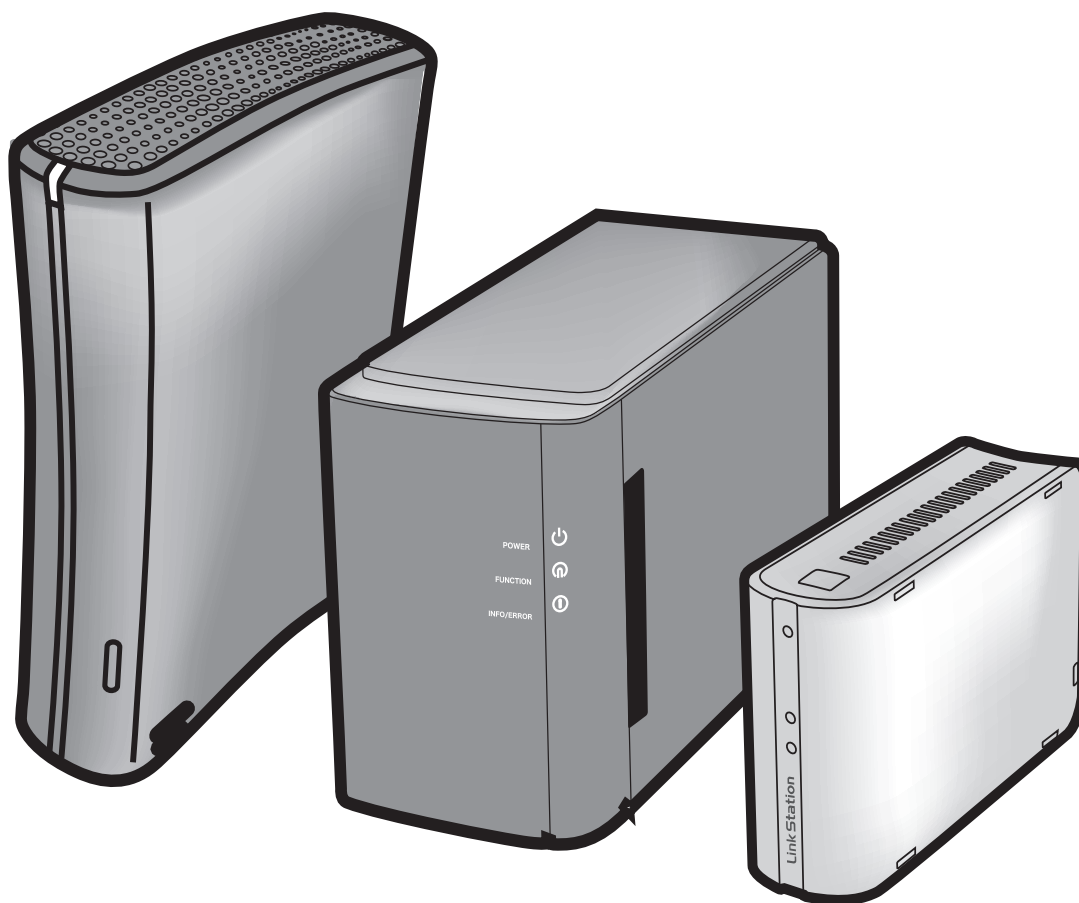


LinkStation Setup Manual



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Chapter 1

Setup

LinkNavigator Setup (LS-XHL, LS-CHL)

To set up your LinkStation (initial setting), from your computer, you will need to install LinkNavigator, which is included on the Utility CD. NAS Navigator2 program, which will also be installed during set up, can be used to open shares on the unit.

In a DHCP network environment, you simply connect this device to the network and power it on to use. It is suggested that the workgroup setting, network drive mapping, date, time and other settings be configured manually using the following procedures.

1 Insert the Utility CD in your computer's CD drive. LinkNavigator will launch.

Note:– If you are using Windows 7 or Vista, the autoplay screen may appear. Click 'Run LSNavi.exe'.


- If "Do you want to allow the following program to make changes to this computer ?" is displayed in Windows 7, please click 'Yes'.
- If "Your permission is necessary to continue program" is displayed in Windows Vista, please click 'Continue'.
- For Mac OS, double-click on the LinkNavigator icon in the utility CD.
- Temporarily disable your anti-virus software and software firewall before installing. You may not be able to set up this device if they are enabled. Refer to the software's manual for instructions. After setup is complete, re-enable the software.

2

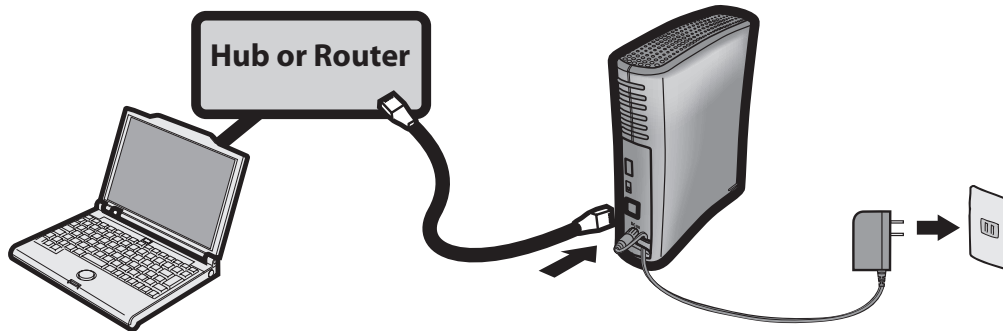


Click [Begin Installation].


The example here shows the Windows' screen (on LS-XHL).

Note: – If this screen is not displayed on Windows, Double click on  icon (LSNavi.exe) included in the Utility CD.

3 Follow the instructions on the screen to connect and set up (initialize) the LinkStation.



4 Now you have completed the setup (initial settings) of your LinkStation.

Click  to close the LinkNavigator.

Then, open the shared folder of the LinkStation using NAS Navigator2 which was installed during setup.

5 Launch NAS Navigator2.

Note: – On Windows, click [start] - [All Programs] - [BUFFALO] - [BUFFALO NAS Navigator] - [BUFFALO NAS Navigator2].

– On Mac OS, double click on [NAS Navigator2] icon in the Dock.



Double click on the LinkStation's icon.

The example here shows the Windows' screen (on LS-XHL).

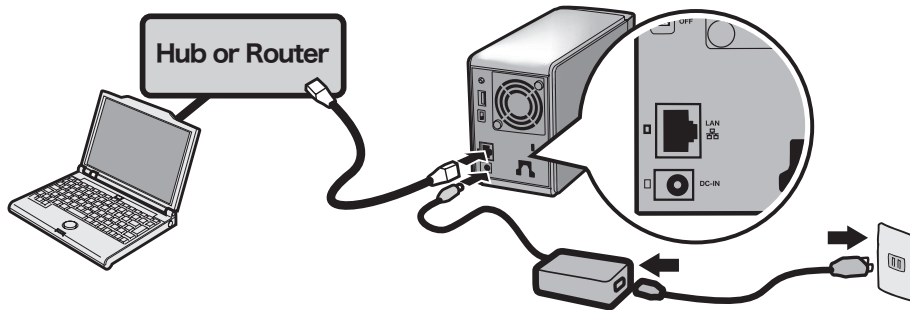
7 The shared folder in the LinkStation is displayed.

Note: – On Mac OS, LinkStation is either mounted as a drive icon on the desktop, or displayed in the sidebar on the Finder.

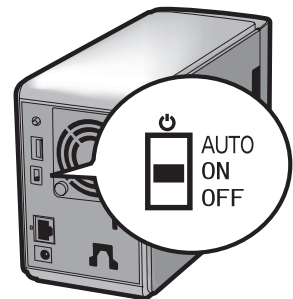
Now you have completed the setup. You can now use the LinkStation's shared folder to save files just like another hard drive.

LinkNavigator Setup (LS-WXL)

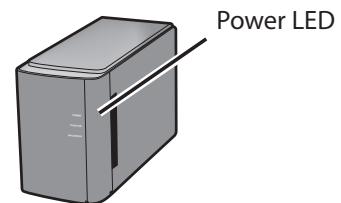
- 1 Connect an Ethernet cable and AC adaptor to the LinkStation.
The Ethernet cable will “click” and lock in place when inserted properly.



- 2 Move the power mode switch on the back of the LinkStation to 'on'.
Note: – Do not set the power mode switch to 'auto' at this time. After the initial installation is complete, then the auto power mode may be used.




- 3 Wait until the power LED stops blinking and becomes a steady blue.



- 4 Insert the Utility CD in your computer's CD drive. LinkNavigator will launch.
Click 'Begin Installation'.



If LinkNavigator doesn't open, open the Utility CD and double-click 'LSNavi.exe' icon . The screen is an example of execution with Windows.

- Note: – If you are using Windows 7 or Vista, the autoplay screen may appear. Click 'Run LSNav.exe'.
- If "Do you want to allow the following program to make changes to this computer?" is displayed in Windows 7, please click 'Yes'.
 - If "Your permission is necessary to continue program" is displayed in Windows Vista, please click 'Continue'.
 - For Mac OS, double-click on the LinkNavigator icon in the utility CD.
 - Temporarily disable your anti-virus software and software firewall before installing. You may not be able to set up this device if they are enabled. Refer to the software's manual for instructions. After setup is complete, re-enable the software.
 - If your computer doesn't have a CD drive, you may download the LinkNavigator software from www.buffalotech.com.

5



Click 'Finish'. NAS Navigator2 starts automatically.

6



In NAS Navigator2, double-click your LinkStation's icon.

7

The LinkStation's shared folder opens. You can now use the LinkStation's shared folder to save files just like any other hard drive.

You can now use the LinkStation's shared folder to save files just like another hard drive.

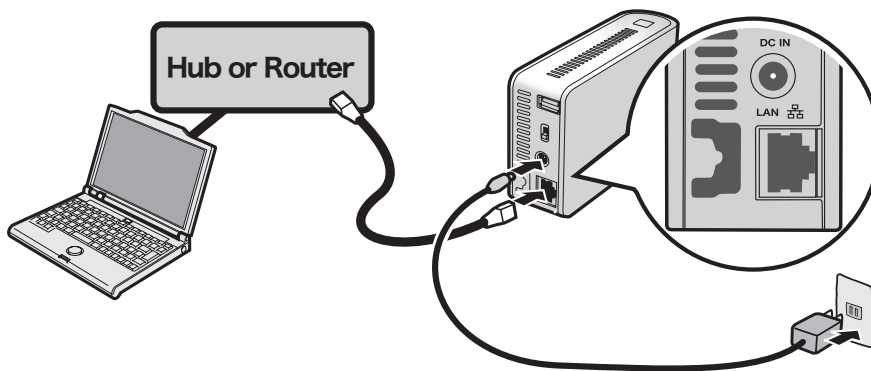
Note: – With Mac OS, the LinkStation is mounted as a drive icon on the desktop, or it is displayed in the sidebar of the Finder.

Setup is now complete.

LinkNavigator Setup (LS-WSXL)

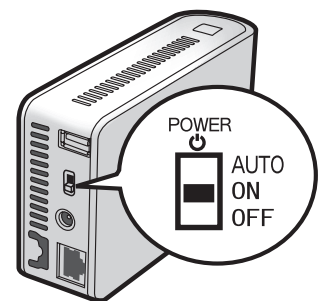
- 1 Connect an Ethernet cable and AC adaptor to the LinkStation.

The Ethernet cable will “click” and lock in place when inserted properly.

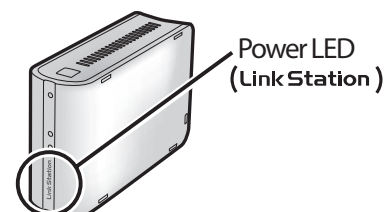


- 2 Move the power mode switch on the back of the LinkStation to 'On'.

Note: – Do not set the power mode switch to “Auto” at this time. After the initial installation is complete, then the auto power mode may be used.



- 3 Wait until the power LED stops blinking and becomes a steady blue.



- 4** Insert the Utility CD in your computer's CD drive. LinkNavigator will launch.
Click 'Begin Installation'.



Note:- If LinkNavigator doesn't open, open the Utility CD and double-click 'LSNavi.exe'.

- If you are using Windows 7 or Vista, the autoplay screen may appear. Click 'Run LSNavi.exe'.
- If "Do you want to allow the following program to make changes to this computer?" is displayed in Windows 7, please click 'Yes'.
- If "Your permission is necessary to continue program" is displayed in Windows Vista, please click 'Continue'.
- For Mac OS, double-click on the LinkNavigator icon in the utility CD.
- Temporarily disable your anti-virus software and software firewall before installing. You may not be able to set up this device if they are enabled. Refer to the software's manual for instructions. After setup is complete, re-enable the software.
- If your computer doesn't have a CD drive, you may download the LinkNavigator software from www.buffalotech.com.

5



Click 'Finish'. NAS Navigator2 starts automatically.

6



If the screen on the left side is displayed, double-click the icon of LinkStation displayed on the screen of NAS Navigator2.

7

The shared folder in LinkStation is displayed.

You can now use the LinkStation's shared folder to save files just like another hard drive.

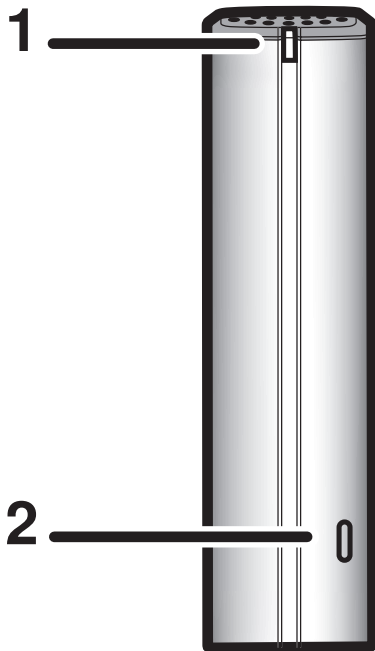
Note: – On Mac OS, LinkStation is mounted as a drive icon on a desktop screen or it is displayed in the sidebar of Finder.

Setup is now complete.

Diagrams and Layout (LS-XHL, LS-CHL)

The following list shows the name of each component of the LinkStation.

Front



1 Power LED

Blue light is ON: Power ON

Blue light is OFF: Power OFF

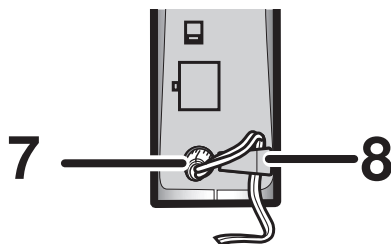
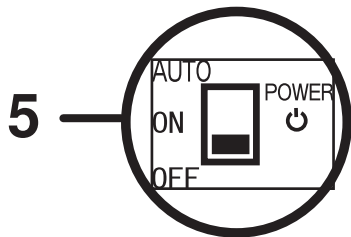
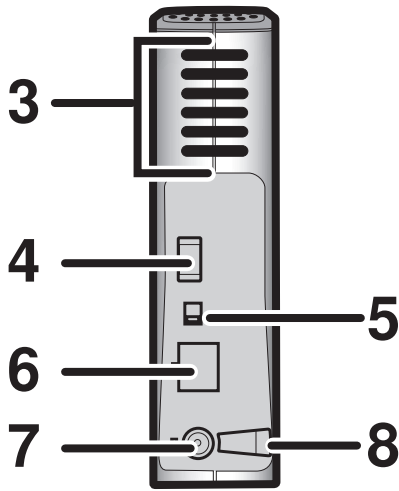
Amber light is flashing: The amber light flashes if there is a message. Flashing pattern varies depending on each message. For more information, refer to "Status LED" on page 72.

Red light is flashing: Red light flashes when an error occurs. Flashing pattern varies depending on each message. For more information, refer to "Status LED" on page 72.

2 Function switch

This is used for the Direct Copy function (function to copy media files on storage device to LinkStation), for removing USB devices which is connected to the LinkStation or for initializing settings of the LinkStation. Refer to "Direct Copy" on page 60, "Remove a USB device" on page 61, and "Initialization" on page 43 for more information.

Back



3 Fan

Do not block the fan when installing the unit.

4 USB Connector (USB 2.0/1.1 Series A)

A USB Mass Storage device, a card reader (except one that recognizes more than 2 memory cards), a UTP device, such as a digital camera, compatible UPS devices, or a compatible USB Printer, may be connected to the LinkStation USB port on the back of the unit. USB devices such as USB hub, mouse or keyboard may not be used.

5 Power Mode Switch

AUTO: Power the LinkStation automatically when the PC is on.

ON: Turn the LinkStation ON.

OFF: (The factory default) Turn the LinkStation OFF.

6 LAN Port Connect a Ethernet cable.

The LED next to the LAN port is the LINK/ACT LED. The LED will turn green when the unit is Linked, and flashes green when there is network activity.

7 Power Connector Connect the AC cable.

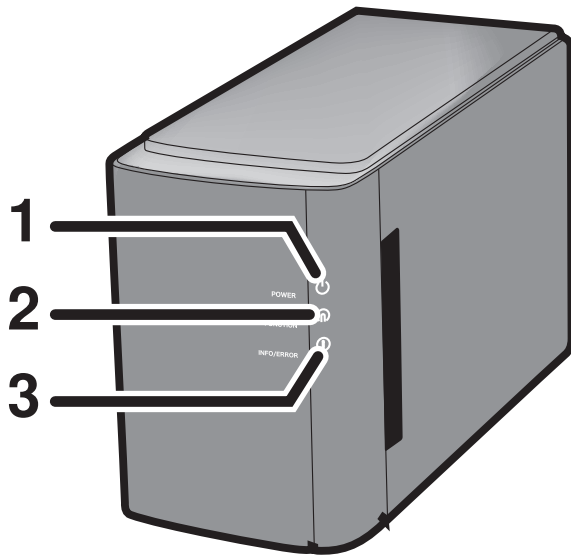
When the AC adapter is connected, the LED light next to the power connector will turn green.

8 Hook Used as a strain relief for AC Adapter cable..

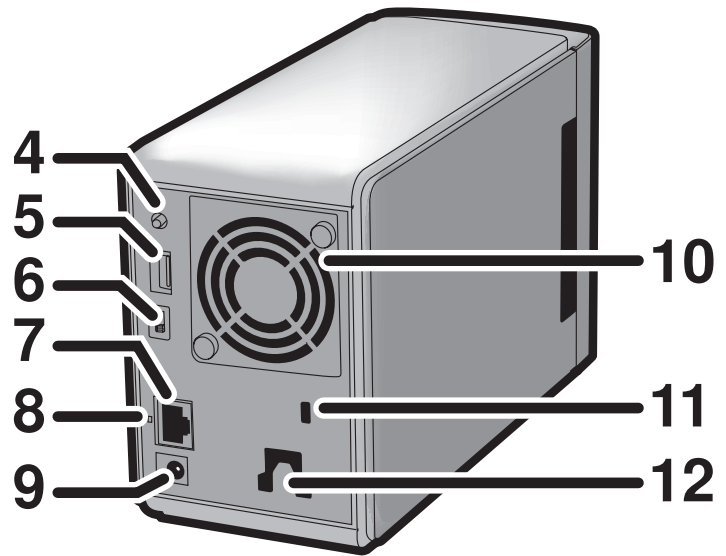
Diagrams and Layout (LS-WXL)

The following list shows the name of each component of the LinkStation.

Front



Back



Note: – Please do not lift the LinkStation by its front cover. It might come off.

1 Power LED

Blue LED: Power on.

LED is off: Power off.

Blinks blue: During startup / shutdown.

2 Function LED

The Function LED glows blue when direct copy is finished, during initialization, and during USB dismounting (about 60 seconds). During direct copy the Function LED blinks blue.

3 Info/Error LED

The Info/Error LED blinks orange when there's a message and red when there's an error.

4 Function Switch

The Function Switch initiates direct copy, dismounts USB devices, and is used to initialize the LinkStation.

5 USB connector (USB 2.0/1.1 Series A)

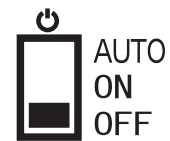
A USB storage device, card reader (except one that recognizes more than 2 memory cards), digital camera, or USB Printer may be connected to the USB port on the back of the LinkStation. USB hubs, mice, and keyboards are not supported.

6 Power mode switch

AUTO: The LinkStation turns on and off automatically with your PC (s).

ON: The LinkStation boots and is operational.

OFF: The LinkStation shuts down.



7 LAN port

Connect to your LAN with an Ethernet cable.

8 Link/Act LED

Glows green for connection.

Blinks green for access.

9 Power connector

The AC adaptor connects here.

10 Fan

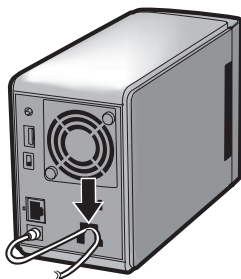
Do not block the fan when installing the unit.

11 Security lock for anti-theft

Many security cables are compatible with this lock.

12 Hook

Secure the power cable so that it doesn't come off by mistake. Slide the cable down to secure.

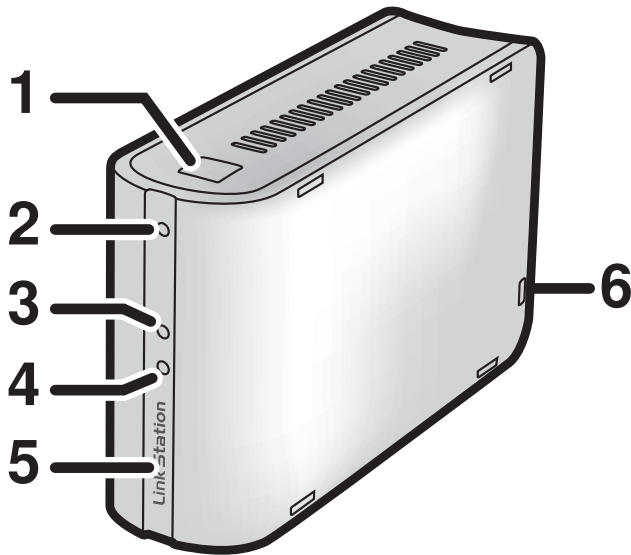


The inserted cable is fixed in the hook by sliding it in the downward direction.

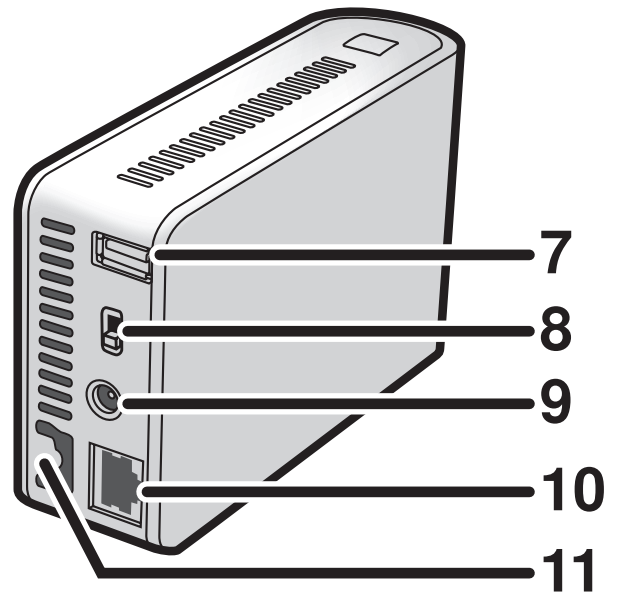
Diagrams and Layout (LS-WSXL)

The following list shows the name of each component of the LinkStation.

Front



Back



1 Function button

The function button initiates direct copy, dismounts USB devices, and is used to initialize the LinkStation.

2 Function LED

The Function LED glows blue when direct copy is finished, during initialization, and during USB dismounting (about 60 seconds). During direct copy the Function LED blinks blue.

3 Link/Act LED

Glows green for connection.
Blinks green for access.

4 Info/Error LED

The Info/Error LED blinks orange when there's a message and red when there's an error.

5 Power LED (LinkStation)

Blue LED: Power on.

LED is off: Power off.

Blinks blue: During startup / shutdown.

6 Security lock for anti-theft

Many security cables are compatible with this lock.

7 USB connector (USB2.0/1.1 Series A)

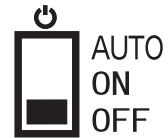
A USB Mass Storage device, a card reader (except one that recognizes more than 2 memory cards), a UTP device, such as a digital camera, compatible UPS devices, or a compatible USB Printer, may be connected to the LinkStation USB port on the back of the unit.

8 Power mode switch

Auto: The LinkStation turns on and off automatically with your PC(s).

On: The LinkStation boots and is operational.

Off: The LinkStation shuts down and turns off.



9 Power connector

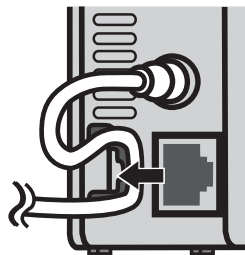
The AC adaptor connects here.

10 LAN port

Connect to your LAN with an Ethernet cable.

11 Hook

Secure the power cable so that it doesn't come off by mistake. Slide the cable down to secure.



The inserted cable is fixed in the hook by sliding it in the downward direction.

Chapter 2

Using your LinkStation

Open Shared Folder

1 Launch NAS Navigator2.

Note: – On Windows, click [start] - [All Programs] - [BUFFALO] - [BUFFALO NAS Navigator2] - [BUFFALO NAS Navigator2].

– On Mac OS, double click on [NAS Navigator2] icon in the Dock.



Double click on the LinkStation's icon.

The example here shows the Windows' screen (on LS-XHL).

3 The shared folder of the LinkStation is displayed.

Note: – On Mac OS, LinkStation is mounted as a drive icon on the desktop, or displayed in the sidebar on the Finder.

You can now use the LinkStation's shared folder to save files just like another hard drive.


Open shared folder from the second PC

You will not have to perform the setup (initial settings) again if you have already set up the LinkStation from one computer.

You will have to install NAS Navigator2 on each additional computer, to open the LinkStation shared folders.

1 Insert the Utility CD in your computer's CD drive. LinkNavigator will launch.

Click 'Begin Installation'.

Note: – If LinkNavigator doesn't open, open the Utility CD and double-click  'LSNavi.exe'.

- If you are using Windows 7 or Vista, the autoplay screen may appear. Click 'Run LSNavi.exe'.
- If "Do you want to allow the following program to make changes to this computer?" is displayed in Windows 7, please click 'Yes'.
- If "Your permission is necessary to continue program" is displayed in Windows Vista, please click 'Continue'.
- For Mac OS, double-click on the LinkNavigator icon in the utility CD.

2



Click [Options] - [Additional Software Installation].

For Mac OS, click [Install NAS Navigator].

3 Follow the instruction on the screen to install NAS Navigator2.

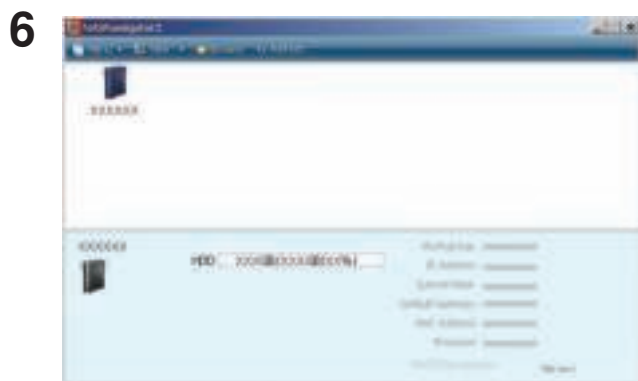
4 After NAS Navigator2 is installed, click  on the right top of the LinkNavigator to close it.

Then, open the shared folder of the LinkStation using NAS Navigator2 which was just installed.

5 Launch NAS Navigator2.

Note: – On Windows, click [start] - [All Programs] - [BUFFALO] - [BUFFALO NAS Navigator2] - [BUFFALO NAS Navigator2].

– On Mac OS, double click on [NAS Navigator2] icon in the Dock.



Double click on the LinkStation's icon.

7 The shared folder in the LinkStation is displayed.

Note: – On Mac OS, LinkStation is mounted as a drive icon on the desktop, or displayed in the sidebar on the Finder.

Setup is completed.

You can now use the LinkStation's shared folder to save files just like another hard drive.

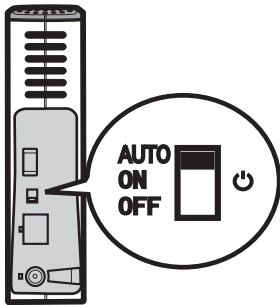
Adding the LinkStation

You will have to run the LinkNavigator for each LinkStations that you add to your network. (You cannot set up multiple LinkStations at the same time.)

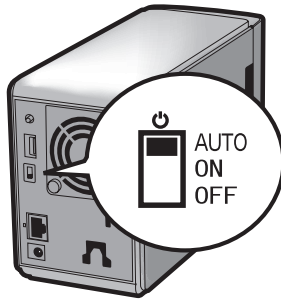
Power Mode Switch

The LinkStation automatically turns ON or OFF with your computer. Install NAS Navigator2 on a computer and set "Auto Power Management feature".

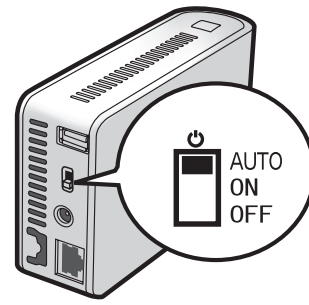
LS-XHL, CHL



LS-WXL



LS-WSXL



Auto: LinkStation automatically turns off when computers with NAS Navigator2 installed turn off. The LinkStation automatically powers on when any of the computers on the network power on. (The LinkStation uses very low power consumption using this feature)

On: The LinkStation stays on, even when computers are off.

Off: Turns LinkStation off. (Factory default)

Note: – Damage can occur to the LinkStation if the AC adapter is removed while in the ON position.

- Some environment may not recognize "AUTO" or this unit may not synchronize with the computer's power behavior. When this occurs, switch it to "ON".
- It may take a while until the Power LED turns off after you turn off your computer.
- Set the Power switch to "ON" position when you set up the LinkStation. Otherwise (or when it is set to "AUTO"), the LinkStation may shutdown during the setup. After the initial setup, switch it to "AUTO" to synchronize with the power of your computer.
- If the LinkStation is off while using the power linking feature with PC due to a power outage or AC adapter is removed, switch the Power switch to ON and boot LinkStation. Put the Power Switch back to the "AUTO" position after LinkStation boot up, enabling the power linking feature with PC.
- Keep in mind that immediately after the Power switch is switched to the "ON" or "AUTO" position, the LinkStation will not shut down for about 5 minutes while it checks the status of your computer.
- The LS-WXL and LS-WSXL don't automatically shut down during RAID initialization or rebuild. If the attached personal computer is shut down during RAID initialization or rebuild, the LinkStation will complete the RAID initialization or rebuild before shutting down.

Web Administration Tool

To display the LinkStation configuration screen, follow the procedure below.

1 Launch NAS Navigator2.

Note:– On Windows, click [start] - [All Programs] - [BUFFALO] - [BUFFALO NAS Navigator2] - [BUFFALO NAS Navigator2].

– On Mac OS, double click on [NAS Navigator2] icon in the Dock.

2



Right click on the LinkStation icon (on Mac OS click the icon while holding down the control key), select [Open Web Admin] in the displayed menu.

Note: – When the total of more than 2 LinkStations and TeraStations are connected on the same network, multiple icons will be displayed. Select the LinkStation you want to display.

– When selecting the LinkStation icon, you can verify individual information of LinkStation such as IP address.

3



Enter your user name and password, and click [Login].

Note: – To display the configuration screen, use the following user name and password.

User name: admin

Password: password

After you login, change the password for security purposes. Refer to page 42.

4



The configuration screen is displayed.

Note: – The current status of the LinkStation (a LinkStation name, IP address, workgroup and hard disk information) is displayed.

Now displaying the LinkStation's configuration has been completed.

Note: – Compatible browsers for the configuration screen are Internet Explorer 6.0 Service Pack 2 or later, Firefox 1.5 or later, and Safari 3 or later. The configuration screen may not be displayed properly in any other browser which is not listed above. For Windows, install Internet Explorer 6.0 Service Pack 2 or later or Firefox 1.5 or later. For Mac OS X 10.3.9, install Firefox 1.5 or later. For Mac OS X 10.4, install Safari 3 or later, or Firefox 1.5 or later.

The configuration screen contains the following items.



- Shared folders

You can add/delete shared folders, set access restrictions, and configure for a direct copy.

- Users/Groups

Register and delete users/groups.

- Networks

Register and delete a network or workgroup.

- Systems

Perform Name, time, disk check format, backup, mail notification settings, timer ON/OFF, UPS synchronization settings, initialization, and complete disk format.

- Extension

Configure for WebAccess, Print Server, and Time Machine.

Add a shared folder

To add a shared folder, use the following procedure.

Note: – Refer to page 20 for the procedures to display the configuration screen.

1



In the LinkStation configuration screen, click [Create Folder] in [Shared Folders].

2



1 Set a shared folder name, attributes and other settings.

Note: – If you would like to copy the settings of an existing folder, select a source folder at [Copy Settings From].

2 Click [Save].

Now you have created a new shared folder.

To protect your data in a shared folder accidentally being deleted (Using Recycle Bin).

You can configure a recycle bin for each folder on the configuration screen above (Not available for AppleTalk and FTP connections). It is just like a recycle bin on your OS. Deleted data in a shared folder will be temporarily moved to a [Recycle Bin] folder. To recover deleted data, open the [Recycle Bin] folder and move files.

To set a shared folder to Read-only

A shared folder will become Read-Only when you select the [Read Only] attribute of a shared folder in the Shared Folder Configuration screen and click [Save].

Note: – This is set to [Read & Write] by factory default.

- A shared folder whose attribute is set to Read Only cannot be written by any users or groups who has a privilege to read and write, therefore this folder will be read only for all users.
- A shared folder whose attribute is set to Read Only or a USB hard disk with NTFS/HFS+ format, the message "(Read Only)" is added to the descriptions of that share folder.

Adding Users

To add a user, use the following procedure.

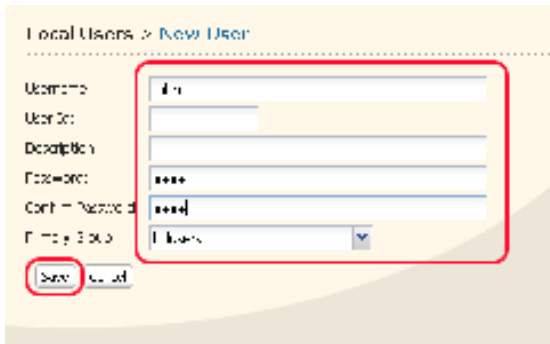
Note: – Refer to page 20 for the procedures to display the configuration screen.

1



- 1 Click [Users/Groups] - [Local Users] on the Link-Station configuration screen.
- 2 Click [Create User].

2



- 1 Enter a name and descriptions of a user.
- 2 Click [Save].

Now you have completed adding a user.

- Use the same user name and password for LinkStation as Window's network login. If these values are different, a shared folder which you have set access restrictions cannot be accessed.

Also, you cannot access a shared folder even though the screen to enter a user name and password is displayed if the network login name is different on Windows 7/Vista/XP/2000 and Windows Server 2003/Server 2008. You must login to Windows using the user name and password set here. To confirm an owner, use the following procedure.

- In properties screen of each file or folder, open a new window using [Security] tab - [Advanced Settings] button, and verify in the [Owner] tab.
- Right click on the bar on which [Name], [Size], [Type], and [Date Modified] and other information regarding My Computer or Explorer are displayed, you can select information to be displayed. From the menu popped up by right clicking, you can verify [Owner].(The procedure to check an owner is different for each OS. The example above shows for Windows XP.)

Adding Groups

To add a group, use the following procedure.

Note: – Refer to page 20 for the procedures to display the configuration screen.



- 1 Click [Users/Groups] - [Local Groups] on the LinkStation configuration screen.
- 2 Click [Create Group].



- 1 Enter a group name and description for that group.
Note: – If a group ID is left blank, a group ID will be automatically assigned.
- 2 Select users who join a group, click [Add].
- 3 Click [Save].

Now you have completed adding a Group.

Access Restrictions

Use the following methods to restrict users on the LinkStation.

Access restrictions for locally registered users

Follow the procedures described on page 28.

Access restrictions on NT Domain

Follow the procedures described on page 30.

Access restrictions on Active Directory

Follow the procedures described on page 27.

Access restrictions by using Delegate Authority server feature

Follow the procedures described on page 34.

Note: – You can set access restrictions per shared folder, but you cannot set restrictions to folders in a shared folder.

- User/Group permissions can not be set from the security tab on the properties screen of a folder when using a Windows SMB server.

Access restrictions for locally registered users

You can set the access restrictions for shared folders by user name and group name for locally registered users.

1 If you are using Windows, create a new Windows user account and set a password.
 You can create a user account and password for Windows in the [User Accounts] within Control Panel.
 If you do not want to create a new account, write down an account and password which has been already registered on Windows.

2 Register a user and group for the LinkStation.

- 1 Register a user name that will use the LinkStation.
 Follow the procedures described in “Adding Users” on page 24.
- 2 Register a group name that will use the LinkStation.
 Follow the procedures described in “Adding Groups” on page 26.

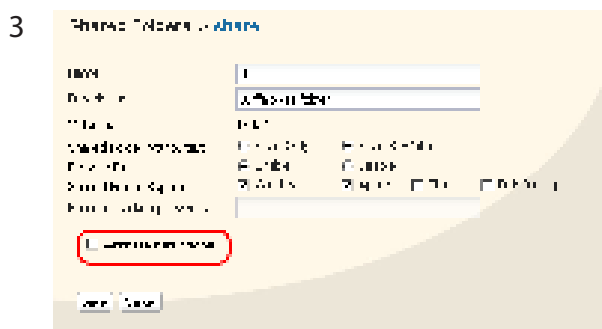
3 Set the access restrictions for shared folders.

Note: – Refer to page 20 for the procedures to display the configuration screen.

- 1 In the LinkStation configuration screen, click [Shared Folders] - [Folder Setup].



Click a shared folder you want to set access restrictions for.



Click the checkbox for [Access Restrictions].

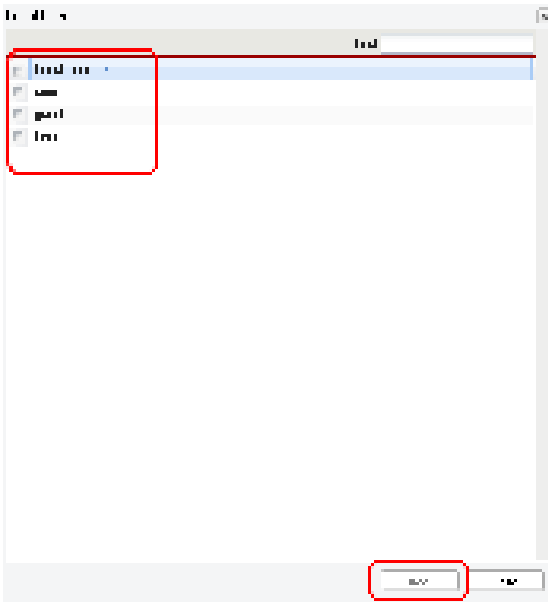
4



Click [Add].

Note: – The procedure described here shows an example of how to set the access restrictions for local users. To set the access restrictions for local group, click [Local Groups]-[Add].

5



1 Click a user you want to permit to access, and insert a checkmark.

Note: – If you have selected [Local Groups] in Step 4, click the group you want to permit to access.

2 Click [Add].

6



Select privilege of the user or group you added.

7 Click [Save].

Now you have completed the settings for access restrictions.

If you log on from a Microsoft Network Domain, you can set the access restrictions with the user names/group names which are registered on the domain.

If the read-only and writable privileges are both given to a specific user, that user will have read-only access.

Access Restrictions on NT Domain

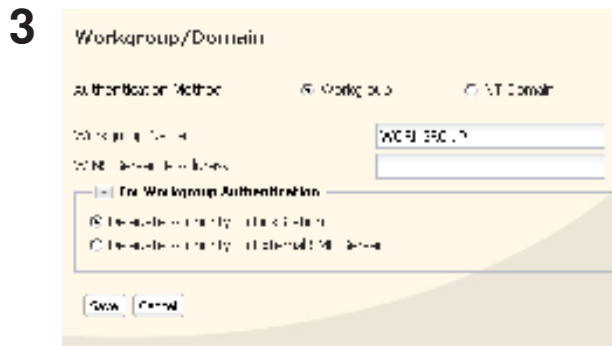
The LinkStation can download users, groups, and passwords from an NT Domain server. This procedure is recommended for system administrators only.

1 Create an account on the Domain Controller for the LinkStation.

Note: – If there is an option to “Accept accounts for computers with Windows 2000 or earlier”, then select it.



Click [Network] - [Workgroup/Domain] - [Modify Settings] in the Web Admin tool



- 1 Select [NT Domain].
- 2 Select [NT Domain Name].
- 3 Select [NT Domain Controller Name].
- 4 Enter an Administrator password.
- 5 Enter an Administrator password.
- 6 Enter WINS Server IP Address
- 7 Click [Save].

4 Follow the instructions on page 28 to add Access Restrictions to Domain Users/Domain Groups.

Note: – Domain names can contain up to 15 alpha-numeric letters. Hyphens, underscores, and periods may be used.

- Don’t use a number or symbol as the first letter of a domain name.
- Domain controller names can contain up to 12 alpha-numeric letters. Hyphens, underscores, and periods may be used. Don’t use a number or symbol as the first letter of a domain name.

Restrictions

If you change the LinkStation's Name, you will no longer be able to use Domain Users/Groups or access restrictions. Rejoin the domain.

If a domain user name contains more than 20 characters, the LinkStation truncates it to 20 characters.

The LinkStation only downloads the first 1000 users or the first 1000 groups from a Domain Controller.

If you operate LinkStation as a member server of NT Domain or Active Directory Domain, you cannot connect as a guest user via AFP.

When you change the user or group settings on the domain controller, these changes may not take effects immediately on LinkStation. If you need to reflect changes on the domain controller immediately, reboot LinkStation.

While you are operating LinkStation as a member server of NT Domain or Active Directory and you change the [Authentication Method] in [Network] - [Workgroup Settings] to [Workgroup] on the Web Admin tool, the computer account on the domain controller will not be deleted automatically.

If it has already joined the domain network, you cannot connect to the LinkStation via FTP using a domain user account.

Access Restrictions on Active Directory

The LinkStation can download users, groups, and passwords from an Active Domain server. This procedure is recommended for system administrators only.



Click [Network] - [Workgroup/Domain] - [Modify Settings] in the Web Admin tool.



- 1 Select [Active Directory].
- 2 Enter an Active Directory Domain Name (Net-BIOS name).
- 3 Enter an Active Directory Domain Name (DNS name).
- 4 Enter an Active Directory Domain Controller Name (Computer name).
- 5 Enter an Administrator password.
- 6 Enter an Administrator password.
- 7 Enter WINS Server IP Address
- 8 Click [Save].

3 Follow the instructions on page 28 to add Access Restrictions to Domain Users/Domain Groups. You have completed the settings for this feature.

Restrictions when administrating in Active Directory Domain

When you have the LinkStation joined to an Active Directory domain, you must specify the DNS Server which can resolve names for Active Directory domain.

After building an Active Directory domain, the administrator's password which is needed to join the Active Directory Domain must be changed at least once, or joining the Active Directory domain will fail.

Active Directory domain's DNS name and NetBIOS name must be identical.

If there are more than 5 minutes differences between the LinkStation's clock and the Domain controllers' clock, joining the domain or authenticating domain user or group may fail.

Access restrictions by using the Delegate Authority server feature

Follow the below procedure to permit access by administration all user accounts and passwords that access LinkStation using a delegate server.

The network administrators or a person who has proper knowledge regarding Microsoft should complete this procedure. Consult your network administrator for details.

- Setting access permission per user/group from the properties screen security tab is not supported when using a SMB server.

There are restrictions when administrating through delegate authority server. You must read restrictions below.

- You cannot set access restrictions if you do not access the LinkStation while logged in to Windows using the account information.
- If you are not accessing the LinkStation while logging into Windows using the account information registered to the authentication server.
- You cannot connect as a guest user via AFP if you use the Delegate Authority option.
- You cannot connect as anonymous via FTP if you use the Delegate Authority option.

For Windows Vista, Windows Server 2003/Server 2008 Users

When using Delegate Authority to External SMB server feature to restrict access, you need to change the security settings on Windows Vista, Windows Server 2003/Server 2008.

Select [Start] - [Programs] - [BUFFALO] - [File Sharing Security Level Change Tool] - [File Sharing Security Level Change Tool], and then select [Change security level] to change the security settings (Select "Recover default security level" change it back to the previous setting).

Note: – "File Sharing Security Level Change Tool" can be installed only on Windows Vista using the CD included.

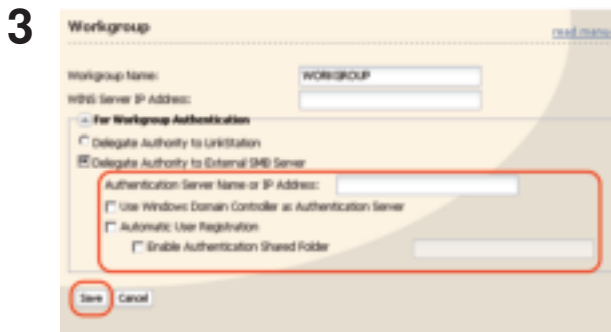
- During the initial setup, the message, "Start changing file sharing security level. Will you continue?" will be displayed. If you click [Yes], follow the instructions on the screen and restart your PC .



- 1 Click [Network] - [Workgroup] on the LinkStation configuration screen.
- 2 Click [Modify Settings].



- 1 Enter the workgroup name.
- Note: – If you specify the Windows Domain Controller as an external SMB authentication server, you need to match the workgroup of this unit to the Windows Domain Controller name.
- 2 Select [Delegate Authority to External SMB Server].



- 1 Enter the name or IP address of an authentication server.
- Note: – When connecting using AFP and FTP, always use an IP address. It may not be authenticated if a server name is used.
- 2 Click [Use Windows Domain Controller as Authentication Server] and [Automatic User Registration] to insert check marks.
 - 3 Click [Enable Authentication Shared Folder] to insert the check mark, and enter the shared folder name for the authentication test.
 - 4 Click [Save].

4 You can restrict the access to the shared folder by the user name selected.

A user that has been registered to the specified authentication server will be automatically registered as a LinkStation's user when he/she opens the shared folder for authentication (you can also register users directly).

A user who is automatically registered will belong to the "hdusers" group. They can be set to belong to any group from the Group settings.

You can restrict the access to the shared folder by the user name obtained.

Names of users who are registered are listed in the [Users/Groups] - [External Users]. To delete a user, select a user and click [Delete].

When connecting using AFP and FTP, always use an IP address. It may not be authenticated if a server name is used.

Enter the IP address when specifying a server in other segment (such as the network over the router).

AFP connection and FTP connection does not allow to obtain user information by delegating authority to external SMB server.

Now you have completed the settings for the Authentication Server.

RAID Arrays

Several RAID modes are available for LS-WXL and LS-WSXL LinkStations. LinkStations with only one hard drive do not support RAID modes.

Note:- All data is lost when the RAID mode is changed. Back up any important data before changing RAID modes.

- In this document, "Recovery" means putting the LinkStation back to the state it was in before the malfunction happened. It does not mean reading data from broken hard drives.
- When the use mode of the hard disk is changed, all the data in the hard disk gets deleted. Please take back-up before changing use mode so that the important data will not be lost.

• RAID 1 mode

Uses 2 hard drives in a mirrored array. One drive's worth of space is usable. Identical data is written to both drives. If one drive is damaged, data can be recovered by replacing the damaged drive.

• RAID 0 mode(LS-WXL, LS-WSXL Default Settings)

Multiple hard drives are combined into a single array. The total capacity of all drives is usable. This is the fastest of the LinkStation's RAID modes. If any drive is damaged, all data on the array is lost.

• Normal Mode

Each drive is accessible as a separate, individual drive. The total capacity of each drive is usable. If any drive is damaged, all data on that drive is lost.

• Using in RAID 1 mode

1 Change system to normal mode (page 41).



Navigate to [System] - [Storage] - [RAID Array] in the Web Admin tool.



Click the array you want to configure.



Select both drives.



- 1 Select [RAID 1].
- 2 Click [Create Raid Array].

6 The confirmation screen will appear. Enter the number shown in the [Confirmation Number] field within 60 seconds, and click [Apply].

7 Follow the instructions displayed on the screen.

You have set up a RAID 1 array. Turn to page 22 to create a shared folder.

Note: –If power is turned off during a RAID rebuild, the RAID rebuild will continue when power is restored. (Example: In LinkStation of 1TB when power supply is changed from OFF to ON after lapse of 3 hours from construction of RAID then reconstruction of RAID should start in remaining 3 hours).

Confirmation screen

When you perform any of the following tasks, a confirmation screen is displayed . To continue, enter the displayed number within 60 seconds and click [Apply].



Confirmation Screen

- Change RAID array (Create/Delete)
- Delete Folder
- Restore Factory Defaults
- Format LinkStation
- Format Array or Disk
- Remove Disk
- Rebuild RAID array

• **Changing to RAID 0 mode**

1 Change system to normal mode (page 41).



Navigate to [System] - [Storage] - [RAID Array] in the Web Admin tool.



Click the array you want to configure.



Select all available hard drives.



- 1 Select [RAID 0].
- 2 Click [Create Raid Array].

6 The confirmation screen will appear. Enter the number shown in the [Confirmation Number] field within 60 seconds, and click [Apply].

7 Follow the instructions displayed on the screen.

You have set up a RAID 0 array. Turn to page 22 to create a shared folder.

• **Changing to Normal mode**



Navigate to [System] - [Storage] - [RAID Array] in the Web Admin tool.



Select the array you want to configure.

3 Click [Create RAID Array].

4 When [Are you sure you want to change RAID mode?] is displayed, click [Apply].

5 The confirmation screen will appear. Enter the number shown in the [Confirmation Number] field within 60 seconds, and click [Apply].

6 Follow the instructions displayed on the screen.

You have set up a Normal mode. Turn to page 22 to create a shared folder.

Changing the administrator user name and the password

Setting for the administrator user name and the password of LinkStation.

1 On a setting screen of LinkStation, [User /group] [Local Groups] is clicked.



Select the user name (It is admin in initialization) on the top and click the 'Edit User'.



1 Enter the user name, the password, and the password for the confirmation.

2 Click [Save].

Note: – In case of the access restriction for which the administrator user is specified, the WebAccess cannot be used. Please use the administrator user name as a user name when login in LinkStation Web Administration Tool.

Now you have completed the setting of administrator's password.

Initialization

To restore the LinkStation to its factory default settings, follow the procedure below.

- 1** Move the power switch to 'ON' while holding down the function button. The function button will flash blue for 1 minute.
- 2** While the function button is flashing, press it again. The status LED will flash blue, then amber. Initialization will take 2 – 3 minutes.
- 3** When the flashing status LED turns solid blue, initialization is complete.

Note: – When the LinkStation is initialized with this process, only the IP address, Ethernet frame size settings, and admin password are reset to factory defaults. You have the option to not initialize the admin password if desired. Other settings can be initialized from the Web Admin Tool.

- To keep the current admin password, select the [Keep current admin password] option.
- If [Keep current admin password] is selected, you will not be able to reset the admin password if you forget it. Write the password down and keep it in a safe place!
- Before rerunning the LinkStation's original installation program, initialize the LinkStation (including the admin password) from the Web Admin Tool.

Initialization of the LinkStation's configuration has been completed.

Initialization on the configuration screen

On the LinkStation configuration screen, you can initialize following settings in addition to the initialized items described above.

Note: – The following settings will be initialized; LinkStation name, Description, NTP settings, Workgroup settings, Shared service settings, the access restrictions of the shared folder, User settings, User group, mail notification feature settings, UPS synchronization settings, Backup Settings, Administrator's password, Print server function, WebAccess feature, Language settings, Timer ON/OFF, HDD spin down, Media server, BitTorrent, and Time Machine.

1



Click [System]-[Restore/Format] on the LinkStation configuration screen.

2 Click [Restore LinkStation].

3 The [Confirm Operation] screen will be displayed.

Enter the exact same number as shown in the [Confirmation Number] field within 60 seconds, and click [Apply].

4 Follow the instructions displayed on the screen.

Now the initialization on the configuration screen has been completed.

Chapter 3

Useful Functions

RAID Scanning

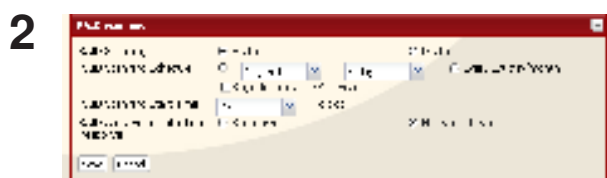
In RAID 1, LS-WXL and LS-WSXL LinkStations support RAID scanning. A RAID scan tests the RAID array for read performance. If defective sectors are found, they are repaired automatically. If your multiple-drive LinkStation is in RAID 1 mode, you should run RAID scans regularly. Configure regular RAID scans as follows:

<The RAID maintenance function >

The RAID maintenance function is a function which can check whether it is possible to read without problem, and whether there is any defective sector in the array where RAID1 is constructed and if there is any problem it automatically repairs that problem. When LinkStation is used with RAID1, it is advisable to regularly execute the RAID maintenance.



Navigate to [System] - [Storage] - [RAID Scanning] in the web admin tool. Under [RAID Scanning], click [Modify Settings].



Choose [Enable], enter your desired schedule, and click [Save].

- Note:
- Check [Shutdown] to automatically shut down the LinkStation whenever a RAID error occurs. Check [Begin Immediate RAID Scan] to initiate an immediate RAID scan.
 - To stop a RAID scan, click [Abort RAID Scanning].
 - Single-drive LinkStations don't support RAID arrays or RAID scanning.

RAID Scanning is now configured.

WebAccess

About WebAccess Feature

This feature allows you to access files in a shared folder on the LinkStation via the Internet (you can access the LinkStation from anywhere to play your music, display pictures, or download/upload data). You can set the access restrictions on the LinkStation per shared folder that you want visible from other computers.

LinkStation is also equipped with auto settings feature for routers via UPnP and redirect feature by using the buffalonas.com server (similar to Dynamic DNS).

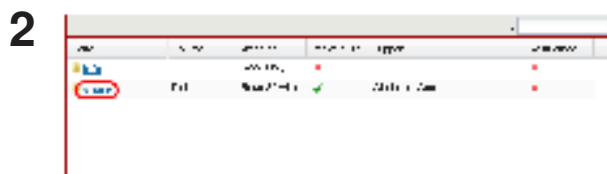
WebAccess configuration procedure

Note: – Refer to page 20 for the procedures to display the configuration screen.



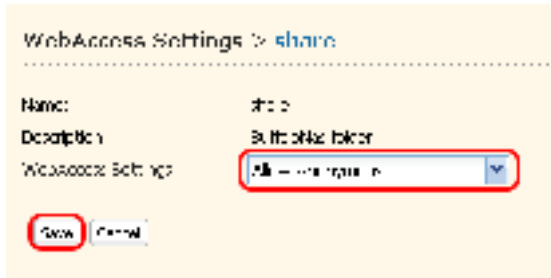
1 Click [Extensions].

2 Click [WebAccess].



Click the shared folder to be published.

3



Click the shared folder to be published.

- 1 Select share you want to set access restriction from [WebAccess Settings].
 - Disable: Shared folders will not be published.
 - Allow Anonymous: Anyone can access (view) shared folders.
 - Allow All Group / Users: Only LinkStation registered groups/users can access (view).
 - Use Inherited Folder Permissions: Use shared folders access restrictions set from shares management screen. If access restrictions are not set in the shared folder management screen, this option is not displayed.

2 Click [Save].

Note: – Depending on settings, files in a shared folder will be visible on the Internet without access restrictions.

4



Click [Modify Settings].

5



- 1 Select [Enable].
- 2 Click [Use BuffaloNAS.com] to insert a checkmark.
- 3 Enter the LinkStation name to be published in [BuffaloNAS.com Name].

Note: – This is the name to enter when accessing BuffaloNAS.com. It does not have to be the same name as the actual LinkStation.

- 4 Enter the password to save and use the name in [BuffaloNAS.com Key].
- 5 Click [Auto-Configure Firewall (UPnP)] to insert a checkmark.

Note: – This does not work unless the router's UPnP is enabled.

- 6 Click [Save].

Note: – If you want to transmit data more securely by using SSL encryption, insert a checkmark [HTTPS/SSL Encryption]. The security alert message will be displayed at this time, proceed with operation.

- To use the generic DNS service instead of using BuffaloNAS.com, enter the host name in [DNS Hostname].
- If configuring manually without using UPnP, enter the external port of a router side. Port 9000 of the LinkStation is default and is used to allow access from the router side the LinkStation (The port on the LinkStation side is set to 9000).
- If the LinkStation is left unconnected from the Internet a certain period of time, its name registration will be deleted on the BuffaloNAS.com server.

Now you have completed the settings for the WebAccess feature.

Procedure to access (view) published folder set by the WebAccess feature

1 Open the following URL in an Internet browser.

(BuffaloNAS.com) <http://buffalonas.com/>

To access BuffaloNAS.com from iPhone/iPod touch:

1 Tap Safari from “Home” screen, and connect to the Internet.

2 Tap the address bar on top of the “Safari” screen.

3 Enter “<http://buffalonas.com/>” in the address bar, and select “Go”.

- The screen shots for step 2 and later screen shots are examples from a PC. The screens will look different from the actual iPhone/iPod screens.
- You cannot play video files or music files for which DRM is set by using this feature.
- You cannot play video files or music files that are saved in the WebAccess folders where access restrictions are set.
- You cannot download files saved to iPhone/iPod touch by using this feature (the video file and music file will be streaming, and the picture files are displayed in the browser).
- The compatibility of playing the video files and music files depends on the specifications of Safari and QuickTime installed on the iPhone/iPod.
- To create a video file which is playable on the iPhone, use off-the-shelf software to convert to playable formats for the iPhone or iPod touch.
- It does not support uploading files, changing file names, or deleting files.
- iPhone and iPod are trademarks of Apple Inc., registered in the U.S. and other countries.



Enter BuffaloNAS.com name which is set in the WebAccess Service configuration on the LinkStation, and click [Connect].



3



On the Internet browser, you can view folder or files on the LinkStation that are published.

To view without using BuffaloNAS.com, open the following URL on the Internet browser.

<http://global IP address of the LinkStation:9000/>

(For SSL, use <https://global IP address of the LinkStation:9000/>)

Note: – To verify the IP address of your LinkStation, see the configuration screen of your router.
Refer to your router's manual for the procedure of how to verify the IP address.

Now you can access (view) a shared folder of the LinkStation which is published.

5 Mail link to this file Send the address link by e-mail.

The file or folder name will be highlighted when you click on it. Click [Mail link to this file] in the highlighted area, and your mail software will launch with the link address included in the mail body to this file which is accessible from the outside. Use this feature when you want to distribute this address link by e-mail.

6 Create Folder Create a folder.

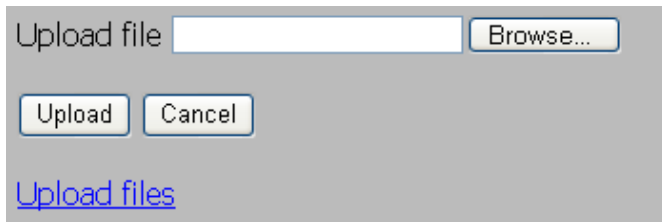
Click [Create Folder], and then the following screen will be displayed. Enter a folder name to create in [Folder Name], and click [Create]. The new folder will be created.



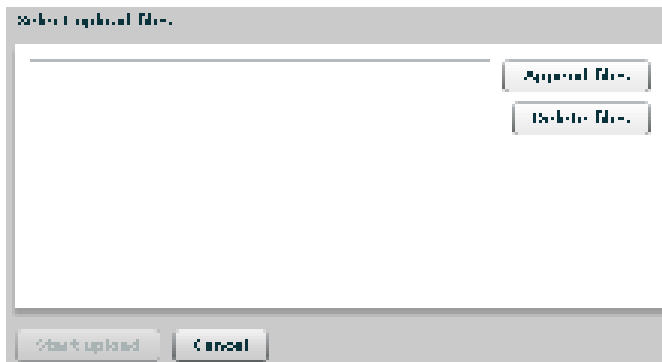
- You can use up to 80 characters for a folder name and file name, regardless of full or half bytes characters (including the extension).

7 Upload Upload files.

Click [Upload] to display the following screen. Click [Browse] in the upload files area, and select a file to be uploaded. Clicking [Upload] will start uploading data you have selected.



Click [Upload Files] to display the following screen.



Select files you want to upload in [Append files], and click [Start upload].

Note: – The following conditions applies to upload.

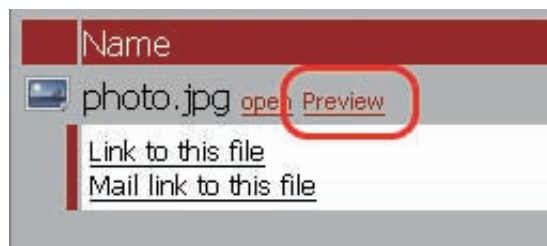
- Up to 2GB in file size
- Up to 100 files per upload

You cannot upload a file if the same file name already exists on the destination.

Delete the file with the identical name in the destination before uploading the new file.

Note: – About the Preview feature

If a graphic data type file is selected, the word [Preview] is displayed next to the file name. Clicking [Preview] will display the preview of the selected file on the browser.



Click **CLOSE X** at the bottom of the image to finish displaying the preview.

Move the mouse cursor on the right top of the preview image, and **NEXT** will be displayed (this will not be displayed if there is no additional graphic files). Clicking **NEXT** will display the next graphic data for a preview.

Move the mouse cursor on the left top of the preview image, and **PREV** will be displayed (this will not be displayed if there is no previous graphic file). Clicking **PREV** will display the previous graphic data for a preview.

BitTorrent Client

About BitTorrent

BitTorrent is the file sharing protocol and a file sharing software (P2P software) protocol, and uses P2P (peer-to-peer) networking.

The differences from other traditional file sharing software and this software are:

- You can download files faster since files are distributed on the network and network traffic to file location will not be concentrated even with a large file.
- It does not keep anonymity, and it is easily known who publishes what files.

Note: – It is prohibited to use any copyrighted movies and audio files without permission from the owner.

<BitTorrent's Website> <http://www.bittorrent.com/>

Step of downloading with BitTorrent

1 Download Torrent information from a search engine on the Internet.

Note: – Torrent Information is called "tracker" (the file with extension of ".torrent"). This file includes information about "the server that knows where the hosts having the files you want to download are".

– Torrent Information can be downloaded from BitTorrent Inc.'s website or personal websites. Follow the terms of use and copyright rules for Torrent Information described on each website.

2 Torrent Information is sent to a server called "tracker" and receive information about a hosts which has a file.

3 Start downloading based on the information received from the "tracker" server.

4 Download pieces of data from multiple hosts and make one complete file.

Use the following steps to download shared files to the LinkStation which are published with BitTorrent Protocol.

Enabling BitTorrent feature and selecting folders

Note: – Refer to page 20 for the procedures to display the configuration screen.



- 1 Click [Extensions] - [BitTorrent] on the configuration screen of the LinkStation.
- 2 Click [Modify Settings].



- 1 Click [Enable].
- 2 From the Download Folder, select a shared folder where the files downloaded with BitTorrent.
- 3 Click [Save].

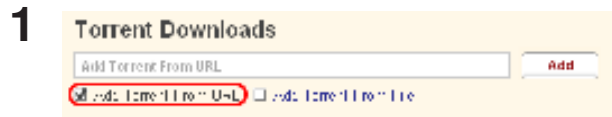


Click [Open Download Manager].

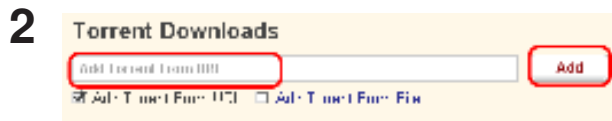


The Download Manager screen will be displayed.
There are two methods downloading; Downloading by adding Torrent information Add Torrent From a URL or Add Torrent From a file.

How to download Torrent Information by URL



Click [Add Torrent From URL].



1 Enter the URL which has Torrent Information in the frame at the left of [Add].

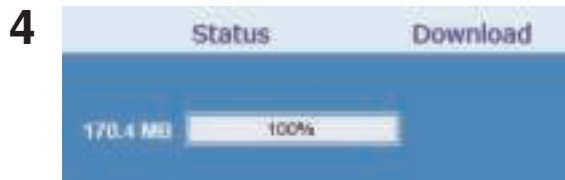
2 Click [Add].

Note: – Torrent Information can be download from BitTorrent Inc.'s website or personal websites. Follow the terms of use and copyright rules for Torrent Information described in each website.



When the message [Torrent URL has been sent.] is displayed, click [Okay].

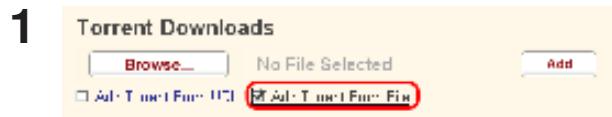
Downloading to the destination folder will begin.



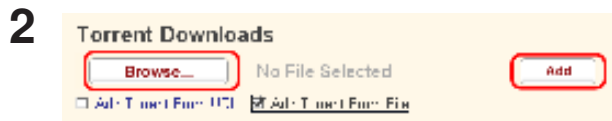
When progress reaches 100%, the download is completed.

Now you have downloaded Torrent Information by adding it from URL.

How to download Torrent Information by adding it from a file



Click [Add Torrent From File].

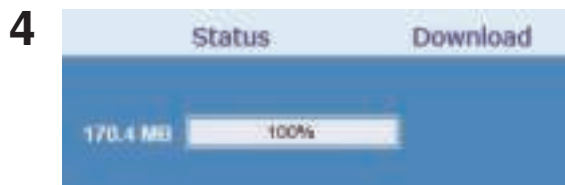


1 Click [Browse...] and select Torrent file saved on the LinkStation or your computer.

2 Click [Add].

Note: – Torrent Information can be download from BitTorrent Inc.'s website or personal websites. Follow the terms of use and copyright rules for Torrent Information described for each website.

3 Downloading to the destination folder will begin.



When progress reaches 100%, the download is completed.

Now you have downloaded Torrent Information by adding from a file.

What you can do in the download screen



Click a queue name and click [Stop], this stops downloading.



Click [Start], it resumes downloading.



Click a queue name and click [Remove], the file will be deleted.



Torrent information will be searched in <http://www.bittorrent.com/> . Enter a word to search in the top right of the download screen and click [Search]. The search result will be displayed in a separate window.



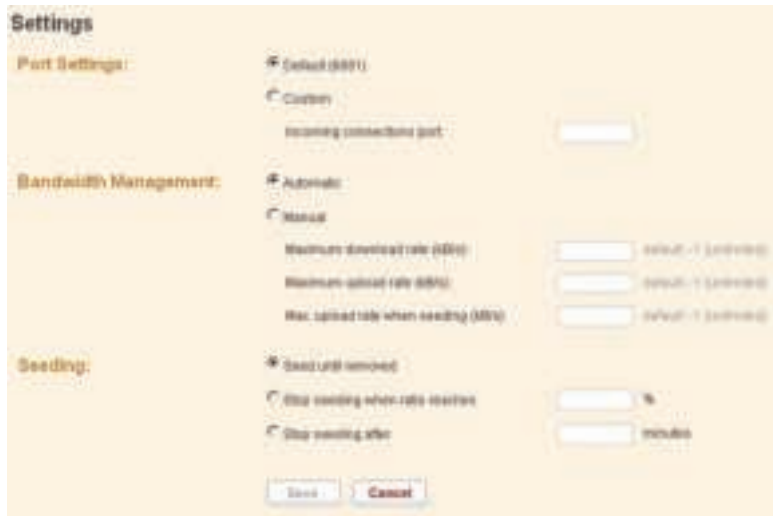
The order of the download queue can be changed by each item. The displayed order can be switched by clicking following items.

[Name] [Size] [Progress] [Download] [Upload] [ETA]



Click [Settings] to display the configuration screen of BitTorrent.

What you can do in the configuration screen



1 Port Settings

Changes a port to use for BitTorrent communication. When the LinkStation is connected to a router, the port of the router will be automatically set by using UPnP.

To set the port manually without using UPnP, enter the port number (the default setting is "Default (6881)") on any port number on the LinkStation side.

2 Bandwidth Management

If this is set to [Automatic], Transmission bandwidth of BitTorrent will be automatically set. If this is set to [Manual], you can specify a maximum bandwidth for download, upload, and seeds. The default setting is [Automatic].

3 Seeding setting

Set the seed period for a file which is finished downloading.

Note: – Seeds are defined as a part of the downloading file that is published on other computers.

[Seed until removed] will continue to seed until Torrent information is deleted.

[Stop seeding when ratio reaches] will stop seeding when the upload percentage (a percentage of the number of byte downloaded against the number of byte uploaded) is achieved to the pre-defined value (%).

[Stop seeding after] stop seeding automatically after the pre-defined time (in minute) has been reached.

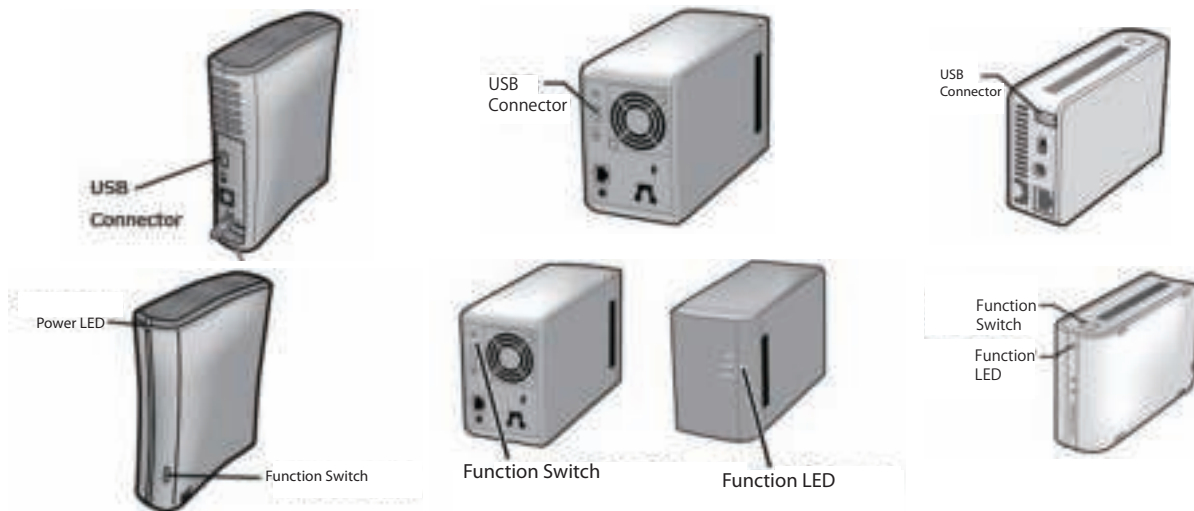
The default setting is [Seed until removed].

Direct Copy

When you use the Direct Copy feature, you can connect a USB device to the LinkStation port to copy movie, music, and image data directly to the LinkStation without using computers.

You can connect a USB mass storage class, a card reader (except for a card reader that can recognize more than 2 memory cards), a UTP device such as digital camera, and the USB connector of the LinkStation. You cannot connect any other USB devices (such as a USB hub, mouse, keyboards and so on).

1 Connect a USB device (USB flash/digital camera/hard disk/card reader) to the LinkStation.



The following restrictions apply if a USB device does not fall into the USB Mass Storage class.

- After a USB device is recognized, the function switch turns blue (for about 60 seconds).
- You will be able to access the USB device after Blue function switch goes out.

2 Data is copied from a USB device to the Direct Copy folder after you connect a USB device and push the function switch on the LinkStation while the function switch is flashing blue (for about 60 seconds).

Note: – While copying, the functions switch will flash blue. Pushing the function switch one more time at this time will abort the Direct Copy.

The destination shared folder is set to a [share] folder as default.

Select a different shared from [Shared Folders] - [Direct Copy] - [Modify Settings] on the configuration screen of a LinkStation and click [save]. Then you can change the shared folder's destination folder.

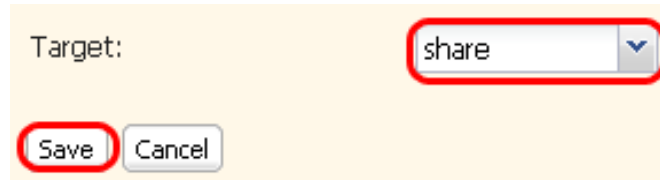
Also, the following copy destination folder will be automatically created in the destination shared folder.

<Direct Copy folder>/pictures/yyyymmdd

yyyy: year copied

mm: month copied

dd: date copied



A folder under the date folder will be created after if a second or third copy is done.

<Direct Copy folder>/pictures/yyyymmdd/n

yyyy: year copied

mm: month copied

dd: date copied

n: 1st time n=0, 2nd time n=1, 3rd time=2 and so on.

Note: – In USB Mass Storage class USB devices, files with following extensions will be copied.

avi, divx, asf, mpg, mpe, m1v, vob, mts, m2ts, m2t, mpeg, mpeg2, vdr, spts, tp, ts, 3gp, mov, m4v, wmv, dvr-ms, xvid, mp4, jpg, jpeg, gif, png, tif, tiff, yuv, bmp, mp3, mpa, wma, aac, apl, ac3, lpcm, pcm, wav, m3u, m4a, m4b, aif, aiff, flac, ogg, mp2, mp1

– All files on digital cameras that do not fall under USB Mass Storage Class will be transferred.

- 3** After you finished copying, make sure that the access LED of USB device is not ON and remove the USB device.

Removing a USB device

If the power of the LinkStation is ON, press and hold the function switch on the front panel of the LinkStation for more than 3 seconds (the function switch will be lit in blue). After the function switch which is illuminated in blue stops illuminating, you can remove a USB device.

If the LinkStation is powering OFF, you can remove the USB device without doing anything.

Time Machine

If you use Time Machine feature which is the back up method from Apple and is supported on Mac OS X 1.5 or later, use the following procedure.

Note: – Refer to page 20 for the procedures to display the configuration screen.

1



Click [AFP] on [Network] - [Settings] - [Network Service].

2

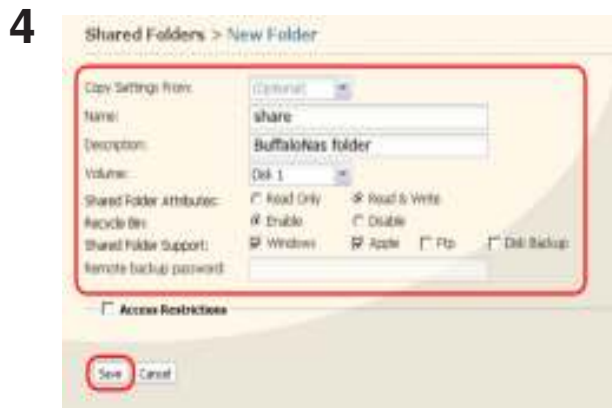


Select [Enable] and click [Save].

3



- 1 Click [Shared Folders].
- 2 Click a shared folder you want to set as a backup destination on Time Machine feature.



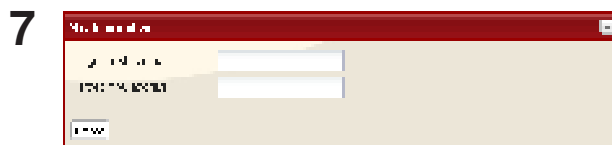
- 1 Select [Apple].
- 2 Click [Save].



- 1 Click [Extensions] - [Time Machine].
- 2 Click [Modify Settings].



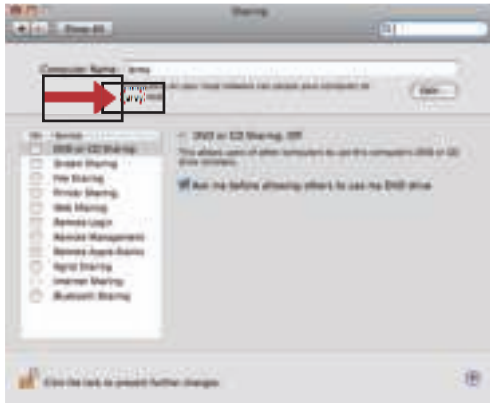
- 1 Select [Enable].
- 2 Select a shared folder of the LinkStation you have set on step 3-4 from applicable shared folders.
- 3 Click [Save].



- 1 Enter a host name of Macintosh which uses the Time Machine feature.
- 2 Enter the MAC address of Macintosh which uses the Time Machine feature.
- 3 Click [Create].

- To verify Macintosh host name:

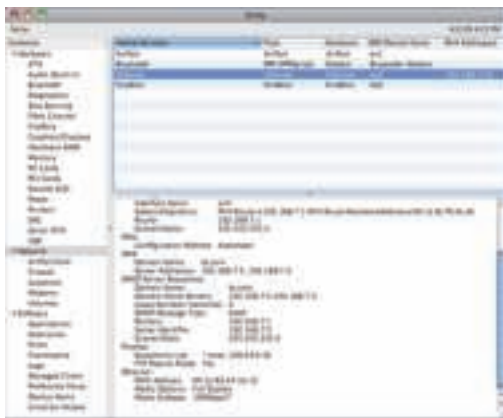
See under [Computer Name] on [System Preferences] — [Sharing] screen.



e.g.) If it is displayed as "bbbbbbbbbb.local", enter "bbbbbbbbbb" as a host name.

e.g.) If it is displayed as "ccccccccc.eee-ee.local", enter "ccccccccc" as a host name .e.g.) If it is displayed as "ddddddddd.fff-ff.jp", enter "ccccccccc" as a host name.

- To verify the MAC address of Macintosh:



1 Open [About This Mac] from Apple menu, and click [More Info].

2 System Profiler is open, click [Network] on the menu at the left of the screen.

3 To display MAC address, select one whose BSD Device Name is [en0] from [Active Services]. Alphanumeric characters displayed on [MAC Address] are the MAC address. You can easily enter the MAC address by dragging and copying the MAC address displayed and pasting it to [Target MAC address].

The folder called <Macintosh host name>_<Macintosh MAC address>.sparsebundle will be created in a shared folder of the LinkStation which is set as a backup destination by Time Machine feature. Be aware that changing this folder name or deleting this folder may prevent from using it as a backup destination of Time Machine or recovering properly.

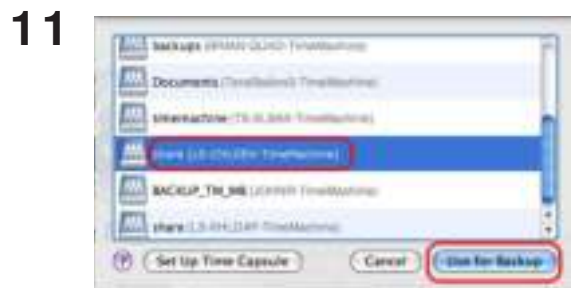
8 Select [System Preferences] from Apple Menu of Mac OS X 10.5.



Click [Time Machine].



Click [Choose Backup Disk].



Select LinkStation, and click [Use for Backup].

12



Enter a user name and password to access the shared folder of the LinkStation, click [Connect].

If you do not use access restrictions for the shared folder of the LinkStation you set as a backup destination, enter "admin" in the user name box and your password for "admin" in the password. If you use the access restrictions feature. enter a user name and password that has the read and write access right.

13



Make sure that the switch of Time Machine is "ON". The number of seconds displayed in [Next Backup] will be counted down, and a backup job will starts when it hits zero.

A backup job will be done in background, so you can operate and shutdown Mac OS as usual.

If you want to recover data or set items you want to exclude from a backup job, refer to Mac OS Help.

Now you have completed to backup using Time Machine.

Sleep Timer

To save energy, you can specify the time to set the LinkStation to Standby mode (hard disk and LED lights are turned off).

You can use Timer ON/OFF feature only when the LinkStation's power switch is ON. This feature cannot be used when it is set to "AUTO" or "OFF".

1



- 1 Click [System]-[Power Management]-[Sleep Timer] on the configuration screen of the LinkStation.
- 2 Click [Modify Settings] for Timer ON/OFF.

2



- 1 Specify a timer interval, beginning time and ending time.
- 2 Click [Save] at the bottom of the screen.

* You can set up to 3 timers.

* You can set wake up at from 0:00 to 23:45.

You can Begin sleep at 0:00 to 27:45.

(If the ending time is 24:00 or later, the beginning time can be set from 4:00 to 23:45.)

24:00 is equivalent to 0:00 of the next day, and 27:00 is equivalent to 3:00 of the next day.

* You can not set the ending time before or the same time as a beginning time.

- During processing disk check, disk format, and backup jobs or when a backup job is scheduled before and after 5 minutes of the current time, the LinkStation will not be proceeded to Standby mode even though the end time has reached.
- If time of the timers are duplicated, the longest interval time is used to operate.

- The examples of multiple timers are set are as following.

(e.g.1) Currently the timer set on Wednesday 10:00 is working:

Timer 1 Everyday 12:00 - 24:00

Timer 2 not used

Timer 3 not used

- Nothing happens on 12:00 and it moves to Standby mode on 24:00

(e.g.2) Currently the timer set on Wednesday 10:00 is working:

Timer 1 Everyday 9:00 - 18:00

Timer 2 Day specified Wednesday 10:00 - 20:00

Timer 3 not used

- Other than on Wednesdays, it starts to work on 9:00 and moves to Standby mode on 18:00.

On Wednesdays, it moves to Standby mode on 20:00.

(e.g.3) Currently the timer set on Wednesday 10:00 is working:

Timer 1 Everyday 9:00 - 18:00

Timer 2 Day specified Wednesday 10:00 - 25:00

Timer 3 not used

- Other than on Wednesdays, it starts to work on 9:00 and moves to Standby mode on 18:00.

- Other than on Wednesdays, it moves to Standby mode on 1:00 of a next day.

(e.g.4) Currently the timer set on Wednesday 10:00 is working:

Timer 1 Everyday 9:00 - 18:00

Timer 2 Day specified Wednesday 07:30:00 - 22:00:00

Timer 3 not used

- Other than on Wednesdays, it moves to Standby mode on 18:00.

- It starts working on 7:30 of Wednesday, and it moves to Standby mode on 22:00 of a next day.

During a Standby mode, pressing the LinkStation's function button or move the power switch to AUTO will cause the status change to the Standby mode to power ON.

Now you have completed the Sleep Timer settings.

Web/database server

The LinkStation can be used as a Web server.

HTML, CGI scripts, images, and JavaScript are supported.

Note: – The LinkStation’s Web server is for advanced users only. Don’t enable it unless you know what you’re doing.

- 1 Navigate to [Network] – [Web Server] in the Web Admin tool and click [Modify Settings].
- 2 [Enable] Web Server, choose an external port setting (81 is the default) and a Web server public folder, and click [Save].



Edit the php.ini file to change the PHP language interpreter settings,. Instructions are in the file.

The Web server is now configured.

<My SQL server>

The LinkStation can be used as a MySQL server.

A MySQL database may be installed and linked with the web server.

- Note: – The LinkStation’s MySQL server is for advanced users only.
– Don’t enable it unless you know what you’re doing.

- 1 Navigate to [Network] – [MySQL Server] in the Web Admin tool and click [Modify Settings].
- 2 [Enable] MySQL Server, choose a port and a data folder, and click [Save].



The MySQL server is now configured.

Appendix

Specifications

Check Buffalo's catalogs or web site (www.buffalotech.com) for information about the latest products or compatible models.

Interface (LAN port)		Interface: Complied with IEEE802.3ab (1000BASE-T) Complied with IEEE802.3u (100BASE-TX) Complied with IEEE802.3 (10BASE-T) Transfer Speed:1000Mbps Full duplex (AutoNegotiation) 100Mbps Full duplex/Half duplex (auto-negotiation), 10Mbps Full duplex/Half duplex (auto-negotiation), Number of ports:1 port (support AUTO-MDIX) Connector type: RJ-45 8-pin Access method: CSMA/CD Protocol: TCP/IP Network File Systems: SMB/CIFS, AFP, FTP, HTTP/HTTPS Jumbo Frame frame length: 1,518/4,102/7,422/9,694 Bytes(Including 14 bytes of the header and 4 bytes of FCS)
Interface (USB Connector)		Interface: USB Standard Revision 2.0 Data transfer speed: Maximum 480 Mbps (Theoretical value) Connector: USB connector (Series A) X 1 Supporting USB devices: USB hard disk manufactured by Buffalo, USB UPS, USB printer and etc. Please ensure the supported USB UPS on Buffalo's website (www.buffalotech.com).
Power/ Consumption power		AC100V 50/60Hz / LS-XHL,CHL: Approximately 24 W (Maximum) Approximately 17 W (Average) LS-WXL: Approximately 48 W (Maximum) Approximately 26 W (Average) LS-WSXL: Approximately 15 W (Maximum) Approximately 9 W (Average)
External size / Weight		LS-XHL,XHL: W45 X H175 X D156 mm (excluding protruding parts) / about 1.1 kg LS-WXL: W86 X H127 X D204 mm (excluding protruding parts) / about 2.3 kg LS-WSXL: W40 X H82 X D135 mm (excluding protruding parts) / about 0.5 kg
Operating Environment		Temperature 5 - 35 °C / Humidity 20 - 80 % (no condensation)
Compatible Models	Compatible computer	IBM/PC Compatible (OADG spec), NEC PC98-NX Series, Apple Mac Series NOTE: Equipped with LAN interface. • The LinkStation cannot be connected with computers via USB; It is only connected via LAN.
	Compatible OS	Windows 7/Vista/XP/2000, Windows Server2003/Server2008, Mac OS X 10.3.9 or later

Status LED (LS-XHL, LS-CHL)

Glowing blue

When the power of LinkStation is ON, the blue Status LED is ON. When it is OFF, the LED is also OFF.



Red flashing (Error code)

An error has occurred when the red status LED at the front on the LinkStation is flashing. The way it flashes indicates the type of error.

Note: – If there is an error message, you can check the meanings of an error with the message displayed when you search for the LinkStation with NAS Navigator2.



Place	Status
10's place	The LED illuminates for 1 second every 0.3 seconds. The number of flashes is the ten's place of the information code.
1's place	The LED illuminates for 0.5 seconds every 0.3 seconds. The number of flashes is the one's place of the information code.

Error code	Error Details
E01	Problems in DRAM DATA LINE.
E02	Problems in DRAM ADDRESS LINE.
E03	Problems in RTC CHIP.
E04	Fail to extract Kernel.
E06	The firmware is corrupted.
E07	Hard disks are not found.
E10	A UPS error. Operating using UPS battery due to the power outage. System will be safely shut down based on the configuration conditions. After the LinkStation shuts down, ensure that power is supplied to the UPS. If there is no problem, briefly press the function switch on the LinkStation (pressing and holding down the switch will not work).
E11	Fan Error. The fan is spinning too slow, or has stopped. Move the unit where there is no objects blocking the fan, providing a good airflow, and in a cool place. The LED is still lit, replace a fan (OP-FAN/LS) which is sold separately.
E15	Hard disk IO error.
E16	The hard disk is not connected or malfunctions.
E17	LinkStation's internal controller error.
E20	The circuit board is damaged. Unplug the power code of the LinkStation and reboot it.
E21	LinkStation's internal controller error.
E22	Mounting error.
E23	The hard disk is damaged.

Amber flashing LED (Information code)

There is an information message when amber status LED at the front of the LinkStation is flashing. The way it flashes indicates the type of error.

Note: – If there is an information message, you can check the meanings of the information with the message displayed when you search for the LinkStation with NAS Navigator2.

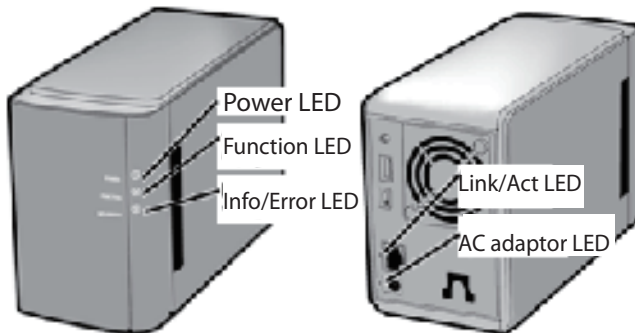


Place	Status
10's place	The LED illuminates for 1 second every 0.3 seconds. The number of flashes is the ten's place of the information code.
1's place	The LED illuminates for 0.5 seconds every 0.3 seconds. The number of flashes is the one's place of the information code.

Information codes	Meanings of the message
I19	Erasing disk (filled with zero).
I23	Initializing the system settings.
I25	Updating the firmware.
I26	Initializing the Web settings.
I27	Checking a USB hard disk.
I28	Formatting a USB hard disk.

Status LED (LS-WXL)

There are 5 LEDs on the LinkStation: "Power", "Function", "Info/Error", "Link/Act", and "AC adaptor".



Power LED

Status	Meaning
Solid Blue	The LinkStation is powered on.
Blinking Blue	The LinkStation is starting up or shutting down.
LED is off	The LinkStation is off.

Function LED

Status	Meaning
Solid Blue	DirectCopy is ready (lights for 1 minute). USB device is dismounted (lights for 5 seconds). Initialization is in progress.
Blinking Blue	DirectCopy is in use. Notes: The function LED (blue) and the info/error LED (Orange) blink together if an error occurs during DirectCopy. Please do the following if this happens: <ol style="list-style-type: none"> 1. Shut down the LinkStation . 2. Detach the USB device from the LinkStation. 3. Reattach the USB device to the LinkStation. 4. Power on the LinkStation.

Info/Error LED

The Info/Error LED blinks orange when it has a message. The message is coded by the pattern of blinking.

Note: – The messages are also available (uncoded) in NAS Navigator2.

Place	Status
10's place	The LED illuminates for 1 second every 0.3 seconds. The number of flashes is the ten's place of the information code.
1's place	The LED illuminates for 0.5 seconds every 0.3 seconds. The number of flashes is the one's place of the information code.

Information code	Message contents
I11	Many defective sectors have been found.
I13	The RAID array is being formatted.
I14	The RAID array is being checked.
I15	The error status of the RAID array is being investigated. Data transfers will be slower than usual until this is complete.
I16	The RAID array is being created.
I17	The RAID array is being resynchronized. Data transfers will be slower than usual until this is complete.
I18	The RAID array is being reconfigured. Data transfers will be slower than usual until this is complete.
I19	The RAID array is being erased.
I23	Initializing the system settings
I25	Updating the firmware
I27	Checking a USB drive
I28	Formatting a USB hard drive

The Info/Error LED blinks red to indicate an error.

The error may be identified by the pattern of blinking.

Note: – The error may also be viewed from NAS Navigator2.

Place	Status
10's place	The LED illuminates for 1 second every 0.3 seconds. The number of flashes is the ten's place of the error code.
1's place	The LED illuminates for 0.5 seconds every 0.3 seconds. The number of flashes is the one's place of the error code.

Error code	Error details
E00	MPU is abnormal; no power.
E01	DRAM data line is abnormal.
E02	DRAM address line is abnormal.
E03	RTC chip is abnormal.
E04	Kernel failure.
E14	The RAID array cannot be mounted. Turn off power, then turn power on again. If the same error is displayed, re-configure RAID.
E15	I/O error of hard drive.
E16	The hard drive is not connected, or data transfer has failed.
E17	Controller error.
E21	Controller error.
E23	The hard drive has crashed.

Link/Act LED

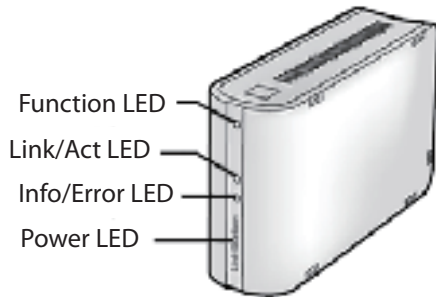
Status	Meaning
Solid green	Linking.
Blinking green	Accessing.

AC adaptor LED

Status	Meaning
Green	Power is connected.
Off	Power is not connected.

Status LED (LS-WSXL)

There are 4 LEDs on the LinkStation: "Function", "Info/Error", "Link/Act", and "Power".



Function LED

Status	Meaning
Solid Blue	DirectCopy is ready (lights for 1 minute). USB device is dismounted (lights for 5 seconds). Lights during initialization.
Blinking Blue	DirectCopy is in use. Notes: The function LED (blue) and the info/error LED (Orange) blink together if an error occurs during DirectCopy. Please do the following if this happens: <ol style="list-style-type: none"> 1. Shut down the LinkStation . 2. Detach the USB device from the LinkStation. 3. Reattach the USB device to the LinkStation. 4. Power on the LinkStation.

Link/Act LED

Status	Meaning
Solid green	Linking.
Blinking green	Accessing.

Info/Error LED

The Info/Error LED blinks orange when it has a message.

The message is coded by the pattern of blinking.

Note: – The messages are also available (uncoded) in NAS Navigator2.

Place	Status
10's place	The LED illuminates for 1 second every 0.3 seconds. The number of flashes is the ten's place of the information code.
1's place	The LED illuminates for 0.5 seconds every 0.3 seconds. The number of flashes is the one's place of the information code.

Information code	Message contents
I11	Many defective sectors have been found.
I13	The RAID array is being formatted.
I14	The RAID array is being checked.
I15	The error status of the RAID array is being investigated. Data transfers will be slower than usual until this is complete.
I16	The RAID array is being created.
I17	The RAID array is being resynchronized. Data transfers will be slower than usual until this is complete.
I18	The RAID array is being reconfigured. Data transfers will be slower than usual until this is complete.
I19	The RAID array is being erased.
I23	Initializing the system settings
I25	Updating the firmware
I27	Checking a USB drive
I28	Formatting a USB hard drive

The Info/Error LED blinks red to indicate an error.

The error may be identified by the pattern of blinking.

Note: – The error may also be viewed from NAS Navigator2.

Place	Status
10's place	The LED illuminates for 1 second every 0.3 seconds. The number of flashes is the ten's place of the error code.
1's place	The LED illuminates for 0.5 seconds every 0.3 seconds. The number of flashes is the one's place of the error code.

Error code	Error details
E00	MPU is abnormal; no power.
E01	DRAM data line is abnormal.
E02	DRAM address line is abnormal.
E03	RTC chip is abnormal.
E04	Kernel failure.
E14	The RAID array cannot be mounted. Turn off power, then turn power on again. If the same error is displayed, re-configure RAID.
E15	I/O error of hard drive.
E16	The hard drive is not connected, or data transfer has failed.
E17	Controller error.
E21	Controller error.
E23	The hard drive has crashed.

Power LED

Status	Meaning
Solid Blue	The LinkStation is powered on.
Blinking blue	The LinkStation is starting up or shutting down.
Off	The LinkStation is off.

Hard drive replacement procedure (LS-WXL)

The LS-WXL's hard drives are simple to replace in case of a disk failure.

Drives in RAID1

You can identify the failed disk in the Web Admin Tool by navigating to [System] – [Storage]. Shut down the LinkStation, and replace the failed drive promptly. When the RAID is rebuilt, your data is copied to the new drive.

Note: – For best results, configure the LinkStation to shut down automatically in the case of a disk failure.

Drives in RAID 0 or normal mode

You can identify the failed disk in the Web AdminTool by navigating to [System] – [Storage]. Shut down the LinkStation, and replace the failed drive.

Note: – All data on the failed drive and any array that it was part of has been lost.

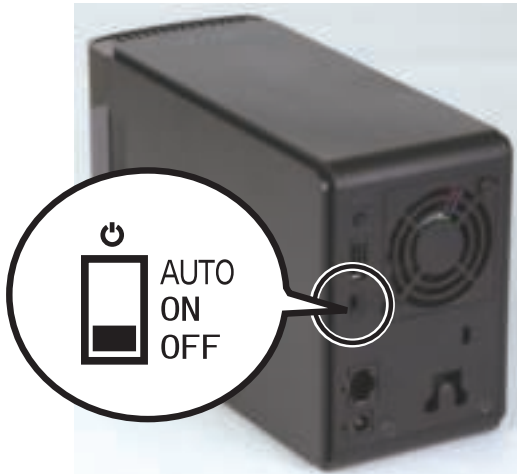
Replacement hard drives for the LS-WXL are available from www.buffalotech.com.

Hard drives on the LS-WSXL are not user-replaceable.

Contact technical support to arrange a replacement LS-WSXL if it fails during the warranty period.

- Note: – Please do not lift the LinkStation by its front cover. The front cover might come off.
- Before removing hard drives, touch a metal object to dissipate static electricity in your body, or wear a static wrist strap.
 - Work carefully! Some of the metal edges inside the LinkStation are sharp.
 - Damage done to the LinkStation by improper disassembly of the LinkStation is not covered by Warranty.
 - Do not reverse the right and left hard drives, or your data may be lost.
 - Replacement drives should be the same capacity as the drive being replaced, or larger.
 - Do not use a hard drive that has previously been used in a LinkStation or TeraStation as a replacement drive. Remove any partitions on it first, or rebuild might not work normally.

1



Shut down the LinkStation and remove all cables.

2

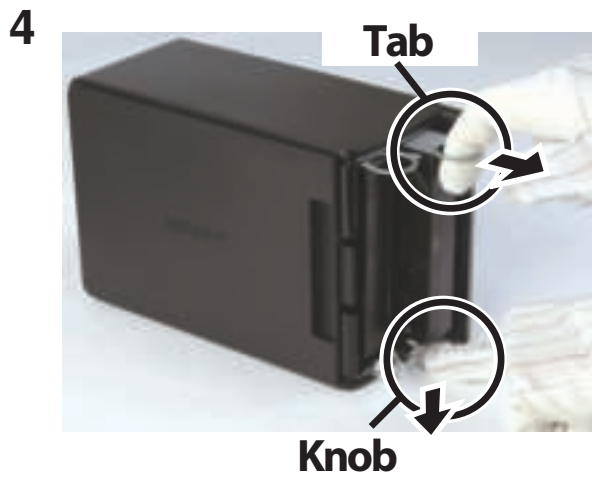


Pull the front cover forward while pressing gently on the hollow on the left side.

3



Remove the front cover.

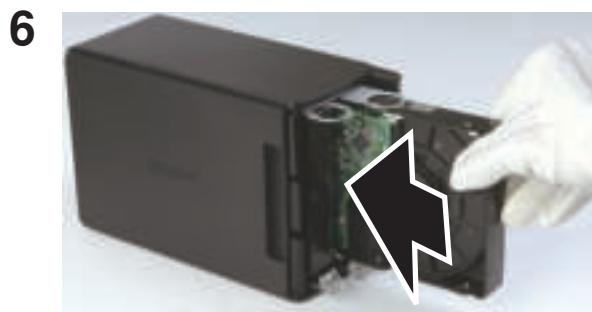


Pull out the tab above the failed drive while pressing the release below the drive. The tab will slide out approximately 2cm (1 inch) .

Note: – Be careful so that the finger will not be caught in knob, tab and hard disks.



Remove the failed drive.



Insert the new drive until it clicks.

7



Reattach the front cover.

8

Reattach all cables and power on the LinkStation.

9



In the Web Admin Tool, navigate to [System] – [Storage] – [RAID array 1] and rebuild the RAID array.

Note: – If the LinkStation is in normal mode, format the new drive in [System] – [Storage].

Software

You can install following software applications and the manual by using utilities CD which comes with the LinkStation.

Select and install software from the selection screen which is displayed during Setup (Or click [Option] and follow the instruction on the screen to install software).

NAS Navigator2



You need NAS Navigator2 in order to display the configuration screen of the LinkStation or search for the LinkStation from the network.

It is always installed when you setup by clicking [Begin Installation] on LinkNavigator.

Note: – When using Power Management with PC feature, you need to install NAS Navigator2 on all computers connected within the same network as LinkStation.

File Sharing Security Level Change Tool



When you configure the [access restrictions by using Delegate Authority server] on the configuration screen of the LinkStation, you need to change security on Windows Vista and Windows Server 2003/Server 2008. Select [Start]-[Programs]-[BUFFALO]-[File Sharing Security Level Change Tool]-[File Sharing Security Level Change Tool], and then select [Change security level] to change the security settings (Select "Recover default security level" change it back to the previous setting).

Note: – This utility can be installed only on Windows Vista and Windows Server2003/Server2008.

Note: – During the initial setup, the message, "Start changing file sharing security level. Will you continue?" will be displayed. If you click [Yes], follow the instructions on the screen and restart your PC .

Click [Option]-[Uninstall Software] on LinkNavigator to delete software you have installed. Follow the instructions displayed on the screen.

Info folder

In the folder called "info" on the internal hard disk of the LinkStation, Install programs such as the NAS Navigator2 is included.

[info]-[English] Folder

- [NASNavi2] Folder. . . Installs NAS Navigator2 by double-clicking Inst.exe.

Troubleshooting

Cannot Setup

The following section lists typical occurrences and causes when you cannot setup the LinkStation by using LinkNavigator or cannot use LinkStation even after finishing setup,

Occurrence: The message "Cannot find LinkStation", "No available LinkStation was found", or "Setup cannot be completed" is displayed.

Cause 1. A LAN cable is not connected.

Reconnect the AC adapter and the LAN cable, and turn on the LinkStation again.

Cause 2. The firewall is enabled, or software running in the background is installed.

Disable the firewall or uninstall software which enables the firewall, and try to search for the LinkStation again.

Cause 3. Both wireless and Ethernet adapter are enabled.

Disable any adapters other than the LAN adapter to connect to the LinkStation.

Cause 4. The defective LAN cable or the connection is not stable.

Change a port on the hub to connect or replace the LAN cable.

Cause 5. Your LAN board, card, or adapter is malfunctioning.

Replace a LAN board, card, or adapter.

Cause 6. The LAN board you are using or the transfer mode of the hub is not set.

Change the LAN board, or change the transfer mode to [10M half-duplex] or [100M half-duplex].

Some LAN boards and hubs may not be connected to the network properly if the transfer mode is set to [Auto Negotiation].

Cause 7. There is a network bridge.

If any network bridge which is not used, delete them.

Cause 8. You are searching from a different network.

You cannot search for the LinkStation over network segments. Connect the LinkStation to the same segment as the computer you use for search.

Cause 9. TCP/IP does not work properly.

Install the LAN adapter's driver again.

Cause 10. You are running Setup second time or more (it has been already run before).

After initializing the LinkStation, follow steps described in "LinkNavigator Setup" on Page 3 to run Setup.

Note: – When using Power Management with PC feature, you need to install NAS Navigator2 on all computers connected within the same network as the LinkStation.

If a shared folder does not open on NAS Navigator2

The LinkStation may not be physically connected or may not be recognized properly. Reconnect the LAN cable and restart your computer and the LinkStation.

A shared folder does not open suddenly

If you use a shared folder on the LinkStation as a network drive, you may not be able to access to the LinkStation when the IP address or the workgroup has changed.

In such a case, follow the instructions in "Open shared folder" on Page 16 and open the shared folder on the LinkStation by using NAS Navigator2.

Note: – On Mac OS, LinkStation is mounted as a drive icon on the desktop, or displayed in the sidebar on Finder.

– If the problem still persists after you tried the procedures described above on Mac OS, select [System]-[Storage]-[Disks]-[Check Disk]-[Delete any hidden, non-essential MacOS dedicated files] on the configuration screen of the LinkStation, and run Disk Check.

If a shared folder does not open even though NAS Navigator 2 recognizes the LinkStation

If power outage occurred or the AC adapter is unplugged while the LinkStation is ON, the LinkStation's firmware may be corrupted and shared folders may not open (You can search for folders on NAS Navigator2 but they do not open).

Note: – In such a case, the LinkStation name displayed on NAS Navigator2 or the configuration screen on the LinkStation is displayed as LS-CHL-abc(abc stands for last 3 digits of the MAC address of the LinkStation) or LS-XHL-abc. In such a case, download the latest firmware from BUFFALO's website (www.buffalotech.com) and update it.

Data Backup

While using the LinkStation, you may lose your important data due to sudden accidents, hard disk failure, or accidental misoperation. It is important to backup your data to recover data or minimize losses in such a case.

Use Mass Storage class hard disk manufactured by BUFFALO (such as TeraStation/LinkStation and a USB external hard disk) as a backup destination.

GPL Information

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