WSA Software Installation And IP Connection Troubleshooting

Sage Instruments - 2026-03-04

How to install WSA software on a PC?

WSA-408 is a complete and self-contained instrument with built-in SBC (Single-Board-Computer), so there is no need for users to install any software.

However, for all other WSA series products (such as WSA-208/308), a user needs to install a small package of software on a Windows PC (any Windows OS versions will be fine) that has an ethernet RJ-45 network port (or a USB-Ethernet adapter). To install:

1. Unzip the WSA_app.zip file provided by *Sage Instruments/QB-Advanced* to a folder on a PC's desktop (or any other folders you may like).
2. The WSA_app internally contains a simple file/folder structure as shown in Figure 1. The "WSA.exe" is the PC executable application code, and the RF_DSP.bin is the DSP executable image file that will be loaded into the WSA 208/308 hardware when "WSA.exe" application first starts. All other files, if any, are not important and can be safely ignored.
3. The "cfg" sub-folder contains a few configuration files and one text-editable file "DSP_IP_addr.txt". This text file is the only one that you may need to edit, which will be explained later. All other files should be left alone, and should not be modified, especially the "bmputil.qwe" file. This file may be hidden on some PC, and you should not in any way remove to attempt modifying it.
4. The "results" sub-folder contains a text file "DEBUG_output.txt" file. It's not important to users, and you can just safely leave it alone. Once a user starts performing "screen capturing" (will generate .png files), "IQ data capturing" (will generate .iqr files), "Test results logging" (will generate .csv files), "Multi-channel Spectral Recording" (will generate .spr files) or Spectrum Analysis trace saving (will generate svtrace.str file), these test results files will be saved inside the "results" sub-folder, unless the PC contains a USB thumb-drive. In that case, all the above files (with the exception for the "svtrace.str" file) will be written into the USB drive automatically. These results files can be disposed at user's discretion at any time in any way. On a WSA-408, these results files can be exported to a USB drive by pressing "System Config" and then "Export/Manage Files".

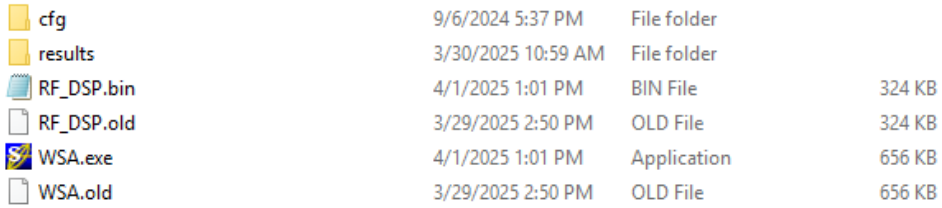

Figure 1 - WSA_app associated files and sub-folders

Running the “WSA.exe” application

After installing the WSA_app on a PC, you can then connect the PC and the WSA unit with an ethernet cable and power on the WSA unit. You can start the WSA application by double-clicking the “WSA.exe” application (suggest that you create a short-cut for this app and put the short-cut on the desktop).

When first running the application, you may run into a Windows Firewall warning as shown in Figure 2. Don’t worry, just click “Allow access” and dismiss it, and it won’t bother you next time. The “WSA.exe” application uses a high-numbered UDP port for command/control and results sending/receiving with the WSA’s DSP. Window’s warning is about this UDP port number, as this port number is not one of those used by the common IP type of applications. There is no networking safety hazard in anyway. Just dismiss the warning once.

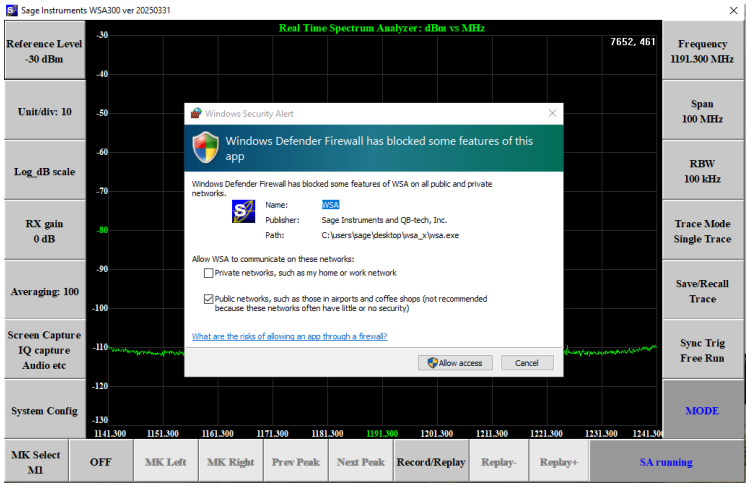

Figure 2 - Possible Windows Firewall warning when running WSA.exe for the 1st time

In case of networking problems

If for some reason, your PC can not establish the network connections with the target DSP inside the WSA unit, you may see an error display as shown in Figure 3.

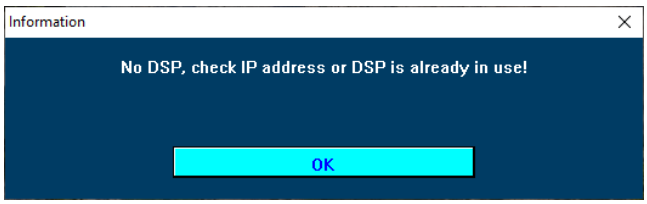

Figure 3 - An error display indicating IP connection problem(s) between the PC and WSA’s DSP

When this happens, you should take the following steps to resolve this issue:

1. Make sure the WSA unit is powered ON, and its ethernet port is lit on indicating correct ethernet connection with the PC.
2. On the PC, open a command prompt, and issue the "ipconfig" command. From the listed network connections, find the one corresponding to the PC's ethernet port, and locate PC's IPv4 address associated with the ethernet port.
3. If the IPv4 address for the ethernet port is shown as "192.168.24.100", then the WSA DSP's IP address will be "192.168.24.5", meaning their first 3 bytes are always the same, except that the DSP's last byte is 5. Issue the command "ping 192.168.24.5" and see if you can get positive response from the DSP. If yes, you can start the "WSA.exe" application again. If not, continue with the remaining steps.
4. If the PC's IPv4 address associated with the ethernet port is obviously incorrect (such as 127.0,0.0) or the subnet mask (should be 255.255.2555.0) or the default gateway are obviously wrong, you should use Windows "network setting" mechanism to set the ethernet port's IPv4 address to a static IP address (not DHCP) like "192.168.24.250" and a subnet mask of "255.255.255.0" and a default gateway of "192.168.24.1". Open Window's setting, then "Network", then "Ethernet", then "Change adapter options", then right-click the desired ethernet port and select "properties", and click "Internet protocol version 4 (TCP/IPv4)", and then "properties", and select "Use the following IP address", and then enter valid numbers into all the fields. In the end, clock "OK". After which, try "ping 192.168.24.5" again. If successful, try launching the "WSA.exe" application again.
5. If for some reason, the WSA.exe application still can not establish connection with the DSP, try disabling all Wi-Fi connections on the PC (for the moment) and all other potential virtual or physical networking ports, and try again. To avoid potential IP address conflict, make sure you're connecting the PC with the WSA directly with a simple ethernet cable, not through a LAN network or an ethernet switch that may contain other IP networking devices.

What if I do need to change WSA-DSP's IPv4 address?

The WSA-DSP's IPv4 address has been conveniently pre-configured to be "x.y.z.5", where the first 3 bytes "x.y.z" follow those of the IPv4 address of the PC associated with the connecting ethernet port. This generally should work fine without any hiccups. However, if you have to connect the PC with the WSA through a complex LAN (Local Area Network), or you have multiple WSA units, and you need to dynamically connect to each one of them from a single PC one at a time, then you may need to assign a more "legitimate" and unique IPv4 address to each WSA unit. This can only be done through the "WSA.exe" GUI (Graphical User Interface) application software. So, you must have one successful connection between the PC and the WSA unit once while running the "WSA.exe" GUI application, then you can change the WSA's IPv4 address.

How to change the WSA DSP's IPv4 address?

After launching the "WSA.exe" GUI application and successful connection with the WSA (with direct local ethernet cable connection between the two), you should see a spectrum display and soft buttons on two sides. Click the left bottom button labeled as "System Config", then click "Advanced configurations", then select "Change IP address", you'll see a dialog shown as in Figure 4.

Figure 4 - IP address changing dialog

If you still like to maintain the default IPv4 address structure (highly recommended, DSP's first 3 bytes are identical to those of the PC's), but just change the last byte from the default "5" to some other number such as "9", then just click the upper right most yellow-colored button "5", and then enter number "9", and then click "OK". The GUI software will momentarily close and relaunch itself. After re-connection, the DSP's address is now "x.y.z.9". Such change is simultaneously reflected in the "cfg\DSP_IP_addr.txt" file whose content will be as shown in Figure 5 after the IP address change taking effect.

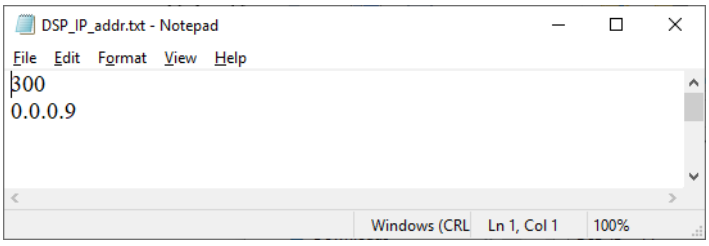

Figure 5 - Information recorded inside the "cfg\DSP_IP_addr.txt" file after IP address change takes effect

The second line "0.0.0.9" inside the "DSP_IP_addr.txt" file shown in Figure 5 means that the DSP's IP address is now "x.y.z.9", where the 3 leading 0s indicate "don't care" (which will always follow those of the PC's).

If you must assign WSA a "legitimate" global IPv4 address whose first 3 bytes may differ from those of the PC's so that it can be accessed in wider area network, then in Figure 4, you must click the lower left "Server contact disabled" button first. After that, you can then edit all 4 bytes of the IP address fields as shown below:

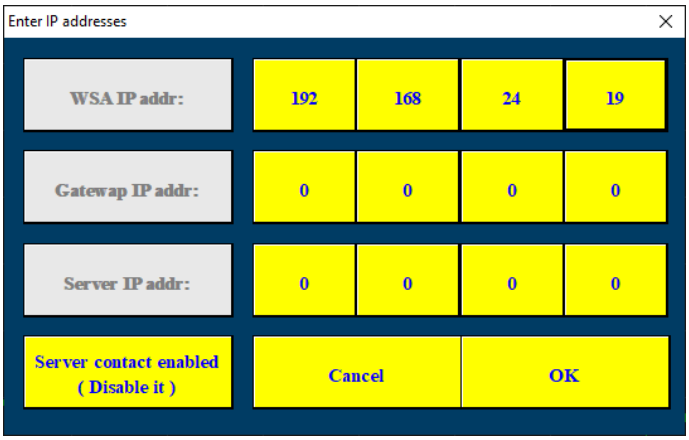

Figure 6 - To modify all 4 bytes of the IP address, click the lower left "Server contact…" button first to enable all fields as shown here.

For the normal applications involving the PC running the "WSA.exe" GUI application connecting with the WSA's DSP, you do not need to set the "Gateway IP addr" and "Server IP addr" fields. Just leave them as all 0s. These two fields are only used when a WSA-208/308 unit has been configured to run the "Spectral auto Recording" feature autonomously by itself without the GUI software running, and the recorded spectral data are automatically sent to a remote server. More details about this feature will be described in a separate document.

What if I forgot WSA's IP address?

The issue with changing WSA-DSP's IP address away from the default "0.0.0.5" is that one tends to forget the new setting, and when the WSA unit is shipped to another location or someone else trying to connect to it from another PC, the forgotten IP address can become quite a problem. In this situation, you can take either one of the following steps:

1. Find the original PC that was used with this particular WSA unit most recently, and check the "cfg\DSP_IP_addr.txt" file as shown in Figure 5. The second line shows the exact IP address of the WSA unit (such as 192.168.24.19). The new PC that is supposed to work with it must have its "cfg\DSP_IP_addr.txt" modified first to "192.168.24.19" (the second line only) and saved, and then launch the WSA GUI application. If you want to change the DSP's IP address back to the normal default, proceed with the steps illustrated above with Figure 4.
2. If the original PC can't be found, and the WSA unit has been left unused for a long time, then you have to install the Wireshark software on a PC and connect this PC with the

WSA's ethernet port directly, turn on WSA, and check the IP packets sent out by WSA as shown below in Figure 7.

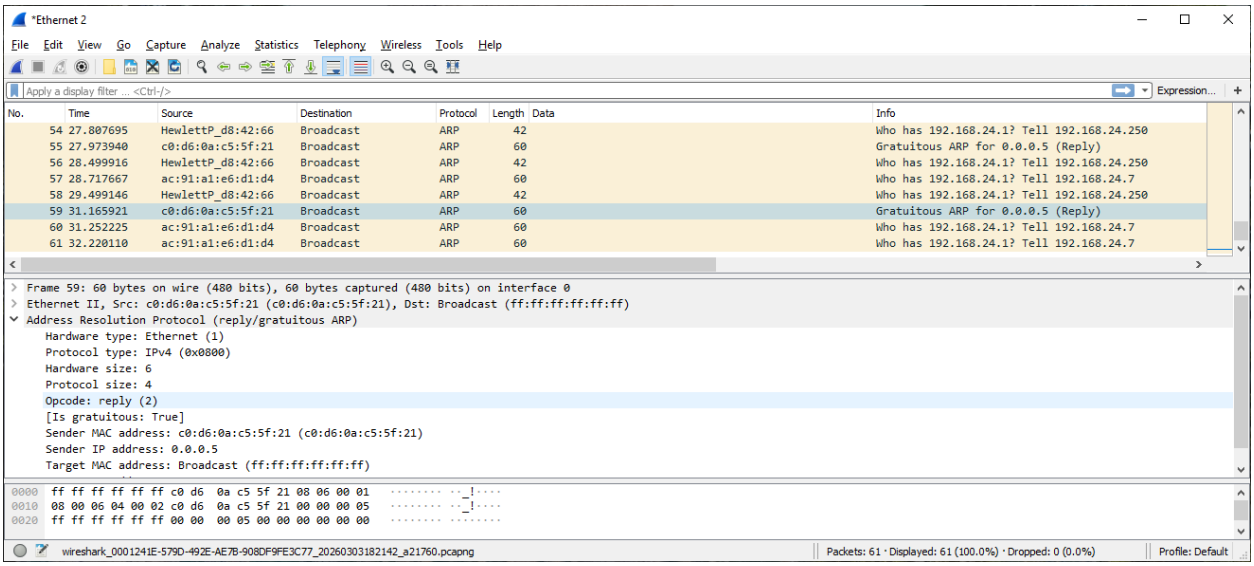

Figure 7 - Wireshark capture of the "Gratuitous ARP" packets sent out by a WSA unit announcing its own IP address

As shown in Figure 7, a WSA unit, once turned on, has been programmed to broadcast periodically its own IP address using the "Gratuitous ARP" or "Reverse ARP" protocol. The packet content indicates that this particular WSA unit's own sender IP address in this case is "0.0.0.5", the default. If it were something else, it would be shown here.

How to resolve an invalid IP address with differing subnet

Occasionally, for whatever reason, the WSA may be set to an invalid IPv4 address (falls outside the subnet range of your PC). More specifically, assume your PC's IPv4 address is 192.168.24.100 with subnet mask 255.255.255.0, and yet the WSA's IPv4 address has somehow been set to 191.165.2.5. Although you may try setting your PC's static IPv4 address to something like "191.165.2.100", but it may upset the PC. A better and proven way to resolve the issue is to do the following:

1. Find the "problematic" WSA's MAC address using Wireshark as shown in Figure 7, where the source MAC address is: c0-d6-0a-c5-5f-21.
2. Build a fixed IPv4 address to MAC address link on your PC by opening a command prompt under administrator privilege and issue the command "arp -s 191.165.2.5 c0-d6-0a-c5-5f-21".
3. Then enter command: "ping 191.165.2.5" to make sure WSA-208 is pingable.
4. Inside the "cfg\DSP_IP_addr.txt" file, change the second line to "191.165.2.5".
5. Start the WSA application, and it should connect. Go to the "Change IP address" menu to set the IP address back to "0.0.0.5".

How to connect to a WSA-408 unit from your own PC?

A WSA-408 unit has its own built-in embedded PC, so it can be operated directly on its touch screen. However, if for some reason, you need to control a WSA-408 unit from your own PC that has the "WSA_app" software installed, you need to follow these steps:

1. Turn on a WSA-408. After the GUI is fully running, close the GUI by "MODE", then "Close GUI". The touch screen will go dark, but don't worry.
2. Connect your PC's ethernet port with the WSA-408's ethernet port through an ethernet cable. Make sure the PC's IPv4 address associated with the ethernet port is NOT "x.y.z.5" and "x.y.z.127" and "x.y.z.254". It can be "192.168.24.100" for example. Make sure the "cfg\DSP_IP_addr.txt" file's second line is the default "0.0.0.5". Launch the "WSA.exe" application on your PC, and your PC will take over the WSA-408's internal DSP away from the embedded SBC.
3. When all is done, close the WSA GUI on your PC first, disconnect the ethernet cable, then press the WSA-408 unit's power button for 2 to 3 seconds, and let the WSA-408 unit power off. After which, you can press the power button again to turn it on, and the WSA-408 will resume its normal operations with the embedded SBC and touch screen.