



# **Recovery Media Creation Guide**

**Based on Active Backup for Business 2.1.0**

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# Introduction

Synology Active Backup for Business is a business-wise and all-in-one backup solution that supports backing up physical devices including Windows PCs and Windows servers. With this solution, you can create recovery media to restore an entire device either automatically or manually.

Recovery media must be created manually if the device intended to be restored is running a 32-bit version of Windows or contains specific driver versions, time zone, or language. However, recovery media can be created automatically if the device intended to be restored is not running a 32-bit version of Windows and does not contain specific drivers, time zone, and language. We recommend you to create recovery media automatically, if possible, because this method is easier.

This Recovery Media Creation Guide details the methods for creating recovery media automatically or manually. Please refer to the following chapters detailing the methods, requirements, limitations, and processes of recovery media creation.

# Method 1: Automatically Create Recovery Media

**Synology Active Backup for Business Recovery Media Creator** is a desktop tool affiliated to our business data protection solution — Active Backup for Business. This automated tool is designed for administrators to effectively and automatically create recovery media to perform bare-metal or volume-level restore. Administrators can adopt this tool if the device intended to be restored is not running a 32-bit version of Windows and does not contain specific drivers, time zone, and language. This tool will create a 64-bit recovery media, and the language and time zone of the media will be the same as the device that creates recovery media. If the device intended to be restored is running a 32-bit version of Windows, please refer to [Method 2: Manually Create Recovery Media](#) for more details.

You can click [here](#) to download this tool and use it to create recovery media if all the default settings do not need to be changed and no further customization is required. You only need to download **Synology Active Backup for Business Recovery Media Creator** when creating recovery media automatically. The tool **Synology Active Backup for Business Recovery Wizard** is embedded in **Synology Active Backup for Business Recovery Media Creator** and therefore does not need to be downloaded and installed additionally. The following sections will guide you through how to use this tool.

## System Requirements and Supported Media Types

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### System Requirements

- Windows 7 (all editions)
- Windows 10 (all editions)
- Windows Server 2008 R2 and onward

### Supported Media Types

#### A USB drive:

- Required capacity: 1 GB
- Required local system volume storage capacity for temporary files: 2.5 GB
- Supported recovery model: UEFI 64-bit

#### An ISO image:

- Required capacity: 1 GB
- Required local system volume storage capacity for temporary files: 2.5 GB
- Supported recovery model: Legacy/UEFI 64-bit

## Create USB Recovery Media

To create USB-based recovery media, please insert a USB drive with enough capacity (1 GB at least) into your device first, otherwise there will be no available USB drive for you to select. Afterward, launch **Synology Active Backup for Business Recovery Media Creator** and select **USB media**.



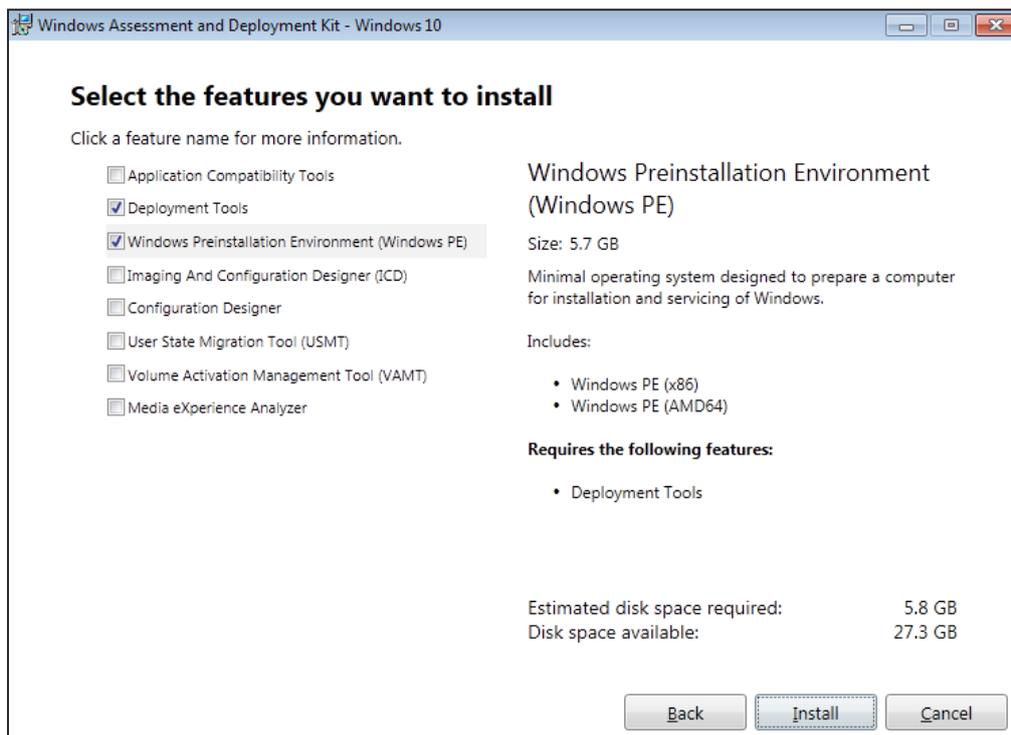
## Windows ADK Installation

A pop-up notification will appear if no Windows ADK is detected. Click **Download** and the wizard will guide you through the entire Windows ADK installation process. Please make sure you have already installed the Windows ADK and Windows PE.

**Deployment Tools** and **Windows Preinstallation Environment (Windows PE)** are the only two features required for building recovery media (see the image on the next page). Installing the Windows ADK may take a few minutes. If you want to download the **Windows Assessment and Deployment Kit (Windows ADK)** in advance, we recommend downloading version **1803**.

### Note:

- Starting with Windows 10 (version 1809), **Windows Preinstallation Environment (Windows PE)**, which is required for creating recovery media, is released separately from the Windows ADK. To create recovery media, both the Windows ADK and WinPE packs need to be downloaded and installed. For more information, please refer to Microsoft's article [Create bootable WinPE media](#).
- Internet connection must be available when downloading and installing the Windows ADK. Under the circumstances where you cannot use the online ADK installer with GUI, please refer to Microsoft's article [Install the Windows ADK offline](#) for more information.
- WinPE for Windows 10 (version 1803) is the suggested WinPE version to be downloaded and installed through the Windows ADK. To further verify its compatibility with the environment of your device, please refer to Microsoft's article [What's New in Windows PE](#).



## Select the Target USB Drive

All of the detected USB drives will be listed in the drop-down menu on Synology Active Backup for Business Recovery Media Creator. Please select a target USB drive and then click **Create** to start the automated recovery media process. Please note that this action cannot be undone once the creation process of USB media has started. Please make sure you want to proceed with USB media creation before you start the recovery media process.

## Time Zone and Language Settings

Synology Active Backup for Business Recovery Media Creator automatically detects and applies the local time zone and language to the created recovery media. The default settings will be applied if the local time zone and language cannot be detected, and the default time zone and language are **Pacific Standard Time (PST)** and **English**, respectively. Please note that the time zone settings may affect the backup time of the recovery media version shown in [Synology Active Backup for Business Recovery Wizard](#), which can be downloaded from [Download Center](#).

## Boot Recovery Media

After the recovery media has been created, a message will appear on the progress bar at the bottom of the tool. Click **Finish** to open the USB device that should have been renamed as Syno Media. Please insert the USB drive onto the device intended to be restored, and then reboot the device. Press **F2** to enter the BIOS mode. Please note that this hotkey may vary according to different vendors. Afterward, navigate to the **Boot** tab, and prioritize **Removable Devices**. Exit the setup process and you will be directed to [Synology Active Backup for Business Recovery Wizard](#), which will start the recovery process automatically.

### Note:

Synology Active Backup for Business Recovery Wizard does not need to be additionally downloaded and installed because it is embedded in Synology Active Backup for Business Recovery Media Creator.

## Create ISO Recovery Media

System volume of at least 2.5 GB is required for creating recovery media in ISO format because creating an ISO image itself will occupy 1 GB, and the temporary files will occupy the remaining 1.5 GB. Afterward, launch **Synology Active Backup for Business Recovery Media Creator** and select **ISO media**.



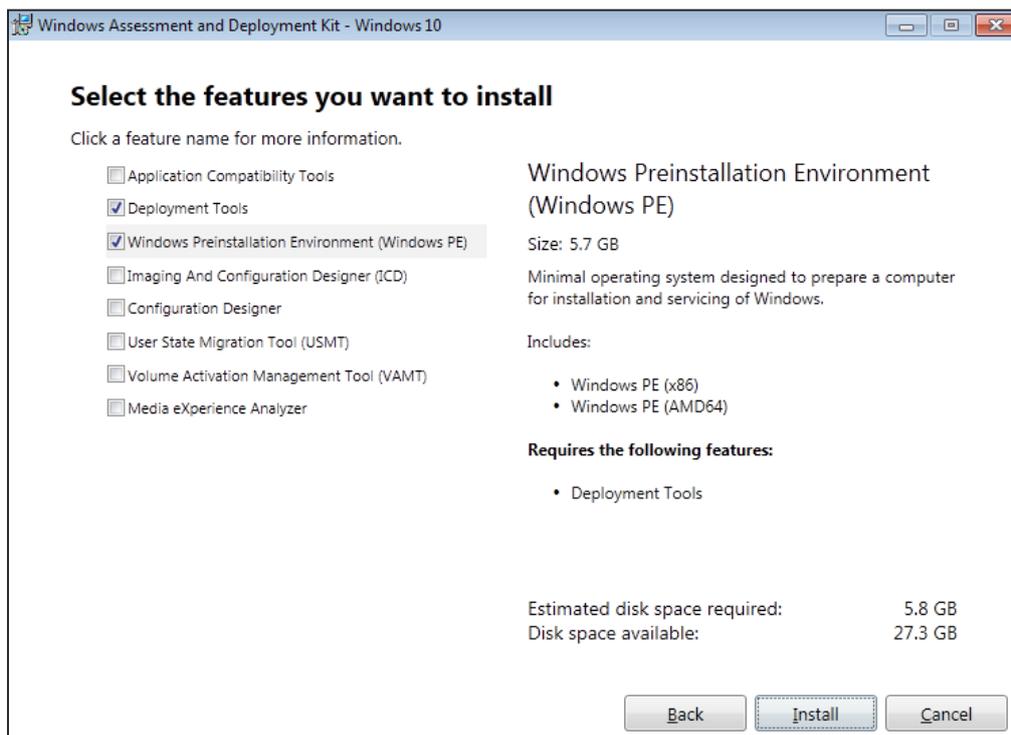
## Windows ADK Installation

A pop-up notification will appear if no Windows ADK is detected. Click **Download** and the wizard will guide you through the entire Windows ADK installation process. Please make sure you have already installed the Windows ADK and Windows PE.

**Deployment Tools** and **Windows Preinstallation Environment (Windows PE)** are the only two features required for building recovery media (see the image on the next page). Installing the Windows ADK may take a few minutes. If you want to download the **Windows Assessment and Deployment Kit (Windows ADK)** in advance, we recommend downloading version **1803**.

### Note:

- Starting with Windows 10 (version 1809), **Windows Preinstallation Environment (Windows PE)**, which is required for creating recovery media, is released separately from the Windows ADK. To create recovery media, both the Windows ADK and WinPE packs need to be downloaded and installed. For more information, please refer to Microsoft's article [Create bootable WinPE media](#).
- Internet connection must be available when downloading and installing the Windows ADK. Under the circumstances where you cannot use the online ADK installer with GUI, please refer to Microsoft's article [Install the Windows ADK offline](#) for more information.
- WinPE for Windows 10 (version 1803) is the suggested WinPE version to be downloaded and installed through the Windows ADK. To further verify its compatibility with the environment of your device, please refer to Microsoft's article [What's New in Windows PE](#).



## Specify the ISO Image Path

To create ISO media, please define the directory for storing the recovery media once it is ready in ISO format. Click  to browse and select the target directory.

## Time Zone and Language

Synology Active Backup for Business Recovery Media Creator automatically detects and applies the local time zone and language to the created recovery media. The default settings will be applied if the local time zone and language cannot be detected, and the default time zone and language are **Pacific Standard Time (PST)** and **English**, respectively. Please note that the time zone settings may affect the backup time of the recovery media version shown in [Synology Active Backup for Business Recovery Wizard](#).

## Boot Recovery Media

After the recovery media has been created, a message will appear on the progress bar at the bottom of the tool. Click **Finish** to open the directory for storing the ISO image. You can either mount the image onto the virtual machine intended for restoration, or burn the image into a disk by using a third-party tool and then insert the disk into the device that you want to restore. Reboot the device and press **F2** to enter the BIOS mode. Please note that this hotkey may vary according to different vendors. Afterward, navigate to the **Boot** tab, and prioritize the order of **CD-ROM Drive**. Exit the setup process and you will be directed to [Synology Active Backup for Business Recovery Wizard](#), which will start the recovery process automatically.

### Note:

Synology Active Backup for Business Recovery Wizard does not need to be additionally downloaded and installed because it is embedded in Synology Active Backup for Business Recovery Media Creator.

## Cancel Recovery Media or Troubleshoot Failure

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To cancel a recovery media creation that is in progress, simply close the application interface. The cancellation process may take a while because of the time required for unmounting the mounted files and deleting the unfinished pack. If a specific stage of the creation process fails, Synology Active Backup for Business Recovery Media Creator will automatically finish the current stage, and then unmount and delete **boot.wim**. However, recovery media created in USB format cannot be rolled back once the creation process has begun.

If recovery media creation fails during the creation process, please open the extracted folder named **Synology Restore Media Creator** and fetch the log titled **restore-media.log** and send it to Synology Technical Support to receive further assistance.

# Method 2: Manually Create Recovery Media

Recovery media must be created manually if the device intended to be restored is running a 32-bit version of Windows or contains specific driver versions, time zone, or language. The following sections guide you through how to create recovery media manually.

## System Requirements and Limitations

---

### Prerequisite Environment

To manually create recovery media, a Windows 7 or above building environment with Internet connection is required. The RAM on the target device must be larger than 512 MB. Before customizing the recovery media, a CD/DVD rewritable drive or a flash drive needs to be attached to the device.

### PE-based Recovery Media

PE-based recovery media contains **Windows Pre-installation Environment (WinPE)**, which is a small Windows operating system for installing, deploying, and repairing the Windows operating system of desktops and servers that have crashed or are unbootable. The recovery media also contains **Synology Active Backup for Business Recovery Wizard** that allows you to restore your device in the pre-installation environment.

To obtain the Windows PE, please download and install the **Windows Assessment and Deployment Kit (Windows ADK)** from Microsoft Windows. Please refer to the section [Download and Install the Windows ADK](#) for more information.

**Note:**

- Recovery media based on WinPE 3.0 or above have enabled dynamic loading of the necessary device drivers. Therefore, we recommend you to use WinPE for Windows 10 that supports better hardware compatibility and reduces the efforts on copying and installing drivers.
- For more information on the compatibility of each WinPE version, please refer to Microsoft's article [What's New in Windows PE](#) for more information.
- Recovery media can be built either for x86 or x64 architecture. An x86-supported recovery media is required for an x86 architecture device.
- The 32-bit version of Windows PE can boot 32-bit Unified Extensible Firmware Interface (UEFI), BIOS PCs, and 64-bit BIOS PCs. The 64-bit version of Windows PE can boot 64-bit Unified Extensible Firmware Interface (UEFI), BIOS PCs, and 64-bit BIOS PCs. For more information on the partition style when setting up Windows, please refer to Microsoft's article [Windows Setup: Installing using the MBR or GPT partition style](#).
- Internet connection must be available when downloading and installing the Windows ADK. Under the circumstances where you cannot use the online ADK installer with GUI, please refer to Microsoft's article [Install the Windows ADK offline](#) for more information.

### Administrative Permission

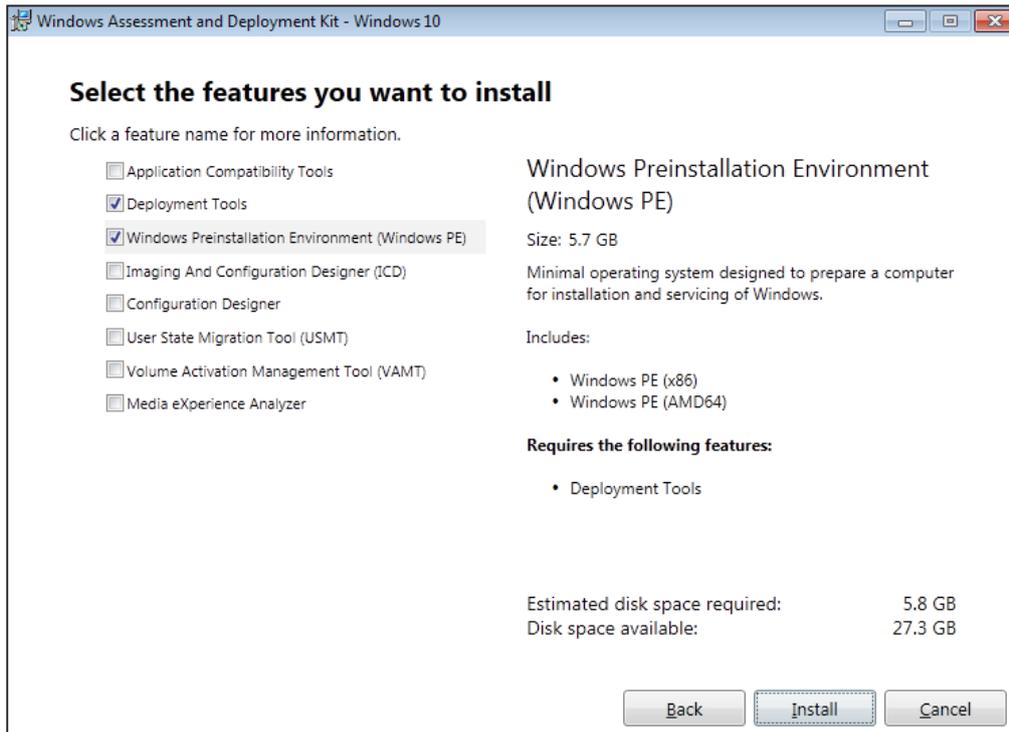
The entire process of creating recovery media requires users with local administrative permission to use the command-line interface (CLI). Right-click the CLI icon and choose **Run as administrator** to begin.

# Create Recovery Media with the Windows ADK

## Download and Install the Windows ADK

You must download and install the **Windows ADK** to create recovery media. We recommend downloading and installing version **1803** if you want to create recovery media.

**Deployment Tools** and **Windows Preinstallation Environment (Windows PE)** are the only two features required for building recovery media (see the image below). Installing the Windows ADK may take a few minutes.



### Note:

- Starting with Windows 10 (version 1809), **Windows Preinstallation Environment (Windows PE)**, which is required for creating recovery media, is released separately from the Windows ADK. To create recovery media, both the Windows ADK and WinPE packs need to be downloaded and installed. For more information, please refer to Microsoft's article [Create bootable WinPE media](#).
- Internet connection must be available when downloading and installing the Windows ADK. Under the circumstances where you cannot use the online ADK installer with GUI, please refer to Microsoft's article [Install the Windows ADK offline](#) for more information.
- WinPE for Windows 10 (version 1803) is the suggested WinPE version to be downloaded and installed through the Windows ADK. To further verify its compatibility with the environment of your device, please refer to Microsoft's article [What's New in Windows PE](#).

## Copy Required Boot Files to WinPE

- 1 Right-click the CLI icon and select **Run as administrator** to begin.
- 2 Change the file directory by the command in this step. For example, if the path of the installed Windows ADK is `C:\Program Files (x86)\Windows Kits\10`, the command will be:

```
cd "C:\Program Files (x86)\Windows Kits\10\Assessment and Deployment Kit\Deployment Tools"
```

- 3 Enter the following command to run the `.bat` file that will read all the environment variables required for creating recovery media:

```
DandISetEnv.bat
```

- 4 Copy WinPE to this designated path. Here we use path `C:\winpe` as the example. Below is the example of the command:

```
copype.cmd amd64 C:\winpe
```

Please note that `amd64` will build the media required for the 64-bit WinPE. `amd64` is used as the example here because it is the mainstream hardware architecture. If you want to create a recovery media for a 32-bit device, the `amd64` in the example command should be changed to `x86`.

## Mount and Configure "boot.wim"

The file `boot.wim` works as the operating system of WinPE. It needs to be mounted before you copy all the necessary configurations and Synology Active Backup for Business Recovery Wizard. Below is the command for mounting `boot.wim`:

```
Dism.exe /Mount-Wim /WimFile:"C:\winpe\media\sources\boot.wim" /index:1 /MountDir:"C:\winpe\mount"
```

### Note:

If a certain hardware requires a specific driver that is not supported by the WinPE, the driver needs to be copied or included in the media during the creation process. Please refer to [Copy Drivers](#) and [Install Drivers](#) for more information.

## Download Synology Active Backup for Business Recovery Wizard

The latest version of the recovery application **Synology Active Backup for Business Recovery Wizard** can be downloaded from [Download Center](#). Whether you should download a recovery wizard with 64-bits or 32-bits depends on the previous parameter you have entered for copying files. Please download the 64-bit zip file if you had entered `amd64`, and download 32-bit zip file if you had entered `x86`.

We recommend you to create a separate folder on your hard disk and name it `ActiveBackup`, so the path would be: `C:\winpe\mount\ActiveBackup`. Afterward, extract the recovery wizard to this directory.

## Set the Time Zone

Time zone settings can be configured at this stage, and may affect the backup time of the recovery media version shown in **Synology Active Backup for Business Recovery Wizard**. You can change the time zone within the quotation marks according to your needs. Please read the list from Microsoft to consult the time zone names: [Default Time Zones](#).

```
//Set the time zone to your local time zone  
Dism.exe /Image:"C:\winpe\mount" /Set-TimeZone:"Taipei Standard Time"
```

## Configure "winpeshl.ini"

After WinPE has been initiated, the executable file **winpeshl.exe** will run automatically. **winpeshl.exe** will read the **winpeshl.ini** file. The purpose of this file is to initialize the network environment once your device has entered the WinPE environment and Active Backup Recovery Wizard has been launched.

You can create this file using notepad, and copy the following content and paste it into your notepad. Afterward, save the file as **winpeshl.ini** and move it to the directory **C:\winpe\mount\Windows\system32**.

```
[LaunchApps]
%systemroot%\System32\wpeinit.exe
%systemdrive%\ActiveBackup\ui\recovery.exe
```

### Note:

Under the circumstances where configurations of resolution and language are required, please refer to the sections [Configure Resolution](#) and [Configure Language Settings](#) for more information.

## Unmount "boot.wim"

Every adjustment made to **boot.wim** needs to be committed to become effective. If all the configurations are ready and expected to be effective, then the parameter **/COMMIT** is required:

```
Dism.exe /Unmount-Wim /MountDir:"C:\winpe\mount" /COMMIT
```

## Pack Recovery Media

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Once the configuration is ready, there are three ways to restore the device through the recovery media: restore the device to VMware through an ISO image, through a USB drive, or through other specified media.

### Pack Recovery Media into an ISO Image

Turning the media into an ISO image allows you to restore it directly on VM or burn the ISO image to CD/DVD or a flash drive with a third-party tool for future recovery. Enter the command below to pack your customized media into an ISO image:

```
MakeWinPEMedia /ISO C:\winpe C:\winpe\custom_pe_amd64.iso
```

### Pack Recovery Media into a USB Drive

- 1 Prepare a USB drive and insert it to your PC.
- 2 Identify whether the partition table pertains to MBR or GPT:  
UEFI-based PC supports both UEFI (GPT) and legacy (MBR) BIOS modes. For Legacy BIOS mode, Windows PE needs to be booted in the MBR mode in order to correctly install Windows. You can refer to Microsoft's article [Boot in UEFI or legacy BIOS mode](#) for more information.
- 3 Enter the following commands in sequence according to your partition table type (see the tables on the next page). Please note that the command in bold should be changed according to your needs.

## GPT

Step Description	Command
1 Launch the disk partition tool	diskpart
2 List all the disks on the device	list disk
3 Select which disk needs to be cleaned in the next step	select disk 2
4 Clean all the data from the previously selected disk	clean
5 Convert the partition table to GPT	convert gpt
6 Create the primary partition	create partition primary
7 Select the first partition	select partition 1
8 Format the USB's file system to FAT32 and name the USB	format quick fs=fat32 label="WinPE"
9 Assign the drive letter for the USB	assign letter="S"
10 Specify that the partition is required by the device, and prevent assigning drive letter automatically on another device	<b>gpt attributes=0x8000000000000001</b>
11 Exit	exit

## MBR

Step Description	Command
1 Launch the disk partition tool	diskpart
2 List all the disks on the device	list disk
3 Select which disk needs to be cleaned in the next step	select disk 2
4 Clean all the data from the previously selected disk	clean
5 Convert the partition table to MBR	convert mbr
6 Create the primary partition	create partition primary
7 Select the first partition	select partition 1
8 Activate the partition to be formatted	active
9 Format the USB's file system to FAT32 and name the USB	format quick fs=ntfs label="WinPE"
10 Assign the drive letter for the USB	assign letter="S"
11 Exit	exit

### Note:

The command in bold should be changed according to your needs. For example, "select disk **2**" should be changed to the corresponding disk number for your media.

4. Enter the command below to copy the customized WinPE file to the USB drive. Please note that the underlined command should be changed according to your requirement. For example, the **S** in the sample command could be changed to your assigned letter.

```
xcopy.exe c:\winpe\media /E /F S:\
```

## Preboot eXecution Environment (PXE) on Synology NAS

Preboot eXecution Environment (PXE) supports booting the WinPE loaded from PXE server via Internet connection. To configure your Synology NAS into a PXE server requires the configuration of DHCP server and TFTP server. This section guides you through how to configure DHCP, PXE, and TFTP on your Synology NAS.

- 1 Create a shared folder "PXE" on your NAS, and then go to your **DSM > Control Panel > File Services > SMB/AFP/NFS** and tick **Enable SMB service**.
- 2 Go to **My Network Places**, enter the shared folder PXE, and create a Boot folder underneath it.

```
net use y: \\Your-Remote-NAS\PXE
y:
md Boot
```

### 3 Mount and customize "boot.wim".

```
Dism.exe /Mount-Wim /WimFile:"C:\winpe\media\sources\boot.wim" /index:1 /
MountDir:"C:\winpe\mount"
```

### 4 Copy the PXE boot file to the newly created Boot folder.

```
copy C:\winpe\mount\windows\Boot\pxe\*. * y:\Boot
```

### 5 Copy the boot.sdi to the same Boot folder.

```
copy C:\winpe\media\Boot\boot.sdi y:\Boot
```

### 6 Copy the bootable WinPE image to the same Boot folder.

```
copy C:\winpe\media\sources\boot.wim y:\Boot
```

### 7 Copy the TrueType font to the Boot folder (optional).

```
copy C:\winpe\media\Boot\Fonts y:\Boot\Fonts
```

### 8 Execute the command-line interface as an administrator, and create a BCD file through the following commands:

```
// Use bcdedit.exe to create space for BCD:
bcdedit /createstore c:\BCD

// Configure the RAMDISK settings:
bcdedit /store c:\BCD /create {ramdiskoptions} /d "Ramdisk options"
bcdedit /store c:\BCD /set {ramdiskoptions} ramdisksdidevice boot
bcdedit /store c:\BCD /set {ramdiskoptions} ramdisksdipath \Boot\boot.sdi
bcdedit /store c:\BCD /create /d "winpe boot image" /application osloader

// The last command will reply a GUID, for example:
// The entry {a4f89c62-2142-11e6-80b6-00155da04110} was successfully created.

// Copy this replied GUID for the next command. Please replace the GUID1 with your GUID in the following
command:
// Create a new boot record for the Windows PE image:
bcdedit /store c:\BCD /set {GUID1} device ramdisk=[boot]\Boot\boot.
wim,{ramdiskoptions}
bcdedit /store c:\BCD /set {GUID1} path \windows\system32\winload.exe
bcdedit /store c:\BCD /set {GUID1} osdevice ramdisk=[boot]\Boot\boot.
wim,{ramdiskoptions}
bcdedit /store c:\BCD /set {GUID1} systemroot \windows
bcdedit /store c:\BCD /set {GUID1} detecthal Yes
bcdedit /store c:\BCD /set {GUID1} winpe Yes

// Configure BOOTMGR settings (Please remember to replace the GUID1 with your own GUID):
bcdedit /store c:\BCD /create {bootmgr} /d "boot manager"
bcdedit /store c:\BCD /set {bootmgr} timeout 30
bcdedit /store c:\BCD -displayorder {GUID1} -addlast
// Copy this BCD file to the shared folder "Boot"
copy c:\BCD y:\Boot\BCD
```

9 Copy `bootmgr.exe` and `pxeboot.n12` to `y:\Boot\`

```
copy y:\Boot\bootmgr.exe y:\bootmgr.exe
copy y:\Boot\pxeboot.n12 y:\pxeboot.n12
```

10 Log in to your DSM, go to **Control Panel > File Services > TFTP** and tick **Enable TFTP service**, and then configure your root directory.

11 Enable DHCP server from **Control Panel > DHCP Server > Network Interface**.

12 Enable PXE from **Control Panel > DHCP Server > PXE** and configure the bootloader.

13 Follow the steps below to configure the recovery machine: enter the BIOS mode and then enable and prioritize the Wake-on-LAN (WOL). In this way, you will be able to access WinPE via PXE.

## **Boot Recovery Media (ISO Image or USB Drive)**

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After you have mounted the ISO image or attached the USB drive to the device intended for restoration, press **F2** to enter the BIOS mode once your device has been rebooted. Please note that this hotkey may vary according to different vendors. Afterward, navigate to the **Boot** tab, and prioritize the order of **CD-ROM Drive** and **Removable Devices** according to where the recovery media is located. Exit the setup process and you will be directed to [Synology Active Backup for Business Recovery Wizard](#), which will start the recovery process automatically.

# Appendix

## Copy Drivers

---

If a certain hardware requires a specific driver that is not supported by WinPE, the driver should be copied to and included into the recovery media when creating the media. Once the image is mounted during the restoration, the driver can be installed onto the device by clicking **Synology Active Backup for Business Recovery Wizard > Load Drivers** after entering WinPE.

Because the WinPE version suggested previously in this Guide contains a broader hardware compatibility, the aforementioned situation rarely happens in this version. This step is therefore optional.

## Install Drivers

---

You can also directly install the drivers into the WinPE operating system. In this way, the specific drivers that you need will be prepared in the operating system without manually loading them upon booting the recovery media.

You can refer to the article [Add and Remove Drivers to an offline Windows Image](#) for more detailed commands regarding this installation.

```
// When installing a specific driver, you can add parameter /ForceUnsigned to allow unsigned drivers:  
Dism.exe /Image: "C:\winpe\mount" /Add-Driver /Driver:"path-to-driver/driver-  
name.inf"
```

```
// When installing all the drivers in the folder, you can add parameter /ForceUnsigned to allow unsigned  
drivers:  
Dism.exe /Image:"C:\winpe\mount" /Add-Driver /Driver:"path-to-driver" /Recurse
```

## Configure Resolution

---

The default resolution of WinPE is 800 x 600. If you wish the resolution during restoration is higher, a graphic card driver is required. Without the graphic card driver, the resolution you have configured will not be applied. Only the resolution supported by WinPE will be applied.

To change the resolution, please add the file named "unattend.xml" under the directory **C:\winpe\mount\** along with the following commands:

```
<?xml version="1.0" encoding="utf-8"?>
<unattend xmlns="urn:schemas-microsoft-com:unattend">
<settings pass="windowsPE">
<component name="Microsoft-Windows-Setup">
processorArchitecture="amd64"
publicKeyToken="31bf3855ad364e35" language="neutral"
versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIConfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<Display>
<ColorDepth>32</ColorDepth>
<HorizontalResolution>1024</HorizontalResolution>
<VerticalResolution>768</VerticalResolution>
<RefreshRate>60</RefreshRate>
</Display>
<EnableNetwork>>true</EnableNetwork>
<EnableFirewall>>true</EnableFirewall>
</component>
</settings>
</unattend>
```

## Configure Language Settings

---

WinPE for Windows 10 does not support downloading the SDK dedicated for a specific language. Only English is supported.

If you want the user interface to support other languages, the language packs and fonts are required to be installed. Configurations of the display language on the user interface and system locale are also required.

If your architecture is amd64, please configure the language settings through the file **WinPE\_OC**s. We suggest to first copy the file to **C:\winpe** to avoid unexpected space error from occurring and to ensure a smoother process.

Access the file **WinPE\_OC**s through the following path:

```
C:\Program Files (x86)\Windows Kits\10\Assessment and Deployment Kit\Windows
Preinstallation Environment\amd64\WinPE_OC
```

To configure the language settings, please follow the formats for relevant commands shown on the next page. Here we use Traditional Chinese as the example.

```
// Install the Language packs for Traditional Chinese:
Dism.exe /Image:"C:\winpe\mount" /Add-Package /PackagePath:"C:\winpe\WinPE_OC\s\
zh-tw\lp.cab"

// Install the font:
Dism.exe /Image:"C:\winpe\mount" /Add-Package /PackagePath:"C:\winpe\WinPE_OC\s\
WinPE-FontSupport-ZH-TW.cab"

// Set the UI language to be Traditional Chinese:
Dism.exe /Image:"C:\winpe\mount" /Set-UILang:zh-tw

// Set the regional language to be Traditional Chinese:
Dism.exe /Image:"C:\winpe\mount" /Set-UserLocale:zh-tw
```

## Add Certificate to WinPE Image

---

This section will guide you through how to add a root certificate to an WinPE image.

- 1 Mount the WinPE image to a temporary location on your computer with DISM. For example:

```
c:\path\to\mount
```

- 2 Import the offline registry hive to a temporary hive in your host registry.

```
reg load HKLM\OFFLINE c:\path\to\mount\Windows\System32\config\Software
```

- 3 Copy the key of the root certificate.

```
reg copy HKEY_LOCAL_MACHINE\Software\Microsoft\SystemCertificates\AuthRoot\
Certificates HKEY_LOCAL_MACHINE\OFFLINE\Microsoft\SystemCertificates\AuthRoot\
Certificates /s /f

reg copy HKEY_LOCAL_MACHINE\Software\Microsoft\SystemCertificates\CA\Certificates
HKEY_LOCAL_MACHINE\OFFLINE\Microsoft\SystemCertificates\CA\Certificates /s /f

reg copy HKEY_LOCAL_MACHINE\Software\Microsoft\SystemCertificates\ROOT\
Certificates HKEY_LOCAL_MACHINE\OFFLINE\Microsoft\SystemCertificates\ROOT\
Certificates /s /f
```

- 4 Remove the registry that you have loaded.

```
reg unload HKLM\OFFLINE
```

- 5 Now, the root certificate is added to the WinPE image.