

User Manual

CloudStor™

CS-X, CS-WX, and CS-WV series



Thank you for purchasing the Buffalo CloudStor. This simple device gives you the flexibility of cloud-based storage without the worries that come with storing your important data on someone else's servers. Using Pogoplug software, CloudStor lets you serve up files, photos, and multimedia over the Web to any of your devices, wherever you may be.

Turn to page 4 to set up your CloudStor.

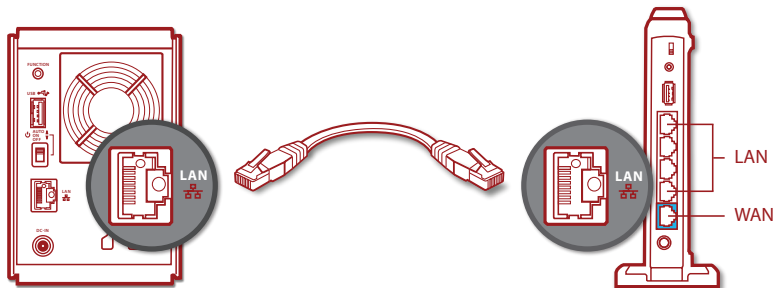
Because we're constantly updating our products, the images and text in this manual may vary slightly from the images and text displayed by your CloudStor. As time passes, future user interfaces, updated software, and later versions of this manual may be available for download from *www.buffalotech.com*.

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Open a browser window on your computer and go to <https://cloudstor.pogoplug.com/>. Click *Set Up Your CloudStor*.

Plug one end of the included Ethernet cable into the Ethernet port on your CloudStor and the other end into any available LAN port on your router.

In the browser window, click *Next*.

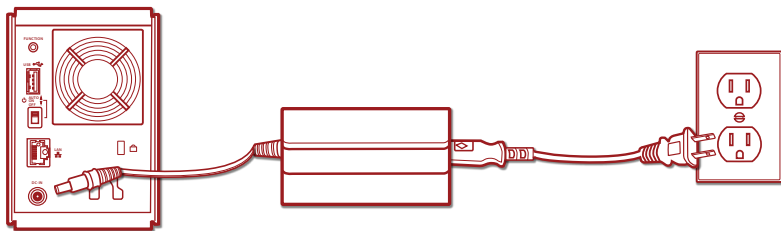


Now, plug your CloudStor into a surge protector, wall socket, or power strip.

Move the power mode switch on the back of the unit to the *on* (middle) position. The blue power LED will begin to blink.

Wait for the CloudStor to boot. This will take about 5 minutes. When the power LED on the front panel stops blinking and glows steadily, the unit has finished booting. The info/error LED should not be blinking. If it is, turn to the next page to troubleshoot.

In the browser window, click *Next*. Follow the instructions on the screen to finish installing your CloudStor.



Troubleshooting

If you've connected your CloudStor to a power source and to a router, but the info/error LED is flashing amber or your CloudStor suddenly turned off by itself, here are some things you can check:

Is the power mode switch on the back of the CloudStor (CS-WX and CS-WV models only) in the *On* position? If it's in the *Auto* (top) position, the CloudStor may suddenly shut down after a few minutes. Move it to the *On* (bottom) position until you've installed NAS Navigator software on your computers.

Is the amber info/error LED on the front of your CloudStor (CS-WX and CS-WV models only) flashing? Check the following:

Is the Ethernet cable connected to your CloudStor and to your router?

Is your router turned on?

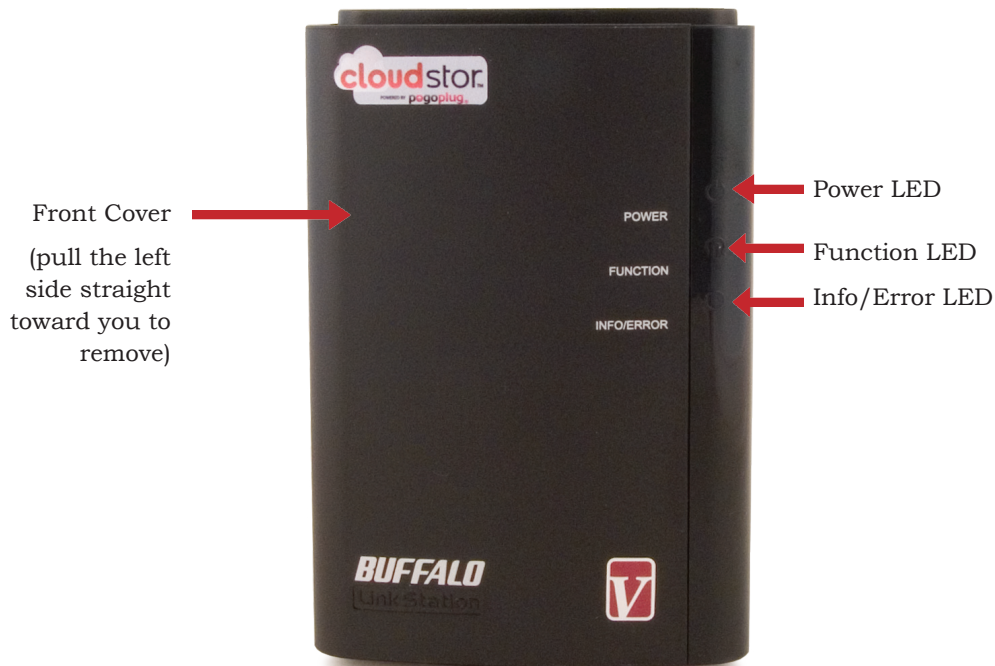
Is your router configured to automatically assign IP addresses (DHCP)?

Do you have a firewall installed that blocks UDP, or is UDP disabled on your router?

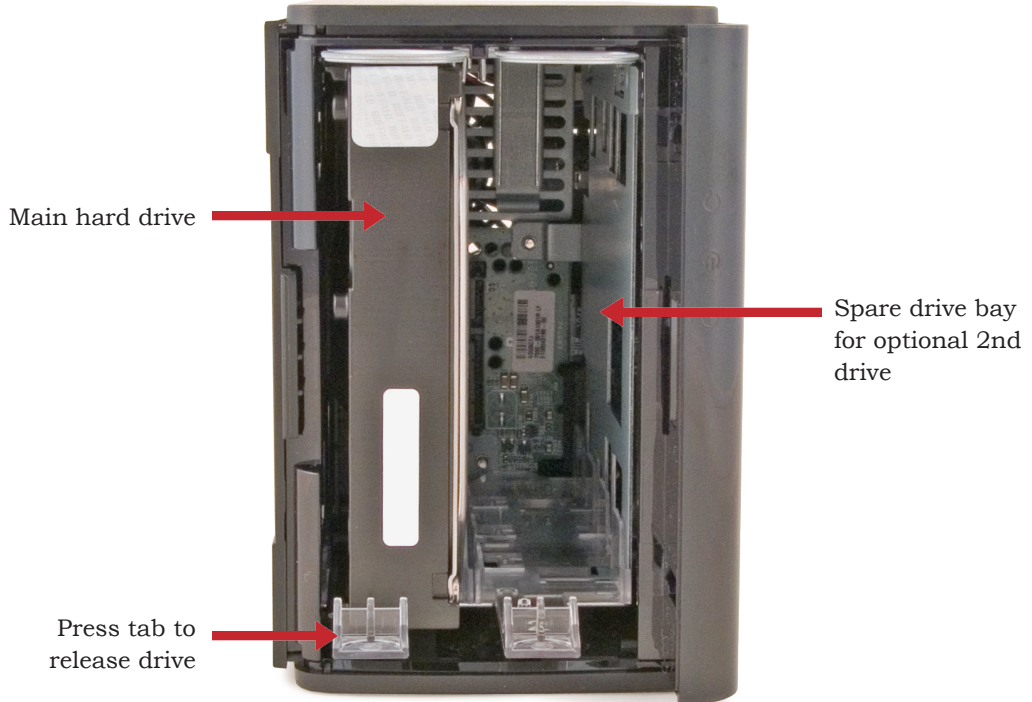
If you have verified all of the above and the info/error LED on the front of your CloudStor is still flashing, please move the power mode switch to the *Off* position, wait until the power LED turns off, and then move it back to the *On* position. It will take about five minutes to boot.

If you continue to have problems, please contact tech support. Tech support contact information is available on pages 50 and 51.

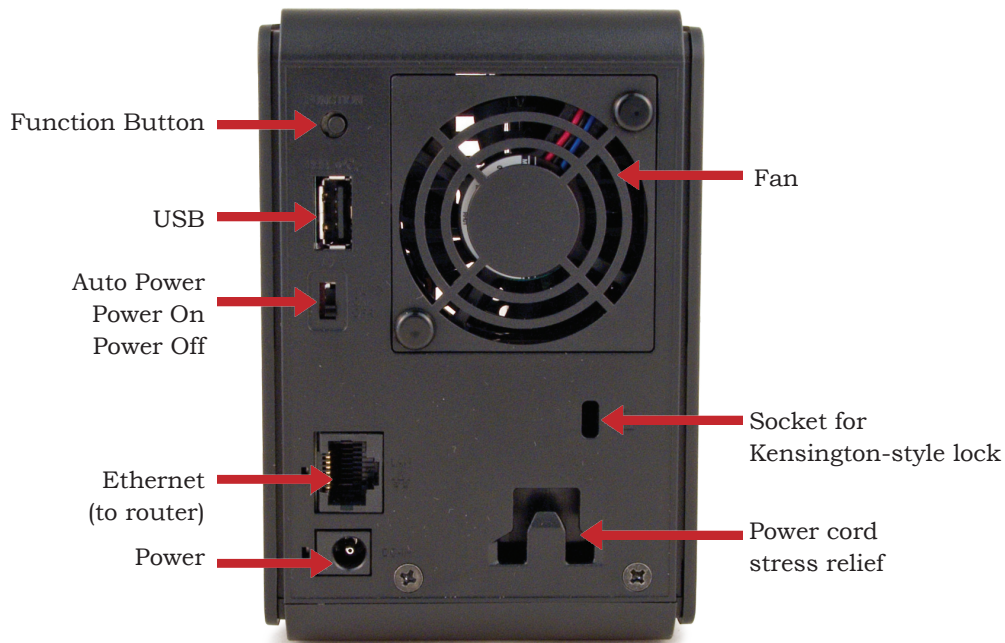
Front (CS-WX and CS-WV)



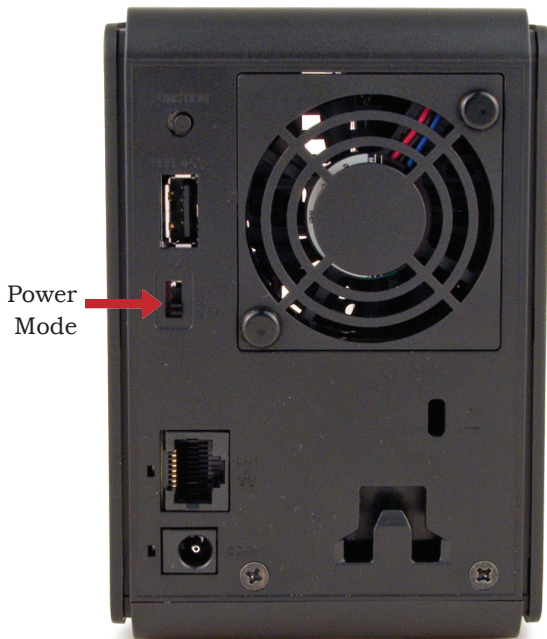
Front Panel Removed (CS-WX and CS-WV)



Rear (CS-WX and CS-WV)



Power Mode Switch (CS-WX and CS-WV)



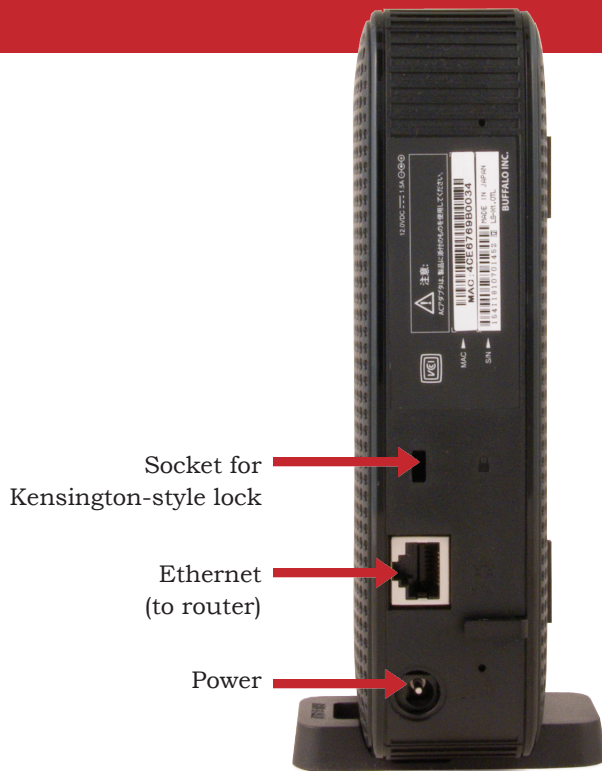
The “Power Mode” switch on the back of the unit has three positions: *Auto*, *On*, and *Off*. The *Auto* position automatically powers the unit on or off with your PC. If your PC is turned on the CloudStor will power up; if the PC is turned off the CloudStor will power down.

You must have installed the NAS Navigator software (available from www.buffalotech.com) on your PC for this feature to work. Otherwise, if you move the switch to *Auto*, your unit will power down by itself and you will have to manually turn it back on.

Move the switch to the *On* (middle) position to have the CloudStor turn on and stay on.

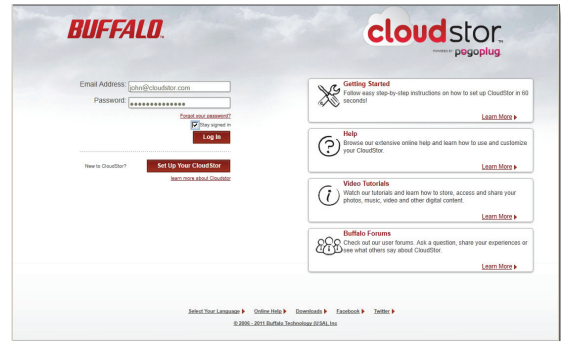
To turn off the CloudStor, move the switch to the *Off* position. It will take several minutes to fully shut down. Do not unplug the unit until shutdown is complete and the power LED is no longer lit.





Login

To access your CloudStor, open a browser and go to *<https://cloudstor.pogoplug.com>*. Enter the email address and password that you registered during setup.



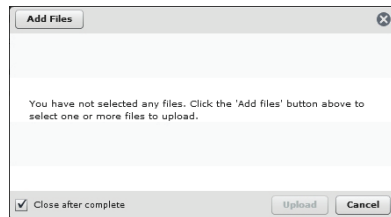
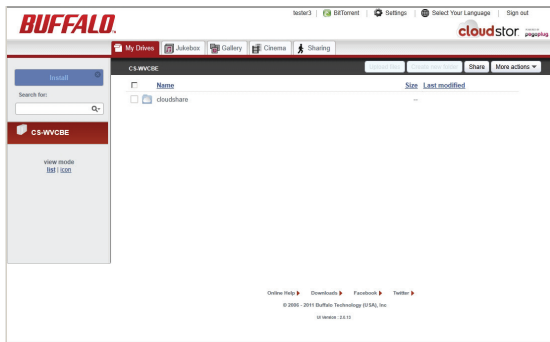
Uploading

Locate the drive and folder you would like to upload to. If this is your first time using the CloudStor, click on the *cloudshare* folder.

Click *Upload Files* on the grey toolbar at the top of the screen.

When the upload files dialogue appears, select *Add File(s)* and choose the file(s) you would like to upload.

Click *Upload*.

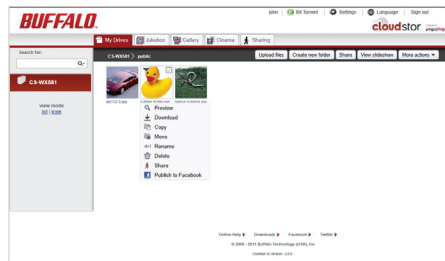
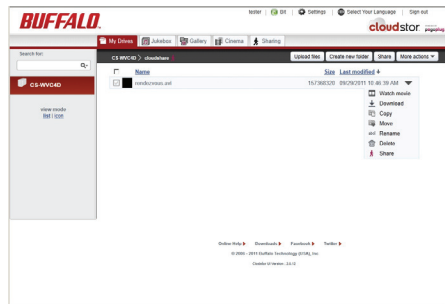


Downloading

Locate the folder or file you would like to download and point to it with your mouse pointer.

Hover over the file to see the down arrow. Click the down arrow and choose *Download*.

The file will be saved to the download location specified in your browser preferences. If you are downloading an entire folder, it will be compressed to a zip file automatically before download.



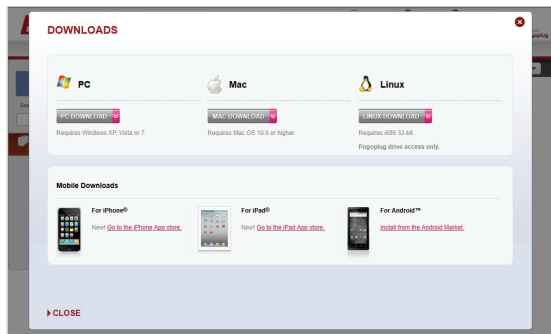
Pogoplug Applications

Pogoplug Drive software allows your CloudStor to appear to your computer as a directly attached drive. You can see and access all drives and folders shared with you via the *Files Shared with me* folder. This works whether you are on the local network or outside of it.

Pogoplug Mobile software for iPhone, iPad, and Android devices give you the ability to access files on your CloudStor from anywhere, anytime on your mobile device.

To download the Pogoplug applications visit www.buffaloCloudStor.com/support/downloads or click on the blue *Install Pogoplug on your computer* button at the top left of the home page.

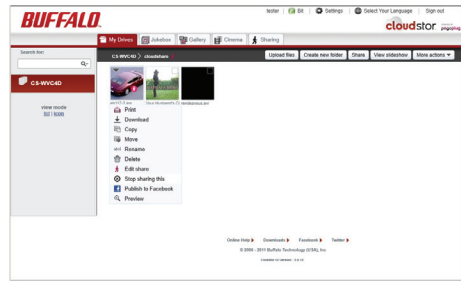
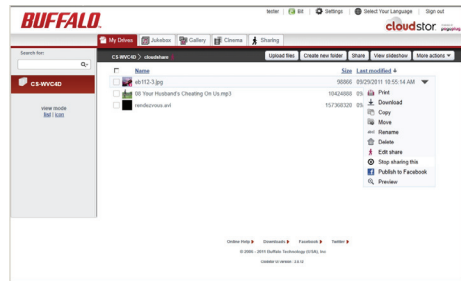
Note: Because the software is client based and the CloudStor drives are not physically attached to your computer, there are some limitations to what you can do with them. For example, CloudStor drive maintenance through the software is not supported.



user it is being shared with has not created an account and password they will no longer be able to access the share. If the owner of the share removes them from the share list and adds them again, a new link will be generated and sent with a 2 week expiration.

To stop sharing a drive, folder, or file:

1. In List mode, click on the arrow to the right of the drive, folder, or file. In Icon mode, hover your cursor over the icon and click on the down arrow.
2. Choose *Stop sharing this*.

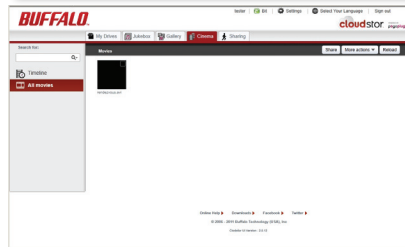
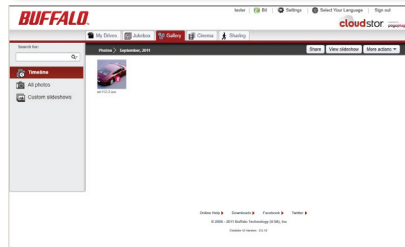
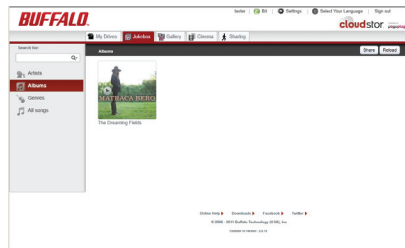


Search

You can use the global search categories *Jukebox*, *Gallery*, and *Cinema* to sort out music, photos, and movies, respectively. Click on a category and the interface will display files in that category.

In each category, view options appear in the left-side menu. The Jukebox category lets you view your music by artist, albums, or genre. The Gallery category lets you view by date or create custom slideshows. The Cinema category lets you organise your videos by date.

To search for a file, enter its name in the *Search for* box and click the icon to the right of the box.

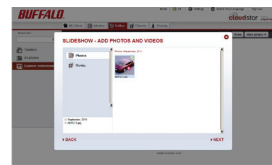


Slideshow

You can create slideshows that include your favorite photos, videos, and music.

To create a slideshow follow these steps:

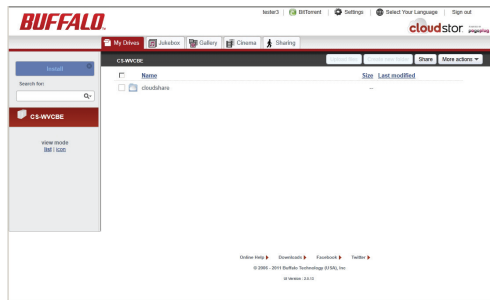
1. Select the *Galleries* tab, then select *Custom Slideshows*. Click *Create*.
2. Enter a name for the new slideshow in the popup window.
3. Put a check next to the folders and files that you want in the slideshow.
4. Select the file of folder of the music that you want to play during your slideshow (optional).
5. Click *Start slideshow*.



Creating New Folders

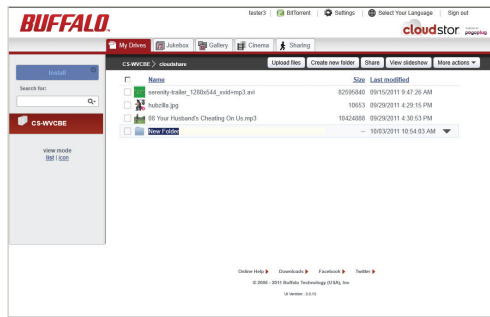
In the navigation bar at the left of the screen, select the device where you would like to create the new folder.

Then, under *Name*, select the folder where the new folder will go.



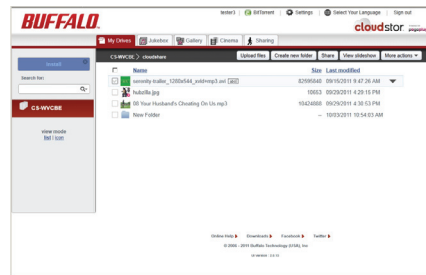
Click *Create New Folder*.

Give your new folder a name.

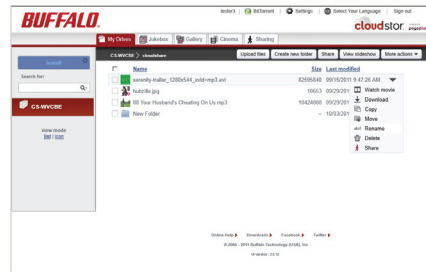


Renaming Files and Folders

Focus your mouse pointer on the name of the folder or file you would like to rename and click on the “abc” icon to the right of it. You can then change the name of the file or folder.

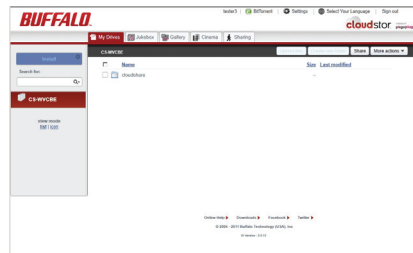


Or, click the down arrow at the far right and choose *Rename*. You can then change the name of the file or folder.

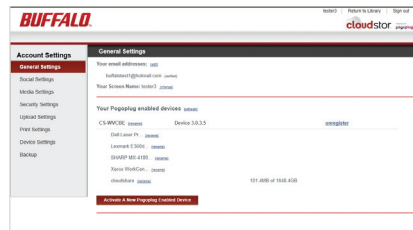


Renaming Devices and Top Folders

Click the *Settings* tab at the top of the window.



You will see a list of your PogoPlug enabled devices. Next to each device there is a *rename* link. Click the link to enter a new name. The new name may include up to 15 alphanumeric characters, hyphens, and underscores.



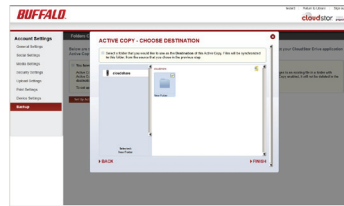
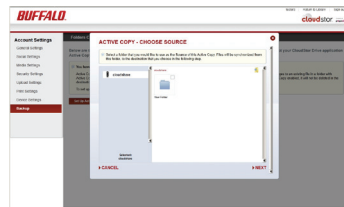
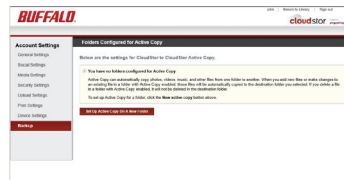
Active Copy

Active Copy automatically backs up a folder to a different folder. Source and target folders may be on your CloudStor, or on a different CloudStor or other Pogoplug device. If you have installed Pogoplug drive software on your computer, you can also use it with Active Copy.

To configure Active Copy, click on *Settings*, then *Backup*. Click on *Set up Active Copy on a New Folder*.

Choose the source folder, then the target folder. Click *Finish* when done.

Depending on how many files are in the source folder and the speed of the network between the two devices, it may take some time for Active Copy to complete.

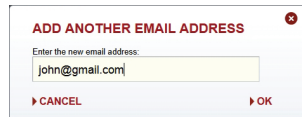
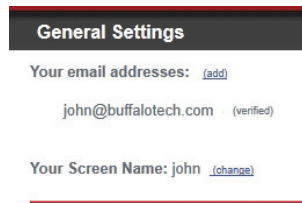


General Settings

From the settings window you can update your email addresses and manage the CloudStor device(s) associated with your account.

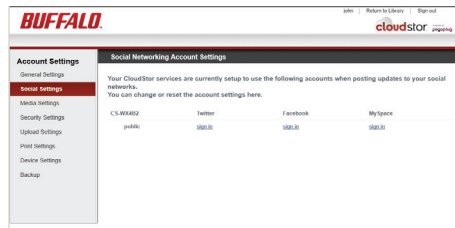
You may associate multiple email addresses with your account. Each email address has full access to all drives and shares associated with the account.

To add additional email addresses to your account, simply click the *add* link next to “Your email addresses”.

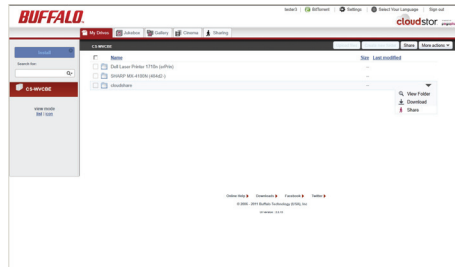


Social Settings

To allow posting to Twitter, Facebook, or MySpace from your CloudStor, log in to the appropriate service in *Social Settings*. To log in to a service, click *sign in* and step through the wizard. Note: you may have to disable your pop-up blocker to log in.



Once you're logged in, you can share folders and files on your social networks. Click *Return to Library*, select a folder or file, click the down arrow, and click *Share*.



Enter the email addresses of anyone you want to send the message to directly. Enter text for your message. If you want to post the message to a social network, click on *More sharing options*, or click *Finish* to send the message now.

SHARE - CHOOSE PEOPLE TO SHARE WITH

To: Choose from address book | More actions ▼

Enter email addresses, separated by commas

Message:

Publish a public link to your Facebook friend's wall (sign-in to Facebook):

☐ Require sign-in to view this share (more secure)
☒ Send share change notifications (recommended)

▶ BACK ▶ MORE SHARING OPTIONS ▶ FINISH

If you're sharing the message to a social network, put a check in the box next to each social network that you want to publish to and click *Finish*.

SHARE - PUBLIC VIEWING

You can choose to make your share publicly accessible. When a public share is created, a share link is given to you. Anyone who knows about this link will be able to access your share. You can also choose to publish this public link to various social networks that you are a member of, so that your friends have access to the share.

☐ Enable public viewing (public link) for this share
☐ Enable public RSS feed
☐ Publish public link to Twitter
☐ Publish public link to MySpace

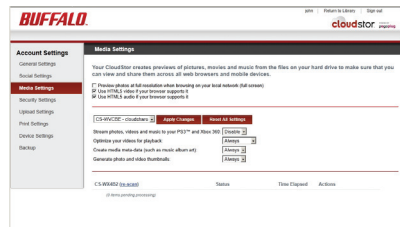
Publish public link with the following text

▶ BACK ▶ FINISH

Media Settings

You can use CloudStor to stream movies, photos, and music to your XBox 360® and PS3® game consoles and to the game consoles of people you share with. You can also play back media files from the CloudStor with a computer browser if Flash is installed. The Media Settings screen also allows you to customize the options for how the CloudStor handles videos. There are 3 options: *optimize videos for playback* (convert into web friendly H.264 encoding), *create media meta-data* (fetch music album art, iPhoto dates, etc.), and *generate thumbnails* (which allows for previewing). All of these options can be turned on or off. Click *Apply Below Changes* to confirm your choice.

You can preview a video by hovering the mouse pointer over the thumbnail for a video. You can turn off this feature on the Media Settings page by unchecking *Preview videos when hovering over video thumbnails*. HTML5 is supported for compatible Web browsers. Select the HTML5 video or audio checkbox to enable this feature.



Security Settings

Changing your Password

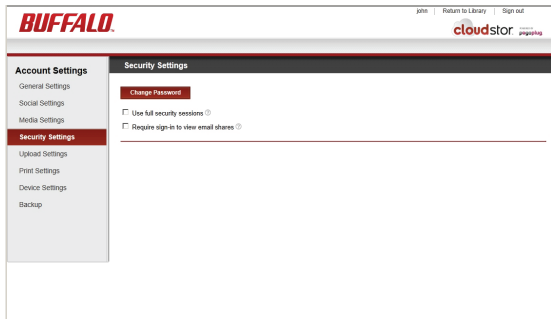
Click “Change Password” to change the password associated with your account.

Full Security

Check the box next to *Use full security sessions* to enable SSL (HTTPS) throughout your entire CloudStor session. Enabling this option may slow down access to your CloudStor. Note that even if this option is disabled, you will always automatically sign in with full security, keeping your password and account access safe.

Require sign-in to view email shares

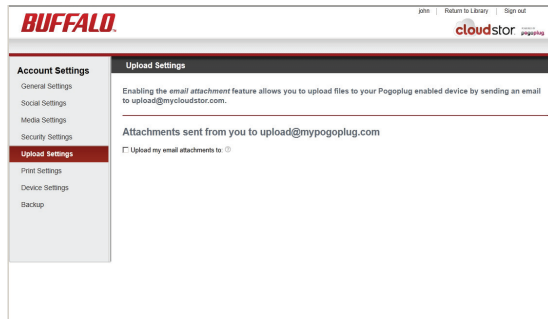
Check the box next to *Require sign-in to view email shares* to require the people you share with to enter a password before viewing the contents of the share. If they have not previously assigned a password with CloudStor, they will be prompted to add one. This feature can also be enabled after you select the file or folder you would like to share by clicking *Share This*, then *More sharing options*. Check *Require sign-in to view this share*.



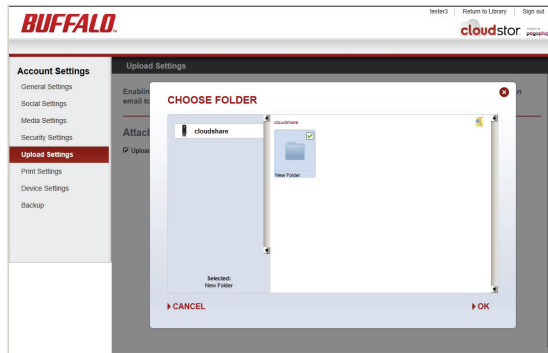
Upload Settings

You may configure your CloudStor to automatically upload files that are emailed as attachments to *upload@mypogoplug.com*.

Check the box next to *Upload my email attachments to*.



Choose a folder to store uploaded attachments, then click *OK*.



Adding a Printer

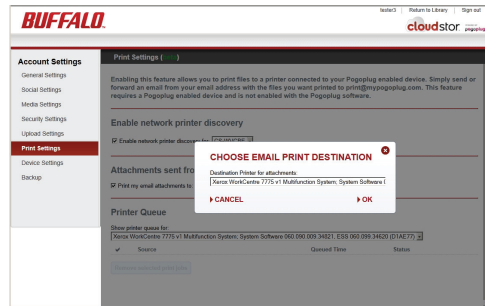
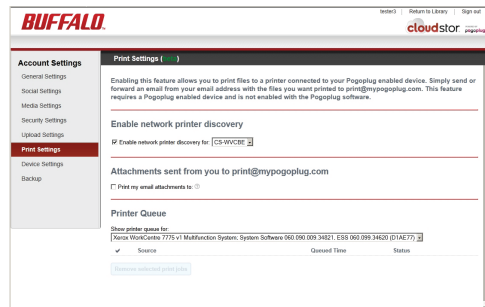
The CloudStor supports most Epson and HP printers manufactured since 2005. USB printers should be attached directly to the USB port on the back of the CloudStor (CS-WX/1D and CS-WV/1D models only). Network printers may be anywhere on the same network (subnet) as the CloudStor.

You can print documents that are stored on your CloudStor to a supported printer. To enable this feature, go to *Print Settings* and check *Enable printer discovery*.

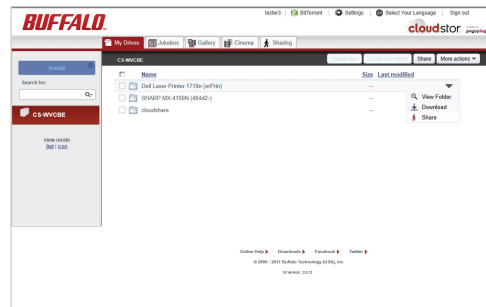
Select your CloudStor from the drop-down menu and click *OK*. You can then print documents stored on the CloudStor by clicking on the printer icon on the document's icon.

Enabling *Print my email attachments* allows you to print files by sending or forwarding an email from your registered email address with the files you want printed attached to *print@mypogoplug.com*.

Select the destination printer from the drop-down list and click *OK*.

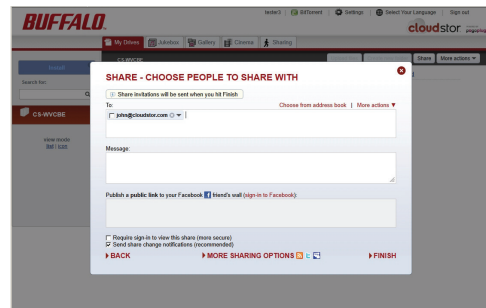


You can also allow others to print by giving printing rights to their email addresses. To share the printer with someone else, go to the Sharing tab, click on printers I share, select Share, chose the printer then the people you want to share the printer with.

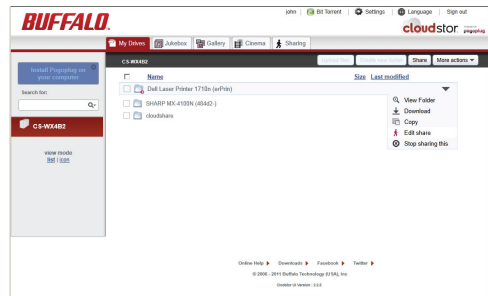


Enter an email address in the *To* field. Enter a message (optional) in the Message field if desired.

Click *Finish*. The person you've invited can now print documents by sending them as attachments to *print@mypogoplug.com*.

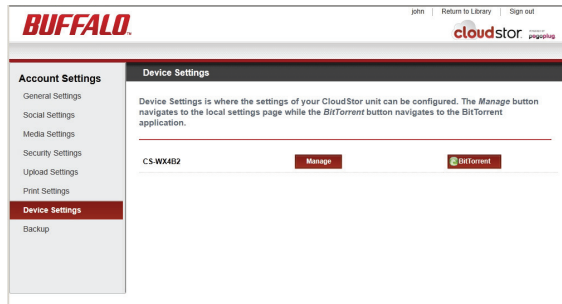


To edit the share, or to stop sharing the printer, go to the Sharing tab, click the black down-arrow to the right of the printer, and select *Edit share* or *Stop sharing this*.



Device Settings

Click *Manage* to open local settings or *BitTorrent* to open BitTorrent settings.



Local Settings

The local settings may be accessed remotely via the Device Settings page or locally as follows:

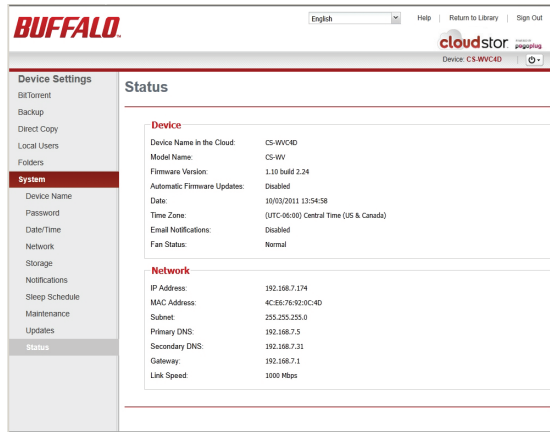
Use NAS Navigator2 to find the CloudStor on the network. By default, it will be named CS-WXabc, CS-WVabc, or CS-Xabc where “abc” is the last three digits of the MAC address of the CloudStor. Right-click and choose *open web admin*. Log in to the CloudStor. The default password is “password”.

BitTorrent - To use BitTorrent, enable it and choose a download folder. By default, the BitTorrent username is “admin” and the password is blank (no password).

Backup - (Time Machine) To use Time Machine, you’ll create a folder for backups on the CloudStor. This folder is not visible from Windows. Time Machine targets can be added and removed from the UI. See page 40 for instructions on configuring Time Machine.

Direct Copy - You may choose the folder where files are copied to here.

Local Users - You may enable or disable local network access to shares on the CloudStor here. Please note that these restrictions are not enforced when accessing the device via the Cloud UI or Pogoplug desktop and mobile apps.



Folders - This lets you add or remove folders on your CloudStor. The user can control what to expose on the cloud (accessible via cloud UI and the Pogoplug desktop and mobile apps) and what to make visible only when you are in the same subnet as the CloudStor (samba and afp).

Device Name - You may change the name of your CloudStor here. The name may include up to 15 alphanumeric characters, a hyphen or an underscore

Password - This is the login password for the local UI. It's not related to the Cloud account. To change the login password for your CloudStor, enter a new password here (twice) and click *Save*. The default password is "password".

Date/Time - You may set the date and time on the CloudStor manually or automatically. If setting manually, enter a time zone, date, and time. Click *Use Local Time* to use the time from your computer. Click [Save] when done.

Network - You may configure the IP address settings on the CloudStor manually or automatically. Automatically (via DHCP) is recommended for most users. If *Manually* is selected, enter the appropriate network settings and click *Save*. This setting can only be changed when you are connected to the CloudStor locally as described above.

Storage - You may reconfigure the hard drive settings for the CloudStor here.

Notifications - Enable *Email Notification* to have your CloudStor automatically send you an email if errors occur. Click *Add* to enter the email addresses that notification will be sent to. Choose which events (Hard Drive Status, Fan Failure, and/or Disk Error) will trigger a notification. Click *Send Test Message* to send a sample email to registered addresses, or *Save* to save your changes and exit. Note: if your notification emails don't seem to arrive, check your junk folder!

Sleep Schedule - Enable to configure the CloudStor to shut down during preset periods.

Maintenance - Clicking *Restore* restores your CloudStor to its factory default settings. Normally, this doesn't affect data stored on the drive. However, you may choose to check *Erase data* before clicking *Restore*, which will erase all data on the drive. Note that this will not unregister the device. If you choose to erase data, it may take several hours to complete.

Clicking *Rebuild Media Library* will recreate thumbnails and re-transcode your videos and movies. Active copy jobs to or from folders on the CloudStor will need to be restarted. This operation cannot be stopped or reversed.

Note: *Restore* and *Rebuild Media Library* can only be used when you are connected to the CloudStor locally.

Updates - If enabled, the CloudStor will be automatically updated with the latest firmware. This is enabled by default. If an update results in unexpected behavior, clear your browser's cache.

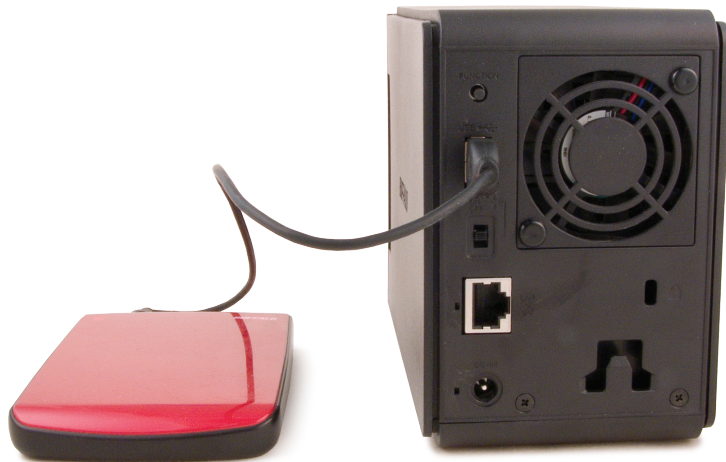
Status - This gives you current system settings for your CloudStor and information about the network.

Language - Select your language from the drop-down list on the top right side of the screen. Note: This only changes the language for the local UI of the device. To change the language for the Cloud UI, click *Return to library* and then click the language tab at the top right.

Restart CloudStor - Power cycles the device. The button is located on the right side of the top bar.

Adding an External USB Drive

You may connect an external USB drive to your CS-WX or CS-WV CloudStor for additional storage or backup. Before connecting the USB drive to the CloudStor, use your computer to format it with NTFS or HFS+. Use NTFS if you are formatting with a Windows computer or HFS+ if you are formatting with a Mac.



Adding a Second Drive

You may add a second drive to CS-WX/1D and CS-WV/1D CloudStor devices for additional storage or data security. For RAID 1 mirroring, the second drive should be the same as or larger capacity than the original drive.

To add a second drive, turn the CloudStor off and remove the front panel. Insert the new drive into the open bay (for RAID, the new drive should be the same or larger capacity than the existing drive). Power the CloudStor on and go to the local user interface at <http://x.x.x.x/>, where x.x.x.x is the IP address of your CloudStor. The new drive will be listed in *Storage*. Click on *Change Disk Settings*. Select either *Keep them independent of each other* or *Group them (Disk Mirroring)*.

If independent, the new drive is formatted and the original drive is unchanged. The info/error LED flashes amber until the format is complete.

For RAID 1, the new drive is formatted into a mirror of the original drive. Data from the original drive will be stored on both drives simultaneously. The info/error LED flashes amber until the process is complete.

Note: Reversing the drives will cause strange things to happen! Don't get them mixed up.



To replace a failed drive, go to the local user interface at <http://x.x.x.x>, where x.x.x.x is the IP address of your CloudStor. See which drive failed. Turn off the CloudStor and replace the bad drive. Turn the CloudStor back on and let it boot up. In the local user interface, click on *After replacing the drive, click here*. The array will be rebuilt.

To remove a drive that has not failed, put the drives into Independent mode. In the local user interface, select that drive to remove and click on *remove disk*. Power down the CloudStor and physically remove the drive.

In **Independent Mode**, the disks are independent. They may contain different data. The full capacity of both drives is usable. There is no redundancy. If a drive fails, all data on that drive is lost.

In **RAID 1**, disk mirroring provides fault tolerance but also decreases overall capacity. An array of drives is created and the system saves the data to both hard drives in the array simultaneously. If a drive fails, the healthy drive continues to work and your data is accessible without interruption. Once the faulty drive is replaced and the array is rebuilt, the array is restored to its original condition.

When changing from Independent mode to RAID 1, you have three options:

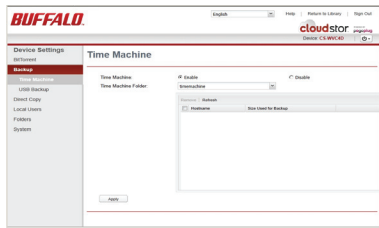
Keep the data from disk 1 (left drive in chassis)

Keep the data from disk 2 (right drive in chassis)

Don't keep any data

When changing from RAID 1 to Independent Mode, all data is lost.

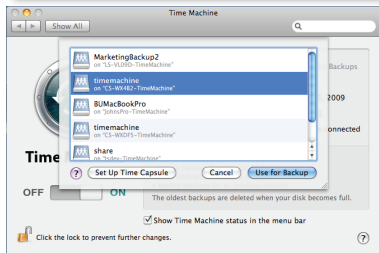
Time Machine



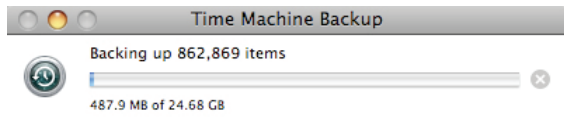
To use the CloudStor as a location for backups from a Mac running Time Machine, begin by navigating to *Device Settings/Backup* in the local user interface and clicking *Enable*, then *Apply*.



On your Mac, open Time Machine. Click on *Choose Backup Disk*.



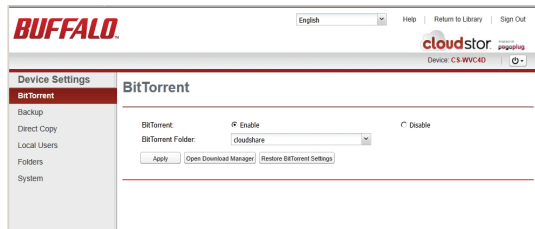
Choose your CloudStor from the list and click *Use for Backup*. In 120 seconds, Time Machine will begin running a backup.



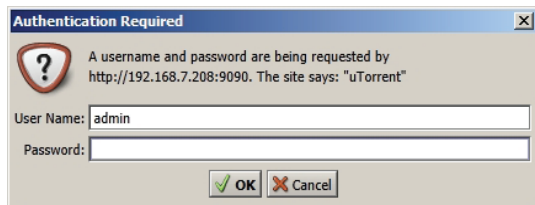
BitTorrent Client

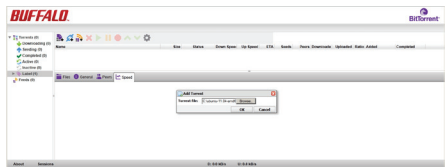
The built-in BitTorrent client on CloudStor will download your files for you. To enable it, select *Enable*. Click *Apply*.

Then, click *Open Download Manager*.

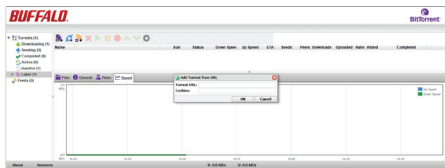


Enter your BitTorrent username and password. This is not the same as your CloudStor username and password. The default BitTorrent username is “admin” and the default password is blank (no password).





To add a torrent, click on the first download icon (the purple one) at the top left. The *Add Torrent* dialog will open. Click *Browse*, navigate to the torrent file, and open it. Click *OK*.



Alternately, click the second (blue) icon, and enter the URL of the torrent in the *Torrent URL* field. Click *OK*.

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

Direct Copy

You can copy digital media files directly to CS-WX/1D and CS-WV/1D CloudStor devices from a USB storage device, such as a digital camera, USB flash drive, or external hard disk.

Connect your USB device to the USB port on the back of the CloudStor. The function LED on the front of the unit will glow blue for 60 seconds.

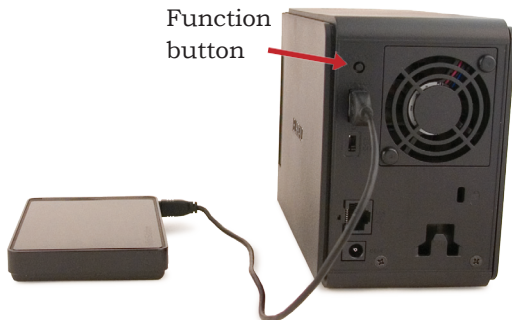
While the function LED is still glowing blue, press the function button and release it. The function LED will begin to blink as all media files on the USB device are copied to the folder on the CloudStor selected in *Device Settings/Direct Copy*. When the copying is finished, the function LED will stop blinking.

When the copy is finished, hold down the function button until the function LED glows a steady blue. This dismounts all attached USB devices, and it's now safe to unplug your device.

Notes: The CS-X CloudStor doesn't support Direct Copy.

If the function LED does not glow blue when the device is connected, then the device is not compatible with Direct Copy.

If no folder is selected in *Device Settings/Direct Copy*, then no files are copied and the function LED will continue blinking. If this happens, hold down the function button until the drive is dismounted.



The following types of files are copied by Direct Copy:

Pictures

*.jpg *.jpeg *.gif *.png *.tif *.tiff *.yuv *.bmp *.raw

Movie

*.avi *.divx *.asf *.mpg *.mpe *.m1v *.vob *.mts *.m2ts *.m2t *.mpeg *.mpeg2 *.vdr *.spts *.tp *.ts
*.3gp *.mov *.m4v *.wmv *.dvr-ms *.xvid *.mp4 *.m4v

Music

*.mp3 *.mpa *.wma *.aac *.apl *.ac3 *.lpcm *.pcm *.wav *.m3u *.m4a *.m4b *.aif *.aiff *.flac *.ogg
*.mp2 *.mp1

LED Error Codes:

If an operation error occurs, the info/error LED will flash red. It will alternate between flashing for 1 second (tens digit) and 1/2 second (ones digit). Combine the number of longer flashes with the number of shorter flashes to produce a two digit error code:

- E00 - (no flashes) MPU failure
- E01 - DRAM data line problem
- E02 - DRAM address line problem
- E03 - RTC chip error
- E04 - failed to extract kernel
- E06 - corrupted firmware
- E07 - a hard disk was not found
- E10 - UPS error
- E11 - fan error
- E15 - hard drive I/O error
- E16 - no hard disks detected
- E17 - internal controller error

- E20 - circuit board error
- E21 - internal controller error
- E22 - mount error
- E23 - hard disk is malfunctioning

LED Information Codes:

The info/error LED will flash amber to give information codes. Like the error codes, these alternate between flashing for 1 second (tens digit) and 1/2 second (ones digit). Combine the number of longer flashes with the number of shorter flashes to produce a two digit information code:

- I19 - erasing disk
- I23 - initializing system
- I25 - updating firmware
- I26 - initializing Web configuration
- I27 - checking USB disk
- I28 - formatting USB disk
- I53 - cannot communicate with cloud service

Specifications (CS-WX and CS-WV)

Hard Drive:	3.5" SATA
Ethernet:	10/100/1000 Mbps RJ-45
USB Interface:	USB 2.0/1.1 (CS-WX and CS-WV only)
Replacement Fan:	OP-FAN/LS
Replacement Power Supply:	OP-AC12L
Power Supply:	100-240 V 50/60 Hz
Client OS Support:	Windows® 7 (32-bit/64-bit), Windows Vista® (32-bit/64-bit), Windows XP, Windows Server® 2003/2008, Windows Server® 2003/2008 R2, Mac OS® X 10.4 or later
Power Consumption:	~17 W average; ~48 W max
Dimensions:	5.0" x 3.4" x 8.1" (127 x 86 x 206 mm)
Weight:	~3.3 pounds (1.5 kg)
Operating Environment:	41°-95° F, 5°-35° C; 20-80% non-condensing

Specifications (CS-X)

Hard Drive:	3.5" SATA
Ethernet:	10/100/1000 Mbps RJ-45
Replacement Power Supply:	OP-AC12L
Power Supply:	100-240 V 50/60 Hz
Client OS Support:	Windows® 7 (32-bit/64-bit), Windows Vista® (32-bit/64-bit), Windows XP, Windows Server® 2003/2008, Windows Server® 2003/2008 R2, Mac OS® X 10.4 or later
Power Consumption:	~18 W average
Dimensions:	3.0" x 5.9" x 7.1" (75 x 150 x 180 mm)
Weight:	~1.9 pounds (0.88 kg)
Operating Environment:	41°-95° F, 5°-35° C; 20-80% non-condensing

Buffalo Technology USA Inc.
11100 Metric Blvd., Suite 750
Austin, TX 78758

GENERAL INQUIRIES

Monday through Friday
8:30am-5:30pm CST

Direct: 512-794-8533 | **Toll-free:** 800-456-9799

Fax: 512-794-8520 | **Email:** sales@buffalotech.com

TECHNICAL SUPPORT

North American Technical Support by phone is available 24 hours a day, 7 days a week. (USA and Canada).

Toll-free: (866) 752-6210 | **Email:** info@buffalotech.com

Buffalo Technology UK Ltd.
2 Bracknell Beeches, Old Bracknell Lane
Bracknell, Berkshire, RG12 7BW
United Kingdom

GENERAL INQUIRIES

Email: *sales@buffalo-technology.com*

TECHNICAL SUPPORT

Buffalo Technology provides technical support in English, German, French, Italian and Spanish. For opening hours and relevant telephone numbers, please go to:

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