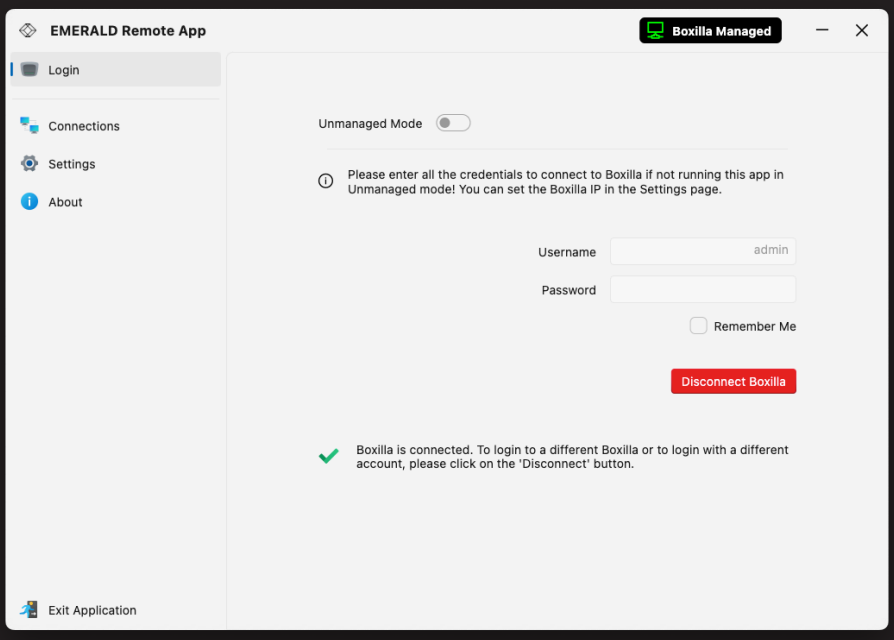
USER MANUAL

EMDRA SERIES

EMERALD® REMOTE APP (macOS)



BLACK BOX®

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CHAPTER 1: SPECIFICATIONS

1.1 HARDWARE/SOFTWARE REQUIREMENTS

Hardware requirements for macOS® system:

- **Supported Architecture:** ARM64 only (Any Apple M series silicon)
- **Operating System: 64-bit macOS running 15.x (Sequoia) version minimum (iOS not supported)**
- **Memory:** 8 GB
- **Free disk space:** ~ 80 MB

Targets Supported: The following target OS and monitor count(s) are supported when using the Remote App:

- Windows® OS: maximum 2 monitors/screens
- macOS®: maximum 1 monitor/screen
- Linux: dependent on distribution

NOTE: The above supported targets include Virtual Machines that use the stated OS.

NOTE: The transmitter HID property must have the value “Absolute” for the mouse to function properly, regardless of the head count: single-head (one monitor) or dual-head (multi-monitor).

CHAPTER 2: OVERVIEW

2.1 INTRODUCTION

The Emerald® system provides you a seamless desktop experience anywhere on a TCP/IP network, while allowing the actual hardware to be securely housed in a corporate data center or in the cloud.

The remote desktops may be hosted on a physical Mac or may be a virtual desktop hosted on a private server or in the cloud. The Emerald system provides you with receivers that communicate with target computer nodes (physical Mac workstations or virtual desktops) over a standard TCP/IP network. The receivers can be either a hardware box or the macOS® version of the Emerald Remote App software.

The macOS version of the Emerald Remote App is software from Black Box that allows you to access your Emerald connections, both physical and virtual, from any Mac device. This increases mobility and device access and monitoring in full HD video on the Emerald system. Multiple connections can be launched simultaneously to facilitate multiple device management.

Several licenses are available:

- EMDRMDEMO-LIC: Emerald Remote Access, 30-day Trial (4 Connections)
- EMDRM1-LIC: Emerald Remote Access, 1 Connection
- EMDRM5-LIC: Emerald Remote Access, 5 Connections
- EMDRM10-LIC: Emerald Remote Access, 10 Connections
- EMDRM20-LIC: Emerald Remote Access, 20 Connections

Physical Mac desktops/laptops/workstations/servers have an Emerald ZeroU, EmeraldSE, EmeraldPE, or an Emerald4K transmitter unit physically connected to provide communication over the TCP/IP network. The performance of Emerald allows them to be deployed on standard corporate networks and even across Wide-Area-Networks (WANs).

Desktop or remote users can access remote keyboard and mouse signals from the receiver box or the macOS version of Remote App software to the remote Mac or virtual desktop via the Emerald system.

2.2 REMOTE APP FEATURES (macOS VERSION)

- High-Quality User Experience: Supports HD video up to 1920 x 1200 with access to both physical machines and virtual machines. 4K Connections are scaled down.
- No receiver is required at the device running the macOS version of Remote App.
  NOTE: To use the macOS version of Remote App in practice, a Boxilla® Manager is required to manage the entire system and host the required license keys for the macOS version of Remote App.
- Multiple Connections: Open connections to multiple devices simultaneously. This allows you to interact or monitor many systems from your own device.
- Security: All access is authenticated by Boxilla in real time, ensuring that the Emerald administrator has full control and can define only the users required to have remote access.
- WAN Support: Once users authenticate with Boxilla, they can connect from anywhere with access to all connected resources.
- Supports audio and copy and paste from client to target.

NOTE: Only text and/or image clipboard data can be copied from and into VM connections. File copying is not supported either way.

CHAPTER 3: CONFIGURATION

3.1 CONFIGURATION OF EMERALD REMOTE APP (macOS VERSION)

The macOS® version of Remote App is software that acts as a receiver in the Emerald® system. The software loads on your Mac to connect to a TCP/IP network, and it decrypts and decompresses the streams to provide video, keyboard, and mouse connections to a user.

Remote App can be run in managed mode, where a valid Boxilla® user can log in and make connections to targets that are allocated to the user. In such a case, a connection to a Boxilla is required.

Boxilla restricts the version of Remote App that can be used. The Boxilla also provides a way to license the remote access to user accounts that are required to be used with the macOS version of Remote App to gain remote access to the connections. The Boxilla also collects the logging of the macOS version of Remote App's activity for audit purposes.

The target connections are defined by their target name, log-in username/password, and TCP port number to be used. The connections that show up in the macOS version of Remote App are configured within the Boxilla manager under "Users." The user(s) need to be assigned a "Remote Access" role under the "Edit" window for the user, and then connections need to be assigned for that user. Those connections would then be visible within the Remote App target selection screen. Bonded Connections are not supported in the macOS version of Remote App and will not be displayed in the list of available connections.

A macOS Remote App user profile is protected by a password to permit different users to access the same unit securely.

3.2 CONFIGURATION OF TRANSMITTER

The Emerald SE/PE/4K Transmitter or ZeroU transmitter converts the video and USB connections of a Mac or workstation to a format that can be connected and controlled over a TCP/IP network. The macOS version of Remote App also supports 3.5mm analog audio signals from the targets if audio is needed. Audio is supported through composite HID (TX composite USB connected to target).

The transmitter controls the connection to a remote Emerald Remote App Mac workstation and manages the flow of information to it. It converts and compresses video and peripheral information for transmission over standard TCP/IP networks.

The transmitter is configured from the Boxilla Manager. The network settings, unit name, and video quality are among the parameters that can be configured on the the transmitter. The transmitter HID setting must use an Absolute profile (Absolute, Mac Absolute, or Basic Absolute). Otherwise the mouse performance will be impacted, or the mouse may not work at all.

The macOS version of Remote App can interface with video and USB keyboard and mouse signals, in addition to analog audio, but it will not support USB-redirected devices, such as flash drives, stream decks, and Wacom tablets.

3.3 CONFIGURATION OF BOXILLA MANAGER

The license file for the macOS version of Remote App must be installed on Boxilla and assigned to the user(s). The Boxilla must also have the minimum macOS supported version of Remote App configured under System->Settings->Remote App.

For more information on Boxilla, refer to the Boxilla user manual.

CHAPTER 4: APPLICATION EXAMPLES

The Emerald® system is built to be flexible so that it can be deployed in many different types of applications, such as basic extension, switching applications (sometimes called matrix), cloud-based desktops, control rooms, digital signage, and kiosk applications and other applications in banking, financial services, broadcast, network operations, industrial, government and enterprise computing sectors. Emerald provides the state-of-the art performance by:

- using digital sources for video and peripheral control, hence removing analog noise issues or other potential environmental issues
- using advanced optimized compression to enable visually lossless video over standard low-bandwidth networks rather than a proprietary connection or dedicated gigabit networks of many systems

4.1 VIDEO AND PERIPHERAL EXTENSION

Many applications require video and peripheral extension, such as PC back-racking, board-room fit-out, remote monitoring, and digital signage.

The transmitter and Remote App Mac can be attached to standard Ethernet IP networks to increase the distance between units – within a building, between buildings, or across a country. Only standard Ethernet/IP rules and the maximum latency the application can tolerate need to be considered, including verifying TCP Ports are open (Port 443, 3389, 9000, and 16384). If video extension only is being used, latency rarely is a consideration since the traffic is typically one-way. When USB-based HID peripheral devices are also required, a network latency of <50 ms is recommended to avoid user issues, such as "poor mouse response." For some applications, such as graphic design network latency, <20 ms may be required to ensure user satisfaction. Latency normally is only an issue when extending across a WAN, because latency inside modern buildings or on dedicated networks is much less than 1 ms.

In Figure 4-1, a typical deployment is shown in a basic extender application. In this deployment, only one transmitter and Emerald Remote App Mac are used to allow remote access to a single workstation. A Boxilla® is required to manage the connections and the macOS® version of Remote App's software and license.

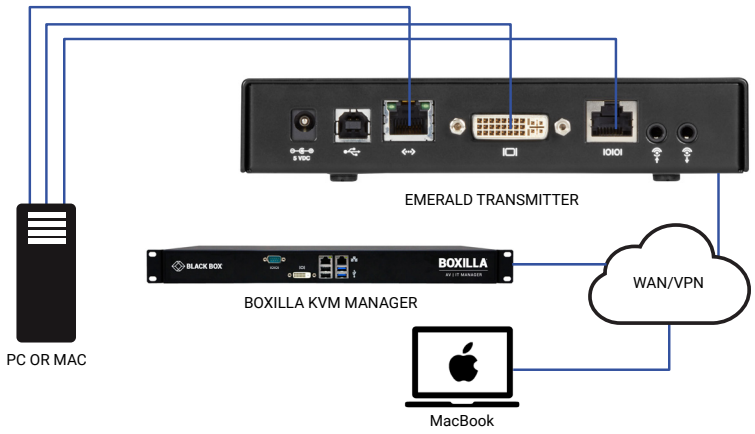

FIGURE 4-1. BASIC EXTENDER APPLICATION

NOTE: Remote App is available for download in two versions: Windows® and macOS. Figure 4-1 shows a typical deployment.

CHAPTER 4: APPLICATION EXAMPLES

4.2 VIDEO AND USB SWITCHING

Numerous applications require being able to switch between different target PCs or virtual desktops.

Connections can be made to a target using the Emerald® On-Screen-Display (OSD). In Figure 4-2, a larger scale system is shown. This is referred to as a switching or matrix type of deployment. In this deployment, there are several receivers or Remote App Mac workstations, transmitters, a manager, and virtual desktops.

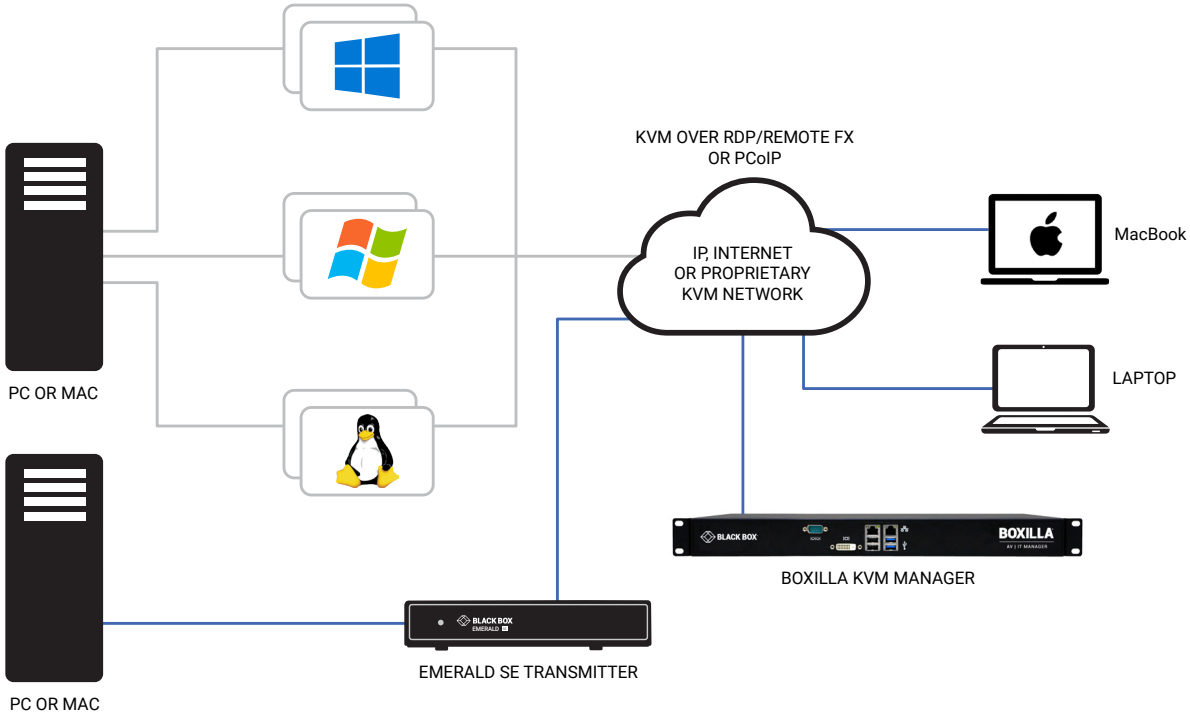

FIGURE 4-2. SWITCHING OR MATRIX APPLICATION

NOTE: Remote App is available for download in two versions: Windows® and macOS®. Figure 4-2 shows a typical, larger-scale deployment.

CHAPTER 5: OSD FOR REMOTE APP

5.1 EMERALD REMOTE APP (macOS) SETUP WIZARD

To install the macOS® version of the Emerald® Remote App on your computer:

1. Visit our product webpages and search for the Remote App license part codes.
2. On those license pages, go under the “Support” tab and download the latest macOS version of Remote App. Note that you may need to click on the “Allow” button to proceed with the download.
3. Once the software is downloaded, either locate the file in the Finder application, or click on the magnifying glass in the download list to open Finder.
4. Double click on the .dmg file. The installer file is shown in the Figure 5-1 below:

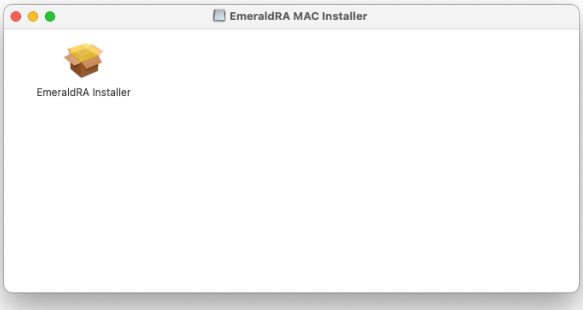

FIGURE 5-1. INSTALLER FILE

After you double-click on the installer icon inside of the .dmg viewer shown in Figure 5-1, the installer setup screen appears, as shown in Figure 5-2 below.

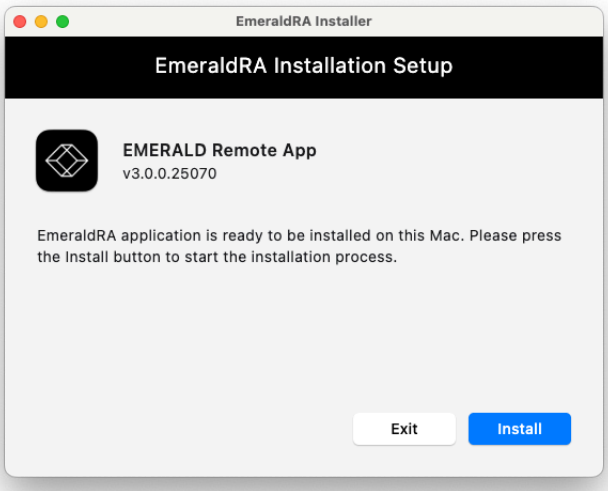

FIGURE 5-2. INSTALLATION SETUP SCREEN

CHAPTER 5: OSD FOR REMOTE APP

5. After you click on the blue “Install” button, enter the admin user password, as shown in Figure 5-3 below, since this is a requirement to allow necessary system changes during Remote App installation.

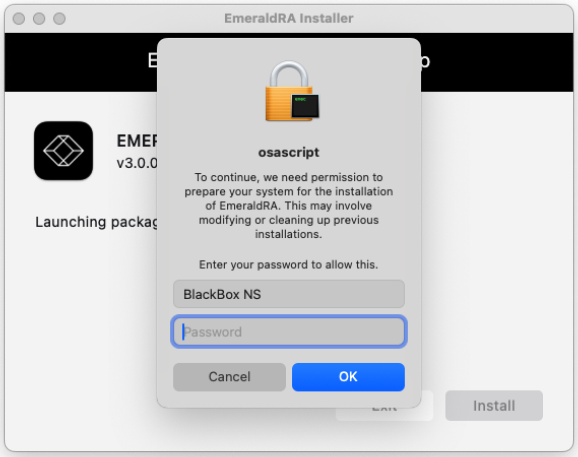

FIGURE 5-3. PASSWORD REQUIRED SCREEN

6. The installer will guide you through the installation. Follow the steps in the installer starting with the welcome screen, which is shown in Figure 5-4 below:

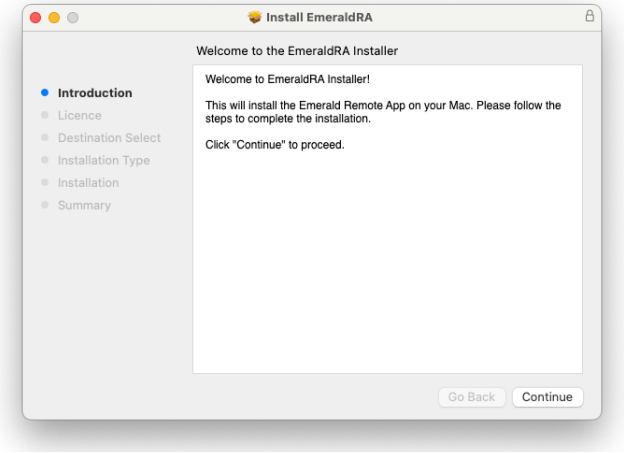

FIGURE 5-4. WELCOME SCREEN

7. During the install, you will need to accept the End-User License Agreement (EULA), as shown in Figure 5-5 below:

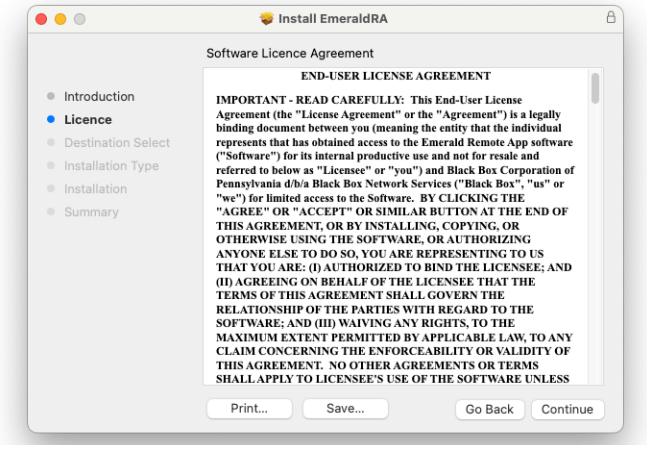

FIGURE 5-5. END-USER LICENSE AGREEMENT SCREEN

From this screen you can click on the “Print” button to print the EULA, if desired. You can also click on the “Save” button to save the agreement. After you review the agreement, click on the “Continue” button to continue with the installation, or click on the “Go Back” button to cancel the installation if you disagree with the EULA.

8. After you accept the licensing agreement, click on the “Install” button if you don’t need to change the install location. Then skip step 9. If you need to change the installation location, click on the “Change Install Location” button on the next installation screen, as shown in Figure 5-6 below:

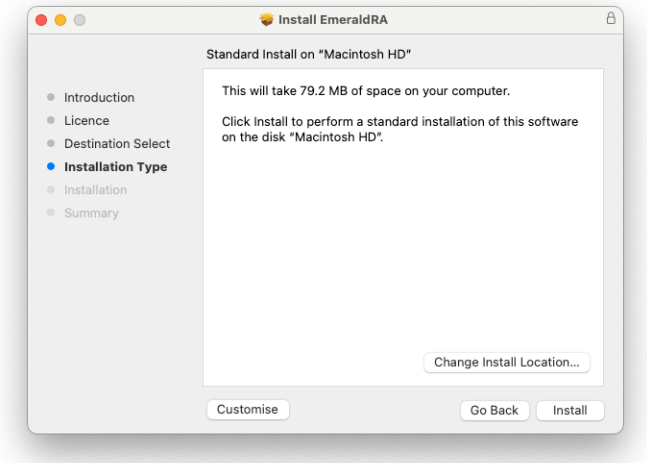

FIGURE 5-6. INSTALL LOCATION SELECTION SCREEN

9. Click on the appropriate destination and then click on the “Continue” button. An example of the “Select a Destination” screen appears in Figure 5-7 below:

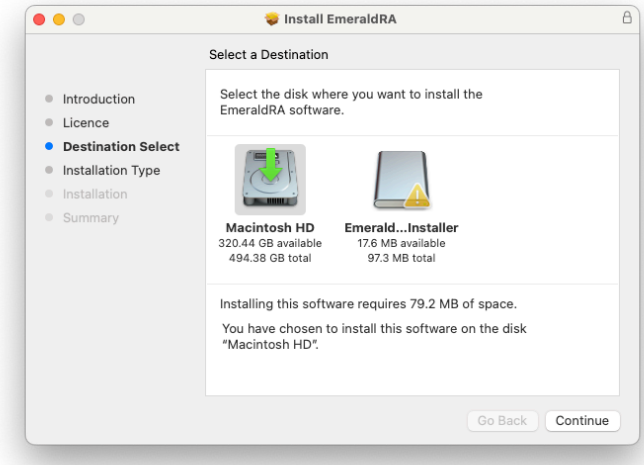

FIGURE 5-7. SELECT A DESTINATION SCREEN

The confirmation screen appears next, as shown in Figure 5-8 below:

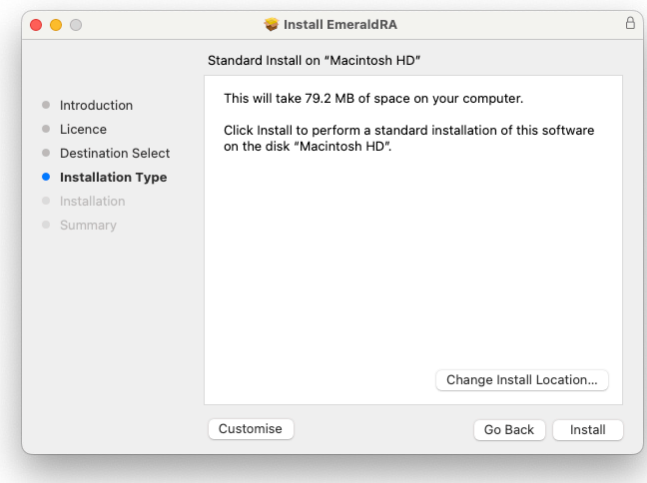

FIGURE 5-8. CONFIRM INSTALLATION SCREEN

10. Click on the “Install” button to confirm.

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The “Install EmeraldRA” screen appears next, and you will be prompted to enter your password, as shown in Figure 5-9 below:

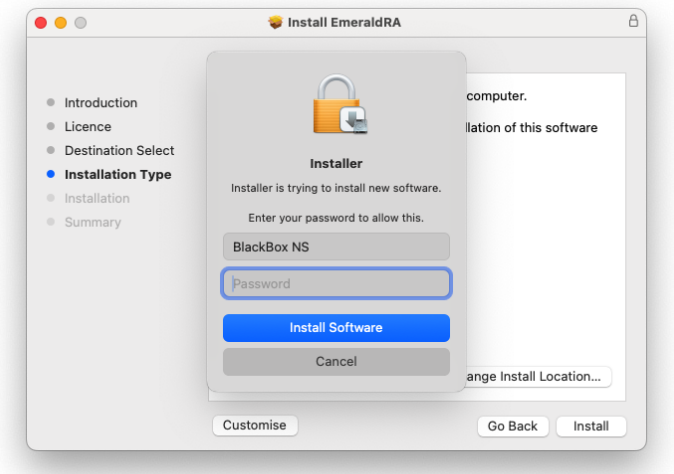

FIGURE 5-9. PASSWORD ENTRY SCREEN

11. After you enter your password and click on the “Install Software” button to continue with the installation, the installation begins, as shown in Figure 5-10 below:

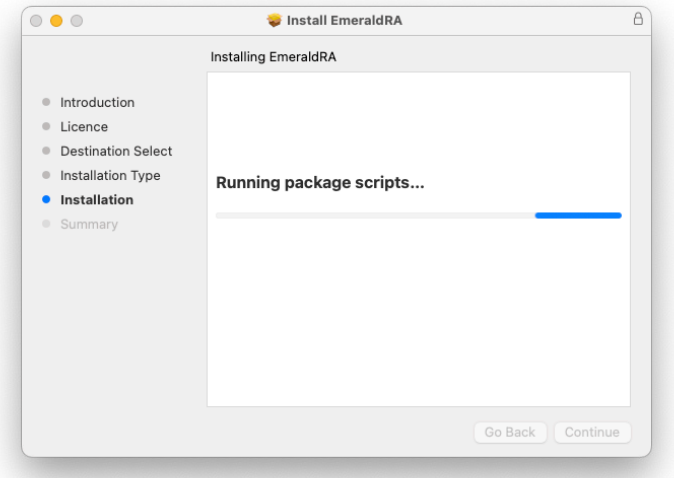

FIGURE 5-10. INSTALLATION IN PROGRESS SCREEN

When the installation completes, you will be notified of the outcome and prompted to click on the “Close” button to exit the installation, as shown in Figure 5-11 below:

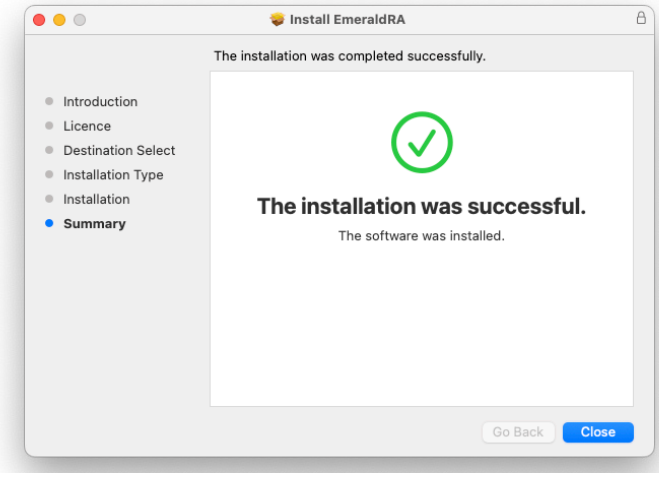

FIGURE 5-11. INSTALLATION COMPLETE SCREEN

12. Click on the “Close” button to exit the installation.

After the software installs, you can double-click on the application in the application folder or open the application via Spotlight. Once open, you are ready to configure the macOS® version of Remote App.

CHAPTER 5: OSD FOR REMOTE APP

5.2 CONFIGURING AND USING EMERALD REMOTE APP (macOS VERSION)

When you launch the macOS® version of the Emerald® Remote App, the screen that appears depends upon if the Remote App was just installed on the machine and if Boxilla® is connected.

If the Remote App was just installed on the client machine, then, upon Remote App launch, you will be taken to the “Settings” screen. Only the “Boxilla IP” field and “unmanaged mode activation” option will be visible, as shown in Figure 5-12 below:

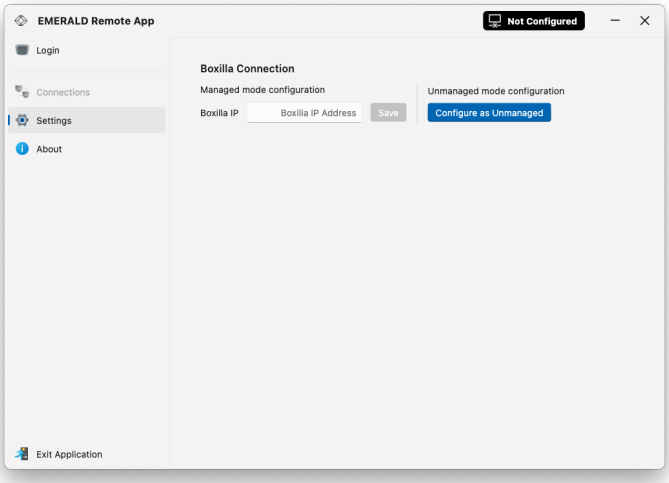

FIGURE 5-12. SETTINGS SCREEN

After you enter the IP address and save it, you will be taken to the login page.

When Boxilla is not connected, a screen with a “Not Configured” message near the window control buttons displays, as shown in Figure 5-13 below:

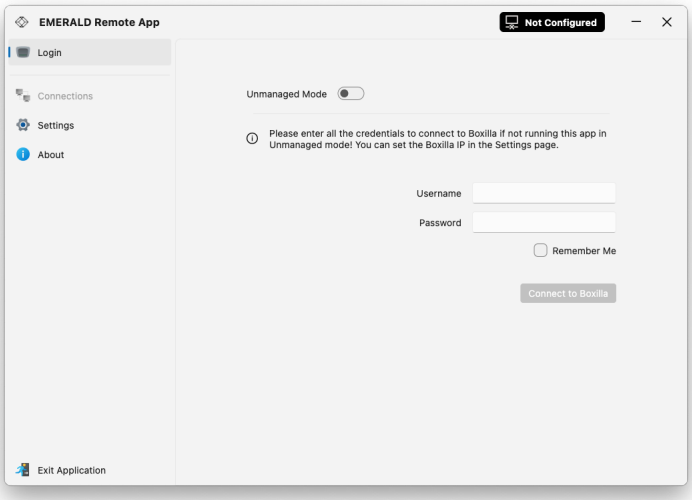

FIGURE 5-13. REMOTE APP SCREEN WHEN NOT CONNECTED TO BOXILLA SCREEN

NOTE: The above screen assumes that the IP address was set in the “Settings” page. Otherwise, “IP address is not set” is displayed in red-color text above the username field.

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To have Boxilla manage the connection, enter your username and password in the fields shown above in Figure 5-13. Then click on the “Connect to Boxilla” button. Otherwise, the connection will be unmanaged.

After clicking on the “Connect to Boxilla” button, the system will display the “Boxilla Connection” screen, where you can enter the IP address of the Boxilla that you want to use to manage your macOS Remote App connection, as shown previously in Figure 5-12.

If not completed after installing Remote App, or if you need to change the information previously entered, enter the IP address and then click on the “Save” button. The system will display the “Login” page, where you will enter your Boxilla® credentials and then click on the “Connect to Boxilla” button, as shown in Figure 5-14 below:

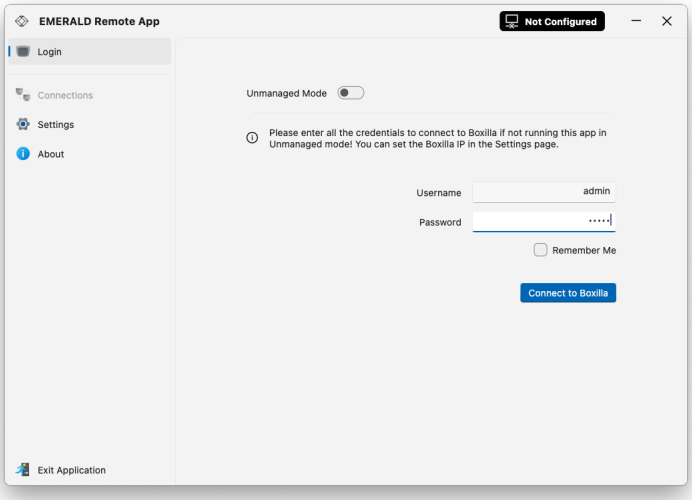

FIGURE 5-14. BOXILLA LOGIN SCREEN WITH CREDENTIALS ENTERED

NOTE: Any user who has “Remote Access” enabled within Boxilla can use the app if the user has this flag set before logging in.

After you click on the “Connect to Boxilla” button, the app displays the connection progress message, as shown in Figure 5-15 below:

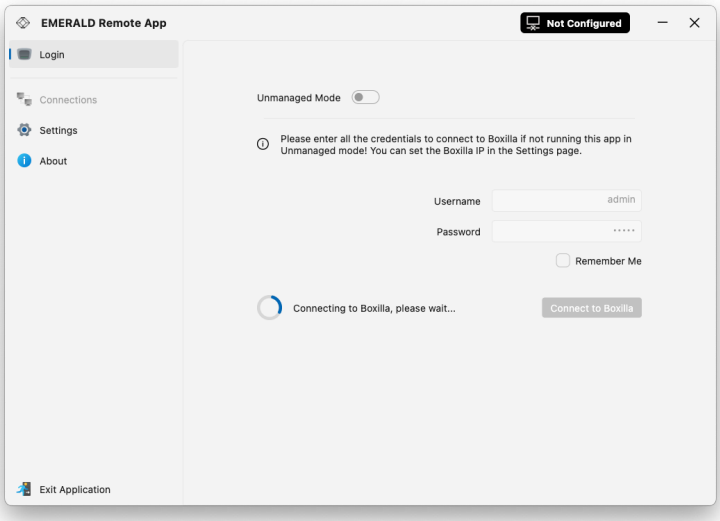

FIGURE 5-15. CONNECTION IN PROGRESS SCREEN

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If the connection is unsuccessful, the app display a pop-up message with the reason for the failure and a suggestion for correcting the issue. An example is shown in Figure 5-16 below:

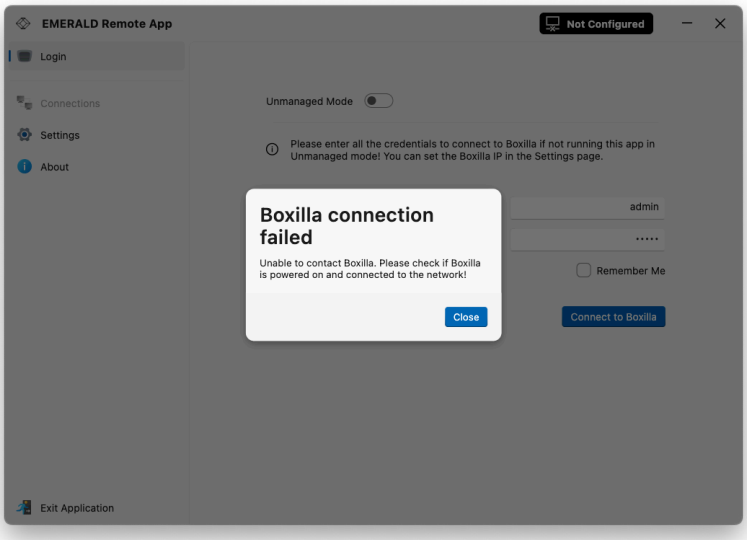

FIGURE 5-16. CONNECTION FAILURE MESSAGE

NOTES:

- The “Settings” page is always accessible, regardless of connection status.
- The “Connections” page is not accessible if the app is not configured in Managed/Unmanaged mode.
- When connected to Boxilla, the status label says “Boxilla Managed;” when configured as unmanaged, the label says “Unmanaged Mode.”

In the example below in Figure 5-17, the Boxilla connection status label on the title bar (near the window control buttons) is updated with “Boxilla Managed” after a successful connection to the Boxilla Manager.

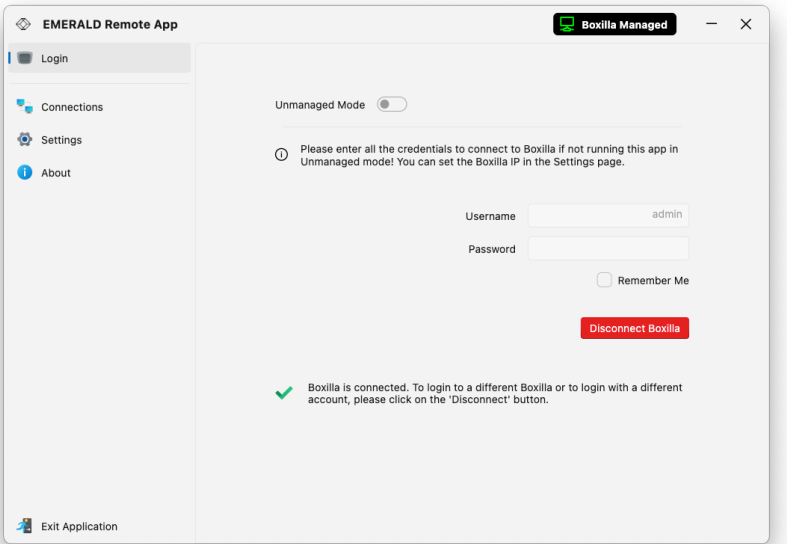

FIGURE 5-17. BOXILLA CONNECTED SCREEN

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In the example below in Figure 5-18, the Boxilla® connection status label on the title bar (near the window control buttons) shows “Unmanaged Mode” since the Boxilla Manager is not managing the connection in this example.

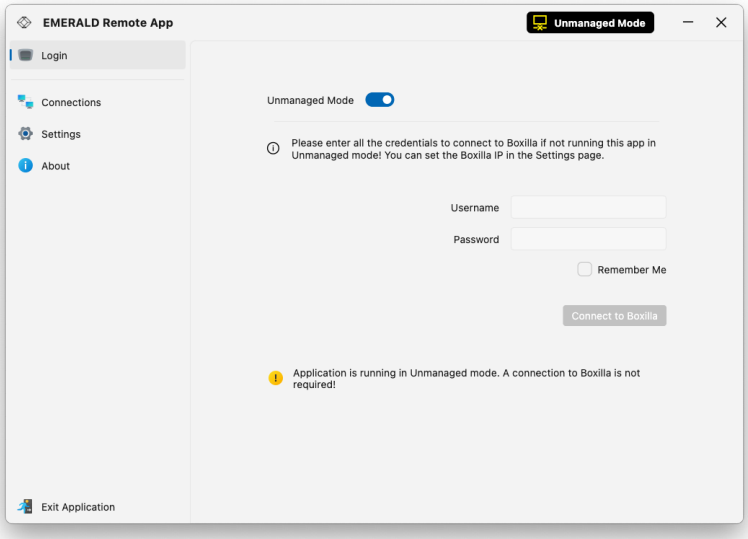

FIGURE 5-18. UNMANAGED MODE

After logging in, you will see a screen of connections that are available to you, as shown in Figure 5-19 below:

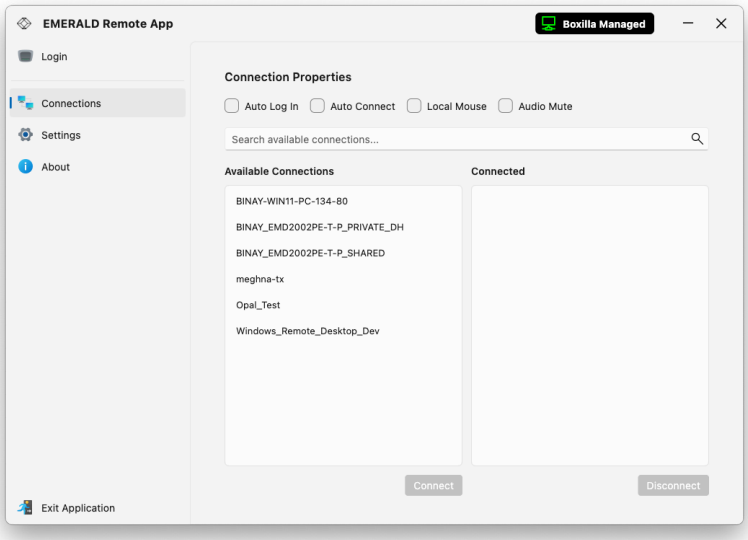

FIGURE 5-19. CONNECTIONS SCREEN

If you do not see any connections, check the Boxilla Users access (i.e. Manage Connections). Click on any connection and then click on the “Connect” button, or double click it to establish a connection to the selected connection. The connection request will be executed, and the system may show certain pop-up messages that confirm the connection status and will open the connection for viewing, if successful.

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NOTE: If you cannot see any target connections, verify that the Boxilla->Connections “Connection Mode” are set to “Optimized” and not “Lossless.” If you set your connections for “Lossless,” the Remote App will not display these connections. The Remote App also does not display bonded connections.

Table 5-1 describes settings available on this connection screen.

TABLE 5-1. CONNECTION SCREEN OPTIONS

OPTION	DESCRIPTION
Auto Log In	When enabled, allows the currently logged in user to automatically log in at next software restart.
Auto Connect	When enabled, the automatic connection will be initiated, which will allow the user who logs in to be directly connected to that system without any additional user intervention.
Local Mouse	When enabled, this will show the local client mouse pointer when it is over the Remote App software window.
Audio Mute	When enabled, this will mute all audio coming from the target computer.

A message is displayed between clicking on a target to connect to it and when the target is shown, as shown in Figure 5-20 below:

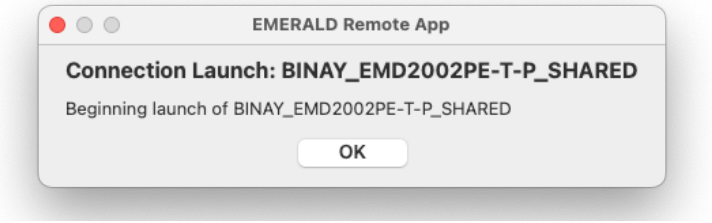

FIGURE 5-20. CONNECTION LAUNCH SCREEN

The pop-up message showing the user is connecting quickly disappears, and the connection window is displayed.

If there are any connection issues, they should appear as a pop-up notification. In such cases, verify that the transmitter or virtual machine is powered on, isn’t in any power save mode, and then try again.

If a connection is already established in private mode and the macOS® version of Remote App attempts to connect to it, you will receive a warning message that the connection is in private mode, as shown in Figure 5-21 below:

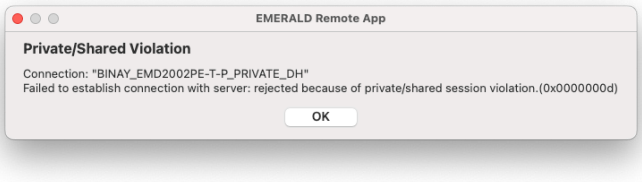

FIGURE 5-21. CONNECTION IN PRIVATE MODE WARNING

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If you connect to a target and the transmitter does not see a video sync, you will be notified via an on-screen message, as shown in Figure 5-22 below:

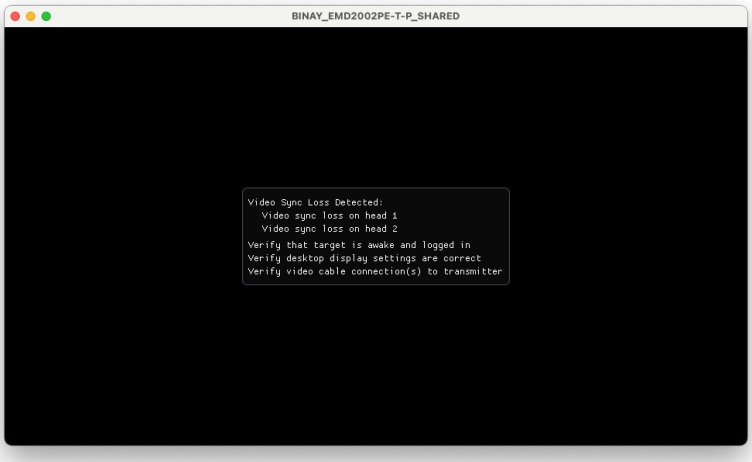

FIGURE 5-22. NO VIDEO SOURCE DETECTED MESSAGE

The “Settings” screen is shown in Figure 5-23 below:

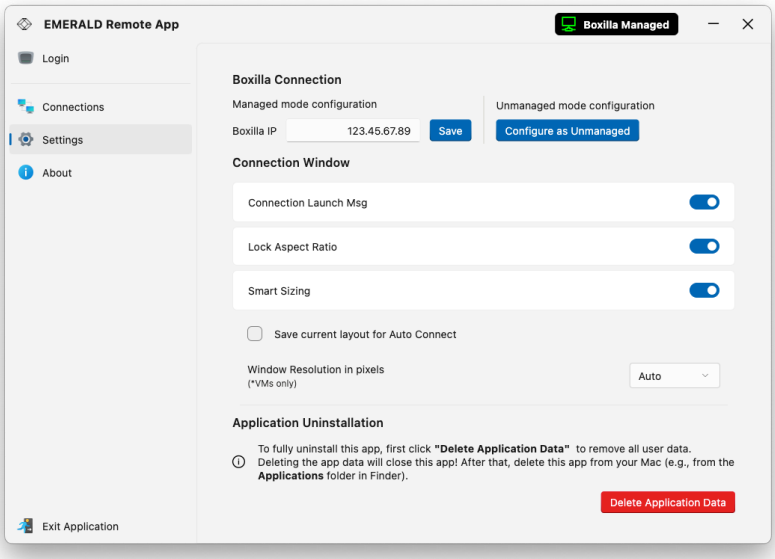

FIGURE 5-23. CONNECTIONS SETTINGS SCREEN

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Table 5-2 describes settings available in the macOS® version of Remote App.

TABLE 5-2. REMOTE APP SETTINGS

SETTING	DESCRIPTION
Connection Launch Msg	When enabled, the software will display the pop-up notifications when a connection is being established.
Lock Aspect Ratio	When enabled, the video resolution aspect ratio will be locked in, and the video will be scaled proportionally.
Smart Sizing	When enabled, this will ensure that the video resolution will not be scaled or distorted.
Save current layout for Auto Connect	When unchecked, checking this option will save the window size and position of all of the currently active connections. Unchecking this will clear this data. Saving the current layout is required to enable the “Auto Connect” feature.
(VMs Only) Windows Resolution (pixels)	This option will determine what resolution is used for virtual machine connections.

Available resolution options are shown in Figure 5-24 below:

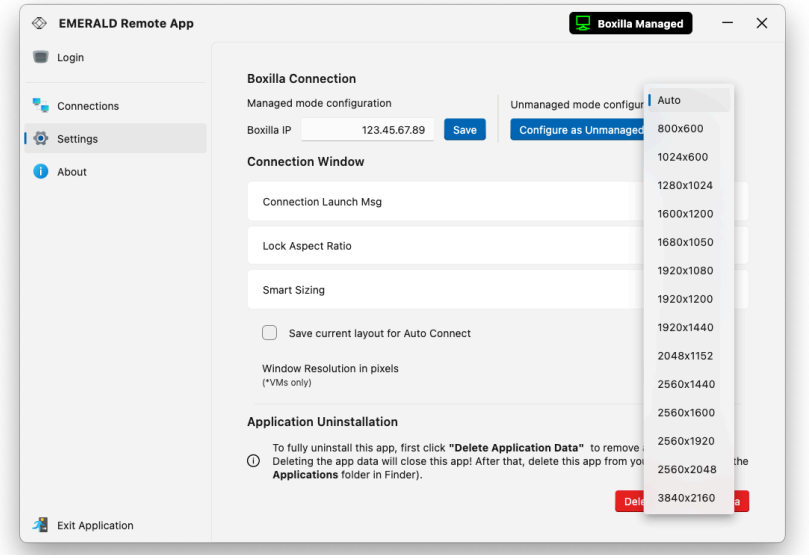

FIGURE 5-24. RESOLUTIONS DROP-DOWN MENU

For any Virtual Machines, you can select the RDP resolution that will be used with the macOS version of Remote App. The setting is applied immediately after you select the resolution from the drop-down list box.

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To abort/disconnect a connection, use the “Connection Properties” screen, as shown in Figure 5-25 below:

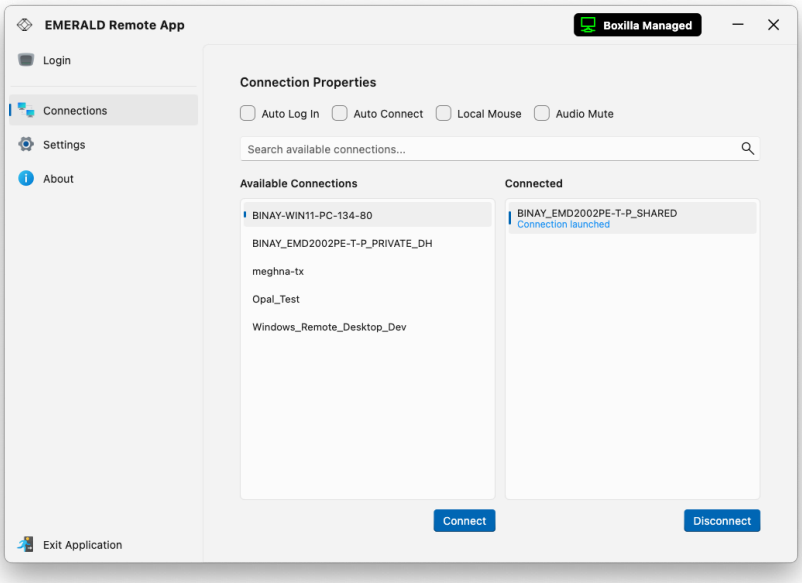

FIGURE 5-25. CONNECTIONS WINDOW WITH MULTIPLE ITEMS SELECTED

To establish a connection, double click on a connection or select the item and then click on the “Connect” button. To terminate a connection, select the connection from the “Connected” list and then click on the “Disconnect” button.

If the network connection is dropped (or severely impaired) on the macOS® client running Remote App, you will see several messages relating to the disconnection of Boxilla® and the increased latency of the connection (which means that either the network is suffering from heavy traffic or you were disconnected). The macOS Remote App will gracefully terminate any connection when it encounters an insufficient CPU resource or latency.

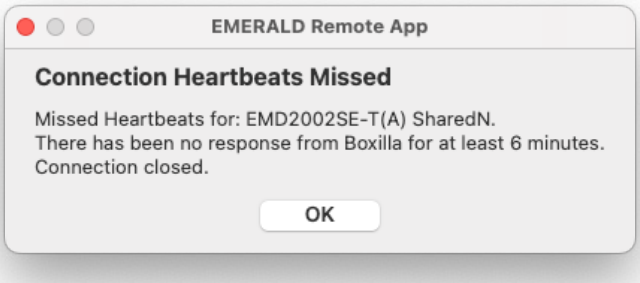

FIGURE 5-26. BOXILLA CONNECTION DISRUPTED MESSAGE

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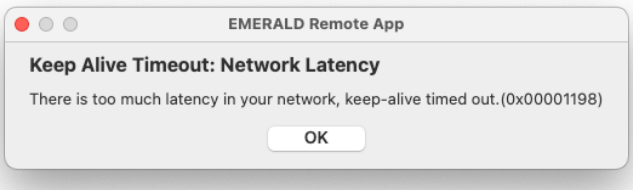

FIGURE 5-27. TOO MUCH LATENCY MESSAGE

Emerald Remote App for Mac 3.x supports the following additional connection types:

- View-only, where keyboard and mouse activity are deactivated in the connection.
- Dual Head (Extended desktop mode), where the Remote App creates two separate windows (initially placed side by side) and the user can move the mouse across the target's extended desktop.
- 4K connections to EMD4000T when connection is set for Optimized only. Video will be scaled down to fit the macOS® Remote App window.

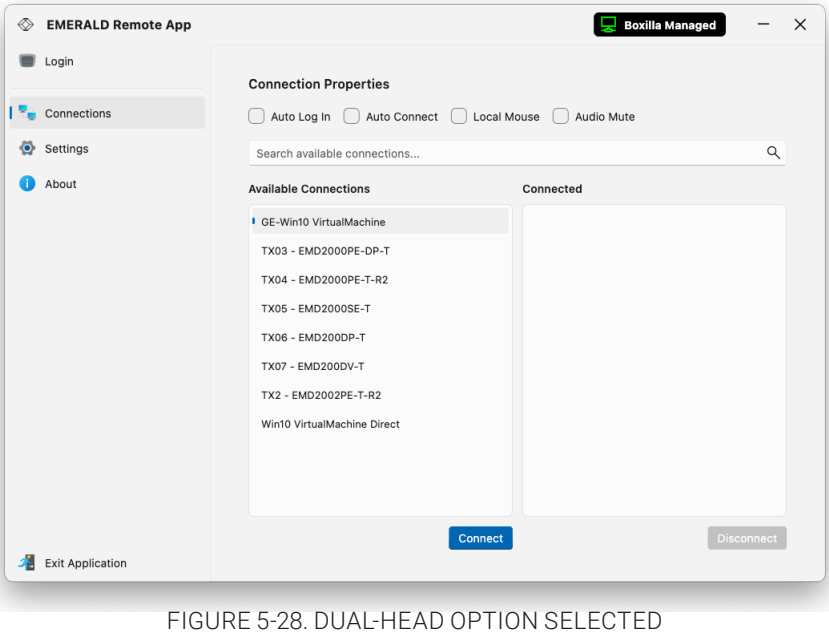

FIGURE 5-28. DUAL-HEAD OPTION SELECTED

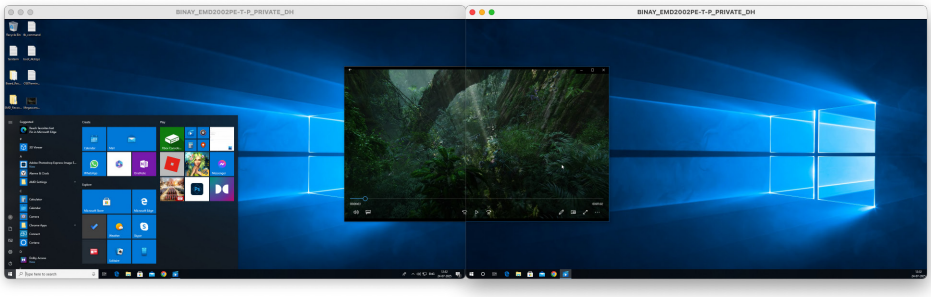

FIGURE 5-29. SPLIT SCREEN FOR DUAL-HEAD CONNECTION

NOTE: To call the Remote Task Manager, or to login with ALT+CTRL+DEL, use the Mac keys ALT+OPT+DEL or ALT+OPT+BACKSPACE. The option to send this hot key is also available through the Hotbar menu.

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5.3 CLIPBOARD COPYING AND PASTING TO A TRANSMITTER

You can copy small amounts (maximum 255 ASCII characters) of text from your client computer and paste into the target for easier data transfer options.

NOTE: The client computer is the Mac computer/laptop. The target is the VM/TX in the viewer window that you are controlling remotely.

The macOS version of Remote App installed on your Mac workstation or laptop can copy the clipboard data to the target device connected to the transmitter. It can NOT take the remote clipboard data from the target device connected to the transmitter and then write that data to the client Mac workstation or laptop clipboard.

To paste the clipboard data to the remote target, copy the text from the client. Then open your macOS® Remote App connection and place the cursor where you choose to paste the info and use the F8 function key to paste the clipboard data to the target. F8 can be disabled as paste if this needs to be used by the user in an application.

NOTE: The F8 Copy/paste disable button is accessible through the hotbar. To access the hotbar, move the mouse cursor in the top right corner on the connection window.

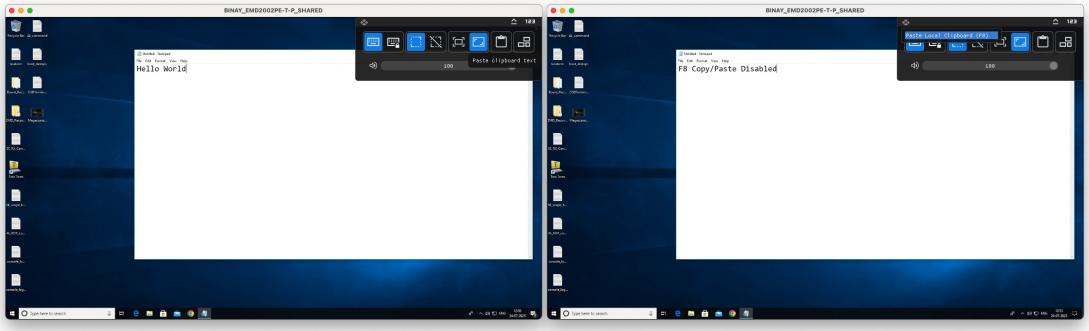

FIGURE 5-30. COPY/PASTE OPTION

NOTE: The clipboard copying and pasting function is on by default for transmitter connections and cannot be turned off.

The macOS Remote App can copy the clipboard data to the transmitter device when its input method supports these language packs: English (UK), English (USA), French, German, Spanish, or Italian.

5.4 CLIPBOARD COPYING AND PASTING TO AND FROM A VM

The macOS version of Remote App can copy the clipboard data on the client Mac workstation or laptop to a Microsoft Windows Virtual Machine target device.

It can take the Microsoft® Windows Virtual Machine target clipboard data and then copy the data to the client Mac workstation clipboard.

NOTE: The clipboard copying and pasting character set is OS-defined for Microsoft Windows Virtual Machine. The clipboard copying and pasting maximum size (number of characters) is OS-defined for the Microsoft Windows Virtual Machine.

The macOS version of Remote App can paste the client Mac workstation clipboard data to the target Microsoft Windows Virtual Machine using the CTRL-V keys.

NOTE: The clipboard copying and pasting function is on by default and cannot be turned off for the Microsoft Windows Virtual Machine.

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5.5 GRACEFUL SHUTDOWN REQUIREMENTS

The macOS version of Remote App will terminate any connection when it encounters an insufficient CPU resource or latency.

The following message will be displayed: “Connection Timed Out: There may be too much latency in your network or the host machine may have insufficient CPU resources to maintain operation.”

To view information about your macOS® version of Remote App, click on the “About” option from the drop-down menu. The “About” screen appears, as shown in Figure 5-31 below:

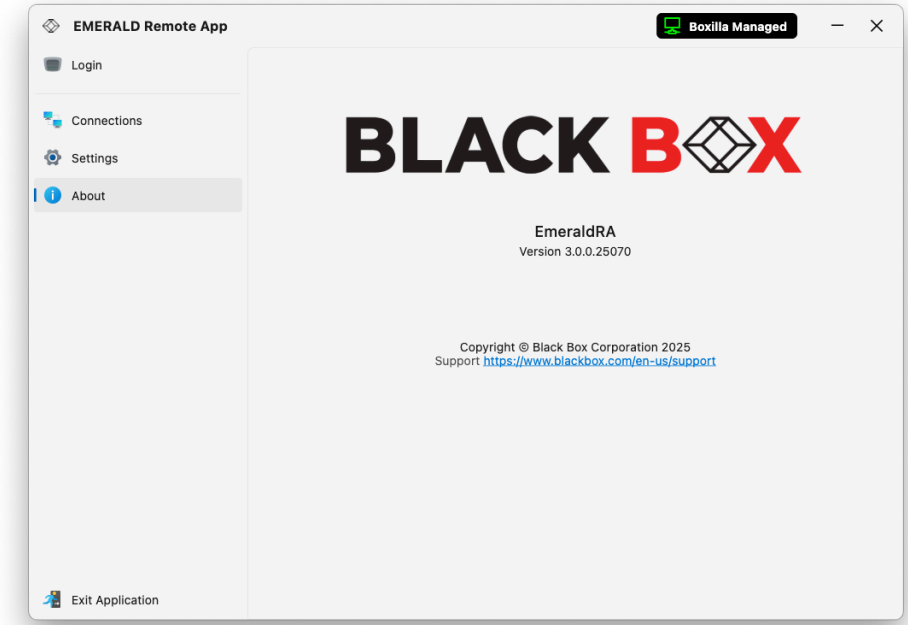

FIGURE 5-31. INFORMATION WINDOW.

To log out of the macOS version of Remote App, click on “Exit Application” button from the left navigation pane, or click on the “X” button located in the top right corner of the application window.

The macOS version of Remote App will time-out after six minutes of inactivity and will require you to log in again. A pop-up message indicates that the connections will be closed, as shown in Figure 5-32 below:

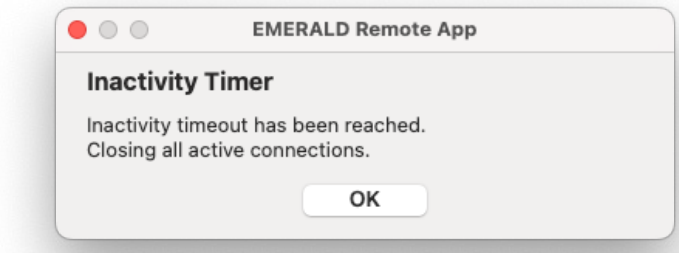

FIGURE 5-32. INACTIVITY TIMER.

NOTE: There is currently no way to disable this automatic logout feature.

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5.6 DEMO MODE

Demo mode is for users who want to use the macOS version of Remote App without having a configured or licensed Boxilla®.

Demo mode provides you with two hardcoded connections: one to a TX with default IP Address 192.168.1.22 and the second to a VM with default IP Address 192.168.1.40. The macOS Remote App and target TX or VM must be on a private subnet.

To access demo mode, enter DEMO on the Boxilla configuration window.

You can do this the first time the macOS version of Remote App is launched after the initial install, or you can change it via the "Settings" option.

The login screen will be displayed if you change/save the Boxilla® IP address in the "Settings" page. Or you can simply navigate to the login screen by clicking on the "Login" button on the left navigation pane. You can enable the "Unmanged Mode" by clicking on the slider button.

An example is shown in Figure 5-33 below:

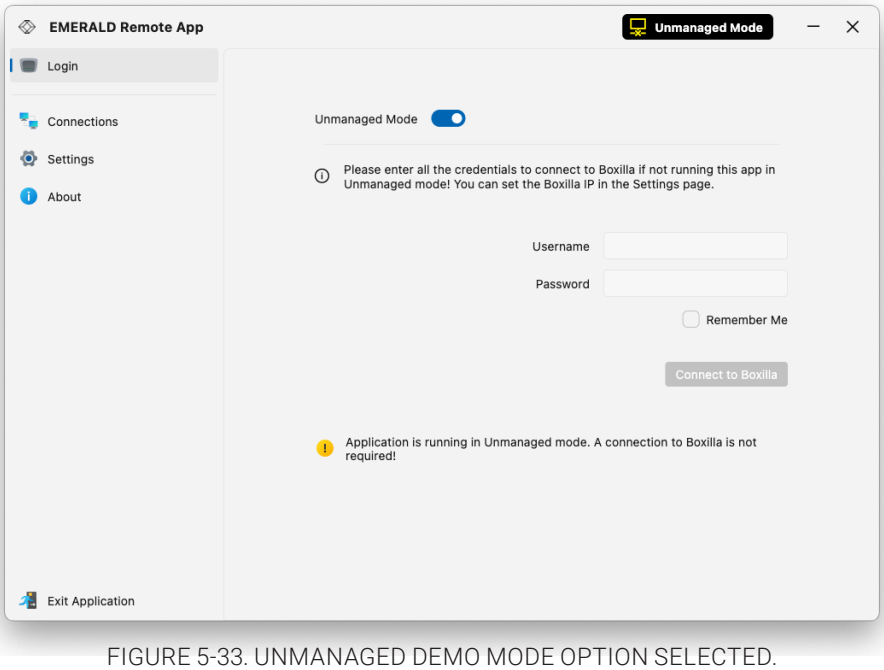

FIGURE 5-33. UNMANAGED DEMO MODE OPTION SELECTED.

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Sample demo connections are shown in Figure 5-34 below:

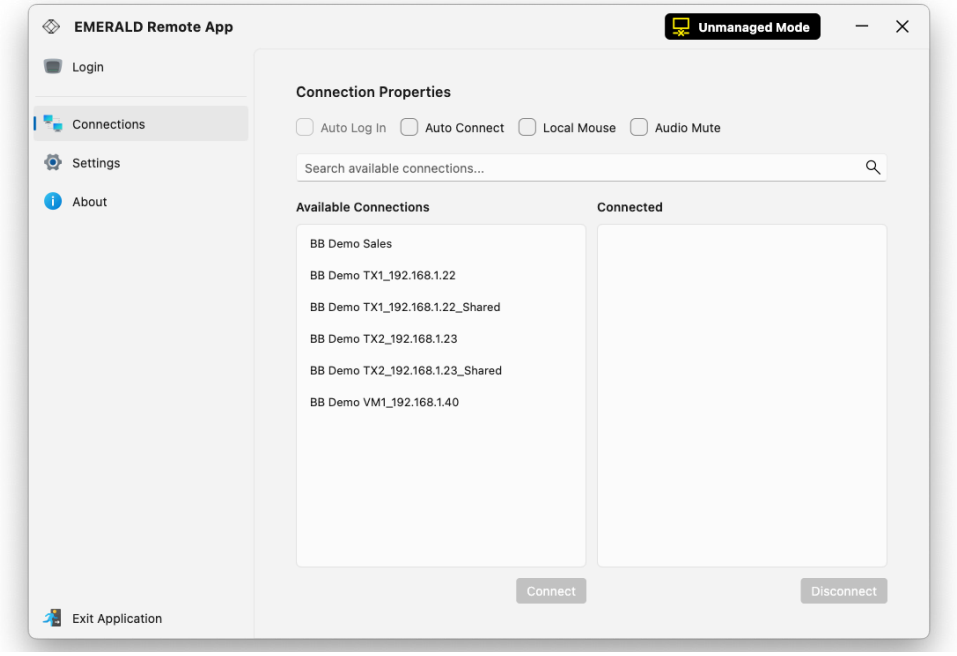

FIGURE 5-34. UNMANAGED DEMO MODE SAMPLE CONNECTIONS

APPENDIX A: REMOTE APP, BOXILLA, & EMERALD PROTOCOLS

The Emerald® solution uses standard IP protocols for communication between Remote App for Mac, Boxilla®, and transmitters.

TABLE A-1. PORT USAGE PER APPLIANCE

COMPONENT	APPLICATION	PORT	EMERALD 4K	EMERALD PE/ZU
Appliance	Video	TCP: 16384	Yes (6.3.10 onwards)	Yes (5.3x onwards)
	TX connections	TCP: 3389	Yes	Yes
	Analog Audio Connection	TCP: 9000		
Boxilla	Boxilla REST HTTPS	TCP: 443	—	—

NOTE: Firewalls on the WAN may cause audio to fail due to a protocol issue that prevents it traversing some firewalls. The audio channel does not perform the SYN/SYNACK sequence which leads to some of these streams being blocked.

APPENDIX B: TECH SUPPORT/DISCLAIMERS/TRADEMARKS

B.1 TECH SUPPORT/CONTACT INFORMATION

Visit blackbox.com/discover-bb/global-presence for regional technical support and contact information.

B.2 DISCLAIMERS

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NOTES

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