MCS-DR STORAGE UNIT

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September 23, 2009

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1   PURPOSE

This document will describe the parts and required assembly of an MCS-DR RAID array. The RAID array must neither be formatted nor partitioned as the MCS-DR uses a custom file system. Accessing and manipulating data currently requires a custom application, though plans for a future linux file system driver are being developed.

2   HARDWARE SPECIFICATION

The MCS-DR's RAID storage unit consists of a 1U rack-mount RAID enclosure, and 5 streaming-tuned hard disk drives. All of the cables and screws required to mount the drives in the enclosure are included with the enclosure, as well as an eSATA cable suitable for connecting the unit to the MCS-DR PC. The enclosure itself is a DAT Optic, Inc. RM5S2P, available from http://www.cwol.com/serial-ata/sata-port-multiplier-encl-rack-mount.htm The drives installed in the enclosure are Seagate SV35.5 model ST31000525SV. They are available from PC Connection at the following URL: http://www.pcconnection.com/IPA/Shop/Product/Detail.htm?sku=9876607.

3   ASSEMBLY

Figure 1. The RAID enclosure.

To open the enclosure, remove 1 black screw (A), 2 silver screws (B), and slide the top cover back. Note that the rack mount tabs for the front sides of the enclosure are included in the kit, but not installed in the unit shown (C).
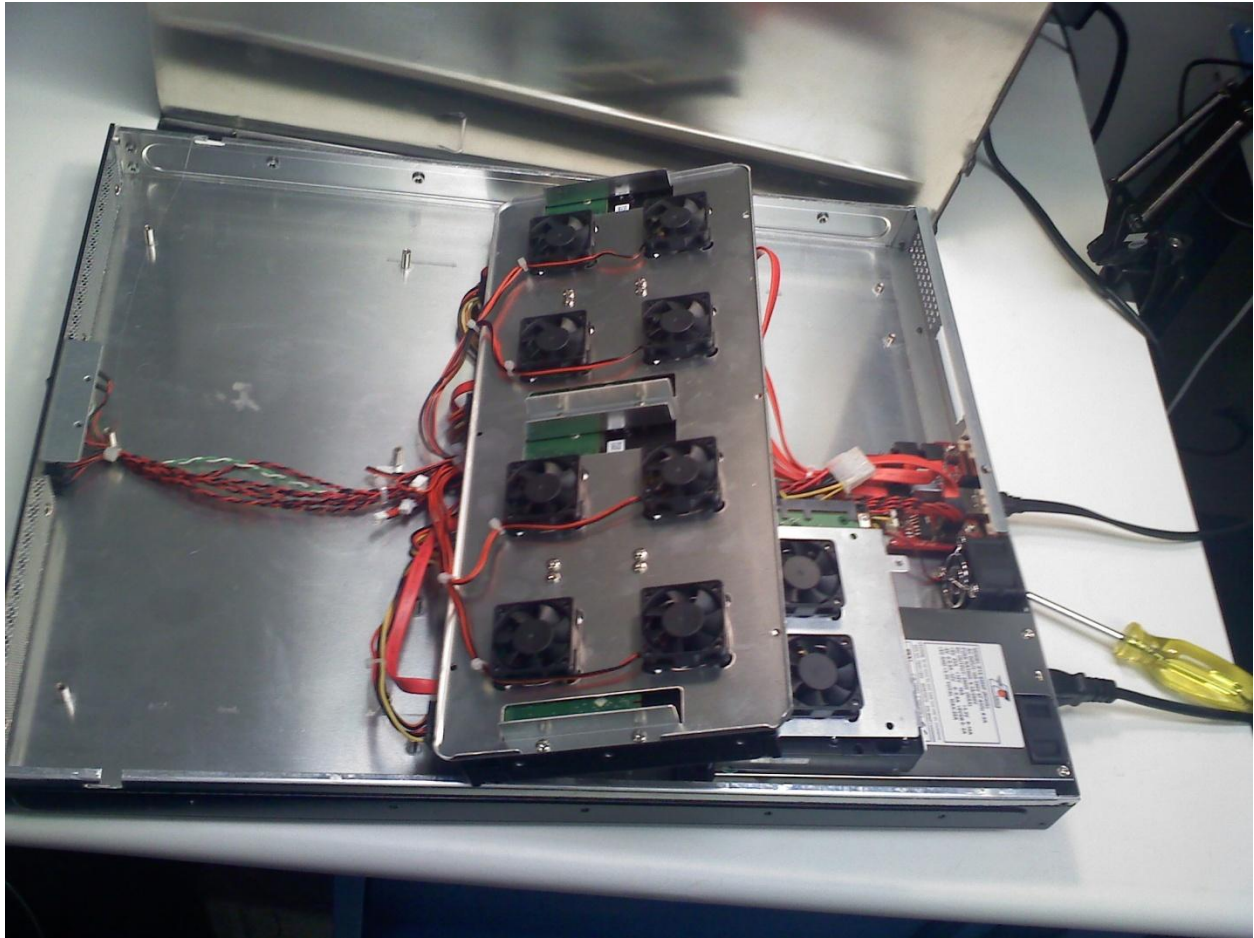
Figure 2. Mounting the first four drives.

The first four drives mount on a raised aluminum tray at the front of the unit. The tray is mounted to standoffs with 6 flush-seated machine screws. remove these screws, and flip the tray back towards the end of the unit. Each of the four drives is mounted to the tray with four coarse thread machine screws. Be sure to mount the drives with the SATA and power connectors towards the back of the unit (when upside-down, as shown, the connectors are towards the front of the chassis).
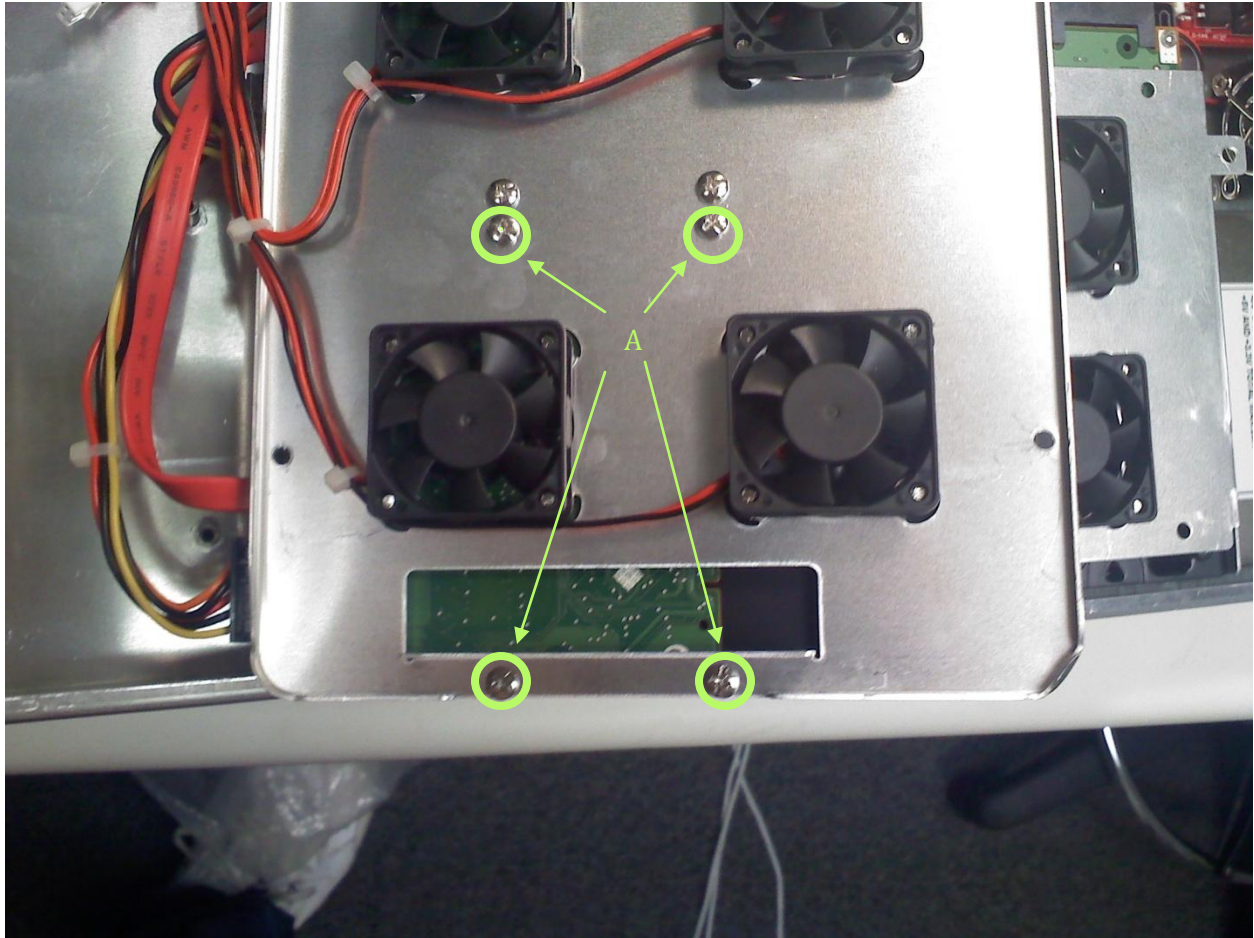
Figure 3. Mounting the first four drives.

Here is a close-up shot showing the mounting screws for one of the four drives which mount on the tray. Be sure to thread all four screws before tightening as the drives may not align very well otherwise. Once all four drives have been mounted, connect the SATA cables and power cables.
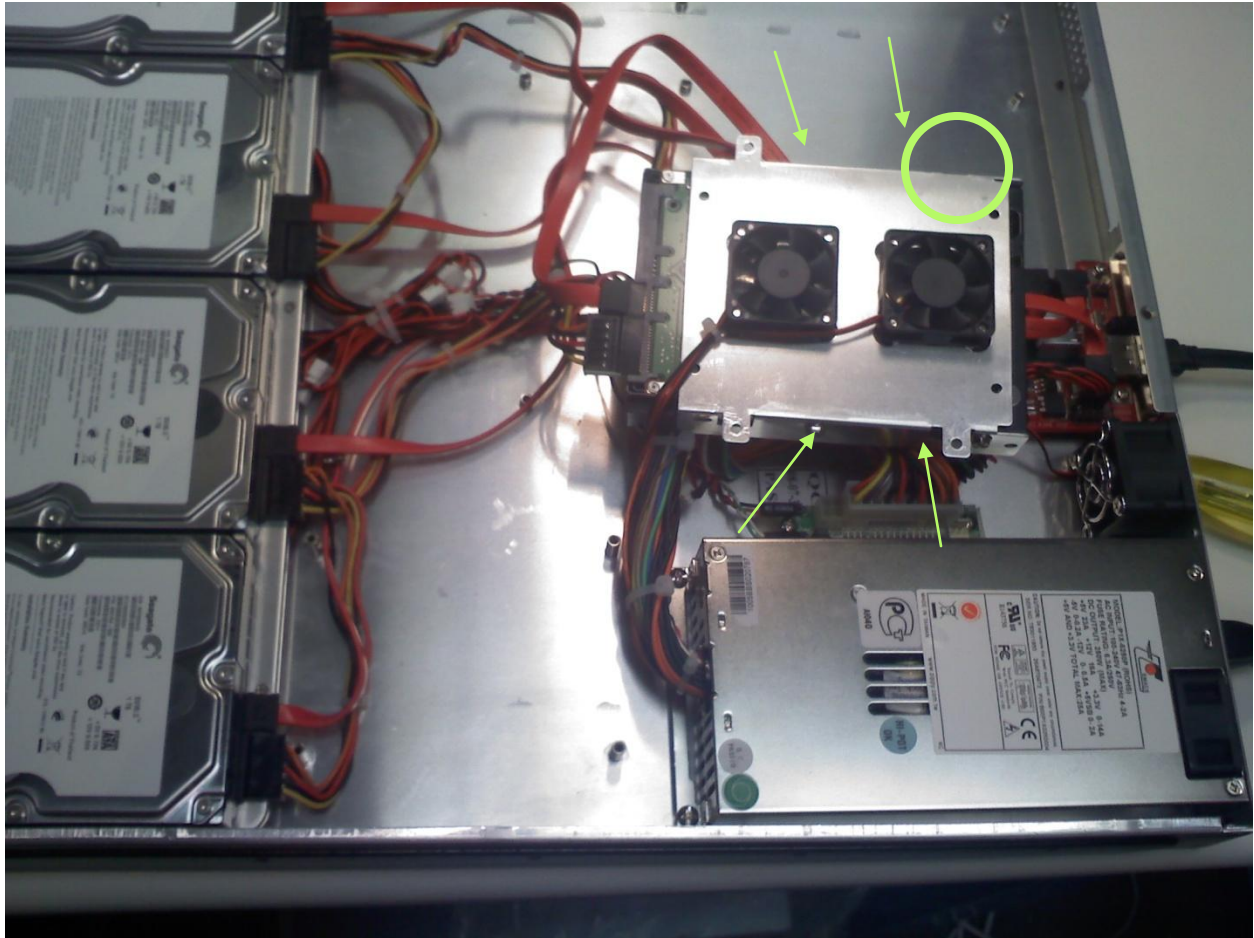
Figure 4. Mounting the fifth drive.

The fifth drive mounts on the smaller aluminum tray near the power supply. Remove the four pancake-head machine screws and flip the tray towards the back of the unit. The clearance between the cables for the 1st and 2nd drives and the small aluminum tray is insufficient, and folding one of the four tabs to be parallel with the drive's side wall was necessary. In the figure above, this is the circled area showing the tab already bent. Like the first four drives, four course thread machine screws mount the drive to the tray, but in this case, they screw in to the side of the drive as opposed to the bottom. These screws' positions are approximately indicated by the green arrows.
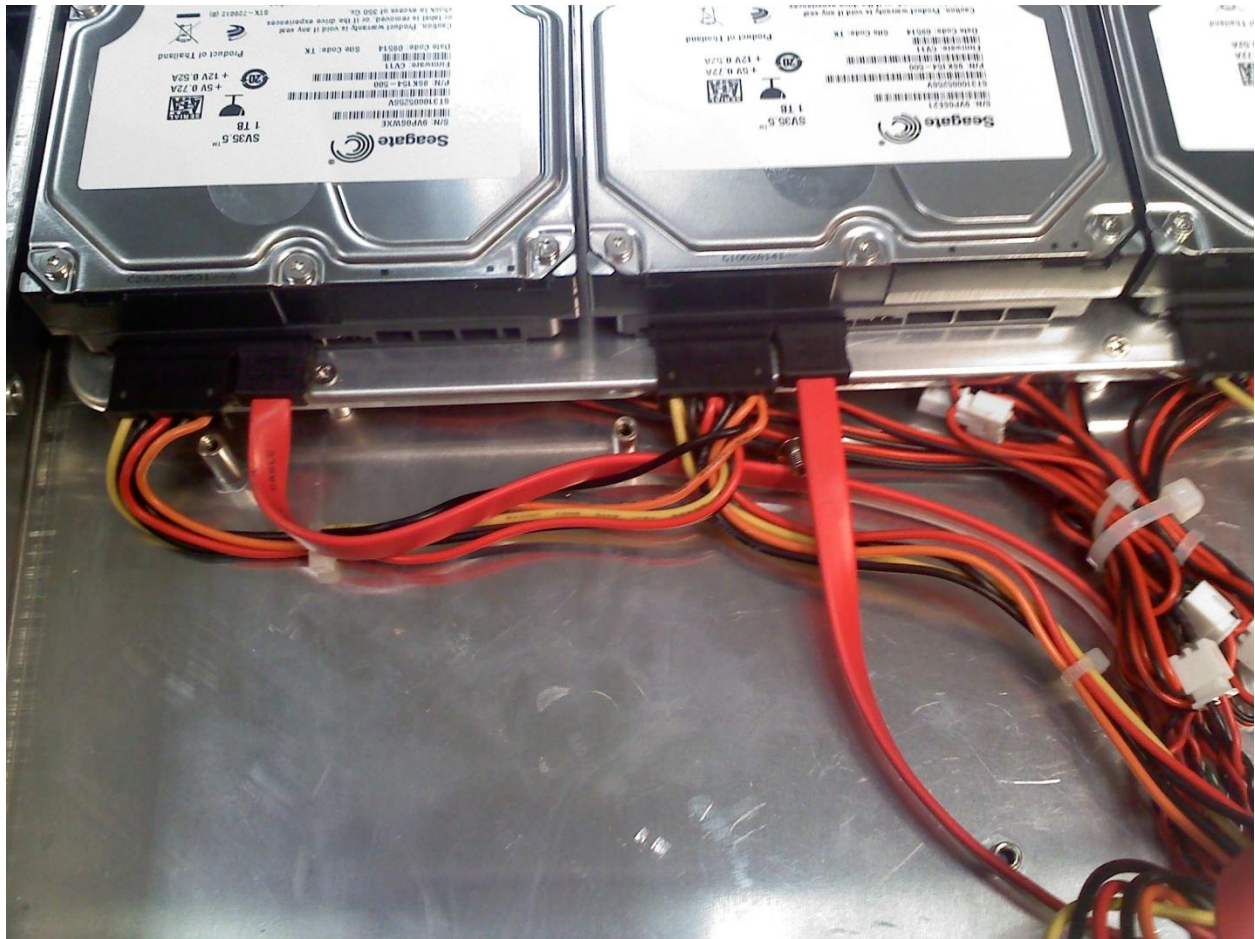
Figure 5. Cable arrangement.

The cables for the first and second drives must be routed to go under the rear aluminum tray as shown. Be careful not to bend the cable sharply or allow the metal edges to rest against the cables with too much pressure.
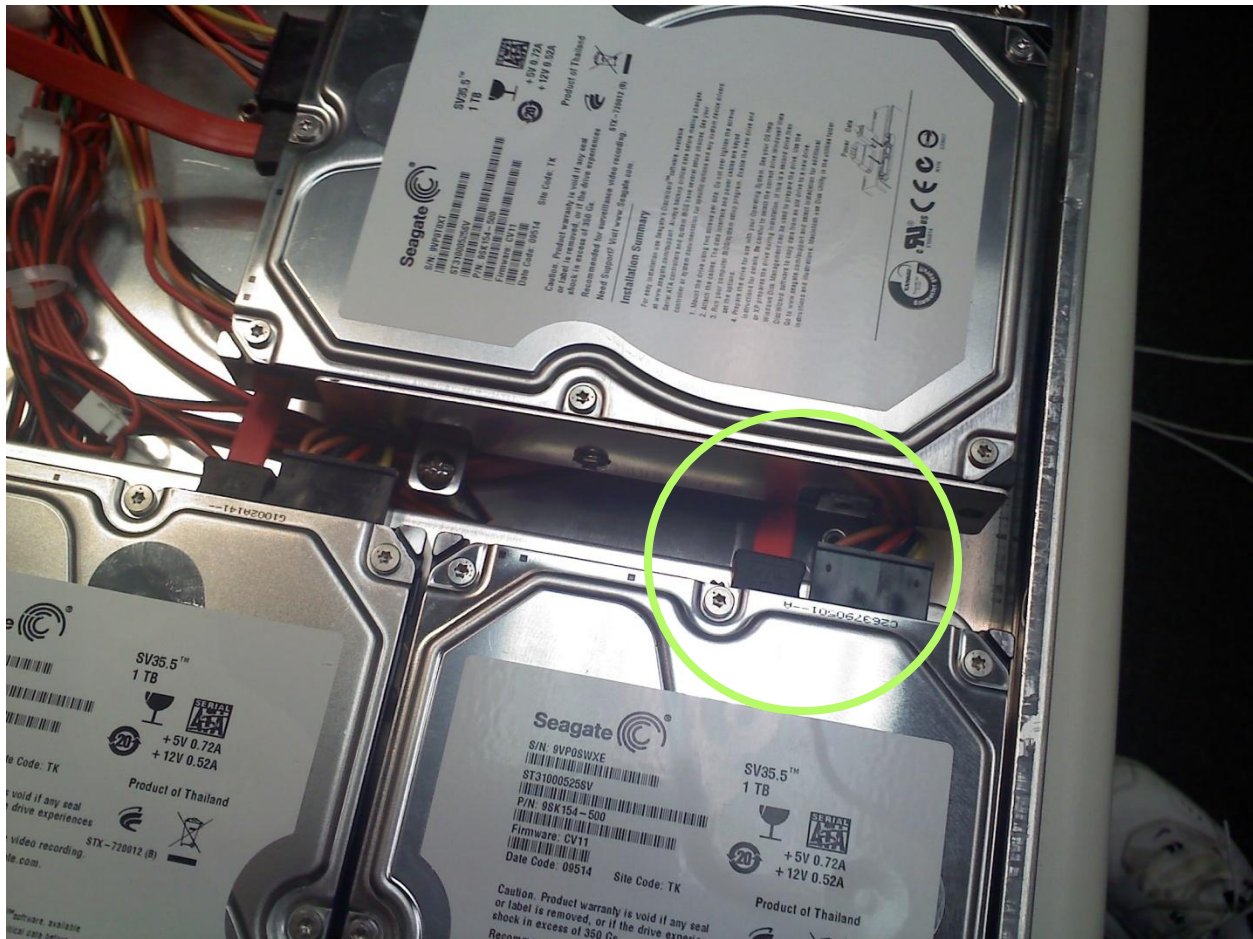
Figure 5. Cable arrangement with fifth drive in place.

This image shows the rear tray mounted and position of the cabling. The green circled area highlights the tab on the rear tray that had to be folded, and how the SATA and power cables must be routed underneath the rear tray.
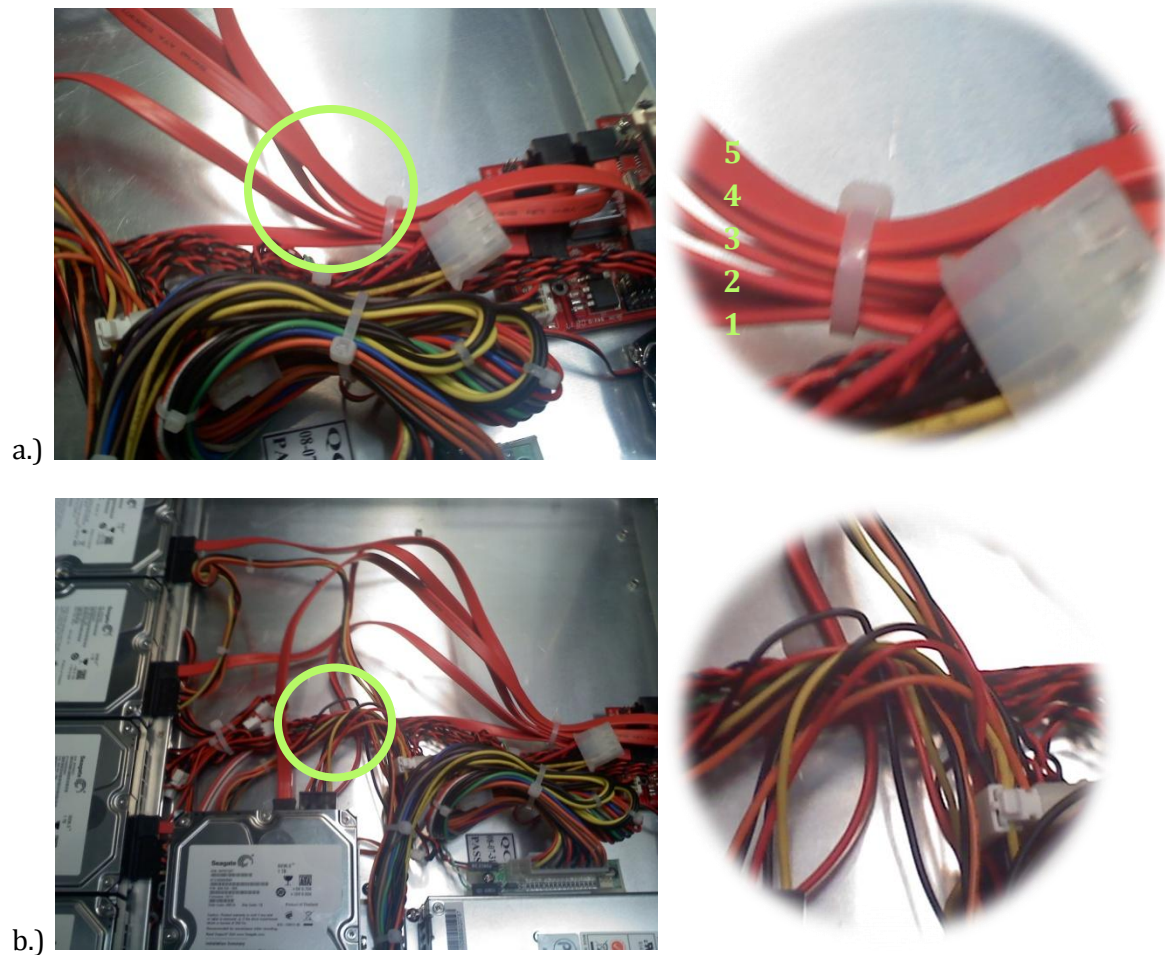
a.)

b.)

Figure 6. Cable connection order and notes.

It is advisable but not necessary to attach the drives in a consistent ordering in the event that data needs to be recovered or a drive replaced. In figure 6.a, the circled SATA cable bundle shows the desirable drive numbering used. The manufacturer may not guarantee that the cables will always be thus bundled, though you may use these images to trace the SATA cables to their connection point on the port-multiplier board and use the same numbering scheme.

As shipped, the cables in the enclosure were zip-tied in way that made connecting the drives difficult. It may be necessary to cut a zip-tie or two near the area highlighted (shown with zip-tie already removed).

Figure 7. The enclosure with 5 mounted drives.

All that remains now is to replace the lid with its 3 retaining screws. The preferred drive numbering is indicated in green.

4 APPENDIX A: ENCLOSURE VENDOR WEBSITE

http://www.cwol.com/serial-ata/sata-port-multiplier-encl-rack-mount.htm

Not a do-it yourselfer?
Buy this enclosure with up to 10TB of installed and tested storage!

5 Drive SATA Rack Mount Port Multiplier Enclosure. Mounts in 1U rack space or stacks on desktop

Team Up this eSATA Rack Mount Enclosure with:
Hi Performance x8 PCI-e eSATA card
CalDigit FASTA Hi-Performance Cards
Sonnet Tempo SATA Host Controllers
eSATA 4 Port SATA II PCI-X RAID Controller
Hitachi SATA II Hard Drives
Seagate Serial ATA 3Gb/s Hard Drives

SATA Rack Mount Enclosure, 5 Drive
Retail Value: $499.00

As Low As:

$359.50
In Qty.

IN STOCK

Enter quantities of items you wish to purchase then "Add" to cart

1 Add **5 Drive SATA Rackmount Port Multiplier Encl.**

Retail	1 ea	2 ea	3-4	5+
$499.00	$374.50	$367.50	$364.50	$359.50

Buy hard drives with this enclosure and SAVE!

2 Add **500GB WD RE3 RAID Edition SATA II HDD**

Retail	2-4	5-9	10+
$179.00	$93.00	$91.00	$89.00

2 Add **750GB Seagate 32MB, SATA II 7200.12 HDD**

Retail	2-4	5-9	10+
$369.00	$83.25	$81.25	$79.25

2 Add **1TB Seagate 32MB, SATA II 7200.12 HDD**

Retail	2-4	5-9	10+
$449.00	$89.00	$87.00	$86.00

2 Add **1.5TB Seagate 32MB, SATA II 7200.11 HDD**

Retail	2-4	5-9	10+
$599.00	$135.75	$133.75	$131.75

5-DRIVE SATA PORT MULTIPLIER RACK MOUNT ENCLOSURE

Super High Density Near Line Storage! Up to 10 Terabytes in a single 1U rack space!

This sleek 1U rack mount enclosure features the latest Silicon Image SiI-3726 SATA Port Multiplier technology and houses five (5) high capacity SATA I or SATA II disks in a single enclosure while connecting to the host system via a single external eSATA cable. Depending upon SATA host controller capabilities, configure as hardware or/and software RAID including: RAID 0, RAID 1, RAID 5, RAID 1+0 or JBOD!

The perfect solution for large storage libraries, digital video & digital audio files and backups, with the flexibility to grow with your storage needs. Using four of the enclosures, in only a 4U rack mount space mount TWENTY (20) SATA drives! Using 2TB hard drives, that's up to Forty (40) Terabytes of near line storage in a 4U space!

Incorporating DirectAir™ technology, the enclosure design includes multiple drive cooling fans to insure that hard drive temperatures stay within eight (8) degrees Celsius of the ambient room temperature, increasing performance reliability and extending hard drive life.

Multiple fans keep your drives running cool, increasing performance and reliability

Features:

- 5 SATA hard drive 1U rack mount enclosure
- Built-in SATA Port Multiplier with eSATA 3.0Gb/s interface
- Compatible with all 3.5" SATA I (Serial ATA 1.5Gb/s) and SATA II (Serial ATA 3Gb/s) Hard Drives
- Auto negotiation for SATA 3 Gb/s and SATA 1.5 Gb/s drives
- Built-in universal power supply with ON/OFF switch
- Drive activity and drive power LEDs

- Platform independent—works with any Mac, Windows or Linux system with compatible SATA Host controller

Specifications:

- **Connectors:** One eSATA connector
- **Cooling:** DirectAir technology
- **Performance:** Up to 3.0Gb/s (300 MB/s)
- **Compatibility:** Compatible with all 3.5" SATA I (Serial ATA 1.5Gb/s) and SATA II (Serial ATA 3Gb/s) Hard Drives
- **Dimensions:** 1U rackmount (W x D x H):19.0"x 20.8"x 1.75"
- **Weight:** 9 lbs / 4.5 kg (without hard drives)
- **Switches:** 1 - Power ON/OFF
- **Power:** Universal AC Voltage (115/230 VAC auto switching) 200W power supply
- **LED Indicators:** 5 - Hard Drive Power, 5 - Hard Drive Activity

Includes:

- 1 - 5 Drive 1U rack mount enclosure
- 1 - eSATA cable
- 1 - AC power cable
- 1 - Drive mounting screw set
- 1 - User manual
- 4 - non-mar rubber feet (protect desktop, and allow multiple units to be "stacked" if not rack mounting)

System Requirements:
- eSATA controller that supports SATA Port Multipliers

4 APPENDIX A: HARD DRIVE VENDOR WEBSITE

http://www.pcconnection.com/IPA/Shop/Product/Detail.htm?sku=9876607