

## Working with Fiber Channel Drives and JBOD's

Summary: When erasing Fiber Channel drives using DestructData hardware and software there are several approaches. The correct approach to be used depends on the exact FC installation that you are attempting to erase. These installations typically fall into one of the following categories

- Loose FC Drives
- JBOD(S) (rack mounted arrays)

DestructData provides solutions for all these scenarios

### Loose FC Drives

In the event you are required to erase loose FC drives, your approach should be determined by the volume to be erased.

For low volume situations where batches of 3-6 drives are adequate there are three possible approaches

- RED-X
- Loose Drive FC Fanout Kit
- Kill Box (OEM JBOD)

All of these approaches will require your hardware platform to be equipped with a FC HBA. (FC RAID Adapters are NOT acceptable. All DestructData products are configured with compatible FC HBAs, no alternate card should be used). Your FC HBA will have one or more FC ports.

If you have access to a RED-X, it will be configured to allow for 1-4 Fiber Channel Drives. Simply mount the drive into the drive caddy and insert it into the bay.

If you do not have a RED-X but have another DestructData device that includes external FC ports then you can use T-Card Breakout Cabling. If you do not have a Fanout Kit one can be purchased from DestructData. Instructions are provided with the kit. Kits can be ordered to process from 4 to 8 drives at once. The FC Fanout Kits includes a power supply, a cable to connect an FC HBA port to the first T-Card, interconnect cables to connect the T-Cards together and the T-Cards themselves. T- Cards are basically small interface boards that connect directly to the FC drive and allow 4 to 8 drives to be daisy-chained together. You can install a T-Card Breakout Kit on each available port of your FC HBA. For example, on a quad-port FC HBA, it would be possible to configure up to (4) 8 drive T-Card Breakout Kits for a total of 32 drives. However, this approach is not recommended when such volume is needed. It is inefficient and would be very messy to implement due to the large number of cables involved.

**Special Note:** *When using the Fanout Kit it is important to remember that every T-Card in the loop must be populated with a drive. Leaving an empty T-Card in a loop can cause unpredictable drive recognition results, especially in Fanout Kits with 5 or more drive positions.*

For batches of more than 4-8 loose drives, where you have access to an external FC port on your DestructData device, it is recommended that you configure a “kill box”.

A kill box is nothing more than an FC JBOD of any manufacture that is connected to your DestructData device via an external FC HBA port. This will allow for a much more streamlined approach for processing batches up to 15 drives (depending on the JBOD being used) and will allow for hot swapping of drives (not supported by the T-Card Breakout Kit).

The loose drives are mounted into the drive carriers of the JBOD and processed accordingly. Many DestructData clients handle drives that are already mounted in drive carriers. To save time they configure multiple kill boxes using the most commonly received typed of carriers. Thus on a single system equipped with FC support, the client may have an EMC DAE on Port 1, a Xyratex on Port 2, an HP Storaegeworks, and a 3Par. Many clients already have access to these components from their inventory so this makes for a very time saving and cost effective implementation.

It should be noted that when selecting kill boxes, the backplane speed should allow for maximum throughput of both the drives to be erased and the HBA being used. Most DestructData FC HBAs are based on the 4GB standard so any 1Gb, 2Gb or 4Gb JBOD may be used. 8Gb enclosures may also be used, however the max bandwidth will be 4Gb/s (we do not recommend the use of any 1GB FC JBODS unless it is a special circumstance involving older FC Drives, some 1GB JBODs are not compatible with 4GB HBAs, a 2GB HBA may have to be used instead)

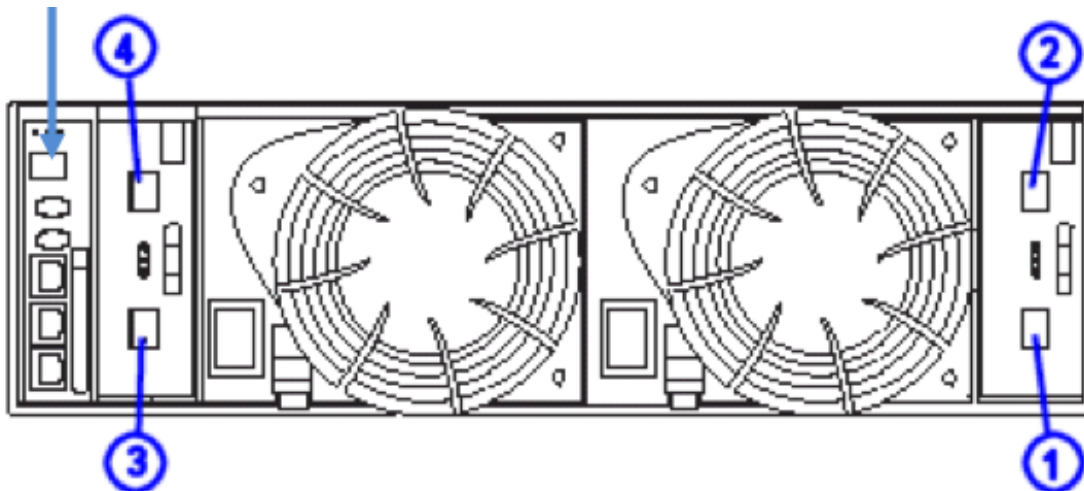
### **High Volume Loose Drives**

The above scenarios describe configurations where processing drives in batches ranging from a single drive to 15 drives is sufficient. In the event you find it necessary to increase throughput beyond this it is possible to scale the kill box approach.

This is done by daisy-chaining kill boxes together in what is called an FCAL or Fiber Channel Arbitrated Loop.

Before attempting this it is important to note that any loop should contain ONLY IDENTICAL components. For example, if you have a DAE4 connected to Port1 on your FC HBA, and you want to expand that loop, do so using another DAE4. Do not attempt to mix JBODS from different manufacturers; results will vary. Also, DO NOT mix JBODS of different backplane speeds; even if they are from the same manufacturer, in most cases this will cause problems.

On the back of any FC JBOD there will be the equivalent of an IN port and an OUT port. These can go by different names depending on manufacturer. Some are PRI (in) and EXP (out), others are TX and RX but it is all equivalent to IN and OUT. In addition, there will usually be (2) sets of these IN/OUT ports. There are two sets to allow for redundancy in the storage configuration, but this redundancy is not needed or desired for wiping purposes.



- 1 – Channel A Out
- 2 – Channel A In
- 3 – Channel B Out
- 4 – Channel B In

Here you can see the two sets of IN/OUT ports, specified as Channel A and Channel B. There are usually several other ports as well but you can ignore these. The ports that you are interested in use FC connections. (There are numerous styles of FC connections including optical and copper, you will need the correct cables depending on the style of connector)

Your loop will be created using either Channel A or Channel B, do not mix channels in an erasure loop. **You must disconnect all original data / host connections from the JBOD prior to direct-attaching for wiping purposes.**

Connect your first JBOD to a port on your FC HBA and insure that you can see drives in this JBOD. Once that is confirmed you know which port is IN on the first JBOD. Using the correct cable connect the OUT port from this first JBOD to the IN port on a second JBOD. Next look for a number selector on the back of the JBOD. There will only be one of these. It displays the chassis number / shelf ID of the JBOD. There is typically a button next to it that can be pressed to rotate through values. (If not, the shelves may be auto-assigning, in which case, power-cycling all enclosures should be sufficient for generating unique IDs) **THE CHASSIS NUMBER MUST BE UNIQUE FOR EACH JBOD IN A LOOP.**

Once you have confirmed this, stop and insure that you can see drives inserted into the second JBOD. If the drives do not appear, power cycle the looped shelf. This is sometimes necessary for the new settings to take effect.

You now have 2 JBODS daisy-chained to a single port on your FC HBA. How far can you extend this chain? It depends on a couple of factors.

First is the number of ports on your HBA. We generally recommend that any loop be limited to 4 JBODs. Since each JBOD typically holds 14 or 15 drives that means up to 60 drives PER PORT, or a possible 240 drives on a quad-port HBA! It is possible to extend loops even farther but results

are unpredictable.

Second, is the type of FC drive being erased. Not all FC drives are created equal. If the drives being erased are genuine FC (SCSI-spec) drives then the numbers above can be achieved since additional drives (beyond the first JBOD) do not impose higher processing loads on the DestructData device (assuming the erasure software is using the SCSI write same command to wipe the drives. However, many newer 'FC' drive are not genuine FC, but are actually SATA drives that have been fitted with FC interposer trays. It is possible to build a loop using JBODS for these drives, however, throughput will be negatively affected by the addition of each JBOD as SATA drives do not support the write same command, and will be limited by the available bandwidth, divided by the total number of drives being wiped. We generally recommend that no more than 2 JBODS be looped per port if FC SATA drives are in use. However, you should feel free to experiment with your particular equipment.

### **Rack Mounted FC Arrays (drives installed in cabinets)**

Another common erasure scenario is to erase an existing, decommissioned array where the drives are still mounted in the original chassis.

Depending on the chassis this is easily done using any DestructData platform that has an external FC port(s).

Not all chassis can be erased in this matter. Please check the DestructData HCL for manufacturer and model numbers that are known to be supported. In general chassis that utilize a series of JBODs can be supported.

The approach here is very similar to erasing high volumes of loose drives described above.

First, identify your JBODS, the cables used and then create one or more loops with each loop connecting to a port on your FC HBA. Be sure the chassis is properly powered. Once everything is cabled properly and powered up you should be able to see all the drives.

Erasing large storage arrays in this manner is much more effective than LUN erasure (or booting the original storage controller into an erasure environment to erase the connected storage).

Under this approach each physical drive is erased individually, sector-by-sector. Each drive is recorded in the audit logs separately, including its serial number (which is often not possible using LUN erasure) and it is possible to confirm that every drive in the chassis was erased in its entirety.

This approach also does not require the chassis 'head-end' or host storage controller units to be powered up, or even be present.

**Special Note:** Power Considerations – If you are trying to erase a large number of FC JBODS inside a data center then you have little to worry about. However, if the equipment has been moved to a staging area it is important to know that you have appropriate power. FC JBODs consume a great deal of power. In general 8 JBODS fully populated with 15 drives each, along with the DestructData wiping system, will work on a dedicated 20 amp circuit 115V circuit, or a 10A 230V circuit.

### **FC Drives with Non-Typical Formatting**

FC drives are not commonly found in the consumer environment. Because of their characteristics and cost they were limited almost exclusively to enterprise data centers. Because of this they were subject to many proprietary implementations. Some of these implementations involved formatting schemes different from the commonly found 512 byte per sector standard. It is not unusual to find FC drives formatted as 520 or even 528 bytes per sector. Many of these

drives were manufactured by IBM, then later by Hitachi and EMC. Such drives require special handling in the decommissioning process.

If the wiping software cannot write in these non-standard formats, the tool may automatically attempt to reformat the drive to a 512-byte-per-sector scheme prior to sanitization. This typically works for the purposes of erasing the drive, but there can be no guarantee that the drive can be easily formatted back to work in the native storage environment without special tools or methods.

#### **Special Note Regarding Hitachi Drives**

In the world of FC drives, Hitachi deserves special attention. The HGST product line poses enormous challenges for decommissioning due to the highly proprietary nature of their security. Not only do these drives utilize non-512 formatting, they may also be restricted in their ability to be moved to another platform. For example, removing a drive from a Hitachi unit and placing it in a DAE style shelf may result in the drive not being recognized. You may then believe the drive is bad, but in reality it is not.

In some cases Hitachi drives will not work unless they are in their native chassis, this can be aggravating since in some cases these devices cannot be directly connected. If you have Hitachi drives that have a 'tailcard' this will often be the case. In many cases these drives can be erased using the FC Fanout Kit and RED-X. Hitachi drives can be frustrating but DestructData has hardware that supports almost every model of drive.