

What is **RAID**? **RAID** is a data storage virtualization technology that combines multiple disk drive components into a logical unit for the purposes of data redundancy or performance improvement. Most commonly used RAID levels are:

RAID LEVEL	DESCRIPTION	EXAMPLE
RAID 0	STRIPING. Combines the capacity of individual HDDs into one. Requires 2 or more HDDs of any capacity	Two 2TB HDDs and one 1TB HDD Total: 5TB
RAID 1	MIRRORING. Writes the same data identically on all HDDs. Requires an even number of HDDs of the same capacity	Four 4TB HDDs Total: 8TB
RAID 5	BLOCK-LEVEL STRIPING. Writes data onto all HDDs with one HDD Being Spare. Requires at least 3 HDD(preferably of the same capacity)	Five 3TB HDDs Total: 12TB

NVRs and Hybrids with model numbers ending in **RT** have a built in RAID controller. This is a true, hardware RAID controller and not software driven.

After the HDDs are installed in the NVR/Hybrid, the HDDs will NOT show up in the HDD list and they will not be available for recording (**Figure 1**).

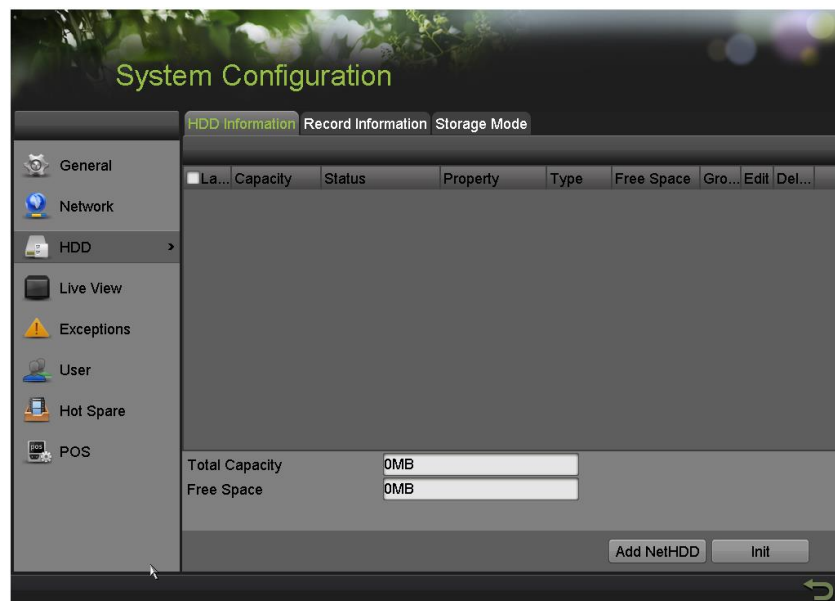


Figure 1

TECHNICAL BULLETIN

In order for the NVR/Hybrid to recognize the HDDs the RAID array needs to be configured. Go to **MENU→SYSTEM CONFIGURATION→RAID**. The HDDs will be shown in the list of available drives under **PHYSICAL DISK** tab (Figure 2).

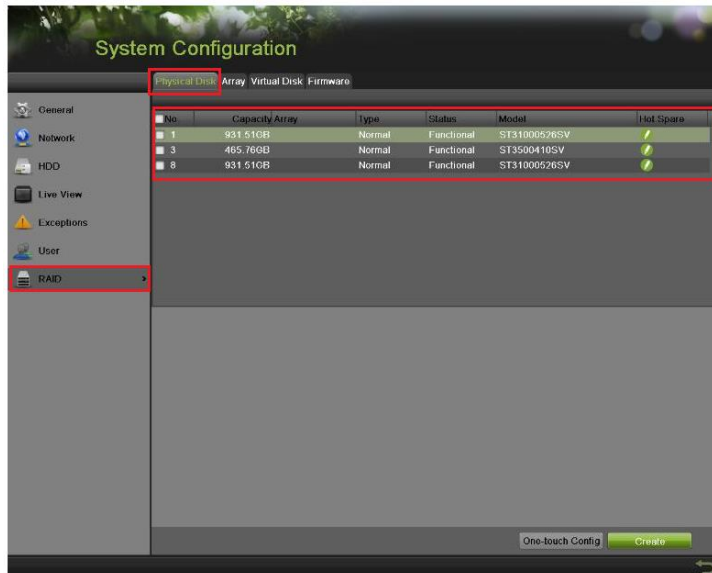


Figure 2

Select the HDDs that will be included in the RAID array and press **CREATE**. A window will appear prompting for an **ARRAY NAME** and **RAID LEVEL** and the disks that will be included in the **ARRAY** (Figure 3).

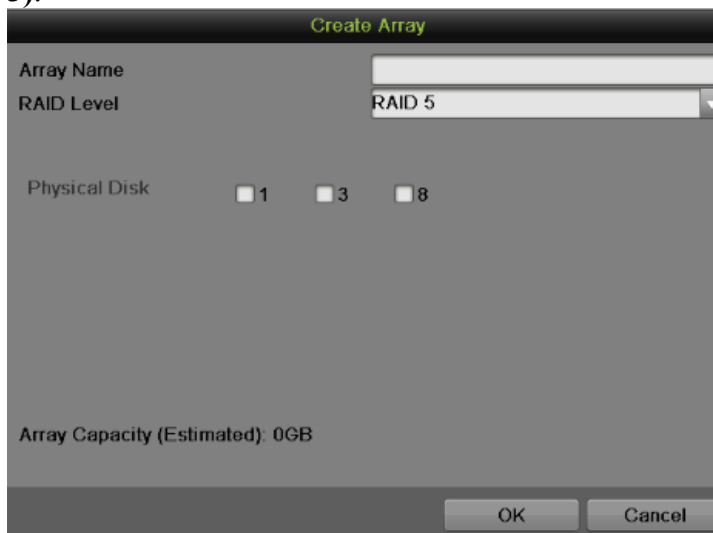


Figure 3

TECHNICAL BULLETIN

After entering the name, and choosing the RAID level and choosing the HDDs that will be included in the RAID array press the “OK” button.

These steps will create the array, but it will not be initialized yet. Next, go to the **ARRAY** tab on the top of the page. This tab will display all available arrays (**Figure 4**).

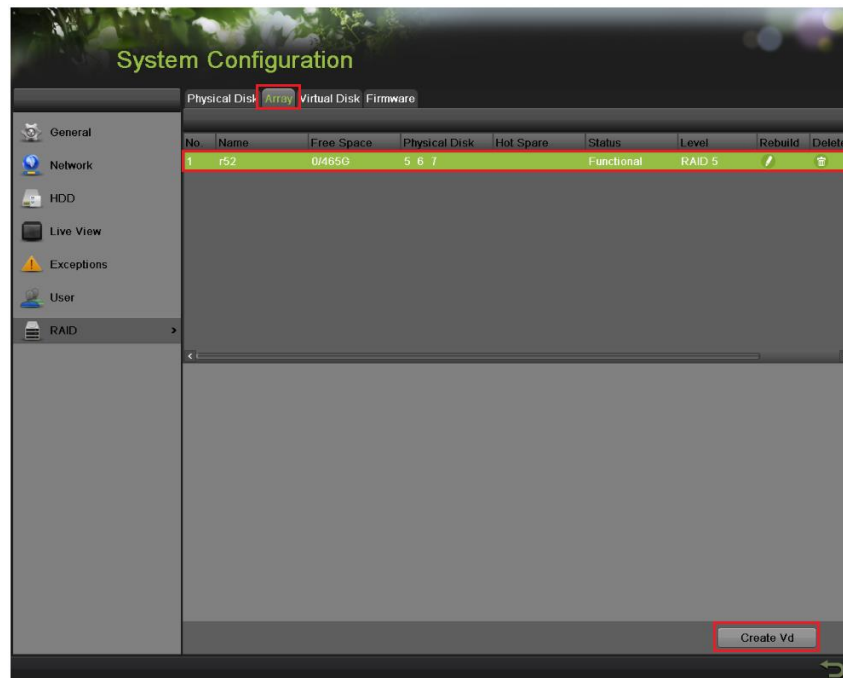


Figure 4

In order to use the array for recording, a **VIRTUAL DRIVE** needs to be created, because at this stage the total disk size is unallocated.

Highlight the array and press “**CREATE VD**”. A window will appear prompting for a **NAME**, **CAPACITY** and **INITIALIZATION TYPE** (**Figure 5 (next page)**).

TECHNICAL BULLETIN

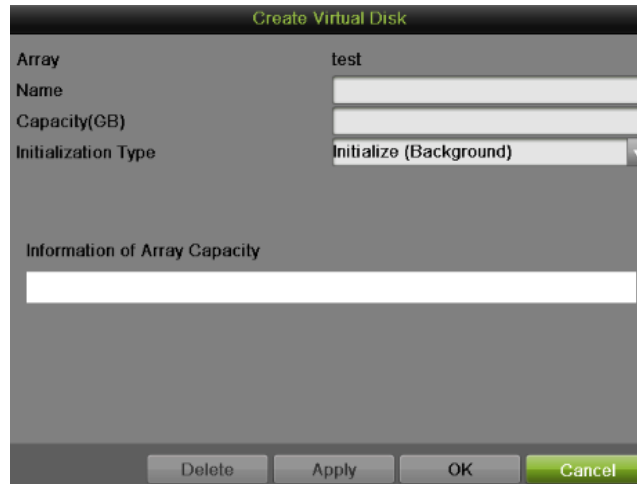


Figure 5

The NAME is a label for the virtual disk, and the capacity allocates the desired size to that particular virtual disk. A very important option is the **INITIALIZATION TYPE**:

INITIALIZATION TYPE determines the initialization process.

There are three options for INITIALIZATION TYPE:

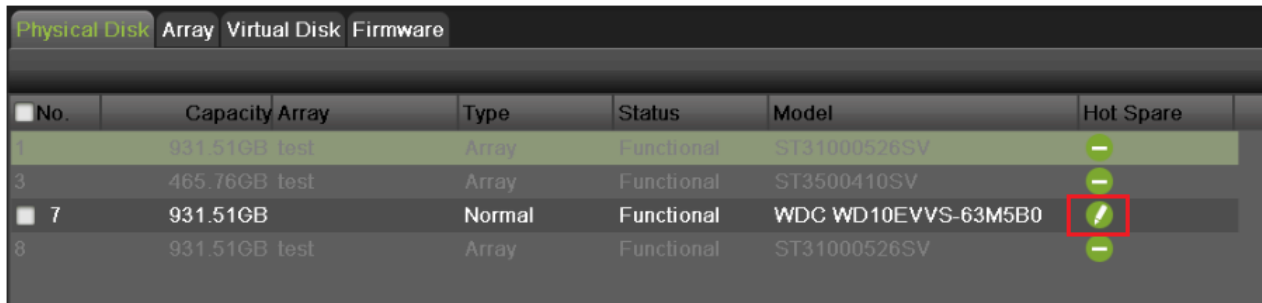
- **Initialization (Fast)**- The array will be initialized without checking the HDD sectors against each other. The HDD will be available for recording immediately.
- **Initialization (Background)**- HDD sectors will be checked against each other in the background. The HDD will be available for recording almost immediately, but the NVR will continue checking the sectors in the background (depending on the HDD size, this can take up to 96 hours)
- **Initialization (Foreground)**-The sectors will be checked against each other in the foreground. The HDD **WILL NOT** be available for recording until this process is finished (depending on the HDD size, this can take up to 96 hours)

HikVision recommends choosing the **Initialization (Background)** option for both performance and reliability.

After this step is complete, the HDDs will be initialized and the unit will be ready for recording.

TECHNICAL BULLETIN

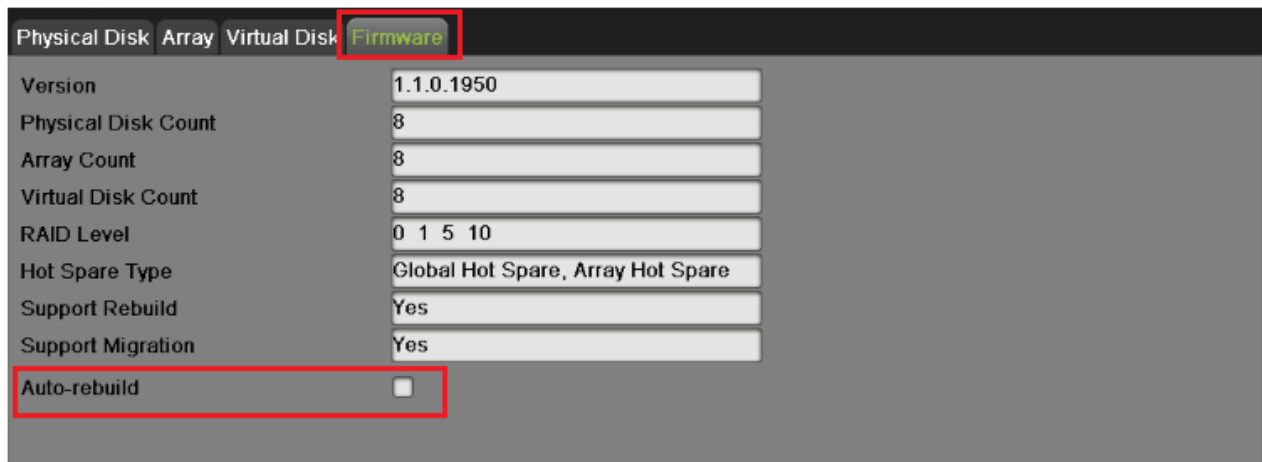
If an extra HDD is installed and is not included in an array, it can be used as a **HOT SPARE**. By clicking the **HOT SPARE** button next to the HDD, the HDD becomes a hot spare for the RAID (**Figure 6**).



No.	Capacity	Array	Type	Status	Model	Hot Spare
1	931.51GB	test	Array	Functional	ST31000526SV	-
3	465.76GB	test	Array	Functional	ST3500410SV	-
7	931.51GB		Normal	Functional	WDC WD10EVVS-63M5B0	!
8	931.51GB	test	Array	Functional	ST31000526SV	-

Figure 6

After the HDD has been added, the **AUTO-REBUILD** has to be enabled. Go to the **FIRMWARE** tab and enable the **AUTO-REBUILD** feature (**Feature 7**).



Version	1.1.0.1950
Physical Disk Count	8
Array Count	8
Virtual Disk Count	8
RAID Level	0 1 5 10
Hot Spare Type	Global Hot Spare, Array Hot Spare
Support Rebuild	Yes
Support Migration	Yes
Auto-rebuild	<input type="checkbox"/>

Figure 7

Having a **HOT SPARE** HDD will increase the reliability of the system. If one of the HDDs in the array fails, the **HOT SPARE** HDD will automatically take over and rebuild the array. During this process the recording will not be interrupted.