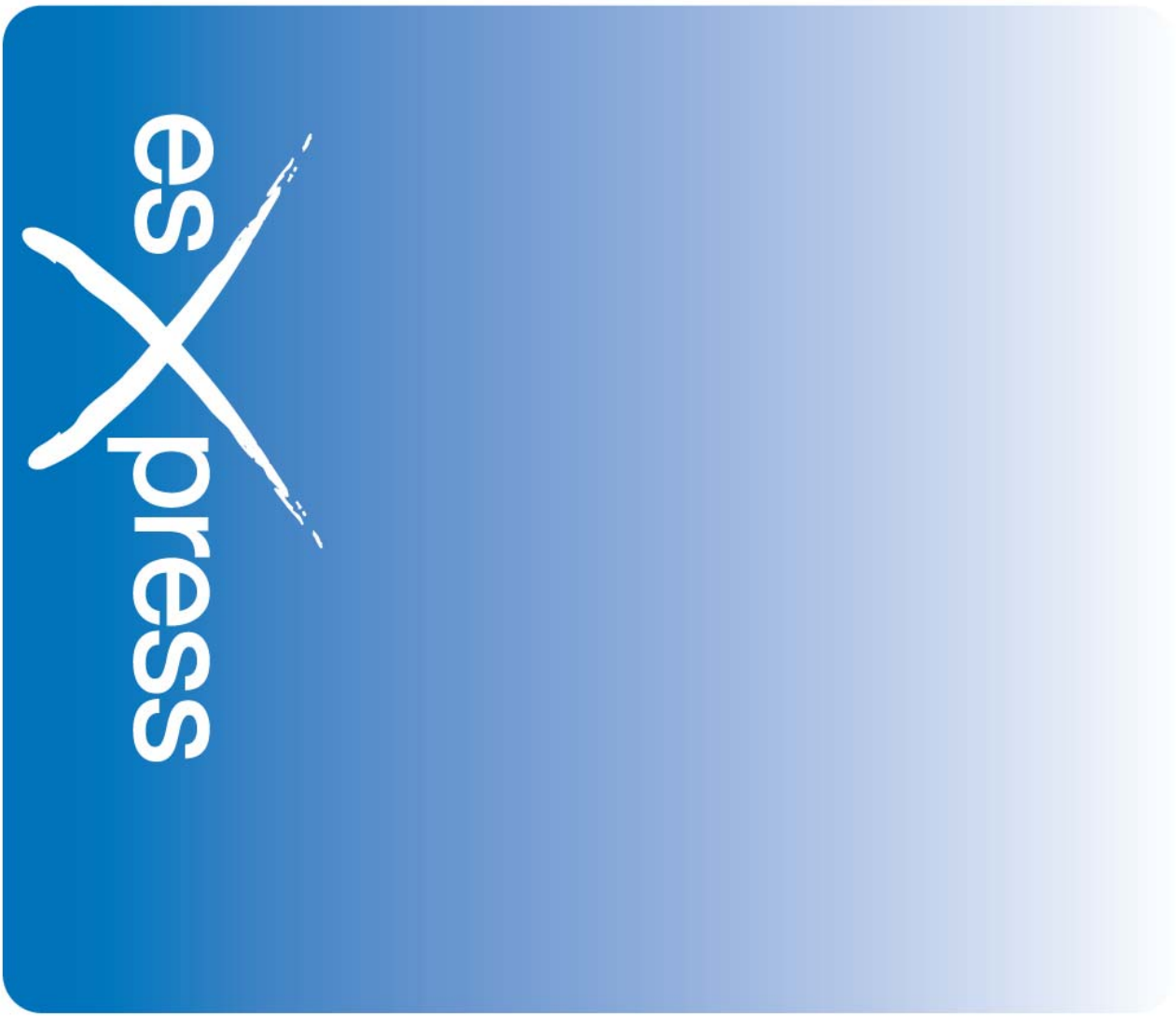
Quantum

User's Guide User's Guide User's Guide User's Guide User's Guide User's Guide

Quantum esXpress 3.6

VMware Based Backup and Recovery



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For information on new sales, licensing and support renewals you can email **sales@Quantum.com**.

For additional information about Quantum products and services, go to:

http://www.Quantum.com

To license and register this product, go to: **www.Quantum.com/esXpress/activation**

Note:	A valid support agreement is necessary to receive new esXpress release and software updates.

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About This Guide

The purpose of this guide is to detail the configuration options available from the esXpress text menu that is accessible on each host where esXpress is installed.

This guide also covers configuration options and topographies supported by esXpress. This guide does not cover the Configuration and Deployment GUI Appliance. If you are using the GUI Appliance to configure esXpress on your hosts, refer to the *Configuration and Deployment GUI Appliance Guide*.

Who Should Read This Guide

esXpress is designed for use by VMware administrator. Installation and administration of esXpress requires that you have a basic understanding of configuring ESX servers, virtual machines, basic networking, and using Virtual Center.

With esXpress you are not limited to the number of hosts, CPUs or virtual machines that can be backed up. esXpress does ship with a 30 day trial of Intelligent Deltas and archive management plug-ins and will run up to 16 Virtual Backup Appliances (VBAs). After 30 days, a license key is needed to continue to run esXpress. Contact Quantum sale for additional license keys.

Quantum Branding

Quantum's version of esXpress has been modified specifically to work in an optimized fashion with the DXi Deduplication appliance. In order for the Quantum DXi data deduplication and replication appliance to function most efficiently, it has been designed to process data that is unencrypted and uncompressed. As a result Quantum esXpress passes data images and deltas directly and unaltered to the DXi-Series system. For best results the DXi performs optimal deduplication and compression within DXi itself. When replication is in use the DXI performs encryption during the data transfer. To ensure economy of scale the DXi is designed to be the central repository for all your virtualized and traditional data center needs. esXpress as delivered by Quantum is intended for use with the DXi family of products as the intended target storage device. Optional storage targets are not supported.

Note: esXpress is installed on a VMware ESX server or host. The esXpress software does NOT get installed on the DXi itself. The DXi is a CIFS or NFS storage target to esXpress.

Note: Since the esXpress software can target any number of storage devices including FTP servers, it should be noted that Quantum will only support CIFS and NFS DXi mounted shares as a storage target. Occasionally throughout this document it will mention FTP targeted shares and or servers. In many cases you can substitute FTP server with the DXi share.

Contacts

Quantum company contacts are listed below.

To order documentation for esXpress or other products contact:

Quantum Corporation
P.O. Box 57100
Irvine, CA 92619-7100

(949) 856-7800
(800) 284-5101

Quantum Home Page

Visit the Quantum home page at:

http://www.Quantum.com

Quantum Support

To contact Quantum Global Services please visit:
http://www.Quantum.com/pdf/Quantum_Global_Services.pdf

We offer two convenient methods to get the support you need, anytime:

- Knowledge Database - An interactive database of the most frequently asked questions: **http://www.Quantum.com/faqs**
- **eSupport -** A Web-based, self-service application that allows registered users to create and track service requests: **http://www.Quantum.com/eSupport**
- **Live Support:** To contact our world-class support representatives, please refer to the information below:

Americas:
1-800-284-5101 (toll-free) or 949-725-2100 (local)

Europe, Middle East and Africa:
United Kingdom: +44 (0) 1256-848748 (local)
France: +44 (0) 1256-848748 (local)
Germany: +44 (0) 1256-848748 (local)

Asia Pacific:
Australia: 1-800 285 435 (toll-free)
China: +86 (10) 8519 2099 (local)
India: +91 (98) 4400 6600 (local)
Asia, Pacific and Japan: +61 (7) 3839 0988 or +1 (949) 725 2100

Technical Publications

To comment on existing documentation send e-mail to:

doc-comments@quantum.com

esXpress Product Information

You can register your esXpress software at:

www.Quantum.com/esXpress/activation

Request More Information:

http://Quantum.mv.treehousei.com/Surveys/06/1BE8BC76ECC42185/RequestMoreInfo.aspx

Service and Support Web site

Register products, license software, browse Quantum Learning courses, check backup software and operating system support, and locate manuals, FAQs, firmware downloads, product updates and more in one convenient location.

Benefit today at:

http://www.Quantum.com/ServiceandSupport/Index.aspx

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Submit online service requests, update contact information, add attachments, and receive status updates via e-mail. Online Service accounts are free from Quantum. That account can also be used to access Quantum's Knowledge, a comprehensive repository of product support information.

Sign up today at:

http://www.Quantum.com/ServiceandSupport/eSupport/Index.aspx.

Documentation

The following documents are available for esXpress:

Document Number	Document Title
6-66737-02	Quantum esXpress VMware Based Backup and Recovery Configuration and Deployment Guide
6-66625-02	Quantum esXpress VMware Based Backup and Recovery Restoration & Disaster Recovery Guide
6-66895-01	Quantum esXpress VMware Based Backup and Recovery Release Notes
6-66896-01	Quantum esXpress VMware Based Backup and Recovery Getting Started Guide
6-66897-01	Quantum esXpress VMware Based Backup and Recovery “X” Commands
6-66899-01	Quantum esXpress VMware Based Backup and Recovery Reports Guide

Webpage URLs

- esXpress product page: **www.Quantum.com/esXpress**
- registration/activation: **www.Quantum.com/esXpress/activation**
- esXpress Quantum branded download: **www.Quantum.com/esXpress/download**

1 Introduction

esXpress Overview

Out of the box, esXpress provides automatic, daily backups of all running virtual machines. It can also perform individual backups that can be scheduled or initiated immediately. The easy installation ensures a simple but powerful backup solution for your virtual infrastructure.

Quantum esXpress software provides high-availability virtual appliances for protecting VMware virtual infrastructures and data to Quantum's DXi™-series deduplication systems. Quantum esXpress combined with Quantum DXi-series deduplication and replication appliances provides a comprehensive, scalable but simple and complete data protection solution for a VMware environment. The esXpress product has revolutionized data protection for virtual environments by using the virtual environment itself to back up more data in less time. esXpress uses "virtual backup appliances" (VBAs) – small virtual machines – to perform autonomous, fault-tolerant backup and restoration of your virtual environment directly to a DXi-series with no additional hardware or software required, and minimal impact to VMware servers, the service console or network performance. It scales easily across an enterprise's entire virtual infrastructure.

esXpress also provides in-depth reporting features including statuses, virtual machine name and size and the effective speed in both GB/hour and MB/second. esXpress can automatically compile and send these reports via email to systems administrators or managers.

This User's Guide is designed to provide a brief overview of the system requirements, installation check list and step by step instructions to install the esXpress software product.

Important:
esXpress is designed for the VMware administrator who has passed the VCP (VMware Certified Professional) exam or has equivalent experience. Installation and administration of the esXpress software requires that the administrator have a core understanding of ESX server configuration, virtual machines, basic networking and VMNET, and using VMware Virtual Center. This product is meant to be customer installable assuming the customer is a VMware administrator. The VMware administrator is for the purpose of this document the "user" and or "customer".

System Requirements

Operating Environment	ESX Server Version 3.5, vSphere 4.x esXpress Version 3.6-x **Note:** VMware Lab Manager and ESXi are not supported
Supported Browsers	IE 7.0 or greater Firefox 3.07 or greater *Other browsers such as Netscape, Safari, AOL or others are not supported

Hardware System Requirements

DXi Requirements

DXi6500 Series	Version 1.3-65 or greater
DXi7500, DXi7500 Express	Version 1.1.1 or greater
DXi3500, DXi5500	Version 1.7.1 or greater
DXi2500-D	Version 1.1.3_25 or greater

System / VMware Requirements

Memory	256 MB of memory allocated for each running VBA
Storage Requirements	A minimum of 8GB of disk space is required on a VMFS partition available to the ESX host to import the compressed GUI VMDK file.
Other Requirements	VMware Virtual Infrastructure Client 3 (VI3) or greater
VMware version	ESX Server version 3.5 (ESX 3.5i is not supported) *. ESX 3.5 or vSphere 4.x versions are supported.
VBA Storage Requirements	3 GB minimum of vmfs space for each running VBA during backups.
Supported Browsers for GUI Interface	Minimum Internet Explorer 7, Firefox 3.0.7
Other Requirements	VMware Virtual Infrastructure Client 3 (VI3) ore greater
*Refer to the VMware ESX Server 3 or vSphere 4 Installation Guide for VMware ESX system requirements	
ESX Service Console Memory Requirement	Minimum requirement is 800MB, The default was 227MB – Require ESX reboot

* Always refer to the Quantum esXpress Backup for VMware Release Notes (6-66895-01)for the most current system and VMware requirements

esXpress Overview

esXpress performs three types of backup operations, Full image, Delta image, and file level backups (FLB). A Full backup is by default, a compressed copy of the entire VMDK file(s) that make up the virtual machine. The Delta backup leverages our patented Intelligent Delta technology to create a differential backup, but unlike traditional backups, we perform this at the block level of the VMDK file. This is also compressed and/or encrypted and packaged into a self-extracting program allowing for easy distribution, long term archival, disaster recovery, or any other circumstance where you may not have installed or access to the esXpress software. File level backups allow you to select discrete files or directories within a virtual machine to extracted and archived, reducing the need for agent-based backups when VMDK image level backups.

FULL and DELTA Backup Archives

esXpress will create two types of image level archives, FULL and DELTA. By default, the system will always create DELTA archives. In order to absolutely ensure the integrity of the backup archives, FULL archives are created under the following conditions:

- The first time a virtual machine is backed up by esXpress.
- The virtual machine or host was scheduled to run FULLS.
- The DELTA threshold has been exceeded.
- The index map for that VMDK does not exist.
- The size of a virtual machine's VMDK changes (expands or shrinks).
- The addition of a VMDK to a virtual machine.

Quantum recommends turning the archive option to “No Zip” to ensure optimum deduplication from the DXi Data Deduplication appliance. Compressed data by its nature does not deduplicate well. The DXi has powerful deduplication engines that can more efficiently deduplicate, compress and perform remote replication than placing the resource burden on an ESX server.

A FULL archive is a non-compressed archive of a VMDK file. The FULL archive can be restored on any Windows, Linux or ESX platform using either free open source utilities like LZOP or a paid commercial product like WinZip. You do not need the esXpress software to restore a FULL archive created with esXpress.

If the conditions for making a FULL have been met, the next backup will be a DELTA archive. The Delta is created by default and uses an index map created during the last FULL backup. A DELTA is a true block level differential of the last FULL backup. Only one FULL and one DELTA file are required to restore any virtual machine VMDK file.

DELTA archives also contain the virtual machine configuration (.vmx) and non-volatile RAM (.NVRAM) files along with the VM log and the Local PHD Configuration file. When esXpress creates a FULL archive, it will also create an empty DELTA archive. Empty meaning it will contain no delta blocks, but it will contain the .vmx and .nvram (and other files) necessary to rebuild the entire virtual machine.

For example, if your backup schedule is creating a FULL archive on Sunday and DELTA archives Monday through Saturday, to restore to Thursday's backup you would require Sunday's FULL and Thursday's DELTA.

esXpress maintains an index map of the FULL backup, meaning no access to the original FULL archive is required in order to create a DELTA archive. This is both efficient and allows you to purge archives to tape.

Backup Archive Storage Requirements

Delta/Full Backups

By default, esXpress only creates a Full backup once a month (or whenever needed) and performs Delta backups each remaining time. esXpress can store a complete month of backups within the same amount of space that other non-delta enabled products use in one week. This reduces both disk and tape usage by an equally proportionate amount.

The following is an example backup of a 36GB virtual machine called MySQL (a 36GB Linux virtual server: The virtual disks are 42% in use and it contains a full Linux operating system. Applications include MySQL with a database containing 1.3 million records. Host is dual P4 2GHz, 512MB RAM (console), 100mb network).

The first backup of this virtual machine is a FULL. It took 49 minutes to complete and compressed to 2.25GB for both of the VMDKs. This is an effective speed of 44GB per hour.

```
522M Sep 23 19:42 00-MySQL.vmdk.gz-070920-1318.phd
```

```
1.7G Sep 23 19:43 01-MySQL_1.vmdk.gz-070920-1318.phd
```

The subsequent Delta backups for each day are 111MB-133MB in size, less than 1% the size of the source VMDK. The Delta backup completed in 26 minutes. The effective speed for the Delta backup was 81GB/hour.

```
22M Sep 24 13:49 00-MySQL.vmdk.delta-2007.09.25-1341-070920-1318.phd
```

```
89M Sep 24 13:57 01-MySQL_1.vmdk.delta-2007.09.25-1341-070920-
1318.phd
```

```
25M Sep 25 14:46 00-MySQL.vmdk.delta-2007.09.25-1437-070920-1318.phd
98M Sep 25 14:55 01-MySQL_1.vmdk.delta-2007.09.25-1437-070920-
1318.phd
29M Sep 26 16:06 00-MySQL.vmdk.delta-2007.09.26-1556-070920-1318.phd
103M Sep 26 16:14 01-MySQL_1.vmdk.delta-2007.09.26-1556-070920-
1318.phd
```

As time goes on, the Delta backups grow larger. That's because the delta file is comprised of the differences between the current VMDK state and the state captured by the last FULL backup. **Thresholds** can be set to force a new Full backup to be performed if the number of Delta blocks exceeds a set percentage.

Getting Started

Planning

As with any software, a successful implementation only comes with proper planning. Quantum recommends completing the below installation check list prior to performing an actual install.

Installation Check List

To ensure proper installation please complete the Installation Check list as it will has you time and frustration during the installation process. If you need support help during the installation process Quantum support engineers will first as if you have completed the below Installation Check.

Ensure the following pre-requisites are met prior to installing the esXpress Backup software product on your VMware ESX servers:

	**Task**	**Status**
	Have your DXi Serial number written down. You will need this to register the product.	
	If you have not already done so, register you esXpress software by visiting **www.Quantum.com/esXpress/activation**. You will need to have your DXi serial number and esXpress Certification number to complete the registration process. Once you have registered your esXpress software, an esXpress activation key will be emailed to you.	
	Ensure your DXi has an active NAS license. **Note:** Not all DXi models come with a default NAS license. If you do not have a DXi NAS license, please contact your sales representative. A DXi NAS license is required for esXpress to communicate with the DXi.	
	Do you have a previously installed copy of esXpress on any VMware ESX servers that will be within your VLAN? If yes, was the demo / production copy downloaded from the PHD site or Quantum site? If you have a PHD version installed you will need to completely un-install this version of esXpress. If you have the Quantum version install you do not need to un-install the software and all you configuration settings can remain the same.	
	Have your esXpress License Key ready. This should have been emailed to you as a result of completing the registration.	

	Task	Status
	The following files must be imported onto the ESX server as described below: **qtm-3.6-x.ovf** **qtm-3.6-x-disk1.vmdk** These files can be imported by downloading them to a local machine from www.Quantum.com/esXpress and subsequently importing them into ESX Server via the Import Virtual Appliance Wizard in the VMware Virtual Infrastructure 3 (VI3) or vSphere 4.x Client. The 2 import files will be contained in the esXpress 3.6 zip file downloaded from the Web site.	
	At least one DXi NAS share must be available for mounting to the ESX server. Export a CIFS or NFS NAS share from your DXi. This will be the target storage for esXpress. **Note:** For optimum performance CIFS shares are the preferred method to connect a DXi to the esXpress backup software.	
	IP address of the ESX server that the Global GUI will be installed on.	
	Each host to be managed by the Global GUI must have a VMKernel IP address assigned. This is required for NFS to connect to the esXpress-quorum. For additional information on configuring a VMKernel IP see the VMware iSCSI SAN Configuration Guide.	
	IP address to assign to the virtual machine of the GUI Appliance (esXpress GUI)	
	Default gateway and subnet mask addresses for the GUI virtual machine. If the host has more than 1 CPU, make sure to allocate only 1 virtual CPU to the appliance VM.	
	The ESX Server should be connected to the internet to download current rpm files. There is a documented procedure for sites that do not have internet access. Please contact Quantum support for assistance if you do not have internet access.	
	Note: Quantum recommends that you assign DHCP addresses for esXpress VBA's.	

Installation Prerequisites

Ensure the following prerequisites are met prior to installing the GUI.

- Download the latest esXpress zip file from Quantum Web site **www.Quantum.com/esXpress/download**

  The following files contained within the zip file will be imported to the ESX server:

  - qtm-3.6-x.ovf
  - qtm-3.6-x-disk1.vmdk

  These files can be imported by downloading them to a local machine and then imported to the ESX Server using the Import Virtual Appliance Wizard in the VMware Virtual Infrastructure 3 (VI3)/4.x Client.

- The client must be logged on to your ESX 3.x.4.x Host.
- Before you begin with the installation, you must have the required network information, including an IP Address, DNS, Default Gateway, etc.
- If the Host is a Dual CPU host, make sure to allocate only 1 virtual CPU to the appliance VM.
- Each host to be managed by the GUI must have a VMKernel IP address assigned. This is required for NFS to connect to the esXpress-quorum.

  If you are not familiar with how to setup a VMKernal IP address, contact your VMware administrator for assistance. For additional information on configuring a VMKernel IP, see the Networking Configuration section of the *VMware iSCSI SAN Configuration Guide.*

  http://www.vmware.com/pdf/vi3_35/esx_3/r35u2/vi3_35_25_u2_iscsi_san_cfg.pdf

- The GUI appliance must be located on the same VLAN as the VMKernel IP address assigned with the same VLAN ID or the network traffic must be routable between the VMKernel IP and the assigned GUI IP for SSH and NFS connections.

Caution Quantum recommends that you *do not* perform any remote host management with the GUI—for example, adding a host that is across the WAN. When installing the GUI, you must perform a Virtual Appliance Import from the VI3 client as shown in the installation instructions—*do not* use the VMware Converter.

- Like many products, esXpress transfers the backup data over the network. In an environment with many ESX hosts, network delays could happen due to the volume of data being moved. It is suggested that you have a 2nd NIC attached to a dedicated backup network.
- Your DXi storage location should be, at minimum, equal to the total size of the VMDK files targeted for backup. This means that if you have 500GB of virtual machines, you should have at least 500GB of storage. This should allow, on average, a month worth of Delta backups online, but this can be less expensive 2nd and 3rd tier space instead of your prime SAN space.
- Lastly, you must have root access to the VMware host to install and execute the esXpress software.

Installing esXpress

Refer to the *esXpress Getting Started Guide* for information about configuring your environment.

esXpress Configuration and Deployment GUI Appliance

As of esXpress version 3.5, the web-based GUI appliance is a single management console for configuring and deploying esXpress. With this new GUI interface you no longer need to configure and install esXpress individually for each host. The GUI appliance can be integrated directly into Virtual Center or accessed using a standard web browser.

For additional information on the esXpress GUI appliance refer to the *GUI Appliance Guide*.

Program Files and Locations

esXpress programs are stored on the host in /home/phd. Binary executables are stored in /home/phd/bin and symbolic links to /home/phd/bin are stored in /usr/local/bin. Additionally, esXpress creates the following folders:

`/tmp/phd`

`/etc/phd`

`/var/run/phd`

For a list of all esXpress programs, on the command line, type phd and hit TAB twice.

Table 1: **esXpress Programs List**

Program	Description
phd	Main esXpress executable. Opens the esXpress menu.
phd-FULL-all	Run a full backup of all VMs based on default settings.
phd-INDEX-all	Run a Delta backup of all VMs based on default settings.
phd-FULL	Run a full backup for one VM.
phd-INDEX	Run a delta backup for one VM.
phd-snap-check	Run a snapshot check.
phd-support	Creates a tar file that assists PHD Virtual support in solving issues. You have the option to send this file via FTP directly to PHD Virtual's support host.
phd_backup	The main cron job that executes the backup process.
phd-edit	Edit a local VM configuration.
_phd_ftp_put	Used internally by esXpress.
_phd_make_index	Used internally by esXpress.
_phd_delta	Used internally by esXpress.
_phd_index	Used internally by esXpress.

At any time, you can find the PHD backup process that is running using the following command:

```
ps –efw | grep phd
```

Command Line Options

When esXpress is installed on a host, you can pass command line options when logged in to the host. For example, using the command **phd o** will open the Backup ONE VM Now menu. You can pass any of the main menu options from the command line of the host device where esXpress is installed.

Aside from the main menu options, you can pass **Lock** commands. This is useful if you are writing your own scripts to control the esXpress backups. The commands clear, pause, stop and abort can be used.

For Example:

`phd clear`: Will CLEAR the locks.

`phd abort`: Will set the ABORT lock.

`phd stop`: Will set the STOP lock.

`phd pause`: Will set the PAUSE lock.

Other command line options include the ability to re-import the previous settings, such as when you upgrade esXpress and want to re-import the previous settings. The command phd-import will import the previous esXpress settings

Backup Planning

When planning a backup strategy using esXpress there are many factors to keep in mind.

Most important is to understand the data transfer rates, both network and DXi storage.

When esXpress is creating a backup of a virtual machine, it will read the VMDK file at between 10 MB and 100 MB per second from the storage device. Quantum has seen speeds of 25-50MB/second per VBA. Again depending on your ESX server and networking environment.

DXi Backup Planning

If an organization has 10 ESX servers this would result in an aggregate speed of 30 to 50 MB per second. This is about half of the maximum bandwidth of a gigabit Ethernet adapter. However, it means the DXi needs to be able to support sustained transfer rates of 30 MB to 50 MB per second from 10 different transfers at once. Refer to your DXi specification data sheets to ensure your DXi can support the networking requirements of your backup topology. Check with your Quantum sales consultant for configuration and performance tuning considerations.

The limiting factors of a Full backup are the host CPU resources, the network or storage adapter bandwidth and the disk write speed of the storage target. On some older ESX hosts, it may be necessary to allocate more CPU resources to the esXpress resource pool.

VMFS Backup Planning

When using VMFS backups, esXpress requires enough space for the Full VMDK size during the backups. This is done to minimize fragmentation on the VMFS partition. It will compress the backup upon completion.

Note: It is not recommended to create a VMFS share on a DXi share. Local storage is recommended for improved performance. If you are planning on vMotioning the VMFS storage, SAN located storage is recommended. The DXi mounted shares should be used as backup targets only.

Example DXi Environment

In a medium sized environment of 22 ESX servers hosting 6TB of virtual machines, the aggregate backup transfer rate when running Full backups can average between 198 and 330 MB per second on an average 2 CPU host. Deltas will only average between 66 and 198 MB per second. The following example illustrates how a single DXi can be configured to handle the load with little modification or expense.

The DXi should have at least three NICs (network interface cards). One NIC for is for the forward facing network IP. The other two NICs should be connected to a separate backup VLAN with two separate IP addresses.

Interleaving is not supported on any DXi. Interleaving is a way to arrange data in a non-contiguous way to increase performance. Interleaving data has an adverse effect on data duplication. Balancing the network backup traffic across multiple NIC's will improve performance.

When configuring the backup destination for each esXpress host, point the odd numbered servers to the IP of the 1st backup NIC a Do the same for the even numbered machines, pointing them to the second NIC. This is a simple way to load balance the DXi to handle the increased demand.

If you have 40 host servers, and they are all sending Full backups simultaneously, it could require between 360 and 600 MB per second of network bandwidth. In this instance, a separate backup network is advisable.

These examples, while extreme, can happen when backing up many virtual machines simultaneously.

When planning a backup strategy, do not expect 50 ESX hosts to be able to send backups to a single backup target simultaneously. Plan to stagger the start times of backups or have multiple DXi targets to balance the load.

Because esXpress is a program that runs on each VMware ESX host it can scale for any size enterprise. Also, because each esXpress runs autonomously there is no single point of failure.

File Level Backups Configuration

As of version 3.1, esXpress provides File Level Backups in addition to Image Level backups. When running with FLBs, the folders you define will be backed up and a compressed archive created on the designated backup target. FLB backups are run in the VBA at the same time the image backup is performed. The FLB archive created is a separate archive from the image backup making it very easy to access and restore your file level backups.

Configuration for FLBs is done at the VM level using the local configuration file (local.vmx.phd). In the local file there are a number of variables to consider for configuring file level backups for esXpress which are explained below. You can edit this file using the text menu Configuration Menu option **Edit VM Local Configuration** on the host.

GUI based File Level Restores are a feature of the DeDup appliance which enable you to restore from a block backup. Since Quantum does not offer the DeDup appliance, FLR can be performed manually. Refer to the esXpress File Level Backup Guide for additional details.

FLB Limitations

FLBs work only on Linux and Windows partitions. On NTFS, only basic partitions are supported, and only the standard cluster size of 4k. Currently, FLB backups are supported for NETWORK targets, only. There is no VMFS backup for FLB.

Solaris and BSD VMs FLBs are not supported.

Configurations Options

For each VM, you must define which VMDK, the PARTITION and the FOLDER to back up using the local.vmx.phd file. This file can be edited using the text menu Configuration Menu option, **Edit VM Local Configuration** on the host and locating the section FLB – File Level Backups.

You can use as many #VM_FLB lines as needed—one per folder. These are special variables and are different from all others in this file.

```
#VM_FLB= Yes/No/Only/Wait |
        SCSI ID (or * for all) |
        Partition (or * for all) |
        Folder to Backup |
        Max Size in MB (0=Use System Default) |
```

```
Archive Method (def/tgz/lzop/zip) |
Backup Target (0=Use Default, 1-9) |
Extra Options
```

- Two # (pound signs/hash marks) at the beginning of a line designates a comment. To activate a line, use a single #.
- The VM_FLB must have at least one # (pound sign/hash mark) at the beginning of the line.

  Example:

  `#VM_FLB=yes|scsi0:0|1|/home|99999|zip|3`

- Yes/No/Only/Wait. The 1st field is the control field for the FLB:
  - YES = This FLB line is enabled. Run this FLB.
  - NO = Ignore this FLB line.
  - ONLY = Only run FLB on this VMDK. Do not run FULL or INDEX backup EVER.

    When using '*' to match the SCSI id, this will be the same as enabling VM_AUTO_FORCE_FLB because all disks would match '*' but for all the time. With ONLY set for a VMDK, then ONLY FLB can ever be done for this VMDK.
  - WAIT = This FLB was requested, and it awaiting update to YES/NO/ONLY
- SCSI ID. The 2nd field is the SCSI ID of the disk to backup.
  - This can also be set to *, to mean all disks.
- Partition. The 3rd field is the PARTITION on the disk to backup.
  - This can also be set to *, to mean all partitions.
- Folder to Backup.
  - Only list one folder here. Use multiple FLB lines for multiple folders. This is the folder name starting at this partition. If this partition was /var folder then to backup /var/log use /log
  - This is the folder name starting at this partition. If this partition was your /var folder, then to backup /var/log you would just use /log
- Max size in MB. The 5th field is the maximum size of the Folder to backup in Megabytes. If the Raw size of the Folder is bigger, then it will be skipped. Setting to 0 will use the system default.
- Archive Method. The 6th field is the archive method to use. Options are TGZ, LZOP and ZIP. For this release, ZIP has limits. It will not handle very large files.

  Set to 'def' to use system default archive method.
- Backup Target. The 7th field is the backup target to use. If it us set to 0, then the system default will be used. Can be set from 0, 1-9.

- Extra Options.
  - Options are separated by a semicolon; fields of an option are separated by a comma.

    Example: opt1;opt2=x,y,z;opt3
  - Current options are:

    separate_subfolders = Will create a separate archive per subfolder. Files in this current folder will not be backed up, only subfolders.

    ufs2,5xbsd,44bsd,sunx86 = Defines the UFS type of the filesystem for Free/Net/OpenBSD and Solaris. For UFS to work correctly you might have to use LSILOGIC in the VBAs instead of BUSLOGIC.
- You can use * for the SCSI ID or the Partition, or both.

  #VM_FLB=yes|*|*|/home|0|def|0

  #VM_FLB=yes|scsi0:0|*|/My Documents|1024|zip|8
- The following line is enabled; it has only one # (pound sign/hash mark), but because it is set to NO, the #VM_FLB will still be ignored:

  #VM_FLB=no|*|*|/|0|def|0
- Force This VM to FLB only. Only run File Level Backups for this VM. Set this to yes to force this VM to backup FLB only. This only applies to Auto Once a Day Backups or Backup All

  VM_AUTO_FORCE_FLB='yes'
- Force a VMDK to FLB ONLY mode on AUTO Backup only. This only applies to Auto Once a Day Backups or Backup All. You can define has many as you need

  VM_AUTO_FORCE_FLB_SCSI='scsi0:0'

Automatic Backup Ordering

With esXpress you can configure the ordering of the Virtual Machines backed up during the automatic and backup all runs or let esXpress determine the order. There are two main methods that can be used to set the backup order, using the VI3 or vSphere client display name or by using the esXpress Local Configuration option (PRO/ENT).

esXpress Ordering Text

One method is to use the esXpress ordering text [o1] through [o9] in the display name of the VM from within the VI3 or vSphere client. The priority of ordering goes from 1 to 9. That is any VM with [o1] in its display name will be backed up first followed by [o2] VMs, [o3] VMs and so on.

Example : Host 1: (display Names)

Server 1 [o1]

Server 2 [o2]

Server 3 [o3]

Server 4 [o1]

In this example Server 1 and Server 4 would be backed up first followed by Servers 2 and then Server 3.

Local Configuration

The esXpress location configuration file can also be used to set backup ordering.

The local configuration option that needs to be set is VM_ORDER.

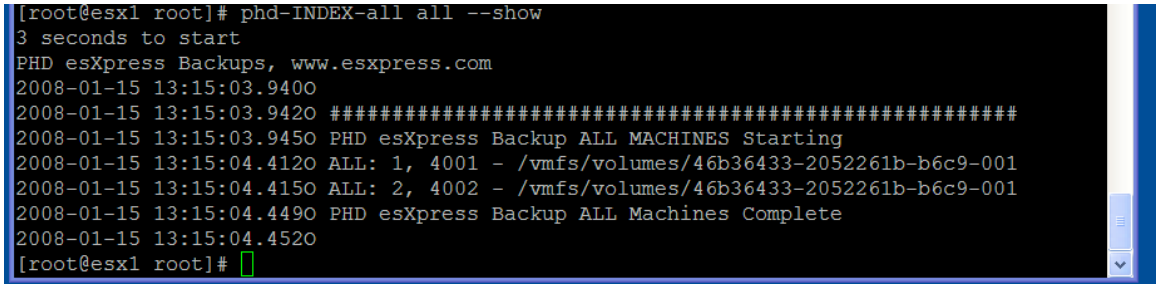
The values of VM_ORDER are in the format x.xxxx (example 1.5000). The virtual machines with the lower values of VM_ORDER set will be backed up first.

Checking backup order:

To check on the order of which your VMs will be backed up you can run the following command :

```
phd-INDEX-all all –show
```

The following figure shows example output of the phd command to show backup order.



About Auto Deletes

This section applies to auto deletes for Delta/Full Backups, only.

Note: Quantum only supports CIFS and NFS DXi shares as targets. The below FTP description should only apply to the DXi.

If you have **NET_Delete_Enable_of_Backups** set to **Yes**, then you have enabled the FTP Auto Delete feature of esXpress. After a VMDK backup has successfully completed, the DXi will be indexed. This is after each VMDK file, so if a VM has 5 VMDK files, the DXi will be checked after each VMDK has successfully backed up and any files meeting the delete criteria will be deleted.

By checking and deleting for each VMDK file after it has been successfully backed up you do not need a huge amount of backup space to keep the minimum backups online. With the minimum days for Full and Deltas being 1, you are assured you will always have at least one backup online.

Once you start using esXpress and start backing up your hosts, and you've got a few days of Delta backups, you will get a better idea what to set your Auto Delete values to. You might find that you can keep one 1 Full backup and 5 Delta backups. We have customer environments where they have FULL=2 and DELTA=45.

Remember this value is currently by host, and you can configure each host with different values.

Note: When esXpress gives you the backup speed (usually expressed in GB/Hour) it is the total average speed based upon the total backup time. Starting from the moment the backup program is called for a VMDK, including the time to add the REDOs and check the DXi for access. Then the VMDK is actually backed up and sent to the DXi. If you have Auto Delete enabled then the DXi will be indexed and the backups are then deleted (in the back ground) while the REDO logs are committed back to the VMDK.

When you get the backup speed of a VM or the overall total the delay in time for committing REDOs and Auto Deleting are added to the time and thus the average speed is lower than it really is.

For Example:

Assume **NET_Keep_Fulls** is set to **2** and esXpress just finished backing up a VMDK. Now the DXi is checked, and all the backups are found that match this particular VMDK name, host and backup mode (Full or Delta). The dates for these are put into a list in reverse order with the most recent first.

esXpress will skip the first two days because NET_Keep_Fulls =2, and delete the rest of the backups.

2006-06-21

2006-06-02

2006-05-16

2006-05-02
esXpress would then delete all backups for the particular VMDK on the following days. **2006-05-16** and **2006-05-02**

When NET_Keep_Fulls is set to 3 it means to keep at most 3 Full backup days of this VMDK.
In the above example, only **2006-05-02** would be deleted.

The same applies for Delta backups.

If you restore backups to your DXi, you might want to use a different folder then your nightly backup folder. If you restore them in the current **FOLDER** that is configured for backups on the DXi and auto delete is enabled, then your restored backups will be deleted when those same VMDK files are backed up.

Snapshots

When a snapshot is taken of a virtual machine it is basically taking a point in time picture of that particular VM. VMware snapshots save the virtual machines disk data, configuration data and even the memory state if selected when taking the snapshot.

Once a snapshot is taken, you will see a number of new files created on your disk which contain all the changes to the virtual machine since the snapshot was taken. These files normally will be created where the .vmx file for the VM is located.

Snapshot Files : (using a VM called RedHat_VM1 with a single vmdk as an example)

RedHat_VM1-000001-delta.vmdk - The delta file is where all the disk changes since the snapshot was taken are stored. It is like a redo log file. The “000001” number represents the disk number.

RedHat_VM1-000001.vmdk – This is the disk description file for the delta file.

RedHat_VM1_Snapshot34.vmsn – This vmsn file stores the state of the Virtual Machine when the snapshot was taken. The “34” in this example is the snapshot number.

Another file to note when looking at snapshots is the vmsd file. In this example it would be called RedHat_VM1.vmsd. This file stores information about the snapshots for this virtual machine.

Sample vmsd file

```
snapshot.lastUID = "34"
snapshot.numSnapshots = "1"      (This means the VM has 1 snapshot)
snapshot.current = "34"          (Current snapshot number is 34)
snapshot0.uid = "34"
snapshot0.filename = "RedHat_VM1-Snapshot34.vmsn" (current snapshot
file)
snapshot0.displayName = "test snap"
snapshot0.description = "test snap"
snapshot0.createTimeHigh = "279513"
snapshot0.createTimeLow = "1697685141"
snapshot0.numDisks = "1"
snapshot0.disk0.fileName = "RedHat_VM1.vmdk"
snapshot0.disk0.node = "scsi0:0"
snapshot.needConsolidate = "FALSE"
snapshot0.type = "1"
```

esXpress Backups and Snapshots

In order to take an image level backup of a Virtual Machine esXpress needs to create a snapshot. This is an important step as it ensures take that the backup is a consistent, point in time backup archive of the virtual machine. Once the snapshot is created esXpress will backup the frozen VMDK file or files and create the backup archives. Once the backup is completed, the snapshot will be removed causing VM changes made while the backup was occurring to be committed.

When creating and removing snapshots esXpress is using normal VMware supplied commands to handle the snapshot management. Nothing is done differently than what would be done manually when someone creates, reverts or deletes snapshots from within the VI3 client.

Disk Free Space and other Snapshot Considerations

Before running esXpress backups, there are a couple of considerations to review in relation to snapshots. One is the amount of free space on your VMFS for your snapshot files.

A number of considerations go into how much free space is needed to account for snapshot growth during your backups. Some factors would include the size of the VM, the estimated time the backups will take and the amount of expected activity that will occur during the backup cycle. Remember, the snapshot is tracking the changes occurring in your Virtual Machine. So, if you're VM is not active during the backup cycle the snapshot files won't grow that large while a high transaction rate in the virtual machine during the backup may have a much larger snapshot growth.

The optimal amount of free space to keep on a VMFS partition may vary. Keeping between 10 and 20% of free space to account for overall virtual machine growth and for snapshot creation is recommended. Every environment is different so testing and monitoring up front is recommended to determine your optimal configuration.

esXpress provides a key configuration option which should be setup initially to ensure you don't have a space issue on your VMFS because of backups and snapshots. The option is **Available Free Space Before Aborting Backup** – This is a value set in gigabytes (GBs). When the amount of free space falls below the value set here the esXpress backups will abort. It is better to abort the backup than to lose space on your VMFS. An error message will be written to your log when this occurs.

If you do not have a lot of free space on your VMFS partition, one option would be to move the VMX file to another VMFS where there is enough space for snapshots. To do this you must to shut the Virtual Machine down first, move the VMX, and then make the necessary configuration changes to point the disks to the correct location.

Troubleshooting Snapshots

Q: I get the following error in my logs, ERROR:vmware says no snapshot, but VMX appears to have one, ERROR: This VM will be skipped, what does this mean?

A: This means that when esXpress call vmware-cmd hassnapshots command it returns NO SNAPSHOT, however when we check the VMX file it shows an entry which appears to have a snapshot.

Q: What can I do if esXpress says that there's already a snapshot of this machine? For example, "- Already has a snapshot, it will be skipped -"

A: In esXpress v3 this is because we have to go through the ESX snap manager to add/remove snaps, any problems with the snap manager WILL affect backup operations. However with the release of esXpress v3.1 we can now backup virtual machines with existing snapshots.

Q: Virtual Center does not show a snapshot yet there are snapshot files remaining, how do I resolve this?

A: The best method to address this is to shutdown your Virtual Machine. Then add a snapshot while it is powered off, then delete (commit) the snapshot. You can then power the VM back on and that will safely remove the snapshot files.

Q: Somehow we created a snapshot not sure why but it's the only one and I would like this backed up file to be just like the rest.

A: From within the VI3 client, select the VM, then choose from the top menu, "Inventory->Virtual Machine->Snapshot->Snapshot Manager". This will show you the snapshots on the VM and allow you to commit them.

Before adding a snapshot and possibly breaking the VM, let's make sure the "vmsd" file is valid. Usually, when a problem occurs, this file is out of sync causing VMware to report a snapshot when none exist. Then the simple act of adding a snapshot can break a VM. On these VMs, can you manually add and remove snapshots OK? After you add one, give it a little time, and then remove it.

Try it again, without the save memory box being checked.

Q: In my log I have the following error WARN: VBA 0, Snapshot Remove Failed for xxx, WARN: No Snapshot defined, but VM xxx is using one. What do these errors mean?

A: esXpress attempted to remove the snapshots and VMware failed to do so. Now these VMs are left with partial snapshots.

To resolve try to add a new snapshot, then select remove all.

Q: I have a VM with multiple VMDKs. It looks like the VBA takes a snapshot of each VMDK one at a time and backs it up before moving on to the next one, is that correct?

A: No. esXpress adds ONE snapshot to the VM and then backs up each VMDK with a different VBA. So while all VMDKs are being backed up it is from a single snapshot.

FAQ – Backing up RDMs with esXpress

Q: Can I backup a VM with RDMs?

A: The short answer is, "Yes" and "No". The long answer is:

1. To do hot backups, esXpress needs to be able to create a snapshot of the VM before backing it up. In VI3, if a VM has ANY VMDKs that have a physical mode RDM (pRDM), it disables snapshots for the entire VM. Therefore, esXpress cannot make a hot backup of the VM. It can back it up when it is powered off. See details in: Can I backup a VM with physical mode RDMs (pRDMs)?

2. A VM with virtual mode RDMs (vRDM) can be backed up when it is powered on or powered off (i.e. hot or cold) because a snapshot can be made of the vRDM.

Note: At the moment, in both cases, esXpress can only restore the RDMs as regular VMDK (flat) file.

Q: Can I backup a VM with physical mode RDMs (pRDMs)? I would like to backup a SQL cluster node that has a VMs with a VMDK configured as the system disk and others as RDMs to our SAN where the databases sit. When I tried to back it up, it failed I suspect because the VM has RDMs configured?

A: To backup a hot VM, esXpress needs to be able to create a snapshot of the VM before backing it up. esXpress cannot make hot backups of a VM with pRDMs because VMware disables snapshots for VMs that have pRDMs. It can back it up when it is powered off (i.e. cold). Without the ability to make a snapshot, this is the only way to preserve the state of the VM and the pRDM. You have a couple of options here:

1. You can power down the machine first (cold) and then start a manual backup. By default, esXpress needs to make snapshots. In this case, edit the VM local config file (/vmfs/volumes/storage/vmname/phd/vmname.vmx.phd) to NOT make a snapshot by setting:

```
VM_NO_SNAP=YES
```

2. To do automatic backups, if you have vmtools installed in the VM, you can have esXpress ask vmtools to power down the VM for you. You can do this by editing the VM local config file and setting:

```
VM_COLD_BACKUP=YES
```

When your backup is finished, your VM will be powered back up.

Note: VM level configuration files are a licensed feature (LE and above).Also, at the moment, esXpress can only restore the RDMs as regular VMDK (flat) files.

Q: Can I backup a VM with virtual mode RDMs (vRDMs)?

A: Yes. A VM with virtual mode RDMs (vRDM) can be backed up when it is powered on or powered off (i.e. hot or cold) because a snapshot can be made of the vRDM.

Note: Currently, esXpress can only restore the RDMs as regular VMDK (flat) files.

2 esXpress Operational Overview

esXpress is different than other products in that it reads, compresses, optionally encrypts, and transfers in one pass. That means that if the VMDK file is 100GB in size, then esXpress will only process 100GB total. esXpress does not need to export the VMDK files.

Default Backup Rules for VMDKs and VMs

Below is a list of the default backup rules that are in place for automatic and manual Backup ALL Machines operations when you install esXpress. See the section labeled O – Options – Configuration Menu for more information on modifying the default parameters. This section describes how to modify these settings using the esXpress text menu installed on each host. If you are using the GUI Appliance to configure your hosts, refer to the GUI Appliance guide for details.

Automatic Backup Rules

- The ONCE A DAY backup starts at 00:01 daily.
- The ONCE A DAY backup will only execute between 00:00 to 06:00 hours.
- Only one automatic backup thread will run at a time. If the ONCE A DAY is still running, any HOURLY backups will not run until the ONCE A DAY has completed.
- Every hour, at the top of the hour, esXpress will check for virtual machines to backup.
- The Locks must be set to clear, or no backups will run.
- Automatic backups will backup all running virtual machines.
- Powered off VMs will be skipped unless Configuration Option **POWERED_OFF** is Yes.
- Automatic backups will skip machines with **[x0]** in the display name.
- If Configuration Option **ONLY_BACKUP_MATCH** has any value, then only machines that have this text in the display name are matched.
- If Configuration Option **DO_NOT_BACKUP_MATCH** has a value, then any machine with this text in the display name will be skipped.
- All backups (automatic and manual) will skip VMDK files that already have REDO logs applied or SKIP files.

- RDM's will be skipped unless Configuration Option **RDM_ENABLE** is set to Yes.
- If you try to make a Delta backup and the Full index map does not exist, a Full backup will be created instead.
- If you resize a VMDK file, a new Full backup will be created.
- If you add new virtual machines (VMDK files) to a host, they will be backed up automatically the next time automatic ONCE-A-DAY backups run.
- If Configuration Option **THRESHOLD_ENABLE** is set to Yes, and the number of Delta blocks in an INDEX backup exceeds the set **THRESHOLD**, a new Full backup will be created the next time that VMDK file is backed up.
- New Full backups will be created each month, the default is the 2nd, optionally Fulls can be made Weekly, Never (only when needed), and on the First Saturday (selectable day) of the month.
- After any automatic backup run, a status email will be sent, if Configuration Option **ENABLE_STATUS** is Yes.

There are two types of automatic backups, the ONCE A DAY and the HOURLY. Backups are initiated by the ESX Server cron daemon which executes the program phd_backup located in the /etc/cron.hourly folder. The default operation of the cron daemon is to execute at 00:01 hours (midnight) each day and every hour after that.

Each time esXpress executes (every hour), its default operation is to check the file /etc/phd/full_backup_last for the last completed ONCE A DAY backup. If it has not been performed, it is immediately started. Otherwise, the program will check the scheduler to see if there are any virtual machines scheduled for backup during this period.

Example Backup Scenario

At 00:01 the cron daemon runs. It executes the phd_backup program which checks to see if the ONCE A DAY backup has run. The default operation of the ONCE A DAY is to backup all powered on virtual machines.

Again, at 01:01, cron executes phd_backup, but it aborts because it detects that the 00:01 ONCE A DAY backup is still running. It repeats this process three more times at 02:01, 03:01 and 04:01.

Then at 05:01, when the cron daemon executes phd_backup, it detects that the ONCE A DAY has completed. It then checks to see if there are any virtual machines scheduled for backup at 05:01. If there are virtual machines scheduled for this hour, they are queued for backup and processed sequentially until complete. This process is repeated every hour until 00:01, when the process starts over.

If there are machines you do not want included, you can exclude them from the automatic process either using an X Command control code in the VM name (see LINK), or by using the Do Not Backup VMs display name match in the configuration screen.

X Commands

X Command control codes can be added to the VM name or to the VM notes section in Virtual Center to modify the default operation for automatic daily backups. For additional information on all of the esXpress control codes available, refer to the X Commands Quick Reference.

X Command values are in 24 hour notation.

Table 2: **X Command control codes**

X Command	Default Value	Description
[x0]		Do not auto backup
[x1]	12	Backup one additional time at noon.
[x2]	6 14	Backup two additional times: 6am and 2pm.
[x3]	6 12 18	Backup three additional times: 6am, noon, and 6pm.
[x4]	6 12 16 20	Backup additionally at 6am, noon, 4pm and 8pm.
[x5]	6 10 13 16 20	Backup additionally at 6am, 10am, 1pm, 4pm and 8pm.
[x6]	6 10 12 14 16 20	Backup additionally at 6am, 10am, noon, 2pm, 4pm, and 8pm.
[x7]	6 10 12 14 16 18 20	Backup additionally at 6am, 10am, noon, 2pm, 4pm, 6pm, and 8pm.
[x8]	6 8 10 12 14 16 18 20	Backup additionally at 6am, 8am, 10am, noon, 2pm, 4pm, 6pm, and 8pm.
[x9]	6 8 10 12 14 16 18 20 22	Backup additionally at 6am, 8am 10am, noon, 2pm, 4pm, 6pm, 8pm and 10pm.

By adding [x0] to the display name, esXpress will backup this virtual machine 0 times, effectively excluding it from the automatic backups. Adding [x1] to the display name instructs esXpress to back it up one extra time per day. Adding [x6] instructs it to backup the virtual machine six extra times, in addition to the ONCE A DAY. Since the display name is carried during the vMotion process, if the VM is moved to another host, the control code will determine how and if it is backed up. So esXpress will not require a configuration change if you vMotion a VM.

Example display names

- Oracle TEST Database Server [x0]
- Primary AD [x9]
- Exchange [x3]

In the example, the Oracle TEST Database Server [x0] is **excluded** from automatic ONCE A DAY backup because of the [x0] in its name. You can still initiate a manual backup from the esXpress menu.

In the next example, Primary AD [x9] will be backed up nine extra times during the day. Looking at the chart (above) you see it will be backed up every two hours, starting at 06:00 hours until 22:00 hours.

And the last example tells the program to backup the server named Exchange [x3] an additional three times, at 06:00, 12:00 and 18:00 hours.

Note: Values assigned to X Commands are stored in the /etc/phd/esXpress.cfg. These are the times assigned to the extra backup cycles. Values can be modified in this file on the host or using the GUI appliance, X Times tab. If you are not running the GUI Appliance in your environment, edit the esXpress.cfg file.

Caution When creating new virtual machines from Virtual Center, do not add the esXpress control codes to the display name. Doing so will cause Virtual Center to create the corresponding VMDK files, VMX files, and folders with the control code embedded in the name. After you have finished creating the virtual machine you can change the display name to include the [x?] control code.

Skipping VMDK Files

In the backup rules we mentioned that VMDK files that have SKIP files will be skipped during backups. To create a SKIP file for a VMDK file you need to create an empty file with the same name as the VMDK file and append **.SKIP** in the same VMFS as the VMDK file.

Example: /vmfs/volumes/LOCAL/wintest.vmdk

Create a SKIP file:

touch /vmfs/volumes/LOCAL/wintest.vmdk.SKIP

Skipping entire Virtual Machines

You can skip an entire VM similar to how you skip a VMDK. Instead of creating a .SKIP file that matches the name of a single VMDK, you create a .SKIP file that matches the name of the .VMX.

Example: /vmfs/volumes/LOCAL/Win2K/Win2k.vmx

Create a SKIP file like this:

touch /vmfs/volumes/LOCAL/Win2K/Win2k.vmx.SKIP

3 Quantum Text Menu - Main Menu

After you have installed esXpress, you will need to become familiar with the esXpress text menu that is available on each host where esXpress is installed. Although all backups are processed within the virtualization layer using VBAs (virtual backup appliances), esXpress does install a small menu in the service console of each host from which you can configure some initial settings. It also provides the ability to perform maintenance tasks and handle restores.

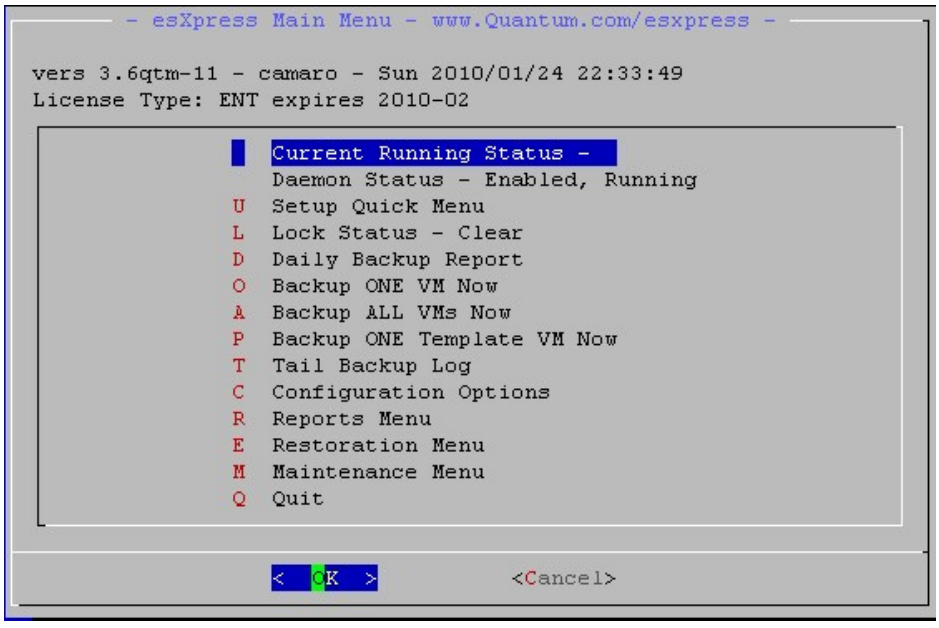
If you are using the GUI Appliance for configuring your hosts, refer to the GUI Appliance Guide for details on how to configure your hosts. When using the GUI Appliance, the text menu on each host is still used for running restores or running backups outside the daily backup window.

To open the esXpress Main menu

1 Login in to your **host** device where esXpress is installed and change to root user.

2 At a command prompt, type **Quantum, esXpress or phd** and hit Enter. They are all symbolically linked to the same command for your convenience.

The esXpress Backup Menu will open.



The first two lines of the menu are status indicators. In the above example, the first selection, `Current Running Status`, will show you if backups are currently running, and note if you had any errors. The second selection, `Daemon Status`, also displays the current status of the background daemon. The `Lock Status` also displays the current lock status. Restorations respect lock status.

The menu also displays the software version, the expiration date, which is the date that deltas will cease operating (renewed via annual support subscription) and the host name. In the above example, the expiration date is 9009-06. In this case it basically means this license doesn't expire, with an expiration date in 9009.

Note: If accessing esXpress via SSH using putty.exe, make sure to enlarge the window beyond the default size, or open and run in full screen. The default window size is not always sufficient to display all backup archives when accessing the Restore a VMDK sub-menu.

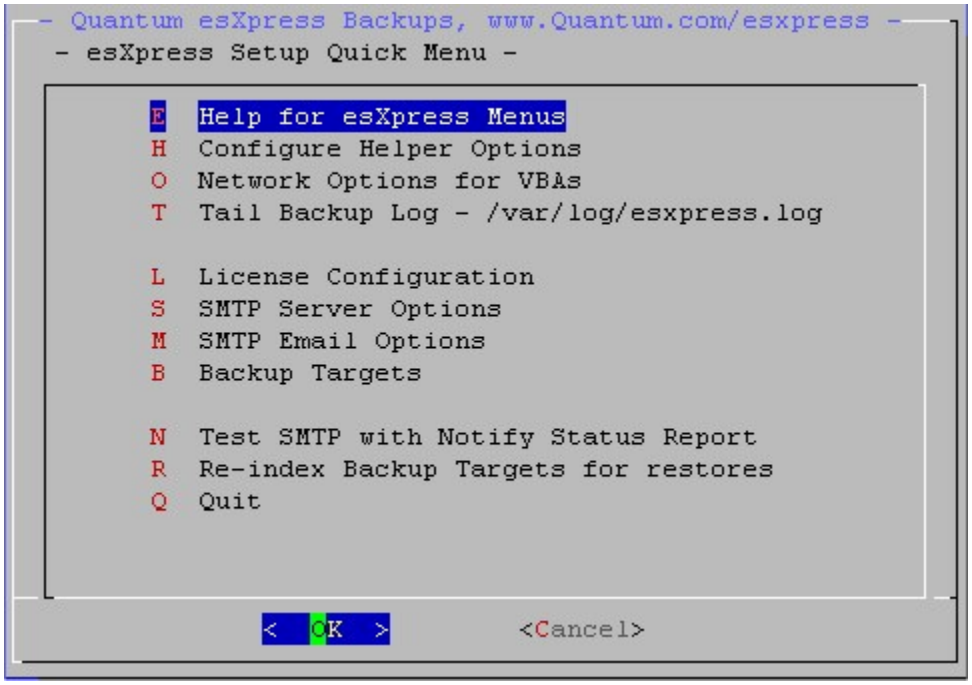
Table 3: **esXpress Main Menu options**

Option	Function	Description
	Current Running Status	Informational Only
	Daemon Status	Informational Only
U	Setup Quick Menu	Quick Start Menu for Initial esXpress setup and configuration.
L	Lock Status	Set backup lock options that allow you to Pause or Stop current and scheduled backup processes.
D	Daily Backup Report	View the daily backup status report. This report is the summary of all virtual machines that has been backed up. This report can be emailed as the Daily Status Report.
O	Backup ONE VM Now	Backup a single virtual machine now.
A	Backup ALL VMs Now	Backup all powered on virtual machines now. Following standard backup rules.
P	Backup One VM Template Now	Backup a virtual machine template.
T	Tail Backup Log	View the last page of the backup log. It will update as the log is written to.
C	Configuration Options	Set virtual helpers, FTP, SMTP and other options for esXpress from this menu. For details, see the next Chapter, **Error! Not a valid result for table.**
R	Reports Menu	View all reports and log files.

Option	Function	Description
E	Restoration Menu	Restore esXpress backups
M	Maintenance Menu	Perform esXpress functions such as start GUI, trim targets, and copy configurations.
Q	Quit	Quit the PHD esXpress application.

esXpress Setup Quick Menu

Option U from the Main Menu opens the esXpress Setup Quick Menu. This menu provides a shortcut method for the initial configuration and setup needed to get esXpress up and running. All of the options on this menu are taken from other esXpress menus and are explained in further detail in the sections of this manual for those options.



Important options:

- Configure Helper Options to set the VMFS for the VBAs to live on.
- Network Options for VBAs to set the network for the VBAs and set the helpers to use DHCP or assign static IPs.
- Backup Targets to setup your initial backup target for esXpress backups.

- Tailing the esXpress backup log.
- Setting up and testing SMTP for esXpress backup reporting.
- Re-indexing your backup targets to provide current backup information for restores.
- Configuring your esXpress licensing

Table 4: **esXpress Setup Quick Menu**

Option	Function	Description
E	Help for esXpress esXpress Menus	esXpress text menu navigation and usage help.
H	Configure Helper Options	Configure the VBA helpers.
O	Network Options for VBAs	Set the networking settings for the VBAs.
T	Tail Backup Log -- /var/log/esXpress/log	Display the running esXpress backup log.
L	License Configuration	Configure esXpress licensing.
S	SMTP Server Options	Configure the SMTP server.
M	SMTP Email Options	Configure esXpress email options.
T	Backup Targets	Configure backup targets.
N	Test SMTP with Notify Status Report	Test the SMTP setup.
R	Re-index Backup Targets for restores	Re-index the backup targets.
Q	Quit	Quit the application.

Main Menu: L - Lock Status

This option allows you to CLEAR, PAUSE, STOP or ABORT currently running backups. The top line will show you the current Lock Status.

Table 5: **Lock Menu Options**

Option	Function	Description
C	Clear Locks	Normal setting. Run backups.
P	Pause Backups	Current running backups will be paused after the current VMDK is finished.
S	Stop Backups	Current running backup will be aborted after the current VMDK is finished.
A	Abort Backups	All running backups are aborted now. Setting the Abort lock will cause the backups to cease, the FTP will be interrupted, the REDO logs will be committed, and the backup run will stop.
L	Quorum – Clear	Clear locks for the quorum.
U	Quorum – Pause	Set a pause lock for the quorum.
T	Quorum – Stop	Set a stop lock for the quorum.
B	Quorum – Abort	Set an abort lock for the quorum.
Q	Quit	Return to the Main Menu.

You can safely run backups then use the Locks to Pause/Stop/Abort the backup runs. When Stopping or Aborting, esXpress will still properly commit REDO logs.

For Example:

To try the Locks, run a backup, then after it starts (by checking Current Status) do an Abort Lock, the backups will cancel almost immediately and the REDOs will be committed and the backup process will end. If you cancel a backup, the partial file on the FTP server will also be deleted.

You can also set the Locks from the command line by running the phd menu with command line options. **clear**, **pause**, **stop** and **abort** are accepted.

phd abort - Will set the ABORT lock.

phd clear - Will CLEAR the locks.

Note: If you set an Abort Lock, no backups will run or VBAs will be allowed to start until you Clear the clocks.

Quorum Locks – The Quorum Locks works the same as the normal locks except they affect all of the hosts in the quorum instead of just the one host.

Main Menu: D - Daily Backup Reports

The backup report shows the results of the last ONCE A DAY backup and the summary of any other virtual machine that has been backed up today. These log entries are also in the program log. Every time a virtual machine is backed up, the summary status of that backup job is recorded. This option is also available in the Reports Menu.

This report is the Daily Backup Status that gets emailed to you after each automatic backup run that actually attempts to backup any virtual machines.

For each virtual machine backed up you know the time, the name, which VMDK files were backed up, whether they were FULL or INDEX backups and total speed. When the Backup ALL option is used (which is the same as a nightly Once-A-Day Backup) then an **ALL TOTAL** block count and speed will be shown. Speeds are expressed as Gigabytes per Hour.

- **10=35** means that 10 Megabytes per Second is 35 Gigabytes per Hour.
- **50=175** means that 50 Megabytes per Second is 175 Gigabytes per Hour.

The following figure shows a sample daily backup log.

The sample figure above shows part of last night's ONCE A DAY backup started on November 6 at 12:01am. Included in this backup are a number of File Level Backups (FLB) as indicated by the **FLB** lines in the report.
An **INDEX:** backup was made of a number of machines including **PdfMailer**.
For that VM it had **68mb** of delta blocks extracted of **4GB**, which was **1.7%**.

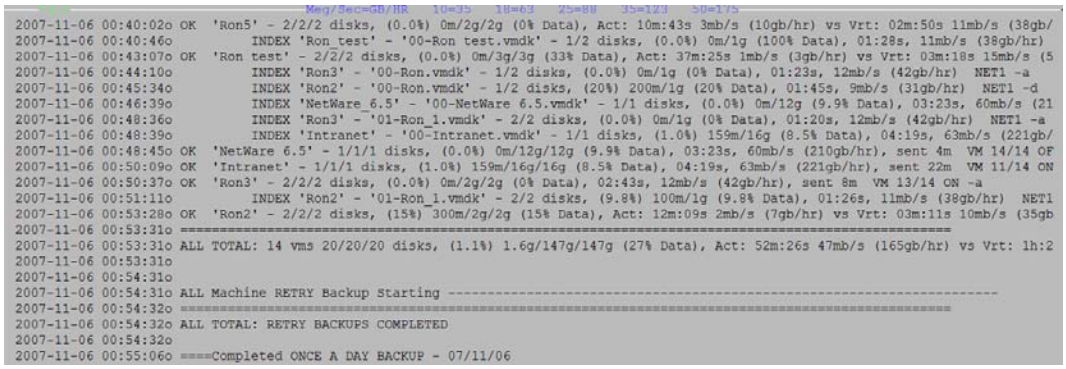
The effective backup speed of this virtual server was 45 gigabytes per hour.

The next figure, below, shows the **ALL TOTAL** line from the Once a Day backup in the Daily Backup Report. showing the ALL Total line in the report. When the backup cycle is complete, esXpress will display a summary line of total blocks processed, total gigabytes processed, total time, gigabytes per hour and throughput in megabytes per second.

In this example a total of **14** virtual machines were backed up, including 20 VMDK disks. Since Delta backups were running a total of **1.6GB** was backed up out of **147GB** total. The total backup speed **was 47m/s** or **165GB** per **hour**.

Also note the *All Machine Retry Backup Starting* section. If there were any failed backups and auto retry was enabled then those retried backups would be shown in this section.

In this example the Once a Day Backup completed at 12:55:06.



Main Menu: O - Backup ONE VM Now (Delta/Full)

You can initiate a single backup of a VM using this option. This could be either a normal backup or a special backup. Special backups keep a separate index map from the normal daily backups and can have different settings (a different backup target, for example). The backup selected can either be a Delta/Full. First select the VM you wish to backup.

Once the VM is selected, choose which type of backup to run.

Main Menu: A - Backup ALL VMs Now (Delta/Full)

This option will initiate a Delta, or Full backup for all of the virtual machines registered to the host including Template Backups.

Main Menu: P - Backup ONE Template VM Now

Select this option to initiate a Template backup. Before selecting this option, you need to search the VMFS for template VMs. Note a specific backup target can be defined for templates.

Main Menu: T - Tail backup Log

The Tail backup log option is a real time log viewer. It shows each operation of the backup as it happens. This screen is not scrollable vertically—use the Log Viewer to view the complete log.

You can scroll this screen horizontally with the left and right arrow keys.

Main Menu: C – Configurations Options

Configurations options are used for setting all of the esXpress options and variables available on the host. These options can also be configured using the esXpress Global GUI for all hosts imported to that GUI Appliance. If you are using the Global GUI, the options can only be maintained from the GUI.

These options are explained in detail in Chapter 4 esXpress Text Menu –Configuration Menu.

Main Menu: R – Reports Menu

All of the reports are available from the Reports Menu including some duplicate options from other menus. From here you can view all the logs and reports. The backup target reports help you manage the space and backups stored on the various esXpress backup targets

The Reports Menu is described in detail in Chapter 5 esXpress Text Menu – Reports Menu.

Main Menu: E – Restoration

The Restoration menu contains all of the restore and replication options. For details about restoring backups, see the Quantum esXpress Restoration and Disaster Recovery Guide.

Table 6: **Restore Menu Options**

Option	Function	Description
C	Restore through the ESX Console	Start a VMDK restore through the ESX console.
X	VMX Restore through the ESX Console	Restore a VMX file through the ESX console.
B	Background Restore Status	Check and monitor background restore queue.
R	Replication Actions	Replication tasks.
L	BG Lock Status -	Control the current lock status.
T	Tail esXpress Log	Real time view of running esXpress log.
I	Re-Index NET and VMFS Backup Targets	Re-Index all available backup targets.
S	Create a STUB File for an existing VMDK	Creates a stub file for an existing VMDK to be used for GSX or VMware Server.
H	Help on Restores (Updated)	esXpress restore Help File.
A	Abort to esXpress Main Menu	Abort and return to the esXpress Main Menu
Q	Quit to esXpress Main Menu	Quite Menu

Main Menu: M – Maintenance Menu

The maintenance menu contains a number of esXpress general system options to assist with maintaining, testing and validating your overall esXpress installation. Included in these options are validating snapshots, re-indexing and trimming backup targets and testing your SMTP setup.

The Maintenance Menu is described in detail in Chapter 6 esXpress Text Menu – Maintenance Menu.

4 esXpress Text Menu - Configuration Menu

All of the options for esXpress are set through the Configuration Menu in the esXpress text menu interface (running on the host console) or the esXpress GUI Appliance (running in a separate virtual machine. If you are using the GUI Appliance to configure your hosts, refer to the GUI Appliance Guide for details.

The configuration for esXpress is stored on the host in the file:

`/etc/phd/esxpress.cfg`

Note: You should not manually update this file unless directed to by the esXpress support.

The options are split into numerous sections; these descriptions will be in the order shown in the text menu.

Automatic backups for esXpress are called by a cronjob (a script or executable called by cron – the scheduling daemon) every hour on each host. The esXpress cronjob is found on the host in:

`/etc/cron.hourly/phd_backup`

Depending on the Main Scheduling Options, esXpress will decide when and what type of backups to run. This cronjob also runs the replication and Trim mode auto deletes.

To access the Configuration Menu

1 Login to your **host** and change to root user.

2 Type phd and hit **Enter**.

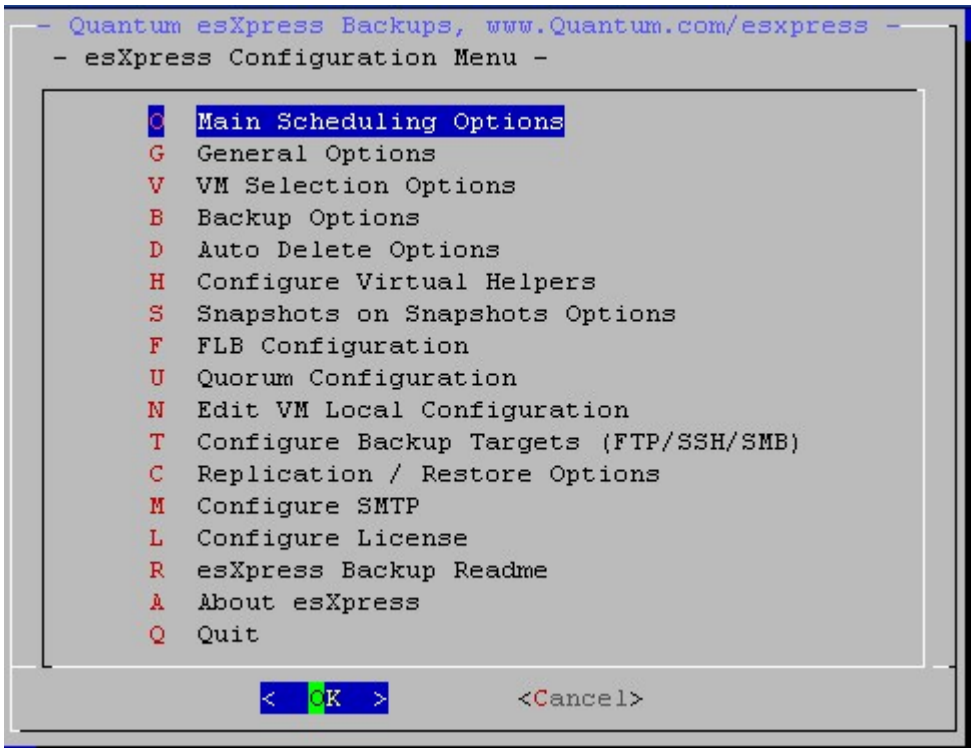
The esXpress Main Menu opens.

3 Select option **C Configuration Options**.

Table 7: **Configuration menu options**

Option	Function	Description
O	Main Scheduling Options	Scheduling Options
G	General Options	General esXpress Options
V	VM Selection Options	Virtual Machine Matching Options
B	Backup Options	Primary Backup Options

Option	Function	Description
D	Auto Delete Options	Auto Delete/Trim Options
H	Configure Virtual Helpers	VBA / Virtual Helper Configuration
S	Snapshots on Snapshots Options	Configure Snapshot on Snapshots Options
F	FLB Configuration	File Level backup host Options
U	Quorum Configuration	Setup esXpress Quorum settings
N	Edit VM Local Configuration	Edit the local configuration options for a specific Virtual Machine
E	Configure Encryption	Encryption Options
T	Configure Backup Targets (NET/SSH/SMB)	Configure esXpress Backup Targets
C	Replication / Restore Options	Simple Replication and Restore Options
M	Configure SMTP	SMTP Options
L	Configure License	Setup your esXpress license information
R	esXpress Backup Readme	Shows the esXpress backup Readme.
A	About esXpress	Shows the current version of esXpress and the build date.
Q	Quit	Quits Configuration Menu and returns to the main menu.



Configuration Menu: O – Main Scheduling Options

The Main Scheduling Options determine what backup operations to run and with what options for the esXpress cronjob (phd_backup). These options mostly apply to Automatic and Backup All commands, but others like the backup mode (BACKUP_MODE) applies all the time, for all backups made. BACKUP_MODE determines what type of backups are run.

Table 8: **Main Scheduling Options**

Main Scheduling Option	Description
Automatic_Backup_Frequency _ (Daily/Weely)	Set the default backup frequency mode. Automatic backups can run on a *daily* or a *weekly* basis. **Daily** – Run the Backup of All VMs every day. The backup all will run at the scheduled time. See *Automatic Backup Start Time*. **Weekly** – Run the Backup of All VMs every week. The backup will run at the scheduled time on the specified day of the week (see Day of Week (for Fulls or Weekly) option). For example, if you have the following settings: Backup_Frequency_Daily/Weekly) = WEEKLY Day_of_Week_(for_Fulls_or_Weekly)= MON your backups will only run on Monday. **Note:** If the server is powered off, there will be no backups until the following Monday after the server is powered back on,
System_Backup_Mode_ (Delta/Full/FLB/Test)	Select the type of backup to run, when esXpress is called. This applies to all backups, automatic and manual. **Delta** – Make a Delta backup by default. When set to Delta, you also need to select how often to make a new Full Backup. **Full** – Always make a FULL backup when backing up a VMDK. If you set to FULL, currently all backups made will be FULL only backups. **FLB** – When backing up a VM, run a FLB (File Level Backup) backup only. The image level Full and Delta backups will not be run, only FLB. If a VM has no FLB defined, then it will not be backed up. If you set to FLB, currently all backups made will be FLB only. **Test** – Run in Test mode. Go through the motions of making a backup, but do not actually do it. Also see option Test_Backup_Level in General Options.

Main Scheduling Option	Description
Make_FULLs_ (monthly/weekly/first/none)	When you set the System Backup Mode to make Delta backups, you need to decide when to make new Full backups. **Monthly** – Make a new Full backup on a monthly basis on a specific date of the month. 1-28. **Weekly** – Make a new Full backup once a week, on a specific day. Mon-Sun. **First** – Make a new Full backup once a Month, on the First 'Mon-Sun day' of the month. **Second** - Make a new Full backup once a Month, on the Second 'Mon-Sun day' of the month. **Third** - Make a new Full backup on a Month, on the Third 'Mon-Sun day' of the month. **Fourth** - Make a new Full backup on a Month, on the Forth 'Mon-Sun day' of the month. **None** – Do not make a new Full backup. Full backups will be created when they need to be. (When needed, or a threshold percentage is reached, or you set the MAX_DAYS option.)
For_FULLS_Day_Of_Month_ (1-28)	When you set the System Backup Mode to make Delta backups and you set Full Mode to Monthly, you have selected to make a new Full backup once a Month on a specific date defined by this option. Valid dates are 1 to 28. *This value only applies to Full Mode – Monthly.*
For_FULLs_Day_Of_Week_ (mon-sun)	When you have the Backup Frequency set to Weekly, you need to set which day of the week to make backups on. If you have set Full mode to weekly, then this option will designate the day of the week for the new Fulls. Valid days are: MON, TUE, WED, THU, FRI, SAT or SUN.
Enable_Automatic_Backups_ (Yes/No)	This option controls if automatic backup operations are run. This applies to automatic, daily and hourly backups, and Trim mode deletes. When set to NO, the phd_backup cronjob will exit when called and no automatic backups will run. If the daemon is still enabled, you can still launch jobs with the VI3 client.

Main Scheduling Option	Description
Retry_Failed_Backups_ (Yes/No/Before/Always)	When the Automatic Backup All runs, you can have it retry failed backups after it has completed. You can also manually run a RETY Backup All. You can do this from the VI3 client with the control text *[xRETRY]>* or *[xRETRYFULL*. A RETRY is when any backup has been marked as an ERR will be tried again. If the VM has multiple disks, then all disks will be backed up again. **No** - Do not retry the failed backups when running the automatic Daily Backup All. **Yes** - esXpress will run the retry of failed backups after the Daily Backup All, regardless of the time. **Before** - If the current time is before the NOT_AFTER time, then failed backups will be tried again. This applies to the Daily Backup All. If selected, esXpress will always retry a failed backup during the Daily Backup All if the current time is less than the 'Do Not Start Automatic Backup After' value. **Always** - esXpress will always retry failed backups on the Daily Backup All, and then you manually run a BACKUP ALL from the VI3 client or from the phd menu. Anytime all VMs are backed up, the failed VMs will be tried again.
Backup_Windows_Starts_at_Time_ (00-23)	This is the time of day to start running the automatic daily backups. The automatic backups run through cron.hourly, which is called every hour. Every hour when the esXpress phd_backup script is called, it checks to see if the current time is equal to or greater than the start time. If so, then the daily backup index-all is called.
Automatic_Backup_Start_Delay_in_Hours_ (0-9)	You should configure all your hosts to start backups at the same time. For some sites this can be too much of a load on your environment, especially on your backup targets. The Start Delay Option is a way to address this issue so you don’t have to stagger the Start Time on your different hosts. Only use this option if you are having load issues in your environment. If not, take the default of “0” (No Delay) When esXpress runs a Backup All, the backup archives all have the same timestamp of when the backup started, even though they do not all run at the start time. By using the delay, all the archives on all the hosts will have the same time stamp. This is important because when a VM gets VMotioned to another host, the date-stamp is checked on the last time that VM was backed up. If it matches the current backup run, then the VM is marked as backed up. If the timestamp is not the same, then the VM is backed up again.

Main Scheduling Option	Description
Backup_Window_Ends_at_Time_ (00-23)	When Automatic Backups are checked to run, the current time must be equal to or greater than the Start Time, and less than this value, the Do_Not_Start_After_Time. For example, if your host had a problem and in the morning you came in and rebooted it, you wouldn't want your backups starting then and affecting your production workloads. If your production day starts at 8AM, then you might want to set this value less than or equal to 08. If backups are currently running, backups will not cease running at this time, but an email will be sent notifying you that the backups are still running. This time has only to do with starting of the backup run and when you start notifying you. With esXpress these 2 options (Automatic Backup Start Time and Do Not Start Automatic Backups After) define the Backup Window for when automatic backups will start.
Hard_Limit_on_Window_ (None/Both/Delta/Full)	Setting this option will cause esXpress to set a hard backup window for the daily automatic backups. The automatic backup window start and end times define the window. The difference when a Hard Window is set is that No backups will be started beginning within 1 hour of the window end time setting. For example if the End Time is set to 7 and then Hard Limit is enabled then no backups will start after 6 AM. **None** – The backup window hard limit is off or not enabled and will not be used. **Both** – The backup window is enabled and will apply to all backups (Both Fulls and Deltas) in the automatic backup run **Delta** – The backup window is enabled but will only apply to Delta backups started during the window. For Full backups the hard window will be ignored. **Full** - The backup window is enabled but will only apply to Full backups started during the window. For Delta backups the hard window will be ignored.
Send_Backup_Running_Email_as_of_ 00-23)	Set the time (hour of day) when if the automatic backups are still running that an email will be generated and sent to the defined accounts that Backups are Still Running.

Main Scheduling Option	Description
Run_esXpress_Daemon_ (Yes/No)	esXpress requires a tiny background process or daemon running on your host. Its name is phd_daemon. This daemon is required for certain functions of esXpress to properly work. Note, the daemon does not run the daily backup - that is the function of the cronjob, phd_backup. The daemon is responsible for the following tasks: Using VMware tools committing the left-over snapshots from VMotioned backups, or backups that did not clean up nicely. Scanning VM display names for control text entered in the VI3 client and to respond accordingly (i.e. to configure and issue commands to esXpress – see "x-commands") The restore queue is run by the daemon. It searches for backup jobs and runs them. It is strongly recommended you keep this value set to YES. If there is a specific situation on your host where you can't have the esXpress daemon (i.e. phd_daemon) running - for example, maybe a troubleshooting situation - then you can set this value to NO.
Enable_esXpress_Cron_Job_ (Yes/No)	Setting this option to 'Yes' enables the esXpress cron jobs to run. The cron jobs runs scheduled esXpress tasks like automatic backups and trim mode. *For esXpress to function properly set this to Yes.*
Allow_[x]_Commands_from_VI3_ (Yes/No/SingleVM)	When the phd_daemon is enabled, you can issue commands to esXpress from within the VI3 client by updating the VM display name. **Yes** – All the [x] commands are enabled. **No** – None of the [x] commands are enabled. **SingleVM** – Only commands that affect a single VM will be allowed. The commands like [xALL] will not be processed Once the esXpress daemon runs the command, the [x#] s removed from the display name. For a list of all X Commands, see the X Commands quick reference.
Also_Check_Notes_for_[x]_Configs_ (Yes/No)	Enabling this option tells esXpress to look at the Virtual Machines Notes fields for valid [x] commands to process.

Automatic Backup Configuration Examples

- Run Delta Backups Every Day – make a Full Once a Week on Saturday:
  `Freq=DAILY / Mode=DELTA / Full=WEEKLY / Day=Sat`
- Run Delta Backups Every Day – make a Full Once a Month on First Sunday:
  `Freq=DAILY / Mode=DELTA / Full=FIRST / Day=SUN`
- Run Delta Backups Every Day – make a Full Once a Month on Third Friday:
  `Freq=DAILY / Mode=DELTA / Full=THIRD / DAY=FRI`
- Run Delta Backups Every Day – Never run a Full unless required:
  `Freq=DAILY / Mode=DELTA / Full=NONE`
- Run Full Backups Every Day, no Deltas:
  `Freq=DAILY / Mode=FULL`
- Run Full Backups Every Week on Mondays, no Deltas:
  `Freq=WEEKLY / Mode=FULL / DAY-MON`
- Run Delta Backups Every Week on Tuesday and make Full on First Tuesday:
  `Freq=WEEKLY / Mode=DELTA / Full=FIRST / Day=TUE`
- Run Delta Backups Every Week on Thursday and make Full on 1st of Each Month:
  `Freq=WEEKLY / Mode=DELTA / Full=MONTHLY / Day=THU / DATE=1`

Configuration Menu: G – General Options

These are the esXpress global configuration options that affect everything in relation to backups. They apply to all backups made, either automatic or manual.

Table 9: **General Options**

General Option	Description
Enable_Delta_Threshold_ (Yes/No)	When the Backup Mode is set to Delta backups, you need to configure when and how often to make a new Full backup. This option will allow you to make a new Full backup when the percent of delta blocks exceeds a pre-set limit. When set to Yes, the delta threshold percentage is checked and enforced.
Delta_Threshold_Percent_ (Make_FULL_If_>)	If you enabled the `Delta_Threshold`, then you need to set a `Delta_Threshold_Percent`. For example, if you set this percentage to 30%, and more than 30% of all total blocks are delta blocks, then the current delta is not made and a full backup is made instead. *The threshold percentage options are a key feature of the esXpress Delta Technology Engine providing the ability to control when Fulls are taken in relation to the percentage of growth of your individual VM delta backups.*
Enable_Max_Days_For_New_FULL_ (Yes/No)	esXpress Delta Backups are based on a Full backup. So, to restore a Delta archive, you must also have the Full archive. With current scheduling options, it is possible that you could miss a Full backup cycle. For example, suppose this scenario occurs: You have your host set to do Full backups on the First Friday of the month. On that day, the power is down. Come Sunday, after you power everything back up, you will still be running Deltas, because Friday was your Full day and was missed due to the power outage. This would normally be OK, but if your backup routine is to delete last months Fulls, you will not have them any more. When you enable this option (`Yes`), anytime a Delta backup is made, the number of calendar days are checked from the last Full backup. If it exceeds the `MAX_DAYS` setting, then a new Full backup will be made. *This is an important fail-safe option providing the ability to ensure Full backups are not missed and you never run into a restore situation where you don't have the full archive.*
Maximum_Days_Before_Making_New_Full_ (1-999)	This is the maximum age that a Full backup can be before a new Full will be made. This age is specified in Calendar Days.

General Option	Description
Enable_Backup_Speed_Throttle_ (Yes/No/By_Time)	esXpress backups have a novel feature, which allows you to slow down the speed of the VBA I/O while running your backups. Normally software has options to make it run faster, but esXpress also give you the option of applying a speed limit, a throttle, to slow down the backup speed. Since esXpress runs in a VBA, just like any other VM on the host, the CPU resources can be limited by the VI3 Resource Pools, but there is no easy way to limit disk I/O. **Yes** – Run with the Throttle enabled. This applies to Full Backups, and the Indexing phase of Delta Backups. **No** – Do not use the Throttle. Let the VBAs run as fast as they can. **By Time** – Only use the throttle between the specified times. This way you can have any backups that run during working hours, to be set at a speed limit, without affecting the environment. Why enable throttling? ESX does not provide any disk slicing. Whichever VM grabs the disk first will hold it until it releases the disk I/O. In larger environments, with many backups being run from VMs on the same disk, throttling should level out the I/O speeds and may actually improve the overall backup performance for the entire environment. Throttling applies only to Delta or Full backups.
Maximum_Disk_I/O_Speed_ (MB_per_second)	If you enabled the Throttle, then you need to set a maximum speed. This is specified in megabytes per second. If you set it to 30, then each VBA will not process data any faster than 30 megabytes per second.
Throttle_Only_Between_Hours_Starting_ (00-23)	This is the start time for throttling backups. Backups started after this time, but before the ending time, will be throttled. This time is only checked when the backup is started. If a backup is already running, and the throttle time comes into play, it will apply to the next VMDK backup started.
Throttle_Only_Between_Hours_Ending_ (00-23)	This is the end time for throttling backups. Backups started before this time, but after the starting time, will be throttled. This time is only checked when the backup is started. If a backup is already running, and the throttle time comes into play, it will apply to the next VMDK backup started.
Commit_Remaining_esXpress_Snapshots_ (Yes/No)	When esXpress goes to backup a VM, the snapshots are checked. If any esXpress snapshots are found, they will be removed by default. If you disable (No) this option, then remaining esXpress snapshots will not be deleted before a backup is started. *Be careful when disabling this option. It may cause a backup to fail.*

General Option	Description
Commit_Consolidated_Helper_Snapshots_ (Yes/No)	When VMware goes to commit a snapshot on a VM, it will add the Consolidate Helper snapshot, and commit the other snapshots back to the VMDK disk. Then afterwards, it will remove the Consolidate Helper snapshot. Sometimes this does not work perfectly, and these snapshots can be left out there by the VMware snap engine. When enabled (Yes), esXpress will try to commit these snapshots when starting a backup. This applies to Snap on Snap (Baja) Mode.
Minimum_FREE_SPACE_on_the_VM_VMFS_ (3_GB+)	When esXpress goes to backup a VM, some free space is required on the VMFS where the VMX file for the VM lives. By default, VMware will put the snapshot in the same folder as the VMX. This applies to all disks in the VM. This option is the minimum amount of space required to be free on a VMFS for esXpress to backup a VM. The value is set in gigabytes. **Note:** If you have set the snapshot pathing parameters in the VMX to store your snapshots on a different VMFS location, esXpress will not understand that, and still check space where the VMX is. Unregister and move the VMX to the other location and re-register it over there.
Abort_Backup_If_Less_Then_X_GB_FREE_ (1_GB+)	While a VM is being backed up, if the free space on the VMFS, where the VMX lives, falls below this value, then the running backup will be aborted. *This is a very important option to set correctly because if you run out of space for a snapshot, the VM will lock up, and you could have possible snapshot corruption.*
Update_VM_Notes_Field_ (Before/After/No)	When esXpress runs a backup, it will update the notes of your VM being backed up to reflect this. When a backup is started, the notes will say a backup has been started. After a backup finishes, the notes will be updated to show if the backup was a success or a failure. **Before** – The esXpress notes will be put before your notes in the annotation field of the VMX. **After** – The esXpress notes will be put after your notes in the annotation field of the VMX. **No** – The notes will not be updated by esXpress. Enabling this option can be very helpful in providing a quick view of backup statuses right from Virtual Infrastructure 3 Client. If you decide you do not like the esXpress notes in your VMs, remember to disable this feature. You can also use the command **[xNOTESALL]** to clear out the esXpress notes from your VMs.

General Option	Description
VM_Notes_Detail_Level_ (Tiny/Short/Med/Long)	This option defines the level of detail in which esXpress will update the VM notes with backup information. There are four choices which can be set. The default setting is Medium (Med). **Tiny** – Shows the basic information when the last backup completed and the backup status. Ex : *_esXpress: 2007-11-05 15:00 - OK - 15% ON* **Small** – Additionally will shows the number of disks in the notes. Ex : *_esXpress: 2007-11-05 15:29 - OK - 2/2/2 disks, (0.0%) ON* **Med** -_Medium will also show disk sizes for the backup including delta. Ex : _e*sXpress: 2007-11-05 15:57 - OK - 1/1/1 disks, (2.3%) 96m/4g/4g (49% Data), 02:57s ON* **Large** -_This will show the full backup informational notes messages just like was added in previous esXpress versions. Ex : *esXpress: 2007-11-05 16:13 - OK - 2/2/2 disks, (0.0%) 0m/2g/2g (0% Data), 02:44s, 12mb/s (42gb/hr), sent 8m ON*
Run_in_Secure_Mode_ (Yes/No=Open_Holes)	Even though esXpress uses VBAs and all backup processing is done in the virtual machines, some things still happen in the console space (see below chart). By default, esXpress will open outbound holes in the host firewall when needed. These holes are not closed, but are there temporarily, until the host is rebooted or the firewall is restarted. **Yes** – Run in Secure Mode. EsXpress will not open any holes in the host firewall. You will need to configure the firewall manually in the VI3 configuration. **No** – Do not run in Secure Mode. EsXpress will open holes in the firewall when needed. This is the default option. esXpress needs to communicate from the console for a few reasons: •If you opted to send mail from the console, it needs to be able to communicate with the SMTP server. •Currently, the restore process is in the console. In order to do a restore, the Net backup targets need to be indexed and files pulled through FTP or SSH. •If you enabled Trim mode, it again needs to index the Net backup targets and connect to do the actual deletes.
Full_Compression_ (gzip/6gzip/9gzip/lzop/nozip)	**Note:** Quantum only supports the "nozip" options to ensure optimal DXi deduplication results. Sets the type of compression to use for Full Backups.
Delta_Compression_ (gzip/6gzip/9gzip/lzop/nozip)	**Note:** Quantum only supports the "nozip" options to ensure optimal DXi deduplication results. Sets the type of compression for Delta Backups.

General Option	Description
When_Editing_use_VI_or_NANO_ (vi/nano)	Sometimes in esXpress you have the need to edit or view certain files. This option allows you to use **vi** or **nano** as the default editor. The default here is nano.

Configuration Menu: V - VM Selection Options

VM Selection Options control which VMs get selected for esXpress backups and the options supporting those backups.

Table 10: **VM Selection Options**

VM Selection Option	Description
Enable_Local_Config_File_Per_VMX_ (Yes/No)	Each VM can have a local configuration file that will override most of the global configuration options. To use this local configuration file, you must enable this option. This is a licensed feature of esXpress Pro/Enterprise. The Local Config File is a powerful esXpress option providing granular configuration option control on specific VMs. For additional information, see Enable Local Config File per VMX Options.
Auto_Backup_Powered_Off_VMs_ (Yes/No)	When the Automatic or Backup All VMs process is run, VMs that are powered off are not selected for backup by default. If enabled (Yes), then powered off VMs will also be backed up. A snapshot will still be applied before the backup, and removed afterwards. The default for this option is No.
Skip_Delta_Backup_If_NO_CHANGE_ (Yes/No)	When making a Delta backup, the VMDK file can be check, to make sure it has changed. This allows you to skip VMDKs that have not changed since the last Delta backup. This may be beneficial in saving space on your backup target where you are not creating the same Delta backup each day if the VM is not changing. For Full backups this option will be ignored. This is a licensed feature of esXpress. **Yes** – Do not Delta backup a VMDK if it has not changed since the last backup. Skip It. **No** – Always do the Delta backup. esXpress keeps track of the VMDK time-stamp in a file called the same as the vmdk_name.INFO A 'phd' folder is created below every VMDK and this time-stamp file is kept there. **Note:** The skip delta backup if unchanged option only applies to normal VM backups. For Template backups if it is unchanged it will Always skip the Delta backup.

VM Selection Option	Description
ONLY_BACKUP_MATCH_ (text_in_name)	When the Automatic or Backup All VMs process is run, VMs that match this egrep match will be included in the backup run. For additional information, see Using an egrep Match
DO_NOT_BACKUP_MATCH_ (text_in_name)	When the Automatic or Backup All VMs process is run, VMs that match this egrep match will not be included in the backup run. For additional information, see Using an egrep Match .
Skip_These_SCSI_IDs_ Globally	This option applies to all backups. You can have esXpress globally skip certain SCSI IDs for backups. List the SCSI IDs here, separated by a space. This is not case sensitive. This is a licensed feature of esXpress.
Backup_VMs_with_DUPE_NAME_VMDKs_ (Yes/No)	If you built a VM that has multiple VMDKs, and they are the same name but on different data-stores, VMware has a problem when committing the snapshots. The VM will need to be shutdown, for the snapshots to be committed. By default esXpress will not backup these Virtual Machines. You can enable this option when this issue is fixed or if you know it will not be an issue in your environment.
Error_on_VMs_with_existing_SNAPSHOTS_ (Yes/No)	When esXpress backs up a VM, it decides if it was a Good backup, or a Warning, or an ERROR. By default, VMs with snapshots are not backed up, and are treated as a WARNING (in the emails). **Yes** – Treat VMs with existing snapshots as a WARNING (in emails) in the Daily Backup Log / Email. **No** – Do not treat them as WARNINGS (errors). Will not cause a WARNING in the emails. *Be Careful when setting this option to No, as you will no longer receive the emails as WARNINGs and could loose track of a VM that is not being backed up due to an existing snapshot error.*
Error_on_Indep_Mode_Disk_Warings_ (Yes/No)	When esXpress backs up a VM, it will add a snapshot to it first. When a VM has an Independent Mode disk, a snapshot is not applied to it. esXpress will still backup the other disks and skip the independent disks. This is useful for RDMs. **Yes** – When encountering an Independent Mode disk, treat it as a WARNING (in emails). **No** – Do not treat an independent mode disk as an error, just note it and move along.

Enable Local Config File per VMX Options

You can set these options per VM, to allow for specific backup options:

- -VM_SKIP, to skip this VM from automatic backups.
- -VM_SKIP_SCSI, to skip specific VMDKs from being backed up always.
- -VM_SKIP_DAYS, to skip automatic backing up this VM on these days.

- -VM_FORCE_FULL_MODE, to always make FULL backups for this VM.
- -VM_FORCE_FULL_DAYS, to select which days to make a FULL backup on always.
- -VM_SPECIAL_TARGET, to override system default for Special Target Location.
- -VM_FULL_TARGET_1/2/3, to override system default for Full Backup Targets.
- -VM_DELTA_TARGET_1/2/3, to override system default for Delta Backup Targets.
- -VM_PREPEND_FOLDER, create a new top level folder on the NET backup target.
- -VM_IN_PARALLEL, to override system default for parallel mode, Yes/No.
- -VM_COLD_BACKUP, backup mode to stop VM, add snapshot, then power on.
- -VM_NO_SNAP, to backup VMs while powered off with NO SNAPSHOT, then power on.
- -VM_QUIESCE, to quiesce VM when the Snapshot is added. Default=No
- -VM_BEFORE_SNAP, future – Added for PHD internal testing
- -VM_AFTER_SNAP, future – Added for PHD internal testing
- -VM_THRESHOLD, to set the Delta Threshold for this VM.
- -VM_THROTTLE, to force a Speed Throttle for this VM.
- -VM_EMAIL, to send an email to users when this VM is backed up. You can list multiple VM_EMAIL lines to send the notification to multiple users.
- -VM_EMAIL_DETAIL, to send a Detailed Email.
- -VM_ORDER, (1-9), you can set VM backup priority order with 1 being the highest priority, when automatic backups run the 1s are processed first, followed by the 2s, etc.
- -VM_DZIP, sets the compression for the VMs delta backups
- -VM_FZIP, sets the compression for the VMs full backups
- - VM_FLB, see File Level Backup Sections of this manual
- - VM_AUTO_FORCE, setting this to Yes forces this VM to File Level Backups Only.
- - VM_AUTO_FORCE_FLB_SCSI, setting this to Yes will force the specific VMDK to run File Level Backups Only. You can enter multiple lines for additional VMDKs.
- - VM_ENABLE_VMFS, overrides the backup to VMFS variable
- - VM_BACKUP_VMFS, UUID of VMFS to use for backups
- - VM_MAX_DAYS, will cause a full backup to be made if the latest full is more than this values calendars days old.

For further information on the local configuration values refer to the actual local config file – local.vmx.phd.

Using an egrep Match

To check for a match, esXpress calls **egrep** and uses your match string. Here is the actual code that is called. What you enter in the MATCH field is replaced in the following statement.

```
echo " $NAME " | egrep -i "(${ONLY_BACKUP_MATCH})"
```

If your MATCH string is 'master', then the command run would be:

```
echo " $NAME " | egrep -i "(master)"
```

This is an **egrep** expression, the '**-i**' makes the search case insensitive and this also means that some characters have special meaning. Characters: **. \ + * ^ $ { [ ] } ( )** and just about most other characters mean something special to egrep. Use a backslash to escape the special characters. The period will match any character. Use periods in place of spaces.
In the example below, we use '?' on the right side to mean match any one character. The pipe '|' symbol is used for an '**or**' MATCH string (on the left side below).

Simple Matches:	
Gold .	Only match machines with 'gold' in the display name
Master|Do.Not.Backup	Match VMs with either '**master**' or '**do?not?backup**' in the display name.
2005-..-..	Match VMs that have '**2005-??-??**' in the name.
2006-[0-9][0-9]-[0-9][0-9]	Match VMs that have '**2006-nn-nn**', where n=0-9
\.\.master\.\.	Match VMs that have '**..master..**' in the display name.
..master..	Match VMs that have '**??master??**' in the display name.

Configuration Menu: B - Backup Options

The backup options menu contains a number of general backup options. This includes controlling if you are backing up to VMFS and the permissions to use there. Also included are special backup options and options for setting up how you want the esXpress backup's folders created.

Table 11: **Backup Options**

Backup Option	Description
Backup_to_VMFS_ (Only/No/Also)	esXpress can backup to Network targets or to the VMFS. Or it can send backups to both at once. When doing esXpress restores, the VMFS is only indexed if the VMFS is set for backups. When backing up to the VMFS, it is all done in the VBA, which means all the Disk I/O is happening in the virtual space. To backup a 10 GB VMDK, a new empty 10 GB VMDK will be created on the VMFS. After the backup is completed, the backup VMDK will we resized to the actual backup size. *Important – For example if you were backing up a 50 GB VMDK, a new 50 GB VMDK has to be created when making the backup*. **Only** - Only backup to the VMFS. **Quantum Recommended Setting. No** - Do not backup to the VMFS and send the backups to a Network target. **Also** - Also backup to the VMFS while backing up to the Network targets. When going to both VMFS and Net, the data stream is split and sent to both places simultaneously.
Which_VMFS_to_Backup_To_ (press_enter_twice_	When backing up to the VMFS, you need to tell esXpress which VMFS to use. When choosing a VMFS, they must have a nice name besides the long UUID name for each. When selecting a VMFS, it must be a version 3 VMFS. esXpress will create a folder on the VMFS called esXpress_backups and the backups will be placed in that folder.
Owner_for_VMFS_Backups_ (chown)	After the backup archives are created on the VMFS, esXpress will change the owner of the archive to the user set here. By default, this is the 'root' user. Set this to the user you want, but this user must exist on the host. You can also assign a group by setting this option to ‘Group (dot) User’ instead of just ‘User’.
Permissions_for_VMFS_Backups_ (chmod_700_755_777)	After the backup archives are created on the VMFS, esXpress will change the permissions on the backup archive to the chmod set here. esXpress allows you to set 700, 755 or 777 (default is 755). **700** - Will only let the chown user access the files. **755** - All users can read the backup archives, but only the chown user can delete them. **777** - All users can read and delete the backup archives.

Backup Option	Description
Enable_Special_One-Up_Backups_ (Yes/No)	esXpress has the ability to make Special Backups, that are done outside the daily backup runs. When making a Special Backup, it can be sent to a different backup target from the daily backups. For special backups you can default them to be either Full or Delta backups. esXpress will also create and maintain a separate Index Map is kept for Special backups. This is a licensed feature of esXpress Pro/Enterprise.
Backup_Mode _for_Special_One-Up_ (Delta/Full)	When esXpress makes a special backup, you can set the default backup mode here. This can either be to run delta backups, or always make a Full backup.
Special_Backup_to_VMFS_ (Default/Only/No/Also)	When running special backups this option controls which backup targets to send the specials to. **Default** – Use the default backup target options defined in the Backup Options. **Only** – Only backup to the VMFS for special backups. This is the VMFS defined in the Backup Options. **No** - Do not backup to the VMFS and send the backups to the Network target defined in Special Backup Target option. **Also** - Also backup to the VMFS while backing up to the Network target. When going to both VMFS and Net, the data stream is split and sent to both places simultaneously.
Send_Special_Backup_to_Target_#_ (1-9)	Choose the Backup Target the Special Backups should go to. This can be set from target #1 to target #9. You should use a different target than the nightly backups, and set it for no auto deletes. Better delete options for Specials are coming
Treat_[xNOW]_as_[xSPECIAL] _ (Yes/No)	Override the default setting for [xNOW] to use [xSPECIAL]. When set to **'Yes'**, anytime you issue the command [xNOW] it will use [xSPECIAL] instead, and a special backup will be created.
Auto_Backup_Registered_Template_VMs_ (Yes/No)	When enabled, this option will backup VM Templates that are currently registered as a VM on this host. They will be treated like any other VM. A snapshot will be added, it will be backed up, and then it will be removed. Local Configuration files do not work for registered Templates. When templates are backed up, the VM Name will be pre-pended with **_TP_** on the backup target folders.
Auto_Backup_ALL_FOUND_Template_VMs_ (Yes/No)	When enabled, the entire VMFS will be searched for template VMs with the **.vmtx** extension. These Template VMs will be backed up without a snapshot. Only enable this option one 1 host, maybe 2. This option is called after the regular backup run is complete.

Backup Option	Description
Target_for_Templates_ (0=Default_1-9)	When you backup a Template, this option defines which backup target you want to send it to. When set to 0 (zero), the template backups will be sent to whatever is defined as the global backup targets. Or you can define which target to use, from 1 to 9.
Net_Separate_Dirs_Full/Delta_ (Yes/No)	When creating the folders on the Net backup targets, enabling this option will create a TOP level folder, based on whether the backup is a Full or Delta. It will create a folder called FULL or DELTA, unless the VM Name options is set. This does not apply to VMFS backups.
Net_Separate_Dirs_by_VM_NAME_ (Yes/No)	When creating the folders on the Net and VMFS backup targets, enabling this option will create a TOP level folder based on the VM Name and the UUID. Enabling this option will override the previous Dirs option.
Net_Separate_Dirs_Date_ (Yes/No)	When enabled, a folder will be created based on the date. This is YEAR.MM.DD and is the date from when the backup run started.
Net_Separate_Dirs_VM_Full/Delta_ (Yes/No)	When enabled the VM Name folder will be appended with the backup mode. This could be Full or Delta. If you enabled the Top level Full and Delta folder, then this option is ignored. This does not apply to VMFS backups.
When_Adding_Snapshot_Quiesce_VM_Tools_(Yes/No)	Enabling this option will force All VMs to be quiesced when adding a Snapshot before backups start. Unless you have a specific reason you need to set this we recommend to leave this option set to 'No'.
When_Adding_Snapshot_to_Novell_Quiesce_ (Yes/No)	Enabling this option will force All Novell VMs to be quiesced when adding a Snapshot before backups start. Some Novell Virtual Machines require it to be quiesced to successfully add a snapshot. If you Novell VMs require it then set this option to 'Yes'. If not then set this option to 'No' and the Novell Virtual Machines will not be quiesced.
After_running_BACKUP_ALL_run_this_script	Add a custom script to run after BACKUP ALL completes.

About Folders on the Backup Targets

When backing up to the Net or VMFS backup targets, folders are created. By default each VM will create a new folder based upon the VM NAME. The VM NAME is the folder the VMX is stored within. When creating the backup folder on the backup target, the folder name is VM NAME (dot) UUID. This will create a unique name for each VM.

This is the format when creating folders on the backup targets.

```
(Pre-Pend from Local CFG) /
      (FULL / DELTA / VM NAME) /
            (Backup Run Date) /
                  (VM NAME . UUID .(Full / Delta)) /
                        (_ss_Snapshot Name)
```

- The Pre-Pend option is from the Local Configuration file of the VMX. This comes before any other folders.
- Next you can enable the Backup Type (Full/Delta) or the VM Name as the folder.
- Backup Run Date - you can have a separate folder based on the date of the backup run.
- Next is the VM Folder name itself. This is based on the VM NAME and the VM UUID. This is to create a unique folder for each VM. The type of backup can be appended to the end, this will separate the Full and Delta backups per VM, in a different folder.
- If the VM being backed up currently has a snapshot, the name of the snapshot will be used as the last folder. This can be handy in deciphering what is on the backup servers and which backups are available.

Configuration Menu: D - Auto Delete Options

esXpress has the ability to delete the backup archives from the Network and the VMFS backup targets according to the retention policies configured. Auto deletion policies can be set separately for network and the VMFS targets. When doing a delete from either the Net targets or VMFS, the backup's targets will be indexed for the existing backup archives (this is based on the options per target). You can add or remove files from the backup targets without any issues because each time a delete is called, the targets are rechecked and all the files are loaded into a database. esXpress issues selects against the DB to find the files to delete.

esXpress can delete backup archives in 2 ways (a third is to manually Trim from the Maintenance Menu).

- Normal deletion - Delete before/after each VMDK backup
- Trim Mode – Host Controlled

Archives are matched by the VM NAME (dot) UUID along with the VMDK SCSI ID and VMDK Name.

Method 1 is enabled by default. After a VMDK is successfully backed up, the backup targets are indexed, and matching backups that meet the delete criteria are deleted.

This is done for each VMDK. This delete action is done in the virtual space using the VBA.

esXpress can also delete in Trim mode (Method 2) instead of the normal delete action. With Trim Mode, you enable one or two hosts to handle Auto-Deletes. This way you only have that 1 or 2 hosts indexing the backup server. If you have a larger environment, having every VMDK backup going out and indexing the DXi, can be too much I/O for it to handle or any storage target for that matter. Assume you have 200 VMDKs that are backed up on an average night, in normal delete mode; the backup targets will be indexed 200 times for archives to be deleted versus 24 times for Trim Mode. Trim mode runs from the console of the host, so the console needs to see the Network target servers, to be able to trim them.

In large VM environments where you are saving many backup archives it may be better to run in Trim mode, which will check every hour to process auto-deletes.

The following options are used to set the Auto Delete on for Network Targets:

- Net Delete Enable of Backups
- Net Purge Fulls Before a New Full (Yes/No)
- Net Also Purge Deltas Before A New Full_(Yes/No)
- Net Delete Matching Deltas on Fulls (Yes/No)

Table 12: **Auto Delete Options**

Auto Delete Option	Description
Hourly_TRIM_Delete_ of_Each_VMDK_ (Yes/No)	When enabled, esXpress will do backup archive deletions in Trim mode. This will run hourly from the console and also relies on the having the Automatic backups enabled. When set to No, the normal deletion method is used, checking after each backup, from the VBA. **Yes** – Run backups in Trim Mode, once an hour from this host. **No** – Do not use Trim Mode, run traditional deletes from the VBA after each VMDK backup.
Ignore_UUID_When_ Auto_Deleting_ (Yes/No)	When doing deletes for a particular VM Name and VMDK, the UUID of the VM is taken into account. This VM Name and UUID make each folder on the backup targets unique. **Yes** - The UUID of the VM Folder Name is ignored. This should not be a problem, assuming that you created different folders names for each of your Virtual Machines. **No** – All VMs are unique. This is how you should be running. *If you are seeing some old VM backups not being trimmed when it looks like they should check the UUIDs to see if they are different. If so then enable the 'Ignore UUID' option to resolve this issue.*

Auto Delete Option	Description
Net_Delete_Enable_of_Backups_ (Yes/No/Test)	When enabled each backup target is indexed after a successful backup, and then the backup archives are selected to be deleted.
Net_Purge_Fulls_Before_a_New_Full_ (Yes/No)	When enabled, backup targets are also indexed before a backup is started. This applies to Full backups. The purpose of this is to free up space before the Full backup runs. When this Purge delete runs, it is based on the FULL_DAYS (minus) 1. So if you normally configured to keep 2 Fulls, this Purge will run and keep 1 unique day. If you have FULL_DAYS = 1, then all Fulls for this VMDK are purged before the backup is started.
NET_Delete_Matching_Deltas_on_Fulls_ (Yes/No)	When enabled and when a Full backup is being deleted, this will also delete the matching delta backups. This will ignore the DELTA_DAYS setting.
NET_Keep_Fulls_ (How Many Days)	Set the unique days of Full backups to keep on the targets.
NET_Keep_Deltas_ (How Many Days)	Set the unique days of Delta backups to keep on the targets.
NET_Minimum_Calendar_Days_to_Keep_Fulls_ (0=None)	This option allows you set a minimum number of calendar days to keep your Full backups. This is a failsafe. If set to 0 (zero), then this option will be ignored. This will guarantee that you also have your Full backups for a minimum number of calendar days. Even if FULL_DAYS=7, set to keep two days of unique Full backups, and you are making Full backups every day, you will not delete any Full backups that are not at least 7 calendar days old. Net Minimum Calendar days is calculated based on real time and uses the INT value of the difference in days. For example, if the value is set to 5 and a backup was stored at noon on the 1st of the month and a second backup is taken on the 6th at midnight, although five calendar days have elapsed, the actual difference between backups is 4.5 days. And since the integer value is used (4), the minimum days setting of 5 has not yet been reached so the older backup is not purged. To ensure 4 days of backups are stored, set this value to 5 and to ensure 5 days, you would set the value to 6, etc.

Note: The options for VMFS Auto Deletes (items preceded with VMFS_) are exactly the same as the Net options, except they apply to the VMFS backup archives.

How Days Work in esXpress Backups

When esXpress is selecting archives to delete, it does so based on the number of unique days of backups actually found on the backup targets for a particular VM Backup and VMDK. This is not the number of calendar days, but the **Unique Days** of actual backups on the targets. Multiple backups in the same day are still one day.

Configuration Menu: H - Configure Virtual Helpers

esXpress uses VBAs (Virtual Backup Appliances) to backup your VMs. A VBA is a tiny Linux VM that's only purpose is to backup VMDKs. The VBAs are created on demand, and then destroyed afterwards. They remain registered in VI3 so they can be put into resource pools. Each time a new backup is requested, the VBA is rebuilt, and afterwards the VMDK files it was using are deleted.

Each VBA needs about 3GB of free space while running. It recommended placing the esXpress VBA helpers in their own resource group.

Table 13: **Configure Virtual Helpers Options**

Option	Description	Function
C	Helper Options	General Helper Options, including VMFS for helpers, max helpers, parallel and aggressive mode.
B	Backup Helper Network Options	Options for setting up the network the VBAs will use and the IP addresses (static or DHCP) for each helper.
E	Email Helpers Network Options	Options to set up the network for esXpress email notification helper.
H	Help on Helpers	Additional help on esXpress Virtual Backup Appliances.
Q	Quit	Quits Helper Options and returns to Configuration Menu.

Virtual Helper Menu: O – Helper Options

Table 14: **Helper Options**

Helper Option	Description
VMFS_For_Helpers_ (press_ENTER)	Since the VBAs are just tiny VMs, they need to live on the VMFS. Here you select which VMFS you want to use. esXpress requires the VMFS to have a pretty name, not the UUID long name. If you have no nice names configured, you cannot choose one. Press enter here twice to bring up a list of found VMFS names. It is better to put the VBAs on local space so you are not wasting SAN space for their use. *Important - This option must be configured in order for esXpress to run on your host. It is also recommended to put the esXpress VBAs on local storage if possible.*
Max_Number_of_Helpers_ (max=CPUs+1)	This is the maximum number of VBAs that will run at once. By design esXpress will not let you run more VBAs than your have processors + 1. If you have a 4 CPU host, you can run a max of 5 backup VBAs at once. **Important:** An important note also is that your esXpress version sets a hard limit on the amount of VBA which can run regardless of the value set in this option. Pro – Max 4 VBAs Enterprise – Max 16 VBAs
Number_of_Helpers_For_Backup_All	When esXpress runs the Automatic Backup or the Backup All VMs command, this is the maximum number of VBAs what will run. This allows you to set auto for 3, and the maximum for 4. So in case you still want to make a manual backup, you can while the backup all is still running.

Helper Option	Description
Run_Helpers_In_Parallel_Per_VM_ (Yes/No)	When esXpress backs up a VM with multiple VMDKs, it can back them up in parallel mode. **Yes** - Backup VMDKs in parallel mode. Use multiple VBAs to backup the same VM if it has multiple VMDK files. This allows faster backup of your VMs. **No** - Do not use parallel mode, backup each VMDK sequentially, one at a time. When you run esXpress in parallel mode the high # VBAs (15, 14, 13 etc) will be selected for use first so make sure you have networking defined, static IP or DHCP for those helpers. *This is a very important feature of esXpress which can greatly reduce backup times for large VMs with multiple VMDK files. In traditional backup methods each VMDK would be backed up sequentially. By enabled this option and running in parallel you can realize the reduced backup time. As your host scales and allows more VBAs to run the performance gained for VMs with multiple VMDKs scales with it.*
Number_of_CPUs_in_VBA_ (1/2/4)	The VBA is just a virtual machine. Set the number of CPUs here for the VBA to use. Two CPUs will make the VBA run a little faster. If you also set 'More' (see below), it will push both CPUs to 100% if your disk can keep up. Changing the number of CPUs will cause the VBA to be unregistered and reregistered on the host. This can cause the VBA to pop out of their resource pools in the VI3. If you can spare the extra CPUs, esXpress will take advantage of them. **Note:** For ESX 3.5 hosts this value can only be set to 1 CPU.
Start_VBA_With_Network_Connected_ (Yes/No)	This will start the esXpress VBA to Connect the Network on Power On. If set to 'No' the network will be connected after the VBA powers up. We suggest you only set this option to 'Yes' if you are running at a minimum ESX 3.5 Update 3 and are having 'Network Connection' Issues. In earlier versions of 3.5 you may experience hostd issues. This problem has been fixed by VMware in Update 3.
Force_VBA_Re-Register_on_Power_On_ (Yes/No)	This will cause esXpress to re-register the VBA each time it powers itself on. *For ESX 3.5 hosts that are running DRS you Must set this value to 'Yes'. If you are running a 3.5 host without DRS then set this value to 'No'. For 3.0.x hosts it is recommended to leave this option set to 'No.'*

Helper Option	Description
Do_Extreme_Network_Fix_on _Power_On_ (Yes/No)	If the VBA experiences problems connecting the network after power on setting this to 'Yes' will attempt to re-synch the host with Virtual Center. *It is not recommended to set this option to 'Yes' unless you are experiencing.* *Network Connection Issues and have been instructed to do so by the esXpress support staff.*
Nickname_For_VBAs_ (host=use hostname)	When the VBAs are created in the VI3, they are created with the host name as part of the VBA display name. This makes each of the VBA unique in the farm. If you do not want to use the hostname, set another name here. If you want to use the hostname name, this should be set to 'host'
How_Aggressive_is_VBA_ (More/Less/One-Ups)	This option controls how aggressive the VBA will run. **Less** - When set to Less, the VBA will run single threaded and consume less CPU. Also when FLB is enabled, they will run after the image level backup is done. If the VBA only has 1 CPU or a speed throttle is set, Less will be forced. **More** - When set to More, the VBA will be more aggressive. It will run multi-threaded in the VBA, but the VBA must have more the 1 CPU, or setting this to More will do nothing. **One-Ups** – Run multi-threaded during One-Up backups, such as running [xNOW]. This only applies if the VBA has more than 1 CPU.
In_VBA_use_SCSI_driver_ (buslogic/lsilogic) –	Select the SCSI driver to use with the esXpress VBA. The default is buslogic. Normally you should not change this value unless directed to by support.

Virtual Helper Menu: B - Backup Helper Network Options

For each VBA helper you need to define the network settings. Since a VBA is just a virtual machine, if you want to do network backups, then they need to have an IP Address. This address can be assigned by DHCP or be hard-coded. If you have a separate network for email, you can assign different network settings for the Email Helper.

When VBA Helpers are chosen to be used, any available helper might be called. If you have 4 VBAs set as your max to run, that does not mean Helper 1 - 4, but only 4 at once. Helpers are used if they have their network configured. If they have a DHCP enabled or Static with an IP set, then they will be used. Make sure you disable DHCP and set no static IP if you do not want a particular VBA Helper to run.

Table 15: **Backup Helper Network Options**

Backup Helper Network Option	**Description**
Network_for_Helpers	This is the virtual network defined on your ESX host that the VBA will use. It is a required option that must be set to a valid network on your host. *Important – you need to define this value in order for the backup helper to properly function. Without setting this option to a Valid Network on your host the esXpress VBAs will not start.*
Default_Netmask_for_VBA_Helpers	The default netmask for the VBA Helpers (ex : 255.255.255.224). **This is required if you are assigning static IPs to any VBAs.**
Default_Gateway_for_VBA_Helpers	The default gateway on the virtual network the VBA helpers are using. **This is required if you are assigning static IPs to any VBAs.**
Default_DNS_server_for_VBA_Helpers	The DNS server to use for the virtual helpers. **This is required if you are assigning static IPs to any VBAs.** *The Helper network address assignment (DHCP or static IP) needs to be defined for each VBA you are using. You can run up to 16 VBAs depending on your esXpress license. It is also a good idea if you are using to DHCP to go ahead and set all the helpers to DHCP. This will ensure that no matter what helper is chosen for the backup it will get an address. This is especially important if you are running in parallel mode.*
Helper_[1-16]_DHCP_(Yes/No)	Set this value to 'Yes' if you are using DHCP for the specific helper. Set it to 'No' if you are assigning a static IP.
Helper_[1-16]_IP_Address	Set the static IP address for the specific helper if you not using DHCP.

Virtual Helper Menu: E - Email Helper Network Options

Table 16: **Email Helper Network Options**

Email Helper Network Option	Description
Send_Email_from_the_Console_ (Yes/No)	This option determines where you wish to send the esXpress backup notification emails from. When this option is set to 'Yes' the email will be sent from the service console and a hole will be opened in your host firewall automatically. If you set this value to 'No' then the notification emails will be sent from an esXpress email helper which is just a tiny virtual machine like the VBAs. **Note:** The following email helper network options only apply if you are sending the email notifications using an email helper and not through the console.
Enable_Separate_Network_ (Yes/No)	If you are using a email helper and want to use a separate virtual network from the default network defined for the VBAs then set this value to 'Yes'. If you wish to use the VBA default network then set this option to 'No'.
Network_for_Email_Helpers	If the 'Enable Separate Network' option is set to 'Yes' then you it is Required to define a virtual network here for the email helper. The email helper when on a separate network will use Helper 99.
Default_Netmask_for_Email_Helpers	Set the default netmask for the esXpress email helper (ex : 255.255.255.224).
Default_Gateway_for_Email_Helpers	Set the default network gateway for the esXpress email helper.
Default_DNS_Server_for_Email_Helpers	Set the DNS server to be used by the esXpress email helper.
Helper_-_DHCP_ (Yes/No)	Set this option to 'Yes' if you are using DHCP for your email helper. Set it to 'No' if you are using a static IP.
-IP_Address	Enter the IP address for the email helper if you are not using DHCP.

Configuration Menu: S - Configure Snaps on Snaps (Backing up VMs with Snapshots)

esXpress supports backing up VMs with existing snapshots. To take advantage of this feature, Snaps on Snaps must be enabled. esXpress uses the VCB commands to handle its snapshot on snapshots mode. These are the VMware supplied VCB commands that exist on the host. You can see these commands by entering 'vcb' then hitting tab, twice on your host. This is not the VCB proxy, but commands in the console.

The commands require a user and password for authentication. You can configure esXpress to Authenticate in two different methods. The first is by using the (VCB method) which uses the file **/etc/vmware/backuptools.conf. The second is** the esXpress method (which stores the user and password in the esXpress configuration file /etc/phd/esxpress.cfg). The User and Password is stored in plain text in both the backuptools.conf and the esXpress.cfg file.

When using the VCB commands you can talk to either the localhost or to a VC server for the snapshot commands. Because of this, you need to **create the localhost user through the VI3 Client** and it must have access to all the VMs (Virtual Machine Permissions, Inventory and State are the key permissions needed). *It is very important that you do not use the root user for anything other than testing.*

Once you have configured the snapshot options, you can test their configuration from the Validate Snapshot Menu, in the Maintenance Menu.

Table 17: **Configure Snapshot on Snapshot Options**

Snapshot on Snapshot Option	**Description**
Enable_Snapshot_on_ Snapshot_Backups_ (Yes/No)	To backup VMs with existing snapshots, you must enable this option. It is important to note that when enabled esXpress will be more aggressive when backing up your VMs. This is because esXpress can add and remove its snapshot but not all of the snapshots. Now with this option enabled it will always try to backup your VMs.

Snapshot on Snapshot Option	Description
VCB_Connection_Authentication_Method_ (vcb/esXpress)	**This option applies to version 3.5 ESX hosts only.** This option controls which of the 2 available authentication methods you want to use. This is required as esXpress needs to use the VCB commands to do Snap on Snap backups, which forces the use of a user and a password. **vcb** - esXpress will use the user and password that is stored in the /etc/vmware/backup.conf file. **esXpress** - Store the user and password you want to use in the esXpress configuration file.
Validate_VCB_against_LocalHost_or_VC_ (localhost/vc)	**This option applies to version 3.5 ESX hosts only.** When using the VCB commands, esXpress can validate against the localhost or to a VC server. The user must be created through the VI3 client for both VC and Localhost. If you are using localhost, create the user from the VI3 client connected directly to the localhost. It also needs have permissions to all VMs and actions (Inventory and State are the key permissions). The same applies to a VC user. *Do not use the root user, other than for testing.*
Start_at_Target_#_for_Backups_ (0=default, 1-9)	When you backup a VM that already has a snapshot, you can define which target you want to start at. This target will be appended to the Roll-Over backup target list, and will be first. If this target fails then the regular backup targets will be tried. This target must be set for Roll-Over and Backup.
If_Using_VC_Enter_Host_Name_Here_ (IP/FQDN of VC)	**This option applies to version 3.5 ESX hosts only.** If you are using VC to validate the VCB user, enter the Name or IP Address of the Virtual Center server here. You should always use the IP address in case of DNS failures.
VCB_User_ (Can_Be_Local_User_or_VC_User)	**This option applies to version 3.5 ESX hosts only.** Enter the name of the user you want to use for the VCB command. Do not use the root user other than for testing. *Important – This use MUST be created through the VI3 client. The user needs the following permissions from within the VI3 client; all permissions under Virtual Machine, the key ones are Inventory and State.*
VCB_Password_ (Can_Be_Local_User_or_VC_User)	**This option applies to version 3.5 ESX hosts only.** Enter the password for the user you are using.

Configuration Menu: F - Configure FLB (File Level Backup) Options

esXpress has the ability to also backup specific folders in a VMDK along with Image level Full and Delta backups. Each VM's file level backups are controlled and configured using the Local Configuration file set per VMX. It is here that you define which VMDKs, the partition, and the folders you want to backup. Then when the backups run, the partitions will be mounted and the folders you defined are compressed (zip or tar) and sent to a backup target. If a VBA has one CPU, then the image (Delta/Full) level backup will run first, then the FLB will run after. If the VBA has more than one CPU then they will run at the same time (multi-threaded).

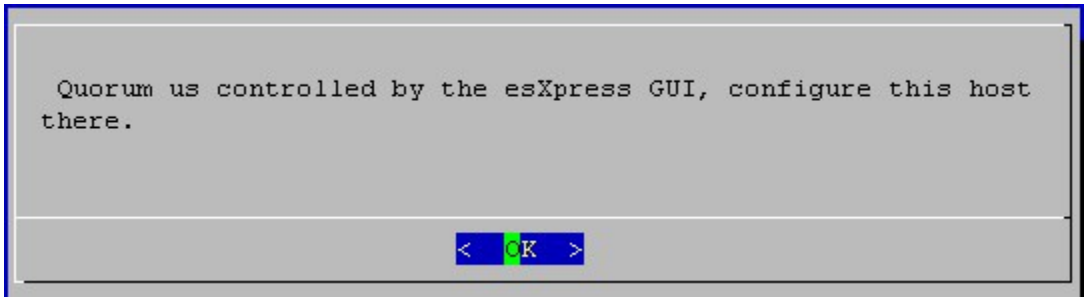
Table 18: **Configure FLB (File Level Backup) Options**

File Level Backup (FLB) Option	Description
Enable_FLB_Backup_Module_ (Yes/No)	The FLB Module must be enabled. **Yes** – Enabled the FLB Module. This will enable the calling of FLBs. **No** – Do not enable the FLB module. No FLBs will be made.
When_Running_A_Backup_Always_Try_FLB_too_ (Yes/No)	If the WHEN_RUNNING is enabled, the FLB module will be called anytime a VMDK backup is made. Or FLB backups can be run only for a VMDK. *It is important to understand the difference with this option and how you want to control when a FLB is made. If you want to run FLB each time a VMDK backup (including automatic backups) is made enable this option. If you want to only take a File Level Backup when you initiate one then disable this option.*
Make_FLB_Backup_File_As_ (zip/tgz/lzop)	esXpress uses the open source zip format, which does not support files or archives bigger than 4 GB. If you have big files to FLB, use tar along with gzip (tgz) or lzop (tar.lzo). These two methods will always work. **zip** – Make a zip compatible file using the open source zip **tgz** – Make a tar file that is compressed with gzip **lzop** – Make a tar file that is compressed with lzop

File Level Backup (FLB) Option	Description
Backup_Target_To_Use_For_FLB_Backup_ (1-9)	Choose the backup target you want FLBs to go to. This can be target #1 to target #9. Folders on the FLB target will be created following the same rules as image backups. If you choose to use Full/Delta in the folder name, then FLB will be used.
Do_Not_FLB_Folder_If_Raw_Size_Is_Greater_Than_ (0-99999_meg)	Before a folder is backed up, the amount of space used is checked. If the space is greater than what is defined in this option in megabytes, then the folder is skipped and noted as an Error in your logs. A Zero for the size limit equals unlimited. If you enter 4096 then the user could have no more the 4 GB worth of data to backup.

Configuration Menu: U – Quorum Configuration

Note: This chapter contains the esXpress menu options "if" you do not have the GUI console installed. If you have the GUI console installed you will see the below dialog box directing you to manage the Quorum via the esXpress GUI.



To manage the Quorum from the esXpress GUI go to the host menu. There you can stop, pause or abort the Quorum by host.

The esXpress Quorum is just a Folder on a shared VMFS. Ideally a new VMFS should be used for this purpose. Please create a separate VMFS for the esXpress Quorum. It does not have to be very large (8GB is sufficient).

When enabled, a folder named esXpress_Quorum will be created on the VMFS of your choice for the Quorum. In this folder some subfolders will be created. In these subfolders, information about each host will be tracked, along with global status and configurations.

- **esXpress_Quorum/Config** – When a Host is joined to the Quorum, it will keep a copy of its config file on the Quorum. The ability to globally edit config files is coming soon. This is setting up that new functionally. If you manually edit on of the Quorum config files for a host, the host will import those changes back to the host level automatically.
- **esXpress_Quorum/Hosts** – Every hour when the cronjob runs on the host it will update a file in this folder saying it is still alive. This file is based on the HostName and it contains the date and licensing information for the host.
- **esXpress_Quorum/Logs** – This folder will be used for global logging.
- **esXpress_Quorum/Mpath** – esXpress will track the changes to your Multi-Pathing for your storage. Every hour, the MPATH information will be dumped, if it has changed, then it will be logged to this folder. File created in this folder are by Date-HostName-mpath. Any time the MPATH changes a new file will be created.
- **esXpress_Quorum/Run** – This is the lock folder. When the Host is enabled for Quorum Locks, this is the folder that will be checked for locks. And when creating locks, this is where they will be created.
- **esXpress_Quorum/Update** – This is the update folder for the Quorum. By putting a new esXpress RPM in this folder, any host connected to the Quorum will find the new RPM, and update itself. Put a new esXpress RPM (such as esxpress-3.1-?-i386.rpm) in this folder. At the beginning of the next hour, and host with updates enabled, will find this RPM file and apply it to the host. When the host first sees the new RPM file, it will create a file based on the RPM-HOSTNAME.Working. Then the host will remove the existing RPMs and install what is in the Update folder. Then when the update is successful, the file will be renamed .OK, or .ERR if it fails.

Table 19: **esXpress Quorum Menu Options**

Option	Description	Function
U	Quorum Status	Current Quorum Status
C	Configure Quorum Options	Configure the esXpress Quorum Options
S	Search For esXpress Quorums	Search for existing esXpress Quorums
H	Help on esXpress Quorums	Displays additional help on esXpress Quorums.
Q	Quit	Quits Quorum and returns to Configuration Menu.

Quorum Configuration: U – Quorum Status

This shows the current status of the Quorum, if it is enabled and if the VMFS is set.

Quorum Configuration: C – Configure Quorum Options

There are a number of host level options which can be configured when setting up the esXpress Quorum. All of these options are found on the *Configure Quorum Options Menu.*

Table 20: **Configure Quorum Options**

Configure Quorum Option	Description
Enable_esXpress_Quorum_ (Yes/No)	To use the esXpress quorum features, this option must be enabled. Set to No by default.
Which_VMFS_to_use_for_Quorum_ (enter_twice)	Choose the VMFS to use for the esXpress Quorum. This should be a separate, designated VMFS for the quorum use. You can test the functionality with a shared LUN, but if you have more than a few ESX hosts, then a separate VMFS should be used and is the recommendation.
Allow_Auto_Updates_ (Yes/No)	When enabled, the esXpress Quorum will be checked for now esXpress RPM files when the hourly cron job runs. If any are found and esXpress backup are not currently running, the packages will be updated with the new version.
Dupe_Configuration_to_Quorum_ (Yes/No)	When enabled, the host will keep its esXpress configuration file (esxpress.cfg) in synch with the copy in the quorum. This is a pre-cursor option to global configuration management.

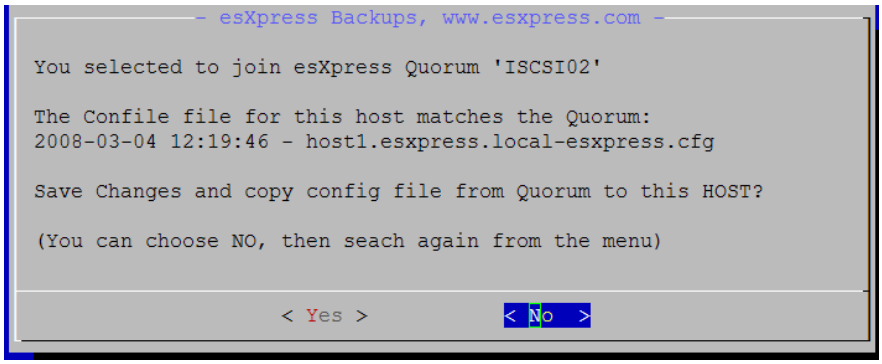
Configure Quorum Option	Description
Use_Quotrum_Lock_Files_ (Yes/No)	If enabled the ESX host will check the quorum for lock files and also have the ability to create quorum lock files. Use: ***phd lock quorum*** to set the Quorum lock Use: ***phd clear quorum*** to clear the Quorum lock
Track_mpath_Changes_ (Yes/No)	If enabled the Multi-Path configuration will checked every hour and logged if it changes.
Log_esXpress_to_Quorum_ (Yes/No)	Enabling this option will cause the esXpress log file (esxpress.log) to also be written to the quorum. This is one of the main reasons why it is recommended to create a separate LUN for the esXpress Quorum. *This option is CURRENTLY DISABLED.*
Rename_esXpress_GUI_Quorum_as_Needed_ (Yes/No)	If automatically renamed by vCenter, allow esXpress to rename the quorum file to its original name.
Refresh_esXpress_GUI_Quorum_VMFS_Names_ (Yes/No)	When set to Yes, the quorum will index the VMFS names automatically, every hour. If you have a large number of hosts using the same LUNs, this may result in backup performance issues. This is set to No, by default. You can index the VMFS names manually using the GUI appliance, Hosts page.

Quorum Configuration: S – Search for esXpress Quorums

When first entering the Quorum menu, you are asked if you want to search for existing esXpress Quorums. If you choose Yes, the VMFS will be searched for esXpress_Quorum folders. If any are found, they will be shown to you in a menu.

If you choose to join a Quorum, and a config file for the Host already exists, then it will be copied back down to the host. If you re-install a host, then install esXpress, all you need to do is rejoin the Quorum and your config file is back.

When you select a VMFS for the esXpress Quorum the following screen is shown to confirm that which this vmfs has been selected to join the esXpress Quorum. In this example the VMFS is ‘ISCS02’.



Select **Yes** to join to esXpress Quorum or **No** to return to the menu.

Configuration Menu: N – Edit Local VM Configuration

esXpress v3.1 provides a feature where you can set specific backup options per each virtual machine which will override the system default values. This is done using a local configuration file for each VM which is located in the phd folder under the folder where the VMX is located.

Note: From the command line you can use 'phd-edit' to edit a local VM Configuration.

This option also appears on the Maintenance Menu. See Chapter 6 esXpress Text Menu – Maintenance Menu for a detailed description of this option.

Configuration Menu: T - Configure Backup Targets

esXpress currently allows up to 9 network backup targets. The backup target configuration menu shows a summarized view of the 9 esXpress targets.

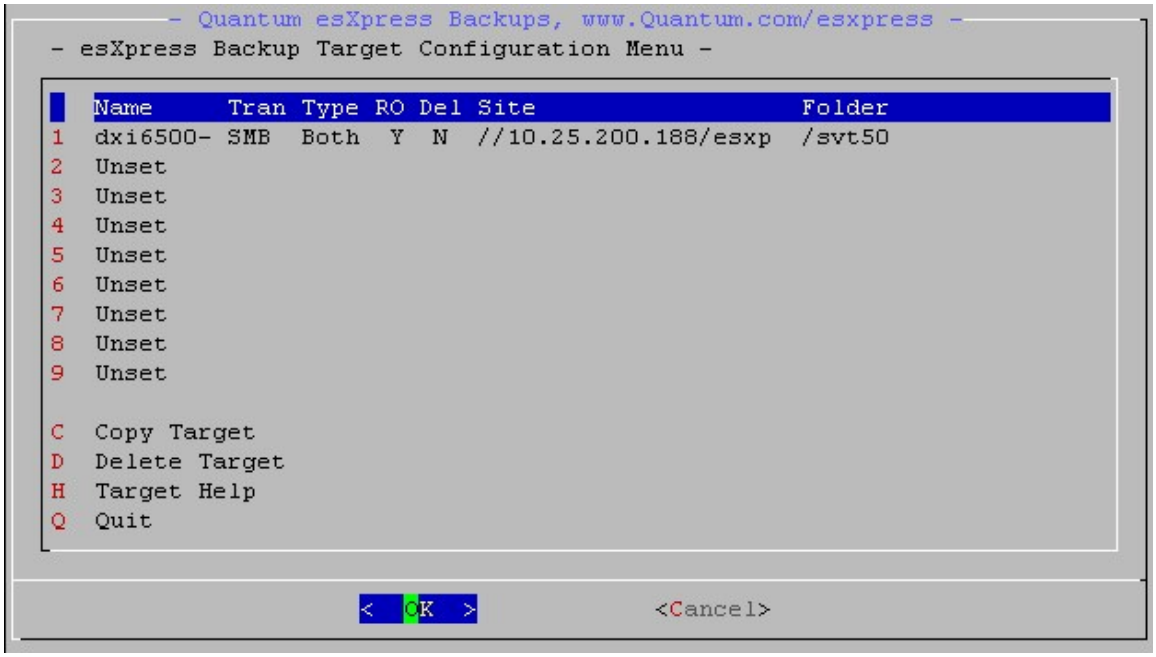


Table 21: **Backup Target Configuration Menu Options**

Option	Description	Function
#	(Targets)	Select a target to open the Target Configuration options menu.
C	Copy Target	Using the option you can copy all of the target configuration options from one backup target to another backup target. First select the source (copy from) target and then you select the destination (copy to) target. You must confirm the copy.
D	Delete Target	Clears the selected target configuration values previously entered.
H	Target Help	Shows the backup target help readme for esXpress v3.1
Q	Quit	Return to the Configuration menu.

Target Configuration Options

When adding a new target, the target configuration menu opens and contains the options shown in the following table.

Table 22: **Target Configuration Options**

Target Configuration Option	Description
Name_For_This_Target	You can defined a nickname or friendly name for each backup target. This name makes it easier to identify each of your backup targets.
Transport_Type_ (ssh/ftp/smb/phdd)	Currently supported backup transports are FTP, SSH and now with 3.1 also SMB. Between FTP and SSH, the faster is FTP, always. If you are using FTP and going to a windows server, make sure you use FileZilla, as IIS is not so great. FileZilla is the PHD/esXpress recommended windows FTP server. SMB tends to be slower than both FTP and SSH. EsXpress internal testing has shown it to be about half that of FTP. If you choose SMB as your transport type it is recommended to do a Backup in Test Mode (See Backup Mode Option) to test the expected backup speeds. However re-indexing the backup target has shown to be much faster than FTP.
Network_Port_ (21/22)	Set the network port. When you choose SSH or FTP the port will be changed for you, unless you configured it to be a number other than the normal 21 or 22.
Target_Type_ (Backup/Restore/Both)	Each backup target can be one of three types. **Both** - The Target is Both a Restore and a Backup Target **Backup** - This target will be used for backup only. For normal backups, you must have a Target set to Backup. This Target will not be indexed for restores. **Restore** - To restore an esXpress backup, the Restore targets are indexed, and any esXpress backups found (including version 2) are loaded into a database, that you can browse through the phd menu. If you have no target set to Restore, then you cannot restore backups. If you cannot find your backup when restoring, remember to re-index the Backup Targets.

Target Configuration Option	Description
Roll-Over_Target_ (Yes/No)	When normal backups run, be it nightly or a one-up, only Targets that have enabled Roll-Over are used. You must have a Backup Target configured for Roll-Over if you want to do backups. As the once a day backup runs, each VM is backed up. When a VBA is started it will look for a Backup Target to use. It will cycle through target 1 to target 9. The ones set for Backup and Roll-Over will be tried for backup. If the backup fails to the selected target, then the next Roll-Over target will be selected. Local CFG options will override and use the local configured Targets instead of the Roll-Over targets. *You must enable the Roll Over Backup Target field for the target to be considered for backups.*
Auto_Delete_ (Yes/No)	After a VMDK is backed up successfully (or before), the Backup Targets with Auto Delete are indexed, and the matching ones are deleted. The backups are matched by VM name and UUID, then the VMDK by SCSI ID and Name.
Target_IP_or_FQDN_or_//server/share	This is the Fully Qualified Domain Name (FQDN) or the IP Address is the backup target. Using the IP address is always better, as DNS can never cause you a problem. **Note:** If the target is defined as a SMB target this field is used differently. Here you would enter your server and share information. Format is //server/share
Backup_Folder_ (Start_with_/)	This is the backup folder to use on the NET target. Once connected to the FTP or SSH service, a change directory we be performed to this backup path. This path must exist on the backup server, it will not be created. It is must start with a '/' (slash). **Note:** The folder is an absolute path on the backup target. If you put '/' it means the '/' directory and not the current working directory (cwd).
User_Name_ (Admin_rights_Dom\Usr)	This is the username for the SSH or FTP service. Using Domain\User is OK, but funny characters in the User Name, such as Quotes, Dollar Signs and other symbols can cause problems.
User_Password_ (No_@_$_\)	This is the username for the SSH or FTP service. Using Domain\User is OK, but funny characters in the User Name, such as Quotes, Dollar Signs and other symbols can cause problems.

Backup Target Theory

For a target to be considered by esXpress as a backup target the following values must be set:

- Username
- Password
- IP/FQDN
- Rollover enabled
- transport type set to either Backup or Both

When setting up the Backup and Restore Targets, there are many different ways to get the result you need.

EXAMPLE 1, Simple Config

Target #1, Configure to your Backup/Restore share.

Target #2, Make it a dupe of the Target #1, this way esXpress will always try the Target #2 if there is a Failure for some reason.

EXAMPLE 2, More complex, a backup server with 2 mount points for backup space.

Target #1, Configure Host #1 to backup to Target #1, which is mount point #1.

Also make Target #1 a Backup Target Only Such as: /backups/1.

Target #2, Configure as a dupe to Target #1

Target #4, Configure Target #4 to be a Restore Target. This way you can see all the backups from all the mount points. Such as: /backups.

Now on another Host, you would configure the Backup Folder to the other mount point. Target #1, Configure Host #2 to backup to Target #1, which is mount point #2. Also make Target #1 a Backup Target Only Such as: /backups/2

Target #2, Configure as a dupe to Target #1. Target #4, Configure Target #4 to be a Restore Target. This way you can see all the backups from all the mount points. Such as: /backups.

You can send backups to different Backup Targets on different Backup Hosts, even the Fulls can be one place, and the Deltas on another. As long as esXpress can index the Restore Target, the backups can be restored.

Configuration Menu: C – Replication / Restore Options

The replication and restore options menu has all the options necessary for configuring simple replication, background restores and auto/mass restores.

Table 23: **Replication / Restore Options**

Replication/Restore Option	Description
Enable_Background_Restores_ (Yes/No)	This option must be enabled in order to run background restores. The phd_daemon must also be enabled.
How_many_concurrent_BG_Restores_to_Run_ (1-4)	Set the maximum amount of background restores that are allowed to run at one time. EsXpress allows up to 4 background restore jobs.
Index_Entire_VMFS_when_loading_Restore_DB_ (Yes/No)	When esXpress indexes the VMFS it is doing a du -a / VMFS and put the results in its database. This provides the names of the existing files. *If you are having issues try disabling this option. For large shares like NFS mounted in VMFS it can cause problems*
Index_VMFS_for_Backup_Archives_ (Yes/No)	Enabling this option will check the VMFS for backup archives when looking to restore.
Use_PHD_Quick_Restore_ (Yes/No)	Enabling this option will run a Quick Restore on replication. A quick restore will not skip NULL blocks on the restore and only restore actual data blocks.
Enable_Auto_Replication_ (Yes/No)	Setting this option to Yes will enable auto replication or simple replication.
Only_Inc_Restores_When_Replicating_ (Yes/No)	When set to Yes only incremental restores will run for replication. An incremental restore will inject only the changed blocks into the replicate to VMDK. **Note:** Incremental restores are only available for DeDup (PHDD) backups which are not supported in this version of the product.
Enable_In_Place_Restores_ (Yes/No)	Not a Quantum Supported feature.
Start_Replication_at_Time_ (0-23)	Defines which hour of the day, midnight (0) through 11 PM (23) that the esXpress replication process will start.

Replication/Restore Option	Description
Run_Replication_Every_x_Hours_ (1/2/4/8/12/24)	This option determines how often the esXpress replication process will run. Possible values in hours are : 1 – will replicate every hour 2 – will replicate every 2 hours 4 – will replicate every 4 hours 8 – will replicate every 8 hours (3 times a day) 12 – will replicate every 12 hours (twice a day) 24 – will replicate every 24 hours (once a day)
Default_VMFS_When_Loading_VM_ Names_ (enter_twice)	This option is looked at when esXpress loads the list of vmdks in the auto.vmdk file used when setting up replication. Here you set the correct vmfs to load them to. *For additional information on the auto.vmdk file and esXpress replication see the DR and Restore Guide which is published separately.*
Use_VBAs_to_do_acual_restore_ (Yes/No)	Setting this option enabled restores through the VBA (Virtual Backup Appliance) instead of doing a restore through the service console.
Set_Change_Block_Threshold_for_VBA_Restore_ (2000)	This value determines the threshold for when to do a VBA restore. This setting is in megabytes and determines the level of blocks to restore before using the VBA. The default is 2000 MB (2GB). You do not want to set this value too low as there is an overhead to start and stop the VBA so for a small amount of data to restore going through the console will be faster. **Note**: VBA Restores are available for DeDup backups Only
Force_In_Place_Restores_Always_ (Yes/No)	Not a Quantum supported feature.

Configuration Menu: M – Configure SMTP

esXpress includes the ability to send detailed status reports after the daily backup run, or after individual one-up backups. This also includes reports based on the archives on the Backup Targets.

Table 24: **Configure SMTP Menu Options**

Option	Description	Function
O	Configure SMTP Options	General SMTP configuration options.
S	Configure SMTP Server	Configuration options for defining the SMTP server esXpress will use when sending notification emails.
N	Test SMTP with Notify Status Script	This option will generate a test notification to validate if your SMTP configuration is setup properly.
F	Test SMTP with Backup Target Report	This will test your SMTP configuration using the Backup Target Report.
T	Tail Backup Log	Running live view of the esXpress backup log.
Q	Quit	Return to the Configuration menu.

SMTP Menu: O – Configure SMTP Options

The SMTP options include a number of specific settings to consider for your esXpress notifications controlling what kind of notifications and when to send them. All of these options are yes/no decisions, whether to enable or not each option. They include whether to send an email after each automatic backup run do you want restore queue emails.

Table 25: **Configure SMTP Options**

SMTP Option	Description
Send_Email_from_the_Console_ (Yes/No)	esXpress can send its emails from the console of the host or by using a VBA. When set to 'Yes' a VBA Helper will be built and turned on just to send an email. If no helpers are currently available (because they are all running) the email process will wait until one is available. Q: Why send emails from a VBA? A: Because your console cannot see the network your SMTP server is on, or because of security policies. In the Helper Options, then for Email Helpers are the options to configure when using a VBA to send the esXpress emails. You can even use a different Virtual Network (instead of the backup network) to send the email from the VBA. Sending from the console is easiest but sometimes not possible. If you choose to send the emails from the console an outbound hole in the Host firewall will be opened to the SMTP server. (That is unless you are running esXpress in Secure Mode).
Include_Host_Name_in_Subject_ (Yes/No)	With this option set to 'Yes' esXpress will put the ESX Host Name that is running the backups in the subject line of the notification email. Example (where HOST-01 is the ESX Host Name): Subject: esXpress: HOST-01, ALL GOOD TODAY, STATUS, BACKUP REPORT (3.117
Send_Log_As_Attached_PDF_File_ (Yes/No)	Enabling this option will send your backup report as a PDF attachment. If this option is set to No then the report will be text within the email body. If you enable this option you can set the report to be either landscape or portrait using the 'Send Status PDF Mode' option explained below.
Send_Nothing_To_Backup_Email_ (Yes/No)	Every day the esXpress cron job runs and selects the VMs to backup. Sometimes you might not have any VMs to backup. When this happens, esXpress will send an email with the subject 'Nothing to Backup' to let you know. By default this is 'Yes', and this notice email will be sent when there is nothing selected to be backed up. Set to 'No' if you do not want to receive this email notification.

SMTP Option	Description
Send_Status_Email_After_Backup_Runs_ (Yes/No/Error)	After the daily backups run or after the running the Backup All command, esXpress will send an email with the backup status and backup report. These are the emails that tell you if the backup was ALL GOOD, had a WARNING or an ERROR status. This status is part of the subject line. **Yes** – The default setting which will enable a backup status email to be sent after the automatic backup or backup all occurs. **No** – When set to 'No' the backup status email will not be generated and sent. **Error** - Do not send the backup status email if the status is 'All Good'. Only send on errors and warning.
Send_Backup_Target_Report_After_Backup_Runs_ (Yes/No)	After the daily backup runs or after running the Backup All command, esXpress will send an email with the stats from the Backup Targets. This is based on the backup archives found on the backup targets when selected for restore. The Backup Target report is run from the same database that you use when doing a restore. If the backup archives are not shown in the restore menus then they will not be included in this report. **Yes** - Send the Backup Target report after a Backup All. **No** - Do not send the Backup Target report. This is the default. Normally you would only set one host or two for this report. Enable this option on the slowest host you have, this way you get the Backup Target report after all the backups are basically done for the day. The subject for this report is: 'Backup Target Report' This report package is made up of six basic reports. 1. Archive Summary per Backup Target. 2. Summary report by each Date, sorted by Date Descending. 3. Delta backups that do not have a matching Full backup. 4. Summary report for each VM by VMDK. Sorted by VM NAME / VMDK File. 5. Summary report for each VM, sorted by VM NAME. 6. Summary report for each VMDK, sorted by the VMDK name. Report 5 and 6 are also included sorted by Last Backup Date descending and by Largest Used Size descending.

SMTP Option	Description
Send_Email_From_Restore_Queue_Console_Only_ (Yes/No)	When you are doing restores through the Background Backup Queue, you will get an email notification at the end of the restore process. You only get the email on restores run through the queue. You will not get an email for restores that you do in the foreground. This report is the summary of who and when the restore job was submitted and the complete output from the restore process. This is the same as what you see when running a restore in the foreground.
Send_VM_Email_On-One-Up_Backup_Console_Only_ (Yes/No)	When this option is set to yes an email notification will be sent when a special one-backup is run. This email is sent from the console only and cannot be sent from the VBA.
Send_VM_Email_On_ERROR_Backup_Console_Only_ (Yes/No)	This is similar to the previous option for One-Up email notifications. When enabled a VM backup status email (like in the previous option) will be sent if a VM backup has an ERROR status. **Yes** - Send One-Up emails if a VM backup gets an ERROR. **No** - Do not force sending a One-Up email on errors. If this is enabled, and the Backup All is running, you will get an email notification for any VM that fails a backup with an ERROR status. This allows you to know early in the backup run about a failure so you can fix it before the entire run fails.
Send_Status_PDFs_Mode_ (Landscape/Portrait)	If you have 'Send log as attached PDF file' enabled you can designate whether you wish them to be either landscape or portrait with this option.

SMTP Menu: S – Configure SMTP Server

These are the configuration options needed to tell esXpress which SMTP to use and to which email addresses the notification emails will be sent to.

Table 26: **SMTP Server Options**

SMTP Server Option	Description
SMTP_Relay_Server_ (IP/FQDN)	This is the SMTP server you which to use for relaying the esXpress notification emails. You can enter either an IP address or a server name.
SMTP_Port_ (default_25)	Enter the port used on SMTP relay server. EsXpress will default to port 25.
Use_This_From_Email_Address	For the notification emails generated by esXpress this email address will show are the From Address.

SMTP Server Option	Description
Include_Host_Name_in_Subject_ (Yes/No)	When the esXpress emails are sent, you can configure the From and To variables for the email. In addition you can also include the host name in the email subject. This is not the complete hostname, but only the first part of it. When set to 'Yes', the email subject will include the host name 'Host1'. Example: esXpress: Host1, Backup Report
Use_This_From_Display_Name	This tells esXpress what to use for the display name for the backup notification emails generated.
Enable_SMTP_Authorization_ (Yes/No)	For some email servers in order to relay mail you have to authenticate. The option tells esXpress that email authorization is required. If your environment requires this then select 'Yes'.
SMTP_Authorization_Method_ (Plain/Logic)	Sets the authorization method as either plain or login.
SMTP_User_Name	This is the SMTP user to be used for authentication to your SMTP relay server. This option is only used if enable SMTP authorization is set to yes.
SMTP_Password	This is the password to be used for authentication to your SMTP relay server. This option is only used if enable SMTP authorization is set to yes.
Send_To_Email_Address_#	esXpress allows for backup notification emails to be sent to up to 5 email addresses. Enter the addresses for to receive the esXpress emails. Only enter one email per line and each email will be sent individually to each recipient. There are no carbon copies.

SMTP Menu: N – Test SMTP with Notify Status Script

This option tests your SMTP server configuration by running the Notify status script. You are first prompted whether to run the test. After a successful test, you will receive an email.

A Sample Status Email

The status email includes all the virtual machines that were backed up today, and whether that backup was good '**OK**' or there was an error '**ERR**'. For each VMDK of each VM you are told if it was a FULL or an INDEX (Delta) backup along with stats for each. At the end of the daily backup run you are given total stats for the entire run if you have this enabled.

If you are backing up virtual machines multiple times a day (by using the control codes such as [x3] in the VM display name) you will get this report emailed to you at the end of each backup run.

SMTP Menu: F – Test SMTP with Backup Target Report

This option can also be used to test your SMTP esXpress configuration. It works exactly as the test using the 'Notify Status Script' except it will use the 'Backup Target Report'.

If this test does work properly then check you SMTP configuration settings for any errors and then retry the test.

SMTP Menu: T - Tail Backup Log

The Tail Backup Log option is a real time log viewer. It shows each operation of the backup as it happens. This screen is not scrollable vertically—use the Log Viewer to view the complete log. You can scroll this screen horizontally with the left and right arrow keys.

Configuration Menu: L - Configure License Menu

This menu is used to configure your esXpress plug in license.

Delta Backups and Encryption are two esXpress licensed feature plug-ins. If you are beyond the DEMO period, you must have a proper License Code or you will not be able to encrypt your backups or do Delta backups. All backups beyond the DEMO period will be un-encrypted Full backups.

If you created backups using Delta's and Encryption before the DEMO period expires, you can still extract and restore your backups. The licenses codes are only for making backups, not restoring.

Table 27: **License Menu Options**

Option	Description	Function
L	Configure License Key	Enter your esXpress license.
C	Copy License file from another host.	This will transfer (via SCP) the license data file from another host.
Q	Quit	Return to the Configuration menu.

License Menu: L – Configure License Key

Your license key is based upon your Company name, Phone Number, a License ID that is given to you and a checksum. Your license status is shown on the top.

Enter your License Code as supplied by PHD. You can enter it in any case (lower/upper) as it will be converted to all to upper case. The License data is case-insensitive.

Once you enter a good License key, the License Type will be shown at the top of the menu along with expiration date of the plug ins.

The LICENSE_ID field shows the expiration date, the number of hosts this license is good for, and the license type.

License Type will show the expiration date for support and the type of license.

5 esXpress Text Menu - Reports Menu

Use the Reports Menu to view all of the esXpress logs and backup reports.

Backup target reports can assist you in managing the space and backups stored on the various esXpress backup targets

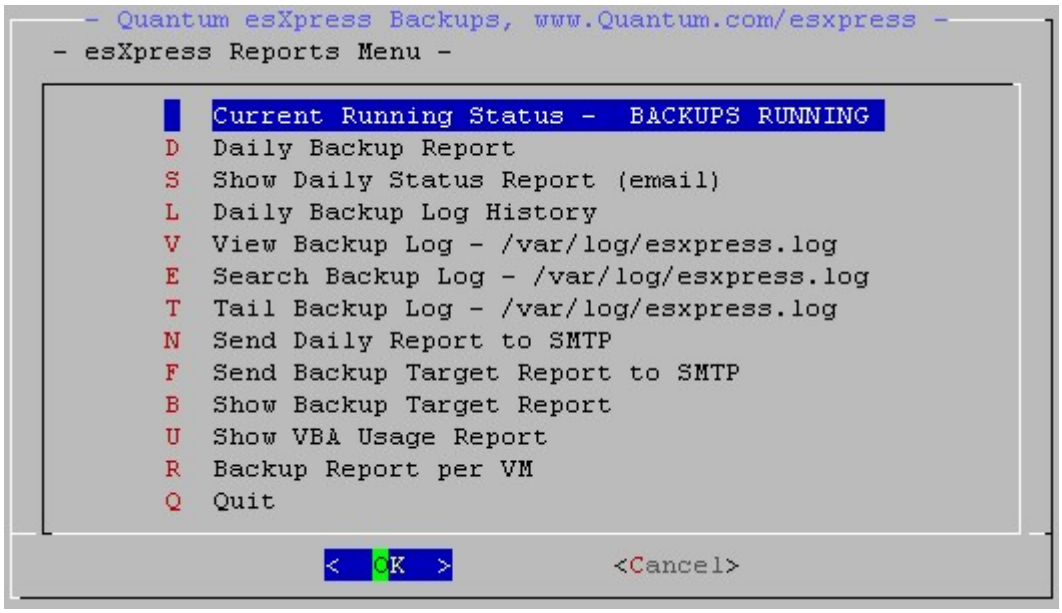


Table 28: **Reports Menu Options**

Option	Description	Function
	Current Running Status	Shows current status of esXpress backups
D	Daily Backup Report	Displays Daily Backup Report
S	Show Daily Status Report	Displays the Daily emailed Status Report
L	Daily Backup Log History	View Daily Backup Log
V	View Daily Backup Log History	View esXpress log - /var/log/esxpress.log
E	Search Backup Log	Search function for - /var/log/esxpress.log
T	Tail Backup Log	Displays last messages of /var/log/esxpress.log

Option	Description	Function
N	Send Daily Report to SMTP	Runs Daily Report and sends it to SMTP
F	Send Backup Target Report to SMTP	Run Backup Target Report and sends it to SMTP
B	Show Backup Target Report	Displays Backup Target Report
U	Show VBA Usage Report	Displays the VBA Usage Report
R	Backup Report per VM	Show Backup Reports for each VM
Q	Quit	Return to the Main Menu.

Reports Menu: – Current Running Status

The menu option is the same as the Current Status from the main menu.

Reports Menu: D – Daily Backup Report

This menu option is the same as the Daily Backup Report from the main menu.

Reports Menu: S – Show Daily Status Report (email)

This report is the summary of all virtual machines that has been backed up. This report can be emailed as the Daily Status Report. It places a copy of the report to /tmp/estatus.txt. A .PDF copy of this report is saved to /tmp/estatus.pdf.

Reports Menu: L – Daily Backup Log History

View the daily backup log history report (esxpress.daily.log).

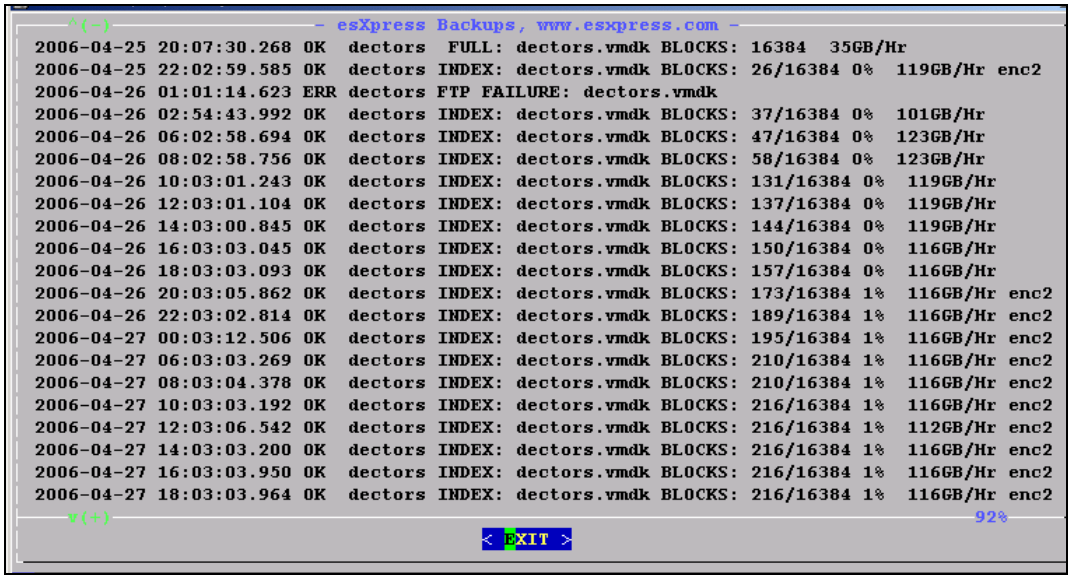
Reports Menu: V – View Backup Log - /var/log/esxpress.log

The View backup log window is a fully scrollable view of the esXpress log file. It uses the Linux editor nano in view only mode. To exit enter '^X' (Control-X). All actions are stored in this log. Everything in the Daily Backup Report and all configuration changes are logged here.

Reports Menu: E – Search Backup Log - /var/log/esxpress.log

The search feature will search the backup log and allow you to see the complete backup history of any VM. You can also search for other types of messages in the backup log.

For example, if you searched the log for the **dectors** VM you might see the following result.



In the example above, the first entry shows that on April 25, 8:07pm, a FULL backup of the server **dectors** was made. The VMDK size is 16,384 blocks, or 4GB (esXpress uses 256k blocks. Blocks / 4 = Megabytes). The average throughput of the backup was 35 GB/hour. This Full backup was not encrypted.

The second entry shows the first INDEX backup of this server. It was also performed April 25, but at 10:02pm. You can also see there were 26 blocks that had changed out of the 16,384 blocks that make up the VMDK file for this virtual machine. The esXpress computed and extracted those 26 blocks at an average speed of 119 GB/hour, or almost 4 times faster than a Full backup, and stored in less than 1% of the original Full backup space. This INDEX backup was encrypted with two passwords.

The log search also shows us that on April 26 at 01:01am the backup failed with a FTP error.

These backups were performed on a 100mb network.

Notice as the Index backups are made, the number of delta blocks increase in each backup. They start out at 26, and get up to 216.

After the list of VMs on the host, other search options are listed. You can search the log for these actions, such as Errors, Warnings, Backup Total, and Thresholds.

Reports Menu: T – Tail Backup Log

This is the same as the Tail Backup Log from Main Menu.

Reports Menu: N- Send Daily Report to SMTP

This is the same as Test SMTP with Notify Status Script.

Reports Menu: F – Send Backup Target Report to SMTP

Use this option to generate the backup target report and email it to the email addresses defined for esXpress.

Reports Menu: B – Show Backup Target Reports

Create the various backup target reports and provides the ability to view the reports on-line. Prior to running the report the backup targets may need to be indexed which could take a few minutes.

The report has a number of sections to it showing the target data in a variety of formats and sorting.

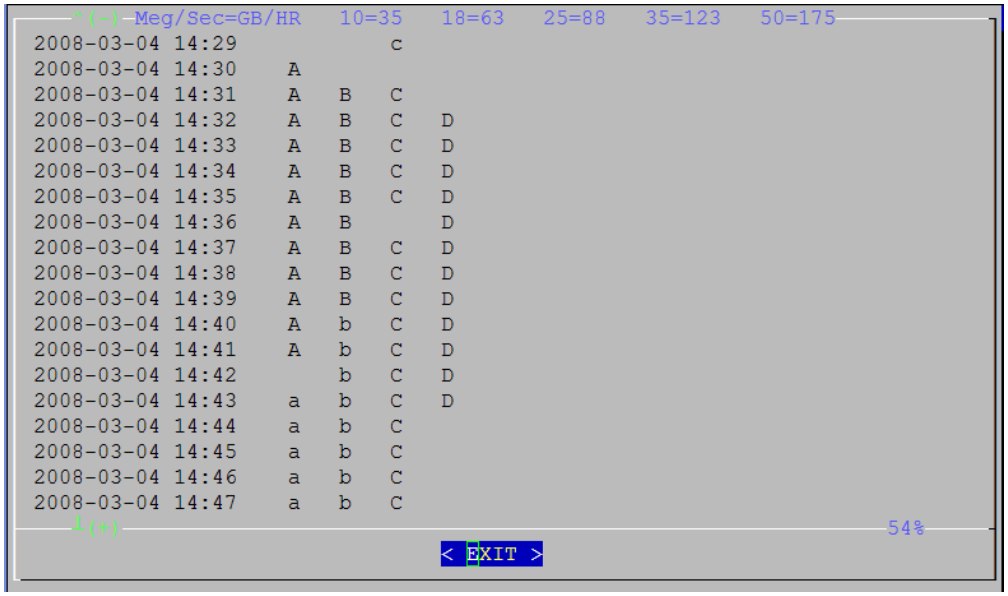
Formats and sorting included in the report:

- By each target, sorted by Alphabetical
- By each Date, sorted by Date Descending
- Delta Backups without a matching Full
- VMFS snapshot report for VMFS folders
- By VM/VMDK, sorted by Alphabetical
- By Virtual Machine, sorted by Alphabetical
- By VMDK, sorted by Alphabetical
- By Target, sorted by Last Backup Date Descending
- By Virtual, Machine sorted by Last Backup Date Descending
- By VMDK, sorted by Last Backup Date Descending
- By Virtual, Machine sorted by Total Size Descending
- By VMDK, sorted by Total Size Descending

Reports Menu: U – Show VBA Usage Report

This option will create a new VBA usage report. The report will show what VBAs are running at any given time.

In the sample VBA usage report below you can see that 4 helpers (A,B,C,D) were running at the same time between 14:32 and 14:35. Each letter entry indicates a message was written to the esXpress log for that helper.



When a helper indicator letter changes from a capital to lowercase or vice versa, this indicates that the helper is now backing up a new VMDK. In the figure above Helper A ends its backup at 14:41 (note the capital letter A) and then starts a new VMDK backup at 14:43 (note the lowercase letter a).

Reports Menu: R – Backup Report per VM

Use this option to view the daily report for each virtual machine that is being backed up on the host. Select the VM you want to view a daily backup report for and with OK highlighted, hit Enter to view the report.

Main Menu: E – Restoration

The Restoration menu contains all of the restore and replication options. For details about restoring backups, see the Quantum esXpress Restoration and Disaster Recovery Guide.

Table 29: **Restore Menu Options**

Option	Function	Description
C	Restore through the ESX Console	Start a VMDK restore through the ESX console.
X	VMX Restore through the ESX Console	Restore a VMX file through the ESX console.
B	Background Restore Status	Check and monitor background restore queue.
R	Replication Actions	Replication tasks.
L	BG Lock Status -	Control the current lock status.
T	Tail esXpress Log	Real time view of running esXpress log.
I	Re-Index NET and VMFS Backup Targets	Re-Index all available backup targets.
S	Create a STUB File for an existing VMDK	Creates a stub file for an existing VMDK to be used for GSX or VMware Server.
H	Help on Restores (Updated)	esXpress restore Help File.
A	Abort to esXpress Main Menu	Abort and return to the esXpress Main Menu
Q	Quit to esXpress Main Menu	Quite Menu

6 esXpress Text Menu - Maintenance Menu

The Maintenance Menu contains a number of esXpress general system options to assist with maintaining, testing and validating your overall esXpress installation. Included in these options are validating snapshots, re-indexing and trimming backup targets and testing your SMTP setup.

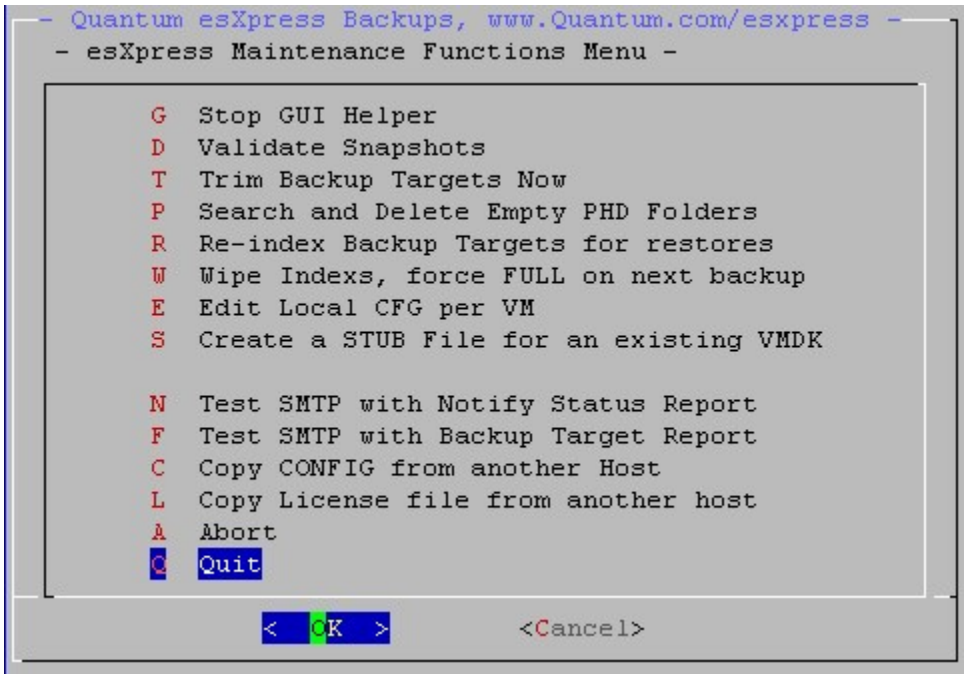


Table 30: **Maintenance Menu Options**

Option	Description	Function
G	Stop GUI Helper	Stop the GUI helper virtual machine. *In esXpress 3.5 the GUI helper is not used.*
D	Validate Snapshots	Validates all snapshots and reports any errors
T	Trim Backup Targets Now	Initiates a trim of the configured backup targets.
P	Search and Delete Empty PHD Folders	Deletes and empty PHD folders found on the VMFS.

Option	Description	Function
R	Re-index Backup Targets for restores	Re-Index all backup targets
W	Wipe Indexes, force Full on next backup	Wipes all indexes from the ESX host
E	Edit Local CFG per VM	Enables editing of local VM configuration files.
S	Create a STUB File for an existing VMDK	Creates Stub for using ESX VMDK files with GSX and Server.
N	Test SMTP with Notify Status Script	This option will generate a test notification to validate if your SMTP configuration is setup properly
F	Test SMTP with Backup Target Report	This option will generate a test notification using the Backup Target Report to validate if SMTP configuration is setup properly
C	Copy Config from another Host	Copy the configuration file from another host.
L	Copy License File from another host	This will copy the license via SCP from another host to this host
A	Abort	Abort Maintenance Menu
Q	Quit	Quit Menu

Maintenance Menu: G – Stop GUI Helper

Note: As of esXpress 3.5, the GUI Helper is no longer used.

Maintenance Menu: D – Validate Snapshots

This command will go out and search the /vmfs/volumes for all VMX files. For each VMX found the vsmd file will be validated against what is known about the snapshots. By default only problems will be reported.

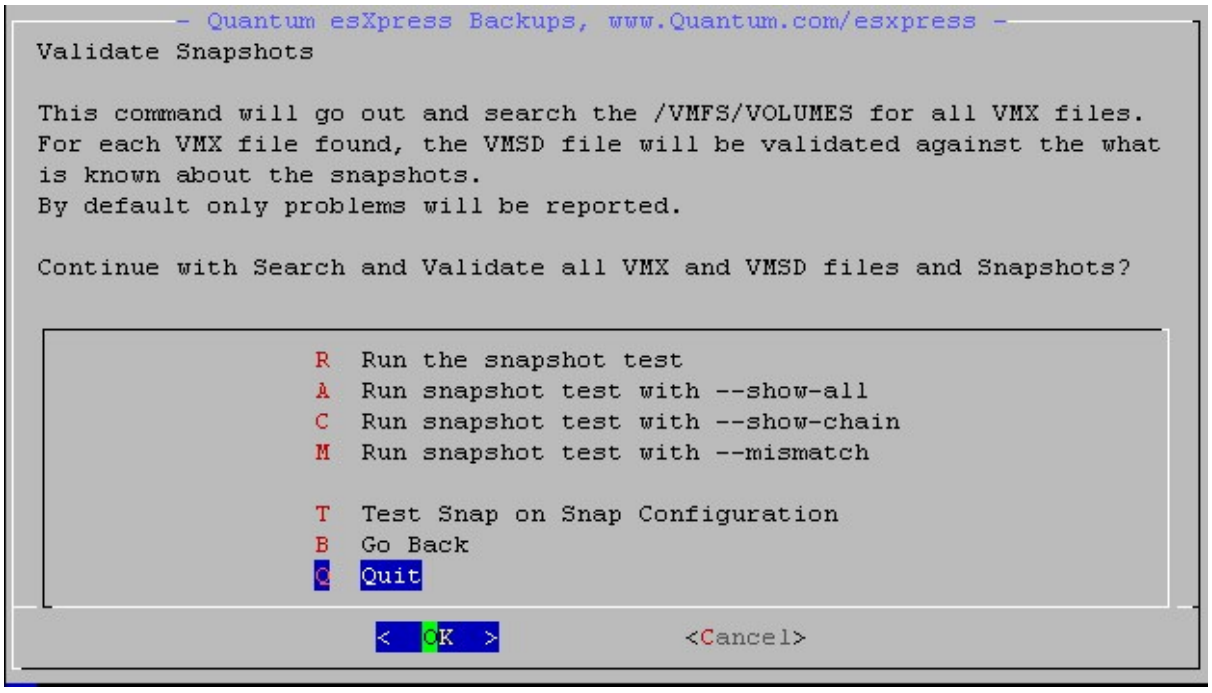


Table 31: **Validate Snapshot Options**

Option	Description	Function
R	Run the snapshot test	This will run the esXpress snapshot test. It will search the /vmfs for all found VMX files looking for any snapshot problems. By default only warning and errors will be shown.
A	Run snapshot test with --show –all	The --show-all option will show all of the virtual machines found on the VMFS whether there is a snapshot issue or not.
C	Run snapshot test with –show -chain	The –show-chain option will show all snapshots for a virtual machine if it has snapshots attached to it. Running with this option will also enable the –show-all option.

Option	Description	Function
M	Run snapshot test with –mismatch	The –mismatch option will show you the details of a virtual machine when the current VMDK in the VMSD file does not match the current VMDK in the VMX file. Running with this option will also enable the –show-all option.
T	Test Snap on Snap Configuration	When this command is run, esXpress will test the configuration options, specifically the authentication settings, you have set up for running in snapshot on snapshot mode. It is recommended to test you configuration settings before running in snapshot on snapshot backups.
B	Go Back	Return to the Maintenance Menu.
Q	Quit	Quit and return to the Maintenance Menu.

Maintenance Menu: T – Trim Backup Targets Now

esXpress provides the ability to trim your backup targets. Using this command esXpress will index all of the backup targets set for Roll-Over and Auto Delete and then will delete old backups against all unique VMs found. A unique VM is defined by the VM name and the UUID. The default system options defined in the configuration for auto-deletes will be used in determining which esXpress backup archives to delete from the target.

Table 32: **Trim Backup Targets Now Menu Options**

Option	Description	Function
T	Just index and Show list of VMs	This will run a test of what would occur if you trimmed your backup targets. It will index the backup targets and show which delete commands it will run. *It is a good idea to run this test before doing an actual trim.*
D	Delete from Targets Now (Follows Atup-Delete options)	Initiates an auto-delete or trim of your defined backup targets. The auto-delete will follow all of the rules you have defined in the Auto-Delete configuration options. *See that section of this manual for additional information regarding those options.*

Option	Description	Function
U	IGNORE UUID and Delete from Targets Now (Follows Auto-Delete options)	Deletes are based on finding virtual machine matches on the backup targets. Normally these matches are done using the VM name (folder name) and the VM UUID (*Universally Unique Identifier*). If you want to initiate an auto-delete and only match against the VM name, ignoring the UUID then you would run this option as opposed to the delete option described above. All rules follow the Auto-Delete configuration options defined. *See that section of this manual for additional information regarding those options.*
B	Go Back	Return to the Maintenance Menu.
Q	Quit	Quits the Trim menu and returns to the Maintenance Menu.

Maintenance Menu: P – Search & Delete empty PHD folders

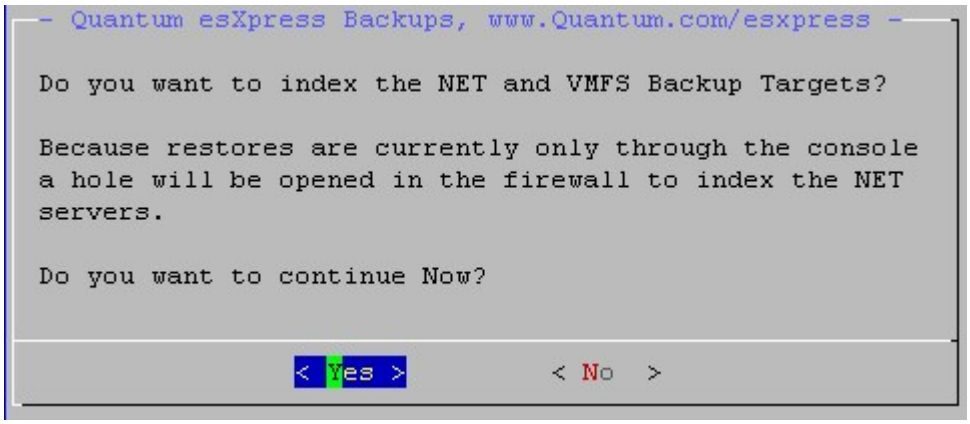
This option will clean up your VMFS for any leftover folders with nothing other than the esXpress 'phd' folder. This can happen if you se VC to delete a VM from your host. The 'phd' folder is where esXpress stores the index of each VMDK along with the local options about each specific VM.

Table 33: **Search and Delete empty folders Menu Options**

Option	Description	Function
T	Test Search and Delete	Running this option will run a test of the delete empty folder function. It is a good idea to run the test before actually doing the search and delete.
D	Search and Delete Now	Choosing this option will run the search of your VMFS and delete/remove and empty PHD folders.
B	Go Back	Return to the Maintenance Menu.
Q	Quit	Quits the Trim menu and returns to the Maintenance Menu.

Maintenance Menu: R – Re-index Backup Targets for restores

Re-index backup targets for restores. This will open a hole in the firewall to index the NET servers.



Maintenance Menu: W – Wipe Indexes, force Full on next backup

This option provides any easy method to set your ESX host to perform a Full backup for all of its registered virtual machines the next time the esXpress automatic backups run. The wipe index function will delete all existing Index files from the PHD folder on the VMFS for each registered VM found. You must confirm your intention to wipe all indexes

Maintenance Menu: E – Edit Local CFG per VM

esXpress provides a feature where you can set specific backup options per each virtual machine which will override the system default values. This is done by using a local configuration file for each VM which is located within the PHD folder under the folder where the VMX is located.

Maintenance Menu: S – Create a STUB File for an existing VMDK

Option ‘S’ will create a STUB file that will allow you to use your ESX VMDK file directly with other VMware products such as GSX or Server.

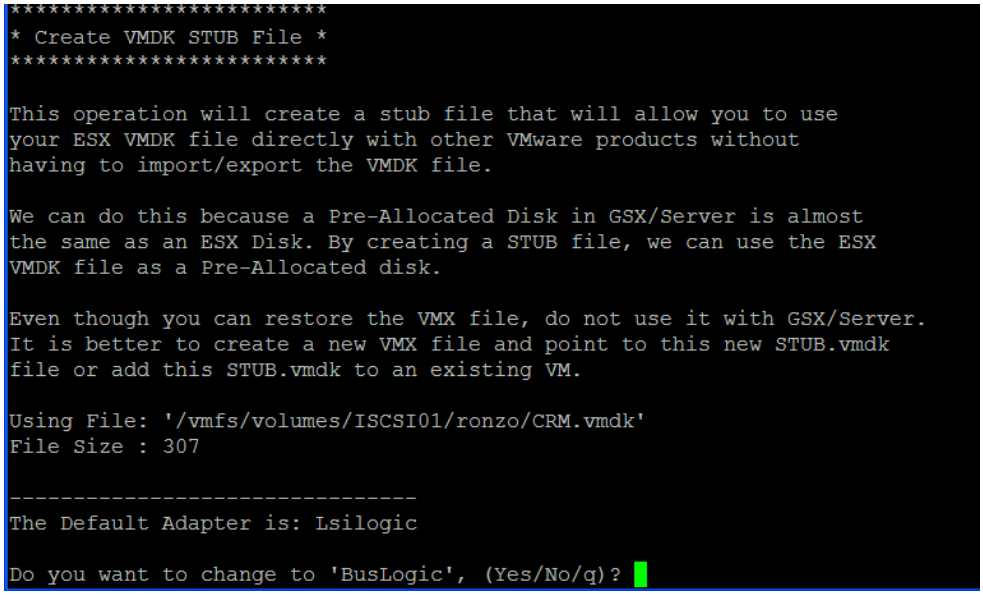
There is very little difference between a pre-allocated disk in GSX/Server and an ESX VMDK file. If you were to create a stub file for an ESX VMDK file, then you can use it with GSX/Server. Boot up and run your ESX VMs directly or just add the ESX VMDK to an existing machine to recover files. You do not have to do any importing or exporting of the VMDK.

Your FTP backup server can be used to bring up VMs or restore data from VMDKs very easily. Even if your backup server is Windows, you can install CYGWIN, and still do esXpress restores and run the Delta VMDKs to restore them.

When running option ‘**C**’, you are presented with another menu.

Option 1, will let you point to any file and create a STUB file for it. You will have to enter the complete path for the file.

Option 2, will create a STUB file based upon the last backup that was restored. Either option will bring you to the create STUB file, as shown in the following figure.



At this point, enter ‘**q**’ to quit, or enter ‘**yes**’ to create the STUB file using ‘lsilogic’. If you enter ‘**no**’, the ‘Buslogic’ will be used for the STUB file.

After the STUB file is created, you can point to it as an existing disk, and use your ESX VMDK directly.

Maintenance Menu: T – Test SMTP with Notify Status Script

This option tests your SMTP server configuration by running the Notify status script. It is the same option that also is on the SMTP Configuration Menu. See that section of this manual for additional information on this option.

Maintenance Menu: F – Test SMTP with Notify Status Script with Backup Target Report

This option tests your SMTP server configuration by running the Notify status script. It is the same option that also is on the SMTP Configuration Menu. However the test notification will be send with the Backup Target Report attached.

Maintenance Menu: C - Copy CONFIG from another Host

Rather than entering all the configuration data manually, you can copy the data from another configured host.

If the software has been reinstalled or upgraded, there will be a copy of the previous configuration file saved as /etc/phd/config.old. If you select this option and the old config. file exists, you will be prompted to import these values instead. Selecting **Yes** will import the values return to the Configuration menu.

You can also import the previous settings directly from the command line by typing: **'phd import'**

By selecting **No**, the program will attempt to use scp to copy the configuration file from another host and do so as user **root**. You must know the root password of the host you are trying to copy from.

The program will prompt for a host name or IP address

If this is the first time this host is connecting to the source host, you will be prompted to continue. Answer **Yes** to continue. The program will proceed to download the configuration file from the source host. When complete, the progress bar should show 100% complete.

After verifying the download was successful, press **Enter** to return to the Configuration menu.

Maintenance Menu: L - Copy License File from another Host

With this option you can copy a license file from another of your hosts running esXpress. It will attempt to scp as the current user which is Root. When prompted you can change to a different user. You also must enter the host from which you are copying the license file from.

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