

TeraStation User Manual

TS-XL/R5, TS-RXL/R5, and TS-WXL/R1 models

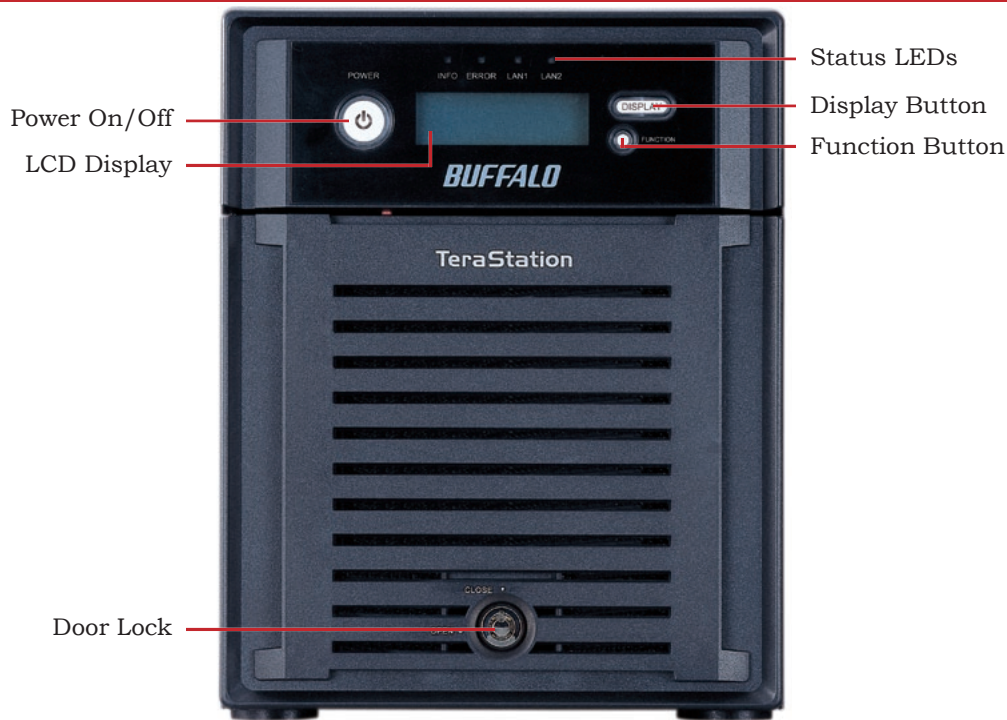


Congratulations on your new TeraStation! The TeraStation is a powerful file server that's as easy to use as a hard drive. With its straightforward Web Admin Tool, anyone can easily configure the TeraStation's settings. You don't even necessarily need to configure it at all; right out of the box it's ready to be plugged in and put to work. But the TeraStation remains a fast, reliable, Linux-based server, with multiple hard drives that may be configured in RAID arrays. This user manual is intended to assist you in configuring your new TeraStation.

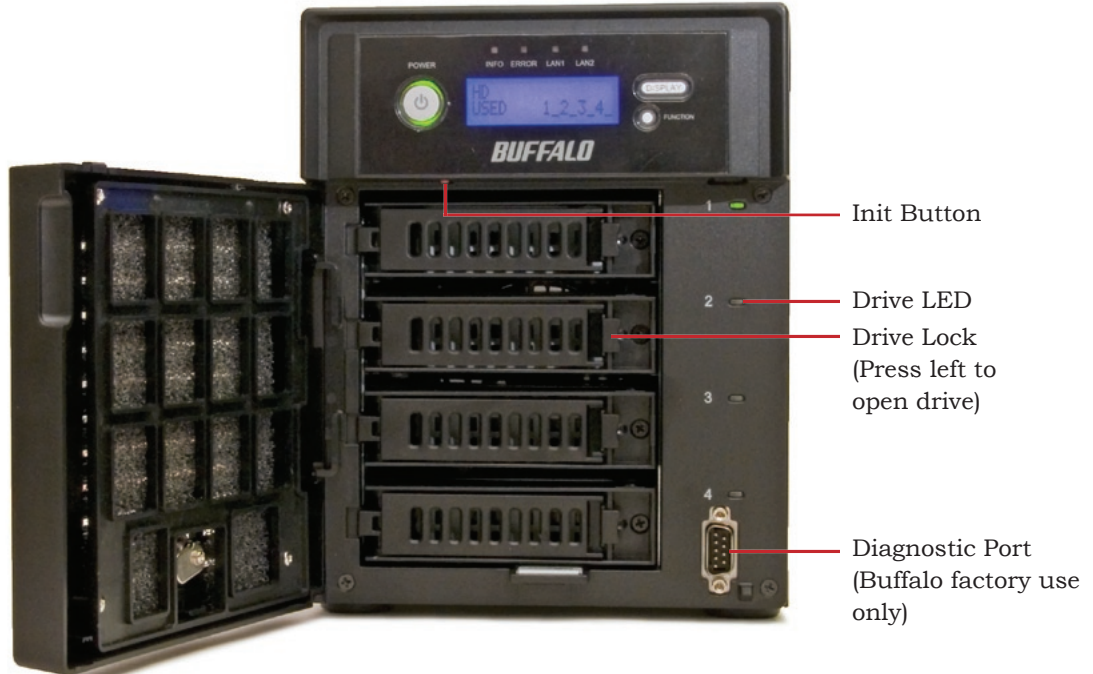
Because we're constantly updating our product, the images and text in this manual may vary slightly from the images and text displayed by your TeraStation. These changes are minor and should not affect the ease of setup adversely. As time passes, future user interfaces, updated software, and later versions of this manual may be freely available for download at our web site: <http://www.buffalotech.com>.

Introduction		Encryption	42
Diagrams and Layout	4	Adding Shares	43
TS-XL/R5	4	Mapping Additional Shares	46
TS-WXL/R1	7	TeraSearch	48
TS-RXL/R5	10	Maintenance	51
Power Mode	13	Replication	52
Using your TeraStation		Backup Jobs	53
Using your TeraStation with a PC	14	Initialization	54
Using your TeraStation with a Mac	17	NS-SHFT	57
Finding your TeraStation's IP address	20	EXT3 Reader	59
Settings and Configuration		UPS	60
Web Admin Tool	21	Extensions	
Users/Groups		Sleep Timer	61
Adding Users	24	Print Server	62
Adding Groups	27	Time Machine	66
Disk Quotas	28	DLNA Media Server	71
Network		Bittorrent Client	73
Settings	29	Direct Copy	75
Port Trunking	30	Remote Access	
Workgroup/Domain	32	WebAccess	76
NFS	34	FTP	81
DFS	35	Troubleshooting	
System		Error codes	82
Settings	36	Troubleshooting Multiple Shares	84
Disks		Replacing a Hard Drive	86
RAID Configuration	37	Appendix	
Hot Spare	39	Specifications	88
Hot Swap	40	Factory Defaults	89
USB Hard Drives	41	Contact Information	90
Formatting Hard Drives	42	GPL Information	91

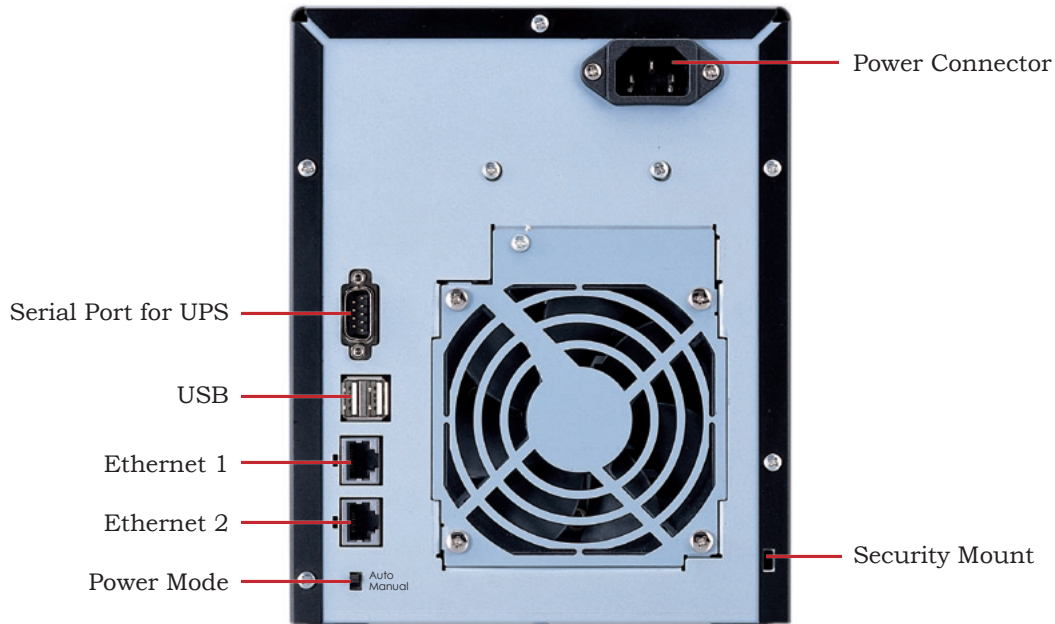
Front Panel (TS-XL/R5)



Open Front Panel (TS-XL/R5)



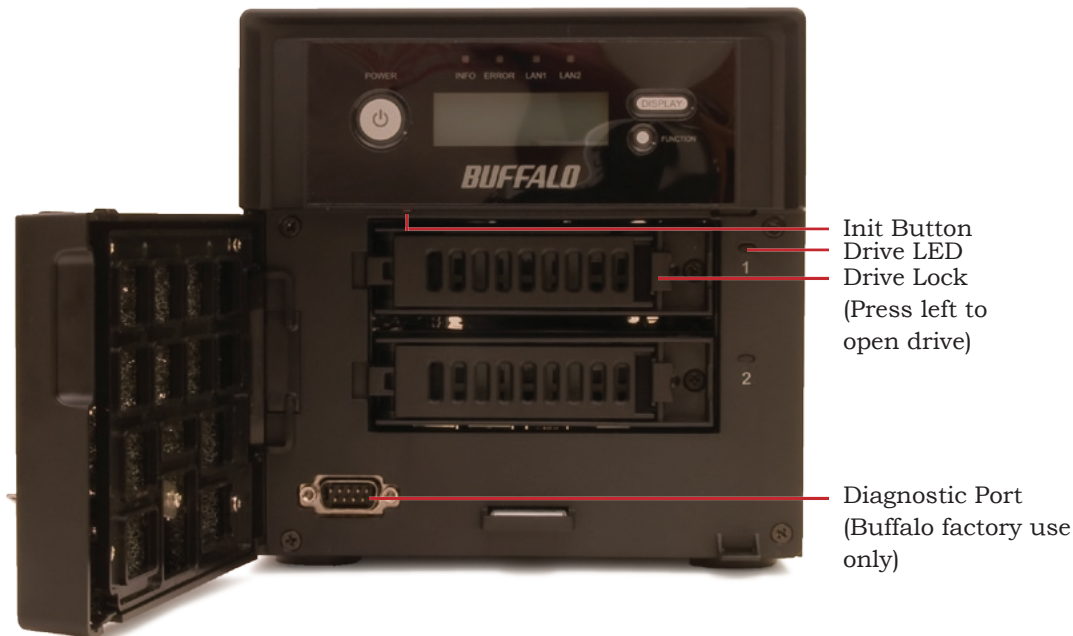
Rear Panel (TS-XL/R5)



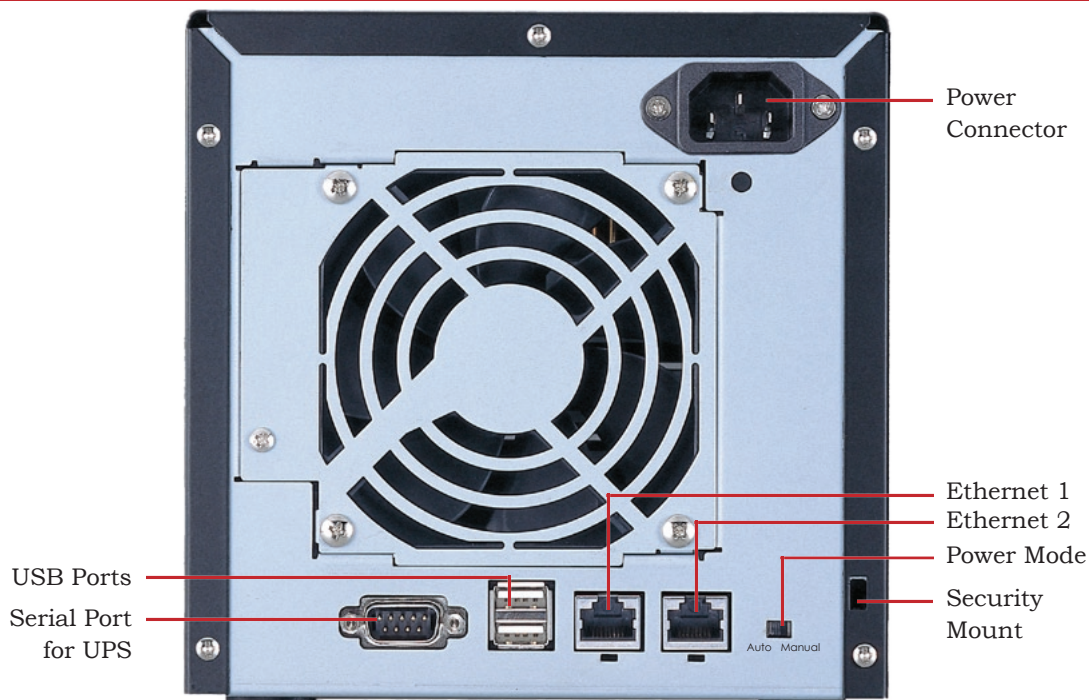
Front Panel (TS-WXL/R1)



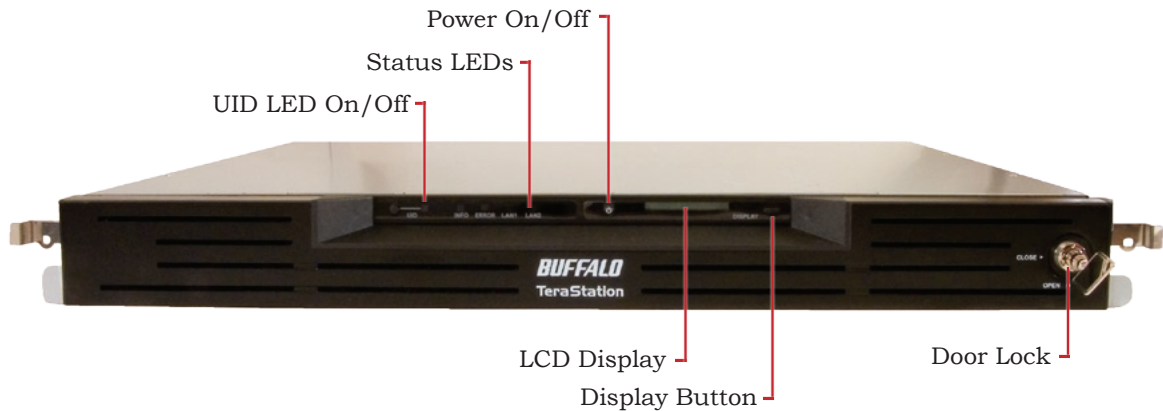
Open Front Panel (TS-WXL/R1)



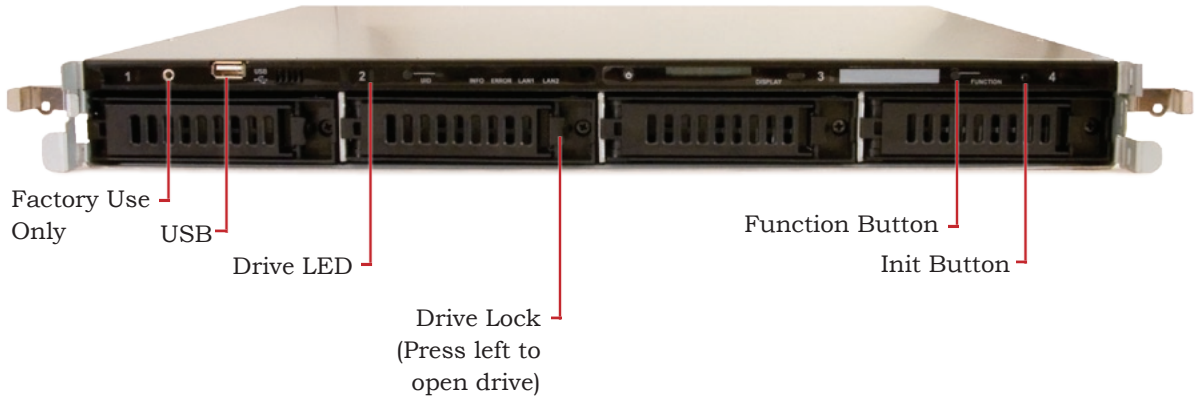
Rear Panel (TS-WXL/R1)



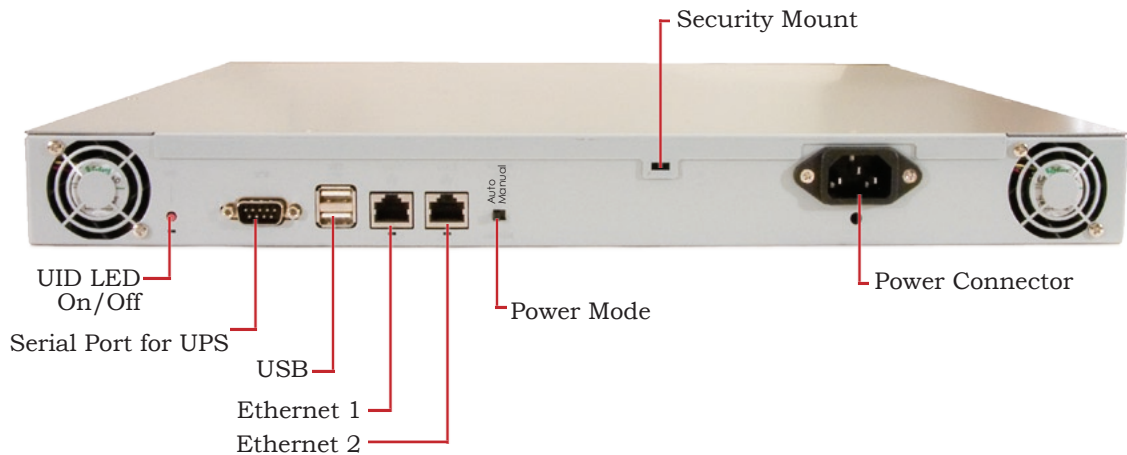
Front Panel (TS-RXL/R5)



Open Front Panel (TS-RXL/R5)



Rear Panel (TS-RXL/R5)



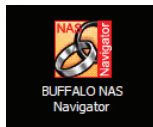
The “Power Mode” switch on the back of the unit has two positions: “Auto” and “Manual”. The “Auto” position automatically powers the unit on or off with your computers. If any of your computers are turned on, the TeraStation will power up; if all computers are turned off, the TeraStation will power down.

You must have installed the NAS Navigator2 software on each of your computers for this feature to work. Otherwise, if you move the switch to “Auto”, your unit will power down by itself and you will have to manually turn it back on.

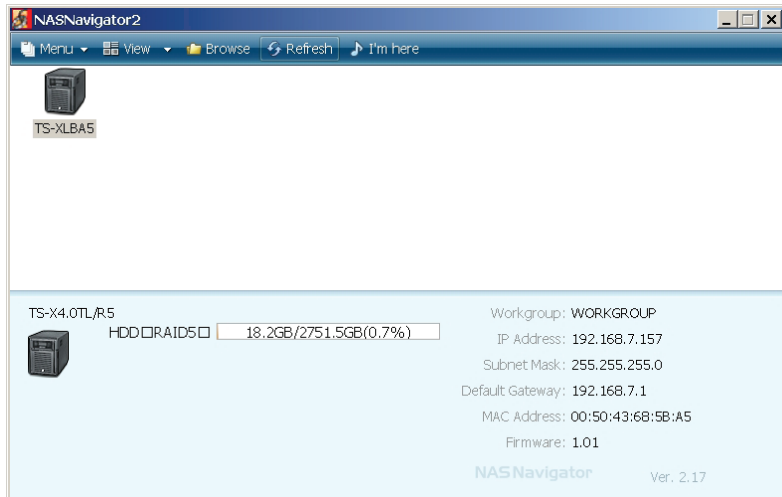
Also note that the unit needs to be powered on if you want to use the Web Access feature. When using Web Access, it is best to leave the Power Mode switch set to “Manual”.

The “Auto” mode does not work if “NasNavi Detection” is disabled in Network/Settings/Network Services, or if Port Trunking is enabled. In either of these cases, use the “Manual” mode.

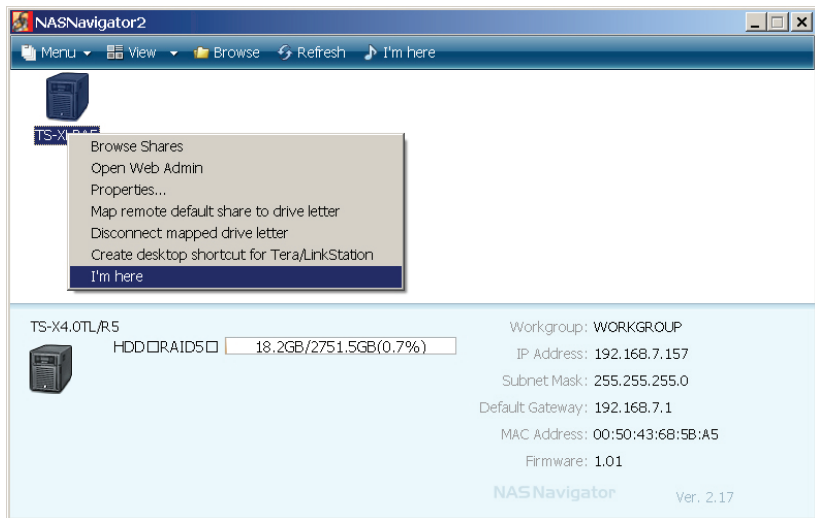
To turn the TeraStation off, hold down the power button on the front panel for five seconds. It will take about 30 seconds to shut down. Do not unplug or interrupt power to the unit until shutdown is complete and all LEDs are off.



On your desktop is a new shortcut to *Buffalo NAS Navigator*. Double-click it to open the NAS Navigator2 client utility.



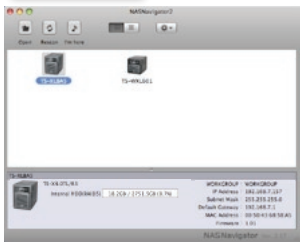
Double-click on your NAS device's icon to open it. Or, right-click on it for more options.



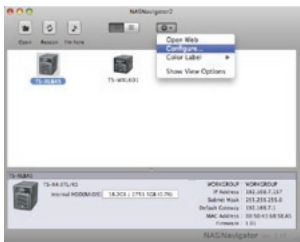
From NAS Navigator2, you can easily browse the shares on your TeraStation, open its Web Admin Tool, map a drive letter to a share, or make a desktop shortcut to the main share on the TeraStation. Clicking *I'm Here* causes the TeraStation to beep and flash its LEDs, making it easy to identify.



After installing the TeraNavigator software, your Mac will have “NASNavigator” in the dock.



The *NASNavigator* icon opens the TeraStation’s client utility. If you have more than one NAS device on the network, each will be visible here. Click on the chosen device to highlight it. Click on the “gear” symbol to drop down available commands.



Open Web opens the Web Admin Tool. *Configure* opens the menu on the next page. *Color Label* lets you color-code your NAS devices in NAS Navigator2. *Show View Options* lets you choose the size and order of icons in the NAS Navigator2 display.



In NAS Navigator2, choose *Configure* from the drop-down menu to get to the Web page. Click *Open Web Page* to go the Web Admin Tool, or click *IP Address* to change the TeraStation's IP Address settings.

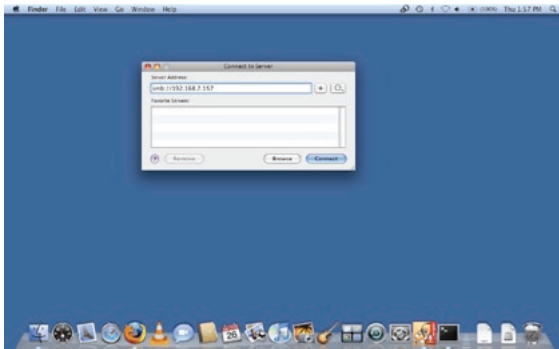


The IP Address page lets you change the TeraStation's IP address settings.



If you have more than one NAS on your network, *Show View Options* can be useful. It lets you choose the order of icons in the NAS Navigator2 display. You may also adjust the size of the icons from here.

You can manually add shares (folders) to your desktop by adding them to the Mac's server list. Begin by clicking Go, and then choose *Connect to Server*.



In the *Server Address* field, enter your TeraStation's IP address in the form *smb://ipaddress* (where "ipaddress" is your TeraStation's IP address), and click *Connect*.

If you don't know your TeraStation's IP address, see page 20.

Select *Guest* and click on *Connect*. Note: If you have configured share permissions on your TeraStation, select *Registered User* and enter your login credentials.



Select the volume that you want to mount, such as *share*, from the list of folders on the TeraStation.



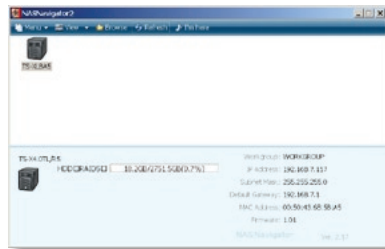
The share will open.



Finding your TeraStation's IP Address

If you don't know your TeraStation's IP address, there are several ways to get it.

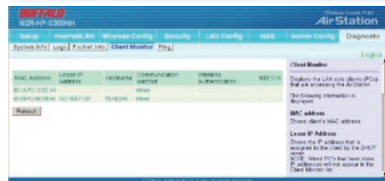
One simple method is to use the NAS Navigator2 client utility (included on your CD) to find your TeraStation(s). Just click on the icon for your TeraStation and you'll be able to read its IP address.

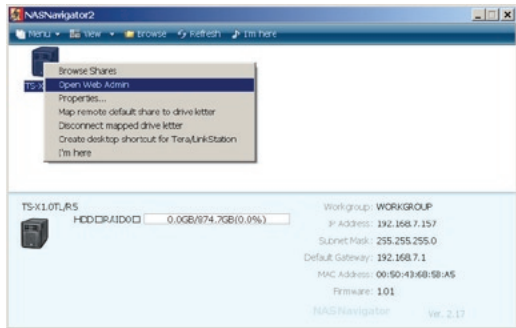


You can get the TeraStation's IP address from the LCD display on the front of the TeraStation. Press the *Display* button until the IP address is displayed.

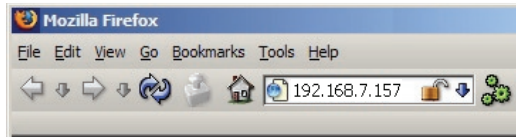


You can always get the TeraStation's IP address from your router's configuration utility. Many Buffalo routers list this information on the *Client Monitor* page, as shown to the right. Consult your router's documentation for instructions on identifying the TeraStation's IP address.



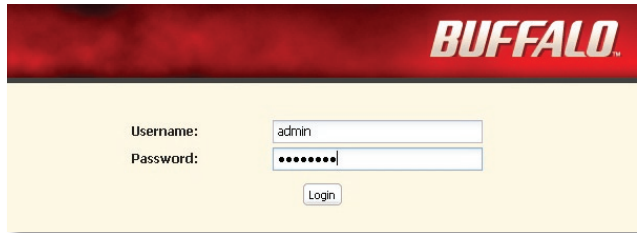


To access the Web Admin Tool, right-click on your TeraStation in NAS Navigator2 and choose *Open Web Admin*.



Alternately, you may access the Web Admin Tool by typing the IP address of your TeraStation into the URL bar of a browser running on a computer connected to the same network as the TeraStation. This works perfectly with OS X, Linux, and other non-Windows PCs.

This login prompt will appear. Enter **admin** for the user name. Until you change it, the password for the admin account will be **password**. Press the *Login* button when finished.

A screenshot of a login interface for Buffalo. At the top, there is a red banner with the word "BUFFALO" in white, italicized, bold letters. Below the banner is a light yellow rectangular area containing the login form. On the left side of this area, the labels "Username:" and "Password:" are positioned. To the right of "Username:" is a text input field containing the text "admin". To the right of "Password:" is a password input field containing seven black dots. Below these two input fields is a small, rounded rectangular button with the text "Login" inside it.

User name: *admin*

Password: *password*

Welcome to the Web Admin Tool! On the left side, you can see your TeraStation's system information. Tabs and submenus along the upper edge allow easy access to all of the settings pages for your TeraStation.

The screenshot shows the TeraStation Web Admin Tool interface. The top navigation bar includes 'TeraStation Network Attached Storage', the 'BUFFALO' logo, and a 'Welcome admin login!' message. Below this is a main navigation menu with tabs: 'System Information', 'Shared Folders', 'Users/Groups', 'Network', 'System', and 'Extensions'. A secondary submenu is visible under 'Shared Folders', containing 'Folder Setup', 'DFS', 'Direct Copy', and 'TeraSecure'. The 'Folder Setup' page is active, showing a 'Folder Setup' section with a 'Create Folder' button and a 'Empty recycle bin of each folder' button. Below this is a table with columns: 'Name', 'Volume', 'Attribute', 'Recycle Bin', 'Support', and 'Restrictions'. The table contains two rows: one for 'WEB' and one for 'SHARE'. The 'SHARE' row is highlighted with a red box. On the left side, there is a sidebar with 'System Information' (Name: TS-XL8AS, IP Address: 192.168.7.197, Storage: RAID Array 1: 0.1 GB / 874.7 GB (0.0 %)), 'Folder Setup' (Shared Folders: 2, Volumes: 1), and 'Locate TeraStation' (Locate button). Annotations with red lines point to various elements: 'Individual Settings' points to the sidebar; 'Category Tabs' points to the main navigation menu; 'Submenus' points to the 'Folder Setup' submenu; and 'Help and Instructions' points to the 'read manual' and 'Access Restriction FAQ' links.

Individual Settings

Category Tabs

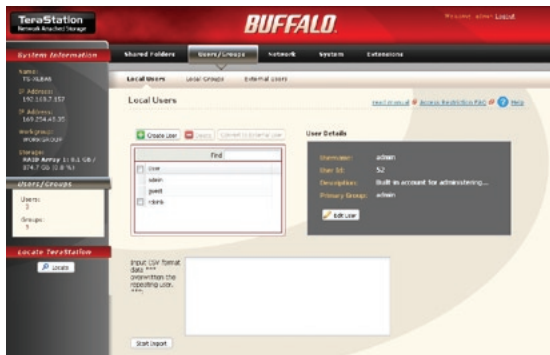
Submenus

Help and Instructions

Name	Volume	Attribute	Recycle Bin	Support	Restrictions
WEB		Rec:Dir	X		X
SHARE	Array 1	Rec:VFile	✓	Windows, Apple	X

Adding Users

To add users, select the *Users/Groups* tab. *Local Users* is the default submenu. Click on *Create User*.



Enter your user information and click *Save*.

You may enable quotas for the user if desired. The hard limit is the maximum amount of space in gigabytes that this user will be able to use. The soft limit, which should be smaller, is the maximum amount of space in gigabytes that the user can use before receiving a warning that they are running out of space.

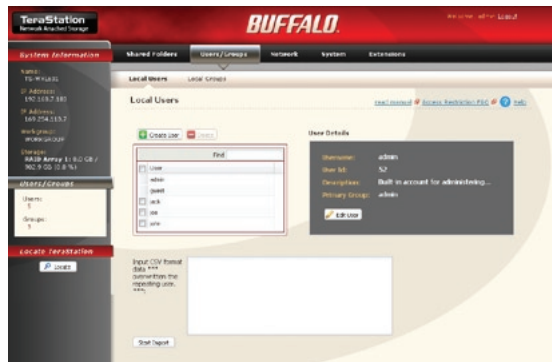
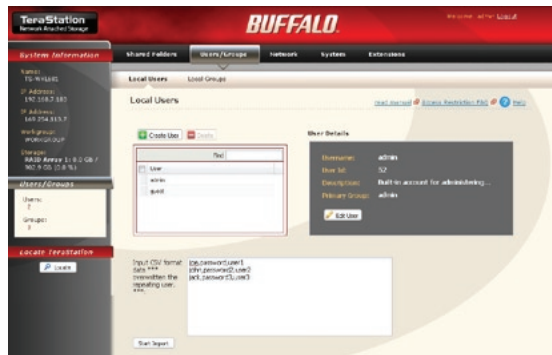


Adding Users in CSV Format

To add many users easily, a CSV (Comma-Separated-Variables) file is recommended. This is a text file, with each line consisting of a *Username*, *Password*, and *Description* separated by commas and ending with a carriage return. These files can contain from 1 - 1000 users. Paste the contents of the CSV file into the CSV input window and click on *Start Import*.

The users from the CSV file will be added to the list of local users for the TeraStation.

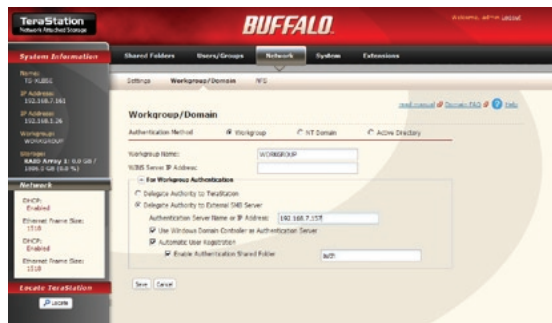
Note: Paste the contents of the CSV text file into the CSV input window, not the text file itself.



Remote Users

You may manage users and passwords for a TeraStation from a SMB server.

In your TeraStation, enable *Delegate Authority to External SMB Server* in *Network/Workgroup/Domain*. Users from the local TeraStation may then be moved to the External Users list. This will remove all passwords, leaving their accounts unusable until the passwords are set on the SMB server. The External Users and their passwords will then be managed from the SMB server. Shares, user rights, and permissions will still be configured from the local TeraStation's Web Admin Tool.



Adding Groups

To add a group, select the *Local Groups* submenu under the *Users/Groups* tab. Click on *Create Group*.



Enter information for your group and click on *Save*.



Disk Quotas

Disk Quotas let you set a maximum on the amount of total storage that may be used by a user or group.

Under the *Users/Groups* tab, click on *Local User* or *Local Group*. Then, click on *Edit User* or *Edit Group* as appropriate. *Enable Quotas* and enter amounts (in Gigabytes) for the maximum storage to be available to the user or group. The hard limit is the absolute maximum amount of space in gigabytes that this user or group will be able to use. The soft limit, which should be smaller, is the maximum amount of space in gigabytes that the user or group can use before receiving a warning that they are running out of space.

If both user and group quotas apply to a member of a group, then whichever is smaller will be enforced.



Network Settings

Network Settings contains settings that affect your Ethernet connection. In most networks, TeraStation will get its IP Address automatically from a DHCP server. You may disable DHCP here and configure the IP address settings manually if desired. If no DHCP server is available and an IP Address is not set manually, it will default to a random address on the 169.254.xxx.xxx subnet with subnet mask 255.255.0.0.

Ethernet Frame Size, *Services*, and *Port Trunking* settings are also set from this page. Only use JumboFrame settings when operating in a Gigabit environment where all other clients support the same JumboFrame setting.



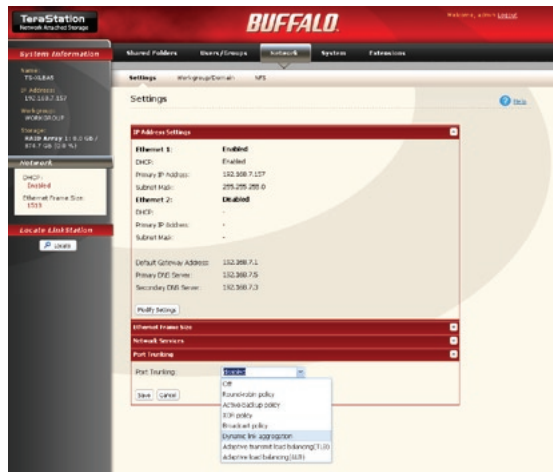
Port Trunking

Port Trunking allows you to connect the TeraStation to the network with two separate Ethernet cables. To use it, you need an “intelligent” switch that supports port trunking.

Configure two LAN ports on the switch in port trunking mode. Connect them to Ethernet ports 1 and 2 on the TeraStation.

In the Web Admin Tool, navigate to *Network/Settings/Port Trunking*. Select one of the port trunking models and click *Save*.

Restart the TeraStation before use.



Port Trunking Modes

Round-robin policy - Transmits packets in sequential order from the first available slave through the last. This mode provides load balancing and fault tolerance.

Active-backup policy - Only one half of the bond is active at once. The other half becomes active if and only if the active slave fails. The bond's MAC address is externally visible on only one port to avoid confusing the switch. This mode provides fault tolerance.

XOR policy - Transmit is based on the source MAC address XOR'd with destination MAC address and modulo slave count. This selects the same slave for each destination MAC address. XOR provides load balancing and fault tolerance.

Broadcast policy - Transmits everything on all slave interfaces. This mode provides fault tolerance.

Dynamic link aggregation - Creates aggregation groups that share the same speed and duplex settings. Utilizes all slaves in the active aggregator according to the 802.3ad specification. Switch must support IEEE 802.3ad Dynamic link aggregation to use this mode.

TLB - Channel bonding that does not require any special switch support. Outgoing traffic is distributed according to the current load (computed relative to the speed) on each slave. Incoming traffic is received by the current slave. If the receiving slave fails, another slave takes over the MAC address of the failed receiving slave.

ALB - Adaptive load balancing includes balance-tlb plus receive load balancing (rlb) for IPV4 traffic and does not require any special switch support. The receive load balancing is achieved by ARP negotiation. The bonding driver intercepts the ARP Replies sent by the local system on their way out and overwrites the source hardware address with the unique hardware address of one of the slaves in the bond such that different peers use different hardware addresses for the server.

Workgroup/Domain Settings

To add the TeraStation to your workgroup or domain, click *Modify Settings*.



Depending on your network type, you may choose to authenticate in *Workgroup*, *NT Domain*, or *Active Directory Mode*.



Note: Before configuring NT Domain authentication, make sure that your TeraStation's firmware is updated to version 1.01 or later.

Screens are different depending on whether you authenticate in *Workgroup*, *NT Domain*, or *Active Directory Mode*. Whichever mode you choose, enter the information needed to log in to the network and click *Save* when finished.

Notes:

If using the TeraStation with an AD server, then the AD server must be connected to the same subnet as Ethernet port 1 of the TeraStation.

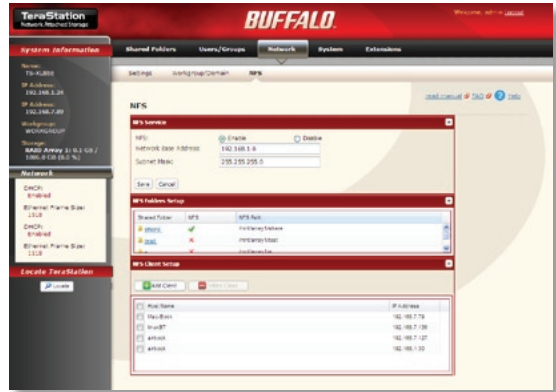
In Active Directory mode, the TeraStation will download the first 1000 entries from the AD list. Use of the TeraStation with AD servers with more than 1000 entries is not supported.

The TeraStation works with the AD servers included with Windows 2003 Server and Windows 2008 Server. Windows 2000 Server is not supported.



NFS

With NFS enabled, you can access a shared folder on the TeraStation from an NFS client. NFS is disabled by default. To enable it, navigate to *Network/NFS* and open *Network Service*. Click *Modify Settings*. *Enable NFS*, enter the TeraStation's network base address and subnet mask, and then click *Save*. Examples: If the TeraStation's IP address is 192.168.1.150 and the subnet mask is 255.255.255.0, then the network base address would be 192.168.1.0. If the subnet mask is 255.255.0.0, then the network base address would be 192.168.0.0.



In *NFS Folders Setup*, click on the name of your share. Click *Enable* and then *Save*.

In *NFS Client Setup*, click *Add Client*. Enter the IP address and subnet mask of your client and click *Save*. Repeat for each client that you want to allow to connect with NFS.

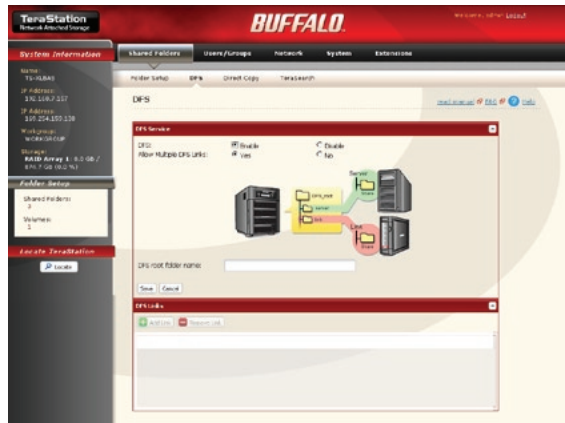
To access the TeraStation through NFS using Windows Services for Unix 3.5, the command will be *mount 192.168.1.150:/mnt/array1/share z:*, where “192.168.1.150” is the TeraStation’s IP address, “/mnt/array1/share” is the NFS publishing path, and “z” is an unused network drive letter. For an OS X Mac, the command would be *mount -t nfs 192.168.1.150:/mnt/array1/share /Volumes*. Other NFS compatible operating systems use different commands to access an NFS share. Consult your OS’s documentation for more information about connecting to an NFS share.

DFS

Distributed File System is a set of client and server services that allow a large enterprise to organize many distributed SMB file shares into a distributed file system. DFS provides location transparency and redundancy to improve data availability in the face of failure or heavy load by allowing shares in multiple different locations to be logically grouped under one folder, or DFS root.

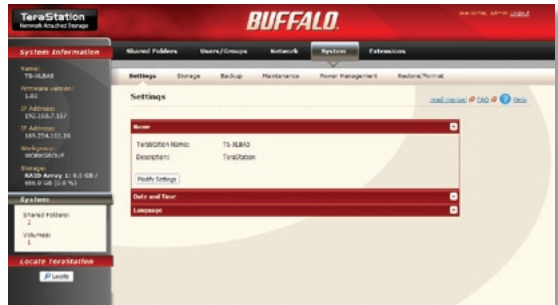
To configure DFS from the Web Access Tool, navigate to *Shared Folder/DFS*. Click *Change Settings*. *Enable* DFS. Select whether or not to allow multiple DFS links on the root. If selected, up to 8 DFS links may be shared on the root. Enter the DFS root folder name and click *Save*.

In *DFS Links*, click *Add Link*. Enter the destination hostname and the destination folder. Enter a name for the link if multiple links are being used. Click *Save*.



System Settings

In *System Settings*, you can modify the NetBIOS name of your TeraStation, date and time settings, and language settings.



RAID Configuration

RAID configuration is done in *System/Storage*. To change RAID configuration, click on an array name in the *RAID Array* under the RAID Configuration section.

Several types of RAID arrays are available.

RAID 0 - All drives are combined into one large, fast drive, giving the maximum capacity for your TeraStation. This size is the one listed on your TeraStation's box and shows the total capacity of the TeraStation with no data used for redundancy. RAID Spanning is fast and efficient, but with no redundancy, if one hard drive fails, all data on the TeraStation is lost.

RAID 1 - Hard drives are arranged in mirrored pairs. Each half of the pair reads and writes exactly the same data. This costs you half the total capacity of the array, but provides excellent redundancy. If a hard drive fails, the mirror continues to supply data, so you may work on normally. You may replace the damaged or defective drive at any time, and normal RAID 1 mirroring will then be automatically restored. This is the default configuration for the TS-WXL/R1.

The screenshot displays the Buffalo TeraStation web interface. The top navigation bar includes 'System Information', 'Shared Folders', 'Mount/Unmount', 'Network', 'System', and 'Preferences'. The 'Storage' section is active, showing a table of drives and their RAID array status.

Dev	Status	Encrypted	USB Name	USB Capacity	Amount Used	%
Array 1	-	X	-	-	-	-
Dev 1	Array 1	X	HD7720BGLA80	-	-	-
Dev 2	Array 1	X	HD7720BGLA80	-	-	-
Dev 3	Array 1	X	HD7720BGLA80	-	-	-
Dev 4	Array 1	X	HD7720BGLA80	-	-	-
USB Dev 1	Disconnected	X	-	-	-	-
USB Dev 2	Disconnected	X	-	-	-	-

Below the drive table, the 'RAID Array' section shows details for 'Array 1':

Name	RAID Mode	Status	Total Capacity	Amount Used	Percent Used	File
Array 1	RAID 0	Normal	2,000,110,560 MB	1,100 MB	0.00 %	1 FC
Array 2	No Configured	-	-	-	-	-

The 'RAID Settings' section shows:

- RAID Scanning: Disabled
- RAID Scanning Schedule: Every 1st day/health
- RAID Scanning Start Time: 2 Hour
- RAID Array Error Detection Response: Not Shutdown

RAID 5 (TS-XL and TS-RXL only) - All drives in a RAID 5 array reserve part of their data space for parity information, allowing all data to be recovered if a single drive fails. The parity information takes up about one hard drive's worth of space, so if you set up all four drives in the TeraStation as a RAID 5 array, your usable capacity will be about 3/4 of the total capacity of the TeraStation. This is the default configuration for the TS-XL and TX-RXL.

RAID 10 (TS-XL and TS-RXL only) - Combines RAID 1 and RAID 0 for a fast, secure array. Half of the TeraStation's total capacity is used for redundant information.

Hot Spare (TS-XL and TX-RXL)

In hot-spare mode, the 4-drive TeraStation will automatically switch over to a standby disk if a disk in an array fails. Hot spare mode works with RAID 5 (3 hard disks) or RAID 1 arrays. Any data on the hot-spare disk will be erased if the array switches over to it.

To configure a hot spare, first build a RAID 5 or RAID 1 array. Leave at least one drive unused.

Navigate to *System/Storage/RAID Array* in the Web Admin Tool and click on the RAID array that you just created.

Check *Set as Spare Disk* and then click *Save*.

The screenshot displays the Buffalo TeraStation Web Admin Tool interface. The top navigation bar includes 'System Information', 'Shared Folders', 'Mounts/Exports', 'Network', 'System', and 'Fabricious'. The 'System' menu is selected, leading to a 'Storage' page. On the left sidebar, 'System Information' shows details like Name (TS-XL804), IP Address (192.168.1.117), and Storage (RAID Array: 11.1.0 GB / 8K, 7 GB (11.1 %)). The 'Storage' section shows 'Shared Folders: 2' and 'Volumes: 6'. The 'Locate RAID Station' button is visible. The main content area shows a 'Storage' overview with a 'Disks' table and a 'RAID Array' table.

Disk	Operational	Use Name	Use Capacity	Amount Used	% Used	File Sys
RAID 1	X					
1 Disk 1	X	HD08GUS08A021	-	-	-	-
1 Disk 2	X	HD08GUS08A021	-	-	-	-
1 Disk 3	X	HD08GUS08A021	-	-	-	-
1 Disk 4	X	HD08GUS08A021	-	-	-	-

Name	RAID Mode	Status	Total Capacity	Amount Used	Percent Used	File Sys
RAID 1	RAID	Normal	91,780,800 KB	1,896,240 KB	2.1 %	NTFS
Array 7	Not Configured					

RAID Scanning	Disabled
RAID Scanning Schedule	Every 3rd day/monthly
RAID Scanning Start Time	2:00 AM
RAID Array Error Detection Response	Not Shutoff

Hot Swap

If a hard drive fails, you may replace it without shutting down the TeraStation. The drive LED for a failed drive will be red.

After replacing the hard drive, the LCD display will show “SW I31 New DiskX Ready”. Hold down the function button for 3 seconds, until it beeps. The TeraStation will rebuild the RAID array automatically.

Only failed drives may be hot-swapped! If your drive is operating normally, with green or blinking LEDs, then you must dismount the drive or shut down the TeraStation first before changing it. To dismount a drive from within the Web Admin tool, navigate to *System/Storage*, select the drive, and click *Remove Disk*.

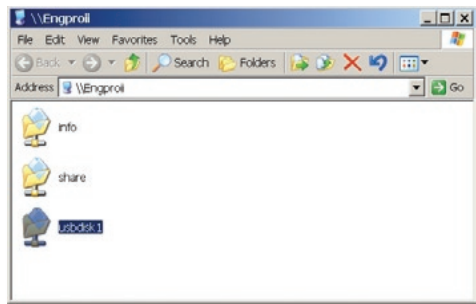


USB Hard Drives

Add a USB hard drive to TeraStation simply by plugging it in to one of the USB ports on the TeraStation. It will then appear in the master folder as a new share on the TeraStation. Not all USB hard drives are supported. Some USB hard drives may have to be reformatted with the TeraStation's format utility before working properly.

Before disconnecting USB devices from the TeraStation, they should be dismantled. Hold the function button down until it glows blue, and then turns off. It's now safe to unplug your USB devices.

Note: Unplugging USB devices without dismantling them first may corrupt your data! You may also dismantle your USB device from within *System/Storage/Disks* in the Web Admin Tool.

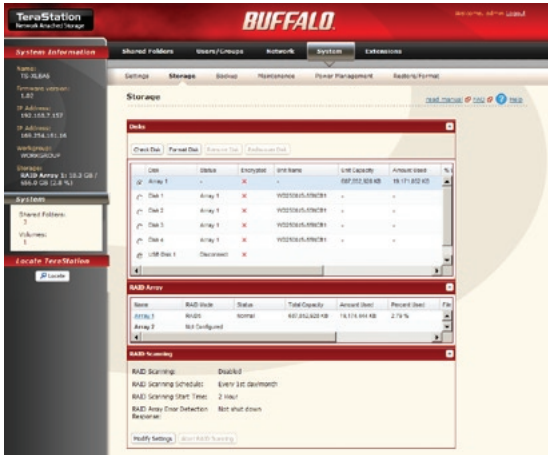


Formatting Hard Drives

Formatting of hard drives is done in the *System/Storage* area of the Web Admin Tool. To format hard drives, select the hard drive(s) that you want to format and click on *Format Disk*.

During a format, you have the option of encrypting the hard drive or array. Checking *Encryption* will encrypt the drive or array with 128 bit AES encryption. The drive will operate normally in the TeraStation, but will not be accessible if removed and connected to a different device.

Note that if you use encryption and a drive is damaged or fails, data recovery services will probably not be able to recover any data from the failed drive. If the drive is part of a RAID 1 or RAID 5 array, you can replace the failed drive with a new drive and restore the array normally.



The screenshot displays the Buffalo TeraStation Web Admin Tool interface. The top navigation bar includes 'System Information', 'Shared Folders', 'Users/Groups', 'Network', 'System', and 'Extensions'. The 'System' tab is active, and the 'Storage' sub-tab is selected. The main content area is titled 'Storage' and contains several sections:

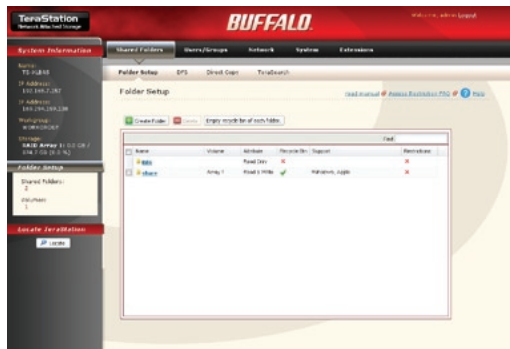
- Disks:** A table listing individual disks with columns for 'Disk', 'Device', 'Encrypted', 'S/N Name', 'S/M Capacity', and 'Amount Used'. The table shows four disks, all of which are encrypted.
- RAID Array:** A table showing RAID array details with columns for 'Name', 'RAID Mode', 'Status', 'Total Capacity', 'Amount Used', and 'Percent Used'. It lists 'Array 1' in RAID mode with a status of 'Normal'.
- RAID Recovery:** A section for RAID recovery settings, including 'RAID Scanning' (disabled), 'RAID Scanning Schedule' (Every 3rd day/month), 'RAID Scanning Start Time' (2 Hour), and 'RAID Array Error Detection' (Not shut down).

Adding Shares

Shares are the lowest level folders on a TeraStation. Out of the box, your TeraStation includes a share named *share*, for your files, and a read-only share called *info*, which contains software and user manuals. You may add other shares as desired.

To add a new share to your TeraStation, navigate to *Shared Folders/Folder Setup* and click *Create Folder*.

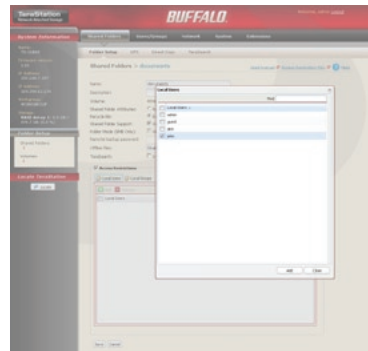
Enter a name for your new share. Other settings can be changed as desired. You may configure your new share's settings manually, or copy the settings from an existing share. If you want to limit which users or groups have access to the share, then put a check next to *Access Restrictions*.



Once you check *Access Restrictions*, you must specifically add access rights for any user or group to access the share. To add rights, choose either the *Local Users* or *Local Groups* tab. If you are using AD, then you will have additional tabs for *Domain Users* and *Domain Groups*. If you're using SMB, then you'll have an additional tab for *External Users*. Click on any of these tabs and then click *Add*.



Put a check next to any users or groups that you want to give access to the share. Click *Add* when done.

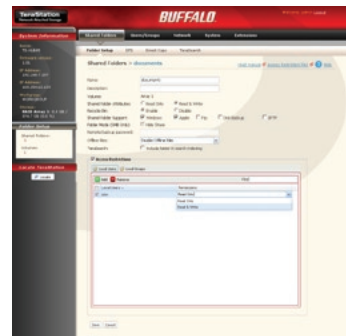


At this point, your chosen users and/or groups have Read-Only access. They will not be able to save files back to the share. If that's what you want, click *Save*.

Or, to add write access, double-click on *Read Only*.



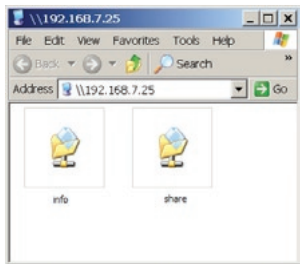
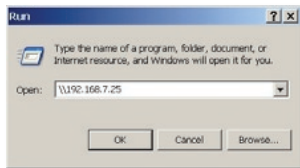
Chose *Read & Write*. Click *Save*. Your user and/or groups can now access and write to the new share.



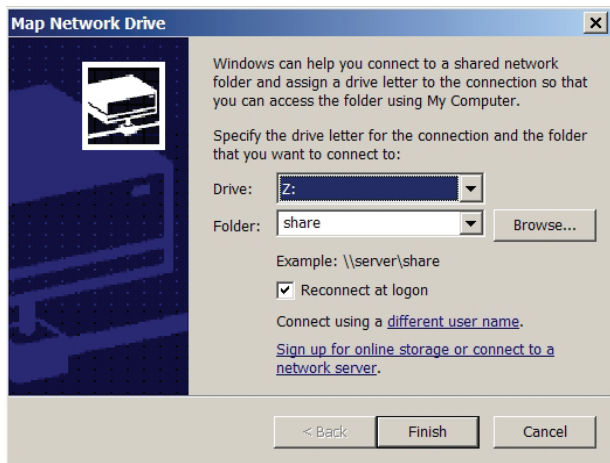
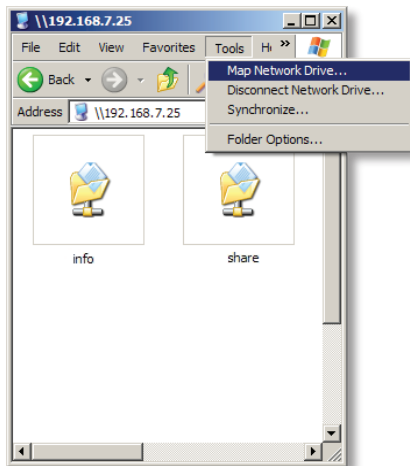
Mapping Additional Shares

You can map additional drive letters to shares on your TeraStation. From the *Start* menu, select *Run...* Enter your TeraStation's hostname (you can get it from the NAS Navigator utility, or its LCD display) or IP address. Press *OK*.

Your TeraStation will open. “Share” is a data folder in your TeraStation by default. “Info” contains your user manuals and software. If you have created other share folders, then they will be visible here too. You can map drive letters to any of these folders.

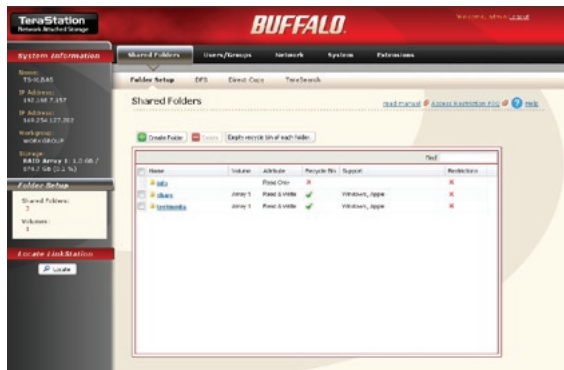


From the *Tools* pull-down menu, select *Map Network Drive*. Choose a drive letter from the *Drive*: pull down menu. To specify the folder to map, either find it with *Browse* or enter **\\TeraStation_Name\share_name** in the *Folder*: field, where *TeraStation_Name* is your TeraStation's hostname and *share_name* is the name of a folder on your TeraStation. Check the *Reconnect at logon* checkbox to have Windows connect to this mapped drive every time it starts. When finished, press the *Finish* button. Your share is now mapped to a drive letter.

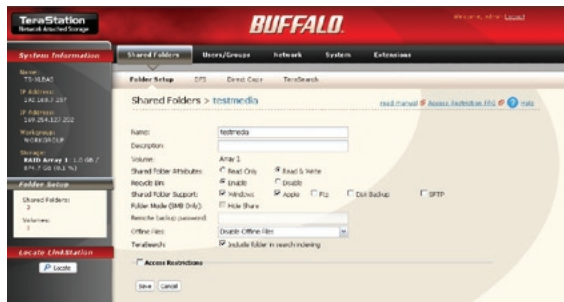


TeraSearch

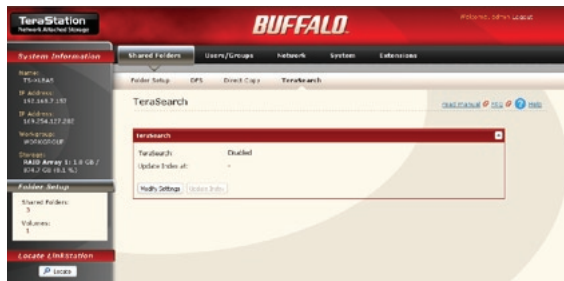
TeraSearch lets you easily find files on your TeraStation. It indexes Word, Excel, PowerPoint, pdf, html, text, and other files. To use it, open the share that you want to be able to search, such as share, by clicking on its name in *Shared Folders/Folder Setup*.



Put a check next to *Include folder in search indexing* and click *Save*.



Navigate to *Shared Folders/TeraSearch*, and click *Modify Settings*.



Put a check next to *Enable*, chose a time for your regular updates, and click *Save*.

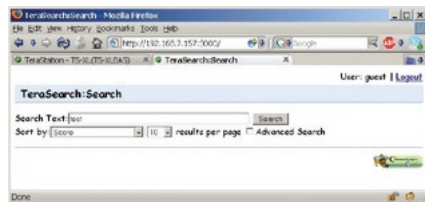
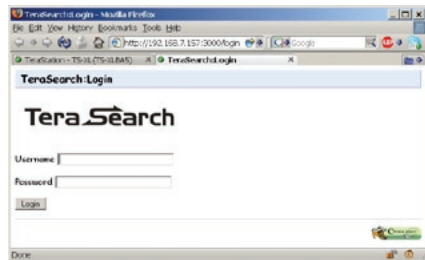


Note: The TeraStation must be powered on to update the index. Updating may take several hours.

Click *Update Index*.

To use TeraSearch, type “//IPaddress:3000” into a URL window of a browser, where IPaddress is the IP address of your TeraStation. Login with your username and password, or you can use the *guest* account with a blank password.

Enter the term you want to search for in the *Search Text* window and click *Search*. You may sort your results by many different criteria.



Maintenance

The Maintenance submenu holds such settings as Email notification, Alerts, and LCD display brightness. You can also restart or shut down the TeraStation from here.



Replication

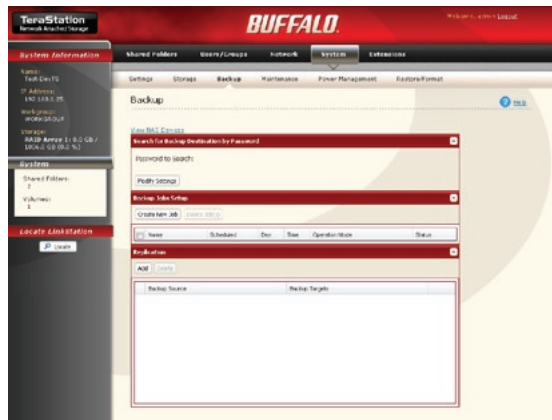
If you have two TeraStations, then you may configure one to replicate all data in a folder on the other. Any changes to files in a share on the Source TeraStation will be duplicated in a backup folder on the Target TeraStation.

To configure replication, connect both TeraStations to a network, or connect an open Ethernet port on the Source TeraStation to an Ethernet port on the Target TeraStation.

Open the Web Admin Tool for the Source TeraStation and navigate to *System/Backup/Replication*. Click *Add*.

Select the source and destination folders for replication and click *Save*.

Note: When replication is first configured, existing files are not immediately copied from Source to Target until a new file is created locally, or *Resynchronization* is clicked in *System /Backup/Replication* of the Web Admin Tool. Remote additions to the Source folder by Backup and WebAccess are also not replicated until a file is added locally to the Source folder, triggering the synchronization, or *Resynchronization* is clicked. However, remote additions to the source folder via FTP or FTPS are synchronized immediately.



Backup Jobs

To create a new backup job, click *Create New Job* in *System/Backup*.

Select the desired job schedule and properties and click *Apply* when done.

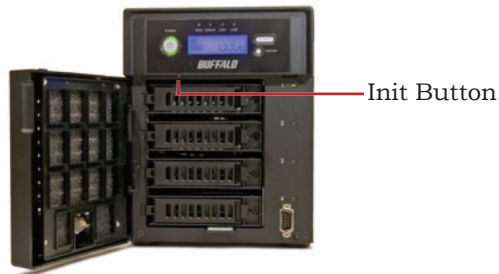


Initialization

You can restore all settings to their factory defaults by clicking *Restore TeraStation*. You can choose to either keep the current admin password after initialization, or revert the password to its default setting of “password”.



You can also initialize your TeraStation from the *Init* button, located on the bottom side of the display panel (open the door to access it), or the front of the rackmount TS-RXL (remove the cover to access it). Holding down the Init button for 3 seconds will initialize all settings including the admin password.

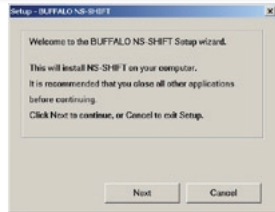
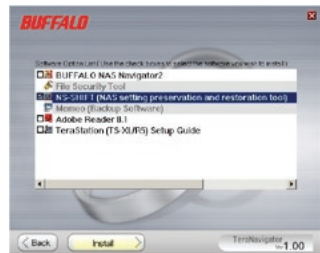


NS-SHFT

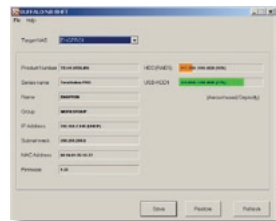
NS-SHFT is a program to save and restore the configuration of Buffalo NAS devices. Settings are saved to a configuration file on a computer. You can use that configuration file to restore your TeraStation's settings, or to easily apply its settings to a different TeraStation. TeraStations must be from the same series to use each other's configuration files, though they may be different sizes.

Normally, NS-SHFT only restores settings. It doesn't affect the data on the TeraStation. But, if you use NS-SHFT to restore a TeraStation to a different RAID configuration, then all data on the drives will be lost.

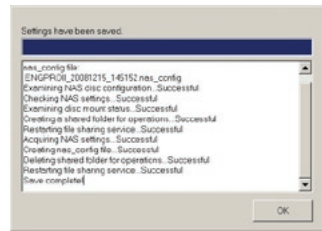
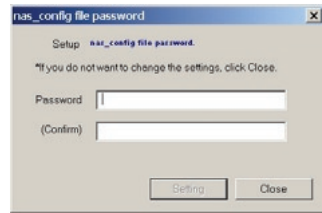
To install NS-SHFT, insert the TeraNavigator CD in your Windows PC's drive. Click *Options*, then *Install*. Step through the wizard to install NS-SHFT.



To save a configuration file with NS-SHFT, select the TeraStation that you want to save the settings from the dropdown menu. Click *Save*. You will have to enter the admin password for the chosen TeraStation to continue.



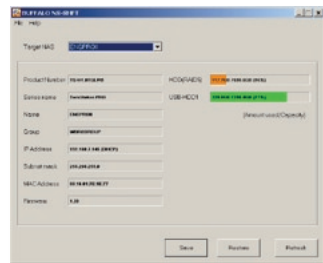
You have the option of password protecting the configuration file. To do so, enter a password and click *Set*. If you don't want to password protect the configuration file, leave the password fields blank and click *Close*.



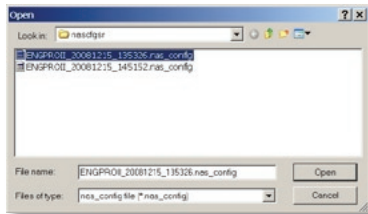
To restore a TeraStation's settings from a saved configuration file with NS-SHFT, select the TeraStation that you want to restore to from the dropdown menu. Click *Restore*.

Enter the admin password for the TeraStation to continue.

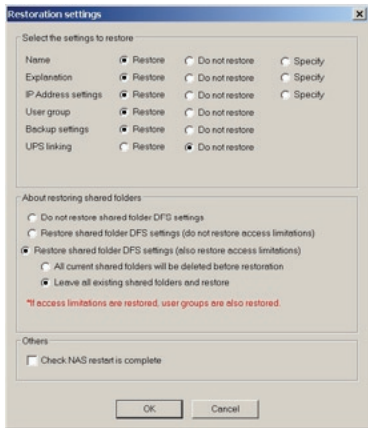
If you entered a password when you were building the configuration file, then you will have to enter it again here.



You may have multiple configurations saved. Select the configuration file with the settings that you want to use.



Choose which settings to restore and click *OK*.



EXT3 Reader

If you use the EXT3 format for an external backup drive connected to the TeraStation, then you may find it convenient to be able to read data on the drive directly from a Windows computer. The EXT3 Reader utility allows you to do exactly that.

To install it, insert your TeraNavigator CD in your PC's drive. Select *Options*, then *Additional Software Installation*. Check *EXT3 Reader* and click *Install*.

To use it, open *Start/Programs/Buffalo/EXT3 Reader* and launch EXT3 Reader. Click *Enable*.

You may now connect your EXT3 formatted USB hard disk to the computer. You will be able to read and copy files from the hard disk to your computer.

Notes:

EXT3 Reader is a program for reading EXT3 hard drives only. Writing and deleting files on the EXT3 hard drive are not supported.

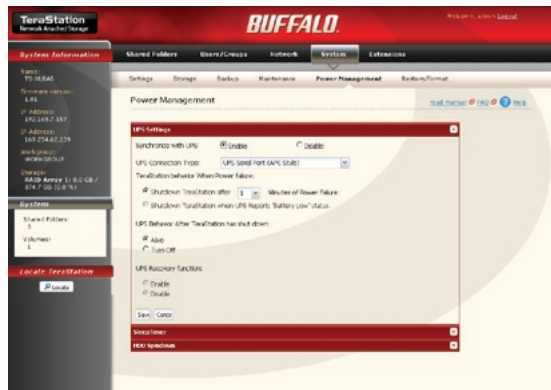
EXT3 Reader and TurboUSB do not play well together. Please uninstall TurboUSB before installing EXT3 Reader.

Before unplugging a USB hard drive from the TeraStation, dismount it first with the Function button. Unplugging drives without first dismounting them may result in unexpected behavior and lost data.

UPS

For best results, the TeraStation should be connected to an Uninterruptible Power Supply. APC SmartUPS models work well. A UPS may be used with either a Serial or USB connection to the TeraStation. After attaching the UPS to the TeraStation, navigate to *System/Power Management/UPS Settings* in the Web Admin Tool. Configure your desired settings and click *Save*.

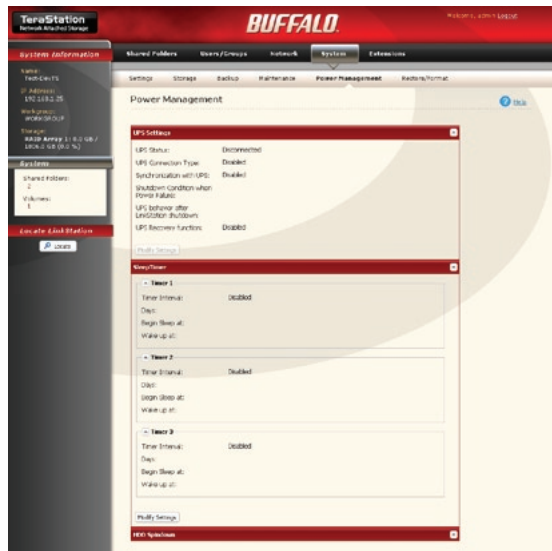
Note: Even if you've previously configured your UPS settings, after attaching a UPS to the TeraStation, open this page and click *Save*. Until you do, the UPS may not be recognized properly.



Sleep Timer

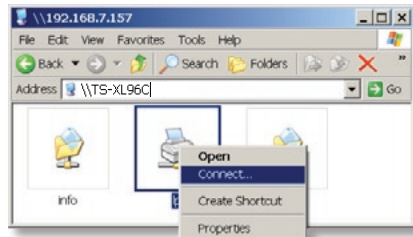
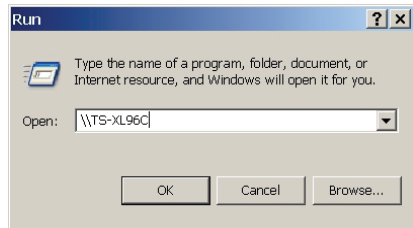
The TeraStation can be configured to go into power-saving (“sleep”) mode at regular intervals. Click *Modify Settings* to configure a sleep interval.

To manually wake a TeraStation from sleep mode before its wake-up time, hold down the power button on the front panel for 3 seconds.

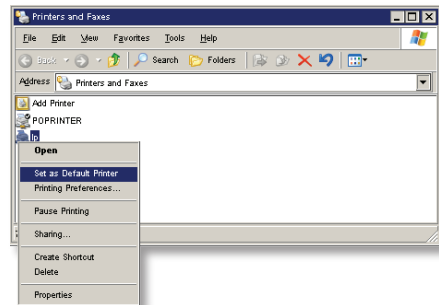
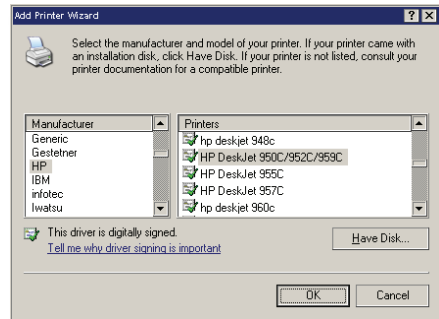


Print Server

- To share a USB printer with the TeraStation, *Enable* print server functionality. Connect the printer to a USB port on the TeraStation and power it on.
- Access the TeraStation by clicking *Start*, selecting the *Run...* option, and entering `\\TeraStation_Name` (where *TeraStation_Name* is the DNS name of your TeraStation, or its IP address). Click the *OK* button when finished.
- Right click on the *lp* icon and select *Connect*.



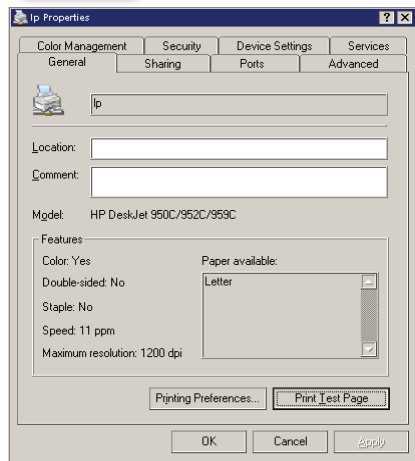
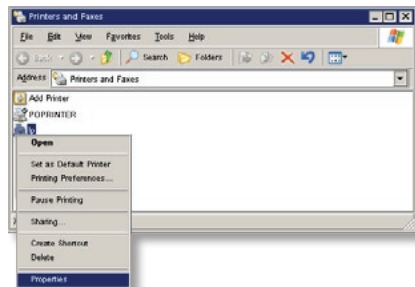
- You will receive a warning that the server does not have the proper drivers. Click *OK* to continue.
- The *Add Printer Wizard* will launch. Select the proper driver for your printer. If the specific printer is not in the list, you will be required to insert the CD that came with your printer into your PC's CD-ROM drive and click the *Have Disk* button. Refer to your printer documentation for further information on installing your printer if necessary. Click *OK* to finish.
- If *lp* is the only printer installed on the PC, then it will automatically be set as the default printer. If it's not the only printer, you may make it the default printer by clicking *Printers and Faxes* in Control Panel, right clicking on the *lp* printer icon and selecting the *Set as Default Printer* option from the *File* drop-down menu.



- To print a test page or configure additional printer settings, right click on the *lp* printer icon and select *Properties*. This will open the printer's driver properties page.
- Click the *Print Test Page* button to print a test page. You can also browse through the available settings for the printer. Please refer to the printer's documentation for more information on changing the printer's settings.

NOTES: The printer installation process can be done on any machine on your network. Multiple machines may print to the printer at the same time. Repeat this process on all computers that require access to the printer.

Not all USB printers are supported. Multifunction printers are specifically *not* supported.



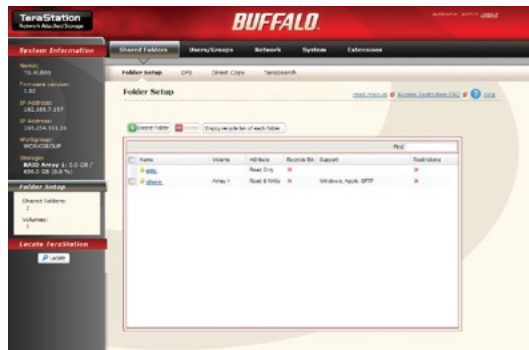


If a corrupt print job is sent to a printer, printing may suddenly fail. If your print jobs seem to be locked up, clearing the print queue may resolve the issue.

To delete the print queue, click *Delete Print Queue*. This will clear all current print jobs. Users will have to re-send any incomplete print jobs to the printer.

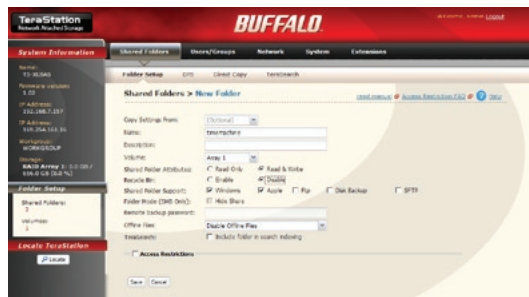
If there are still problems sending jobs to the printer, shut down the TeraStation and the printer. Turn the printer on, and then turn the TeraStation back on again. Verify that the USB cable is securely fastened to both the printer and the TeraStation. Finally, you may consult the printer manufacturer's documentation for more troubleshooting information.

Time Machine



To use the TeraStation as a location for backups from a Mac running Time Machine, begin by creating a folder for the backups.

In *Shared Folder Setup*, click on *Create Folder*.



Name the folder. Make sure that *Apple* is checked for Shared Folder Attributes. *Disable* Recycle Bin support. Click *Save*.



Navigate to *Extensions/Time Machine* and click *Modify Settings*.



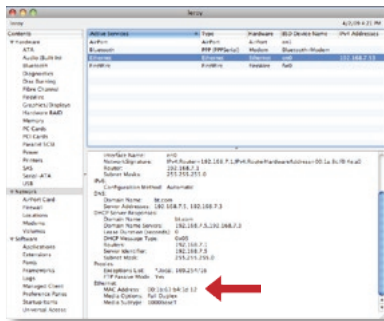
Enable Time Machine. For the *Target Folder*, choose the folder you created for the backups. Click *Save*.



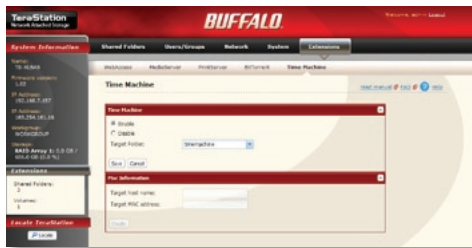
Enter the Mac's "Computer Name" (from its Sharing page) as the *Target Host Name*. For the *Target MAC address*, enter the Mac's Ethernet ID from Advanced Settings in its Network Preferences page. See the next page for instructions on finding the right values for these fields. Click *Create* when done.



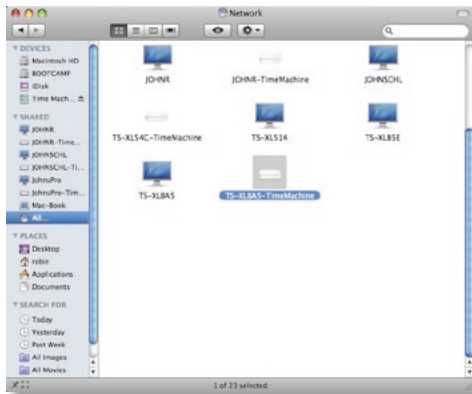
The name for the *Target Host Name* field can be found just under the Computer Name on the *Sharing* page in *System Preferences*. It is circled in red in the screenshot to the left. Do not include the part after the first period. By default, the Target Host name will be the same as the Computer Name above it unless you have changed it. To work with Time Machine, this name should contain only the following characters: 0123456789abcdefghijklmnopqrstuvwxyz_ABCDEFGHIJKLMNOPQRSTUVWXYZ. Spaces and other characters should not be used if Time Machine is to function properly.



For the *Target MAC address*, enter the Mac's Ethernet MAC Address from *System Profiler*, located in *Applications/Utilities*. Make sure that you are looking at the Ethernet MAC Address and not the AirPort MAC Address, as they will be different.



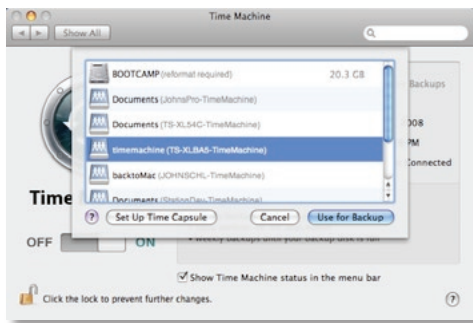
It will take several minutes for the image file to be created. The file *TargetHostName_TargetMACAddress.sparsebundle* is being created in the backup folder. To be safe, wait seven minutes before continuing.



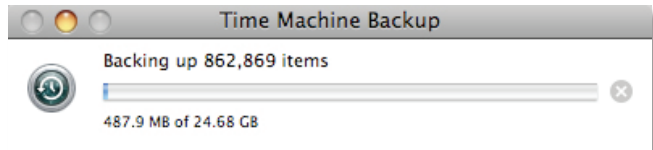
After seven minutes have passed, open the Finder. Click on *All* below *Shared*. Find your TeraStation's "TimeMachine" in the window and double-click on it. Close the Finder.



Move the switch to the “ON” position. Click on *Change Disk*.



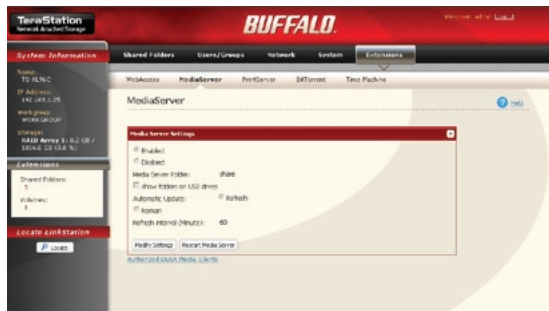
Choose your TeraStation from the list and click *Use for Backup*. In 120 seconds, Time Machine will begin running a backup.



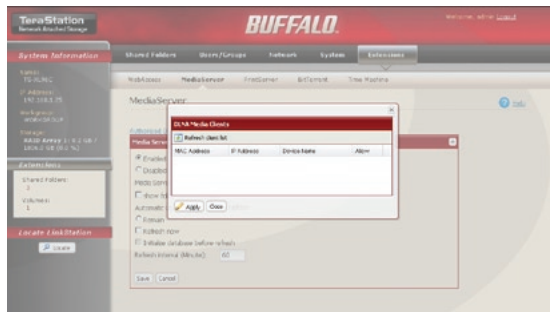
DLNA Media Server

A share on the TeraStation can be streamed to DLNA compatible media players on your network. To configure DLNA media streaming, click on *Modify Settings*.

Highlight *Enabled* and choose the media folder on your TeraStation to share. Click *Save* when done.



Clicking *Authorized DLNA Media Clients* opens this screen, where you can see all of the available media players on your network. Click *Close* when done.



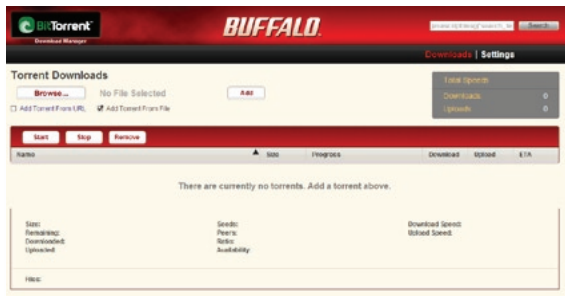
BitTorrent Client

TeraStation's built-in BitTorrent client will download files for you. To enable it, select *Enabled*. Choose a target folder for downloaded files to go to and click *Save*.

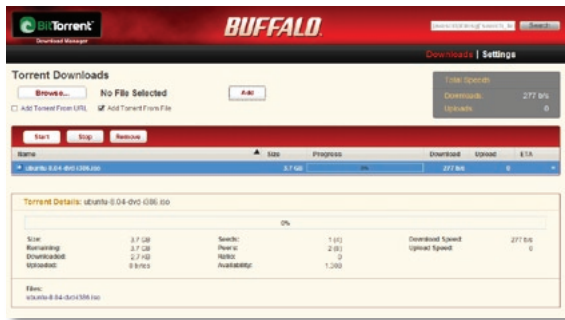


Then, click *Open Download Manager*.





To add a torrent, click *Add* and then *Browse*. Navigate to the torrent file and open it.



The file(s) will automatically download in the background.

Direct Copy

You can copy digital media files directly to the TeraStation from a USB storage device, such as a digital camera, USB flash drive, or external hard disk.

1. Connect your USB device to a USB port on the TeraStation. The function button will glow blue for 60 seconds.
2. While the function button is still glowing blue, press it once.



By default, the folder *yyyyymmdd* is created in *share*, where *yyyy* is the year, *mm* is the month, and *dd* is the day. All files from the source device are copied to this folder.

Remote Access - WebAccess

With Buffalo's WebAccess, you can access your TeraStation from anywhere in the world with an Internet connection. It's easy to access your files, or share them with other people, wherever they may be.

To use WebAccess, *Enable* 'WebAccess Service'.

You may also enable SSL Encryption if desired.

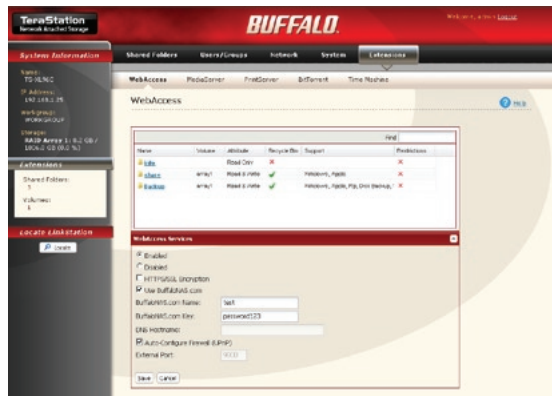
Using 'BuffaloNAS.com' is recommended.

Otherwise, you'll have to manage your own DNS settings.

'Auto-Configure Firewall' is recommended if your router supports UPnP (most do since 2001). If you choose not to enable this, then you must manually configure your router and firewall to forward internal port 9000 to the Internet.

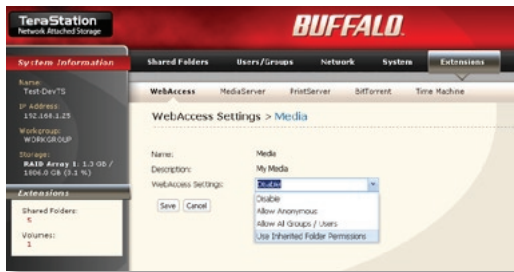
Choose a name for your BuffaloNAS account and a password ("key"). This name is the name that will be used to access your TeraStation and to share with your friends. The password for this protects other people from using it, so picking a strong password is recommended. If you get a message that your chosen account name is already in use, then choose a different account name.

Click *Help* in the top right of the window for detailed information on each setting.





To enable WebAccess for a share, click on the sharename from Extensions/WebAccess.



Choose your desired level of WebAccess from the 'WebAccess Settings' dropdown:

'Disable' will prevent remote access to this share through WebAccess. This is the default setting.

'Allow Anonymous' will allow *anyone* to access the share. Choose this if you want your TeraStation share and all files on it to be freely available to everyone in the world.

'Allow All Groups/Users' will allow only people who have an account on the TeraStation to access this share remotely.

'Use Inherited Folder Permissions' gives each user the same rights to folders remotely that they have locally.

Click the *Save* button to save your changes.

Using WebAccess

To access your TeraStation remotely, open a browser window on any computer connected to the Internet and go to *www.buffalonas.com*.

In the dialog box, type the BuffaloNAS name that you set on page 76.

Alternately, you can go directly to your share by typing *BuffaloNAS.com/your_BuffaloNAS_name* in the URL window.

The folders from your TeraStation's share will appear. Files from anonymous shares will appear to the right. To see files from shares that are not set to anonymous, or to upload files, you will need to *log in*. The 'login' link is on the top left corner of the page.





To access individual folders on the right, click on their *open* links.

Clicking on individual files will give you other options, depending on the filetype.



Uploading Files with WebAccess



To upload files to the TeraStation, click *Upload* in the bottom left corner of the window. Note: This option will only appear if you are logged in and at least one user (besides admin) has been given access to the share.



A new window will open. Click on *Browse* and navigate to the file that you want to upload. Then, click *Upload*.



Your file will be copied to the TeraStation.

Remote Access - FTP

The TeraStation includes FTP server capability, allowing you to access files on it from anywhere. If enabled for a folder, then you can read and save to any files in that folder from anywhere. To use FTP,

- 1: Set up your account. In Users/Groups, make a user account for yourself. For convenience, give this account the same username and password that you use to log in to your computer. Then, you won't have to retype it in each time you access the TeraStation locally.
- 2: In Network Settings/Network Services, enable the FTP service.
- 3: Enable remote access. In Shared Folders Setup, click on the folder that you want to be able to access remotely. It will be named "share" unless you have added new folders to your TeraStation. Enable FTP in Shared Folder Support. Enable Access Restrictions. Give yourself Read or Read and Write permissions. Click 'Apply'. Then, check 'FTP' in Shared Folder Support. Click 'Save'.
- 4: Forward your port. In your router's setup utility, forward port 21 to the LAN-side IP address of the TeraStation.

To access your TeraStation remotely, type *ftp://username:password@ipaddress/array1/share* into a web browser where

username - is your username,

password - is your password,

ipaddress - is the WAN side IP address of your router, and

share - is the name of the folder on your TeraStation that you're accessing.

Error codes

Error Code	Description	Alert Sound
E00	MPU error: Main MPU is not responding.	A
E01	Error on DRAM data line	A
E02	Error on DRAM address line	A
E03	RTC chip error	A
E04	Failed to load kernel (FLASH error)	A
E05	Watch Dog Timer has halted system	A
E06	Cannot load initrd	B
E07	A hard drive was not detected	B
E10	UPS AC line failure	B
E11	FAN Error: Fan rotation speed is low or fan is stopped.	B
E12	Overheating	B
E13	Error has occurred on RAID Array X	B
E14	Cannot mount RAID Array X	B
E15	Bad sectors on hard drive	A
E16	Cannot find hard drive X	B
E17	Cannot communicate with RTC chip	A
E18	Cannot communicate with SATA chip	A
E20	Cannot communicate with USB chip	A
E21	Cannot communicate with Ethernet chip	A
E22	Cannot mount hard drive X	B
E23	HD X has been removed from raid array because of errors	B
E24	Replication error	

Information codes

Code	Description	Alert Sound
I10	Overheating warning	B
I11	Bad sectors on hard drive	B
I12	Operating in degraded mode	B
I13	Formatting array X	
I14	Performing disk check on array X	
I15	Scanning and recovering array X	
I16	Structuring array X	
I17	Resyncing array X	
I18	Rebuilding array X	
I19	Filling array X	
I20	Formatting array X	
I21	Performing disk check on disk X	
I22	Filling disk X	
I23	Initializing system	B
I24	Obtaining an IP address from DHCP	
I25	Updating firmware	
I26	Initializing web configuration	
I27	Checking USB disk	
I28	Formatting USB disk	
I29	Setting quota	
I30	New Hard Drive X is ready. Press the Function button.	
I31	New Hard Drive X is ready to configure.	

Note: Alert sound “A” beeps continuously until you press the power button on the front of the TeraStation once. Alert sound “B” beeps 5 times.

Troubleshooting Multiple Shares

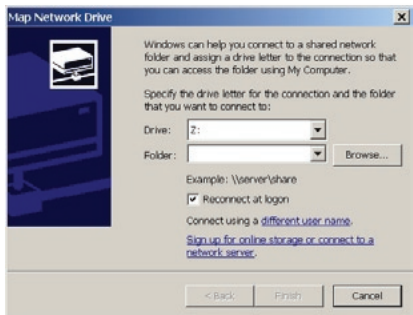


credentials can access or map drive letters for a network resource such as the TeraStation. As such, only one username and password can be used while mapping drives to a PC. If unsecure, unrestricted shares are mapped and then an attempt to map a secure, restricted share is made from the same PC, then this error will occur. To prevent this, you must create all mapped shares using the same login and password information. Please follow the steps on the next page to remedy this problem.

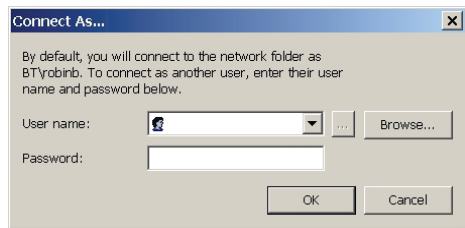
When accessing multiple shares to a Windows PC, you may see this error message.

This is caused by having multiple shares to the same resource using different login credentials. The error occurs when connecting to at least one secure, restricted share. Due to a constraint in Microsoft Windows, only one set of login

Mapping Multiple Shares



When mapping any share, select the *Connect using a different user name* option. A login and password prompt will appear. Use the username and password required by any secure, restricted shares for *all* shares. All mapped shares on a single PC must use the same username and password!



If only unrestricted shares are being mapped, then it's not necessary to set a username and password for shares. Multiple mapped drives to unrestricted shares can exist without a username or password as long as no restricted, secure shares are mapped. If an unrestricted share and a restricted share are being mapped or accessed, use the restricted username and password for the unrestricted share login by using the *Connect using a different user name* option. This will allow a Windows PC to access both shares without any problems.

Hard Drive Replacement

If TeraStation encounters a disk error, an error will appear on the front-panel LCD screen. If notification is configured, you will be sent an error message by email. The LED beside the failed drive will be lit red, indicating that the drive has been disabled and should be replaced.

Turn the key counter-clockwise and open the drive door (or remove the front cover for the TS-RXL rackmount).

Push the lock tab gently to the left and swing out the drive lock.



The hard drive will now slide out.





Slide the new drive into the empty drive slot.



Close the drive lock to secure the hard drive in place.



Hold down the function button until it beeps. The rebuild process may take several hours. Performance will be slower than usual until the rebuild is complete.

LAN Standards:	1000BASE-T IEEE802.3ab, 100BASE-T IEEE 802.3u, 10BASE-T IEEE 802.3
USB:	USB 2.0 (2 sockets for TS-XL/R5 and TS-WXL/R1; 3 sockets for TS-XL/R5)
Compatible OS:	Windows 2000, XP, Vista* Mac OS X 10.3.9 or later
UPS:	SmartUPS Compatible (Serial or USB)
Protocols:	TCP/IP, SMB/CIFS, FTP, FTPS, SFTP, NFS, AFP
Power Consumption:	~60 W nominal (TS-XL/R5) ~110 W nominal (TS-RXL/R5) ~30 W nominal (TS-WXL/R1)
Dimensions:	6.7" x 8.5" x 9.1" (170 x 215 x 230 mm) TS-XL/R5 17.1" x 1.75" x 16.4" (434 x 44.3 x 417 mm) TS-RXL/R5 6.7" x 6.7" x 9.1" (170 x 170 x 230 mm) TS-WXL/R1
Weight:	17.6 lb. (8.0 kg.) for TS-XL/R5 19.9 lb. (9.0 kg.) for TS-RXL/R5 9.9 lb. (4.5 kg.) for TS-WXL/R1
Operating Environment:	41° - 95° F; 20-80% non-condensing

*The TeraStation is also compatible with Windows Server 2003 and Windows Server 2008, but the included installation and backup software are not. Windows Server 2000 is not supported.

Administrator Name: *admin* (cannot be changed)

Password: *password*

Default Shared Folder: *share*

Recycle Bin: *disabled* for share

DHCP Client: *Automatic*. If no DHCP Server is available, then the IP address is assigned randomly to the 169.254.xxx.xxx subnet with subnet mask 255.255.0.0.

Three default groups are always available on the TeraStation: *hdusers*, *admin*, and *guest*. These groups may not be deleted or edited.

Microsoft Network Group: *WORKGROUP*

Ethernet frame size: *1518 bytes*

AFP: *enabled*

FTP Server: *disabled*

NTP: *enabled*

Print Server: *enabled*

WebAccess: *disabled*

Time Machine: *disabled*

TeraSearch: *disabled*

DLNA Media Server: *disabled*

BitTorrent: *disabled*

RAID mode: *4 drives in RAID 5* for TS-XL/R5 and TS-RXL/R5; *2 drives in RAID 1* for TS-WXL/R1

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The source code for Buffalo products that use GPL code is available at <http://opensource.buffalo.jp>.