FlowMagic

RAID Controller User Guide

Supported Models:
FlowMagic-400
FlowMagic-3200
FlowMagic-3240
FlowMagic-StorageShelf-3545
FlowMagic-400R
FlowMagic-204P,204P-17,2100P

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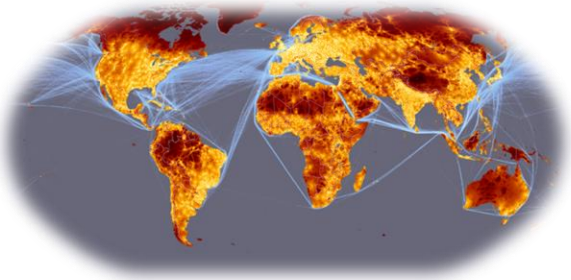

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Welcome to FlowMagic RAID Array Controller User Guide.

FlowMagic appliances often provide two options for its storage configuration.

- Hardware assisted RAID
- Non-RAID

For models with hardware assisted RAID, both RAID and non-RAID are supported.

This user guide describes how to operate on the FlowMagic with hardware assisted RAID controllers including the setup and operational procedure.

The FlowMagic models with hardware assisted RAID array controllers are:

- FlowMagic-400R
- FlowMagic-2100P
- FlowMagic-3200-12
- FlowMagic-3240

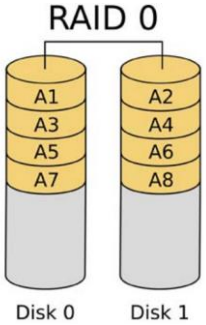
Should you have any question, suggestion or feature request, please don't hesitate to contact Infinicore support team at Email: support@infinicoreinc.com. We are more than happy to assist you.

Chapter 1 Introduction to RAID

The FlowMagic supports RAID levels 0, 1, 1E, 5, 6, 10, 50 and 60. The brief definition and features of different levels are descripted in below paragraphs.

1.1 RAID 0

RAID 0, also known as disk striping, is a technique that breaks up a file and spread the data across all the disk drives in a RAID group, as shown in below figure.

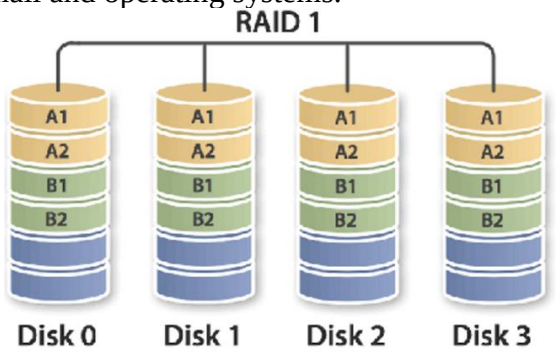


The benefit of RAID 0 is that it improves performance, because striping spreads data across more physical disk drives, multiple disks can access the contents of a file, allowing writes and reads to be complete more quickly.

The drawback of RAID 0 is that it does not have parity, which means it cannot check whether data has been lost or written over when it is moved from one place to another place. If a drive fails, there is no redundancy and all data would be lost.

1.2 RAID 1

RAID 1, also known as disk mirroring, is the replication of data to two or more disks, as shown in below figure. Disk mirroring is a good choice for applications that requires high performance and high availability, such as transactional applications, email and operating systems.

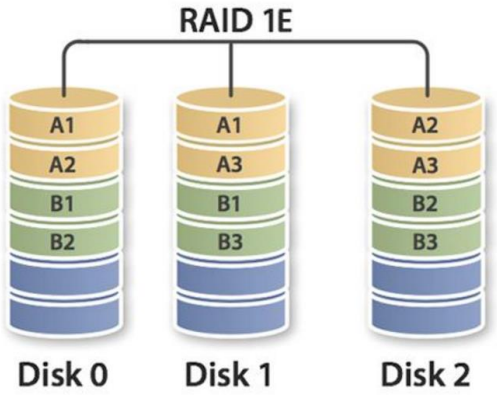


Because both disks are operational, data can be read from them simultaneously, which makes read operations quite fast. The RAID array will operate if one disk is operational. Write operations, however, are slower because every write operation is done twice.

Disk mirroring provides instantaneous failover for data required by mission-critical applications. If primary arrays are damaged, traffic is switched to secondary or mirrored backup arrays.

1.2 RAID 1E

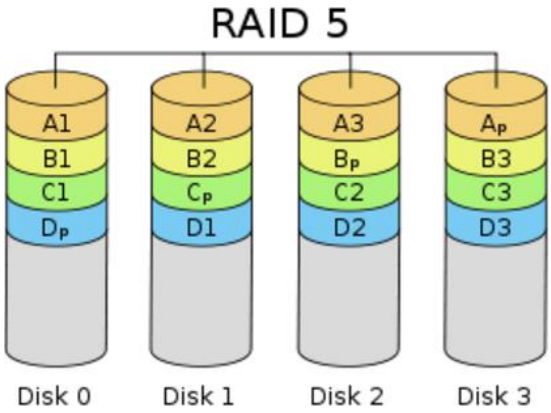
RAID 1E, also known as striped mirroring or enhanced mirroring or hybrid mirroring, is a RAID level that combine RAID 0's striping capabilities with RAID 1's mirroring protection, as shown in below figure. RAID 1E uses an odd number of disks to achieve data protection goals.



RAID 1E works by striping data across all of the disks and a copy of the data is also striped across all of the disks. RAID 1E can potentially provide more performance than a traditional RAID 1. The disadvantage of RAID 1E I its 50 percentage disk overhead.

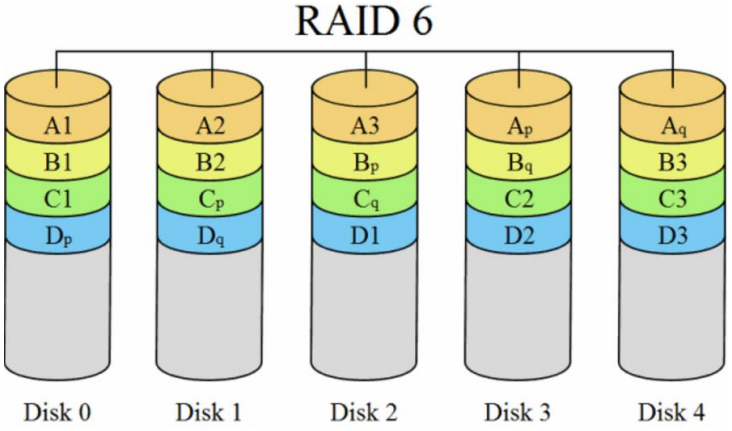
1.3 RAID 5

RAID 5, redundant array of independent disks, is a RAID configuration what uses disk striping with parity, as shown in below figure. Because data and parity are striped across all of the disks, no single disk is a bottleneck. Striping also allows users to reconstruct data in case of a disk failure. Reads and writes are more evenly balanced in this configuration, making RAID 5 the most commonly used RAID method.



1.4 RAID 6

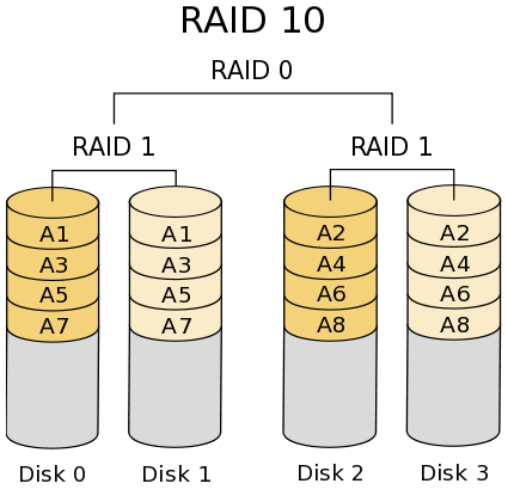
RAID 6, also known as double parity RAID, uses two parity stripes on each disk, as shown in below figure. It allows for two disk failures within the RAID set before any data is lost.



This configuration offers very high fault- and drive-failure tolerance. It is used for environments that need long data retention periods, such as archiving. One disadvantage in using RAID 6 is that each set of parities must be calculated separately, which slows write performance. Implementing RAID 6 is also more expensive because of the two extra disks required for parity.

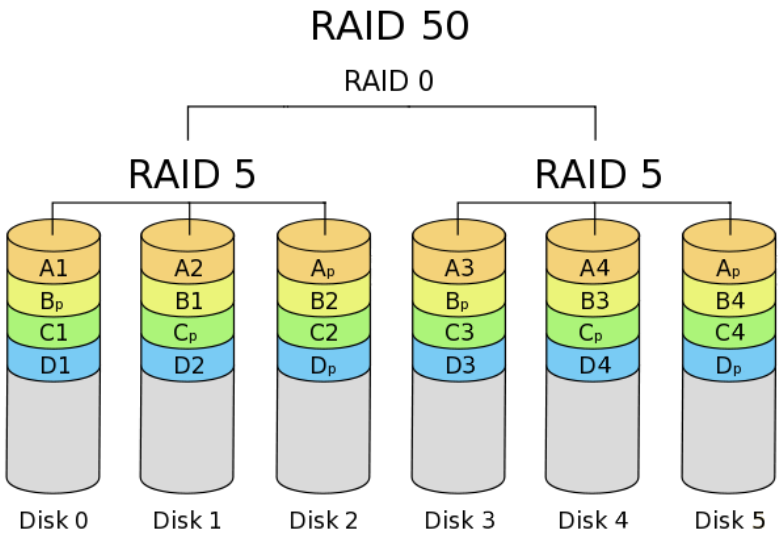
1.5 RAID 10

RAID 10, also known as RAID 1+0, combines disk mirroring and disk striping to protect data, as shown in below figure. A RAID 10 configuration requires a minimum of four disks, and stripes data across mirrored pairs. As long as one disk in each mirrored pair is functional, data can be retrieved. If two disks in the same mirrored pair fail, all data will be lost because there is no parity in the striped sets.



1.6 RAID 50

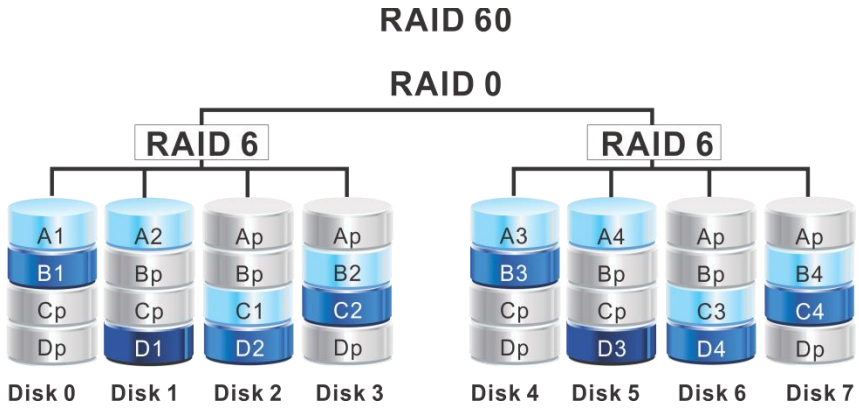
RAID 50, also known as RAID 5+0, combines distributed parity of RAID 5 with striping of RAID 0, as shown in below figure. It requires a minimum of six drives.



This RAID level offers better write performance, increased data protection and faster rebuilds than RAID 5. Performance does not degrade as much as in a RAID 5 array because a single failure only affects one array. Up to four drive failures can be overcome as long as each failed drive occurs in a different RAID 5 array.

1.7 RAID 60

RAID 50, also known as RAID 6+0, combines the straight block level striping of RAID 0 with the distributed double parity of RAID 6, as shown in below figure. It requires a minimum of eight drives.



Like RAID 50, RAID 60 is a multi-level disk set; you start with a bunch of RAID 6 sets, and then these sets are aggregated at a higher level into a RAID 0 array that has no redundancy on its own. However, each RAID 60 set does have redundancy and can withstand the loss of up to two disks in each parity set. In theory, in the diagram below, you could lose six of the 12 total disks (two in each set) and still

have an operational array. As soon as you lose more than two disks in a single parity set, though, your world would come crashing down, as the RAID 0 set breaks, and you're back to data recovery mode.

Chapter 2 RAID Card Configuration Work Flow and Utilities

There are two brands of high-performance RAID controller used in the FlowMagic appliances. These two brands of the RAID cards share similar configuration work flow.

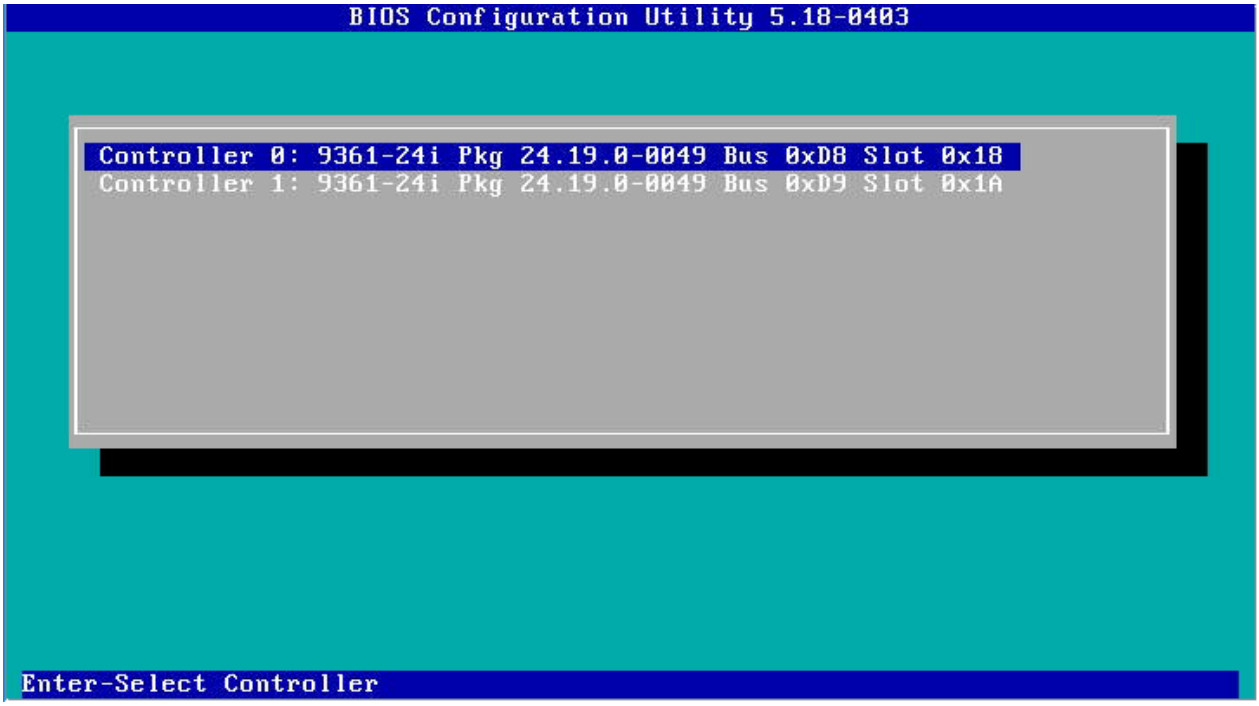
- MicroSemi (former PMC-Sierra) Adaptec RAID card
- Avago (former LSI) MegaRAID RAID card

This chapter provides an overview about the RAID card configuration work flow.

A typical work flow of RAID configuration is to use the embedded configuration utility at the boot time. The configuration utility is made available when computer boots pass the BIOS stage. The RAID configuration utility will be loaded automatically by BIOS and start executing.

By using a key stroke, the RAID configuration utility can be entered.

The following screenshot shows an output from Avago's MegaRAID product family, which could be found in high end FlowMagic.

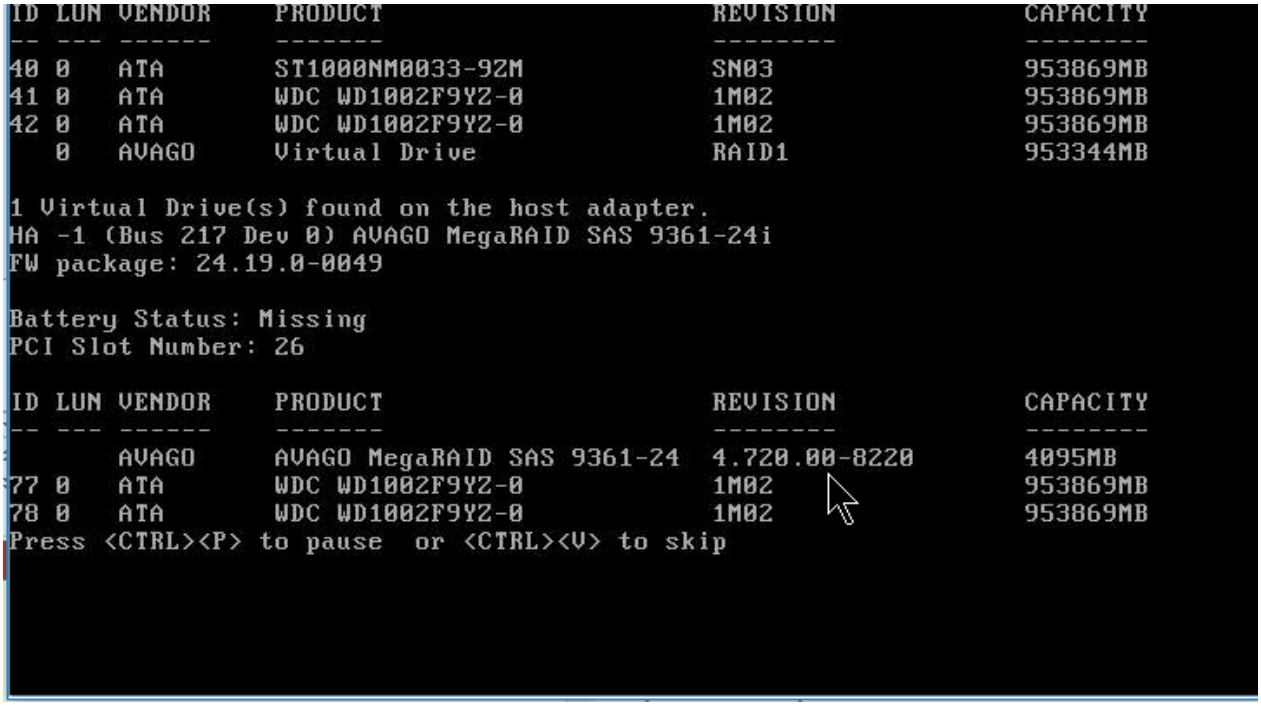


Chapter 3 provides detailed setup workflow for the Avago's MegaRAID product family.

Chapter 4 provides detailed setup workflow for the Microsemi's Adaptec RAID product family.

Chapter 3 FlowMagic Avago MegaRAID Card Configuration Work Flow and Utilities

The FlowMagic-3240 leverages Avago MegaRAID to provide the RAID management for the unit. Enter “Ctrl+V” to launch the management utility.



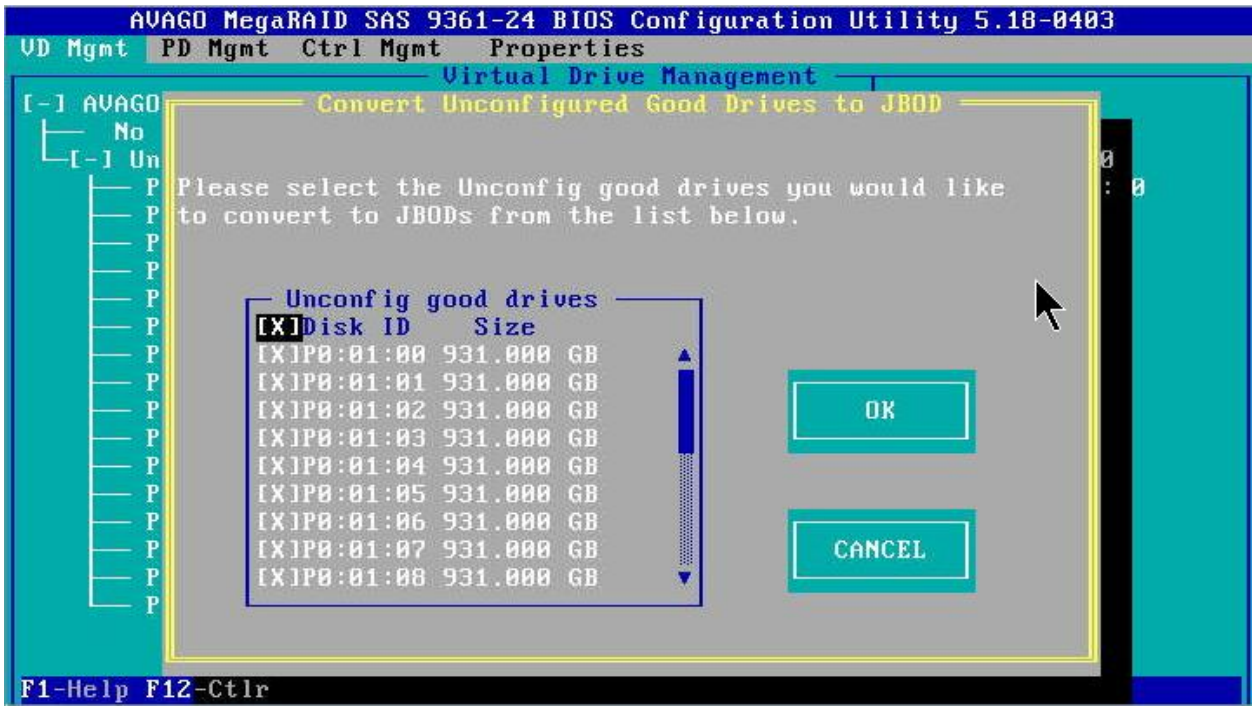
After the management utility enters, one should find the user interface similar to the following screenshot.

There are two modes for each drive that is operate differently under MegaRAID controller.

- JBOD mode

  JBOD stands for Just Bunch of Drives. In the JBOD mode, drives are exposed to the operating system as individual drive. Operating sees the drive natively.

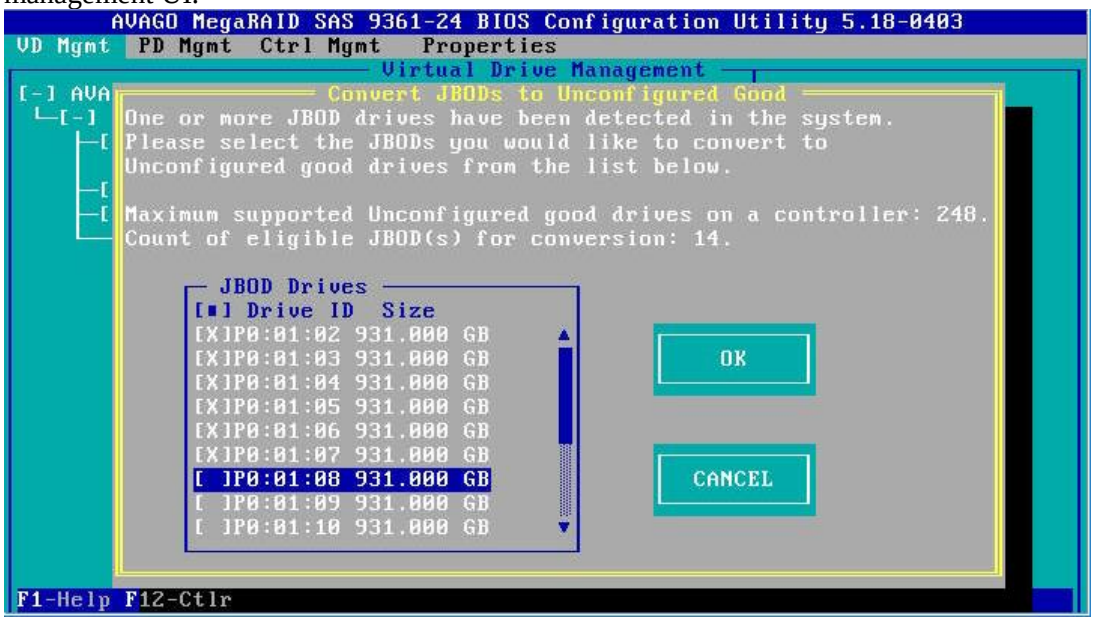
  JBOD mode can be entered by using the following UI.



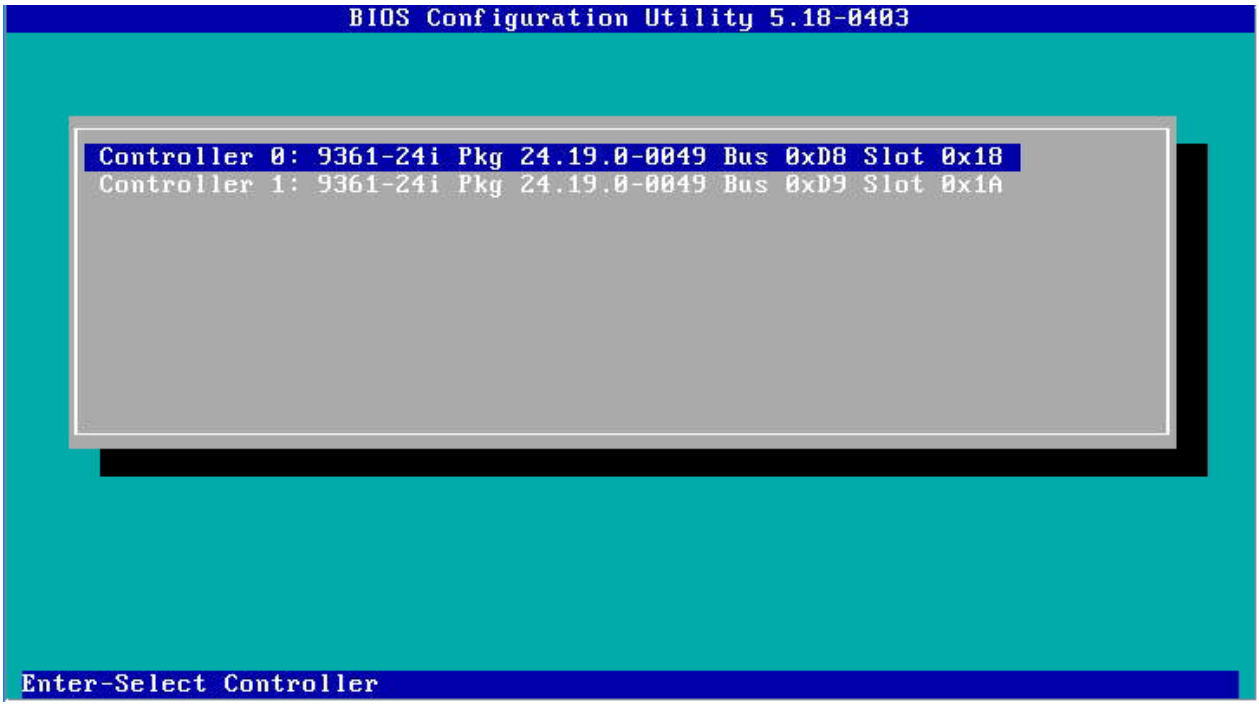
- Unconfigured Good mode

  The Unconfigured Good mode is used to indicate that the drive is available to be used in RAID. When a drive is placed in good mode however has not been used by any RAID, the drive is not discoverable by the operating system.

  To change a drive from JOB to Unconfigured Good mode, please use the following management UI.



After press the access key, the BIOS configuration utility will be shown on the screen.



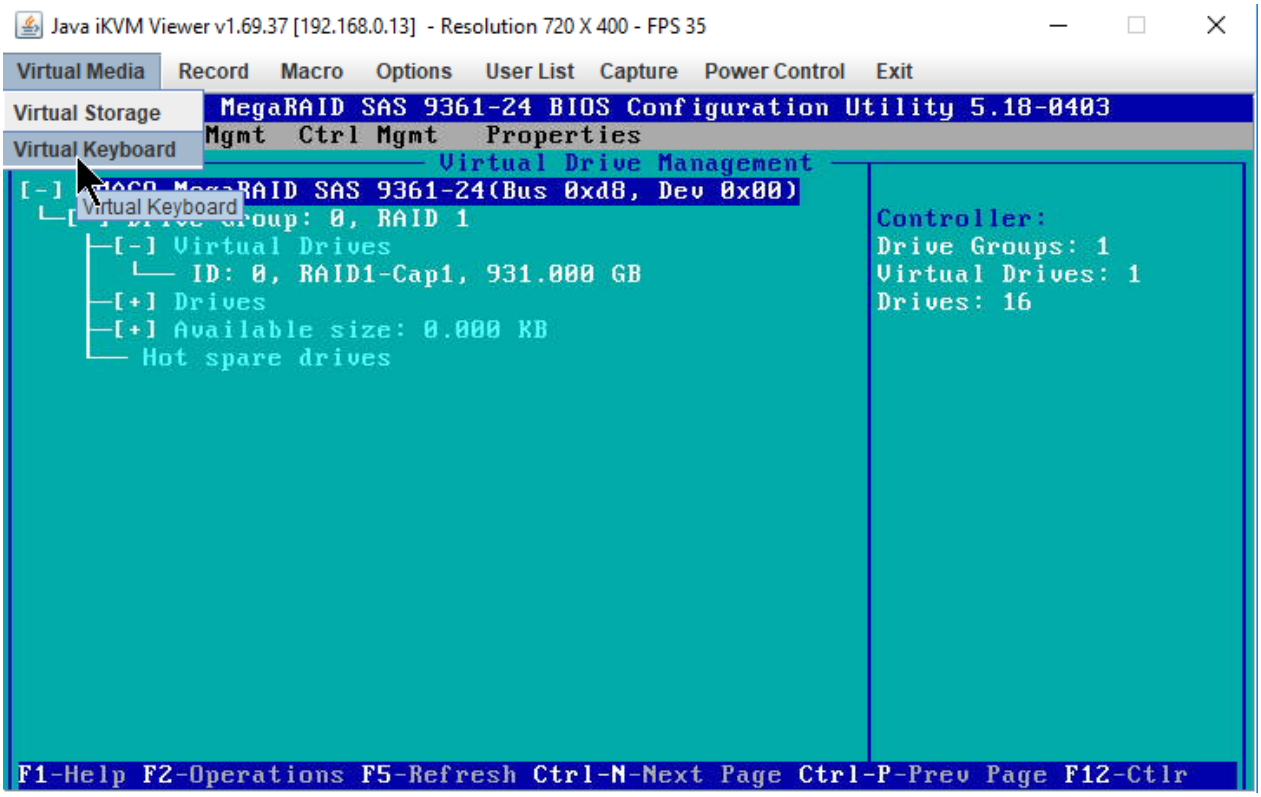
What's shown above lists two RAID controllers installed in the FlowMagic-3240 chassis. The first controller, identified as Controller 0 is used to control the 24 SAS/SATA drives located on the front. The 2nd controller, identified as Controller 1 is used to control the 12 SAS/SATA drives located on the back of the chassis. There is not any cross connect link between the two RAID controllers. Planning can be made when it comes to the decision of how to load balance the traffic to the front and back drives.

We will use the first controller as an example to demonstrate work flow.

Note to IPMI/BMC User

When you are using the IPMI/BMC to access the boot screen, please note that due to a Shortcut (F2) confliction between the IPMI/BMC browser and RAID configuration utility, you might not be able to invoke the Operations. To avoid this, please use the software keyboard to press the F2 key.

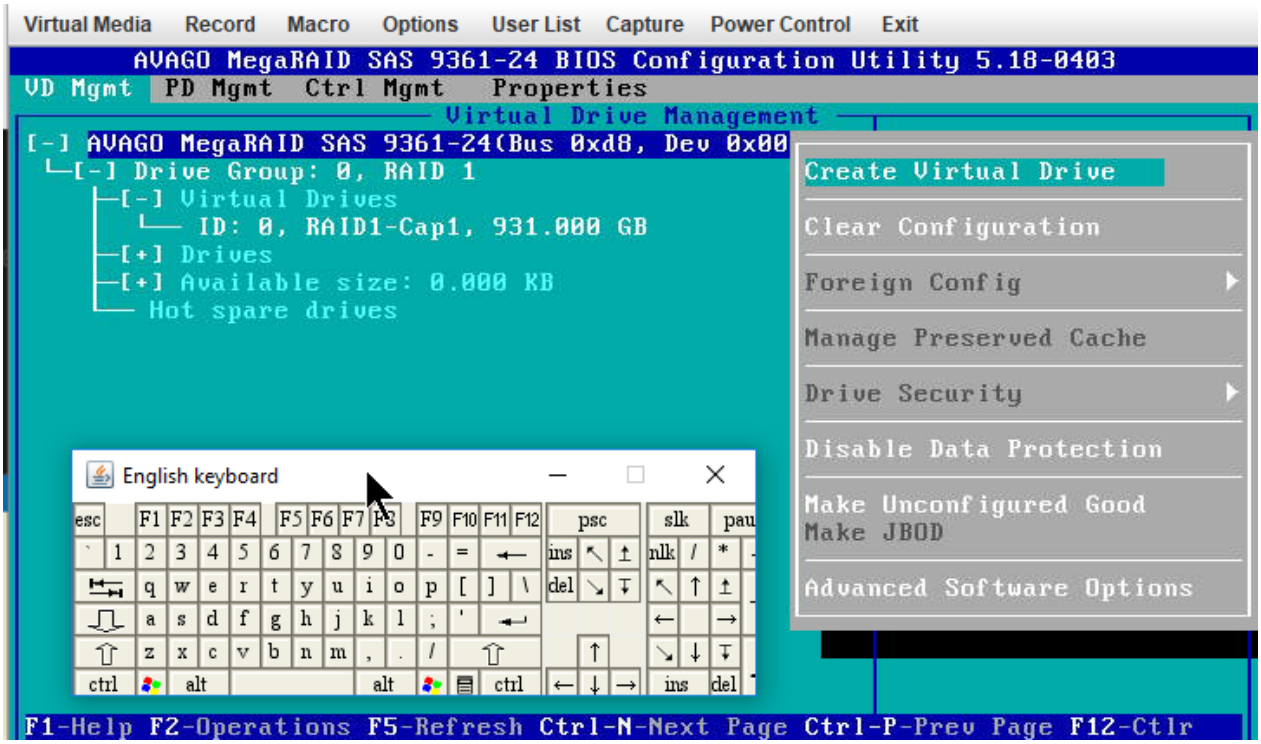
Software keyboard can be invoked as shown below.



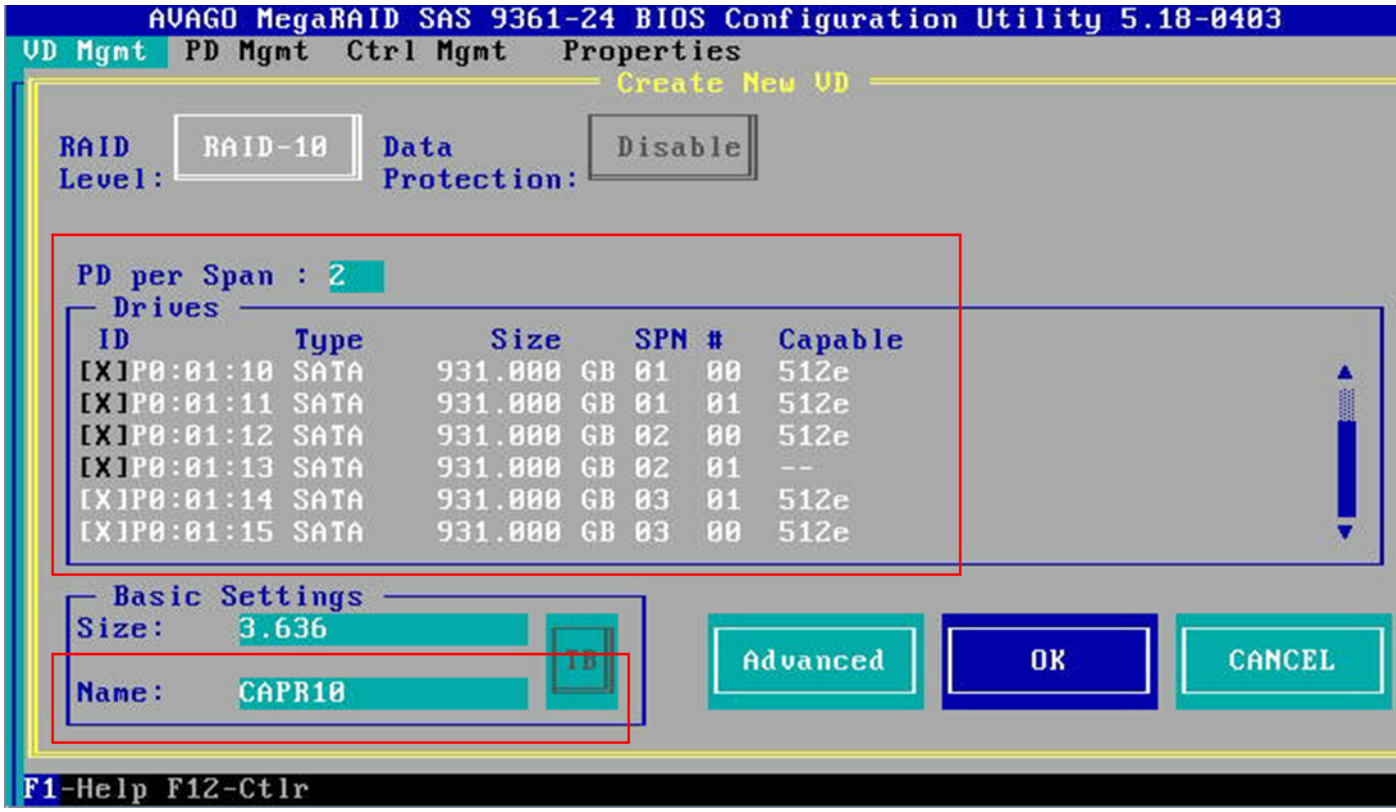
To create a RAID array, please move the cursor to highlight the controller line, after that press "F2" key to invoke the drop-down menu.

Use the "Create Virtual Drive" to launch the RAID configuration.

There are other options that is available at the same menu to conduct the controller maintenance operation.



After invoking the “Create Virtual Drive” menu, the Virtual Drive configuration UI will be shown.



Please select the desired drives to use and give the to-be-created RAID array a name. The name of the virtual drive will be read by the FlowMagic operating system and used as part the UI to identify the RAID array.

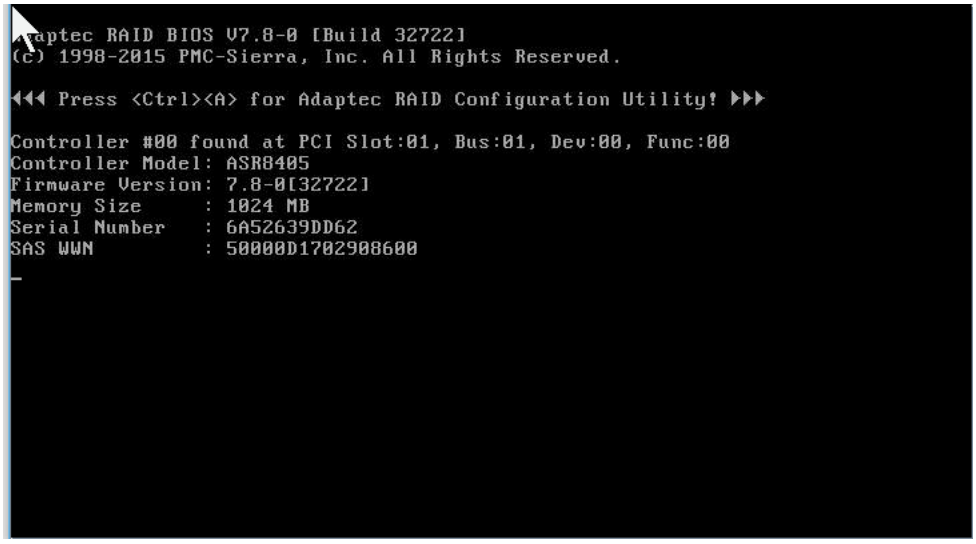
After the RAID is created, please use the “ESC” key to quit the Configuration utility. Once the configuration utility exits, it will display the following notice.

One can use the IPMI/BMC UI to reset the FlowMagic or use the physical power button or reset push button to trigger a rest.


** Press Control+Alt+Delete to reboot **

Chapter 4 RAID Card Configuration Work Flow and Utilities

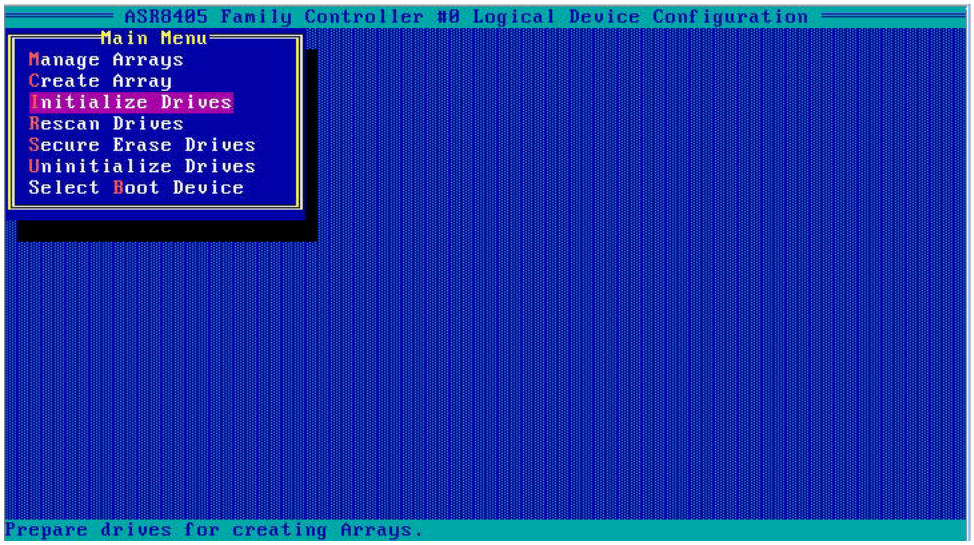
This chapter provides the work flow to setup MicroSemi's Adaptec RAID controller. To launch Adaptec RAID configuration utility press "Ctrl + A" as shown below:



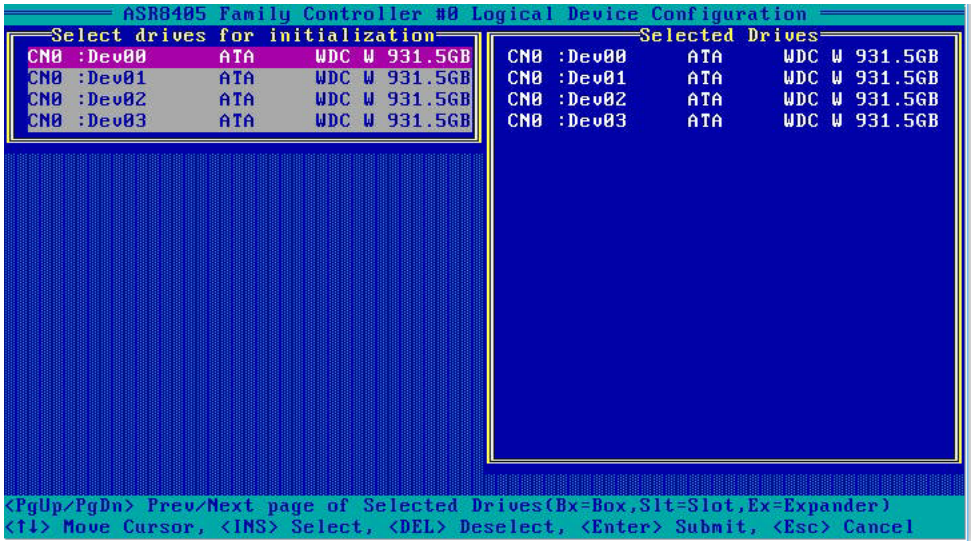
The launched RAID configuration utility is shown in below figure. After launch configuration utility, the drives need be initialized before making RAID configurations.

4.1 Initialize Drives

From the Main Menu, move the press "I" or move up/down arrow to "Initialize Drives" and press Enter to initialize drives, as show in the below figure.



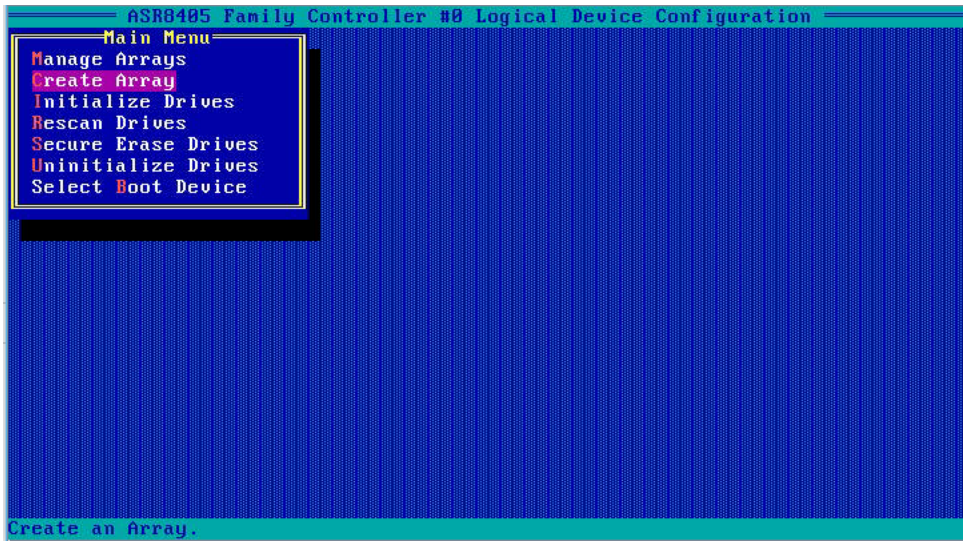
After press “Initialize Drives”, there is a list showing all the drives that can be managed. Using Up or Down Arrow keys to move cursor and press <Insert> to select or <Delete> to deselect the drive(s) to initialize.



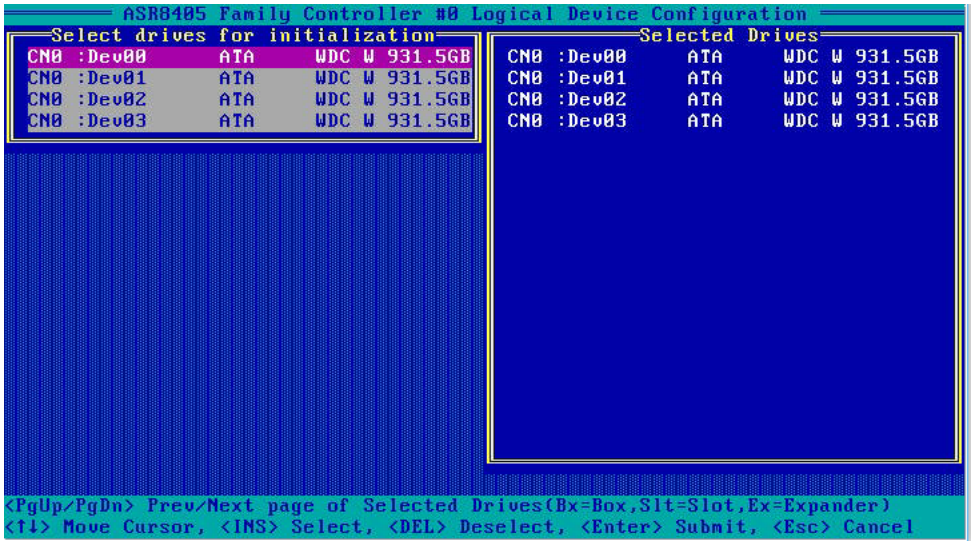
Press <Enter> to submit Initialize Drives operations as shown in below figure, please wait until the initialization finishes.

4.2 Create RAID Array

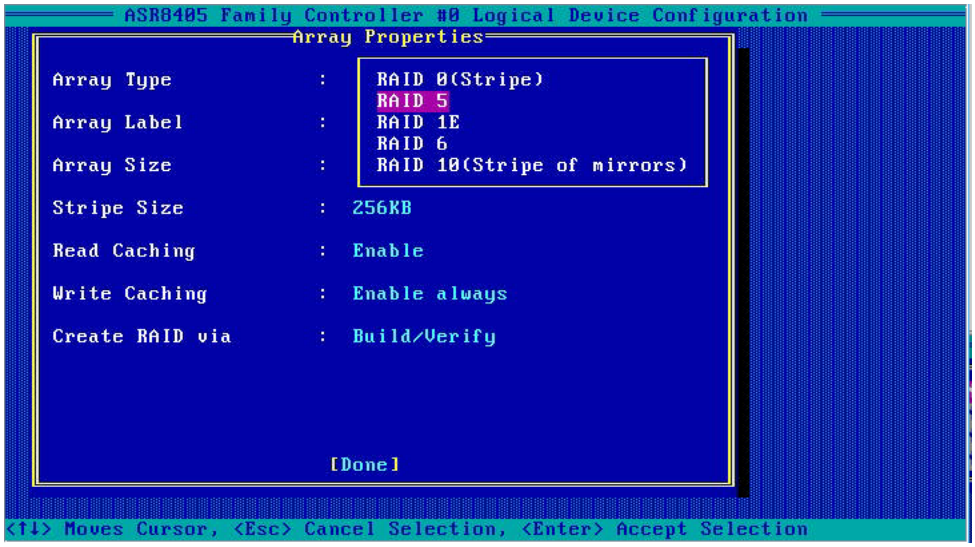
From the Main Menu, move the press “C” or move up/down arrow to “Create Array” and press <Enter> to create RAID array, as show in the below figure.



After press “Create Array”, there is a list showing all the drives that can be selected. Using Up or Down Arrow keys to move cursor and press <Insert> to select or <Delete> to deselect the drive(s) to create array.

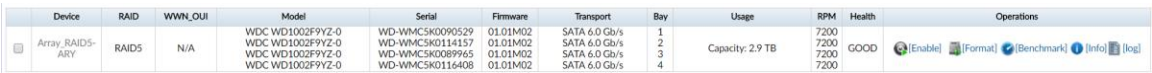


After select the drives, then array type need to be specified. There are five array type such as RAID 0, RAID 5, RAID 1E, RAID 6, RAID 10, RAID 50 and RAID 60 as shown in the below figure.



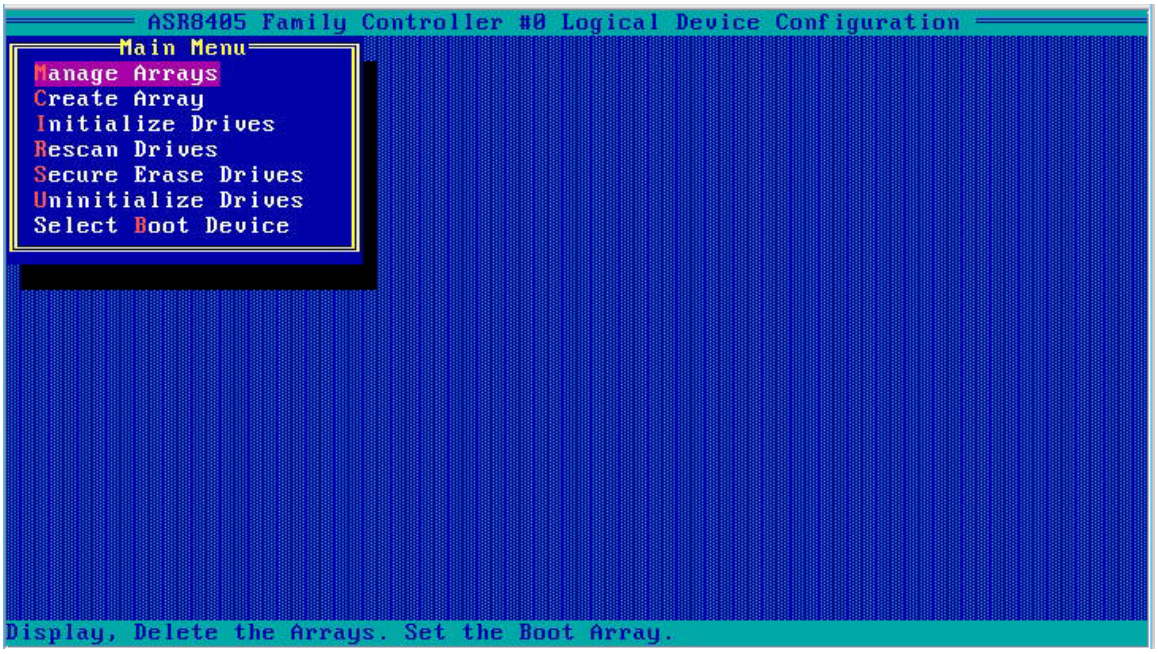
After configure the right array type, array label need to be set up in addition to Array Size, Stripe size, Read caching, Write Caching, Create RADI vi need to be configured as shown in below figure.

Once RAID Array is created, reboot the FlowMagic appliance and the configured Array will show in the Storage Tab on Web UI as shown in below figure.

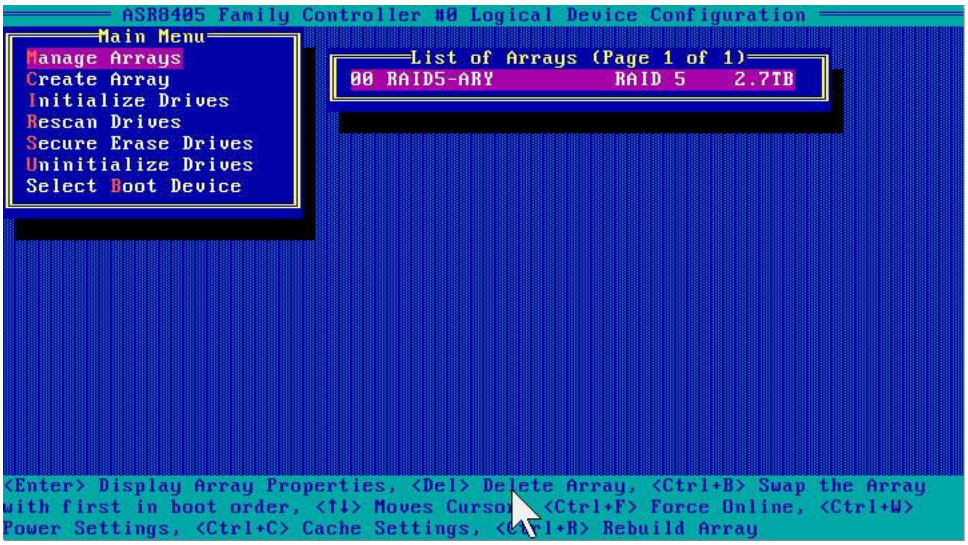


4.3 Manage RAID Array

From the Main Menu, move the press “M” or move up/down arrow to “Manage Array” and press <Enter> to manage existing RAID arrays, as show in the below figure.

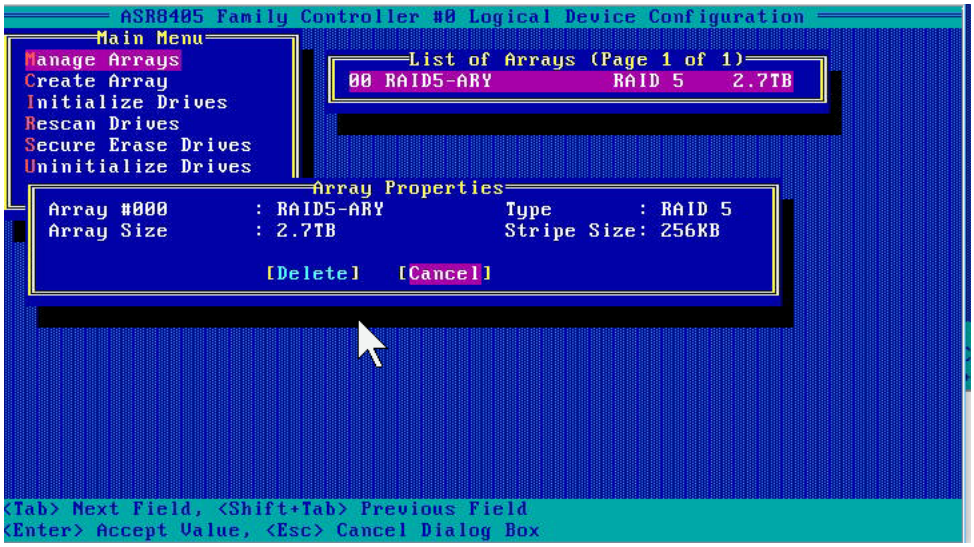


After press “Manage Array”, there is a list showing all the arrays that can be managed. Using Up or Down Arrow keys to move cursor and press <Enter> to display array properties; <Del> to delete array; <Ctrl+B> to swap the Array with first in boot order; <Ctrl+F> to force online; <Ctrk+W> to modify power settings; <Ctrl+C> to cache settings and <Ctrl+B> to rebuild Array.



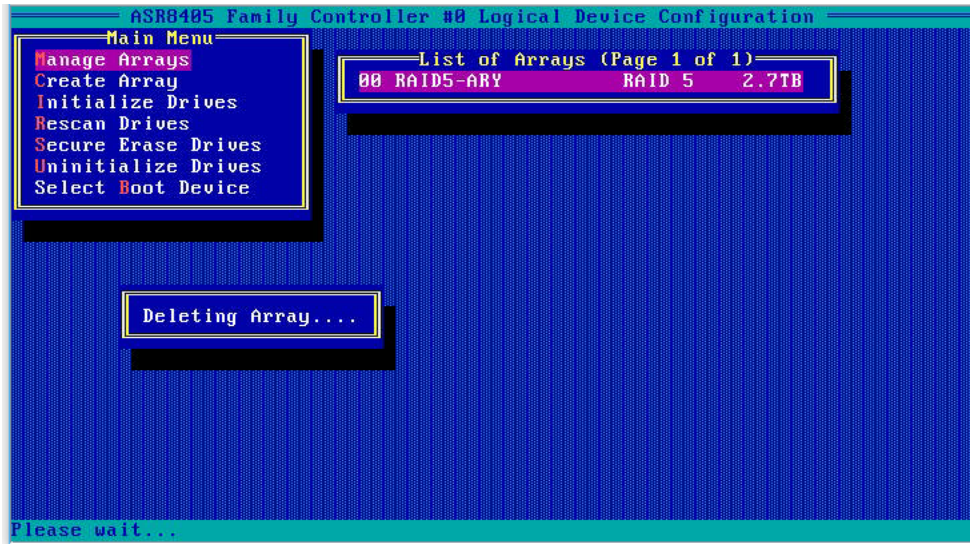
4.3.1 Display RAID Array Properties

Press <Enter> to display the selected RAID array properties as shown in the below figure.



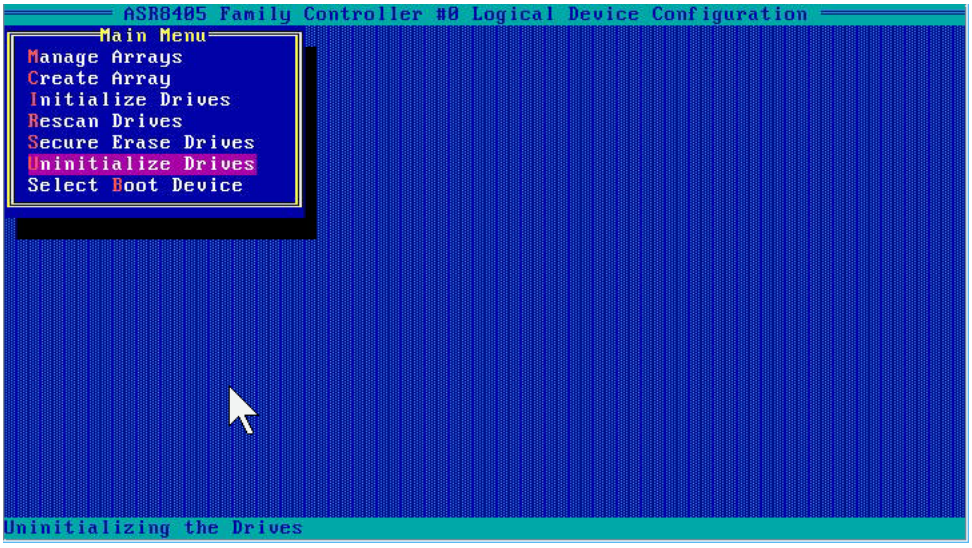
4.3.2 Display RAID Array Properties

Press <Del> to delete the selected RAID array as shown in the below figure.

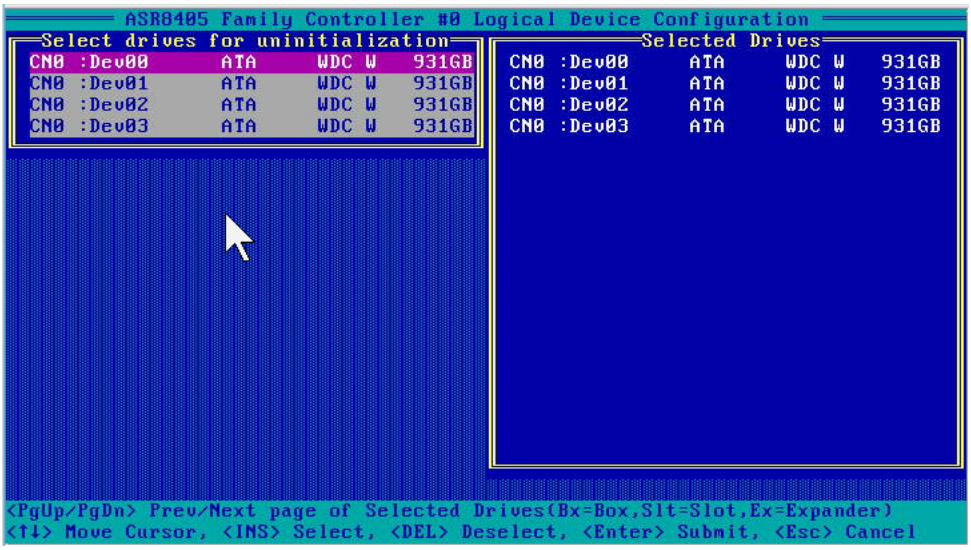


4.4 Un-initialize Drives

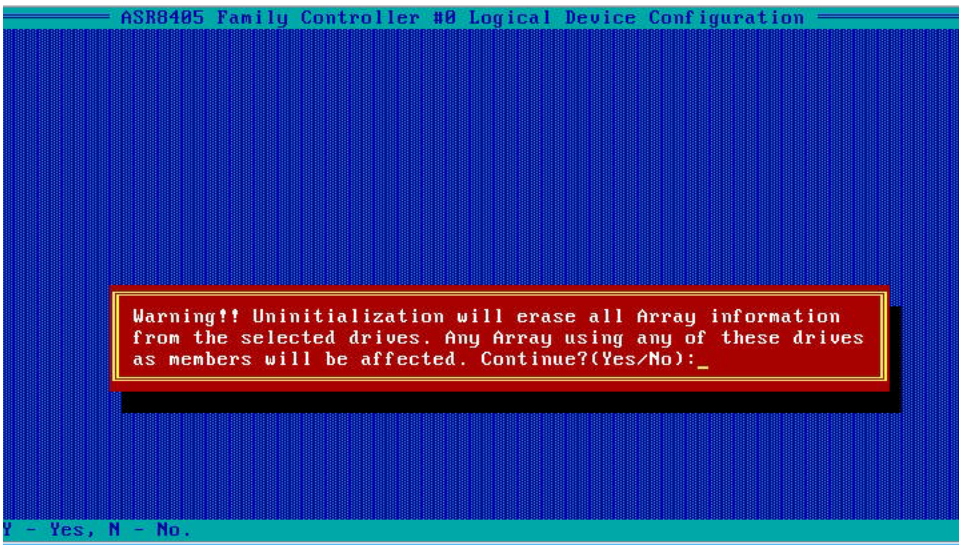
The drives need to be uninitialized before they can be reused. To uninitialize drives, from the Main Menu, move the press “U” or move up/down arrow to “Uninitialize Drives” and press Enter to uninitialize drives, as show in the below figure.



After press “Uninitialize Drives”, there is a list showing all the drives that can be uninitialized. Using Up or Down Arrow keys to move cursor and press <Insert> to select or <Delete> to deselect the drive(s) to uninitialize, as shown in the below figure.

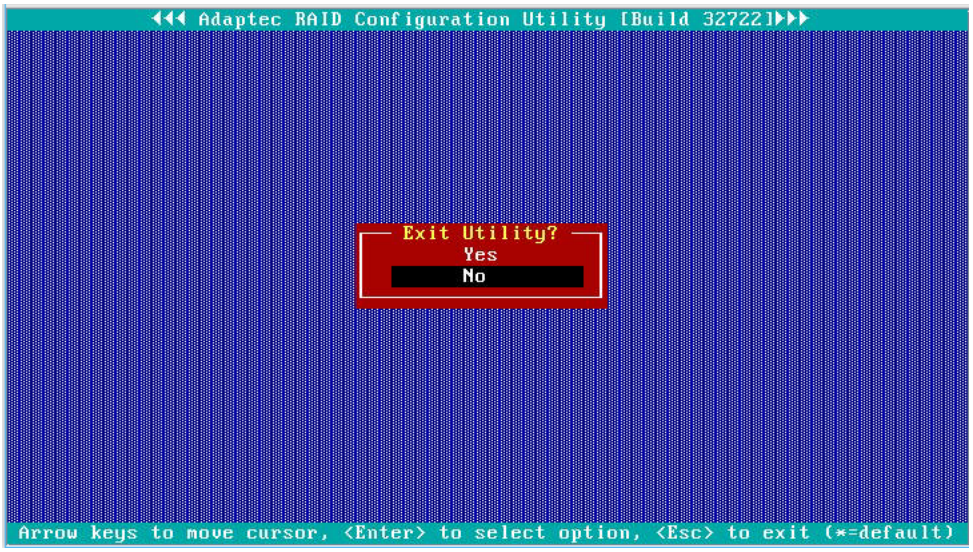


Press <Enter> to submit Uninitialize Drives operations as shown in below figure, please wait until the uninitialization finishes. Please be aware that uninitialzation will erase all array information from the selected drives, any array using any of the drives as members will be affected. Input “Y” to confirm uninitialization operation, and input “N” to cancel uninitialization operation, as shown in below figure.



4.5 Exit RAID Configuration Utility

After setting up the RAID configuration, press <ESC> to exit RAID Configuration Utility, as show in the below figure.



Chapter 5 Recommended Reading Material

The following list provides further reading materials when users find the need to gain in-depth knowledge in specific area.

- UG-100 FlowMagic Hardware Owner Manual and Getting Started Guide
- UG-101 FlowMagic Firmware Update Guide
- UG-102 FlowMagic System Recovery Guide
- UG-103 FlowMagic Rack Mounting Guide
- UG-104 FlowMagic Network Packet Capture Analysis and Export Guide
- UG-105 FlowMagic Hard Disk Drive Selection and Storage Management Guide