

# USB and OpenVMS



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While USB drivers for HP OpenVMS have been around since the late days of Alpha, it wasn't until HP Integrity servers refinements to USB support that have made this as another usable storage medium. This white paper will only discuss USB Mass Storage Device uses on HP Integrity servers. USB is **not** officially supported by HP.

## Uses of USB on OpenVMS

While the USB medium is slower compared to SAN or SCSI direct access disks, it is very good at backup up and restoring disks, files, and savesets. Field engineers use them to boot diagnostic media. You can even create an image copy of the OpenVMS bootable DVD and boot off it. This will boot much faster than the DVD. Additionally, not until recently the larger sized USB mass storage devices reaching north of 128 GB could even be considered for actual work. **One commonly asked question is about booting from USB.** A copy of the OpenVMS V8.4 Update 7 DVD media as it is slightly larger than 4 GB; trying to boot large system disks from this media is impractical.

### USB and OpenVMS Backup

Today, many companies use network backup products. These products usually require a valid OS to install. While the size of USB mass storage devices could be impractical with large SAN data disks, customers do use this method effectively. Most OpenVMS systems disk are between 32 and 128 GB so mounting a USB mass storage device and initializing it like a regular JBOD disk and doing an image backup to it could be a huge time saver. USB devices show up as DNAX devices.

#### How to use your USB Drive on OpenVMS

Using USB mass storage devices on OpenVMS is very straight forward. If you want to use it to take an online backup of your system disk from a running system, you need to do the following:

1. Put an adequately sized USB mass storage device into one of the USB device slots.
2. Init the USB device to insure you can see \$init DNA0: ABC
3. Mount foreign the USB device \$mount/foreign DNA0:
4. Backup your system disk on the fly \$backup/image/ignore=(lab,inter,noback) sys\$sysdevice: DNA0:

Backup times range around 45–60 minutes for a 32–64 GB system disk. Restore times are about 50% faster at around 20–30 minutes. So if you fall into the situation where you have no backup medium on your system and only rely on a network backup program, doing these “hot backups” to a USB pen/disk drive can really advance your recovery period.

#### How to find a Connected USB device

```
$SHOW DEVICE DN
```

Lists all the mass storage devices connected on the system.

```
$UCM SHOW DEVICE/BRIEF
```

This command lists all connected USB devices as shown below; this is useful if multiple mass storage devices are connected.

In the output of [figure 1](#), note that DNA2 is a SanDisk Pen drive and that DNA4 is an Iomega USB HDD drive.

**Figure 1.** UCM command output

```

$ ucm sho dev/br

Bus 0 (OHA0)
  Root Hub                - 3 port(s)

Bus 1 (OHB0)
  Root Hub                - 2 port(s)

Bus 2 (EHA0)
  Root Hub                - 5 port(s)
  3.0.0.0.0.0 -> DNA4      - Iomega Iomega Select HDD
  4.0.0.0.0.0 -> DNA2      - SanDisk Cruzer Edge
    
```

*Additional safeguards by doing USB backups.*

If HP Integrity servers with only network backup tools need a patch or an upgrade, HP strongly recommends, backup the system disk, and on rare occasions use the backup to recover to a state prior to an install. USB mass storage devices can be your recovery action plan in these cases. You will also need a bootable DVD to recover, but to be able to recover your system in under an hour using a DVD and USB pen drive is a nice tool to have in your tool bag.

## Nuts and bolts of using USB and DVD to backup and restore a system disk

### Step by step

Items needed are a bootable OpenVMS DVD and a USB mass storage device of the correct size to match the system disk. These steps will walk you through creating a “hot backup” on USB and then how to recover off that hot backup.

Here are the steps:

Creating a HOT BACKUP on the FLY

1. Insert the USB mass storage device on running system, generally first drive is DNA0: (\$sho dev DNA to be sure)
2. \$init DNAx: ABC
3. \$backup/image/ignore=(lab,inter,noback) sys\$sysdevice: DNAx:
  - A. Backups will take 30–60 minutes depending on the size (Make note of the files not backed up)
  - B. When backup is complete and you are ready to test a restore here are the steps
    - i. Shutdown the system and boot off of the OpenVMS V8.4 Update 7 media
    - ii. When the system has booted off DVD, using the menu, exit to DCL
    - iii. At this point insert the USB mass storage device with the “Hot Backup” into the system (doing this earlier may result in issues)
    - iv. In some scenarios, you may need to run the following to get the USB mass storage device seen
      - a. RUN /DETACHED SYS\$SYSTEM:USB\$UCM\_SERVER.EXE /process\_name=UCMSERVER
      - b. \$mount/over=id DNA0:
      - c. \$mount/foreign recovery\_device:
      - d. \$backup/image/ignore=(lab,inter,noback) DNA0: recovery\_device:
  - C. See caveats below as there are more steps needed to make this recovery device bootable.

## Some caveats after the disk is restored

First, if an INIT was performed in the backup statement then a new GUID signature file is created and before you attempt to boot, even if restoring to the same drive, you will need to run `$_sys$manager:boot_options`. You will have to either use option 5 from the screen, which reads as “validate boot options and fix them as necessary” and validate the `boot_options` or remove and re-add the recovered disk in `boot_options`. Ensure you read the additional steps below before running these commands. Also, make sure the new disks boot order number is correct.

You must make sure that you use these switches in both backup and restore: `/ignore=(lab,inter,noback)`

At this point, you should be OK to boot from your newly created disk drive. However, if the backup wasn't taken with the proper switches and doesn't reboot, these measures below can help save USB backup and make it bootable again.

When using the V8.4 Update 7 DVD, it is imperative that you do not put the USB pen drive in the machine until it has completely booted off DVD

1. You might face a situation where `$backup/image/init` was causing issues with the bootblock and page/swap files thus causing the “Hot Backup” recovered disk not to boot and for that reason you can add these steps should you need to repair the newly created drive to be a bootable disk. You would need to boot off a bootable DVD or USB and follow these steps to get your backup of the USB mass storage device seen.

You may need to run below if you do not see your DNAx device

**RUN /DETACHED SYS\$SYSTEM:USB\$UCM\_SERVER.EXE /process\_name=UCMSERVER**

- A. `$mount/over=id recovery_device:`
- B. `$set bootblock/i64/preserve=signature recovery_device:`  
(The `preserve=signature` will maintain the disks GUID signature file during bootblock creation)
- C. `$mc sysgen create/size=1000000 recovery_device:[sysx.sysexe]pagefile.sys;`  
(where x is your root IE:0 for standalone machines)
- D. `$mc sysgen create/size=50000 recovery_device:[sysx.sysexe]swapfile.sys;`

Now you are ready to successfully reboot off the “Hot Backup” you created from USB

## Some thoughts and additional uses

Now that you have seen how to use your USB mass storage devices to help recover your system disk this can spur other additional uses. Customers who have development machines can find this routine advantageous. In many cases different machines have different configurations and mostly never the same backup medium. So creating/building test or development machines without like backup medium is a challenge. Using USB to clone system disks and other smaller disks for testing from live environments can make getting the data and building your test machines very easy, especially if those machines are in other buildings and not on the same network.

## Conclusion

HP Engineers have been using USB for many years to build, test and recover HP Integrity systems. Because it is a slower medium compared to SAN or SCSI direct access disks and has size limitations, it doesn't bode well for real-time usage but as you can see, it can really save you in the event of a disk failure or upgrade failure.

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