

How to migrate your Win 7 OS installation to Samsung 950 PRO NVMe RAID

With this instruction you should be able to do a number of derivative how to including setting up a RAID with 950 PRO and getting your computer to recognize it, moving Win 7, 8 or 10 current installations to a 950 PRO RAID or just to a non RAID 950 PRO, or just installing an OS on a 950 PRO RAID.

My Computer hardware details that are pertinent: Asrock Z170 Extreme 7+ motherboard, UEFI bios ver 2, Intel i7 6700K CPU, 2 x 950 PRO NVMe (512 GB) RAID 0, and Win 7 PRO SP1 installation on a Seagate Momentus XT 750 GB harddrive.

Note: Best to upgrade UEFI Bios to the new 2.11 before starting. At the bottom of this, you can read my fingers into desk upgrade of UEFI Bios to ver 2.11 after having already done all this work and have a running Win 7 OS installation on 950 Pro NMVe RAID.

Note: You should be able to do this with a number of motherboards with M.2 slot(s) because what really matters is Intel Rapid Storage Technology (RST) and RAID drivers. My Asrock motherboard does not show the 950 PROs in the UEFI M.2 slots, but more on that later. Also even though I used Win 7 Pro, I see no reason why Win 7 Home or even Vista Ultimate cannot be transferred or installed on 950 PRO singly or in RAID.

I am a big believer in backing up throughout the process either with software or a harddrive duplicator like StarTech USB/eSATA 1:1 SATA Duplicator Dock with UASP, which I used during the process. I should say I went down a few blind allies but below is the direct route.

I am writing this all from memory but I think I got it all right. I tried to write these instructions as detailed as possible so that anyone can do this. I also encourage you to read all the instructions before you start

Windows installation must be on a GPT harddrive.

If your OS installation is still on a MBR harddrive, to convert your OS to a GPT harddrive is not easy, but doable. Just not the scope of these instructions. You need to create an EFI partition (1st partition about 200MB, Fat32) and build the boot. There are some tutorials out there if you search for Create EFI or Fix EFI. You can also try Macrium Reflect Rescue Disc (which is free) which has a fix EFI boot feature on it if it can locate your OS installation and you have a partition for the EFI at the beginning of your harddrive already set.

Download and Load 950 PRO drivers

After you have successfully installed your 950 PRO(s) into M.2 slots go into your OS. Download and install drivers.

<http://www.samsung.com/global/business/semiconductor/minisite/SSD/global/html/support/downloads.html>

Direct:

http://ssd.samsungsemi.com/ecomobile/ssd/update15.do?fname=/Samsung_NVMeExpress_Driver_rev10.zip

There is also the Samsung NVMe driver install manual.

There are links to Samsung NVMe Driver v1.4.7.16 Installer Set.rar, which I used. The link I got mine no longer exists so I cannot vouch for: <http://www.win-raid.com/t29f25-Recommended-AHCI-RAID-and-NVMe-Drivers.html> that will take you to a mega drive.

You will need to use a zip program like 7-zip to open the rar file.

After the driver installation in Device Manager you will see the Samsung 950 Pro NVMe (s) in under disk drives and the controller in Storage Controller. Later if you make a RAID these drivers will be replaced with Intel Raid 0 Volume SCSI Disk Device and Intel Chipset SATA RAID Controller.

Initializing 950 PRO to GPT

If you open up disk management, you will not see the 950 PRO(s). Open a partition manager. I used MiniTool. You will see the 950 PRO(s) but they need to be initialized to GPT. You do not have to format or create a partition. Close MiniTool.

Open Disk Manager- Right click - Computer in Windows Explorer>Manage from popup menu>Disk Management. You will now see 950 PRO(s) in Disk Management.

Start Intel Rapid Storage Technology (RST)

Start Intel Rapid Storage Technology (RST) (in Programs) if it has not been started.

In it you will not see the 950 PRO(s), but will see any other SSD or hybrid drives. No worries. Go to Help>About>lower right corner, if you have anything less than ver 14.6 time to upgrade RST.

If you need RST 14.6 grab it here: <https://downloadcenter.intel.com/download/25165/Intel-Rapid-Storage-Technology-Intel-RST-RAID-Driver>

Also grab the appropriate Info RST f6flp zip file from the page as you may need it to load RST and RAID drivers if your install ends up being different. Unzip burn to CD or USB but I find USB can be unreliable to be recognized in dealing with Win 7 recovery or transfers.

Install RST 14.6. Restart Computer.

Note: If you are not making a RAID you can format your Samsung 950 Pro NVMe and skip the rest of the RAID part of these instructions and go directly to **Moving your Win 7 install to your Samsung 950 Pro NVMe RAID** down below.

Stop Intel Rapid Storage Technology (RST)

Yes, that is right we are going to stop it after installing it, but will restart it later. Go to Computer Management Window as explained earlier to get to Disk Management.

Services and Applications>Services>find Intel Rapid Storage Technology>right click>Properties> General Tab>Startup type> disable. You do not want RST to start up automatically when windows starts.

Than go lower in the General Tab to Service status and Stop. Stop RST. Close out the Computer Management Windows.

Getting Windows to load Intel RAID drivers on next boot.

Exit all programs in Windows

Click Start, type regedit in the Start Search box, and then press ENTER.

If you receive the User Account Control dialog box, click Continue.

Locate and then click the following registry subkey:

HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\IastorV

In the pane on the right side, right-click Start in the Name column, and then click Modify.

In the Value data box, type 0, and then click OK.

Go to registry subkeys:

HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\msahci

HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\iaStor

They should be 0 also but check.

In the pane on the right side, right-click Start in the Name column, and then click Modify.

In the Value data box, type 0, and then click OK

On the File menu, click Exit to close Registry Editor

Restart Computer.

Create the 950 PRO RAID in UEFI

Turn on computer and go into UEFI bios.(delete key)

Go to Advance Tab (may differ in other manufacturer interface)

Got to Storage Configuration> SATA Mode Selection>choose RAID

Selection menu will change below.

In Launch Storage OpROM policy select UEFI only.

Under this in the menu under the M.2 slot(s) that you installed the 950 PRO(s) like M.2_1 RST Pcie Storage Remapping click on and enable mapping

Save and exit.

Reboot and enter into UEFI bios again.

Got to Advance Tab and you will now see Intel Rapid Storage Technology at the bottom of the first menu. Click on it.

On this page you will create your RAID volume and you will see Samsung 950 Pro NMVe listed along with any other SSDs.

Create a Volume Name.

Select Type of Volume (I went with RAID 0, more on that later.)

Select disks to be in that volume by clicking on Samsung 950 Pro NMVe(s) and choose the “x”

After choosing the disks to be in your RAID, click the Create RAID button. Your RAID will be created and the name of your RAID will appear on this page as a RAID created.

Exit UEFI and reboot.

Note: Samsung 950 Pro NMVe never show up in the list of SATA and M.2 slots under Storage Configuration. Only under Intel RAID. Also the Asrock UEFI ver 2 uses RST 1.5 and has not been upgraded but that does not matter to set up this RAID with Samsung 950 Pro NMVe. Just as I write this Asrock upgrade their UEFI to ver 2.11 which uses RST 1.6. It does not change anything as far as these instructions and you still cannot see the Samsung 950 Pro NMVe except when building the RAID in UEFI bios.

Ok we are going to enter UEFI again.

Go to Advance Tab>Storage Configuration> Launch Storage OpROM policy > and change it back from UEFI to AHCI. Yes, you read that right.

Go back to Advance Tab menu. You can click on Intel Rapid Storage Technology in the main menu of the Advance Tab and you will see your RAID is still there.

Save and exit.

Installing RAID driver in your Windows 7 Installation

On reboot click F8 and go into safe mode. In Safe mode the Install Device Drivers (new) will start up automatically. It will load the Intel Raid driver and SSD drivers for any SSD you have on your system. Click on the install device balloon to watch the install. Strange the reboot message came up behind my install device window, so move that window, so you can know when to reboot.

Go back into the UEFI on reboot>Go to Advance Tab>Storage Configuration> Launch Storage OpROM policy > and change it back from AHCI to UEFI. Save and Exit.

Reboot and start your Windows 7 install normal.

You will now notice your 950 PRO RAID in your Windows Explorer with whatever name you gave it.

Startup Intel Rapid Storage Technology in Services and Applications reversing what you did earlier when you stopped RST. You also want it to startup automatically or automatic (delayed) for future startups.

Let RST load up and you will see your RAID in it.

This is definitely a place where you want to back up your OS.

Moving your Win 7 install to your Samsung 950 Pro NMVe RAID

Ok I think there are two ways you can do this. You can clone disk with MiniTool or Easus Partition manager. Or you can create an OS system image and load that image on to the RAID in a PreWindows Environment or in the Emergency Disk made from your imaging software. You need to create the Emergency Disk with your imaging software in your current OS so that it will hopefully include the Intel RAID Drivers. If your Emergency Disk for whatever reason doesn't include the RAID drivers, you have the RAID drivers on another disk that you made earlier in this instructions and you can load the Intel RAID driver during the startup of the Emergency Disk.

I used Easus Workstation 8.9 which is a paid program to transfer my Win 7 installation to Samsung 950 Pro NMVe RAID. I used this software because it has a system transfer tab that allows you to install drivers if needed in the WinPE. I did not need to do this as the Win PE Emergency disk included the driver and my Samsung 950 Pro NMVe RAID showed up in environment as an option. Another reason it has a place to check where you can optimize for SSD for the transfer on to the NMVe RAID. I do not know if this makes any difference

My only other bit advice is to unplug the SATA cable on one end of all unnecessary harddrives so that you only have the harddrive your OS image is on, the 950 PRO RAID, and your CD/DVD drive plugged in. It is not necessary to unplug the power on these harddrives. I also

plug the harddrive my OS image was on directly to an internal SATA and not through any external harddrive connection.

Now Comes The Cross Your Fingers Moment

After you successful transfer you OS image onto your 950 PRO RAID, do not add any hard drives. Remove your Emergency Disk and the harddrive your image was on so you only have your 950 PRO RAID. Reboot go into UEFI. Under Boot Tab make sure your first boot is the Boot Manager (RAID name that you gave it). Save Exit.

So I tried to start Win 7 normally, and in safe mode and it froze during startup, then I tried Last Known Good Configuration under F8 and I got in.

If you do not get in the after a few tries, a suggestion attach your original harddrive with OS on it. Boot into it by selecting the Boot Manager of that harddrive in the UEFI bios, then use Easy BCD to create an entry for the OS on the RAID. Reboot. Select that new entry that is on the Boot Manager of the original OS harddrive. Try both normal, safe mode, and Last Known Good Configuration. Hopefully you will get in. It will adjust and load any driver need automatically, then you can backup, disconnect the original OS harddrive and attempt to boot in the RAID OS by the RAID boot manager.

Back up like crazy once your Win OS has fully loaded. I also added all harddrives one at a time that I had unplugged while Windows 7 on RAID was live and computer on. You may have to go into Disk Management to change them from Offline to Online or they will automatically load.

After you first get in, all future startups will be normal startup as long as the Boot Manager (Intel 950 PRO RAID) is your first boot.

Initial observation Windows 7 on Samsung 950 Pro NMVe RAID

Boot time and shut down is very fast. Backup time of your OS is really fast. I went from about 2 hours to about 17 minutes. I ran the Windows Experience Index without doing any tweaks on my computer, I got 7.9 for everything but the Intel CPU was 7.8. My bottleneck now, but easy to change.

Microsoft made me reactivate my Windows 7 installation and my Microsoft Office. A bit of a pain as the only thing that changed was the RAID. No other licensed software asked me to reactivate their software.

I plan on upgrading now to Win 10 and have a copy of the Win 7 PRO installation on my RAID in a dual boot situation. May as well since I have no other computer to use the Win 7 software on and you never know when you may need it to go in and fix your running Win 10.

Thoughts on RAIDs and Backing UP

There are no RAIDs that are a backup system!

I ran a Raid 0+1 for years. It worked fine even when a harddrive went bad. Rebuild was easy. Then my motherboard started going bad (maybe my Intel chip) and one day my RAID came back as bad but I could not go into the RAID and fix it using the Intel software. For whatever reason it would not allow me to rebuild even though later I found out that all harddrives in the RAID were good. I did have backups of all pertinent information and data files, so I rebuilt this current computer.

So for me redundancy in a RAID has very little value, I may as well just have a RAID 0 and backup software that mirrors my RAID in real time or very close to real time to regular disk harddrive. This way in the event of failure, I can just use the mirror to boot into with no down time and also have time to rebuild the RAID replacing whatever went bad. A RAID 0 plus a harddrive mirror gives you all the advantage of the speed of having a RAID and a backup all for just 3 drives. Every RAID beyond 0 and 1 requires more drives and you get no backup.

CMS use to have Bounce Back that worked flawlessly at doing mirroring of a bootable harddisk with OS, but their recent Bounce Back 17 is just a repackaging Novastar backup software which from what I can tell does not have real time mirroring.

I have found two that do Comodo Backup (free) and Backup4All (not free). I have been playing around with Comodo Backup but am still figuring it out and the jury is still out as to whether it will do all of what I need it to do. It definitely has the scheduling to mirror backup in real time. I have not tried Backup4All yet. If you install Comodo Backup and do not want their Cloud Backup which is what they are selling with this free backup software, make sure you unclick cloud backup box during installation.

Imaging is fine but so many image backup software have proprietary imaging files and you have to make sure your Emergency Disk is current with small changes in your system drivers overtime that imaging is too tentative for my liking. I have had image failures so I really do not rely on imaging. Besides disk harddrives are relatively cheap so why have imaging or compression. DriveImage XML is a free imaging software with non-proprietary imaging files, so you can reinstall with a number of different rescue disks or Linux. Also I will mention Yardis (free) which is very easy to use and will backup your files over networks or to another harddrive in system. It can run continuously in the background, it just does not mirror or make a bootable harddrive mirror of your OS.

Note: So after doing all this UEFI bios ver 2.11 came out and I upgraded because I figure it would have Intel RST 14.6. I also wanted to see if the Samsung 950 Pro NMVe would popup in the M.2 slots in the UEFI bios. I thought the upgrade would keep all of my settings as a previous upgrade had. Anyway I was backed up. The upgrade did not keep all my settings. It kept the SATA Mode Selection RAID but the Launch Storage OpROM policy was changed to Legacy only and it looked like my RAID was gone. I changed the Launch Storage OpROM policy back

to UEFI only, saved and exited, rebooted, went back into UEFI bios the Intel Rapid Storage Technology menu entry came back, opened it, and my RAID was still there. I changed the Boot Manager back to the RAID and my OS booted with no problem. Also the upgrade changed my UEFI from Advanced to Easy and a few other selections. You are reading this Asrock.

That is all. If people run into problem, or I made a memory error let me know and I will refine the instructions.

Good Luck and Backup Often!