



## **Booting BartPE With RDX**

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## Introduction

As an example of a novel approach to using RDX®, this whitepaper introduces the idea of booting the BartPE “Preinstalled Environment” from an RDX cartridge. BartPE provides a bootable environment based on Microsoft Windows® installation and setup CD’s. Much more information about BartPE is available from the PEBuilder website<sup>i</sup>.

### ***BIOS USB Boot Support***

USB boot is a relatively new concept as of the time of the draft of this whitepaper. Older system BIOS may not support USB boot, or may support boot with limitations. Before attempting to install a USB bootable operating system it may be a good idea to check for any available system BIOS upgrades. Most new system BIOS includes a boot order menu which can be used to configure and enable USB boot options. Consult your system BIOS documentation for more specific instructions.

### ***BIOS SATA Boot Support***

At the time of this writing, there are no known BIOS which support boot from SATA ATAPI removable disk devices. For the time being, there does not exist a good way to boot a system using the SATA RDX. As removable disk SATA devices become more prevalent this situation is likely to change.

## Tools Required

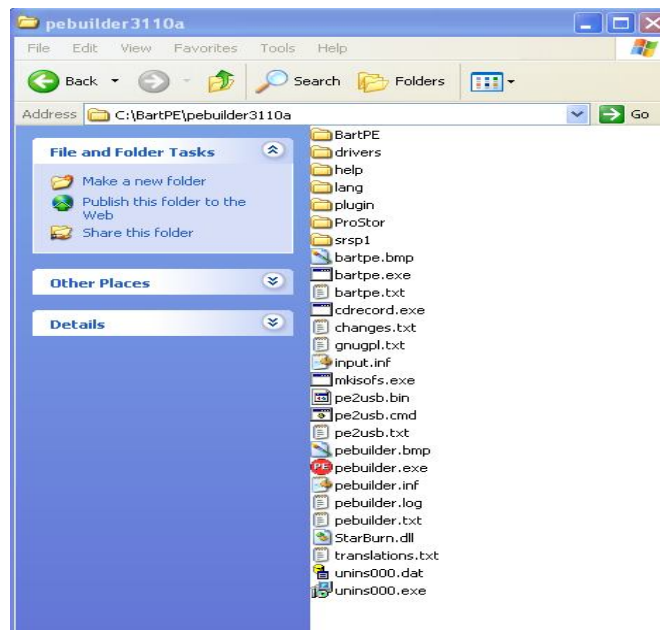
This section outlines the tools required to setup a bootable BartPE RDX cartridge. More information about using these tools will be included in following sections.

- One RDX cartridge (Note: any user data on this cartridge will be destroyed.)
- One USB RDX drive.
- ProStor supplied utilities ZIP folder, downloadable from the rdxstorage.com website<sup>ii</sup> and included with this whitepaper.
- A Windows XP or 2003 Installation CD.
- The Windows Server 2003 Service Pack 1 installation executable, downloadable from Microsoft at: <http://support.microsoft.com/kb/889100/>
- The “secinspect.exe” program, downloadable from Microsoft at: <http://www.microsoft.com/downloads/details.aspx?FamilyID=dd3ef22a-a586-4079-9489-c3ea14573fc4&DisplayLang=en>
- The AvEL LinkFormatter utility, downloadable from [http://www.iodata.com/usa/products/AVLP2\\_SW.php#SW](http://www.iodata.com/usa/products/AVLP2_SW.php#SW) and installed on a Windows 2003/XP system.
  - Other FAT32 formatting utilities may work, however it is necessary that the disk is formatted with a partitioned layout complete with master boot record and NOT in superfloppy format (this is the default format used by Microsoft FORMAT.EXE on Windows XP and 2003 systems.)
- BartPE PEBuilder, downloaded from <http://www.nu2.nu/pebuilder/download/>

## Installation Steps

This section is meant to be a step-by step list of the installation process. Any data to be typed at the command prompt is printed in *italics*.

1. **Download and install BartPE's PEBuilder utility to a folder on your hard drive (C:\BartPE will work.)**
  - The PEBuilder executable is available from <http://www.nu2.nu/pebuilder/download/>
  - You do not need to launch PEBuilder yet, just install source to a folder on your hard drive.
  - PEBuilder version 3110a is the only version currently tested.
2. **Download the ProStor Utilities .zip file from the ProStor website and extract the contents into the "pebuilder3110a" folder.**
  - Folder names may vary based on the version of PEBuilder used.
  - This step will create a "ProStor" folder in the BartPE tree.
3. **Download the Service Pack for Windows Server 2003 by following the links on the support page at <http://support.microsoft.com/kb/889100/>. Place the downloaded .exe file in the "WinServer2003SP1" folder of the "ProStor" folder created above.**
  - Do this step even if you are using a Windows XP installation CD. You do not need a valid Win 2003 Server installation to download these files.
4. **Run *excpy.bat* in the "ProStor\WinServer2003SP1\batch" folder of the ProStor utilities tree created in step 2.**
  - Double click on the file or run from the command line.
  - The batch file *excpy.bat* extracts and copies the files *ramdisk.sys* and *setupldr.bin* into a new folder "srsp1" at the pebuilder root. At the completion of this step, your source tree should look like the following picture.



5. **Place a Windows XP or 2003 installation disk in your CDROM drive. Start "pebuilder.exe" in your PE builder installation directory. Set the "Source: (path to Windows installation files)" edit box to the drive letter of your CDROM drive. Press the "Build" button to build BartPE.**

- Check closely for any errors or warnings that occur in this process, as these may keep your boot image from working correctly. Use the arrow buttons to scroll between error/warning messages.
- When using a Dell XP OEM install CD, you will most likely see the following warnings:
  - Warning: file “iastor.sys” not found
  - Warning: file “a320raid.sys” not found
  - Warning: file “aac.sys” not found
  - Warning: file “aarich.shs” not found

To resolve these errors, copy and paste the folder “Prostor\dellfix” from into the “pebuilder3110a\plugin” folder and re-run the pebuilder process (Step 5.) (The dellfix files were taken from the FAQ item at <http://www.nu2.nu/pebuilder/faq/#26>.)

You can typically ignore the warning “Using an OEM CD can mean trouble” if no other warnings or errors occur.

#### 6. Place the downloaded “Sector Inspector” application (secinspect.exe) into the “ProStor\secinspect” folder.

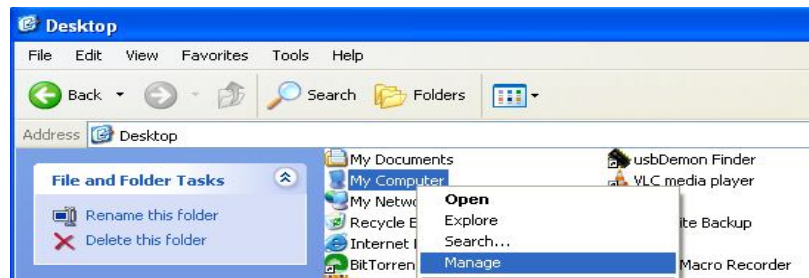
- Download Sector Inspector from Microsoft at <http://www.microsoft.com/downloads/details.aspx?FamilyID=DD3EF22A-A586-4079-9489-C3EA14573FC4&displaylang=en> or by searching the Microsoft site for “Sector Inspector.”
- Typically the .exe is installed to C:\Program Files\Windows Resource Kits\Tools. Copy and paste to the “ProStor\secinspect” folder of the PEBuilder tree.

#### 7. Use AVer LinkFormatter to format the RDX cartridge FAT32 (download from [http://www.iodata.com/usa/products/AVLP2\\_SW.php#SW](http://www.iodata.com/usa/products/AVLP2_SW.php#SW))

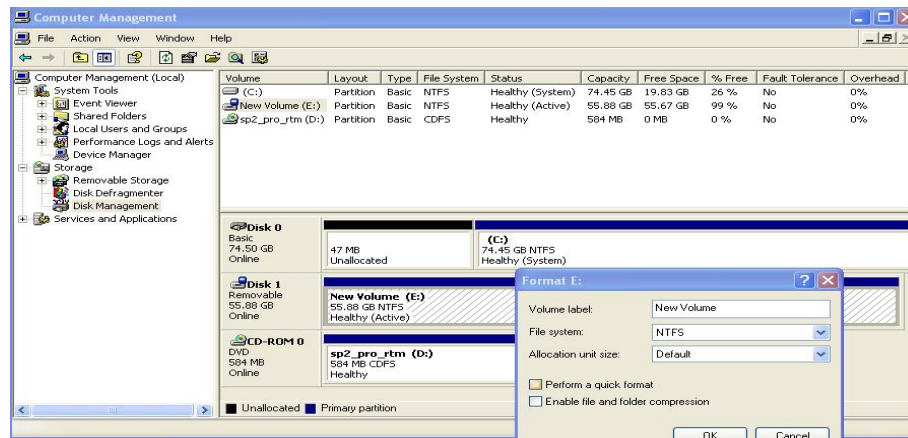
- With the USB drive plugged into your system, insert the cartridge to be formatted. **ALL USER DATA ON THIS DISK WILL BE LOST.**
- Use the AVer LinkFormatter utility to format the cartridge FAT32 by selecting the drive in the drop-down box and selecting “Next.”
- Select “I accept precautions” to accept formatting precautions.
- Press the “Execute” button to format the cartridge.
- For those who may be curious, additional information about why this step is necessary follows below.
  - The true reason for this step was not to setup a FAT32 format on the cartridge, but to create a Master Boot Record (MBR). The default Windows formatting utility creates a “superfloppy” format on an un-initialized disk which does not include an MBR and does not support boot. However, if an MBR has been placed on the disk using a third party tool (such as LinkFormatter) the Windows NTFS formatting utility will write NTFS format to the existing partition and leave the MBR as-is, thereby supporting boot on the new NTFS partition. We will re-format with NTFS once again in the next step, replacing the FAT32 format but keeping the MBR written by the LinkFormatter utility.
  - An alternative to this step would be to use the *fdisk* command on a Linux® system to create a partitioned cartridge before formatting NTFS.

**8. Re-format the cartridge with NTFS (now with a partition table and MBR) through the “Disk Management Console.”**

- Eject the cartridge and re-insert. Make sure all disk management pages are closed. Open the Management Console by selecting “Manage” in the right-click menu of the “My Computer” icon on the desktop.

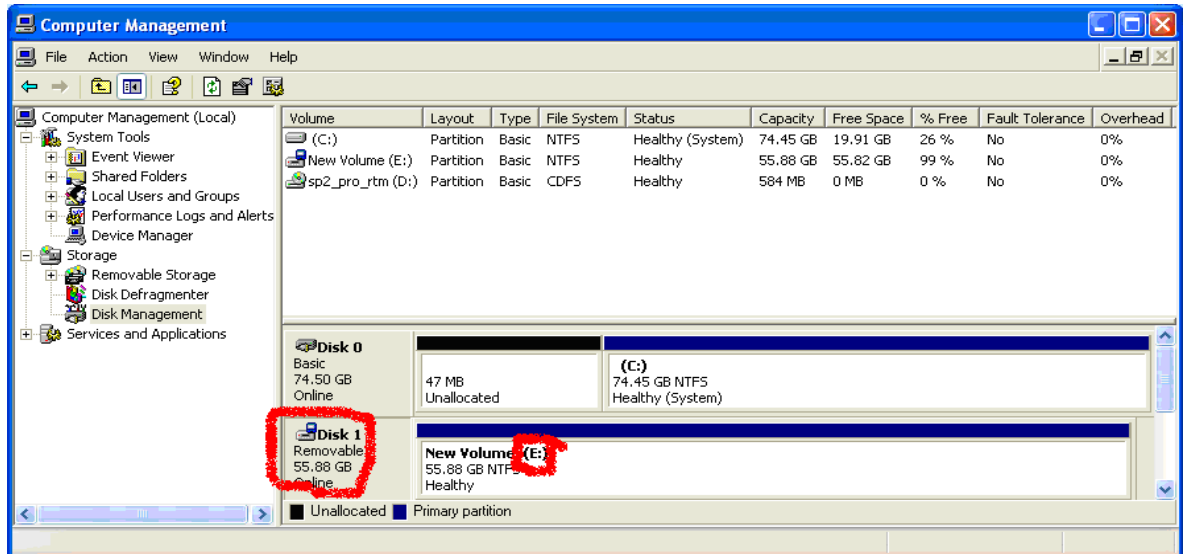


- Select the “Disk Management” console. Right click on the drive letter of the RDX drive and select the “Format” option. Select “Perform a quick format” and press OK.



9. Open the Disk Management console once again. Take note of the “Disk” and volume label (in parenthesis) of the RDX drive. Modify “Prostor\script\DiskDefines.bat” with the correct disk number and volume label.

- Instructions on starting the Disk Management console may be found in Step 8.
- Example Disk and Volume letters are shown below (in this case Disk 1 and Volume letter E.)

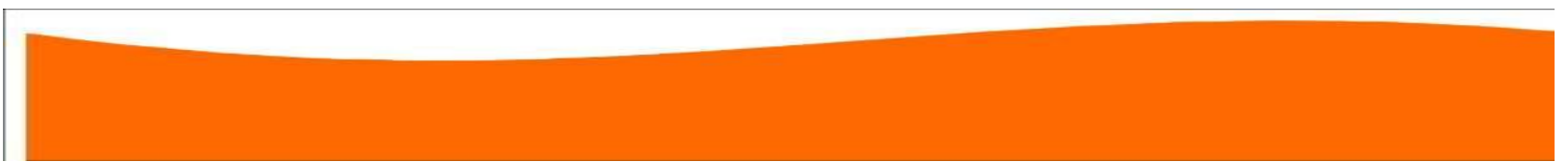


- From Windows Explorer, right-click on “ProStor\script\DiskDefines.bat” and select “edit” to bring up a text editor. Set the values obtained from the Disk Management console above into the variables PhysicalDiskNumber and VolumeLabel as shown below.

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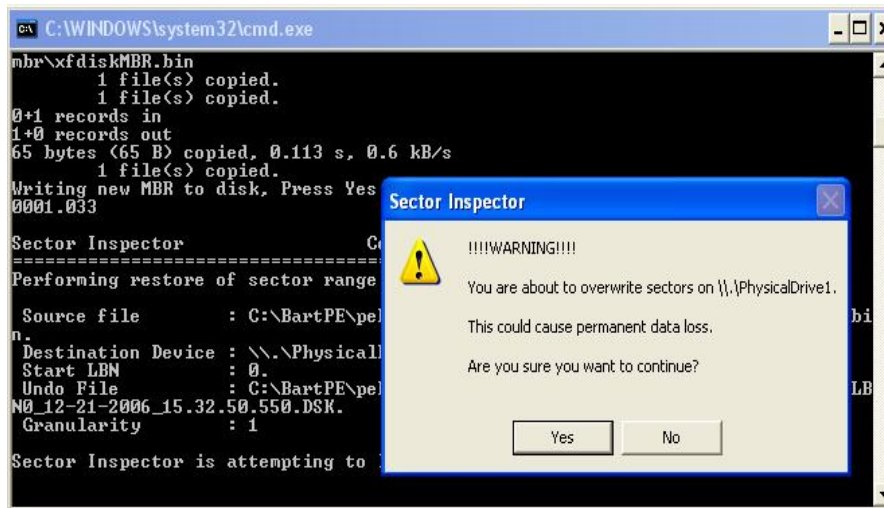
:: Example Settings:
:: set PhysicalDiskNumber=1
:: set VolumeLabel=E
::
:: Set appropriate values here based on your system configuration
set PhysicalDiskNumber=1
set VolumeLabel=E
    
```

DiskDefines.bat



**10. From Windows Explorer, double click on the “Prostor\script\MakeBootable.bat” batch file to start creation of the bootable cartridge.**

- The “MakeBootable.bat” file completes the following steps with minimal user intervention:
  - Backs up the Master Boot Record (MBR) of the installed cartridge.
  - Adds bootcode to the MBR from the xfdisk<sup>iii</sup> project using UnixUtils<sup>iv</sup> and the dd command.
  - Writes the MBR back to disk. At this point you will see a confirmation prompt as shown below.



- Double check that the drive number shown in the “PhysicalDrive” area of the SectorInspector pop-up window matches the number set in the “DiskDefines.bat” file in the previous step and press “Yes” to continue.
  - Creates BartPE boot files on the system disk by calling “pe2usb\_mod.cmd,” a modified version of “pe2usb.cmd” taken from the BartPE forums<sup>v</sup>.
- i. When the “MakeBootable.bat” file completes you should have a bootable cartridge.

**11. Reboot the system with BIOS configured for USB boot**

- Depending on boot order, you may need to remove bootable CD or floppy disks from drives to allow boot to USB. You should now boot into BartPE from the RDX cartridge, with access to a command prompt and USB 2.0 transfer rates.
- For information about customizing BartPE with administration tools and utilities, please refer to the documentation at <http://www.nu2.nu/pebuilder/>.

## Creating Additional Boot Cartridges

Once you have setup the initial boot cartridge creation folder tree, creating additional boot cartridges is much easier. When the source tree is setup properly, executing steps 7-10 with a new cartridge installed will write the cartridge with a bootable image (all existing data on the cartridge will be lost.)

## Troubleshooting

Check the BartPE FAQ's at <http://www.nu2.nu/pebuilder/faq/>. Extensive support is also available at the 911 CD forums at <http://www.911cd.net/forums/>.

## Summary

This whitepaper demonstrates the ability of the RDX USB device to boot BartPE from an installed cartridge. Booting an operating system is a unique and useful application of the RDX removable disk device.

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## References

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<sup>i</sup> BartPE, PEBuilder, <http://www.nu2.nu/pebuilder/>

<sup>ii</sup> Rdxstorage.com whitepaper page <http://www.rdxstorage.com/support/documentation.php>

<sup>iii</sup> XFDISK, Extended FDISK, <http://www.mecronome.de/xfdisk/download.php>

<sup>iv</sup> Unix Utils, Native Win32 ports of GNU utilities, <http://unxutils.sourceforge.net/>

<sup>v</sup> 911CD Forums, Booting Bart PE from USB Drive, <http://www.911cd.net/forums/index.php?showtopic=10806&mode=threaded>