

congatec Application Note



Applicable Products	conga-XLX, conga-CLX, conga-B945, conga-BM45
Application Note Subject	Setup and configure a SATA RAID system
Document Name	AN15_Configure_RAID_System
Usage Designation	External

Application Note #15

Revision 1.1

Revision History

Revision	Date (dd.mm.yy)	Author	Changes
0.1	21.06.07	OAL	Initial release
1.0	18.07.07	OAL	Official release
1.1	04/02/11	MSW	Added conga-BM45 CPU module

Preface

This application note is a short example of how to setup and configure a system to operate in RAID Level 1 (Mirror) with two Serial ATA (SATA) hard disk drives (HDD) while using Microsoft Windows® XP.

Disclaimer

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Intended Audience

This Application Note is intended for technically qualified personnel. It is not intended for general audiences.

Symbols

The following symbols may be used in this Application Note:



Warning

Warnings indicate conditions that, if not observed, can cause personal injury.



Caution

Cautions warn the user about how to prevent damage to hardware or loss of data.



Note

Notes call attention to important information that should be observed.

Terminology

Some of the following terms may be used throughout this document.

Term	Description
RAID	RAID: Redundant Array of Independent Drives. A group of hard disks that operate together to improve performance or provide fault tolerance and error recovery through data striping, mirroring, and other techniques.
BIOS	BIOS: Basic Input Output System. BIOS is actually firmware, the software that is programmed into a ROM (Read-Only Memory) chip built onto the motherboard of a computer
Flash	A special type of EEPROM (Electrically Erasable Read Only Memory) that can be erased and reprogrammed in blocks instead of one byte at a time. Many modern PCs have their BIOS stored on a flash memory chip so that it can easily be updated if necessary.
POST	Power-on Self Test. A diagnostic testing sequence run by a computer's BIOS as the computer's power is initially turned on. The POST will determine if the computer's RAM, disk drives, peripheral devices and other hardware components are properly working.
PATA	PATA: Parallel Advanced Technology Attachment is a standard interface for connecting storage devices such as hard disks and CD-ROM drives inside personal computers.
SATA	SATA: Serial Advanced Technology Attachment was designed as a successor to the legacy Advanced Technology Attachment standard (ATA) also known as Parallel ATA.
CGUTIL	congatec System Utility. Universal tool for BIOS updates and BIOS modifications.
CGOS	congatec Generic Operating System API. Software driver for the congatec Embedded BIOS features.

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1 Introduction

The following sections describe how to setup and configure a system to operate in RAID Level 1 (Mirror) with two SATA hard disk drives while using Microsoft Windows® XP. RAID Level 1 uses disk mirroring, which provides 100% duplication of data. This offers the highest reliability. RAID Level 0 is also supported but has yet to be tested therefore is not included in this application note.

The first section of this application note describes the steps that must be done when using the conga-B945 or the conga-BM45 CPU module. The conga-B945 utilizes Intel's ICH7M-DH I/O controller hub, which supports Intel® Matrix Storage Technology that provides integrated RAID Level 0 and Level 1 functionality on the two SATA ports. The conga-BM45 utilizes Intel's ICH9M-E I/O controller hub.

The second section covers the required steps that must be done when using a conga-XLX or a conga-CLX CPU module. The LX800 based platform has an onboard VIA VT6421 Serial ATA RAID Controller that supports RAID Level 0 and RAID Level 1 functionality on the two SATA ports.

Software components include an option ROM for pre-boot configuration and boot functionality, a Microsoft Windows® compatible driver ('F6flpy32.zip' for the conga-B945 and conga-BM45 or 'vt6421_win2kxp.zip' for the conga-XLX/CLX), and a user interface for configuration and management of the RAID capability.



Notes

Parallel ATA (PATA) RAID is not supported.

In order to ensure proper RAID functionality, it is recommended that the two SATA hard disk drives that are being used have the same storage capacity. Furthermore, using the Intel® Matrix Storage Manager to reduce the capacity of the SATA hard disk drive is not recommended. This may cause a malfunction of the SATA RAID functionality.

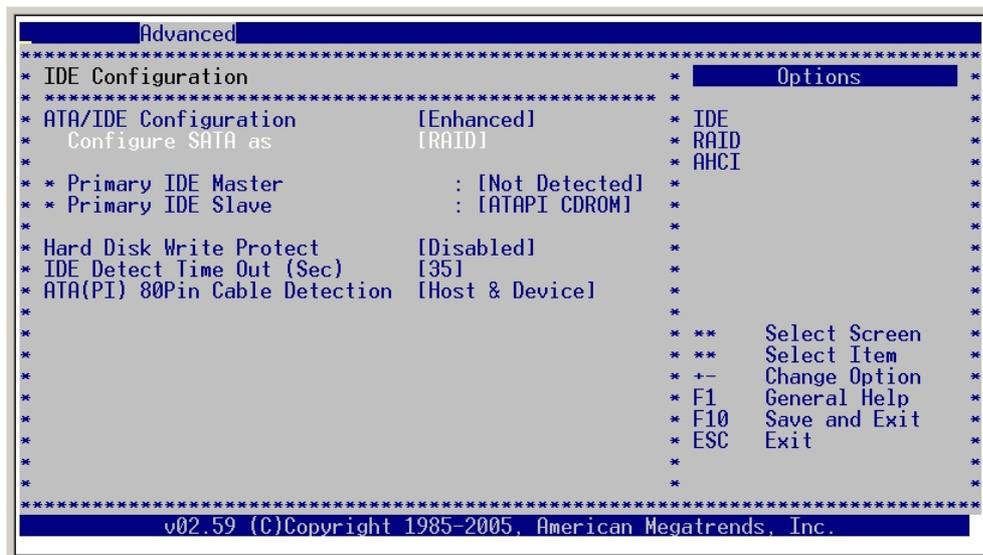
2 Setup and configure a SATA RAID Level 1 System with the conga-B945/BM45

This section describes how to setup and configure a conga-B945 or conga-BM45 based system to operate in Serial ATA RAID Level 1 (Mirror) mode while using Windows® XP.

1. Connect the CPU module to the baseboard. Attach two SATA RAID hard disk drives and enter the BIOS setup menu. Enter the 'IDE Configuration' setup node in the 'Advanced' menu and change the 'ATA/IDE Configuration' setting to [Enhanced].



2. Additionally set 'Configure SATA as' to [RAID].



5. In the storage manager's 'MAIN MENU' window the two attached SATA hard disk drives should be displayed in the 'Physical Disks' section. Choose item 1 'Create RAID Volume' and press <ENTER> to enter the 'CREATE VOLUME MENU'.

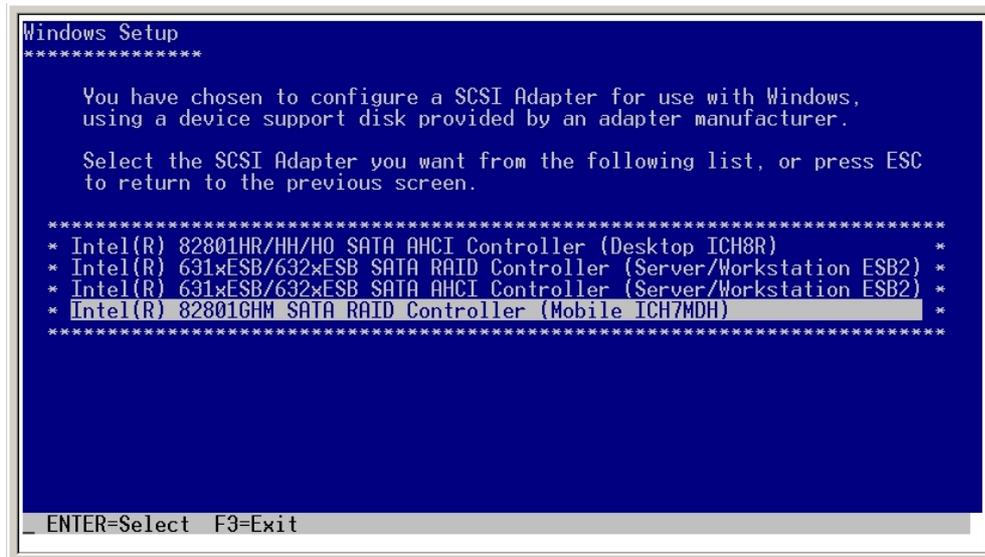
```
Copyright(C) 2003-06 Intel Corporation. All Rights Reserved.
*****[ MAIN MENU ]*****
*
* 1. Create RAID Volume
* 2. Delete RAID Volume
* 3. Reset Disks to Non-RAID
* 4. Exit
*
*****[ DISK/VOLUME INFORMATION ]*****
*
* RAID Volumes:
* None defined.
*
* Physical Disks:
* Port Drive Model      Serial #              Size   Type/Status(Vol ID)
* 0  WDC WD800BEVS-22   WD-WXE307161168     74.5GB Non-RAID Disk
* 2  WDC WD800JD-75MS  WD-WMAM9F947521     74.5GB Non-RAID Disk
*
*
*
*
*****
[**]-Select      [ESC]-Exit      [ENTER]-Select Menu
```

6. In the 'CREATE VOLUME MENU' name the RAID hard disk drives and select a RAID Level from the list. Confirm the settings by selecting the 'Create Volume' option. For this application note RAID Level 1 (Mirror) is selected.

```
Copyright(C) 2003-06 Intel Corporation. All Rights Reserved.
*****[ CREATE VOLUME MENU ]*****
*
*      Name:  RAID Disk
*      RAID Level:  RAID1(Mirror)
*      Disks:  Select Disks
*      Strip Size:  N/A
*      Capacity:  74.5 GB
*
*      Create Volume_
*
*****[ HELP ]*****
*
*
*      Press "ENTER" to Create the specified volume.
*
*
*****
[**]Change  [TAB]-Next  [ESC]-Previous Menu  [ENTER]-Select
```

 **Note**

Using the Intel® Matrix Storage Manager to reduce the capacity of the SATA hard disk drive is not recommended. This may cause a malfunction of the SATA RAID functionality.



10. The SATA RAID driver is now included in the operating system software. Continue and finish the installation by following the Microsoft Windows® XP installation commands.
11. After the installation is finished, the easiest way to determine the mode is to identify how the Serial ATA controller is presented within the Device Manager. Information about how this can be done can be found in section 4 of the 'Readme.txt' file that is part of the F6flpy32.zip.

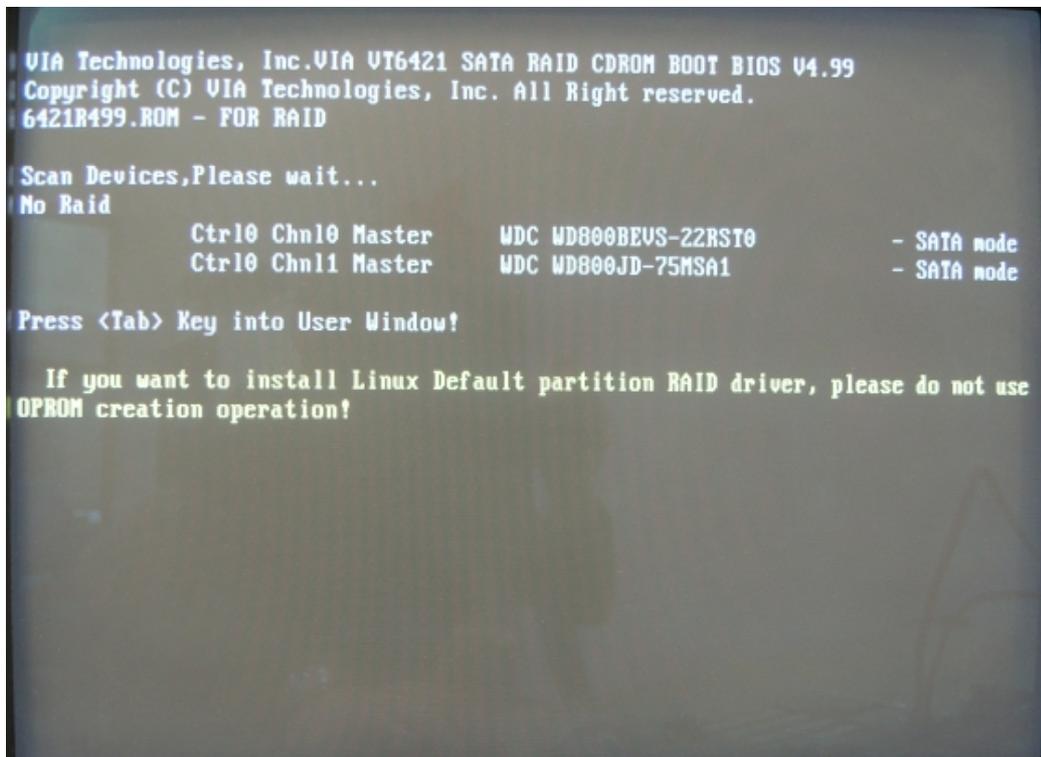
Notes

The screenshot is from a conga-B945 equipped system. A conga-BM45 equipped system screenshot would be identical.

3 Setup and configure a SATA RAID Level 1 System with the conga-XLX

This section describes how to setup and configure a conga-XLX based system to operate in Serial ATA RAID Level 1 (Mirror) mode while using Windows® XP.

1. Connect the conga-XLX CPU module to the baseboard and attach two SATA RAID hard disk drives to the system. A change of BIOS settings is not necessary.
2. Boot your system. During POST the following window for the onboard VIA VT6421 SATA RAID Controller is displayed for a short period of time. Enter the configuration utility by pressing the <Tab> key.



```
VIA Technologies, Inc.VIA VT6421 SATA RAID CDRom BOOT BIOS V4.99
Copyright (C) VIA Technologies, Inc. All Right reserved.
6421R499.ROM - FOR RAID

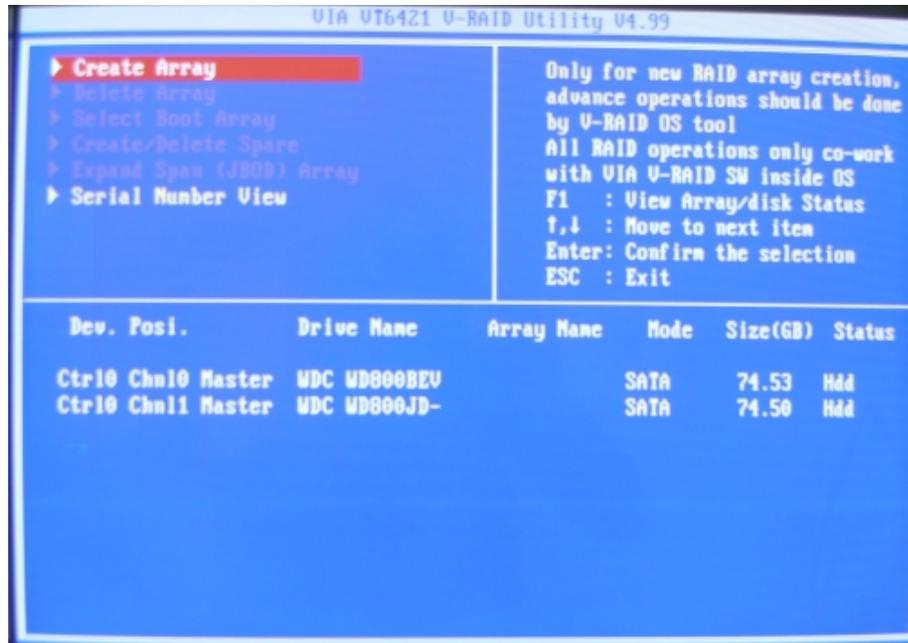
Scan Devices,Please wait...
No Raid

Ctrl0 Chn10 Master      WDC WD800BEVS-22RST0      - SATA mode
Ctrl0 Chn11 Master      WDC WD800JD-75MSA1        - SATA mode

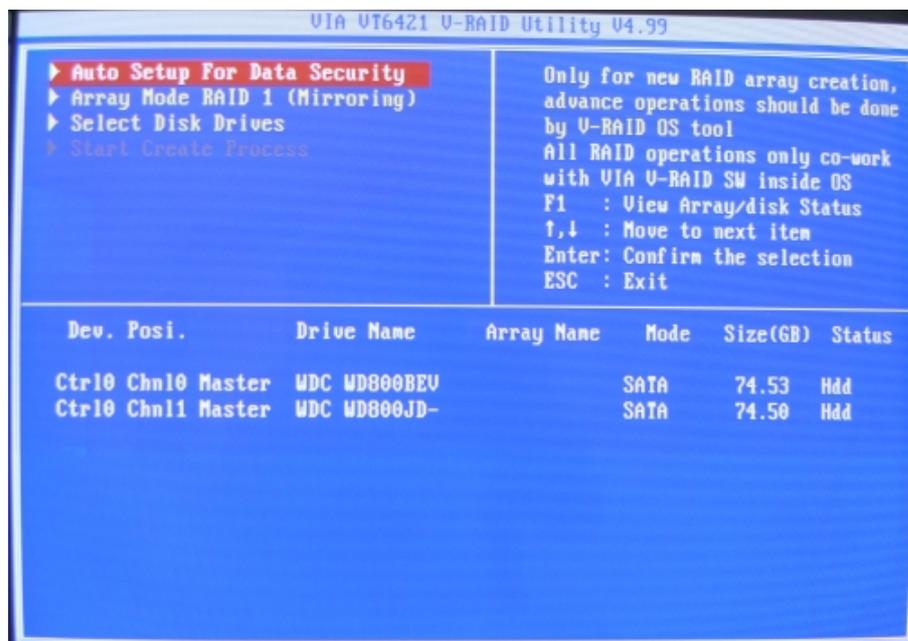
Press <Tab> Key into User Window!

If you want to install Linux Default partition RAID driver, please do not use
OPROM creation operation!
```

- The two attached SATA hard disk drives are displayed (as pictured below) in the main menu of the RAID configuration utility. Choose the 'Create Array' selection from the list, which is used for a new RAID array creation and confirm the selection by pressing <Enter>.



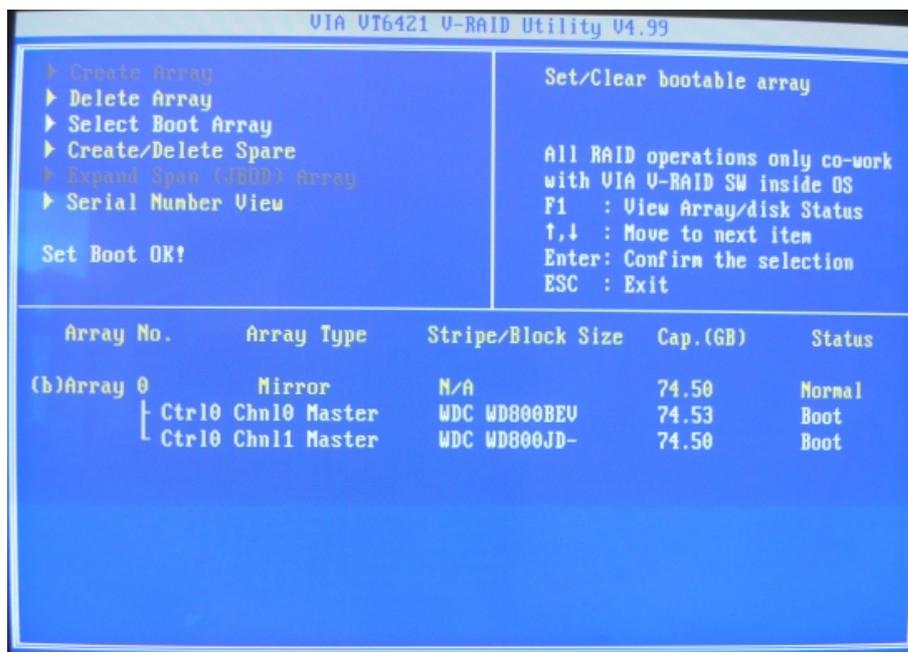
- In the 'Create Array' menu window first select the 'Array Mode RAID 1 (Mirroring)' from the list. Once this is done then move up to the 'Auto Setup For Data Security' selection and confirm using <Enter>. A message appears that the data on the selected disks will be destroyed. Continue by selecting <YES>.



- Another message shows that a new array is created. Now the two SATA hard disk drives are combined to one array (Array 0 in the picture below). Exit the 'Create Array' menu by pressing <ESC>.



- Back in the main menu of the RAID configuration utility, go to the item 'Select Boot Array' and highlight the earlier created array (Array 0). A green letter b appears in brackets (b) in front of the selected array. Additionally, the message "Set Boot OK!" will be displayed in the upper left window. Exit the main menu by pressing <ESC> and confirm by selecting <YES>.



- When rebooting the system, the onboard VIA VT6421 SATA RAID controller scans for devices and will now indicate that the two attached SATA hard disk drives are ready for RAID. The message pictured below will appear for a short period of time during POST.

```
VIA Technologies, Inc.VIA VT6421 SATA RAID CDROM BOOT BIOS V4.99
Copyright (C) VIA Technologies, Inc. All Right reserved.
6421R499.ROM - FOR RAID

Scan Devices,Please wait...
Raid
  Array 0      Mirror      N/A      74.50      Normal
  | Ctrl0 Chn10 Master      WDC WD800BEV      74.53      Source
  | Ctrl0 Chn11 Master      WDC WD800JD-      74.50      Mirror

Press <Tab> Key into User Window!

If you want to install Linux Default partition RAID driver, please do not use
OPROM creation operation!
```

- Download the VIA VT6421 SATA RAID driver (vt6421_win2kxp.zip) from the congatec homepage (<http://www.congatec.com>) and extract the contents. The contents of this zip file are required to pre-install the SATA RAID driver using the <F6> method during Microsoft Windows® XP setup. Prepare a floppy disk as described in the 'Readme.txt' file included in the zip file.
- Attach a floppy disk drive to the system. Reboot the system from the installation CD for Windows® XP and start the installation process. Immediately after the start of the Windows® XP Setup, press <F6> to install the third party SCSI/RAID driver. Later on during setup, Windows® XP will request that the device support disk for mass storage devices be inserted. When this request appears, insert the previously prepared floppy disk into the floppy drive. Press the <S> (<Z> for German installation) to implement the RAID driver. Choose the SATA RAID driver (VIA RAID Controller (Windows XP)) from the displayed list and confirm by pressing <Enter>.

Note

Be aware that not all USB Floppy disk drives are supported by Windows XP during installation. Refer to the Microsoft® support homepage (Article ID 916196): <http://support.microsoft.com/kb/916196/en-us>.

10. The SATA RAID driver is now included in the operating system software. Continue and finish the installation by following the Microsoft Windows® XP installation commands.
11. After the installation is finished, the easiest way to determine the mode is to identify how the Serial ATA controller is presented within the Device Manager.