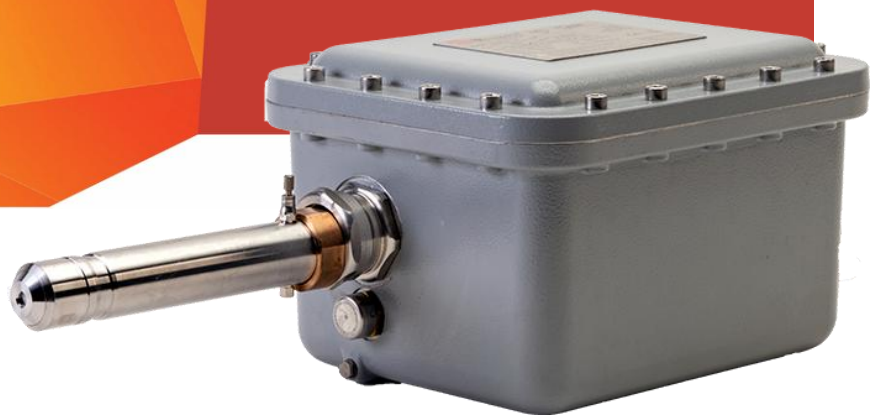
KEIT spectrometers



IRmadillo™

Integrated Controller
Local Access Guide

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DOC0914
28 March 2025, 17:01

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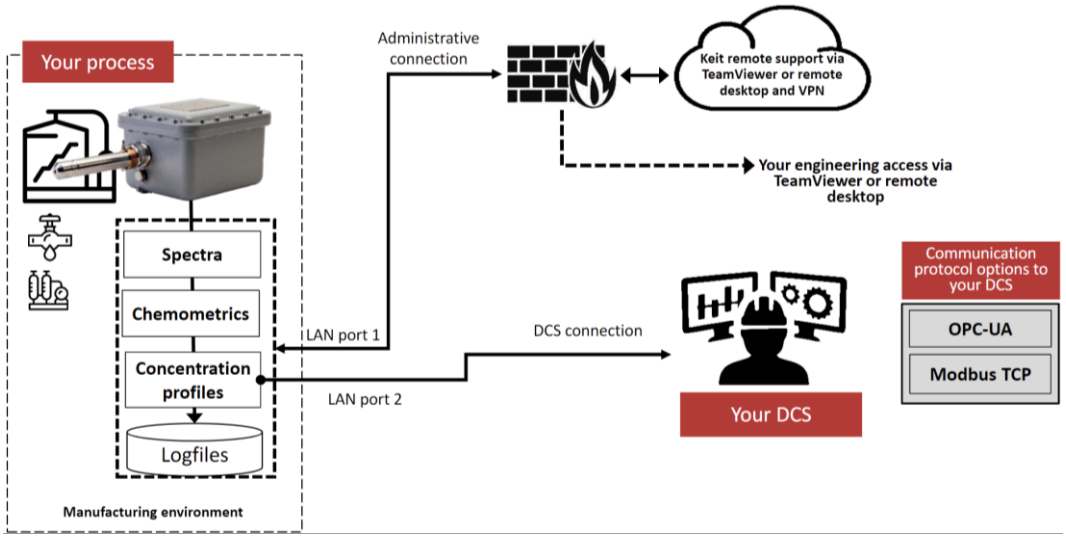
1. CONFIGURATION OVERVIEWS

You may need access to the IRmadillo's integrated controller during use or troubleshooting. This is performed via a Remote Desktop connection to a computer (the 'local-access PC').

We provide two flying Ethernet leads (with female RJ45 connectors), which may be used in the below configurations to connect to your DCS and local-access PC in parallel.

See the IRmadillo datasheet for information on recommended cable standards and maximum lengths.

1.1. Preferred configuration



Separate Ethernet leads are used for your *DCS connection* and your *Administrative connection* (to the local-access PC).

The IRmadillo controller must* be connected to the DCS **via a network**.

The IRmadillo controller can be connected to the local-access PC:

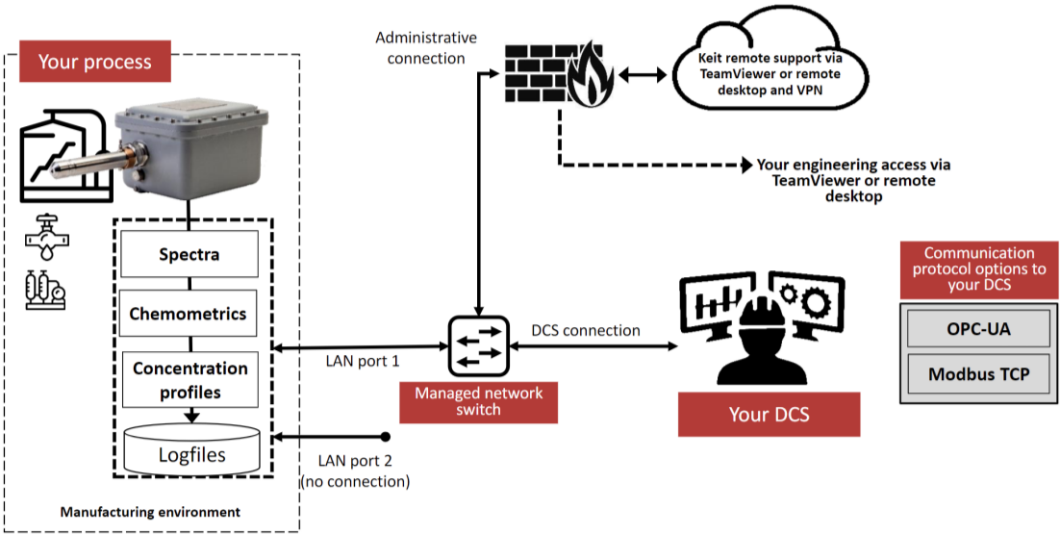
a) via a common network; or
b) via a direct Ethernet-to-Ethernet connection

In the case of a), the network may need to be configured to allow Remote Desktop access between the local-access PC and the IRmadillo controller.

In the case of b), the connection should be 'plug-and-play'.

* *If your DCS communicates with the IRmadillo over a direct Ethernet-to-Ethernet connection, at least Modbus TCP communications are likely to be unstable or absent.*

1.2. Alternative configuration



A single Ethernet lead is used to connect the IRmadillo controller to a network switch. In turn, your DCS and the local-access PC are both connected to that same network.

The network may need to be configured to allow Remote Desktop access between the local-access PC and the IRmadillo controller.

2. CONNECTING VIA REMOTE DESKTOP

This section assumes that your local-access PC runs Windows 10, which comes preinstalled with *Remote Desktop Connection* (RDC).

However, we understand that Remote Desktop may be configured to work with a local-access PC running Linux, Mac OS or other non-Windows operating systems.

Remote Desktop can also be used on older releases of Windows. However, we highly recommend using a version of Windows that is still serviced by Microsoft.

2.1. Run Remote Desktop Connection

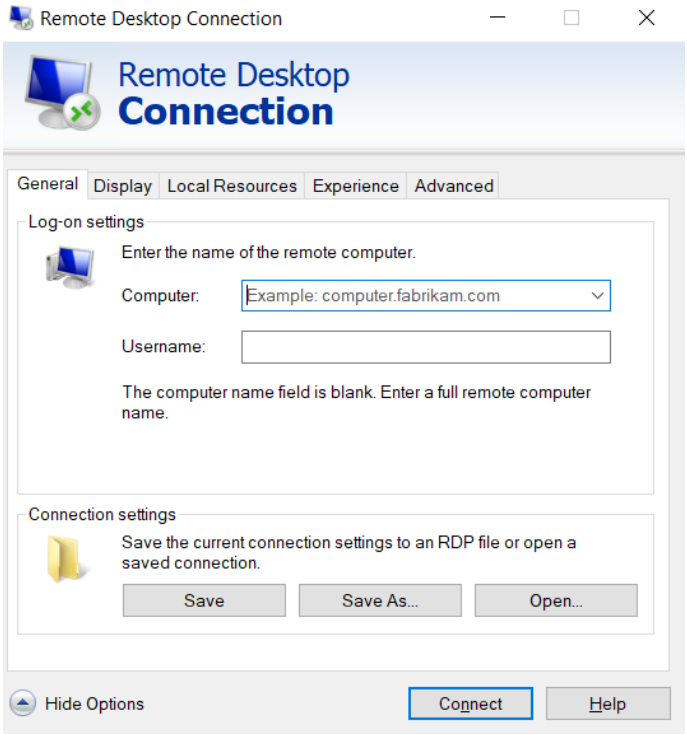
Once you have connected the IRmadillo controller using one of the above configurations, open *Remote Desktop Connection* on the local-access PC. This is normally located here:

Start Menu → Windows Accessories → Remote Desktop Connection

Alternatively, you can find it by pressing the Windows key (or CTRL + ESC), then typing *Remote Desktop Connection* and selecting the program when it appears. If you require frequent access, we recommend saving a convenient shortcut to this program.

2.2. Enter Credentials

You should be greeted with a window titled *Remote Desktop Connection*. Click *Show Options*.



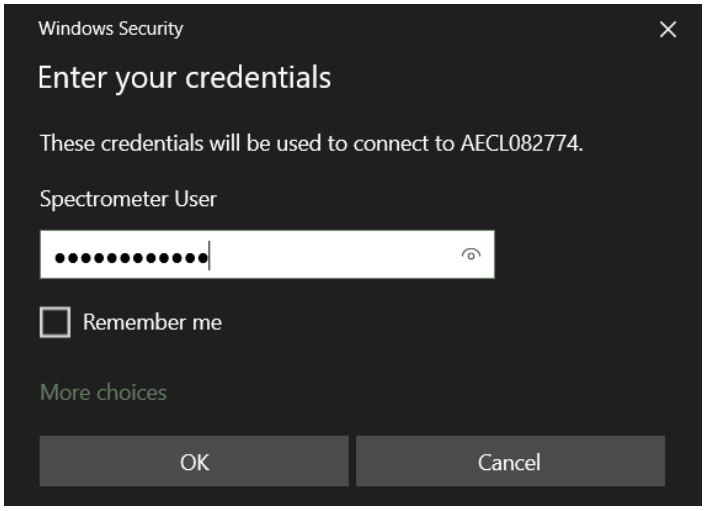
Your credentials are shared with you in DOC0910.

Under *Computer*, enter the 'PC Name' of your computer.

Under *Username*, enter the relevant account (*Spectrometer User* or *Administrator*).

Click *Connect* and Windows will prompt you for a password. Enter the respective password and click *OK*.

If you connect frequently, consider ticking *Remember me*.



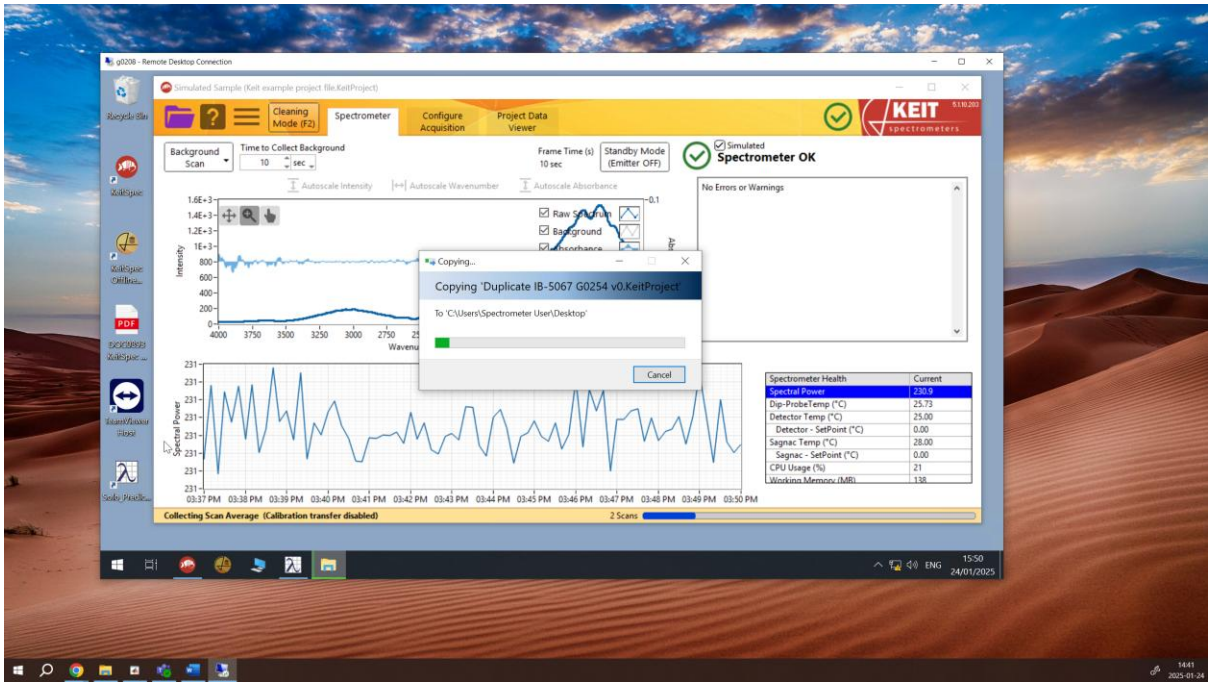
You should now have access to the relevant account.

2.3. Using RDP and transferring files

If no remote access is provided to Keit, you may be asked to access the device using this method to transfer data or to upload calibrations to the device (see DOC1021) so you can get the most out of your instrument.

When connected, RDP opens a new window that allows you to control the IRmadillo. To transfer files to the computer you have just connected to, the standard clipboard – copy and paste function can normally be used. If this is not possible contact your IT administrator for alternatives.

NOTE: the clipboard cannot be used for anything else for the duration of the transfer.



3. TROUBLESHOOTING

3.1. A note on old operating systems

This guide assumes that your local-access PC runs Windows 10. Our experience shows that old operating systems may present difficult-to-resolve and difficult-to-reproduce issues.

As such, we highly recommend you remote-access to the IRmadillo controller from a currently-serviced version of your operating system that is up-to-date. A list of current versions of Windows 10 and 11 can be found here and here, respectively. Windows versions 8.1 and older are **not** serviced and so we recommend against running these.

3.2. My credentials don't work

If RDC rejects your username and password, double check them against those provided to you in DOC0910. Pay particular attention to case sensitivity.

If you continue to have trouble with your credentials, contact Keit.

3.3. RDC connects, but runs slowly

A slow or stuttering connection is often caused by:

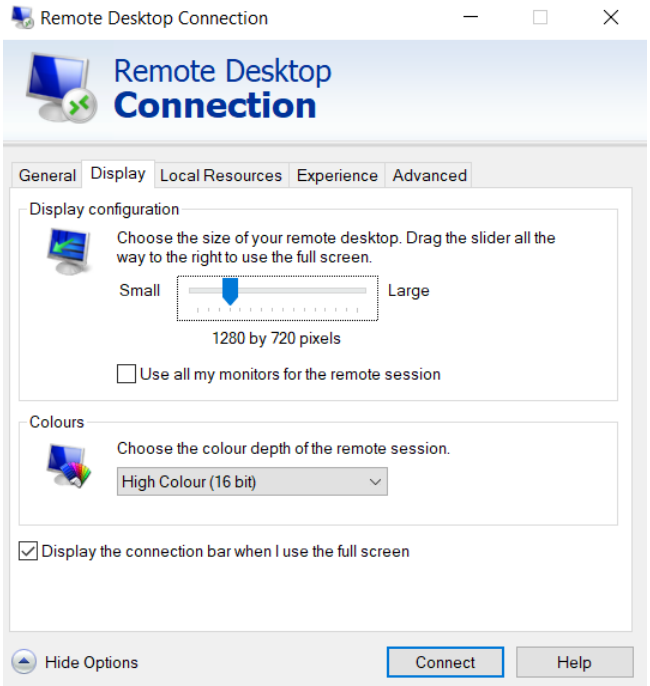
- a poor or overloaded network connection;
- insufficient processing power or memory on the local-access PC.

3.3.1. Move to a direct ethernet connection

If you are connecting via a common network, then consider instead using a direct ethernet connection. Such a connection will ensure there is plenty of bandwidth for your local-access PC to communicate with the IRmadillo controller.

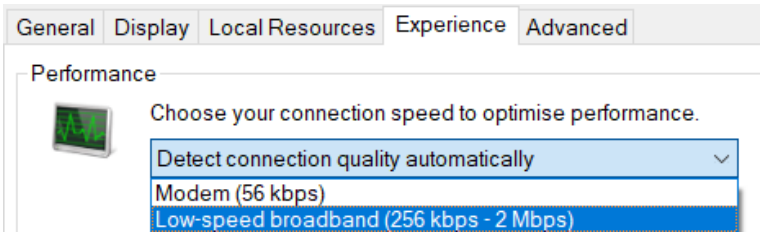
3.3.2. Change RDC display and performance settings

In *Remote Desktop Connection*, click *Show Options* and navigate to the *Display* tab.

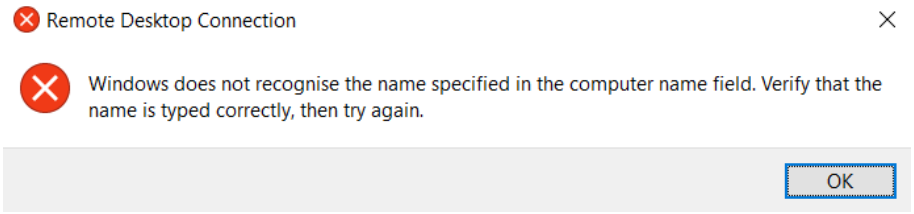


Slide the *Display configuration* slider to the left. Most modern computers will support a 1280 by 720 resolution without problems.

If you are still experiencing issues, navigate to the *Experience* tab and select a lower connection speed such as *Low-speed broadband* or *Modem*.



3.4. RDC does not connect: Windows does not recognise …

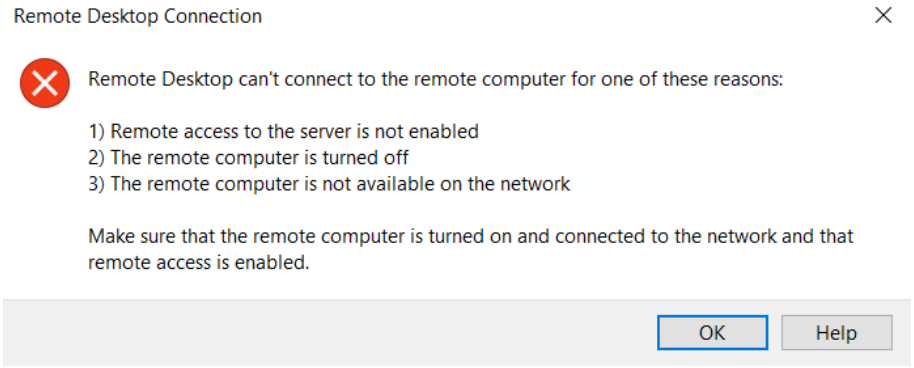


This issue is usually caused by typos like including a space in the PC name. Double check the PC name and try again.

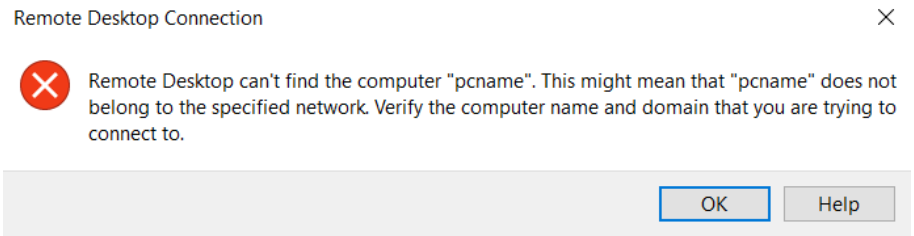
3.5. RDC does not connect: Networking issues

RDC may refuse to connect immediately after entry of the PC name, before asking for a password. The main two we have experience with are:

Remote Desktop can't connect to the remote computer ...



Remote Desktop can't find the computer "___" ...



Both errors can be caused by a variety of root problems relating to networking.

Problems like this might be straightforward to fix, but could indicate DNS issues or network/firewall configuration problems. Resolving or working around the latter is somewhat involved, so we recommend troubleshooting in this order:

3.5.1. Check for typos

Double check the PC name and re-try.

3.5.2. Check that the IRmadillo is switched on

The IRmadillo does not have an indicator to show it is powered on, so double check that it is plugged into a suitable socket and receiving power.

If the IRmadillo controller has been shut down (as opposed to restarted), it must be power-cycled to boot. If this is the case, unplug the IRmadillo for 10 seconds, then plug it back in (or, if using a switched socket, switch it off and on).

3.5.3. Check the firewall settings on your local-access PC

On your local-access PC, navigate to Windows Defender Firewall:

Start Menu → Windows System → Control Panel → System and Security

→ Windows Defender Firewall

In the left-hand panel, click *Allow an app or feature through Windows Defender Firewall,* then click *Change settings* and enter your administrator password if prompted.

Scroll through the list and ensure all boxes are ticked next to the following entries:

- Network discovery
- Remote desktop
- Remote service management
- Routing and remote access
- Windows remote management

Click *OK*.

3.5.4. Check the sharing settings on your local-access PC

On your local-access PC, navigate to Network and Sharing Centre:

Start Menu → Windows System → Control Panel → Network and Internet

→ Network and Sharing Centre

In the left-hand panel, click *Change advanced sharing settings*.

Under each section, click *Turn on network discovery* if available, then click *Save changes*.

3.5.5. Check that the IRmadillo has a suitable network connection

Review the connection options in section **Error! Reference source not found.**:

- A direct Ethernet to Ethernet connection is always[†] a suitable network connection for remote access

[†] This assumes that the local-access PC does not have strict or unusual settings e.g. from a group policy. This would be apparent if unable to follow sections 3.5.3 & 3.5.4.

- Other network connections may be interfered with by strict or unusual network/firewall configuration – such as a firewall blocking Remote Desktop traffic

If you are using remote desktop via a network, ensure that the local-access PC is in fact on the same network as the IRmadillo. This sounds obvious, but some networks treat wireless connections separately to Ethernet connections. Some networks additionally treat domain joined devices separately to non-domain joined devices.

A discussion with your network administrator might establish whether any network or firewall settings are a) interfering with Remote Desktop, and b) able to be changed.

3.5.6. Further diagnosis

If you:

- suspect your network/firewall configurations are causing issues, and
- need reliable access via PC name,

Then we highly recommend moving to a direct Ethernet-to-Ethernet connection. Our experience shows that a direct connection between the IRmadillo controller and your local-access PC is normally reliable.

If you cannot use a direct Ethernet-to-Ethernet connection, then we highly recommend you talk to your network administrator or another specialist. The possible combinations of the settings employed by a network makes diagnosing problems as a third party prohibitive.

However, if your network's configuration or firewall settings are not obviously to blame, or you anyway want to further diagnose an RDC client that does not connect, we provide some more involved diagnosis in section 4 below. There are additionally instructions for allowing access via IP address rather than PC name in section 5.

4. FURTHER DIAGNOSIS OF NETWORK ISSUES

These steps should be performed using a direct Ethernet-to-Ethernet connection. They assume you have already followed section 3.

4.1. Ping the IRmadillo controller

Open *Command Prompt* (*Start Menu → Windows System → Command Prompt*).

Enter the following command, replacing "*PCNAME*" with your PC name, and press enter:

```
ping -4 PCNAME
```

4.1.1. If ping is successful

A **successful ping** will return "**`(0% loss)`**" and look something like this (highlighted for clarity):

```
Pinging PCNAME [XXX.XXX.XXX.XXX] with 32 bytes of data:
[...]
Pinging statistics for XXX.XXX.XXX.XXX:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)
[truncated]
```

If your ping is successful, you should be able to connect using Remote Desktop.

If Remote Desktop works and you can use this network configuration (Ethernet-to-Ethernet) for future Remote Desktop connections, then no further action is likely to be required.

If Remote Desktop works but you would like to use a different network configuration, then note this IP address down and skip ahead to section 5.

If Remote Desktop does not work, then proceed to the next step anyway.

4.1.2. If ping is unsuccessful

An **unsuccessful ping** will usually return "**`Request timed out`**" and "**`(100% loss)`**", or:

```
Ping request could not find host PCNAME. Please check the name and try
again.
```

If your ping is unsuccessful, disconnect your local-access PC from any network connections besides the direct Ethernet-to-Ethernet connection (including wireless connections), then try again. If ping is now successful, there is likely a DNS record or setting causing problems on a network you disconnected from: talk to your network administrator.

Regardless, if your first ping was unsuccessful, proceed to the next section.

4.2. Find the IRmadillo controller's IP address

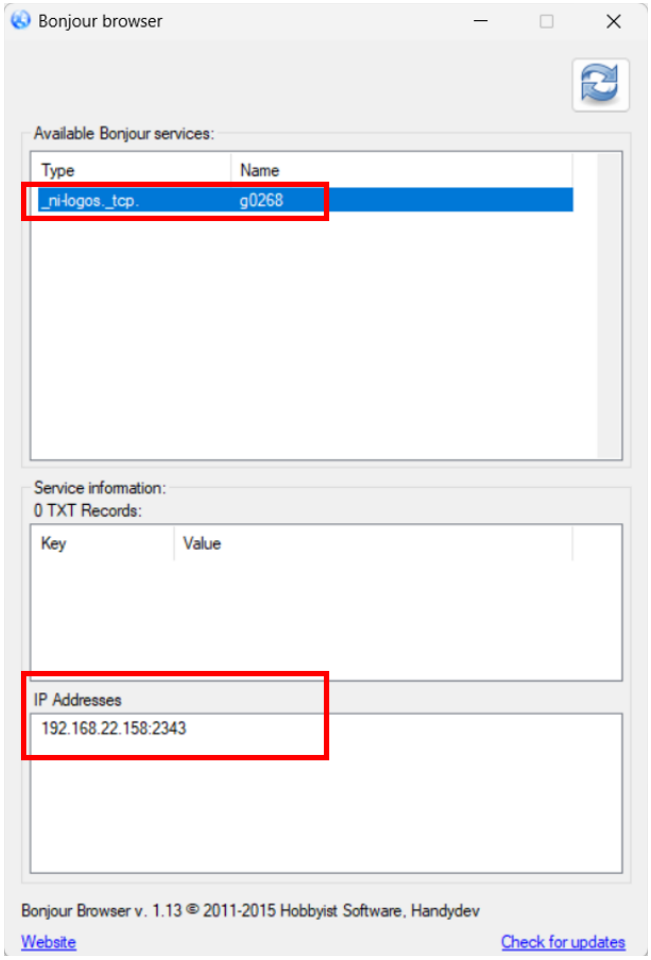
Disconnect your local-access PC from any network connections besides the direct Ethernet-to-Ethernet connection (including wireless connections).

4.2.1. Bonjour browser (zeroconf networking)

The IRmadillo controller may be found using its zeroconf networking identifier which is usually the same as the hostname. This is enabled by default on the controller and should work regardless of static IP addresses and different subnet masks.

Bonjour browser can be downloaded here: Bonjour Browser for Windows

Once installed, it may be run to detect all zeroconf enabled devices. Your computer should only be able to see the IRmadillo. Clicking on the name will reveal the IP address at the bottom (you can ignore the *:2343* or similar that appears after it):



4.2.2. ARP command

Enter the following command into *Command Prompt* and press enter:

```
arp -a
```

You should be presented with a single list of IP addresses in the following format:

```
Interface: 169.254.XXX.XXX --- 0xe
  Internet Address      Physical Address      Type
  169.254.YYY.YYY       XX-XX-XX-XX-XX-XX     dynamic
  169.254.255.255       ff-ff-ff-ff-ff-ff     static
[truncated]
```

We are looking for the highlighted line: it should be in the form 169.254.YYY.YYY, but not 169.254.255.255.

If this line is present, note the IP address down and proceed to the next step.

If this line is not present, note down your own IP address (listed after “Interface:” – in this example, it is shown as 169.254.XXX.XXX), then use the following command:

```
arp -a -v
```

"-v" stands for "verbose": you should now be presented with a more verbose list.

Look for the heading that reads "Interface: 169.254.XXX.XXX", matching the one you just noted down. Under that heading, look for the same line as above, formatted 169.254.YYY.YYY. Its type is likely to now read "invalid":

```
Interface: 169.254.XXX.XXX --- 0xe
  Internet Address      Physical Address      Type
  169.254.YYY.YYY       00-00-00-00-00-00     invalid
  169.254.255.255       ff-ff-ff-ff-ff-ff     static
[truncated]
```

If this line is present, note the IP address down and proceed to the next step.

If this line is still not present, run the following commands one after another:

```
ipconfig /flushdns
ipconfig /registerdns
```

Then try `arp -a -v` again. Again, if the line is present, note the IP address down.

4.2.3. IP Scanner

If the ARP command does not find the desired IP address, then an IP scanning tool will be required. We have used Advanced IP Scanner (available at https://www.advanced-ip-scanner.com/), but any equivalent software should work.

Download and install the software to your local-access PC (which may require re-enabling other network connections), then run it.

When configuring the range of IP addresses to scan, enter the following, then begin scanning:

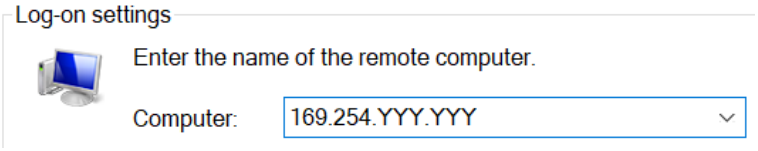
```
169.254.0.1 - 169.254.255.254
```

N.B. this scan can take a long time: well over an hour. Consider adjusting settings for a faster scan time (will cause higher CPU usage).

The IP scanner will eventually provide a list of devices and their names. Identify the device that has a name matching your PC name in DOC0910 and note its IP address. Otherwise, note all found IP addresses down, ready to try them one-by-one.

4.2.4. Testing the IP address

To confirm that you have noted the correct IP address down, try to connect via Remote Desktop by entering the IP address into the *Computer* field in RDC:



RDC should prompt you for a password after you click *Connect*. Enter the relevant credentials from DOC0910, then click *OK*.

If RDC does not prompt you for a password, or your credentials are rejected, then it is likely that the selected IP address is not for the IRmadillo controller. We recommend repeating the above steps and, if you have not already used an IP scanning tool, using one.

If RDC connects successfully, you should now consider configuring the IRmadillo controller for access via a static IP address. See section 5 below.

5. CONFIGURING ACCESS VIA IP ADDRESS

This section walks you through obtaining future access using a static IP address.

If you wish to have future access to the IRmadillo controller via a network (see 1.1a) Preferred configuration) or via a network shared with the DCS (see 1.2 Alternative configuration), then plug in that connection now.

Whether using one of the above configurations, or continuing to use direct Ethernet-to-Ethernet, **label the flying cable that you are using: your static IP will be tied to that cable!**

5.1. Find the IRmadillo controller's IP address

On the IRmadillo controller (accessed via Remote Desktop Connection), open *Command Prompt* (*Start Menu → Windows System → Command Prompt*).

Run the following command:

```
ipconfig
```

You should receive an output detailing two *Ethernet adapter*s. If you have a network connection and a direct Ethernet-to-Ethernet connection, that might look like:

```
Ethernet adapter Ethernet:
[...]
  Autoconfiguration IPv4 Address . . : 169.254.YYY.YYY
[...]

Ethernet adapter Ethernet 2:
[...]
  IPv4 Address . . . . . . . . . . . : ZZZ.ZZZ.ZZZ.ZZZ
[...]
```

For the connection you want to use for future Remote Desktop access, note down both:

- the IPv4 address, and
- the Ethernet adapter number

The 169.254.YYY.YYY address is the Ethernet-to-Ethernet connection. In our example, this occupies the adapter called "*Ethernet*". The other address is the newly-added network, which occupies the adapter named "*Ethernet 2*".

5.2. Manually assign an IP address to the controller

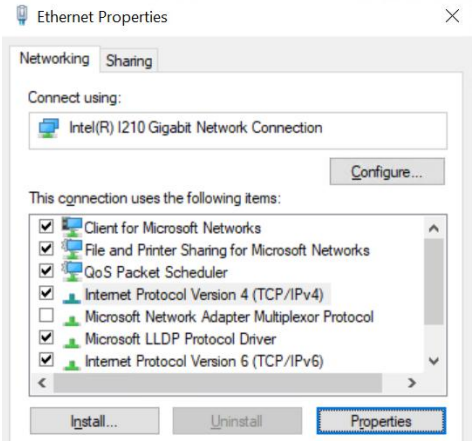
Navigate to:

Control Panel → Network and Internet → Network and Sharing Center

→ Change adapter settings

Right click on the Ethernet adapter you identified earlier, corresponding to the connection you want to use for future Remote Desktop access. Select *Properties*.

In the new window, click on *Internet Protocol Version 4 (TCP/IPv4)* and then select *Properties*.

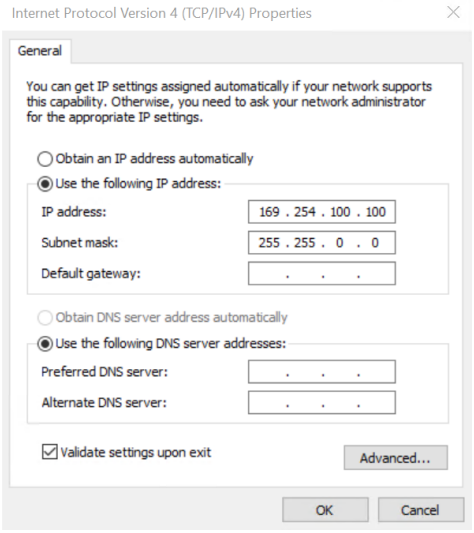


Then, check *Use the following IP address* and enter an IP address into the *IP address* box.

You can either enter the address you were using earlier, or you can enter an address of your choice. The former reduces the risk of duplicating another device's IP address.

Click in the *Subnet mask* box and it should populate automatically. You can leave *Default gateway* blank.

Click *Validate settings upon exit*, then *OK*. Your RDC connection may end: if so, reconnect (using the new IP, if it has changed).



Open *Command Prompt* on the controller, then run `ipconfig` again. The IP address should match the static IP set in the last step.

Note this IP address down.

You should be able to use this IP address to remotely access the IRmadillo controller in the future, without risk of it being reassigned. Be aware, however, of assigning this IP to other devices in the future.