

| Title:           | Configuring RAID Array            |          |     |       |  |
|------------------|-----------------------------------|----------|-----|-------|--|
| Date:            | 12/02/2014                        | Version: | 1.0 | Pages |  |
| Product:         | DS-9016HWI-RT, DS-96xxNI-RT units |          |     |       |  |
| Action Required: | Information only                  |          |     |       |  |

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

HikVision NVRs and Hybrids with model numbers ending in <u>**RT**</u> (e.g. DS-9632NI-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**).

| Syste              | em Configu        | uration           |                |      |            |              |
|--------------------|-------------------|-------------------|----------------|------|------------|--------------|
|                    | HDD Information F | Record Informatio | n Storage Mode | ,    |            |              |
| 🔬 General          | La Capacity       | Status            | Property       | Type | Free Space | Gro Edit Del |
| 2 Network          |                   |                   |                |      |            |              |
| HDD >              |                   |                   |                |      |            |              |
| Live View          |                   |                   |                |      |            |              |
| <b></b> Exceptions |                   |                   |                |      |            |              |
| 👱 User             |                   |                   |                |      |            |              |
| 🛃 Hot Spare        |                   |                   |                |      |            |              |
| POS                | Total Capacity    | OMB               | _              |      |            |              |
|                    | Free Space        | OMB               |                |      |            |              |
|                    |                   |                   |                |      | Add NetHDD | ) Init       |
| λ.                 |                   |                   |                |      |            | 5            |

Figure 1

- 1 -Hikvision USA, Inc. 908 Canada Court, Industry, CA 91748 Phone: 909-895-0400 Fax: 909-595-0788 Email: <u>techsupport@hikvisionusa.com</u> Website: <u>http://www.hikvision.com</u>



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In order for the NVR/Hybrid to recognize the HDDs the RAID array needs to be configured. Go to **MENU** $\rightarrow$ **SYSTEM CONFIGURATION** $\rightarrow$ **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).





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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).

| System Configuration |                    |                      |               |           |        |                 |           |        |
|----------------------|--------------------|----------------------|---------------|-----------|--------|-----------------|-----------|--------|
|                      | Physical Disk Arra | Virtual Disk Firm    | nware         |           |        |                 |           |        |
| General              | No. Name           | Free Space<br>0/465G | Physical Disk | Hot Spare | Status | Level<br>RAID 5 | Rebuild   | Delete |
|                      |                    |                      |               |           |        |                 |           |        |
| Live View            |                    |                      |               |           |        |                 |           |        |
| Lxceptions           |                    |                      |               |           |        |                 |           |        |
|                      | •                  |                      |               |           |        |                 |           |        |
|                      | <.                 |                      |               |           |        |                 | _         | >      |
|                      |                    |                      |               |           |        |                 |           |        |
|                      |                    |                      |               |           |        |                 |           |        |
|                      |                    |                      |               |           |        |                 |           |        |
|                      |                    |                      |               |           |        |                 |           |        |
|                      |                    |                      |               |           |        | _               |           | -      |
|                      |                    |                      |               |           |        |                 | Create Vd |        |
|                      |                    | T                    |               | 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)).



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| Create Virtual Disk           |                             |  |  |
|-------------------------------|-----------------------------|--|--|
| Array                         | test                        |  |  |
| Name                          |                             |  |  |
| Capacity(GB)                  |                             |  |  |
| Initialization Type           | Initialize (Background) 🔹 🗸 |  |  |
|                               |                             |  |  |
| Information of Array Capacity |                             |  |  |
|                               |                             |  |  |
| Delete Ap                     | oply OK Cancel              |  |  |

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.



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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**).

| Physical E | Physical Disk Array Virtual Disk Firmware |        |            |                     |           |  |
|------------|---|--------|------------|---------------------|-----------|--|
| No.        | Capacity Array                            | Туре   | Status     | Model               | Hot Spare |  |
| 1          | 931.51GB test                             | Array  | Functional | ST31000526SV        | <b>—</b>  |  |
| 3          |   |        |            |                     |           |  |
| 7          | 931.51GB                                  | Normal | Functional | WDC WD10EVVS-63M5B0 | 0         |  |
| 8          |   |        |            |                     |           |  |

Figure 6

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

| Physical Disk Array Virtual Disk Fi | rmware                            |  |
|-------------------------------------|-----------------------------------|--|
| 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                        |                                   |  |
| L                                   |                                   |  |
|                                     |                                   |  |



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.