

**Network Attached Storage** 

TeraStation WSS WSH5010N6

# **User Manual**



Please make sure to read this manual before using and follow the procedures. If you have any inquiries about the product, contact the number on the warranty statement or the packing box. Do not discard this manual, the warranty statement, or the packing box.

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# **Chapter 1 Getting Started**

### Diagrams

#### WSH5610DN6



#### 1 Power Button (心)

To power on, connect the power cable and wait for 10 seconds, then press the power button. To power off, press the power button.

#### **2** Power LED

The LED glows blue when power is on.

### **3** Access LED

Shows network activity. This LED blinks green when hard drives are being accessed.

#### 4 Fail LED

If there is an error on the drives, this LED glows amber. Open Buffalo Dashboard to see error messages.

#### **5** LAN1 LED

When LAN port 1 is connected, this LED glows green. It blinks when the connection is active.

#### 6 LAN2 LED

When LAN port 2 is connected, this LED glows green. It blinks when the connection is active.

### 7 LCD Panel

This display shows the status of many TeraStation settings.

### 8 Mode Button

Not in use normally; if the TeraStation beeps, press this button to stop the beeping.

### **9** Select Button

Not in use normally.

### **10** Drive Lock

Open the front panel with the key to replace hard drives or press the reset button.

### **11** Reset Button

To shut down and reboot the TeraStation, press and hold this button. Do not use this button normally.

### **12** Status LEDs

Normally, these LEDs blink green when hard drives are accessed. If a drive fails or dismounts, its LED will turn amber.

### 13 VGA Port

You can connect a VGA monitor to this port. Connecting a monitor directly to the TeraStation is only supported for monitoring the progress of Windows Update.

### **14** HDMI Port

You can connect a HDMI monitor to this port. Connecting a monitor directly to the TeraStation is only supported for monitoring the progress of Windows Update.

### 15 eSATA Port

eSATA-compatible hard drives are available with this port. Turn the TeraStation off before connecting the drives.

### 16 UPS Port

Connect to a UPS.

### **17** USB 3.0 Port (SS€→)

Compatible Buffalo USB 3.0 hard drives, USB memory devices, and USB UPSs can be connected. USB hubs are not supported.

### 

Compatible Buffalo USB hard drives, USB memory devices, and USB UPSs can be connected. USB hubs are not supported.

### 19 LAN Port 2

This second Ethernet port may be used for network redundancy or backup. You may connect a second TeraStation directly to this port for backup.

### 20 LAN Port 1

Use an Ethernet cable to connect this port to your network.

### **21** Power Connector

Use the included power cable to connect to an UPS, surge protector, or outlet.

### **22** Fan

Spins to avoid overheating inside. Do not block the fan.

#### **23** Anti-Theft Security Slot

Use this slot to secure your TeraStation with a cable lock (not included).

### 24 Link LED

Glows amber when the TeraStation is connected to a network.

### 25 Act LED

This LED shows network activity. It blinks amber when the TeraStation is accessed over the network.

# **Opening Windows Storage Server**

To connect Windows Storage Server, follow the procedure below.

Note: If using macOS, download and install "Microsoft Remote Desktop" from the Mac App Store.

- **1** Double-click the NAS Navigator2 icon ( ) to start NAS Navigator2.
- **2** Right-click your TeraStation's icon and select *Open Remote Desktop*. For macOS, select the TeraStation's icon while holding down the control key, then select *Open Remote Desktop*.

If the message "The identity of the remote computer cannot be verified. Do you want to connect anyway?" is displayed, click *Yes* or *Continue*.

Menu 👻 🔠 View	👻 🇀 Browse 🛛 😏 Refresh	
Browse Share Open Remot Properties Create Deskt	te Desktop	
/SH5610DN6 Series		Workgroup: WORKGROUP
/SH5610DN6 Series	C: 14.9 GB/58.9 GB (25.3%)	IP Address: 192.168.10.29
SH5610DN6 Series	C: 14.9 GB/58.9 GB (25.3%) D: 0.4 GB/7451.9 GB (0.0%)	IP Address: 192.168.10.29 Subnet Mask: 255.255.255.0
/SH5610DN6 Series		IP Address: 192.168.10.29 Subnet Mask: 255.255.0 Default Gateway: 192.168.10.1
/SH5610DN6 Series		IP Address: 192.168.10.29 Subnet Mask: 255.255.255.0 Default Gateway: 192.168.10.1 MAC Address: 00:04:5F:A1:5A:0E
VSH5610DN6 Series		IP Address: 192.168.10.29 Subnet Mask: 255.255.0 Default Gateway: 192.168.10.1

**3** Enter the admin username and password and press the Enter key. The default username and password are "Administrator" and "password".

Windows Storage Server will open in the remote desktop.

# **Changing Settings**

### **Configuring Date and Time**

**1** Click the time in the system tray of Windows Storage Server.



**2** Click Change date and time settings > Change date and time, select the current date and time, and click OK.



**Note:** From the *Internet Time* tab, click *Change settings*, then select *Synchronize with an Internet time server*. The date and time can be obtained automatically.

### **Creating a Shared Folder**

No shared folders are configured by default. Before using the TeraStation, follow the procedure below to create one or more shared folders.

This is an example to create a shared folder, named "Share" in drive D, which anyone can access.

**1** From Server Manager, click *Tools > Computer Management*.



**2** Click Shared Folders.

**3** Right-click *Shares* and click *New Share*.

🛃 Computer Management				
File Action View Help				
🗢 🄿 🙍 🖬 🔂 🖬				
<ul> <li>Computer Management (Local</li> <li>W System Tools</li> </ul>		^		
> ( Task Scheduler	Shares	Nev	v Share	
> 🛃 Event Viewer	8 Sessior		vonarem	
> 👸 Shared Folders	👔 Open F	Nev	v	>
> 🜆 Local Users and Groups		Hel	n	
> 🔊 Performance			٢	
📇 Device Manager				
✓ 🚝 Storage				
> 🐌 Windows Server Backup				
📅 Disk Management				
> 🚠 Services and Applications				

### 4 Click Next.

**5** Enter the path of an existing folder or a new folder, then click *Next*.

Create A Shared Folder	Wizard	×
Folder Path Specify the path t	to the folder you want to share.	23
Computer name:	WSH5610DN6A0E	
Type the path to the f folder.	older you want to share, or click Browse to pick the fold	er or add a new
Folder path:	D:\Share	Browse
Example:	C: \Pocs \Public	
	< Back Next >	Cancel

#### Notes:

- Enter "D:\Share" into the folder path to create the shared folder for the first time.
- If the message "The system cannot find the specified path. Do you want to create it?" is displayed, click Yes.

**6** Enter a name for the share and a description (optional), then click *Next*.

Create A Shared Folde	er Wizard X
Name, Description Specify how peo	ple see and use this share over the network.
Type information abo offline, dick Change.	out the share for users. To modify how people use the content while
Share name:	Share
Share path:	\\WSH5610DN6A0E\Share
Description:	
Offline setting:	Selected files and programs available offline Change
	< Back Next > Cancel

**7** Select "Customize permissions", then click *Custom*.

Create A Shared Folder Wizard	$\times$
Shared Folder Permissions Permissions let you control who can see the folder and the level of access they have.	23
Set the kind of permissions you want for the shared folder.	
○ All users have read-only access	
○ Administrators have full access; other users have read-only access	
○ Administrators have full access; other users have no access	
Customize permissions	
Custom	
By default, only share permissions are set on this folder. To control local access permissions to this folder or objects within the folder, click Custom and then modify th permissions on the Security tab to apply specific permissions on the folder.	e
< Back Finish Ca	ancel

8 Choose *Everyone* and select the "Allow" checkbox for "Change".

Customize Permiss	ions			?	$\times$
Share Permissions	Security				
Group or user name	es:				
Sector Se					
		Ado	d	Remov	'e
Permissions for Eve	eryone		Allow	Deny	,
Full Control					
Change			$\checkmark$		
Read					
			ОК	Ca	ncel

**9** From the *Security* tab, click *Edit* > *Add*.

Customize Permiss	sions		?	×
Share Permissions	Security			
Object name: D	:\Share			
Group or user nam	ies:			_
Serveryone			· · · · · · · · · · · · · · · · · · ·	•
SCREATOR O	WNER			
SYSTEM			×	1
<			>	
To change permis	sions, click Edit		Edit	
		Allow	Demi	
Permissions for Ev	eryone	Allow	Deny	_
Permissions for Ev Full control	eryone	Allow	Deny	•
	eryone	~		
Full control	-	~		
Full control Modify		~		
Full control Modify Read & execute		× × ×		
Full control Modify Read & execute List folder conte	ents	~ ~ ~ ~ ~ ~ ~ ~		

**10** Enter "Everyone" under "Enter the object names to select", then click *OK*.

Select Users or Groups		×
<u>S</u> elect this object type: Users, Groups, or Built-in security principals		Object Types
From this location:		
WSH5610DN6A0E		Locations
Enter the object names to select ( <u>examples</u> ):		
Everyone		Check Names
Advanced	ОК	Cancel

**11** Choose "Everyone", then select the "Allow" checkbox for *Modify*.

📕 Permissions for Share		×
Security		
Object name: D:\Share		
Group or user names:		
State of the second sec		
SYSTEM & Administrators (WSH5610DN	6A0F\Administrato	(and
Leveryone		
Sers (WSH5610DN6A0E\U	lsers)	
	A <u>d</u> d	<u>R</u> emove
Permissions for Everyone	Allow	Deny
Full control	$\checkmark$	□ <u>^</u>
Modify	$\checkmark$	
Read & execute	$\checkmark$	
List folder contents	$\checkmark$	
Read	$\checkmark$	
ОК	Cancel	Apply

### **12** Click OK > OK > Finish > Finish.

Notes:

#### Enable a guest account:

- (1) From Server Manager, click *Tools > Computer Management*.
- (2) Click Local Users and Groups.
- (3) Double-click Users > Guest.
- (4) From the General tab, clear the "Account is disabled" checkbox, then click OK.

#### Enable access permissions:

- (1) From Server Manager, click *Tools > Computer Management*.
- (2) Click Shared Folders.
- (3) Double-click Shares, then double-click the desired shared folder.
- (4) From the Security tab, click Edit.
- (5) From the *Local Users and Groups* list, add the users or groups that will be allowed access (the groups and users must be created beforehand). To allow access for all users, add a guest and change Administrator's "Access Permission" to "Full Control".

# **Turning the TeraStation On and Off**

Press the power button on the TeraStation to turn it on and off. Or you can turn off your TeraStation by following the procedure below.

1 Click the Start button.

ம

**2** Click the

icon, then Shut down.

**3** Select the reason why you want to shut down, then click *Continue*.

When the power LED on the front of the TeraStation turns off, the shutdown process is complete.

**Note:** Always shut down the TeraStation before unplugging it. The TeraStation can be damaged if it is suddenly unplugged without being powered down first.

## **Installing Antivirus Software**

Installing antivirus software on the TeraStation is strongly recommended. The installation process may vary depending on which antivirus software you use.

# **Chapter 2 Preinstalled Software**

The following software is preinstalled on the TeraStation.

- RAID Builder
- Buffalo Dashboard
- Email Notification
- Buffalo Replication
- TeraStation Backup & Replication Folder Settings

# **RAID Builder**

RAID Builder is used to create RAID volumes. See the "Storage Management" chapter for more details. To launch RAID Builder, you must be logged in as a member of the Administrators group in Windows Storage Server. **Note:** This software cannot be accessed by multiple users at the same time. Before launching it, make sure that it is not being used by another user.

鬜 RAID Builder	:	X
RAID Mode		
RAID 6 volume		
O RAID 5 volume		
RAID 10 volume		
O Striped volume	Q P Parity	
	Build a RAID 6 volume using 6 drives.	1
	Available capacity:7,450 GB	
<current raid="" statu<br="">RAID Mode:RAID 6 vo Capacity:7,451 GB Status:Normal</current>	s> lume	
Format RAID	Build New RAID Array Cancel	

# **Buffalo Dashboard**

Buffalo Dashboard displays system information and dismounts drives. To launch it, double-click the Buffalo

Dashboard icon in the system tray.

Note: This software cannot be accessed by multiple users at the same time. Before launching it, make sure that it is not being used by another user.



ltems	Descriptions
System Information	<ul> <li>Product Name: Displays the model name of the TeraStation.</li> <li>Computer Name: Displays the hostname of the TeraStation.</li> <li>Domain Name: Displays the type of domain that the TeraStation is a member of.</li> <li>OS: Displays the type of Windows installed on the TeraStation.</li> <li>OS Version: Displays the version of the OS.</li> </ul>
System mornation	<b>Firmware</b> : Displays the version of the OS. <b>Firmware</b> : Displays the firmware version of the TeraStation. <b>Check for updates</b> : Enables or disables checking for new firmware releases. When a new firmware version is available, you will be notified here. <b>Manufacturer</b> : Displays "Buffalo Inc.".
Temperature	Displays the temperature of the system.
Fan	Displays the fan rpm.

ltems	Descriptions
Backup	Displays the status of backup and replication.
Network Information	Displays IP addresses, subnet masks, default gateways, LAN port numbers, link speed, and status.
Drive	Displays the status, drive numbers, names, capacity, and physical sector sizes of each drive. <b>Options:</b> <b>Shut down the TeraStation when the temperature of the drive</b> <b>becomes abnormally high</b> : The TeraStation will automatically shut down if the drive gets too hot.
ERROR	Displays error or information codes. For more detail information, refer to the "Errors and Statuses on Buffalo Dashboard" section below.

Note: "Options" and "Check for updates" functionalities are only available when logged in as an administrator.

### Errors and Statuses on Buffalo Dashboard

**Note:** The "x" in the message is a number of drive or assigned drive letter where an error or information event occurs.

Message	Description	Corrective Action
SYSTEM Error E11 Fan Failure	An error occurred in the fan speed.	Check that no foreign objects or dust are clogging the fan. If any foreign objects or dust are found, use a pair of tweezers, air duster, or other tools to remove them. If the error is displayed again, contact Buffalo technical support for assistance.
SYSTEM Error E12 Cooling Failure	A rise in the system temperature may have exceeded the allowable safety value.	Do not place objects in the area around the TeraStation. Also, move the TeraStation to a cool location. Make sure that the TeraStation's fan is working normally.
HDx Error E16 HDx Not Found	Unable to find the drive.	The drive may be disconnected or may have failed.
HDx Broken E30 Replace the DISK	An error occurred, so the drive was removed from the volume.	Replace the drive.
SYSTEM I10 TOO HOT !	A rise in the system temperature may have exceeded the allowable safety value.	Move the TeraStation to a cool location. Do not place objects in the area around the TeraStation.
Operation I12 DEGRADE MODE	Operating in degraded mode.	Check the drive where the error occurred and replace it with a new drive. For the replacement method, refer to chapter 6, "Drive Replacement".
RAID I18 x Drive Rebuilding	Resynchronizing the volume. <b>Note:</b> Transfer speeds are slower during the resynchronizing process.	Wait until resynchronization finishes. It will take about 8–12 hours per terabyte for a RAID 5 volume and 3–6 hours per terabyte for a mirrored volume. This message will disappear when resynchronization finishes.
Replication I33 Replicate Failure	An error occurred during replication.	From Buffalo Replication, click <i>Sync</i> to execute resynchronization. If the error is displayed again, contact Buffalo technical support for assistance.
New Firmware I52 Available	A new firmware version has been released.	Update the firmware.

Message	Description	Corrective Action
l54 Backup Failure	The backup job failed.	Make sure that the backup job is configured correctly. Make sure that the NAS is on and not in standby mode. If the backup job still fails, check the status of NAS, the network, and the backup source and destination. Also, check the backup log to see if any errors were recorded.

## **Email Notification**

Your TeraStation can send you email reports when settings are changed or an error occurs. See the "Enabling Email Notification" section in chapter 5 for more details.

To launch Email Notification, you must be logged in as a member of the Administrators group in Windows Storage Server.

Note: This software cannot be accessed by multiple users at the same time. Before launching it, make sure that it is not being used by another user.

🖷 Email Notification	×
	^
Enable email notification	
Send to	
Email Address	New
	Edit
	Delete
Authentication	
SMTP Server Address:	Port Number: 25
User Authentication Method:	None ~
POP Server Address:	Port Number: 110
Usemame:	Password:
Usemane.	Fassworu.
SSL/TLS:	Disable
	Accept untrusted or self-signed certificates
Email Settings	
Sender Address:	
Title:	TeraStation Status
Inte:	
	Content Options
<b>T</b> . M	
Test Message	OK Cancel Apply

## **Buffalo Replication**

Your TeraStation can be synchronized with another TeraStation, replicating most data. See the "Configuring Replication" section in chapter 4 for more details.

To launch Buffalo Replication, you must be logged in as a member of the Administrators group in Windows Storage Server.

Note: This software cannot be accessed by multiple users at the same time. Before launching it, make sure that it is not being used by another user.

Status	Replication Source	Replication Target	

# **TeraStation Backup & Replication Folder Settings**

Before using it as a backup device on the network, configure your TeraStation in "TeraStation Backup & Replication Folder Settings".

To launch TeraStation Backup & Replication Folder Settings, you must be logged in as a member of the Administrators group in Windows Storage Server.

**Note:** This software cannot be accessed by multiple users at the same time. Before launching it, make sure that it is not being used by another user.

eraStation E	Backup & Replication Folder Se	:	
	Label	Folder	Backup Device Access Key
<b>⊁</b> ∗ 1			
		e access key for security. In order for anothe ation or backup source or destination, you mu	

ltems	Descriptions
Label	Enter a name for the backup or replication destination. When you search for backup devices on the network, this name will appear.
Folder	Specify a shared folder where backup data will be stored. Do not select the root directory where the shared folder is created.
Backup Device Access Key	Enter the desired characters for a backup device access key. The backup device access key may contain up to 8 alphanumeric characters, hyphens (-), and underscores (_). The first character should not be a symbol. You may leave this field blank if you do not want a backup device access key, but for security reasons we highly recommend entering one for the shared folder. If a backup device access key is configured for the shared folder, that folder will not show up as a target for the replication destination or backup source or destination when configuring a backup job on another Buffalo device unless it's entered.
	To remove a folder from the list of available backup targets, select the folder and click this button.
Save	Saves the settings.
Close	Exits TeraStation Backup & Replication Folder Settings.

# **Chapter 3 Storage Management**

### **Working with Volumes**

### **Notice When Creating Volumes**

- To create a volume, use RAID Builder instead of the Disk Management option in Windows Storage Server.
- When volumes are deleted, formatted, or changed to another volume type, all data stored on the volumes is erased. Before executing these operations, back up any important data.
- In this manual, "recover" means reverting the TeraStation (including data) to its former state prior to the drive failure. It doesn't refer to reading data from a failed drive.

### Volume Types

### **RAID 6 Volumes**

RAID 6 distributes two parity blocks when writing data. The usable space is equal to the sum of the capacity of four drives. If two drives in a RAID 6 volume fail, data on the volume can be recovered after the failed drives are replaced. However, if three or more drives fail, all data is lost.

### **RAID 5 Volumes**

RAID 5 distributes a parity block when writing data. The usable space is equal to the sum of the capacity of the five drives. If one drive in a RAID 5 volume fails, data on the volume can be recovered after the failed drive is replaced. However, if two or more drives fail, all data is lost.

### **RAID 10 Volumes**

Mirrored pairs of drives in RAID 1 volumes are combined into a RAID 0 volume. The usable space is equal to the capacity of three drives. The same data is written to multiple drives so that if one drive from either or both RAID 1 volume fails, data on the volume can be recovered after the failed drives are replaced. However, if two drives on the same RAID 1 volume or three drives in total fail, all data is lost.

### **Striped Volumes**

RAID 0 stripes data across the multiple drives, but lacks parity blocks like RAID 5 or RAID 6. The usable space is equal to the capacity of all drives on the TeraStation. RAID 0 doesn't have any redundancy so data cannot be recovered if even a single drive fails.

## **Creating a Volume**

To create a volume, follow the procedure below. Successfully following the procedure will erase all data stored on the volumes.

1 Click the Start button and click *RAID Builder*.

**2** Select the desired volume type under "RAID Mode" and click *Build New RAID Array*.

鬜 RAID Builder		×
RAID Mode		
RAID 6 volume		
○ RAID 5 volume		BF
○ RAID 10 volume		
O Striped volume	Q P Parity	0 1
	Build a RAID 6 volume using 6 drives.	
	Available capacity:7,450 GB	
<current raid="" statu<br="">RAID Mode:RAID 6 vo Capacity:7,451 GB Status:Normal</current>	s> lume	
Format RAID	Build New RAID Array	Cancel

**3** Click *OK* when a warning message is displayed.

- **4** Click *OK* again. Creating the volume will begin. The TeraStation will shut down automatically after about a minute.
- **5** When the power LED is distinguished, press the power button on the TeraStation to turn it on.

**6** Connect Windows Storage Server via the remote desktop.

**7** Click the Start button and click *RAID Builder*.

**8** Click *Format RAID* and click *OK*.

After creating the volume is completed, refer to chapter 1 to create a shared folder.

#### Notes:

- If the I18 message is displayed under "ERROR" on Buffalo Dashboard, the volume has not been created yet. Wait until the message disappears and try from the step 7 again.
- You can also format the volume using the "Format RAID" button on RAID Builder.

# **Chapter 4 Backup and Replication**

Data stored in the TeraStation may be lost through drive failure or wrong operation. To avoid losing data accidentally, back up your data regularly.

You can back up data using the following functions:

- Windows Server Backup
- Buffalo Replication
- DFS Replication

## **Backing Up in Windows Storage Server**

### **Preparing a Backup Destination**

Follow the procedure below to set your backup schedule.

**1** From Server Manager, click *Tools > Windows Server Backup*. The "Windows Server Backup" wizard will start.



**2** Click *Local Backup*. If "Reading data; please wait..." is displayed, please wait until any messages disappear.



**3** Right-click on "Local Backup" and select *Backup Schedule*.... The "Backup Schedule Wizard" will start.





**5** Select "Custom" and click *Next*.

Backup Schedule Wizard	wp Configuration
Getting Started Select Backup Configurat Select Items for Backup Specify Backup Time Specify Destination Type Confirmation Summary	<ul> <li>What type of configuration do you want to schedule?</li> <li>Full server (recommended)</li> <li>I want to back up all my server data, applications and system state.</li> <li>Backup size: 17.47 GB</li> <li>Custom</li> <li>I want to choose custom volumes, files for backup.</li> </ul>
	< Previous Next > Finish Cancel

Click Add Items.

7	Select the backup source folders or drives and click OK.
-	Sciect the backup source folders of arrives and click on.

Select Items	×
Specify items to include in the backup by selecting or clearing the associated check boxes. The items that have included in the current backup are already selected.	it you
Bare metal recovery System state EFI System Partition Local disk (C:) Local disk (D:)	
OK Cance	

8 Click Next.

**9** Specify the schedule to run the backup and click *Next*.

🐌 Backup Schedule Wizard					×
Specify Bac	kup Time				
Getting Started	How often and when do	o you want to run ba	ckups?		
Select Backup Configurat	Once a day				
Select Items for Backup	Select time of day:	9:00 PM	$\sim$		
Specify Backup Time	O More than once a da	У			
Specify Destination Type		me and then click Ad			
Confirmation	Available time:	_	Scheduled tin	ne:	
Summary	12:00 AM 12:30 AM 1:00 AM 1:30 AM 2:00 AM 2:30 AM 3:00 AM 3:30 AM 4:00 AM 4:30 AM	Add > < Remove	9:00 PM	~	
	< Previo	ous Next >	Finish	Cancel	

**10** Select the backup destination and click *Next*.

🐌 Backup Schedule Wizard	X
Specify Des	tination Type
Getting Started Select Backup Configurat Select Items for Backup Specify Backup Time Specify Destination Type Select Destination Disk Confirmation Summary	<ul> <li>Where do you want to store the backups?</li> <li>Back up to a hard disk that is dedicated for backups (recommended) Choose this option for the safest way to store backups. The hard disk that you use will be formatted and then dedicated to only store backups.</li> <li>Back up to a volume Choose this option if you cannot dedicate an entire disk for backups. Note that the performance of the volume may be reduced by up to 200 percent while it is used to store backups. We recommend that you do not store other server data on the same volume.</li> <li>Back up to a shared network folder Choose this option if you do not want to store backups locally on the server. Note that you will only have one backup at a time because when you create a new backup it overwrites the previous backup.</li> </ul>
	< Previous Next > Finish Cancel

**11** Step through the wizard to finish.

### **Recovering Backup Data**

Follow the procedure below to recover the backup data to the TeraStation.

**Note:** Bare-metal recovery is not supported for the backup data stored using the backup function of Windows Storage Server.

**1** From Server Manager, click *Tools > Windows Server Backup*. The "Windows Server Backup" wizard will start.



**2** Click *Local Backup*. If "Reading data; please wait..." is displayed, please wait until any messages disappear.



**3** Right-click on "Local Backup" and click *Recover...*. The recovery wizard will start.

ᡖ wbadmin - [Wii	ndows Server Backup (Local)\Local Backup	]	
File Action Vie	w Help		
🗢 🔿 🔁 📰	? 🗊		
🐞 Windows Server	Backup (I Local Backup		
🚯 Local Ba	Backup Schedule		
	Backup Once		s
	Recover		
	Configure Performance Settings		e
	View	>	
	Help		
			1

**4** Select where the backup data is saved and click *Next*. When "A backup stored on another location" is selected, specify the folder of the backup data in the next page.

Secovery Wizard	×
Getting Star	ted
Getting Started Select Backup Date Select Recovery Type Select Items to Recover Specify Recovery Options Confirmation Recovery Progress	You can use this wizard to recover files, applications, volumes, or the system state from a backup that was created earlier. Where is the backup stored that you want to use for the recovery? ① This server (WSH5610DN6A0E) ① A backup stored on <u>a</u> nother location To continue, click Next.
	< <u>P</u> revious <u>N</u> ext > <u>R</u> ecover Cancel

**5** Select the date when a data backup occurred and click *Next*.

Recovery Wizard	ckup Date	
Getting Started Select Backup Date Select Recovery Type Select Items to Recover Specify Recovery Options Confirmation Recovery Progress	Oldest available backup:       1/5/2018 4:37 PM         Available backups       Available backups         Select the date of a backup to use for recovery. Backups are available for dates shown in bold.         Image: Select the date of a backup to use for recovery. Backups are available for dates shown in bold.         Image: Select the date of a backup to use for recovery. Backups are available for dates shown in bold.         Image: Select the date of a backup to use for recovery. Backups are available for dates shown in bold.         Image: Select the date of a backup to use for recovery. Backups are available for dates shown in bold.         Image: Select the date of a backup to use for recovery. Backups are available for dates shown in bold.         Image: Select the date of a backup to use for recovery. Backups are available for dates shown in bold.         Image: Select the date of a backup to use for recovery. Backups are available for dates shown in bold.         Image: Select the date of a backup to use for recovery. Backups are available for dates shown in bold.         Image: Select the date of a backup to use for recovery.         Image: Select the date of a backup to use for recovery.         Image: Select the date of a backup to use for recovery.         Image: Select the date of a backup to use for recovery.         Image: Select the date of a backup to use for recovery.         Image: Select the date of a backup to use for recovery.         Image: Select the date of a backup to use for recovery.	
	< Previous Next > Recover Cancel	

**6** Select the recovery targets and click *Next*.

Select Rec	overy Type	
Getting Started Select Backup Date Select Recovery Type Select Items to Recover Specify Recovery Options Confirmation Recovery Progress	<ul> <li>What do you want to recover?</li> <li>Files and folders You can browse volumes included in this backup and select files and folders. Hyper-V You can restore virtual machines to their original location, another location or copy the virtual hard disk files of a virtual machine. Volumes You can restore an entire volume, such as all data stored on C:. Applications You can recover applications that have registered with Windows Server Backup. System state You can restore just the system state.</li></ul>	
	< Previous Next > Recover Cancel	

**7** Step through the wizard to finish.

# **Configuring Replication**

Replication copies all data from a share to a share on a different TeraStation. This is an easy way to configure a reliable system to provide data protection in the event your main TeraStation fails. To configure replication, connect an Ethernet cable to the LAN port of each TeraStation and follow the steps below.

**Note:** The replication operation may not proceed properly if a large number of files or a large capacity file have been replicated continually for a long time, causing too large of a data load. Before starting replication, check if there are any possible pauses for operational issues.

### **Differences Between Buffalo Replication and DFS Replication**

### **Buffalo Replication**

- One-way replication (from the TeraStation to another device)
- Another Buffalo NAS devices can easily be configured for the replication destinations.

### **DFS Replication**

- Two-way replication
- The Active Directory domain environment is required and the TeraStation should be joined to the domain.

If your environment must join the Active Directory domain, use DFS Replication. If joining the Active Directory is not required, or if a TeraStation or LinkStation has been configured as the replication destination, using Buffalo Replication is recommended.

## **Before Using Replication**

- For best results, use static IP addresses with the same subnet masks for both replication TeraStations (source and destination). If on a VPN network, configure the network settings so that broadcast packets are not dropped.
- Setting the TeraStation on a 1000 Mbps network is recommended.
- Up to five replication tasks can be created.
- Filenames and file paths that will be copied by replication should be within 170 characters. Files with filenames that are longer than 170 characters may not be copied correctly.

### **Buffalo Replication**

If using Buffalo Windows Storage Server-installed TeraStations as both the replication source and destination, start from step 1. If using a different TeraStation as the replication destination, refer to that TeraStation's user manual to configure it as a replication destination. After you finish configuring on the TeraStation's Settings, go to step 3.

2 Click the blank space under "Label" and enter a label for the folder. Click under "Folder" and select the folder as a replication destination. Enter the desired characters for a backup device access key and click *Save* when finished.

TeraStation Backup & Replication Folder Settings X						
		Label	Folder	Backup Device Access Key		
	<b>}</b> ∗ 1					
	It is recondevice to enter the	Save Close				

**3** Click *Buffalo Replication* in the Start menu on the replication source TeraStation's Windows Storage Server.

<sup>1</sup> Click *TeraStation Backup & Replication Folder Settings* in the Start menu on the replication destination TeraStation's Windows Storage Server.

4 Click the blank space under "Replication Source", click . , and select a folder from the list as the replication source folder, then click *OK*.

Status	Replication Source	Replication Target	
1			

**5** If you had configured a backup device access key to the replication destination folder, click *Set Backup Device Access Key*. If you didn't, skip to step 7.

**6** Enter the configured backup device access key of the replication destination folder and click *OK*.

Set Backup Device Acc	ess Key	×
Backup Device Access	s Key	
	ОК	Cancel

**7** Click the blank space under "Replication Target" and select the folder, then click *Select* from a folder list. If no shared folders appear, click *Refresh* and try again.

To configure folders on the device that is located on another network, click *Add* and enter the IP address of the device, then click *Save*. After the IP address is added to the list, click *Refresh* again to add the folder to the list of folders.

Replication Target X				
TeraStations and LinkS	tations 🛛 🖒 Refresh 📕			
Hostname WS5420RN6DBB WSH5610DN6XXX WSH5610DN6XXX	IP Address 192.168.10.22 192.168.10.29 192.168.10.29	Target Folder repdst Label Label1		
TS5210D063 TS5410D2FD	192.168.10.12 192.168.10.38	dst_rep rep_dst		
IP Addresses	😵 Delete			
IP Address				
			Select	Cancel
			Select	Cancer

### When finished configuring, click *Apply*.

Replication List       Status       Replication Source       Replication Target         1	
▶ 1 🗌 🖉 Edting 🖿 D:\vep_src 🖿 TS5410D2FD@rep_dst	
Folder Setup	Close

**9** Click *OK*. The task will start a differential overwrite from the replication source data to the replication destination. The task will start a full backup from the replication source data to the replication destination after deleting existing files in the replication destination.

#### Notes:

- To delete the settings from the list, select the task and click Delete.
- The Ethernet port number to use for replication cannot be specified in the replication task.
- The following files and folders will not be replicated:

Files with periods (.) or underscores (\_) as the first character in their name. Folders with periods (.) or underscores (\_) as the first character in their name. .AppleDesktop/ Network Trash Folder/ TheVolumeSeHngsFolder/ .DS\_Store/ .AppleDouble/ .AppleDB/

### If the Network Settings Are Changed After Replication Tasks Are Created

If the network settings are changed after replication tasks are created, the TeraStation cannot communicate with the replication destination TeraStation and replication may fail. For example, disconnecting the Ethernet cable and reconnecting it to another LAN port or changing the IP address of the replication source or destination TeraStation. If the network settings are changed, refresh the list of TeraStations and LinkStations as follows.

**1** Click *Buffalo Replication* in the Start menu on Windows Storage Server.

**2** Click *Refresh* and refresh the detected TeraStations and LinkStations list.

**3** When the TeraStation that the network settings were changed is displayed in the refreshed list, close the window and click *Sync*.

### **DFS Replication**

DFS (Distributed File System) is a set of client and server services that allows Windows users to organize many distributed SMB file shares into a distributed file system.

To use DFS Replication, the TeraStation must be joined to an Active Directory domain. Make the necessary settings as detailed below to use DFS Replication on Windows Storage Server.

This section uses the following environment parameters as an example: Replication Source: "WSH5610DN6A0E" Replication Destination: "Server-A"

Namespace Server: "WSH5610DN6A0E" Namespace Name: "Public2" Namespace Folder: "buffalo-share" Replication Group: "Buffalo\_DFS"

Replication Source Folder: "D:\rep\_src" Replication Destination Folder: "D:\rep\_dst"
#### Joining an Active Directory

**1** From Server Manager, click *Local Server*.

🚡 Server Manager				
Server Ma	nager • Local Se	erver - 🕲 I 🚩		
Dashboard	PROPERTIES For WSH5610DN6A08			
Local Server	Computer name	WSH5610DN6A0E		
All Servers	Computer name Workgroup	WORKGROUP		
File and Storage Services ▷				
	Windows Firewall	Private: On		
	Remote management	Enabled		
	Remote Desktop	Enabled		
	NIC Teaming	Disabled		
	Ethernet	IPv4 address assigned by DHCP, IPv6		
	Ethernet 2	Not connected		

**2** Click the hostname of your TeraStation.

**3** From the *Computer Name* tab, click *Change*.

System Properties		×	
Computer Name Hardy	ware Advanced Remote		
Windows uses the following information to identify your computer on the network.			
Computer <u>d</u> escription:	l		
	For example: "IIS Production Server" or "Accounting Server".		
Full computer name:	WSH5610DN6A0E		
Workgroup:	WORKGROUP		
Workgroup:       WORKGROUP         To rename this computer or change its domain or workgroup, click Change.       Change			
	OK Cancel Apply		

**4** Select "Domain", enter a domain name, and click *OK*.

Computer Name/Domain	n Changes	×	
You can change the name and the membership of this computer. Changes might affect access to network resources.			
Computer name:			
WSH5610DN6A0E			
Full computer name: WSH5610DN6A0E		More	
Member of			
Domain:			
nas.buffalo.local			
O Workgroup:			
WORKGROUP			
	OK	Cancel	

5 Enter an administrator username and password for the Active Directory domain controller.

Windows S	Windows Security ×			
Compu	Computer Name/Domain Changes			
Enter the name and password of an account with permission to join the domain.				
8	User name			
Password				
Domain: nas.buffalo.local				
	OK Cancel			

- **6** Click *OK*, then click *OK* again.
- 7 Click Close.
- 8 Click *Restart Now* and restart your computer to apply settings.

#### **Installing DFS**

**1** From Server Manager, click *Dashboard* > Add roles and features.



**2** Click Next.

### **3** Select "Role-based or feature-based installation" and click *Next*.

📥 Add Roles and Features Wizard		-		×
Select installation	type	DESTI WSH5610DN6A0E.	NATION SER nas.buffalo.i	
Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	<ul> <li>Select the installation type. You can install roles and features on a running machine, or on an offline virtual hard disk (VHD).</li> <li>Role-based or feature-based installation Configure a single server by adding roles, role services, and features.</li> <li>Remote Desktop Services installation Install required role services for Virtual Desktop Infrastructure (VDI) to or session-based desktop deployment.</li> </ul>			
	< Previous Next >	Install	Cance	el

#### **4** Click Next.

**5** Select "DFS Namespaces" under "File and Storage Services" > "File and iSCSI Services".

elect server ro	les	DESTINATION SERVER WSH5610DN6A0E.nas.buffalo.loca
Before You Begin Installation Type Server Selection	Select one or more roles to install on the selected server. Roles Active Directory Federation Services	Description DFS Namespaces enables you to
Server Roles Features Confirmation Results	<ul> <li>Active Directory Lightweight Directory Services</li> <li>DHCP Server</li> <li>DNS Server</li> <li>File and Storage Services (4 of 12 installed)</li> <li>File and iSCSI Services (3 of 11 installed)</li> <li>File Server (Installed)</li> <li>BranchCache for Network Files</li> <li>Data Deduplication</li> <li>DFS Namespaces</li> <li>DFS Replication</li> <li>File Server VSS Agent Service</li> <li>iSCSI Target Server (Installed)</li> <li>iSCSI Target Storage Provider (VDS and VSS</li> </ul>	group shared folders located on different servers into one or more logically structured namespaces. Each namespace appears to users a a single shared folder with a series of subfolders. However, the underlying structure of the namespace can consist of numerou shared folders located on different servers and in multiple sites.
	Server for NFS Work Folders Storage Services (Installed) Hyper-V	

**6** Select "Include management tools (if applicable)" and click *Add Features*.

Add Roles and Features Wizard	
Add features that are require	ed for DFS Namespaces?
he following tools are required to n have to be installed on the same ser	-
<ul> <li>Remote Server Administration 1</li> <li>Role Administration Tools</li> </ul>	Tools
<ul> <li>File Services Tools</li> </ul>	
[Tools] DFS Manager	ment Tools
✓ Include management tools (if a	applicable)
✓ Include management tools (if a	Add Features Cancel

#### **7** Select and "DFS Replication".

Select server roles	S	DESTINAT WSH5610DN6A0E.nas.	ION SERVER buffalo.local
Before You Begin Installation Type Server Selection	Select one or more roles to install on the selected server. Roles	Description	
Server Roles Features Confirmation Results	<ul> <li>Active Directory Federation Services</li> <li>Active Directory Lightweight Directory Services</li> <li>DHCP Server</li> <li>DNS Server</li> <li>■ File and Storage Services (4 of 12 installed)</li> <li>✓ File Server (Installed)</li> <li>■ File and Storage Services (3 of 11 installed)</li> <li>✓ File Server (Installed)</li> <li>■ BranchCache for Network Files</li> <li>Data Deduplication</li> <li>✓ DFS Replication</li> <li>File Server Resource Manager</li> <li>File Server VSS Agent Service</li> <li>✓ iSCSI Target Storage Provider (VDS and VSS</li> <li>Server for NFS</li> <li>Work Folders</li> <li>✓ Storage Services (Installed)</li> <li>✓ Hyper-V</li> </ul>	DFS Replication is a multir replication engine that en- to synchronize folders on servers across local or wid network (WAN) network connections. It uses the Re Differential Compression ( protocol to update only th of files that have changed last replication. DFS Replic be used in conjunction wit Namespaces, or by itself.	ables you multiple le area emote (RDC) he portions since the cation can

**8** Click *Next* twice, then click *Install*.

**9** Click *Close* to finish.

#### **Creating Namespaces**

**1** From Server Manager, click *Tools > DFS Management*.



**2** Right-click *Namespaces*, then click *New Namespace*.



**3** Enter a hostname for the namespace server and click *Next*.

🐴 New Namespace Wizard			-		×
Namespace S	erver				
Steps:	Enter the name of the server that will host the namespace. The server you specify				
Namespace Server	will be known as the namespace server.				
Namespace Name and Settings	Server:				
Namespace Type	WSH5610DN6A0E	Browse			
Review Settings and Create Namespace					
Confirmation					
		< <u>P</u> revious <u>N</u> e	xt >	Cance	ł

**4** Enter a name for the namespace and click *Next*.

🐴 New Namespace Wizard		-		×
Namespace N	ame and Settings			
Steps: Namespace Server Namespace Name and Settings	Enter a name for the namespace. This name will appear after the server or domain name in the namespace path, such as \\Server\Name or \\Domain\Name.			
Namespace Type	Public2	1		
Review Settings and Create Namespace Confirmation	Example: Public  If necessary, the wizard will create a shared folder on the namespace server. To modify the settings of the shared folder, such as its local path and permissions, click Edit Settings.  Edit Settings			
	< Previous Ne	ed >	Cance	el

**5** Select *Domain-based namespace* and click *Next*.

🐴 New Namespace Wizard	- D X	(
Namespace Ty	уре	
Steps: Namespace Server Namespace Name and Settings Namespace Type Review Settings and Create Namespace Confirmation	Select the type of namespace to create. <ul> <li>Domain-based namespace</li> <li>A domain-based namespace is stored on one or more namespace servers and in Active Directory Domain Services. You can increase the availability of a domain-based namespace by using multiple servers. When created in Windows Server 2008 mode, the namespace supports increased scalability and access-based enumeration.</li> <li>Imable Windows Server 2008 mode</li> <li>Preview of domain-based namespace:</li> <li>\nas buffalo_local\Public2</li> </ul> <li>Stand-alone namespace         <ul> <li>A stand-alone namespace is stored on a single namespace server. You can increase the availability of a stand-alone namespace by hosting it on a failover cluster.</li> </ul> </li> <li>Preview of stand-alone namespace:         <ul> <li>\WSH5610DN6A0E\Public2</li> </ul> </li>	
	< Previous Next > Cancel	

**6** Click *Create*.

**7** Click *Close* when the New Namespace Wizard finishes.

**8** From DFS Management, right-click the name you created through the wizard and click *New Folder*.

沓 DFS Management				
😤 File Action View Window Help				
🗢 🄿 🙍 🖬 🗟 🖬				
🐴 DFS Management	Namespaces			
> 🏭 Namespaces	Name			
<b>Va</b>	🏄 \\nas.buf	New Folder		
		Add Namespace Server		
		Delegate Management Permissions		
		Remove Namespace from Display		
		New Window from Here		
		Delete		
		Refresh		
		Properties		
		Help		

**9** Enter a folder name and click *Add*.

are		
ire		
ire		
are		
Remove		
	ОК	Cancel

**10** Enter a path to the folder or select from the list by clicking *Browse*. Click *OK*. You may be asked to create a new folder if the selected path doesn't exist. In such a case, click *Yes*.



### **11** Click *OK* again.

#### **Configuring DFS Replication**

**1** From Server Manager, click *Tools* > *DFS Management*.

	– 🗆 X
🗕 🕑   🚩 Manage	Tools View Help
	Component Services
SERVER MANAGER	Computer Management
JERVER MARAOLR	Defragment and Optimize Drives
	DFS Management
	Disk Cleanup
<ol> <li>Configure this loc</li> </ol>	Event Viewer
	iSCSI Initiator
2 Add roles and feat	iSNS Server
2 Add Toles and Tea	Local Security Policy
	Windows PowerShell
	Windows PowerShell (x86)
	Windows PowerShell ISE
	Windows PowerShell ISE (x86)
	Windows Server Backup

**2** Right-click *Replication*, then click *New Replication Group*.

🐴 DFS Managemer	nt	
🐴 File Action \	/iew Window Help	
🗢 🔿 🔁 📰	🗟 🔽 📻	
Carl DFS Managemen	t Replication	
> 🏭 Namespaces	Name	
Ca nepnear	New Replication Group	ter
	Add Replication Groups to Display	
	Delegate Management Permissions	
	Disable Topology Verification	
	View	>
	New Window from Here	
	Refresh	
	Export List	
	Help	

### **3** Select the group replication type and click *Next*.

🐴 New Replication Group W	izard	-		×
Replication Gr	оир Туре			
Steps:	Select the type of replication group to create.			
Replication Group Type Name and Domain Replication Group Members Topology Selection Hub Members Hub and Spoke Connections Replication Group Schedule and Bandwidth Primary Member Folders to Replicate Review Settings and Create Replication Group Confirmation	<ul> <li>Multipurpose replication group         This option configures replication between two or more servers for publication, content sharing, and other scenarios.         </li> <li>Replication group for data collection         This option configures two-way replication between two servers, such as a branch server and a hub (destination) server. This allows you to collect data at the hub server. You can then use backup software to back up the data on the hub server.     </li> </ul>			
	< Previous Nex	t> [	Cance	ł

**4** Enter a name for the replication group and click *Next*.

🐴 New Replication Group W	Vizard -	-		Х
Name and Do	main			
Steps:	Type a name and domain for the replication group. The name of the replication group must be unique in the domain that hosts the replication group.			
Replication Group Type				
Name and Domain	Name of replication group:			
Replication Group Members	Buffalo_DFS			
Topology Selection				
Hub Members	Optional description of replication group:			
Hub and Spoke Connections				
Replication Group Schedule and Bandwidth	~			
Primary Member	Domain:			
Folders to Replicate	nas.buffalo.local Browse			
Review Settings and Create Replication Group				
Confirmation				
	< Previous Next >		Cancel	I

#### 5 Click Add.

🐴 New Replication Group W	lizard		-	- C	x נ
Replication Gr	oup Members				
Steps:	Click Add and then select two replication group.	o or more servers that will become members of the	,		
Replication Group Type					
Name and Domain	Members:				
Replication Group Members	Server	Domain			
Topology Selection					
Hub Members					
Hub and Spoke Connections					
Replication Group Schedule and Bandwidth					
Primary Member					
Folders to Replicate					
Review Settings and Create Replication Group					
Confirmation					
	Add Remove				
		< Previous	Next >	0	Cancel

**6** Enter more than two servers' hostnames to join the replication group and click *OK*.

Select Computers	×
Select this object type: Computers	Object Types
From this location: nas.buffalo.local	Locations
Enter the object names to select ( <u>examples</u> ): <u>WSH5610DN6A0E</u> ; <u>SERVER-A</u>	Check Names
Advanced OK	Cancel

#### 7 Click Next.

🐴 New Replication Group W	ïzard			-		×
Replication Gr	oup Members					
Steps:	Click Add and then select two replication group.	o or more servers that will be	ecome members of the			
Replication Group Type						
Name and Domain	Members:					
Replication Group Members	Server	Domain				
Topology Selection	WSH5610DN6A0E	nas.buffalo.local				
Hub Members	SERVER-A	nas.buffalo.local				
Hub and Spoke Connections						
Replication Group Schedule and Bandwidth						
Primary Member						
Folders to Replicate						
Review Settings and Create Replication Group						
Confirmation						
	Add Remove					
			< Previous Ne	xt >	Cance	l

**8** Select "Full mesh" and click *Next*.

New Replication Group V		-		×
Steps: Replication Group Type Name and Domain Replication Group Members Topology Selection Replication Group Schedule and Bandwidth Primary Member Folders to Replicate Review Settings and Create Replication Group Confirmation	<ul> <li>Select a topology of connections among members of the replication group.</li> <li>Hub and spoke</li> <li>This topology requires three or more members in the replication group. In this topology, spoke members are connected to one or two hub members. This topology works well in publication scenarios where data originates from the hub member and replicates out to the spoke members.</li> <li>Full mesh In this topology, each member replicates with all other members of the replication group. This topology works well when there are ten or fewer members in the replication group. No topology Select this option if you want to create a custom topology after you finish this wizard. No replication will take place until you create the custom topology. </li> </ul>	<b>.</b>		
	< Previous Ne	ext >	Cance	el

#### Click *Next* again.

🐴 New Replication Group W	fizard	-		×
Replication G	roup Schedule and Bandwidth			
Steps: Replication Group Type Name and Domain Replication Group Members Topology Selection Replication Group Schedule and Bandwidth Primary Member Folders to Replicate Review Settings and Create Replication Group Confirmation	<ul> <li>Select the replication schedule and bandwidth to be used by default for all new connections in the replication group.</li> <li>Replicate continuously using the specified bandwidth</li> <li>Use this option to enable replication 24 hours a day, seven days a week using the following bandwidth:</li> <li>Bandwidth: <ul> <li>Ful</li> <li>Pollicate during the specified days and times</li> </ul> </li> <li>Replicate during the specified days and times at which replication occurs by default. The initial replication schedule has no replication intervals; you must create at least one replication interval before replication can occur.</li> </ul> <li>Edt Schedule</li>			
	< Previous	Next >	Cance	el

**Note:** You have options to specify the network band and the date and time. To configure bandwidth, select *Replicate continuously using the specified bandwidth* and the bit rate from the drop-down list. To configure the schedule time, select *Replicate during the specified days and times* and click *Edit Schedule*. You can select the date and time in the displayed window.

Select the device as the primary member and click *Next*.

Mew Replication Group V		-		×
Steps: Replication Group Type Name and Domain Replication Group Members Topology Selection Replication Group Schedule and Bandwidth Primary Member Folders to Replicate Review Settings and Create Replication Group Confirmation	Select the server that contains the content you want to replicate to other members. This server is known as the primary member. Primary member: WSH5610DN6A0E ✓ If the folders to be replicated already exist on multiple servers, the folders and files on the primary member will be authoritative during initial replication.			
	< Previous Nex	d >	Cance	1

### Click Add.

🐴 New Replication Group W	îzard			-		×
Folders to Rep	licate					
Steps:	To select a folder on the primar members of the replication grou	y member that you want to rep up, click Add.	plicate to other			
Replication Group Type						
Name and Domain	Replicated folders:					
Replication Group Members	Local Path	Replicated Folder Name	NTFS Permissions			
Topology Selection						
Replication Group Schedule and Bandwidth						
Primary Member						
Folders to Replicate						
Review Settings and Create Replication Group						
Confirmation						
	Add Edit	Remove				
			< Previous Nex	t >	Cance	el

Select the folder as the replication source and click *OK*.

Add Folder to Replicate	×
Member:	
WSH5610DN6A0E	
Local path of folder to replicate:	
D:\rep_src Browse	
Example: C:\Documents	
Select or type a name to represent this folder on all members of the replication group. This name is known as the replicated folder name.  Use name based on path:	
rep_src	
O Use custom name:	
Example: Documents	
Permissions >> OK Cancel	

### Click Next.

🐴 New Replication Group Wi	îzard			-		$\times$
Folders to Rep	licate					
Steps:	To select a folder on the primar members of the replication grou		plicate to other			
Replication Group Type						
Name and Domain	Replicated folders:					
Replication Group Members	Local Path	Replicated Folder Name	NTFS Permissions			
Topology Selection	D:\rep_src	rep_src	Use existing per			
Replication Group Schedule and Bandwidth						
Primary Member						
Folders to Replicate						
Local Path of rep-A on Other Members						
Review Settings and Create Replication Group						
Confirmation						
	Add Edit	Remove				
			< Previous Nex	t>	Cance	el

#### Click Edit.

New Replication Group	Wizard			-		×
Local Path of	rep-A on Other M	lembers				
Steps: Replication Group Type Name and Domain Replication Group Members Topology Selection Replication Group Schedule and Bandwidth Primary Member Folders to Replicate Local Path of rep-A on Other Members	select the appropriat O Primary mem	te member and then	d folder or whether the folder is re click Edit WSH5610DN6A0E D:\rep-A Membership Stat Disabled	ad-only,		
Review Settings and Create Replication Group Confirmation	Edt		< Previous	Next >	Canc	el

Select "Enabled" and select the folder as the replication destination, then click OK.

Edit	$\times$
General	
Member:	
SERVER-A	
Select the initial status of the replicated folder on this member.	-
Membership status:	
<ul> <li>Disabled</li> <li>The replicated folder will not be stored on this member.</li> </ul>	
Enabled Keep the following folder synchronized with other members.	
Local path of folder:	
D:\rep_dst Browse	
Example: C:\Data	
Make the selected replicated folder on this member read-only.	
OK Cance	ł

### 16 Click Next.

🐴 New Replication Group W	lizard			_		×
Local Path of r	rep-A on Other M	lembers				
Steps: Replication Group Type Name and Domain Replication Group Members	select the appropriat	e member and then clic	older or whether the folder is read ck Edit WSH5610DN6A0E D:\rep-A	-only,		
Topology Selection	Member details:				1	
Replication Group Schedule and Bandwidth	Member SERVER-A	Local Path D:\rep_dst	Membership Stat Enabled			
Primary Member Folders to Replicate Local Path of rep-A on Other Members						
Review Settings and Create Replication Group Confirmation						
	Edt				,	
			< Previous	Next >	Cano	xel

### Click Create.

🐴 New Replication Group W	Vizard	-		×
Review Settin	gs and Create Replication Group			
Steps: Replication Group Type Name and Domain	You selected the following settings for the new replication group. If the settings are correct, click Create to create the new replication group. To change a setting, click Previous, or select the appropriate page in the orientation pane.			
Replication Group Members	Replication group settings:			
Topology Selection	Replication Group Name:  Buffalo. DFS			
Replication Group Schedule and Bandwidth	Replication Group Description:			
Primary Member				
Folders to Replicate	Domain of Replication Group: nas.buffalo.local			
Local Path of rep-A on Other Members	Replication Group Members (2): WSH5610DN6A0E			
Review Settings and Create Replication Group	SERVER-A			
Confirmation	Topology type: Full mesh			
	List of connections (2): SERVER-A -> WSH5610DN6A0E WSH5610DN6A0E -> SERVER-A			
	Default Connection Schedule: Replicate continuously with Full bandwidth			
	< Previous Cre	ate	Cance	el

#### Click *Close* when completed.

🐴 New Replication Group W	izard		-		×
Confirmation					
Steps:					
Replication Group Type	You have successfully completed the N	ew Replication Group Wizard.			
Name and Domain	-				
Replication Group Members	Tasks Errors				
Topology Selection	Task	Status			
Replication Group Schedule	Create replication group.	Success			
and Bandwidth	Create replication group.	Success			
Primary Member	Set permissions on replicated folders.	Success			
Folders to Replicate	Create replicated folder.	Success			
Local Path of rep-A on Other	Create membership objects.	Success			
Members	Create connections.	Success			
Review Settings and Create Replication Group					
Confirmation					
	To size the staging folder quota large enou from slowing or stopping, you must take in				
	files to be replicated. For more information optimization guidance.				
	Sport in a series i Sports of Robe				
				Close	,

**Note:** >It may take some time before actual replication is caught up. When the following window appears, click *OK*.



**Chapter 5 Additional Settings** 

## **Changing Server Name, Workgroups, and Domains**

**1** From Server Manager, click *Local Server*.

ᡖ Server Manager		
Server Mar	nager • Local Ser	rver 🛛 🕫 🛛 🖡
Dashboard	PROPERTIES For WSH5610DN6A0E	
Local Server	Computer name	WSH5610DN6A0E
All Servers	Computer name Workgroup	WORKGROUP
File and Storage Services ▷		
	Windows Firewall	Private: On
	Remote management	Enabled
	Remote Desktop	Enabled
	NIC Teaming	Disabled
	Ethernet	IPv4 address assigned by DHCP, IPv6
	Ethernet 2	Not connected

**2** Click the hostname of your TeraStation.

**3** From the *Computer Name* tab, click *Change*.

System Properties	>	<					
Computer Name Hardwa	are Advanced Remote						
Windows uses the following information to identify your computer on the network.							
Computer description:							
	For example: "IIS Production Server" or "Accounting Server".						
Full computer name:	WSH5610DN6A0E						
Workgroup:	WORKGROUP						
To rename this computer workgroup, click Change	r or change its domain or e.						
	OK Cancel Apply						

**4** Enter the computer name, choose domain or workgroup, and click *OK*.

Computer Name/Domain C	Changes	×
You can change the name an computer. Changes might affe		
Computer name:		
Buffalo_sample		
Full computer name: Buffalo_sample		More
Member of		
O Domain:		
Workgroup:		
WORKGROUP		
	ОК	Cancel

**Note:** The computer name should contain 15 characters or less. If 16 or more characters are entered, all characters from the 16th character on are ignored.

### **Changing the Password**

The default password for the TeraStation's administrator account is "password". This is public knowledge, so for security, you should change it immediately. Follow the procedure below to change the password.

#### Administrator's Password



4 Enter the current administrator's password and a new password (twice), then press the Enter key.



#### **Passwords for Other Users**

**1** From Server Manager, click *Tools > Computer Management*.



- **2** Click *Local Users and Groups*, then double-click *Users*.
- **3** Right-click the user whose password will be changed and click *Set Password*.

File Action View Help	? 📷	
<ul> <li>Computer Management (Local</li> <li> <sup>1</sup> <sup>1</sup></li></ul>	Administrator	Full Name
> 🛃 Event Viewer	Buffalo_user01	Set Password
<ul> <li>         Shared Folders     </li> <li>         Iccal Users and Groups     </li> </ul>	💭 Guest	All Tasks >
Users Groups		Delete
> ( Performance		Rename
🚦 Device Manager		Properties
<ul> <li>Storage</li> <li>Windows Server Backup</li> <li>Disk Management</li> </ul>		Help

**4** Click *Proceed*.

\_

**5** Enter a new password (twice).

Set Password for Buffalo	o_user01	?	$\times$	
New password:	•••••			
Confirm password:	•••••			
If you click OK, the following will occur: This user account will immediately lose access to all of its encrypted files, stored passwords, and personal security certificates.				
If you click Cancel, the pa occur.	ssword will not be change	ed and no data l	loss will	
	OK Cancel			

# Adding a User

**1** From Server Manager, click *Tools* > *Computer Management*.

	– 🗆 X	
🛛 🔁   🚩 Manage	Tools View Help	
	Component Services	
SERVER MANAGER	Computer Management	
SERVER MANAGER	Defragment and Optimize Drives	
	DFS Management	
1 Configura this lo	Disk Cleanup	
1 Configure this lo	Event Viewer	
	iSCSI Initiator	
2 Add roles and feat	iSNS Server	
	Local Security Policy	
	Windows PowerShell	
	Windows PowerShell (x86)	
	Windows PowerShell ISE	
	Windows PowerShell ISE (x86)	
	Windows Server Backup	

**2** Click Local Users and Groups.

**3** Right-click *Users* and click *New User*.

🜆 Computer Management		
File Action View Help		
Computer Management (Local	Name Users	
> 🕑 Task Scheduler	Groups	New User
> 🛃 Event Viewer	oroups	Refresh
> 👸 Shared Folders		
> 🌆 Local Users and Groups		Help
> 🔊 Performance		

**4** Enter the desired settings and click *Create*.

New User				?	×
User name:	Buffa	o_user01			
Full name:					
Description:					
Password:		•••••			
Confirm passw	ord:	•••••			
User must o	hange pa	ssword at ne	xt logon		
	t change	password			
User canno					
User canno	never expir	res			
		res			
Password n		es			
Password n		es			
Password n		es	Create		Close

5 Click Close.

# **Connecting with Standard Accounts**

Accounts not belonging to the Administrators group cannot connect to Windows Storage Server through the remote desktop. Those accounts must be added to the "Remote Desktop Users" group. Follow the procedure below to add accounts to the group.

**1** From Server Manager, click *Tools > Computer Management*.



**2** Click *Local Users and Groups*, then double-click *Groups*.

**3** Double-click *Remote Desktop Users*.

Computer Management File Action View Help			- 0	×
	2 🖬			
<ul> <li>Computer Management (Local</li> <li>System Tools</li> <li>Task Scheduler</li> <li>Event Viewer</li> <li>Shared Folders</li> <li>Local Users and Groups</li> <li>Verformance</li> <li>Device Manager</li> <li>Storage</li> <li>Windows Server Backup</li> <li>Disk Management</li> <li>Services and Applications</li> </ul>	Image: Second	Description Members of this group can remot Administrators have complete an Backup Operators can override se Members of this group are allowe Members are authorized to perfor Members are allowed to launch, a Members of this group can read e Guests have the same access as m Members of this group have com Built-in group used by Internet Inf Members of this group can have s Members of this group can acces Power Users are included for back Members of this group can acces Power Users are included for back Members can administer printers Servers in this group can perform Servers in this group andle users Members of this group are grante Members of this group are grante Members of this group are grante Members of this group are mana Users are prevented from making	Actions Groups More Actions Remote Desktop Users More Actions	
< >>				

Click *Add*.

Click Advanced.

Click *Find Now*.

**7** Select the user to be added as a group member and click *OK*.

Select Users	×
Select this object type:	
Users or Built-in security principals	Object Types
From this location:	
WSH5610DN6A0E	Locations
Common Queries	
N <u>a</u> me: Starts with $\checkmark$	<u>C</u> olumns
Description: Starts with <	Find <u>N</u> ow
Disa <u>b</u> led accounts	Stop
Non expiring password	
Days since last logon: 🗸 🗸	<i>~</i>
Search res <u>u</u> lts:	OK Cancel
Name	In Folder
& Administrator	WSH5610DN6A
ALL APPLICATION PACKAGES	
ANONYMOUS LOGON	
Authenticated Users	
BATCH	
Buffalo_user01	WSH5610DN6A
Reconsole Logon	
CREATOR GROUP	
CREATOR OWNER	~

Click *OK*, then click *OK* again.

### **Adding a Group**

**1** From Server Manager, click *Tools* > *Computer Management*.



- **2** Click Local Users and Groups.
- **3** Right-click *Groups* and choose *New Group*.



**4** Enter a group name and click *Add*.

New Group		7	, ×
Group name:	Buffalo_group01		
Description:			
Members:			
Add	Remove		
Help	Crea	ate	Close

#### Click Advanced.

Click *Find Now*.
**7** Select the users to be registered to the group.

Select Users		×
Select this object type:		
Users or Built-in security principals	Object Types	
From this location:		
WSH5610DN6A0E	Locations	
Common Queries		
N <u>a</u> me: Starts with $\vee$	Colu	mns
Description: Starts with V	Find	l <u>N</u> ow
Disabled accounts	S	<u>t</u> op
Non expiring password		
Days since last logon: 🔍 🗸	<del>/</del>	<b>3</b>
Search res <u>u</u> lts:	OK Ca	ncel
lame	In Folder	1
Administrator	WSH5610DN6A	
ALL APPLICATION PACKAGES		
ANONYMOUS LOGON		
Authenticated Users		
BATCH		
Buffalo_user01	WSH5610DN6A	
CONSOLE LOGON		
CREATOR GROUP		
CREATOR OWNER		~

8 Click OK, then click OK again.

- 9 Click Create.
- **10** Click Close.

# **Enabling Email Notification**

Your TeraStation can send you email reports daily, or when settings are changed or an error occurs. Notification emails may be triggered by any of TeraStation reports or Windows event logs.

# **Configuring Email Server**

**1** Click the Start button and click *Email Notification*.

**2** Select the "Enable email notification" checkbox.

🖫 Email Notification	×
Enable email notification	
Send to	
Email Address	New
	Edit
	Delete
Authentication	
SMTP Server Address:	Port Number: 25
User Authentication Method:	None ~
POP Server Address:	Port Number: 110
Usemame:	Password:
SSL/TLS:	Disable
002 120.	
	Accept untrusted or self-signed certificates
Email Settings	
Sender Address:	
Title:	TeraStation Status
	Content Options
Test Message	OK Cancel Apply

**3** Click *New* and enter an email address.

**4** Enter your email server settings. Click *OK* to finish the email notification settings. You can send a test email when clicking *Test Message*.

**5** Enter the password of the user you're logged in as and click *OK*.

Items	Descriptions	
Enable email notification	If enabled, email reports will be sent during specific events.	
Send to	Adds a new receiver for the notification email. Click <i>New</i> to add a new email address. Click <i>Edit</i> to change the receiver settings or <i>Delete</i> to remove an address from the list. <b>Note:</b> Up to five email addresses may be added.	

ltems	Descriptions	
Authentication	<ul> <li>SMTP Server Address: Enter your email SMTP server's address and port number. Port number 25 is configured by default.</li> <li>Note: If you choose "None" or "POP before SMTP" for the user authorization, the port number is locked to "25".</li> <li>User Authentication Method: Select the user authorization type from "None", "POP before SMTP", "LOGIN (SMTP-AUTH/LOGIN)", and "CRAM-MD5 (SMTP-AUTH/CRAM-MD5)". If "POP before SMTP" is selected, enter the POP server address and port number. Unless the port is specified, the standard port number (110) is used.</li> <li>Username and Password: Enter the username and password of your email server.</li> <li>SSL/TLS: If "LOGIN (SMTP-AUTH/LOGIN)" or "CRAM-MD5 (SMTP-AUTH/CRAM-MD5)" is selected, select whether to use SSL/TLS or STARTTLS.</li> </ul>	
Email Settings	<ul> <li>Sender Address: Enter the sender's email address for notification emails.</li> <li>Title: Enter the subject of the notification email.</li> <li>Click <i>Content Options</i> to select the event that will trigger the notification emails to be sent.</li> </ul>	
Test Message	Sends a test email to the email address which is configured.	

# **Specifying TeraStation Reports**

A notification email can be sent using TeraStation reports.

- **1** Click the Start button and click *Email Notification*.
- **2** Click Content Options.

**3** Click the *Report Settings* tab and select the "Use TeraStation reports to determine notification type" checkbox.

-	Email Notification				
Report Sett	ings Event ID S	ettings			
☑ Use T	eraStation reports	s to determine notific	ation type		
9	Select All	Daily Report	🗌 Info	Notice	Error
	Internal Drive	Off		Off	Off
Drives	RAID Volume	Off	Off	Off	
	USB Drive	Off			
	Fan	Off			Off
	Backup	Off	Off	Off	
R	eplication			Off	
Sy	rstem Alert	Off	Off	Off	Off
				ОК	Cancel

4 Click On or Off to enable/disable the notifications of the function. When you select the checkboxes to the left of each log level, all notifications of the line will be selected at once.

**5** Click *OK*, then click *OK* again.

**6** Enter the password of the user you're logged in as and click *OK*.

Levels	Details		
Daily Report	Describes the status of the TeraStation in a daily report email.		
Info	Sends a notification email if an event occurs. Info reports will contain just information such as capacity information, backup job starts/finishes, etc.		
Notice	Sends a notification email if a non-critical error occurs. Notice reports will contain warnings such as something has failed, but the function or TeraStation can continue operating as usual. It is recommended to do the corrective action for the notice as soon as possible.		

Levels	Details
Error	Sends a notification email if an error occurs. Error reports will describe any critical failures that prevented a function or TeraStation from operating. It is recommended to do the corrective action for the error immediately.

# Specifying Windows Event Logs

A notification email will be sent when the specified event occurs. This section describes notifications using Windows Update events.



- **2** Click Content Options.
- **3** Click the *Event ID Settings* tab and select the "Use Windows event logs to determine notification type" checkbox.

🚡 Email Notifica	ition			×
Report Settings	Event ID Setting	S		
🗹 Use Windo	ws event logs to a	determine notification ty	pe	
Log Level	Log Type	Source	Event ID	New Edit Delete
			Oł	Cancel

## 4 Click New.

**5** Select the importance level from the "Log Level" list.

**6** Select "System" from the "Log Type" list.

**7** Enter "Microsoft-Windows-WindowsUpdateClient" into the "Source" box.

8 An event ID can be blank. All events triggered by Windows Update will be notified. If you prefer only being notified of specific events, enter those event IDs.

**9** Click *OK* three times.

**10** Enter the password of the user you're logged in as and click *OK*.

# **Acquiring Windows Event Logs**

To acquire event logs of the TeraStation, follow the procedure below.

**1** From Server Manager, click *Tools > Event Viewer*.



**2** Double-click *Windows Logs*.

**3** Right-click on either "Application", "Security", "Setup", or "System" in the left-side menu to determine the logs to be saved.

**4** Click Save All Events As.

**5** Specify the desired location and enter a filename, then click *Save*. Do not change the file type.

**6** When the "Display Information" screen appears, click *OK*.

The operation to acquire event logs is complete. Open the log file stored in the specified location to check the contents of the event logs.

# **Chapter 6 Drive Replacement**

# LEDs

If a drive fails or dismounts, the LED will glow as below. To see the status LEDs, open the front cover.



## 1 Fail LED

Glows amber if a drive has failed.

## **2** Status LEDs

The failed drive's status LED will be glowing a steady amber. It also glows when the drive is dismounted. If the volume is fragmented by a drive failure, such as in the case of a 3-drive failure in a RAID 6 volume, the LEDs will glow as above and the "SYSTEM DOWN" message will be displayed on the LCD panel.

#### Notes:

- For the replacement drive, use a Buffalo OP-HDBN/B series drive. The new drive should be the same size as the replacement drive.
- The TeraStation is fragile. Handle it with care. Do not drop or bump the TeraStation.
- Use caution when handling the TeraStation in order to avoid personal injury.
- Never disassemble any parts while replacing a drive unless instructed to do so in this manual. Any malfunction or damage caused by disassembling the TeraStation will void your warranty.
- To avoid damaging the TeraStation with static electricity, ground yourself by touching something made of metal before handling any sensitive electronic parts.
- Do not change the order of the drives in the TeraStation. For example, pulling out drive 1 and replacing it with drive 2 may cause data to be corrupted or lost.

# **Drive Replacement Procedure**

Follow the procedure below to replace a defective drive.

# "ONE DRIVE DOWN" Is Displayed on the LCD Panel

If the "ONE DRIVE DOWN" message is displayed, there is no redundancy for RAID 5 and RAID 10 volumes. It is recommended to replace the defective drive immediately. Back up data before replacing drives. **Note:** The "x" on the LCD panel message is a number of volume type.

**1** Open the front cover with the included key.



- **2** Check the status LEDs. The LED for the failed drive glows amber.
- Push the unlock button of the drive whose status LED is glowing amber and swing the locking mechanism out.
   Do not unplug and remove the drives with the status LED lit green. If you do, it may cause data loss or the TeraStation to malfunction.



**4** Pull out the drive cartridge and remove it from the TeraStation.



**5** Remove the drive from the cartridge.



**6** Install a new drive into the cartridge.



**7** Replace the four screws.



8 Insert the new drive into the empty slot, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.



**9** Close the front cover with the key.



**10** The "RAID-x RECOVERING 0%" message will be displayed on the LCD panel after 3 minutes.



**11** When "RAID-x NORMAL" is displayed, drive replacement is finished.



Drive replacement is finished.

# "TWO DRIVE DOWN" or "MULTIPLE DOWN" Is Displayed on the LCD Panel

If either the "TWO DRIVE DOWN" message or the "MULTIPLE DOWN" message is displayed, there is no redundancy. It is recommended to replace the defective drive immediately. Back up data before replacing drives.

Note: The "x" on the LCD panel message is a number of volume type.

## **1** Open the front cover with the included key.



- **2** Check the status LEDs. The LED for the failed drive glows amber.
- Push the unlock button of the drive whose status LED is glowing amber and swing the locking mechanism out.
   Do not unplug and remove the drives with the status LED lit green. If you do, it may cause data loss or the TeraStation to malfunction.



**4** Pull out the drive cartridge and remove it from the TeraStation.



**5** Remove the drive from the cartridge.



**6** Install a new drive into the cartridge.



**7** Replace the four screws.



8 Insert the new drive into the empty slots, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.



**9** The "RAID-x RECOVERING 0%" message will be displayed on the LCD panel after 3 minutes.



**10** When "RAID-x ONE DRIVE DOWN" is displayed, replacement for a defective drive is finished.



- **11** Push the rest of the failed drive's unlock button and swing the locking mechanism out.
- 12 Insert the new drive into the empty slot, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.
- **13** Close the front cover with the key.



**14** The "RAID-x RECOVERING 0%" message will be displayed on the LCD panel after 3 minutes.

RAID-x RECOVERING 0%

**15** When "RAID-x NORMAL" is displayed, drive replacement is finished.

RAID-x	
NORMAL	

# **<u>"SYSTEM DOWN" Is Displayed on the LCD Panel</u></u>**

When the "SYSTEM DOWN" message is displayed, data on the TeraStation has already been lost. The issue occurs on the drive so the operating system may become unstable. It is recommended to replace the defective drive immediately. Back up data before replacing drives.

## **For Striped Volume:**

- **1** Turn off the TeraStation. It may take some time until the shutdown process completes.
- **2** Turn the TeraStation on while holding down the mode button.
- **3** When "RAID-0 NORMAL" is displayed, you can proceed. If "SYSTEM DOWN" is still displayed, go to the next step to replace the defective drive.
- **4** Open the front cover with the included key.



**5** Check the status LEDs. The LED for the failed drive glows amber.

**6** Push the unlock button of the drive whose status LED is glowing amber and swing the locking mechanism out.

Do not unplug and remove the drives with the status LED lit green. If you do, it may cause data loss or the TeraStation to malfunction.



**7** Pull out the drive cartridge and remove it from the TeraStation.



**8** Remove the drive from the cartridge.



**9** Install a new drive into the cartridge.



**10** Replace the four screws.



**11** Insert the new drive into the empty slots, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.



## **12** Close the front cover with the key.



**13** Turn the TeraStation off first, then turn it on while holding down the mode button.

**14** "RAID-0 NORMAL" will be displayed on the LCD panel.

RAID-0 NORMAL

**15** Create a volume by referring to the "Creating a Volume" section in chapter 3.

## For RAID 6 or RAID 10 Volumes:

- **1** Open the front cover with the included key.
- **2** Check the status LEDs. The LED for the failed drive glows amber.
- **3** Pull out two drive cartridges whose status LED glow amber and remove them from the TeraStation. Leave the drives whose status LEDs blink amber in the TeraStation.

Do not unplug and remove the drives with the status LED lit green. If you do, it may cause data loss or the TeraStation to malfunction.

**4** Turn off the TeraStation. It may take some time until the shutdown process completes.

**5** Turn on the TeraStation while holding down the mode button with the drives left removed.

**6** When either the "RAID-x TWO DRIVE DOWN" message or the "MULTIPLE DOWN" message is displayed, replace the defective drive by referring to the ""TWO DRIVE DOWN" or "MULTIPLE DOWN" Is Displayed on the LCD Panel" section above.

If "SYSTEM DOWN" is still displayed, go to the next step to replace more defective drives.

**7** Pull out other defective drive cartridges whose status LED glows amber and remove them from the TeraStation.

**8** Remove drives from the cartridges and install new drives in them.

**9** Insert the new drive into all empty slots, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.

**10** Close the front cover with the key.

**11** Turn the TeraStation off, then turn it on while holding down the mode button.

**12** "RAID-x NORMAL" will be displayed on the LCD panel.



If either "RAID-x ONE DRIVE DOWN", "RAID-x TWO DRIVE DOWN", or "SYSTEM DOWN" messages are displayed, try the procedure described in each section above.

**13** Create a volume by referring to the "Creating a Volume" section in chapter 3.

### For RAID 5 Volume:

**1** Open the front cover with the included key.

- **2** Check the status LEDs. The LED for the failed drive glows amber.
- **3** Pull out one drive cartridge whose status LED glow amber and remove them from the TeraStation. Leave the drives whose status LEDs blink amber in the TeraStation.

Do not unplug and remove the drives with the status LED lit green. If you do, it may cause data loss or the TeraStation to malfunction.

**4** Turn off the TeraStation. It may take some time until the shutdown process completes.

**5** Turn on the TeraStation while holding down the mode button with the drives left removed.

**6** When the "RAID-5 ONE DRIVE DOWN" message is displayed, replace the defective drive by referring to the ""ONE DRIVE DOWN" Is Displayed on the LCD Panel" section above.

If "SYSTEM DOWN" is still displayed, go to the next step to replace the defective drive.

**7** Remove another defective drive cartridge whose status LED glows amber from the TeraStation.

**8** Remove drives from the cartridges and install new drives in them.

**9** Insert the new drive into all empty slots, slide the drive in with the locking mechanism open, and swing the lock back down until it clicks into the place.

**10** Close the front cover with the key.

**11** Turn the TeraStation off, then turn it on while holding down the mode button.

**12** "RAID-5 NORMAL" will be displayed on the LCD panel.

RAID-5	
NORMAL	

If "RAID-5 ONE DRIVE DOWN" or "SYSTEM DOWN" is displayed, try the procedure described in the each section above.

**13** Create a volume by referring to the "Creating a Volume" section in chapter 3.

# Replacing a Non-Malfunctioning Drive

#### Do not replace a drive that is not malfunctioning.

If you must change a drive that is not malfunctioning, shut down the TeraStation before replacing the drive. If you need to replace more than one drive at the same time, replace the drives one at a time to preserve your data. When replacing the non-malfunctioning drive, follow the procedures below:

## **Operating in Striped Volume**

All data on the volume will be deleted after replacing the drive. You will not be able to use the TeraStation until the drive has been replaced. Refer to the ""SYSTEM DOWN" Is Displayed on the LCD Panel" section above for the procedure.

## **Operating in a Redundant Volume Other Than Striped Volume**

If you are using a redundant volume such as RAID 5 or 6, the volume will be in degraded mode after replacing the drive. You need to recover from degraded mode by replacing the drive. Refer to the ""ONE DRIVE DOWN" Is Displayed on the LCD Panel" section above for the procedure.

Chapter 7 l	<b>Jtilities</b>
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# **NAS Navigator2 for Windows**

NAS Navigator2 is a utility program that makes it easy to display Windows Storage Server, change the TeraStation's IP address, or check its drive in remote desktop. To install NAS Navigator2, download the installer from http://d.buffalo.jp/WSH5010N6/.

Double-click the NAS Navigator2 icon (O) to start NAS Navigator2.

NAS Navigator2		- 🗆 ×
🎦 Menu 👻 🏭 View 👻	G Refresh	
WSH5610DN6A0 E		
WSH5610DN6 Series	C: 14,1 GB/58.9 GB (23.9%)	Workgroup: WORKGROUP
	D: 0.4 GB/7451.9 GB (0.0%)	Subnet Mask: 255.255.25.0
	0. 0.4 36/1451.9 36 (0.0%)	Default Gateway: 192.168.10.1
		MAC Address: GG:HH:IEU:KK:LL
		Firmware: 3.10
		NAS Navigator version 2.92

Click a TeraStation's icon to display total capacity, used capacity, workgroup name, IP address, subnet mask, default gateway, MAC address, and firmware version.

Double-click the icon to open a shared folder on the TeraStation.

Name		Description		
	Map All Remote Shares to Drive Letters	Assigns all Buffalo NAS devices' shared folders as network drives. This is available only when a shared folder has been created.		
Create Desktop Shortcut*		Creates a desktop shortcut to the Buffalo NAS device's shared folders.		
Menu	Launch NAS Navigator2 on Startup	Launches NAS Navigator2 in the system tray when Windows boots.		
	Display Errors	If an error occurs, an error message will appear from the NAS Navigator2 icon in the system tray.		
	Properties*	Opens the properties page that lets you configure the Buffalo NAS device's IP address or open Windows Storage Server in remote desktop.		
	Close	Closes NAS Navigator2.		

Name		Description	
	View	Icons: Displays icons. Details: Displays the hostname, product name, workgroup, IP address, subnet mask, and default gateway.	
View	Sort by	If you have multiple Buffalo NAS devices on the network, you may choose to display them in order of hostname, product name, workgroup, IP address, subnet mask, or default gateway.	
Browse*		Opens the Buffalo NAS device's shared folders.	
Refresh		Searches for the Buffalo NAS devices on the network again.	
	Browse Shares	Opens the Buffalo NAS device's shared folders.	
	Open Remote Desktop	Opens Windows Storage Server in remote desktop.	
Right-click your device's icon to show these menus.	Properties	Opens the properties page that lets you configure the Buffalo NAS device's IP address or open Windows Storage Server in remote desktop.	
	Create Desktop Shortcut	Creates a desktop shortcut to the Buffalo NAS device's shared folders.	

\*Click on the Buffalo NAS device's icon to display these options.

When NAS Navigator2 is closed, right-click the NAS Navigator2 icon in the system tray for the following options.

Browse Shares	WSH5610DN6A0E >			
Open Remote Desktop	Refresh			
Properties	Open NAS Navigator2			
Create Shortcut	Exit	-		

Name		Description
	Browse Shares	Opens the Buffalo NAS device's shared folders.
	Open Remote Desktop	Opens Windows Storage Server in remote desktop.
Buffalo NAS device name	Properties	Opens the properties page that lets you configure the Buffalo NAS device's IP address or open Windows Storage Server in remote desktop.
	Create Shortcut	Creates a desktop shortcut to the Buffalo NAS device's shared folders.
Refresh		Searches for the Buffalo NAS devices on the network again.
		Opens the NAS Navigator2 window.
		Exits NAS Navigator2.

The following tasks may be performed from the Buffalo NAS device's properties page.

WSH5610DN6A0E Properties	×
WSH5610DN6 Series	
Remote Desktop   IP Address	
Open Remote Desktop Open Remote Desktop	
OK Cancel Ap	ply

Name	Description	
Remote Desktop	Click Open Remote Desktop to open Windows Storage Server.	
IP Address	Select the "Use DHCP" checkbox to assign an IP address from the DHCP server automatically. If there is no DHCP server on the network, you cannot use this function. Select the "Renew IP address" checkbox to obtain an IP address from the DHCP server. You can manually enter a static IP address, subnet mask, and default gateway.	

## **Changing the IP Address**

- **1** Double-click the NAS Navigator2 icon ( ) to start NAS Navigator2.
- **2** Right-click your TeraStation's icon and select *Properties* > *IP Address*.
- **3** Clear the "Use DHCP" checkbox and enter the desired settings, then click *OK*. If the username and password prompt appears, enter the admin username and password.

# NAS Navigator2 for macOS

NAS Navigator2 is a utility program that makes it easy to display Windows Storage Server, change the TeraStation's IP address, or check its drive in remote desktop. To install NAS Navigator2, download the installer from http://d.buffalo.jp/WSH5010N6/.

Click the NAS Navigator2 icon ( O ) in the Dock to start NAS Navigator2.

NAS Na	vigator2
😑 🕹 🗦 📰 🗮 🌣	Y
Open Refresh I'm here	
WSH5610DN6A0E	
	0
SH5610DN6A0E WSH5610DN6 Series	Workgroup : WORKGROUP
The second se	
C: 14.1 GB / 58.9 GB (23.9	Subpot Mack : 255 255 255 0
D: 0.4 GB / 7451.9 GB (0.0	0%) Default Gateway : 192.168.10.1
	MAC Address : GG:HH:II:JJ:KK:LL
	MAG Address · GOTTITITES. ALEE
	Firmware : 3.10

Click a TeraStation's icon to display total capacity, used capacity, workgroup name, IP address, subnet mask, default gateway, MAC address, and firmware version.

Double-click the icon to open a shared folder on the TeraStation.

Name		Description	
Open		Opens the Buffalo NAS device's shared folders.	
Refresh		Searches for the Buffalo NAS devices on the network again.	
Open Remote Desktop		Opens Windows Storage Server in remote desktop.	
Configure		Opens the properties page that lets you configure the Buffalo NAS device's IP address or open Windows Storage Server in remote desktop.	
Label Color		Selects the color of the name displayed below the icon.	
View Options Auto Power Mode		Lets you choose icon size, position, and view mode.	
		Auto power mode can turn supported Buffalo NAS devices on the network on and off automatically.	
	Open Folder	Opens the Buffalo NAS device's shared folders.	
To display these options,	Open Remote Desktop	Opens Windows Storage Server in remote desktop.	
hold down the control key and click your device's icon.	Configure	Opens the properties page that lets you configure the Buffalo NAS device's IP address or open Windows Storage Server in remote desktop.	
	Label Color	Selects the color of the name displayed below the icon.	

The following tasks may be performed from the Buffalo NAS device's properties page.

•					NAS Navig	ator2			
	P	WSH5610D WSH5610DN6		Remote	Desktop	IP Address			
	IP Ado Subne	e DHCP Renew IP add dress: et Mask: It Gateway:	dress 0 192	0 0	0 1				
	Administra	ator Usernam	ne						
	Administra	ator Passwor	d				Cancel	Apply	

Name	Description	
Remote Desktop	Click Open Remote Desktop to open Windows Storage Server.	
IP Address	Select the "Use DHCP" checkbox to assign an IP address from the DHCP server automatically. If there is no DHCP server on the network, you cannot use this function. Select the "Renew IP address" checkbox to obtain an IP address from the DHCP server. You can manually enter a static IP address, subnet mask, and default gateway.	

# **Changing the IP Address**

- 1 Click the NAS Navigator2 icon ( ) in the Dock to start NAS Navigator2.
- **2** Click the TeraStation icon while holding down the control key, then select *Configure* > *IP Address*.
- **3** Clear the "Use DHCP" checkbox; enter the desired settings and the administrator password, then click *Apply*.

# **NovaBACKUP**

NovaBACKUP is a Windows utility that lets you back up data on your computer.

The NovaBACKUP installer is available from http://d.buffalo.jp/WSH5010N6/. Select the region and model to go to your specific model's d.buffalo website. Download the NovaBACKUP installer and install it onto your computer. To download the installer, you will need the serial number of your TeraStation. The serial number is printed on the label on the back of the unit.

# **Chapter 8 Troubleshooting**

While using the TeraStation, you may lose your important data due to sudden accidents, hard disk failure, or accidental misoperation. Back up your data regularly! For best results, back up your data to Buffalo drives like the TeraStation, LinkStation, or DriveStation series.

# **The TeraStation Becomes Unaccessible**

Common causes of typical issues that may occur, including if you are unable to search using NAS Navigator2 or the remote desktop screen does not open, are described below.

#### Cause 1. The cables are not connected correctly:

The cables are not physically connected, or there may be a contact defect. Reconnect the AC cable and Ethernet cable and restart both the computer and TeraStation.

#### Cause 2. Security software in the background is blocking communication:

Add an exception to your firewall software, or disable the firewall software completely. Turn off any software security suite that might include a firewall. Try searching again.

#### Cause 3. Wireless and wired adapters are both enabled:

Disable all adapters except for the Ethernet adapter connected to the TeraStation.

#### Cause 4. The Ethernet cable is defective, or the connection is unstable:

Try changing the hub port or Ethernet cable that you used to connect.

#### Cause 5. The LAN board, card, or adapter that you are using is defective:

Try changing the LAN board, card, or adapter.

#### Cause 6. The duplex mode of the network adapter or hub has not been set:

Select either "10M half-duplex" or "100M half-duplex" for the duplex mode of the network adapter or hub. Some network adapters may be unable to connect the network correctly when the duplex mode is set to auto negotiation.

#### Cause 7. A network bridge is installed:

If the network has a network bridge that is not being used, remove it.

#### Cause 8. You are searching from a different network:

You cannot conduct searches beyond your local network subnet. Connect the TeraStation to the same network subnet as the computer performing the search.

#### Cause 9. TCP/IP is not operating correctly:

Reinstall the LAN adapter drivers.

#### Cause 10. Remote desktop connection software is not installed on your Mac:

If using macOS, download and install "Microsoft Remote Desktop" from the Mac App Store.

# **Shared Folders Suddenly Do Not Open**

If the TeraStation shared folder is assigned and used as a network drive, the TeraStation may suddenly become inaccessible if network settings such as IP addresses or groups are changed. If this happens, open NAS Navigator2 and double-click your TeraStation icon to access a shared folder.

# Unable to Access the Shared Folder or the System Becomes Unstable

This usually happens because too many software applications are running on Windows Storage Server, causing a memory shortage. Exit or uninstall some of the software running on Windows Storage Server, then restart the TeraStation.

# **Drive Status Cannot Be Found**

If the language settings are not the same for the following options, the drive status such as error, resynchronization, or degraded may not be detected correctly. Configure the same language for these options.

- Display language
- Welcome screen and system account
- System locale

# **LCD Panel Displays a Different IP Address**

The IP address displayed when pressing the select button is for maintenance use only and this is not the IP address of the TeraStation.

# Resynchronization Regressed When TeraStation Was Restarted While Resynchronizing

If you restart the TeraStation while resynchronizing, the resynchronization temporarily halts and will resume after the reboot completes. The ones place digit of the progress display will be reset to "0".

For example, if rebooted when resynchronizing has proceeded to 15%, the progress status after restarting will be 10%.

# **TeraStation Does Not Boot**

If Windows Storage Server no longer functions properly, perform recovery using the supplied SD card. This recovery procedure erases your data. Backing up regularly is highly recommended to avoid losing your important data.

# Notice Before Recovery

• Do not connect the SD card to another TeraStation or your computer. The recovery process that involves using this SD card is intended for this product only.

- If the storage pool is created on drive 1, delete the storage pool before running the recovery process.
- Remove all USB devices except for the supplied SD card, a card reader, a mouse, and keyboard before recovering. When it's completed, you can connect them back to the TeraStation.

## **Recovering Windows Storage Server**

- **1** Turn off the TeraStation, following the procedure on the "Turning the TeraStation On and Off" section in chapter 1.
- **2** Insert the SD card into the card reader (not included).
- **3** Connect a mouse, keyboard, and the card reader to the TeraStation using a USB 3.0 or 2.0 port.
- **4** Connect the monitor to the TeraStation using a HDMI or VGA port.
- **5** Press the power button to turn the TeraStation on.
- **6** Press the F11 key some times until the "Please select boot device:" is displayed. When it's displayed, stop pressing F11. If it not displayed, repeat from the step 1.
- **7** Press the Down Arrow key and select the SD card beginning from "UEFI:", then press the Enter key.
- 8 The recovery process proceeds automatically.
- **9** When the recovery process finishes, the TeraStation shuts down automatically.
- **10** Turn on the TeraStation. If it boots up properly, recovery is completed.

# **Chapter 9 Appendix**

# **Default Settings**

Administrator's Name	Administrator
Password	password
Shared Folders	Drives C and D are configured as administrative hidden shares by Windows Storage Server's default settings.
IP Address	The TeraStation will get its IP address automatically from a DHCP server on the network. If no DHCP server is available, then an IP address will be assigned as follows: IP Address: 169.254.xxx.xxx ("xxx" is assigned randomly when booting the TeraStation.) Subnet Mask: 255.255.0.0
Registered Groups	Windows Storage Server's default groups are registered.
Microsoft Network Group Setting	WORKGROUP
Volume Type	RAID 6 volume
Local Security Policy	"Password must meet complexity requirements" is disabled by default.

**Note:** The Windows settings on this TeraStation have been customized for best performance so that the power options settings can be left alone as recommended.

The TeraStation has the following functions and roles:

#### Features:

.NET Framework 4.7, iSNS Server, Windows PowerShell 5.1, WoW64 Support etc.

#### **Roles:**

File and Storage Services

Note: For other installed roles and features, see "Roles and Features", which you can reach by clicking "Local Server" on the left side menu in "Server Manager".

# **Errors on the LCD Panel**

The TeraStation indicates errors on the LCD panel. The LCD panel can help you troubleshoot problems. Refer to the "Diagrams" section in chapter 1 to locate where the LCD panel is.

If an error occurs, the TeraStation will beep. You can stop the beeping by pressing the mode button.

**Note:** The "x" on the LCD panel message is a number of volume type.

## **Error Messages**

LCD Panel	Corrective Action
RAID-x ONE DRIVE DOWN	One drive failed. Check the LED in front for the defective drive. Refer to chapter 6, "Drive Replacement", and replace the failed drive with a new drive. You can stop the beeping by pressing the mode button.

LCD Panel	Corrective Action	
RAID-x TWO DRIVE DOWN	Two drives failed. Check the LED in front for the defective drive. Refer to chapter 6, "Drive Replacement", and replace the failed drive with a new driv You can stop the beeping by pressing the mode button.	
MULTIPLE DOWN	<ul><li>Two or three drives failed. Check the LED in front for the defective drive.</li><li>Refer to chapter 6, "Drive Replacement", and replace the failed drive with a new drive.</li><li>You can stop the beeping by pressing the mode button.</li></ul>	
SYSTEM DOWN	<ul> <li>Three or more drives failed. Check the LED in front for the defective drive.</li> <li>Refer to chapter 6, "Drive Replacement", and replace the failed drive with a new drive.</li> <li>You can stop the beeping by pressing the mode button.</li> </ul>	
Code ROM Error System Halted	Program ROM cannot be read. Shut off the TeraStation, wait 10 seconds, then turn it back on. If the error still remains, contact Buffalo technical support.	
Work RAM Error System Halted	A work memory error occurred on the array controller. Shut off the TeraStation, wait 10 seconds, then turn it back on. If the error still remains, contact Buffalo technical support.	
Dispatch Nesting Error		
Divide or FPP or Invalid Code Err		
System INTERRUPT Error		
System SBI INT Occur		
System RIE INT:0x000		
System AE INT:0x000	Internal error. The TeraStation cannot be accessed. Contact Buffalo technical support.	
System TRAP Error		
Buffer Manager Queue Error		
Cache Buffer Error 0x#######		
Buffer Size Error		
Buffer Manager Link Error		

# Characters Added When "ONE DRIVE DOWN" or "SYSTEM DOWN" Occurs

When "ONE DRIVE DOWN" or "SYSTEM DOWN" is displayed on the LCD panel, one of the following characters will also be displayed. Refer to the chart below for more detailed information about the error that occurred.

### **For Hardware Errors**

r		
A		Replace the drive by referring to chapter 6, "Drive Replacement".
В		
С		
D		
E		
Ι		
М	The drives may be malfunctioning.	
Ν		
0		
р		
R		
S		
Т		
Y	-	
Z		
Z		
L		
W		
Х	Drive disconnected.	Reconnect the drive.

**Note:** If "S", "Z", or "z" is displayed, the drives may be malfunctioning. Contact Buffalo technical support while keeping the TeraStation power on.

## **For Software Errors**

U	I he drives may be maitunctioning	Replace the drive by referring to chapter 6,
E		"Drive Replacement".

# **Specifications**

Check the Buffalo website for information about the latest products and specifications.			
Installed System	Microsoft Windows Storage Server 2016 Standard Edition Note: The Microsoft Software License is on the d.buffalo website, http://d.buffalo.jp/WSH5010N6/. Be sure to read the terms and conditions of th license.		
LAN Interface	Standards Compliance	IEEE 802.3ab (1000BASE-T), IEEE 802.3u (100BASE- TX), IEEE 802.3 (10BASE-T)	
	Data Transfer Rates	10/100/1000 Mbps (auto sensing)	
	Number of Ports	2	
	Connector Type	RJ-45 8-pin (auto MDI-X)	

	Standards Compliance	USB 3.0/2.0
		USB 3.0: max. 5 Gbps
USB Interface	Data Transfer Rates	USB 2.0: max. 480 Mbps
	Number of Ports	2 x USB 2.0, 1 x USB 3.0
	Connector Type	Туре А
Other Interfaces	1 x eSATA port, 1 x HDMI port, 1 x VGA port, 1 x D-sub 9 pin (male) port	
	Number of Drive Bays	6
	Drive Interface	SATA 3 Gbps
	Supported Volume Types	RAID 0/10/5/6
Internal Hard Drives		Buffalo OP-HDBN/B series drive
	Replacement Drive	Note: The new drive should be the same size as
		the replacement drive. The drives listed above are
		available from the Buffalo website.
	Power Supply	AC 100–240 V, 3.0 A, 50/60 Hz
	Dimensions (W x H x D,	
	excluding protruding parts)	170 x 260 x 230 mm; 6.7 x 10.2 x 9.1 in
	Weight	9.0 kg; 19.8 lb
	Power Consumption	Max. 120 W
Other	Operating Environment	Temperature: 5–35°C; 41–95°F Humidity: 20–80% non-condensing
	Compatible Devices	Windows PCs, tablets, and Mac computers with wired or wireless Ethernet connection. <b>Note:</b> The TeraStation requires an Ethernet connection with your computer for operation. The TeraStation cannot connect via USB.
	Supported OS	Windows 10, 8.1, 7 Windows Server 2016, 2012 R2, 2012, 2008 R2, 2008 macOS 10.13, 10.12, 10.11