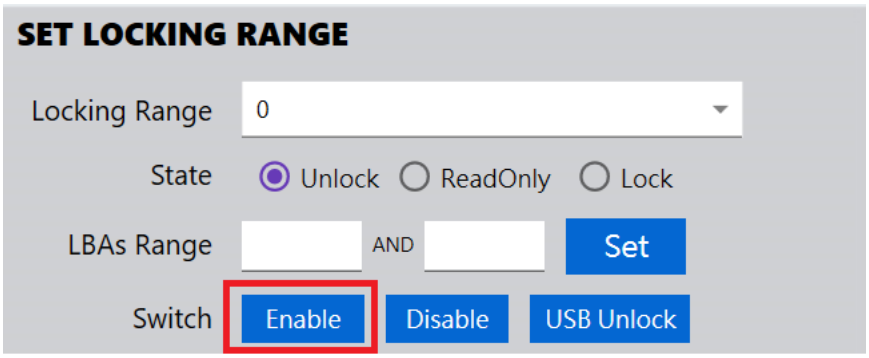
3. Change SID/ADMIN password (old password **ADATA**)



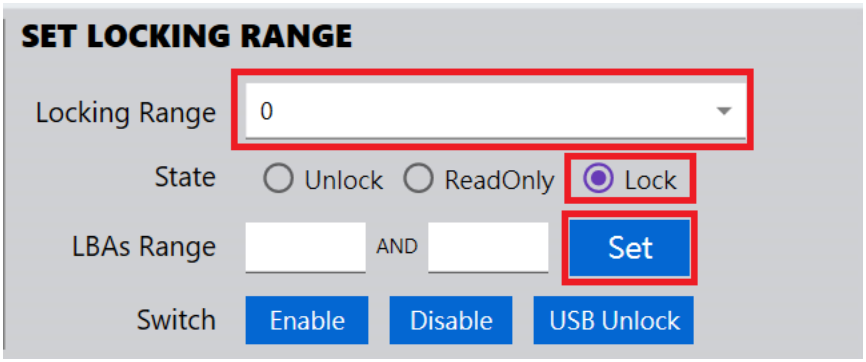


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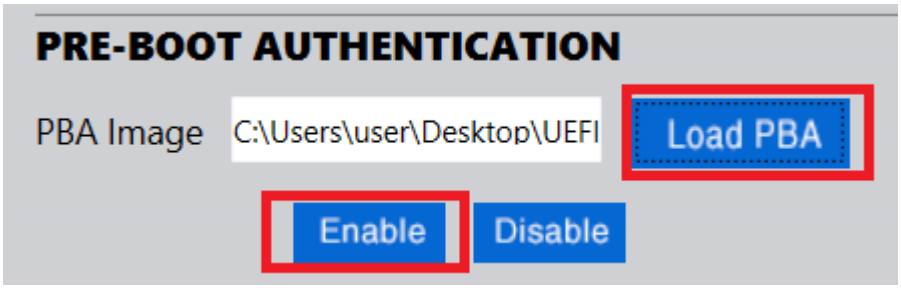
4. Enable Locking Range (Whole disk)



5. Set and Lock Locking Range 0



6. Load PBA image and click Enable



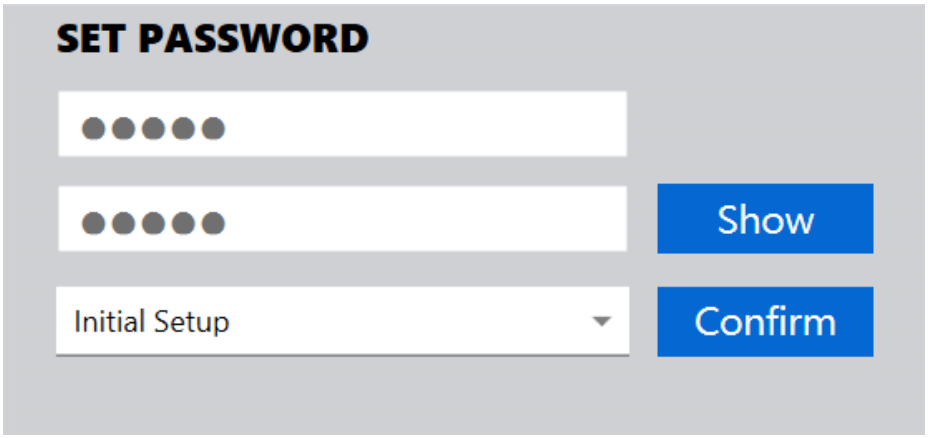
7. Power OFF the system.
8. Power ON the system and select boot sequence to UEFI OS, key in Admin password to unlock disk and boot to system disk.

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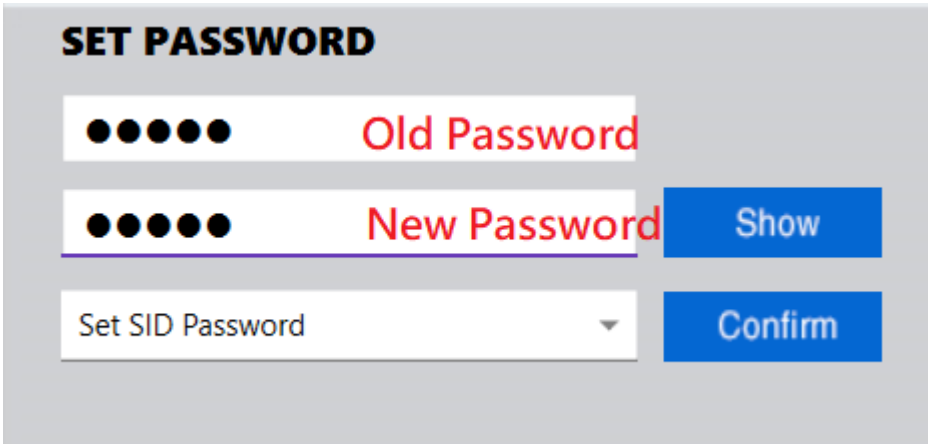
2. Configure TCG OPAL and Unlock on USB external SSD:

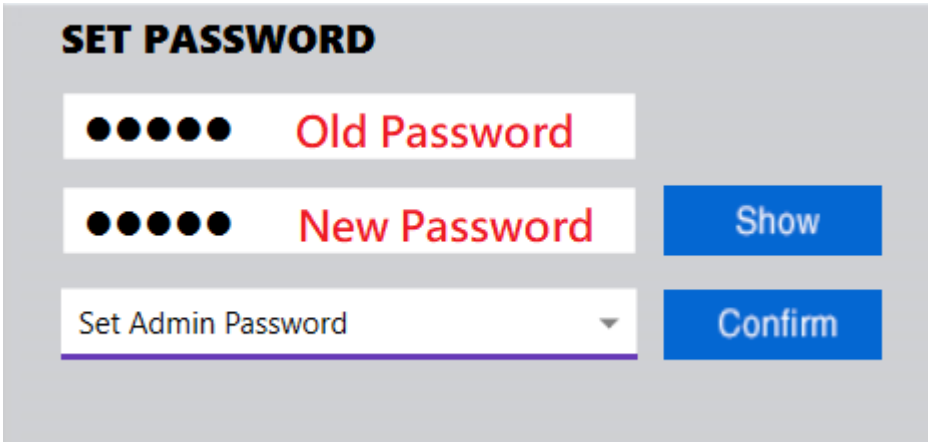
Follow these steps to configure TCG OPAL on USB external SSD.

1. Select SSD which you would like to configure in SSD Information
2. Run Initial Setup (Click Confirm directly)



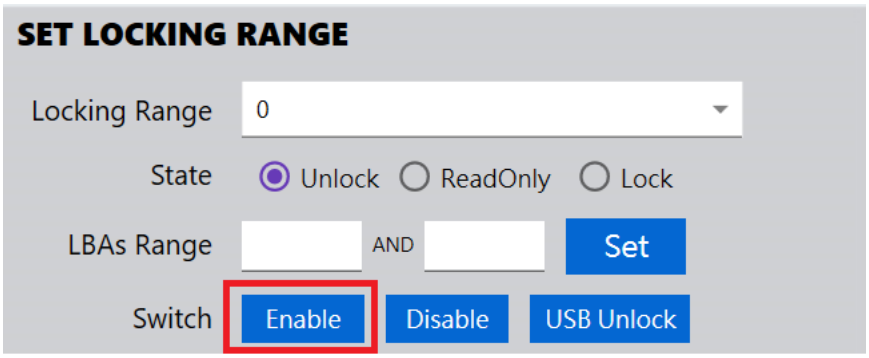
3. Change SID/ADMIN password (old Password **ADATA**)



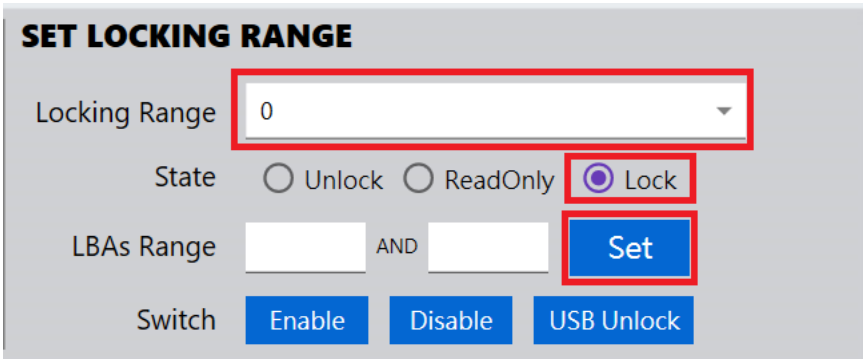


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4. Enable Locking Range (Whole disk)

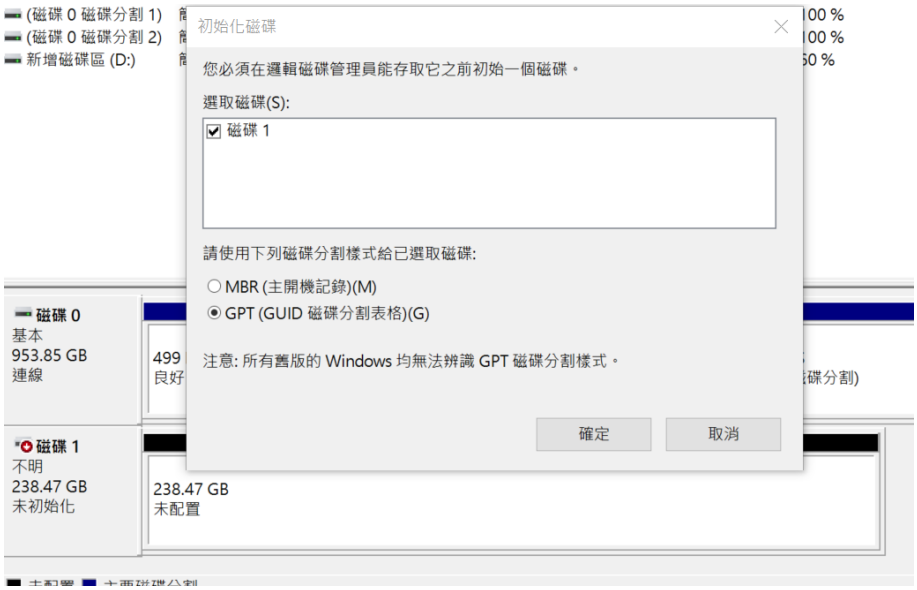


5. Set and Lock Locking Range 0



User can do normal work until unplug USB external SSD.

After USB external SSD plug in, system shows SSD is not initialized due to it was encrypted.

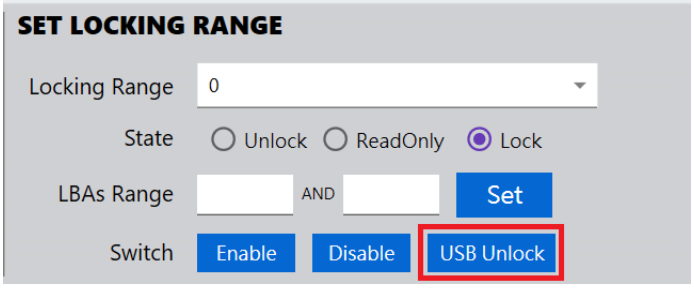


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Unlock USB TCG OPAL Disk:

User has to launch A+ OPAL to unlock SSD.

1. Select SSD which you would like to unlock in SSD Information
2. Click USB Unlock and key in **Admin** password.



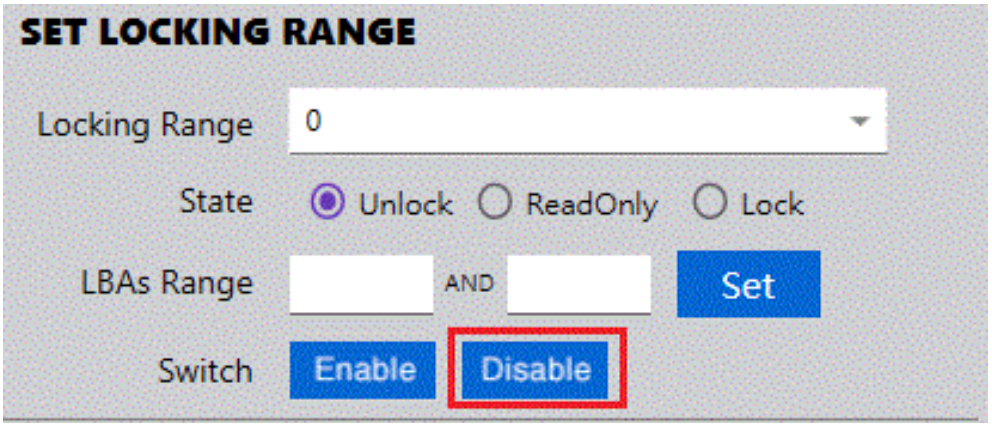
3. Encrypted disk will be unlocked automatically and can be read/write.

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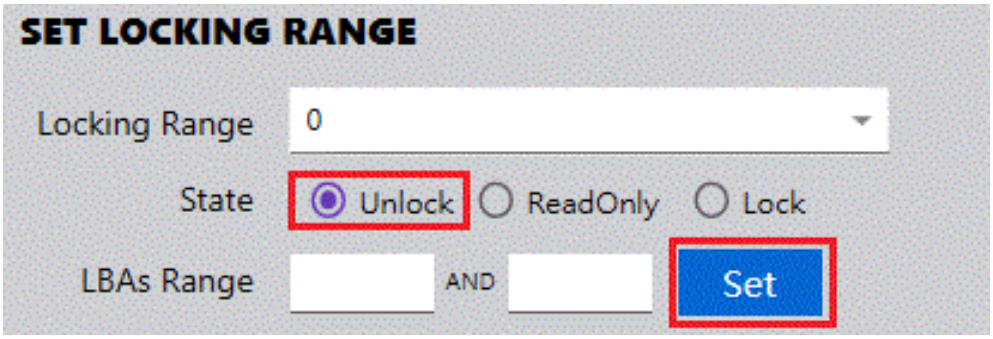
3. Remove TCG OPAL configuration and keep data:

Follow these steps to remove TCG OPAL on SSD

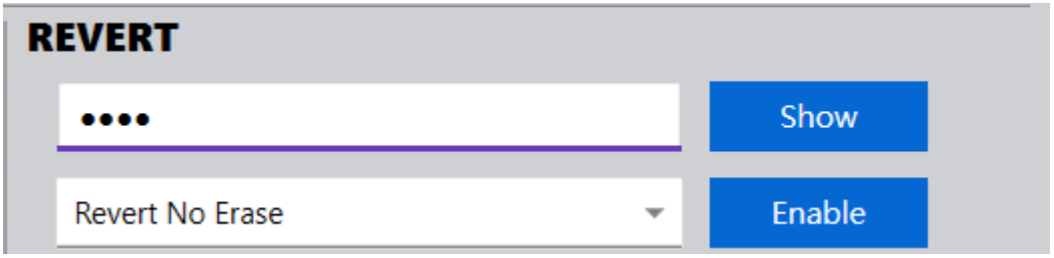
1. Disable Locking Range (Whole disk)



2. Unlock Locking Range 0



3. Revert No Erase (ADMIN password is required)



4. Revert Tper (SID password is required)

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FAQ

1. Does A+ OPAL support to configure NVMe SSD?

Answer: Yes, 1.1 or above version support both SATA and NVMe.

2. Does A+ OPAL support to configure by using USB adapter?

Answer: Yes, 1.1 or above version support to configure by using USB adapter. **Some USB adapter controller does not support**.

3. Does A+ OPAL support to configure system SSD?

Answer: A+ OPAL does not support to configure the system SSD (C:) directly. If user would configure system SSD, please unplug system SSD and install it into another system and configure it as 2nd SSD. **System Disk only supports to set ADMIN password**.

4. Does A+ OPAL support to configure another brand SSD which supports TCG OPAL

Answer: A+ OPAL does not support to configure other brand SSD; user cannot see SSD list at A+ OPAL SSD INFORMATION.

5. If I forgot SID/ADMIN password, can I recover my data back or unlock my locked SSD?

Answer: if you lost/forgot your password. The only way is using PSID which printed on your label to do PSID revert, **all data will be lost**. **Please backup all data before using A+ OPAL**.

6. What is default SID/ADMIN password after running initial setup?

Answer: Default password is ADATA.

7. Can I run A+ OPAL on my all ADATA SSD?

Answer: Only ADATA IA SSD which supports TCG OPAL firmware can be run A+ OPAL.

8. I used SATA/USB adapter to connect SSD but it shows TCG OPAL is not supported and cannot be configured?

Answer: There is a combability issue on some USB adapter. Please make sure you use correct adapter.

9. Why does my ADATA Industrial SSD cannot configure TCG OPAL by using A+ OPAL?

Answer: Please make sure the SSD model which support TCG OPAL and firmware is enabled.

10. After following user guide to configure the ADATA SSD, SSD still cannot be unlocked at UEFI OS after entered correct ADMIN password.

Answer: There is a combability issue on some motherboard.

11. When I configure NVMe SSD with USB adapter, A+ OPAL PRE-BOOT AUTHENTICATION section cannot be used?

Answer: PRE-BOOT AUTHENTICATION does not support by using NVMe SSD with USB adapter. User has to install NVMe SSD into PCIe port to configure PRE-BOOT AUTHENTICATION.

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12. After using A+ OPAL to unlock the disk, why does my disk still show locked in disk management?

Answer: Please set disk offline and set online to check locked disk status.

13. What is PSID and what is ADMIN & SID password? When do I use this password?

Answer:

PSID(Physical Secure ID): It is 32 digits which was printed on the SSD/NVMe label. It is for user to reset SSD/NVMe to factory setting. All DATA will be lost after running **"PSID Revert".**

ADMIN password: This password is for user to setup all TCG configuration and login in pre-boot image. This password is for **"Set Locking Range"**(Unlock/Read Only/Unlock)、**"Unlock USB"**、**"Pre-boot Image"**(Enable/Disable)、**"Revert No Erase"**、**Locking Information"** and Log in Pre-boot image.

SID password: This password is for user to remove TCG OPAL configuration. It is for **"Revert Tper"**.

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