MirrorOp Sender

USER'S MANUAL

Version 02

Welcome to MirrorOp Sender

Thank you for choosing MirrorOp Sender, the leader in screen mirroring and collaboration technology.

MirrorOp Sender is an industrial standard for real-time screen sharing and remote desktop operations. It has been widely adopted in the projector industry and also being introduced to more consumer products, including TV, smartphones and set-top boxes.

For more information, please visit www.mirrorop.com

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Downloading MirrorOp Sender software

MirrorOp Sender software can be downloaded from the following sources:

1. Download from mirrorop.com (Windows):
   Open the link http://mirrorop.com/store_Windows_Sender.html in your browser. Click "Try Now" to download and try, or click "Check out with PayPal" to purchase a license (registration key) if your receiver does not include a valid license key.

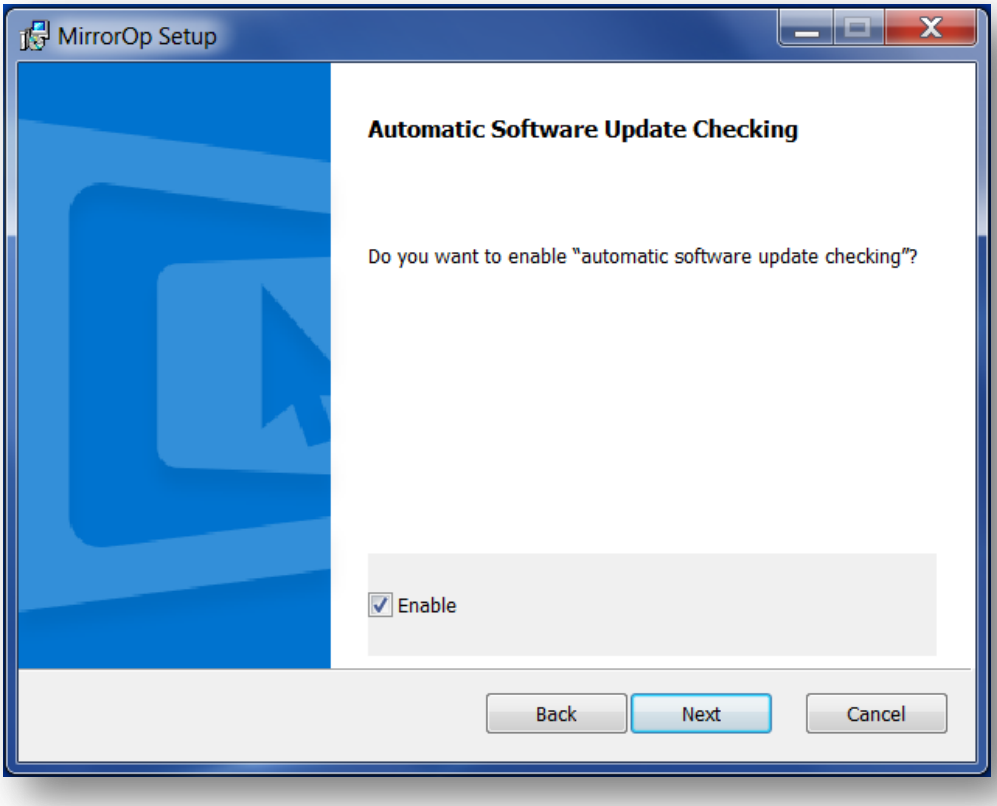
2. Download from mirrorop.com (Mac):
   Open the link http://mirrorop.com/store_Mac_Sender.html in your browser. Click "Try Now" to download and try, or click "Check out with PayPal" to purchase a license (registration key) if your receiver does not include a valid license key.

3. Download from the hardware receiver product that offers MirrorOp Sender in the package. For detailed information, please refer to the user's manual of the product you purchased.

Installation

Windows:
After downloading the installer from the website or device, double click the installer to start the installation. Follow on-screen instructions to complete the installation. Once installed, you should find the MirrorOp Sender application in your Program Files folder.

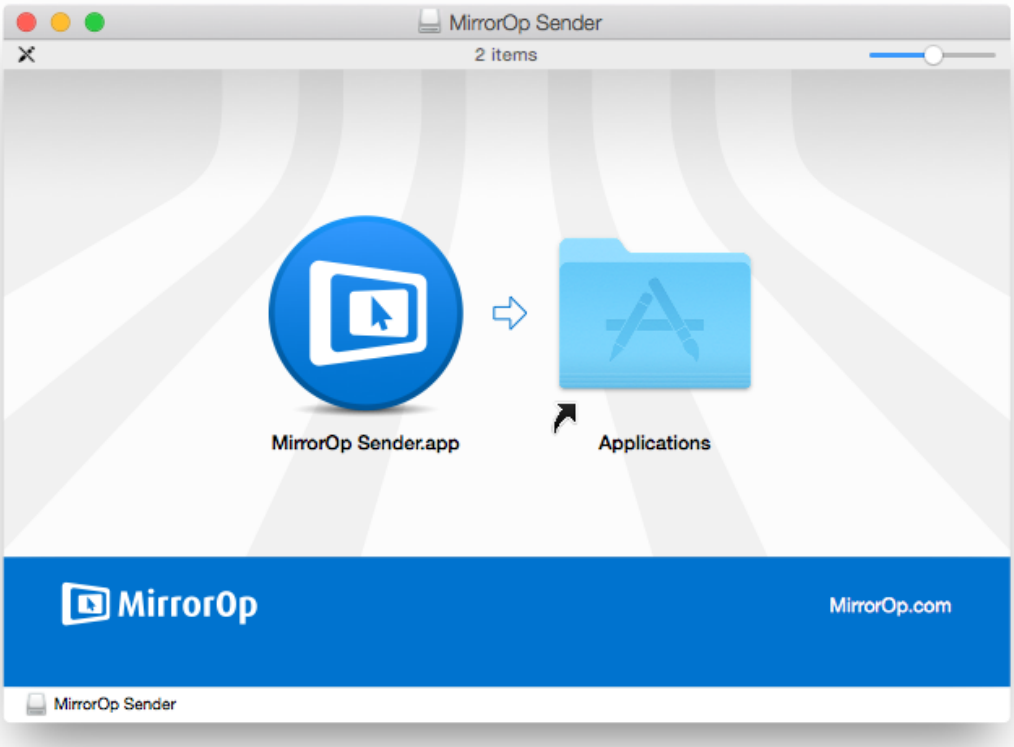
Note: The option of enabling/disabling Automatic Software Update Checking is available during the installation process.



Mac:
After you download the app from the website or device, drag the MirrorOp Sender app to your Applications folder.

Note: For some advanced features, additional driver(s) may be required. In such cases, you will see a hint message when selecting such features. Follow the information in the message to

download and install additional drivers if you want to use such features.



Activation

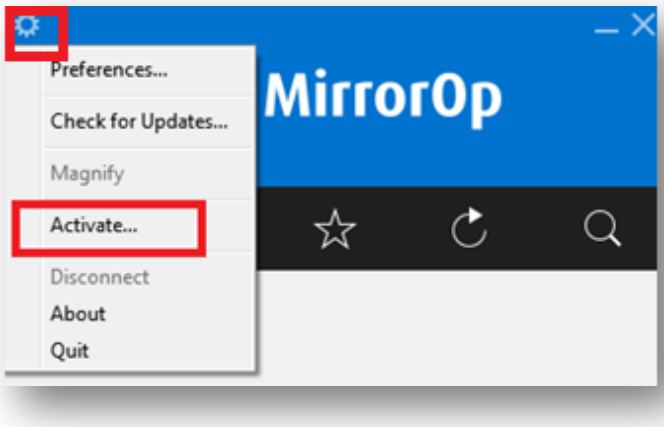
This MirrorOp Sender application can be used with many different receivers, such as wePresent/ClickShare products and Windows/Mac/Android/iOS devices.

Depending on which receiver the MirrorOp Sender application is connected to, different features will be enabled based on the capabilities of the receiver. In most cases if you use this application with a hardware device that already includes a valid license (registration key) for this software, activation is not required. However, if you use this application with a receiver that does not include a valid license, for example a Windows device, you should activate the application with a valid registration key.

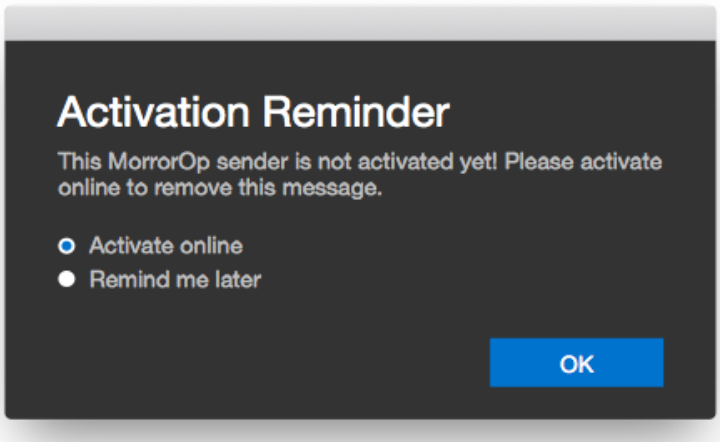
To open the Activation window, go to the Help menu (Mac)/Settings menu (Windows) and click “Activate”.

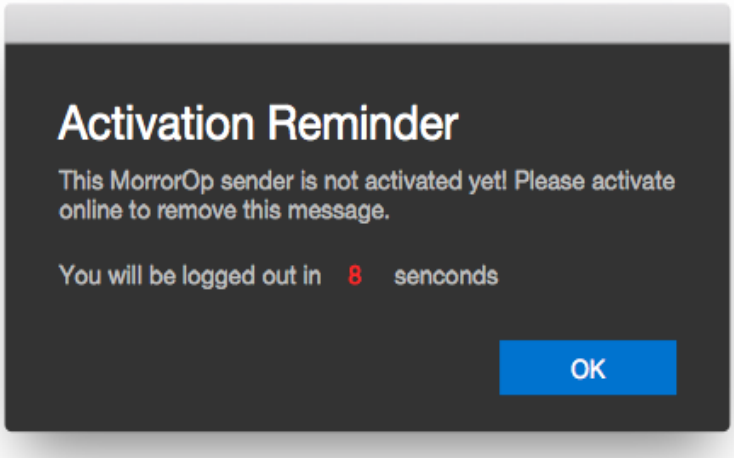
(For Mac)

(For Windows)



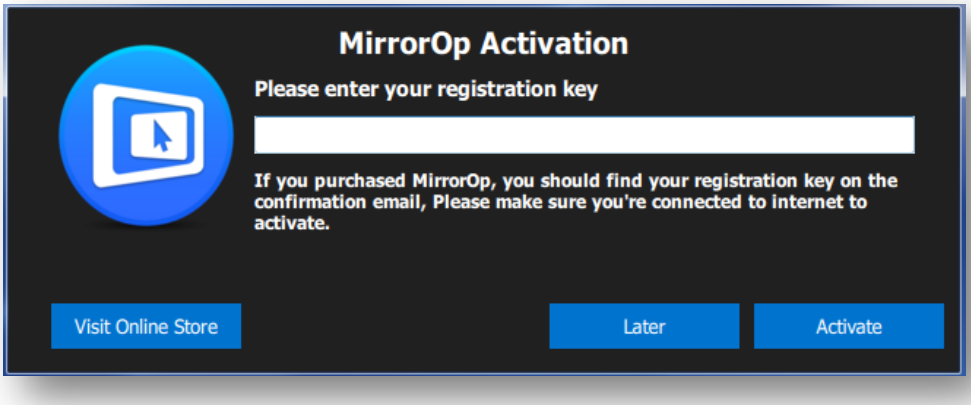
When this application is used without a valid license (that is, no valid license for the receiver and not activated with a key), it will show a warning message and disconnect from the receiver every 5 minutes.





A registration key can be purchased in the application. Click the “Visit Online Store” button on the Activation window to find purchase options.

Once you have a registration key, enter the key in the Activation window (including all the dashes "-") and click the Activate button. Make sure you’re connected to the internet when activating MirrorOp Sender.



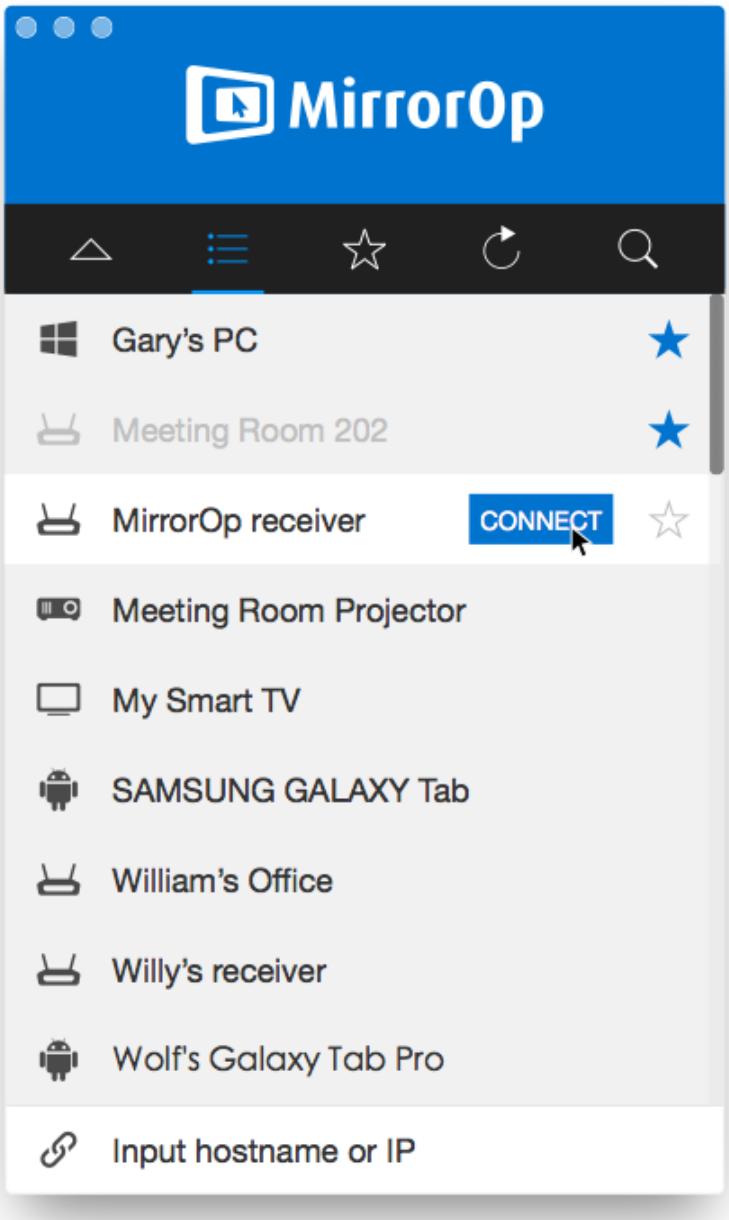
Note: One registration key is valid for one computer only unless otherwise specified when you purchase. Using the same key on a second computer will make activation on the first computer invalid.

Using MirrorOp Sender

To use MirrorOp Sender, first you should connect your computer to the same network where the receiver is connected. Then, find the MirrorOp Sender application and launch it.

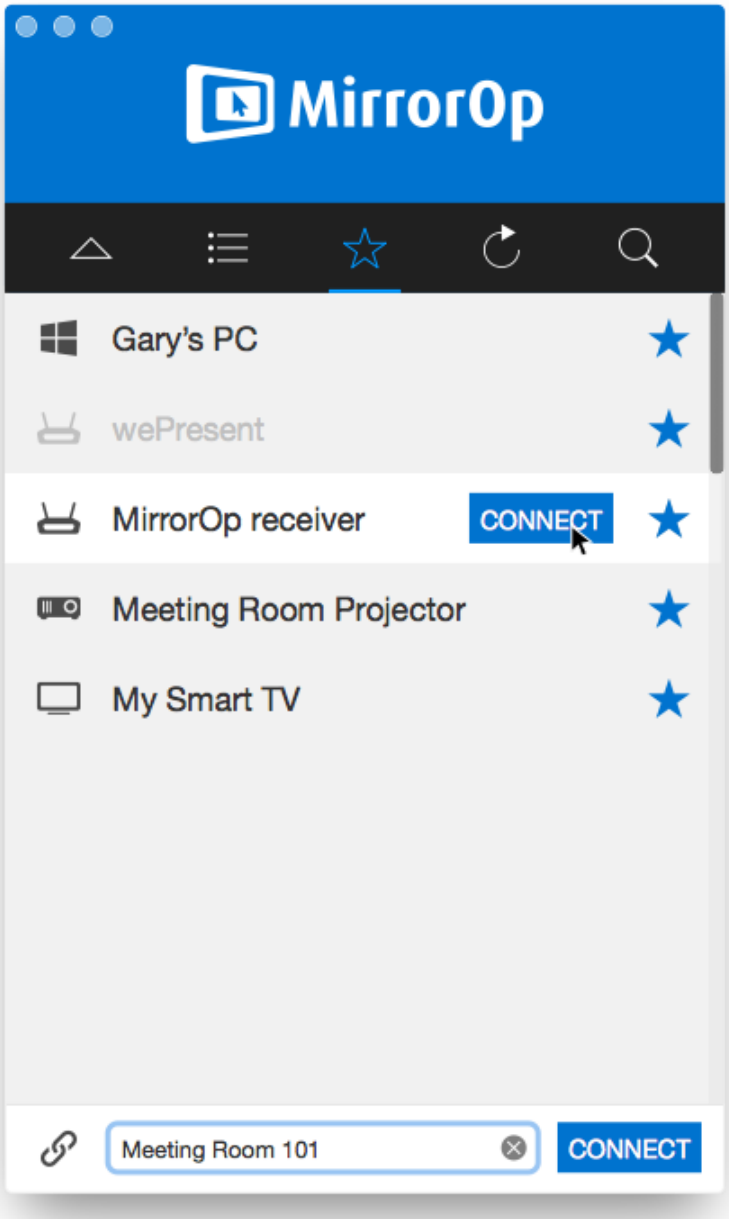
Finding receivers to use

Once launched, MirrorOp Sender will look for receivers on the network and generate a list. Move your mouse to the receiver you want to use and click "CONNECT" to connect to the receiver.



You can also choose to save receiver(s) you use frequently to “Favorites” , telling MirrorOp Sender to launch from the Favorites list next time. For more detailed information, please refer to the “Using Favorites” section.

The “Refresh List” button only works for receivers that reside on the same subnet (that is, the first three sections of the IP address of the receiver are the same as those of the computer). For those receivers not on the same subnet, which is more likely to happen in big corporate networks with different subnets, you can input the IP address or hostname of the receiver in the text box at the bottom of the interface. Once connected, you can also save the receivers you use frequently to Favorites to have the application remember the hostnames and IP addresses without entering them again.

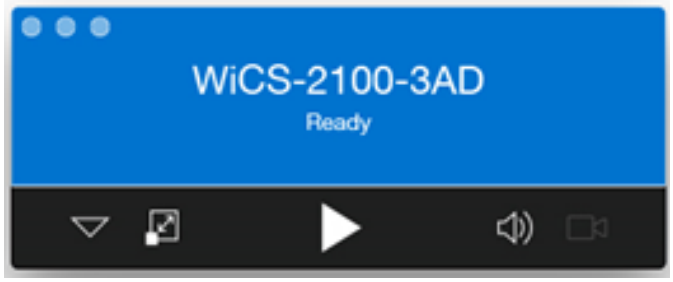


Info Panel

The receiver name and current status will be displayed on the Info Panel. Whenever the status changes, for example you start displaying or streaming, the Info Panel will be automatically expanded. It will automatically collapse if no mouse movement is detected for 3 seconds.

(MirrorOp Sender for wePresent WiPG devices)

(MirrorOp Sender for wePresent WiCS-2100)



You can also manually expand the info panel by clicking the button.

(MirrorOp Sender for wePresent WiPG devices)

(MirrorOp Sender for wePresent WiCS-2100)

Mini Panel

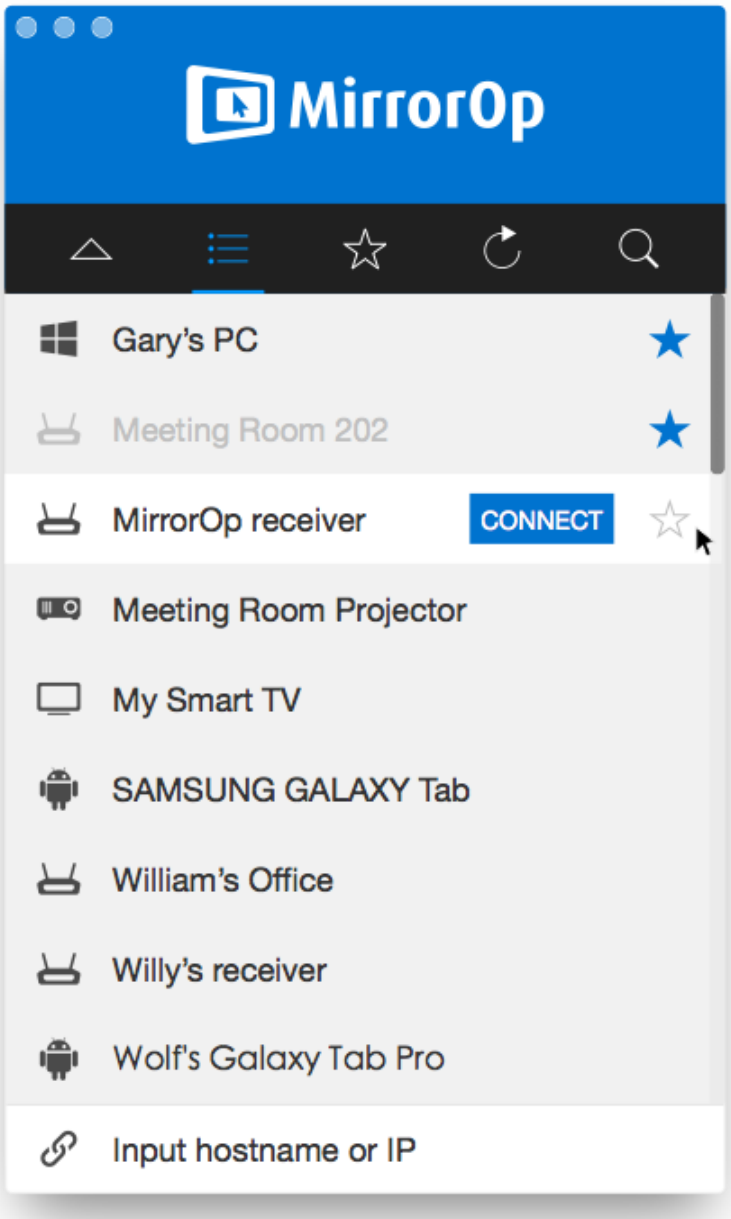
To save space on screen when sharing your desktop, MirrorOp Sender automatically minimizes to the Mini Panel mode if no mouse movement is detected for 5 seconds.

The Mini Panel contains most frequently used controls you need when sharing your screen. You can manually expand the receiver list to switch to another receiver or disconnect from a receiver. To do so, click the  button on the mini panel.

Using Favorites

Favorites is a new design introduced into MirrorOp Sender. Similar to the concept in most web browsers, Favorites are used to store destinations you visit often so that you can access them quickly. In this case, the receivers you use frequently are to be stored.

If you have many receivers around in your office, going through the complete receiver list every time may be time consuming and unnecessary. You can save the receivers you use most frequently as Favorites, and set the preference to



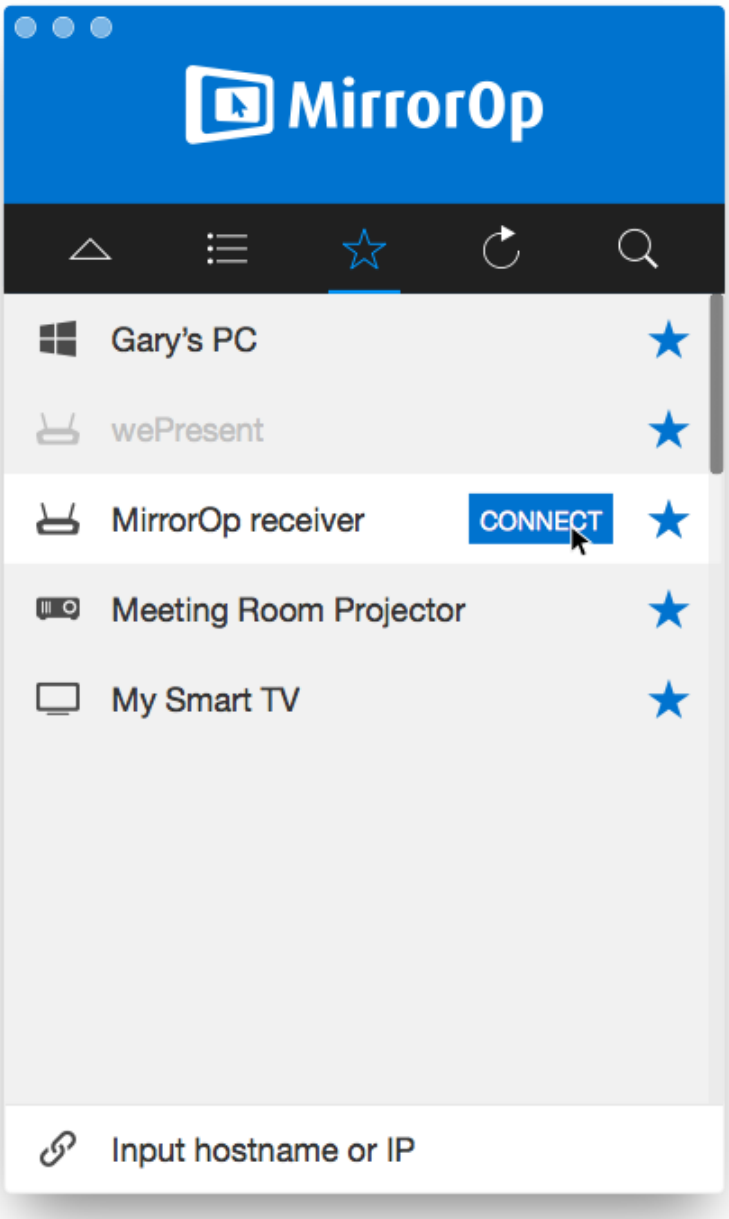
directly launch the application from your Favorites list instead of going over the discovery process every time.

To save a receiver to your Favorites, move your mouse to the receiver you want to add. Look for the STAR icon  on the right of the list, and click to add the receiver.

To remove a receiver from Favorites, move your mouse to the STAR  of that receiver and click again.

Receivers in Favorites are always visible on the list. If a receiver can be discovered, its name is shown in black. If a receiver on the list cannot be discovered, its name is displayed in gray.

A receiver may not be discovered but still connectable. For example, a receiver is on another subnet of the corporate network which your computer have access to. Or, some corporate network may block all UDP broadcasting packets thus prevents the discovery mechanism to find receivers. In such cases you can still connect to these receivers from the Favorites list. Simply move your mouse to the receiver you want to use, and click "CONNECT". MirrorOp Sender will try to connect to that receiver with last known IP address. If it is not found on that IP address, MirrorOp Sender will try to get the IP address from the DNS server with the receiver hostname. If the receiver hostname is found on another IP address, MirrorOp Sender will connect with the new IP address and update the address to the list. If all these efforts failed, the receiver may be turned off or the network your computer is connected to cannot access that receiver.


MirrorOp
Gary's PC
wePresent
MirrorOp receiver
CONNECT
Meeting Room Projector
My Smart TV
Input hostname or IP

Start Mirroring

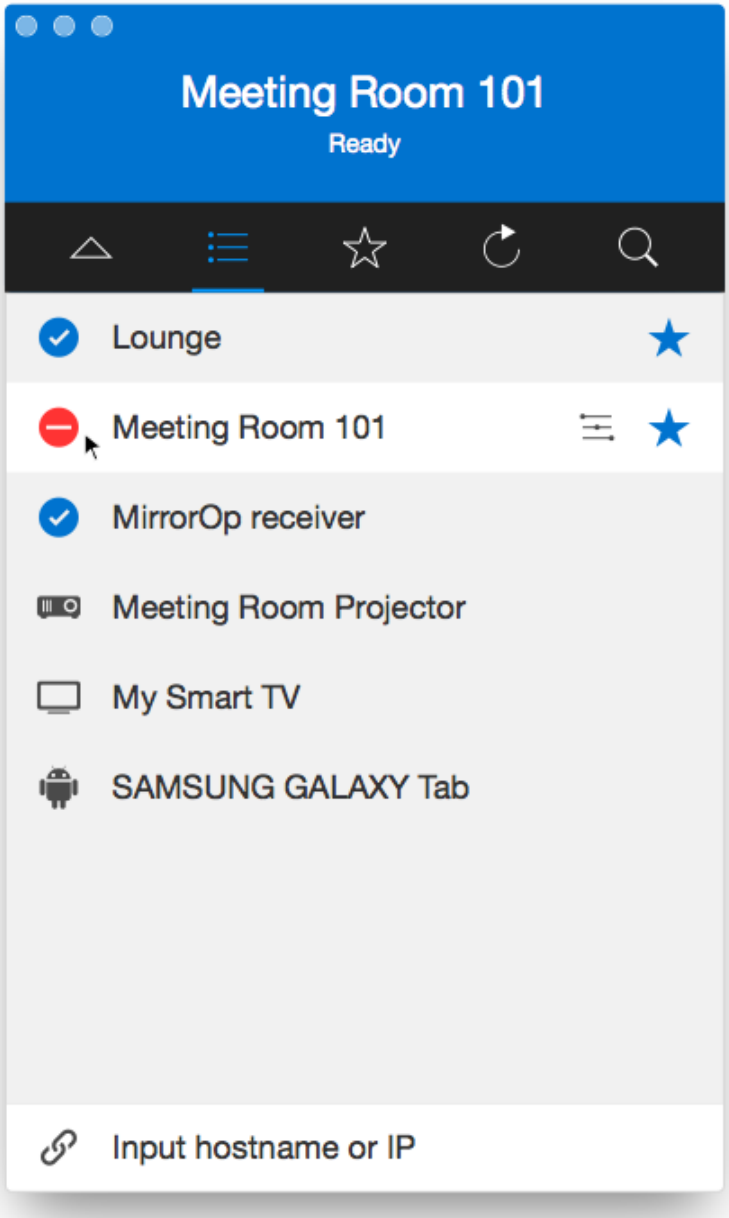
To start mirroring to the receiver you selected, click the Play button. The screen image will be presented on the receiver side.

To stop mirroring, click the Stop button. The screen will return to the standby screen.

To pause mirroring, click the Pause button. The receiver screen will stay on the last image until Play button is clicked again or Stop button is clicked.

Disconnecting from a receiver

To disconnect from a receiver, move your mouse to the receiver name in the receiver list. The blue check mark in front of the receiver name will change to a red STOP sign as shown in the figure below. Click on the STOP sign to disconnect from the receiver.



Advanced Features

Depending on the receiver you connect to, some advanced features can be enabled. For example, multiple screens can be shared to the same receiver at the same time (Split Screen), or you can also share one computer to multiple receivers (one-to-many).

Advanced features include but not limited to the following:

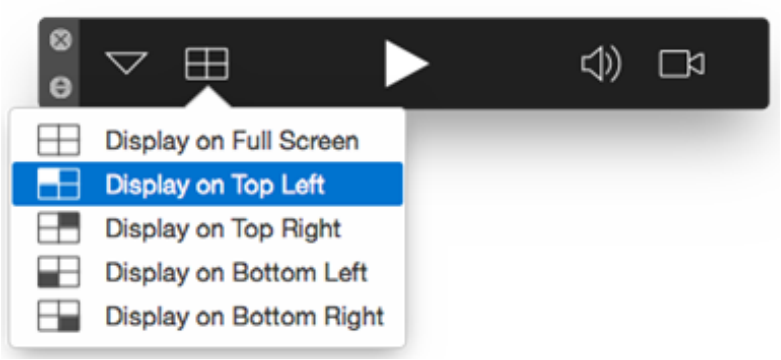
- Split screen
- Auto Layout
- Extended Desktop
- Video streaming
- One-to-many (1-to-4 distribution)
- Re-display of connection info
- Universal multi-touch (UMT)
- Simulate remote USB input devices as local devices (USB over IP)
- Student Control (Moderator preview & control)

To know which advanced featured your receiver supports, please refer to the user's manual of your product.

Split Screen (Quad Screen)

Split/Quad screen is an advanced feature offered on wePresent WiPG devices. If the receiver supports split/quad screen, the split button will be enabled.

(MirrorOp Sender for wePresent WiPG devices)



Select full screen or one of the corners where you want to display on the receiver screen. When you click the Play button, the position selected on the split menu will be used. If you select the position where some screen is already displayed, the displayed screen will be replaced immediately.

Auto Layout

Auto layout is an advanced feature offered on wePresent WiCS devices. If the receiver supports auto layout, the Auto Layout button will be enabled.

(MirrorOp Sender for wePresent WiCS-2100)

There are two projection modes: auto layout and full screen. If you select the auto layout mode, the display layout will change automatically according to the number of device screens projected to the display (please see below). If you select the full screen mode, the current display (either full-screen or split-screen) will be replaced by a new full-screen display.

Auto Layout	1 device screen projected	2 device screens projected	3 device screens projected	4 device screens projected
				

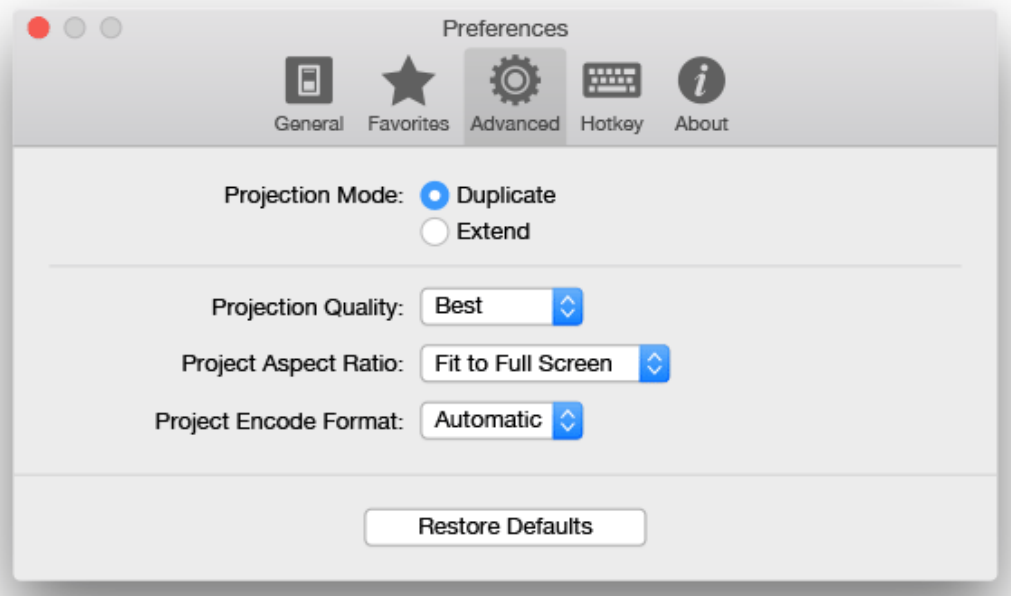
Extended Screen

Besides displaying your main desktop, it is also possible to display an extended desktop to the receiver. This is useful when you want to present a document to the audience while using your main desktop to read your notes or confidential data.

Extended screen can be enabled on most Windows 7 and Windows 8 PCs. However, depending on the driver support of your graphic card, additional driver may be required to turn on the "virtual" extended screen. In this case, the MirrorOp Sender application will ask to download and install an additional driver. You may decide whether to install it or not.

For Mac computers, an additional driver is always required to use the virtual extended desktop. **(Please note that the Extended Screen feature is not supported by macOS 10.13.4 and above.)**

To use the extended screen, choose "Extend" in the (Advanced) Preferences. To switch back to the main screen, choose "Duplicate". You can also set a hotkey to toggle the extended screen on and off. For details, please refer to "Setting Hotkeys".



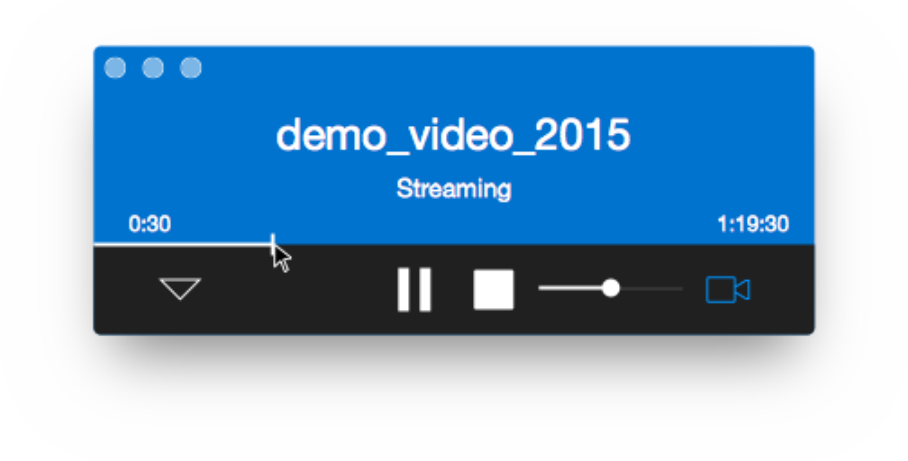
Video Streaming

Although screen mirroring serves most scenarios for presentation or teaching, sometimes the network performance or computer performance may not be good enough to provide smooth video experience. In this case, video streaming may be an alternative.

If your receiver supports video streaming, the video button will be enabled. Click on the video button to choose a video file you want to play. Similar to any video streaming solution, the video will be buffered to the receiver memory and played automatically once ready.

Note: The "video streaming" feature can be enabled only when the computer and the receiver deice are on the same subnet (i.e. the first three sections of the IP address of the receiver device are the same as those of the computer).

While streaming, you can use the playback control buttons to pause, stop, adjust volume or jump to a certain position in the video. Please note that if you try to stream a video in the split-screen mode, the display will automatically switch to the full-screen mode. (Video streaming is not supported in the split-screen mode.)



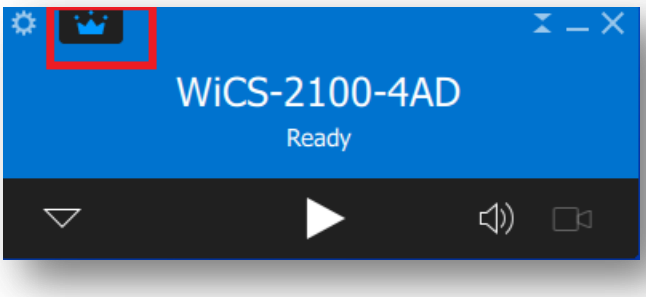
When the video ends, MirrorOp Sender will automatically return to the standby state. You can repeat the steps to choose another video, or directly click the Play button to display your screen again.

Student Monitor

"Student Monitor" is a new feature supported by wePresent WiCS-2100. This feature enables moderator preview and control from a Windows/Mac sender (teacher). With this feature, monitoring and moderation can be done directly via the MirrorOp Sender UI (User Interface) on a teacher's Mac/Windows computer. In other words, through the MirrorOp Sender UI, a teacher can use his/her Mac/Windows computer to preview and control all students' device screens before they are projected to the display. **As moderation and monitoring can be performed with ease and without interfering too much in group activities, "Student Monitor" is a great tool for creating a dynamic but orderly classroom.**

Moderator/Teacher Login:

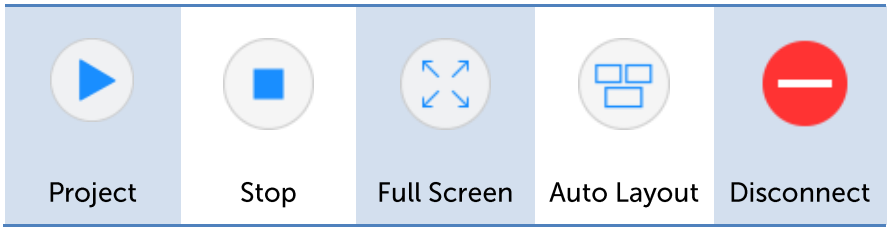
A crown icon will appear on the upper-left corner of the MirrorOp Sender Info Panel after your sender device is connected to the WiCS-2100. Click the icon and enter the password **(default password: moderator)** to log into "Student Monitor". Once you have logged in, the white crown icon will turn blue.



Moderator/Teacher Preview and Control:

After logging into "Student Monitor", you will see the thumbnails of connected senders' device screens in the moderator window. This gives you a preview of what to expect. In addition to the thumbnail preview, you can perform the control functions by clicking the following buttons:

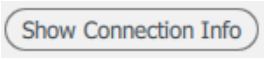
- Thumbnail Control:



- Disconnect All:

  Click the "Disconnect All" button on the upper-right corner of the moderator window, and you will disconnect all users except yourself (moderator/teacher) from the WiCS-2100.

- Connection Info:

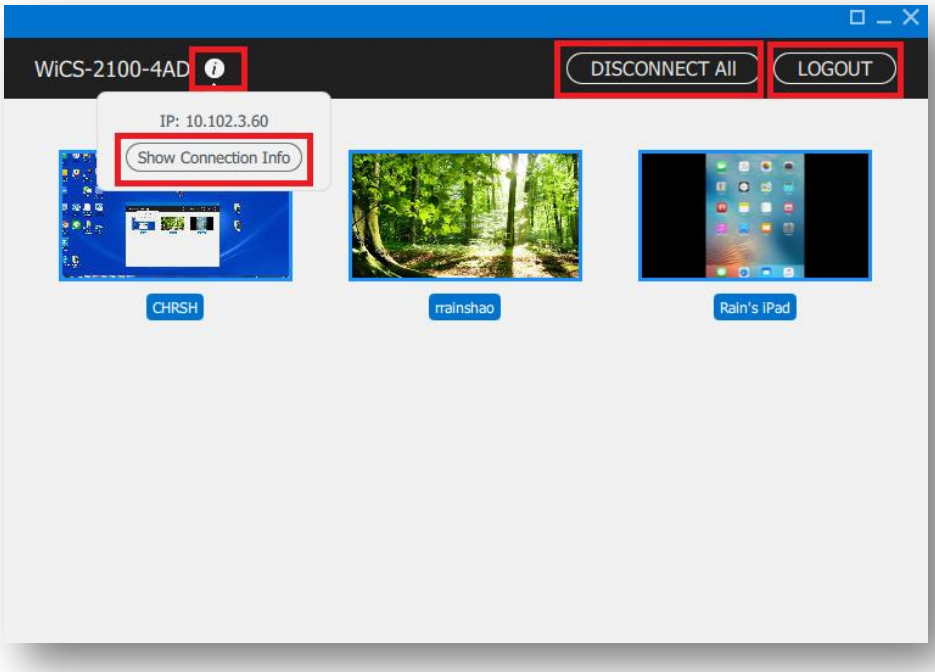
  Click  on the upper-left corner of the moderator window, and you will see the IP address of the receiver device (WiCS-2100). In order for others to connect to the WiCS-2100 when it is in the projection mode, just click on 

, and all the connection information, including login code (if there is one), SSID, hostname, IP address of the WiCS-2100, will be shown on the display.

Moderator/Teacher) Logout:

If you want to log out of "Student Monitor", just click on 

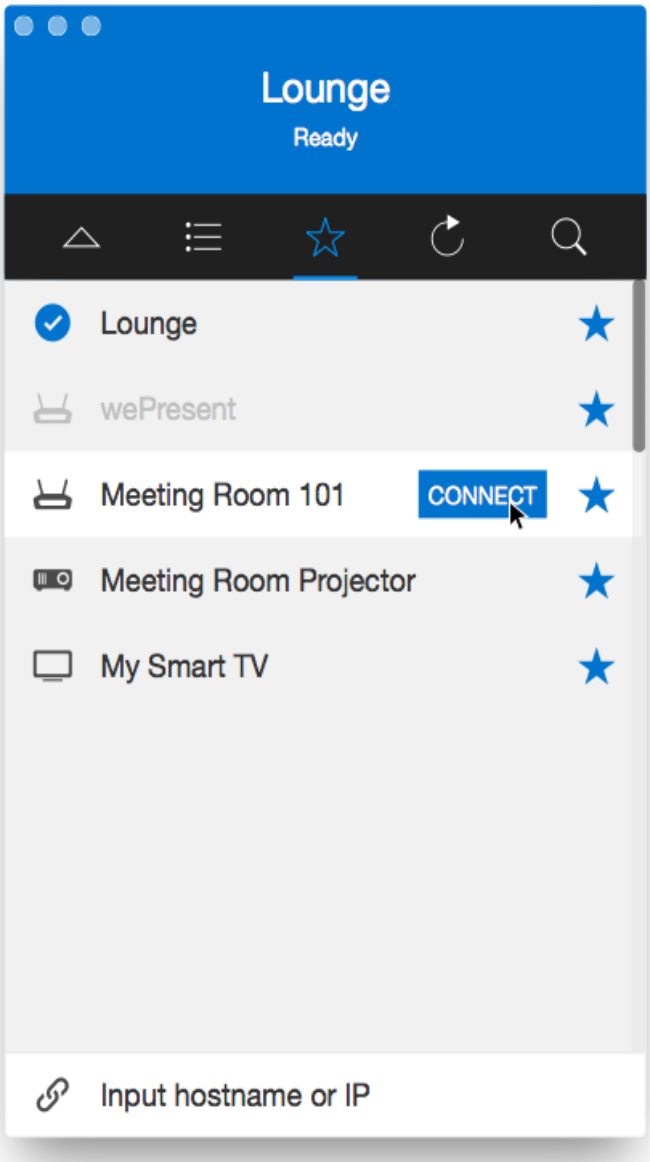
or simply close the moderator window.



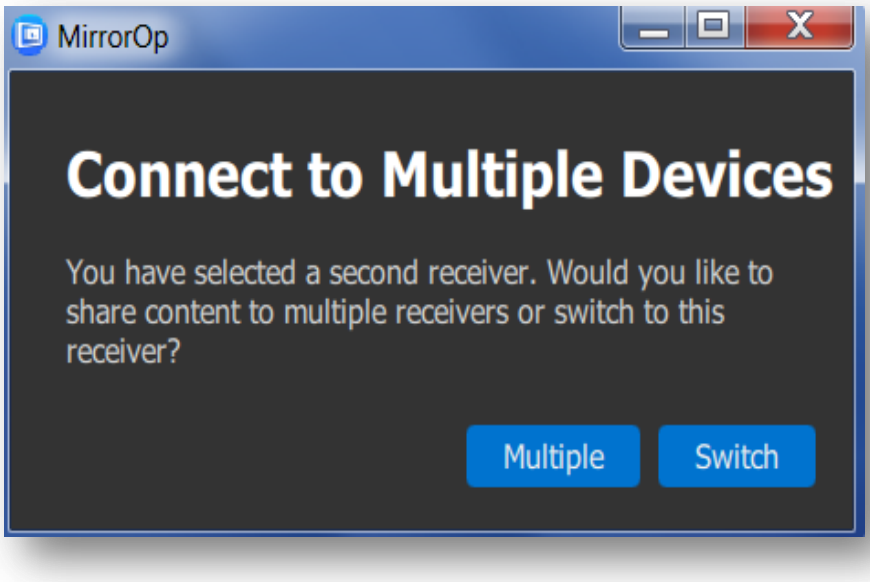
One-to-Many Distribution

"One-to-many distribution" is a special feature sometimes used in large conference rooms or classrooms. The idea is to send the same content to multiple receivers so that viewers can see the same content on different displays. This feature is not available on every receiver. To know whether your receiver supports this, please refer to the specifications of your receiver.

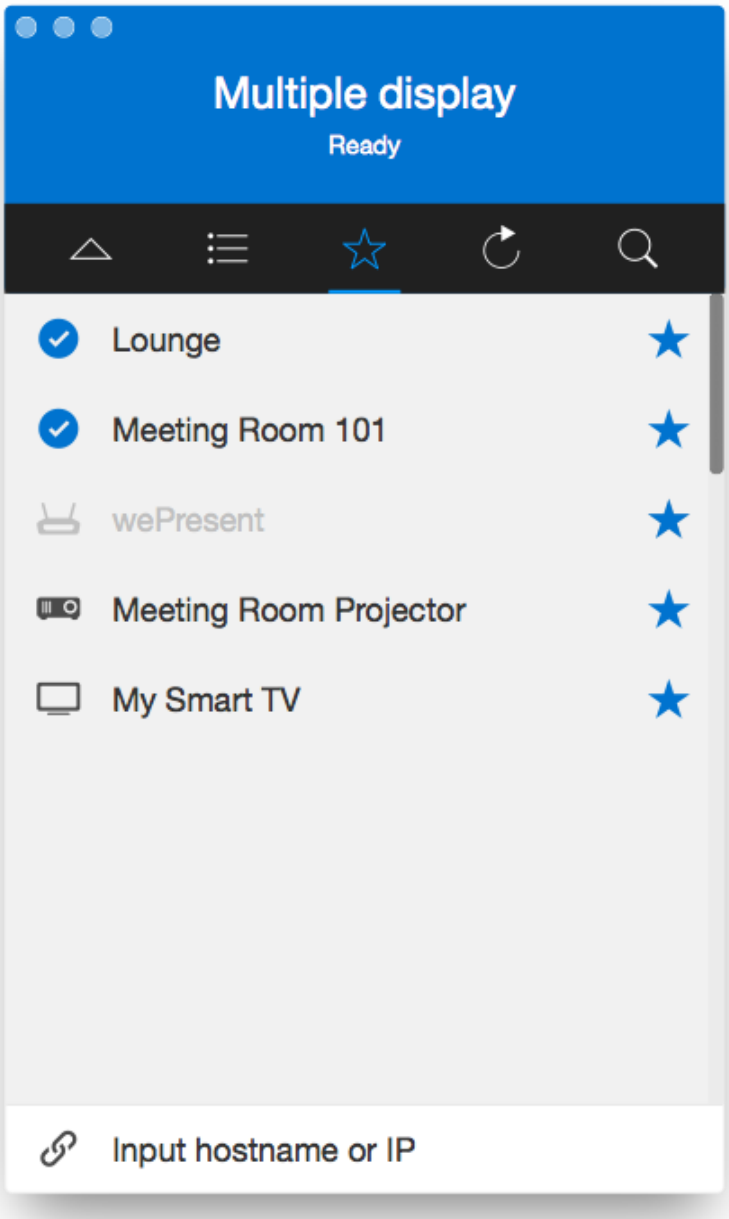
To enable one-to-many distribution, when you're already connected to a receiver, repeat the same procedure to connect another receiver.



A hint message will be displayed to confirm whether you want to switch to another receiver or enable multiple receivers. Click "Switch" if you want to use the new receiver and disconnect from the previous one, or click "Multiple" if you want to enable multiple receivers.



If you select "Multiple", MirrorOp Sender will connect to the second receiver and keeps the connection with the first one. You can see there are two check marks on the list now. Repeat the procedure if you want to connect to more receivers simultaneously.



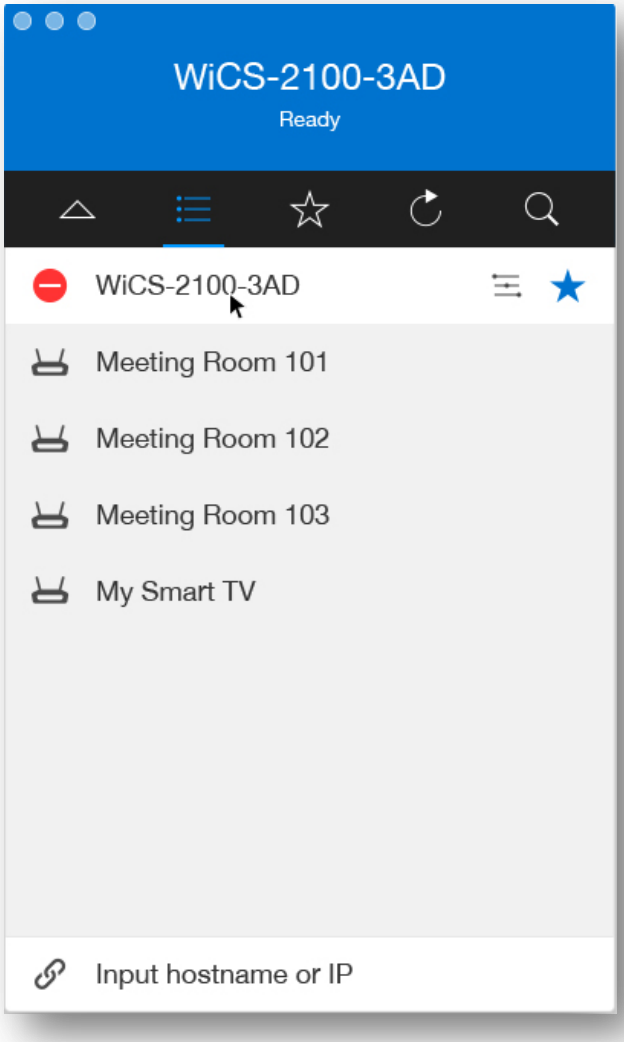
Note:

1. *More bandwidth will be required as more receivers are added. Performance may be decreased if you project to multiple receivers.* ***A sender can connect to a maximum of 4 receivers simultaneously.***
2. ***The "Moderation" and "Video Streaming" features will be disabled if you connect to multiple receivers concurrently.***

Re-Display of Connection Info

If someone mirrors his/her device screen to the wePresent unit, the connection information (e.g. code, SSID, hostname and IP) of the wePresent unit will disappear from the display after display timeout.

In order for others to connect to the wePresent unit when it is in the projection mode, a user (whose device is already connected to the wePresent unit) can double-click the hostname of the wePresent unit on the MirrorOp Sender UI (receiver list) to temporarily show its code/SSID/hostname/IP on the display.



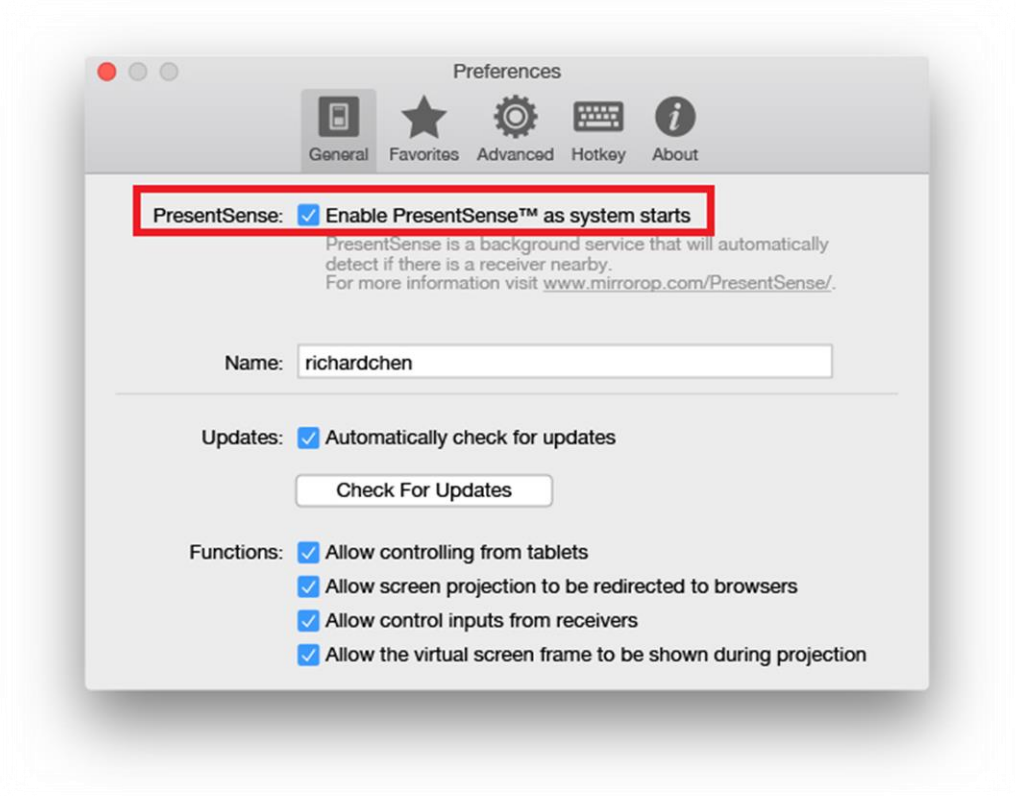
Note: If your receiver device is WiCS-2100, re-display of connection info can also be done via "Student Monitor". (Please refer to the section on "Student Monitor".)

PresentSense

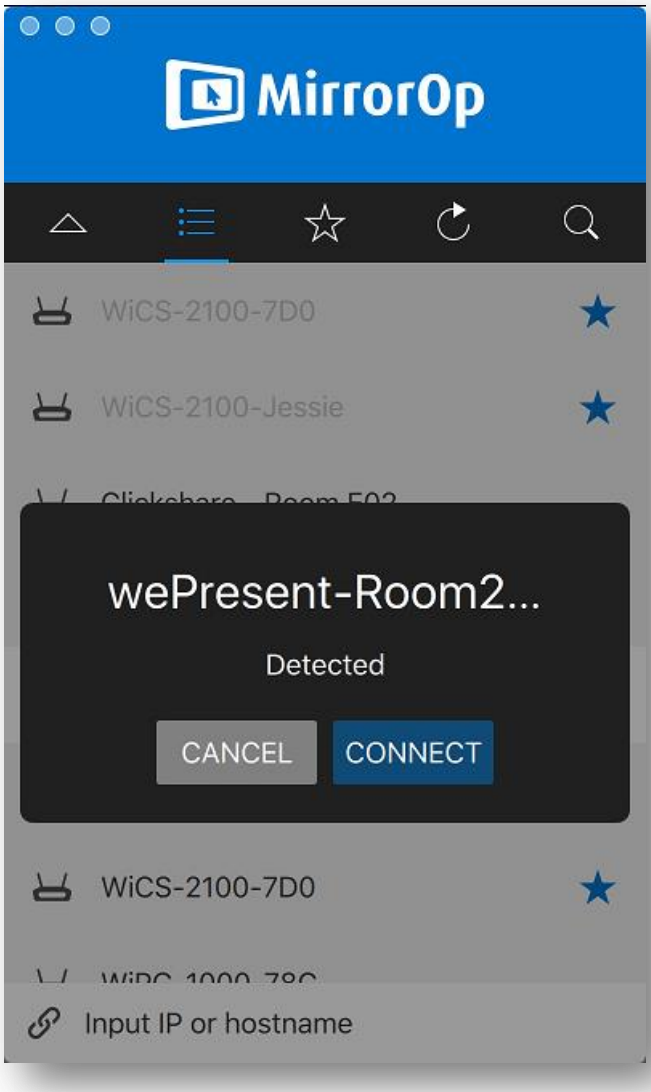
PresentSense is a new design to help you pick the nearest receiver (and most likely the one you will use) instead of going through the receiver list every time. This design requires Bluetooth Low Energy technology (or BLE) support on both your sender devices and receiver devices.

On the sender side, an additional PresentSense utility is used to run in the background and detects the BLE signals of receivers to decide whether there are receivers nearby. **Currently, PresentSense can work on Mac, Android and iOS devices.**

To use PresentSense, you need to enable the PresentSense feature in MirrorOp Sender. If a receiver is found, the utility will read its connection information and sort it with other receivers to determine which is the nearest.



Once a receiver is detected, a message will pop up. If that receiver is the one you want to connect to, click on “CONNECT” for immediate connection. If not, click on “CANCEL” and manually search for the nearest receiver instead.

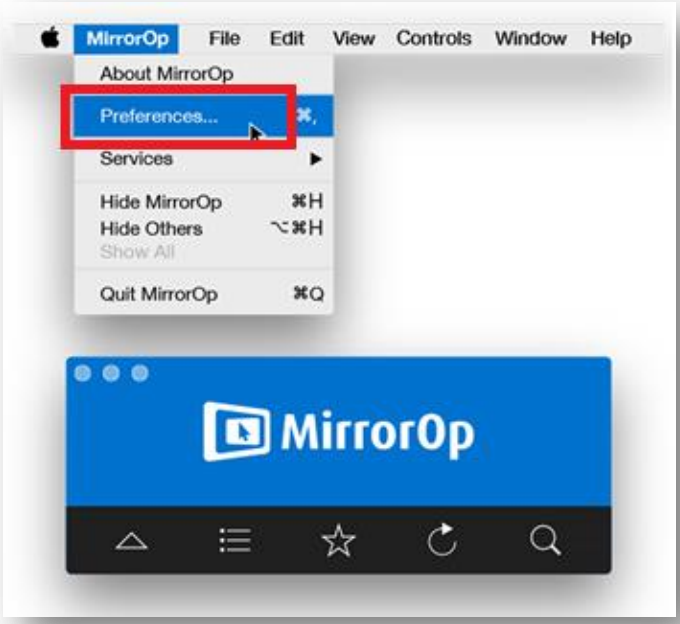

MirrorOp
WiCS-2100-7D0
WiCS-2100-Jessie
wePresent-Room2...
Detected
CANCEL
CONNECT
WiCS-2100-7D0
Input IP or hostname

Setting Preferences

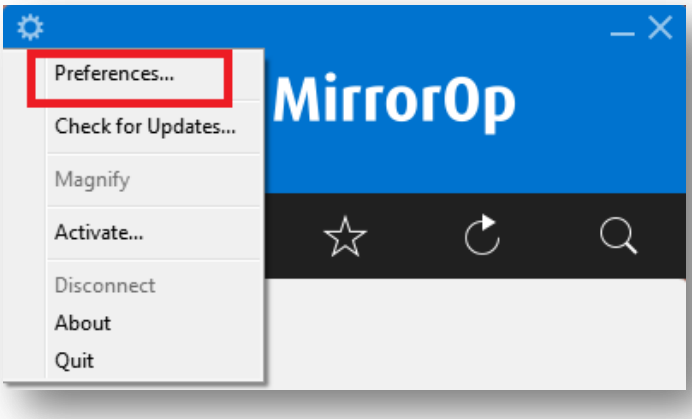
Everyone has some preferences when using MirrorOp Sender. For example, what name to be shown on the receiver list, start from discovery or favorites, even customized hot keys. You can make MirrorOp Sender friendlier with settings you prefer, and the Preferences are the place to do so.

To set your preferences, open the Preferences dialog from the MirrorOp menu (Mac) or the Settings button (Windows).

(For Mac)



(For Windows)



The Preferences are categorized into several tabs:

- General
- Favorites
- Advanced
- Hotkeys
- About

Click on the tab you want to modify to change setting in that tab.

General Preferences

This is where you set the following general preferences:

PresentSense (Mac only) - Enable PresentSense as system starts:
When this option is enabled, the PresentSense utility will be launched as system starts and keep running in the background. You can also manually launch the PresentSense utility when necessary if you don't want to run the utility every time your computer starts.

Name:
The name which is shown on the Conference Control list is used to identify this sender. You can enter up to 26 characters for the name.

Functions:

- Allow controlling from tablets/smartphones **(the SidePad function)** – The default passcode is 1111:

When this option is enabled, you can use a tablet/smartphone (with the MirrorOp Receiver app installed) to connect to the wePresent unit. Then, you can see the screen of the projecting computer and remotely control it from your

tablet/smartphone. This is useful if you want to move around when giving a presentation. Please refer to the manual of your receiver device (wePresent unit) to understand how to enable this function.

Note:
(a) You can download the MirrorOp Receiver app from app stores.
(b) Your computer, wePresent unit and tablet/smartphone need to be on the same subnet.

- Allow screen projection to be redirected to browsers **(the WebSlides function)**:

When this option is checked, and when your screen is displayed on the receiver, other users can also use any web browser to see your screen and save it as image files. This function must also be supported by the receiver device. Please refer to the manual of your receiver device (wePresent unit) to understand how to enable this function.

- Allow control inputs from receivers **(the Remote Control function)**:

When this option is turned on, you can control the projecting computer with input devices (mouse, keyboard, touch panel) that are attached to the receiver. If you don't want to let others (e.g. conference moderator, teacher, etc.) control your computer from the receiver side, turn this option off.

- Allow the virtual screen frame to appear during projection:

When this option is checked, and when you project your computer screen to the receiver, an orange frame appears on your computer screen (and on the receiver display accordingly), reminding you that your computer screen is currently being projected.

Audio (Windows only):

- Mute PC audio when projecting:

When this option is enabled, the PC will be muted when projecting to avoid echo in the same room. If you want to keep PC audio output, uncheck this option.

Others (Windows only):

- Always on top:

When this option is enabled, the MirrorOp Sender window will always be placed on top of all other windows so that you can always easily access it even when

using other applications. Always on top may not work if other application is running as full-screen mode, for example some video players.

- Automatically check for updates:

When this option is turned on, MirrorOp Sender will check whether there is an update available every time it is launched.

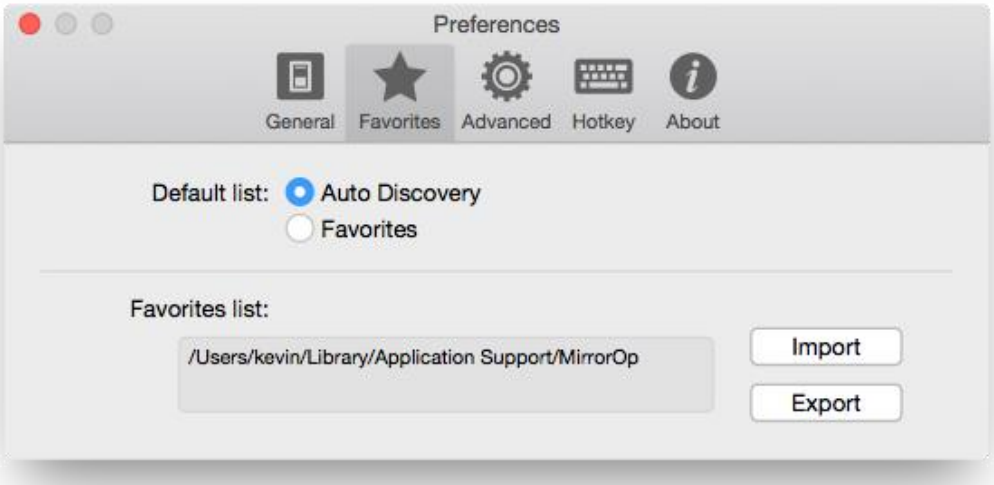
- Check for updates

Click on this button to manually check whether there is an update available.

Favorites Preferences

Favorites list is useful if you mostly use the same receivers. You can tell MirrorOp Sender to directly start from your favorites list without going through the discovery process.

If you like to start MirrorOp Sender from your Favorites list, choose "Favorites". If you like to start by searching for receivers, choose "Auto Discovery".



You can also import or export the Favorites list in order to exchange the list with other computers or colleagues.

To export your list, click the "Export" button, and then select the folder to save it.

To import the data of the Favorites list from a file, click "Import" and then locate the file. The contents of the external file will be imported to the current Favorites list. The original contents of the current Favorites list will be over-written.

Advanced Settings

In most cases, you can skip this section. MirrorOp Sender uses appropriate default settings based on the capabilities of your computer, network and receiver. However, if you want to adjust some settings to get better results yourself, you can do it here. You may want to make sure you know what you're doing before changing the settings.

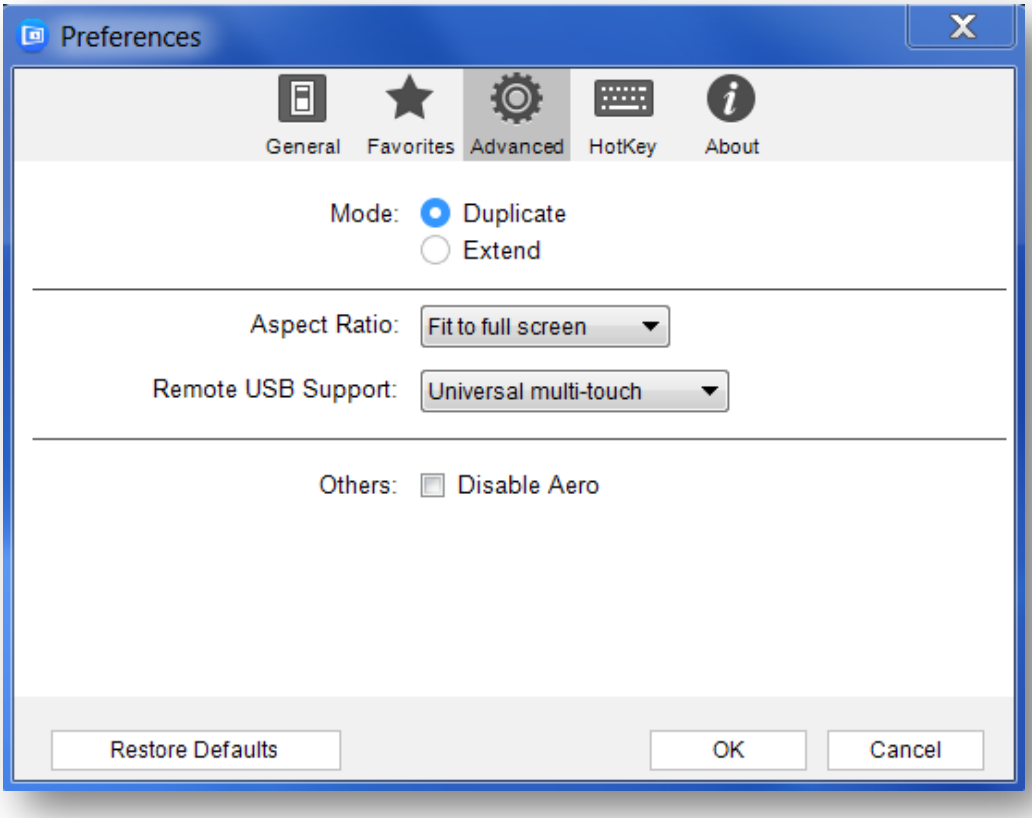
Mode:
Choose "Duplicate" if you want to see the same image as on your main desktop. Choose "Extend" if you want to use the virtual extended desktop. An additional driver may be necessary to enable the extended mode. Please download and install the driver when prompted. **(Please note that the Extended Screen feature is not supported by macOS 10.13.4 and above.)**

Remote USB Support (Windows only):

- Universal multi-touch: Receive multi-touch inputs from touch devices and translate them into commands to fit the sender OS. Please note that some special commands that require specific driver supports may not be supported.
- Simulate as local USB: Simulate the remote USB device as a local device in Windows. Windows will recognize the remote device and use the original driver of that device.

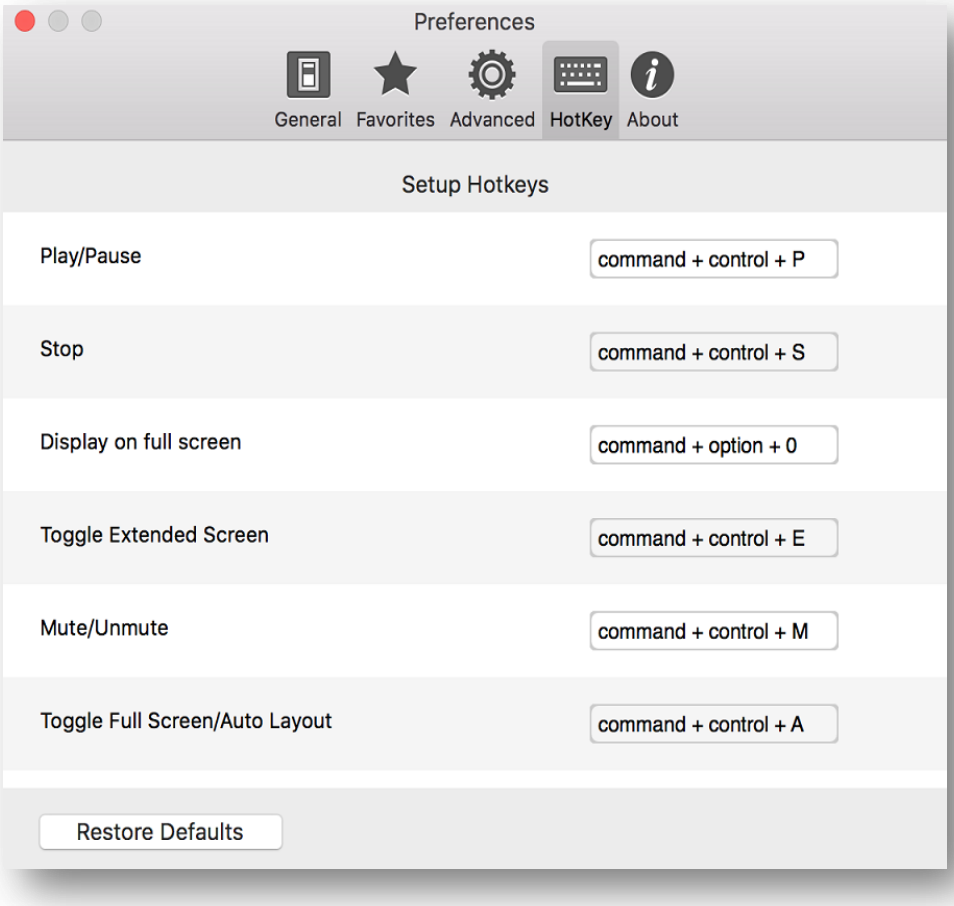
Others (Windows only):

- Disable Aero: Disable the Windows Aero Glass interface.


Preferences
General
Favorites
Advanced
HotKey
About
Mode:
Duplicate
Extend
Aspect Ratio:
Fit to full screen
Remote USB Support:
Universal multi-touch
Others:
Disable Aero
Restore Defaults
OK
Cancel

Setting Hotkeys

Hotkeys are handy if you use certain functions frequently. MirrorOp Sender supports most system hotkeys, for example copy-paste to input or edit text. There are some MirrorOp-Sender-specific controls you can also trigger with hotkeys. The default hotkey definitions are listed on this tab. If you prefer to use your own definition, you can also change the definition here.



To change a hotkey, click in the edit box to the right of the control you want to change. Then, press the hotkey combination you want to use. The new definition should appear in the edit box. Please note that the definitions cannot conflict with other controls or system definitions, otherwise they may not work properly. If you enter a combination which is currently used by another control, the definition will be assigned to the current control you're editing, the previous one will be cleared.

When you're done editing, simply click OK (Windows) or close the dialog. If you would like to restore to default definitions, click the "Restore Defaults" button.

About MirrorOp

On the About tab, you can check the version number, visit the MirrorOp website, access the Help file (MirrorOp Sender User's Manual), or read the EULA (End User License Agreement).

Frequently Asked Questions

Q: The message "Device is busy" always pops up on my laptop when I project my laptop screen to the wePresent unit via MirrorOp Sender. How can I fix it?

A: The latest version of MirrorOp Sender is not compatible with the hardware of previous wePresent models, including WGA-120, WGA-310 and WiPG-1000 (old model). To fix this issue, you can download an older version of MirrorOp Sender (version 1.0.7.1. and backwards) from the Home Page of your wePresent unit or directly from http://MirrorOp.com/downloads/MirrorOp1_v1071.zip.

Q: I cannot download the VDD driver when logging in as system user. How can I solve it?

A: You can try to log in as administrator, or directly download the VDD driver from the following link: http://MirrorOp.com/downloads/VDD2_ver2009.zip.

Open Source Software Used in MirrorOp Sender

MirrorOp Sender contains software components licensed under various Open Source licenses. Please refer to the below list for further information:

Name	Version	From	Licensing Terms	Modified / Used
Boost	1_57_0	http://www.boost.org/	Boost Software License 1.0 http://www.boost.org/users/license.html	Used
Crypto++	5.6.3	https://www.cryptopp.com/	Boost Software License 1.0 https://www.cryptopp.com/License.txt	Used
OpenSSL	1.0.2	https://www.openssl.org/	https://www.openssl.org/source/license.html	Used
JsonCpp	1.6.5	https://github.com/open-source-parsers/jsoncpp	MIT License https://github.com/open-source-parsers/jsoncpp/blob/master/LICENSE	Used
base64	NA	https://github.com/ReneNyffenegger/cpp-base64	zlib	Used
SoX	0.1.1	https://sourceforge.net/projects/soxr/	LGPL v2	Used
MediaInfo		https://mediaarea.net/zh-TW/MediaInfo	MIT License	Used
libiconv		http://www.gnu.org/software/libiconv	LGPL	Used
LibIntl		http://gnuwin32.sourceforge.net/packages/libintl.htm	LGPL	Used
x264		http://www.videolan.org/developers/x264.html	GPL v2	Used
MinHook	1.1.0.0	https://github.com/TsudaKageyu/minhook	MinHook license (BSD License) https://github.com/TsudaKageyu/minhook/blob/master/LICENSE.txt	Used
libjpeg	8a	http://ijg.org/	BSD-style license	Used
Syphon-	1.3	https://andreacremaschi.gith	MIT License	Used

virtual-screen		ub.io/Syphon-virtual-screen/	https://github.com/andreacremaschi/Syphon-virtual-screen/blob/develop/SyphonVirtualScreen/LICENSES.txt	
SoundFlower		https://github.com/mattingalls/Soundflower	MIT	Used