Module Network Configuration

Slate network configuration and troubleshooting steps

Technical Application Note

Document No. D104-005
Document Revision 1.0
05/2025

aparian

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1 PREFACE

1.1 PURPOSE OF THIS DOCUMENT

This document is to be used as an aid for the user to configure their Aparian module's network parameters (e.g., IP address). The user can update the network parameters using the Slate DHCP Server or manually using the Slate Target Browser. This document will also provide troubleshooting steps for issues the user may face during the process.

1.2 ADDITIONAL INFORMATION

The following resources contain additional information that can assist the user with the module installation and operation.

Resource	Link
Aparian	https://www.aparian.com/

Table 1.1. - Additional Information

1.3 SUPPORT

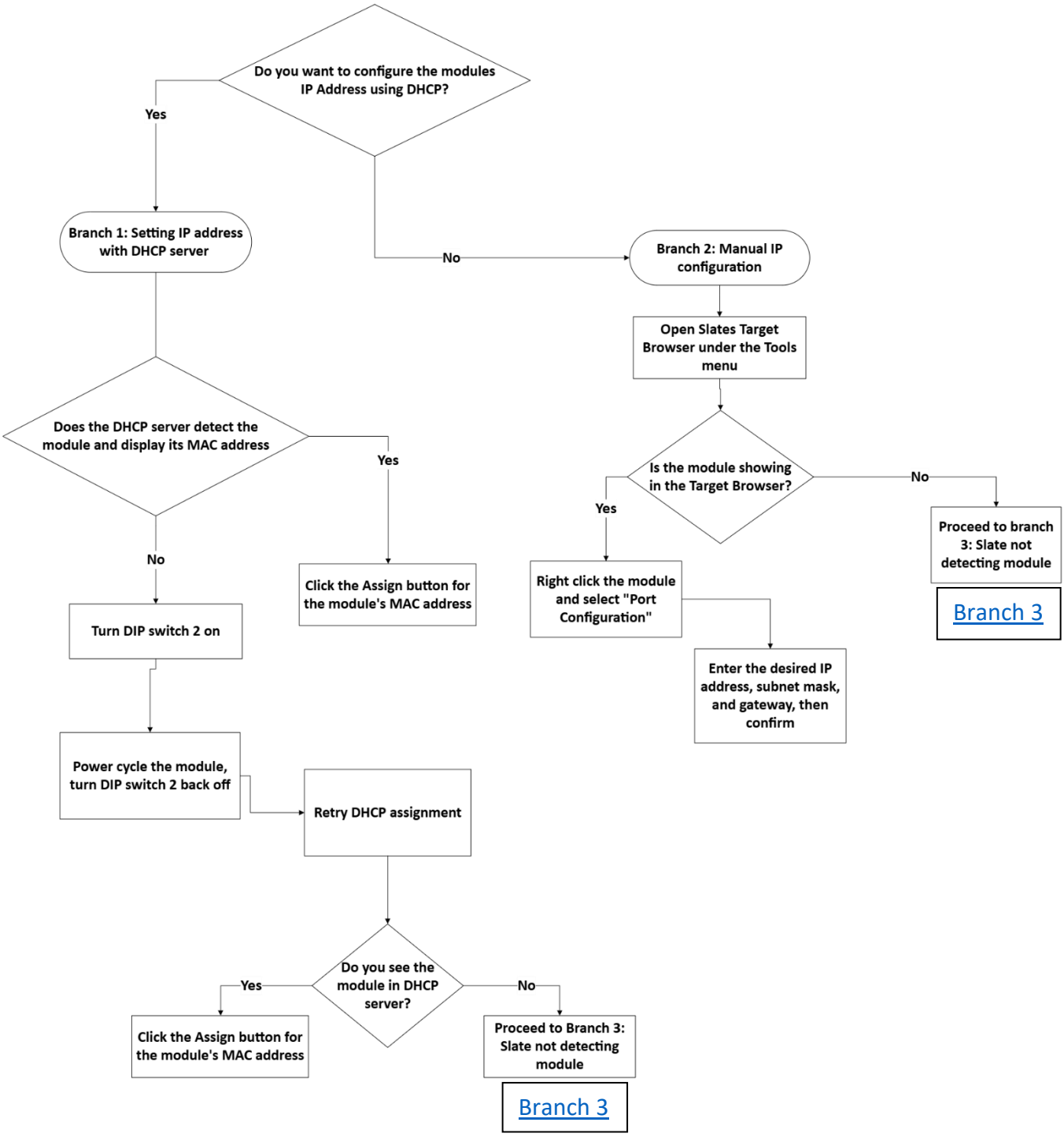
Technical support will be provided via the Web (in the form of user manuals, FAQ, datasheets etc.) to assist with installation, operation, and diagnostics.

For additional support the user can use either of the following:

Resource	Link
Contact us web link	www.aparian.com/contact-us
Support email	support@aparian.com

Table 1.2. - Additional Information

2 CONFIGURE IP ADDRESS FOR MODULE



2.1 DO YOU WANT TO CONFIGURE THE MODULES IP ADDRESS USING DHCP?

- **Yes**: Proceed to Branch 1: Setting IP address with DHCP server.
- **No**: Proceed to Branch 2: Manual IP Configuration.

2.1.1 BRANCH 1: SETTING IP ADDRESS WITH DHCP SERVER

2.1.1.1 ACCESS THE DHCP SERVER IN SLATE UNDER THE TOOLS MENU

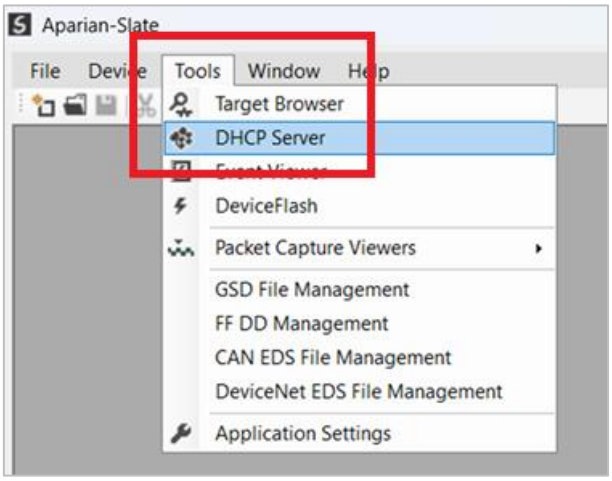


Figure 2.1 – Launch Slate's DHCP Server

- Does the DHCP server detect the module and display its MAC address?
  - **Yes:**
    - Click the assign button for the modules MAC address.

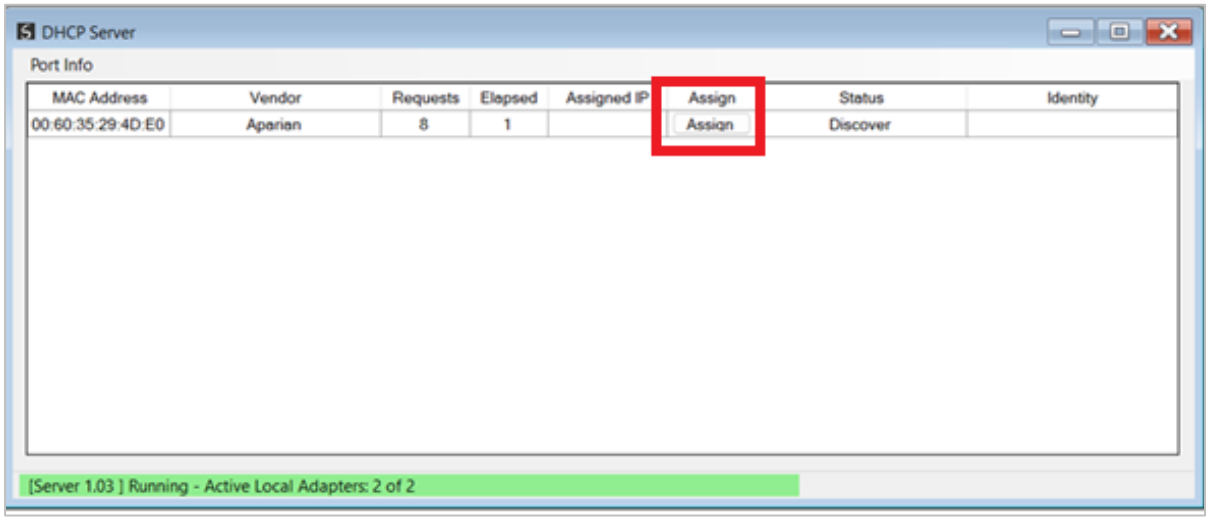


Figure 2.2 – Assign IP using DHCP Server

- Enter or select the desired IP address, check “Enable Static” to disable future DHCP requests, and press Ok.

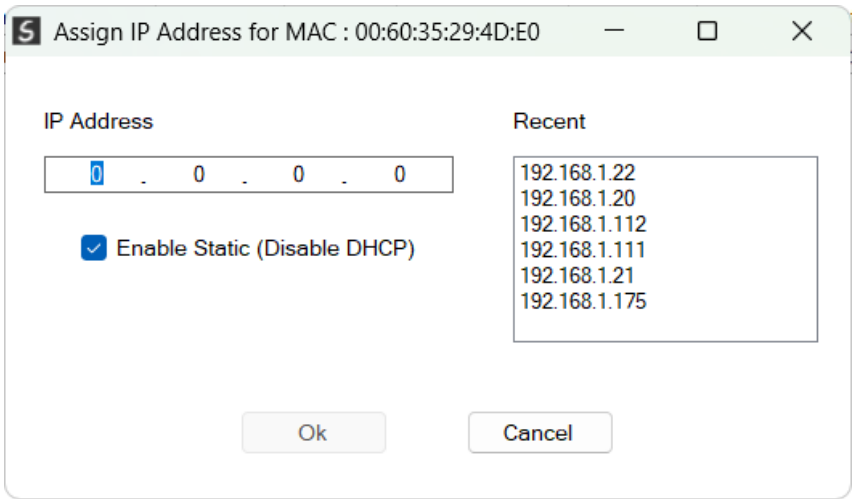


Figure 2.3 – DHCP Server IP address window

- The DHCP server assigns the IP address, reads the devices identity object, and indicates success with a green background.

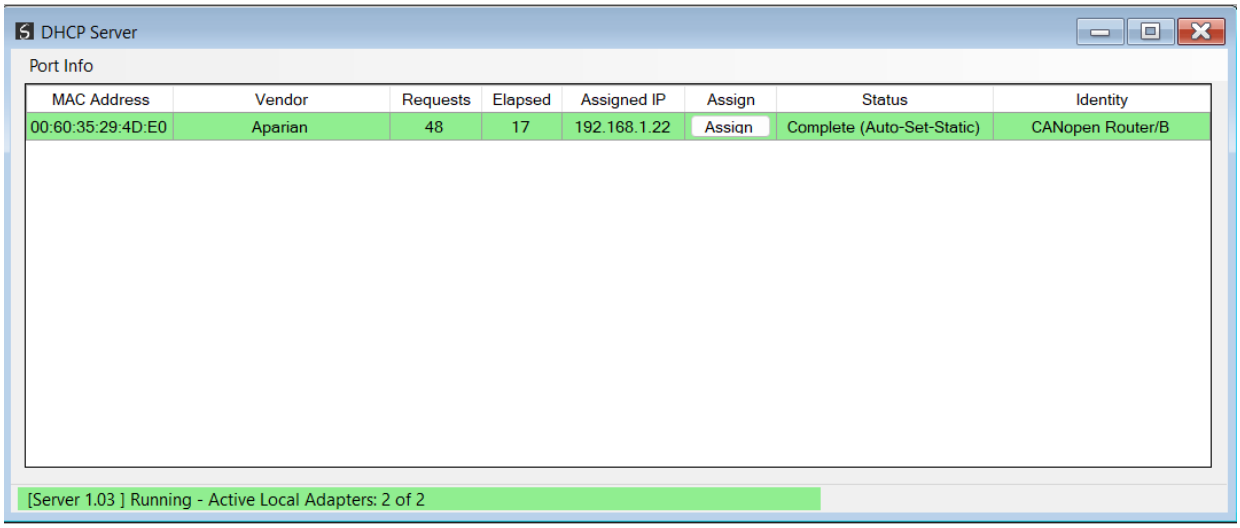


Figure 2.4 – Successful IP address assignment

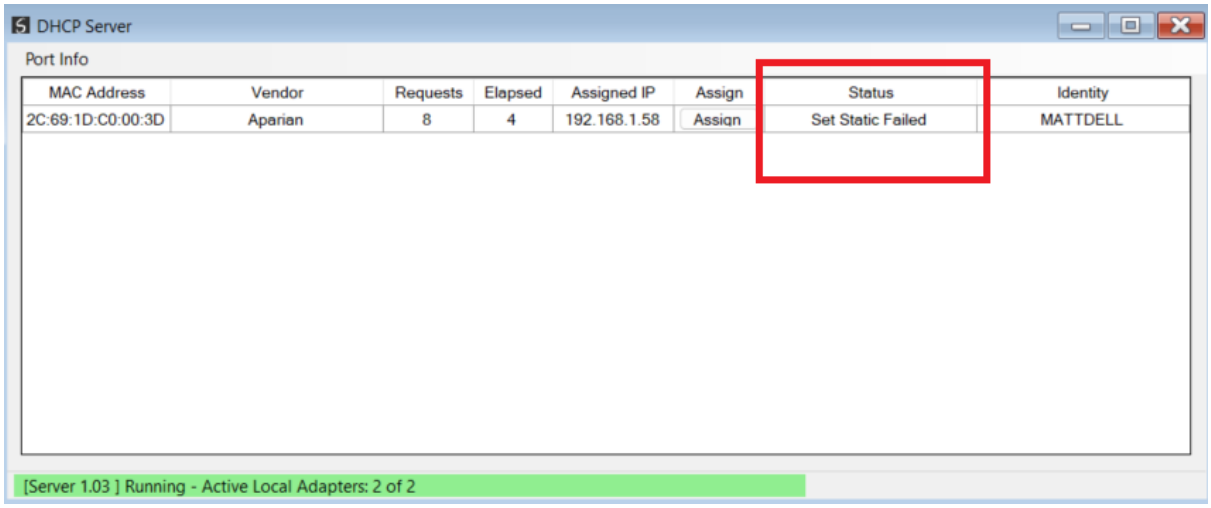


Figure 2.5 – Static address assignment failed

- **NOTE**: If the module displays "Set Static Failed" during DHCP server assignment it is likely that there is an IP conflict, proceed to Branch 6: IP conflict.

  - **No:**
    - Switch DIP switch 2 to the on position to force the module into DHCP mode.
    - Power cycle the module and once the module is powered on again, ensure you turn DIP switch 2 back off immediately.
    - Retry DHCP assignment in the DHCP server.

- Is the module still not detected?
  - **Yes**: Proceed to Branch 3: Troubleshooting Slate Not Detecting Module
  - **No**: Return to "Does the DHCP server detect the module"

2.1.2 BRANCH 2: MANUAL IP CONFIGURATION

2.1.2.1 MANUALLY ASSIGNING IP

- Open the Slate Target Browser under the Tools menu, right-click the device, and select "Port Configuration"
- Enter the desired IP address, subnet mask, and gateway, then press Ok.
- Ping the module using command prompt ("ping <IP Address>"). Does the module respond to pings?
  - **Yes**: Configuration successful
  - **No**: Proceed to Branch 5: Module doesn't respond when pinged

2.1.2.2 MANUALLY DISCOVERING THE IP ADDRESS

- In Slate, open the Target Browser under the Tools menu.
- Click the plug symbol at the top left.

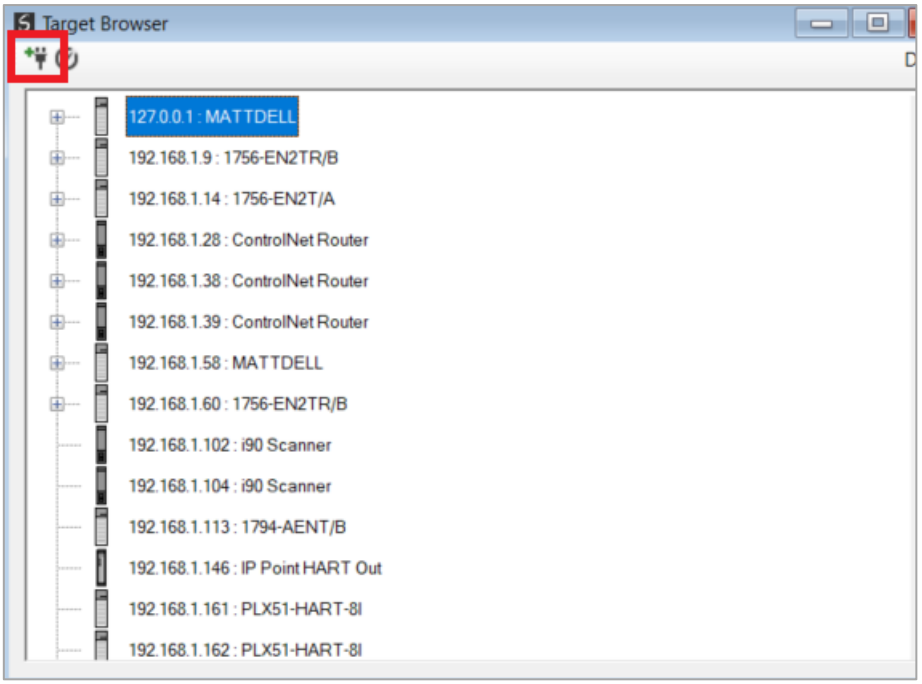


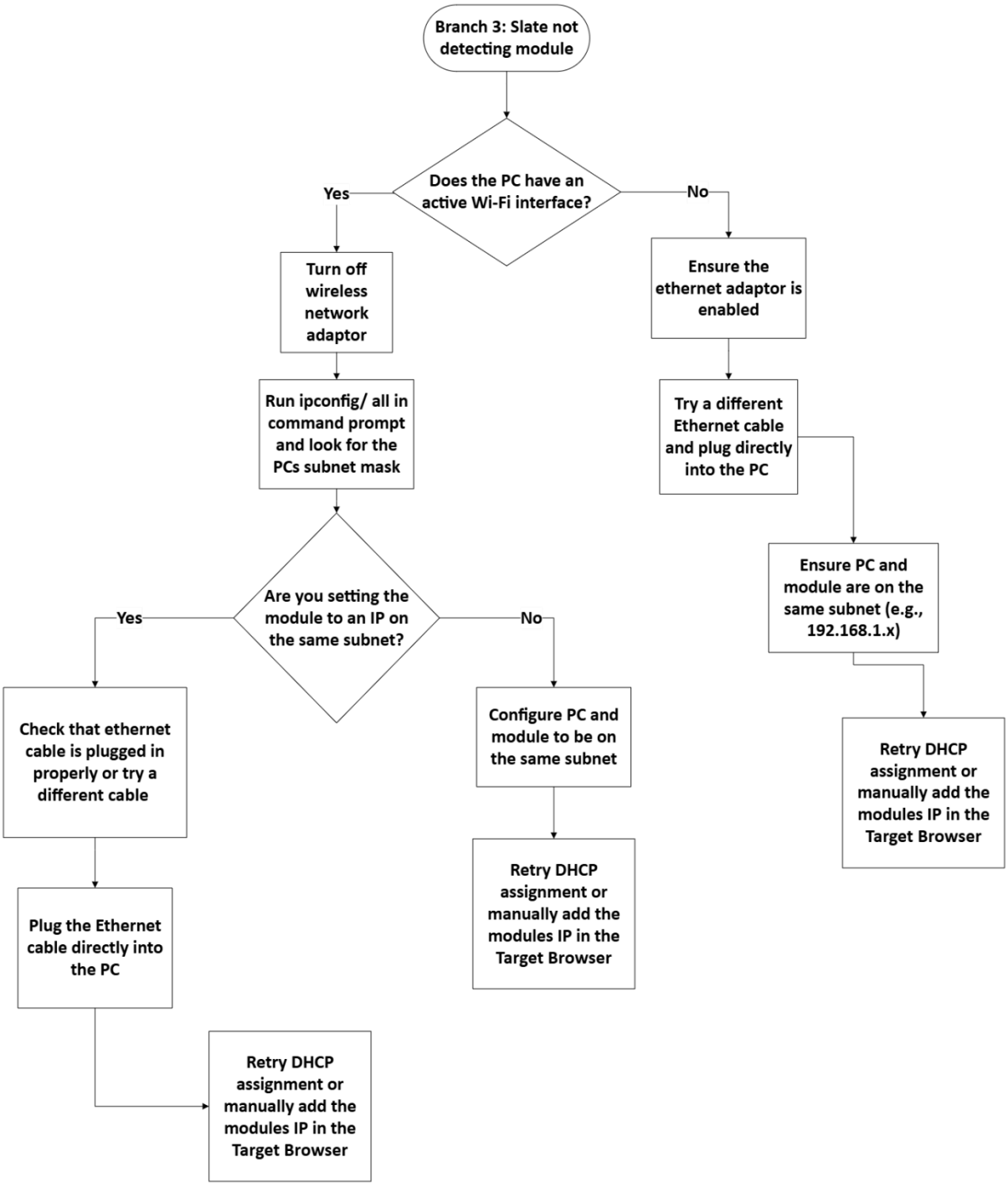
Figure 2.6 – Scan IP node

- This will open a window that you can type the IP address of the module you are trying to discover. Type in the IP address
- If the device is configured it should appear in the Target Browser list.

2.2 TROUBLESHOOTING

- Slate can't detect the module: Proceed to Branch 3: Slate not detecting module.
- Module fails to acquire IP via DHCP: Proceed to Branch 4: Module fails to acquire IP via DHCP
- Module doesn't respond when pinged: Proceed to Branch 5: Module doesn't respond when pinged.
- IP conflict: Proceed to Branch 6: IP conflict
- IP conflict despite unique IP Address: Proceed to Branch 7: IP conflict with unique IP Address
- Slate Target Browser doesn't show module: Proceed to Branch 8: Slate Target browser issues.
- Intermittent configuration errors in Slate: Proceed to Branch 9: Slate intermittent configuration errors.

2.2.1 BRANCH 3: SLATE NOT DETECTING MODULE



- Does the PC have an active Wi-Fi interface?
  - **Yes**:
    - Temporarily disable wireless adaptor by going to settings/network & internet/advanced network settings/disable Wi-Fi

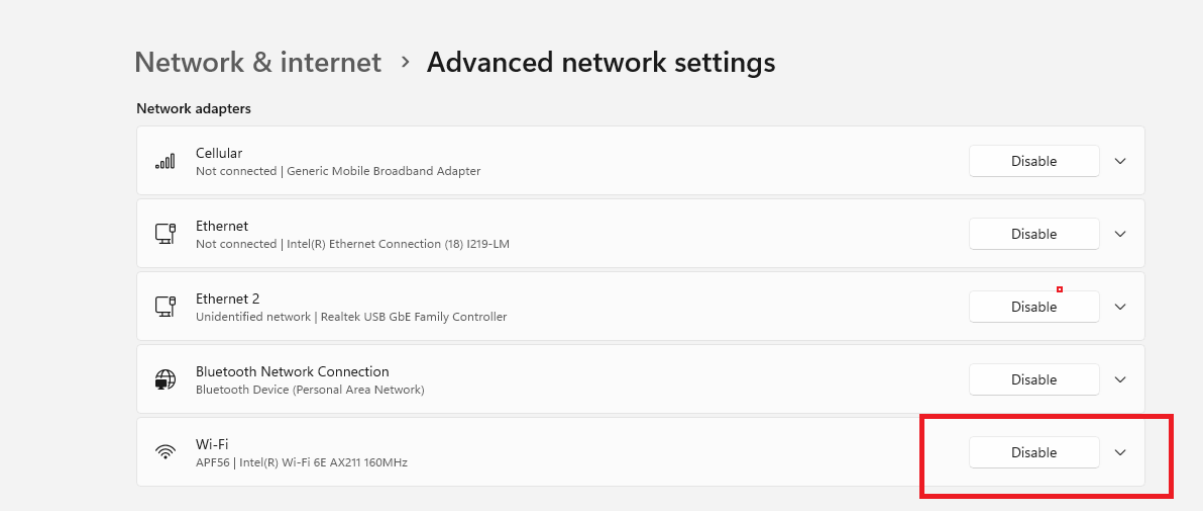


Figure 2.7 – Disable wireless adaptor

- Run ipconfig/all in Command Prompt to verify active interfaces.

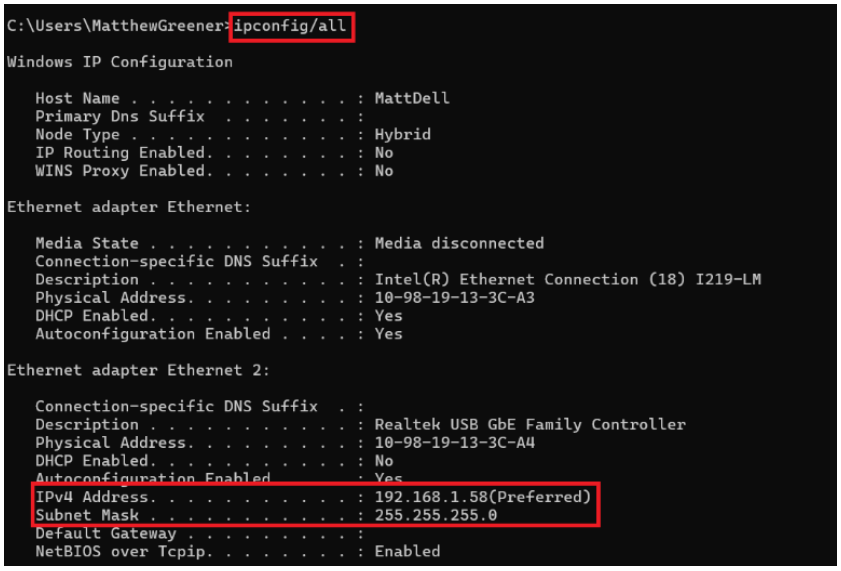


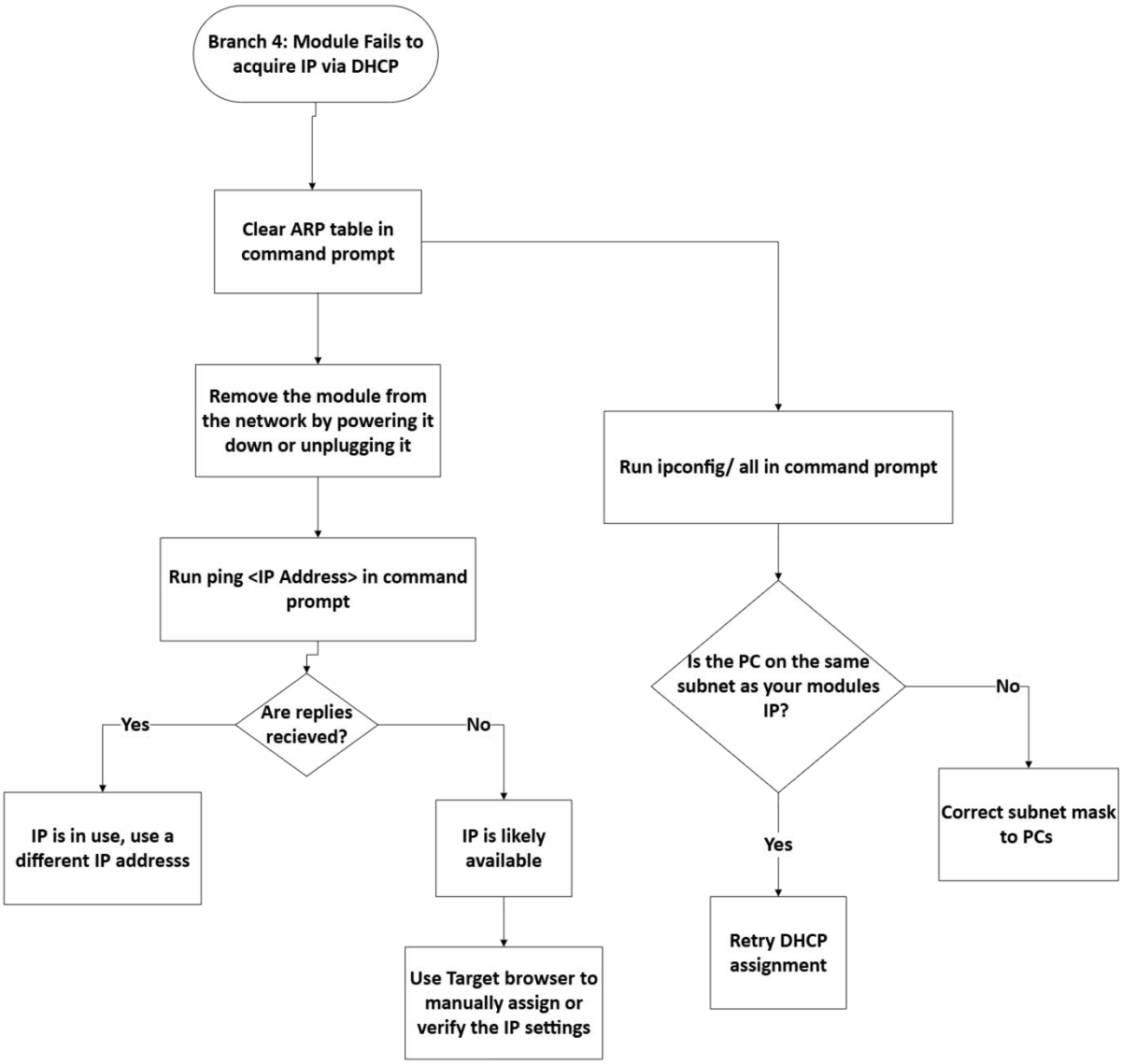
Figure 2.8 – Run command “ipconfig/all” in command prompt

- ❖ Are the PC and module on the same Subnet (e.g., 192.168.1.x)?
  - ➢ **Yes**:
    - Retry DHCP assignment or use the Slate Target Browser to manually add the modules IP.

- **No**:
  - Configure PC and module to be on the same subnet.
  - Retry DHCP assignment or manually add IP in Target Browser.

- **No**:
  - Try a different Ethernet cable and plug it directly into the PC.
  - Ensure the Ethernet adaptor is enabled.
  - Ensure PC and module are on the same subnet (e.g., 192.168.1.x).

2.2.2 BRANCH 4: MODULE FAILS TO ACQUIRE IP ADDRESS VIA DHCP

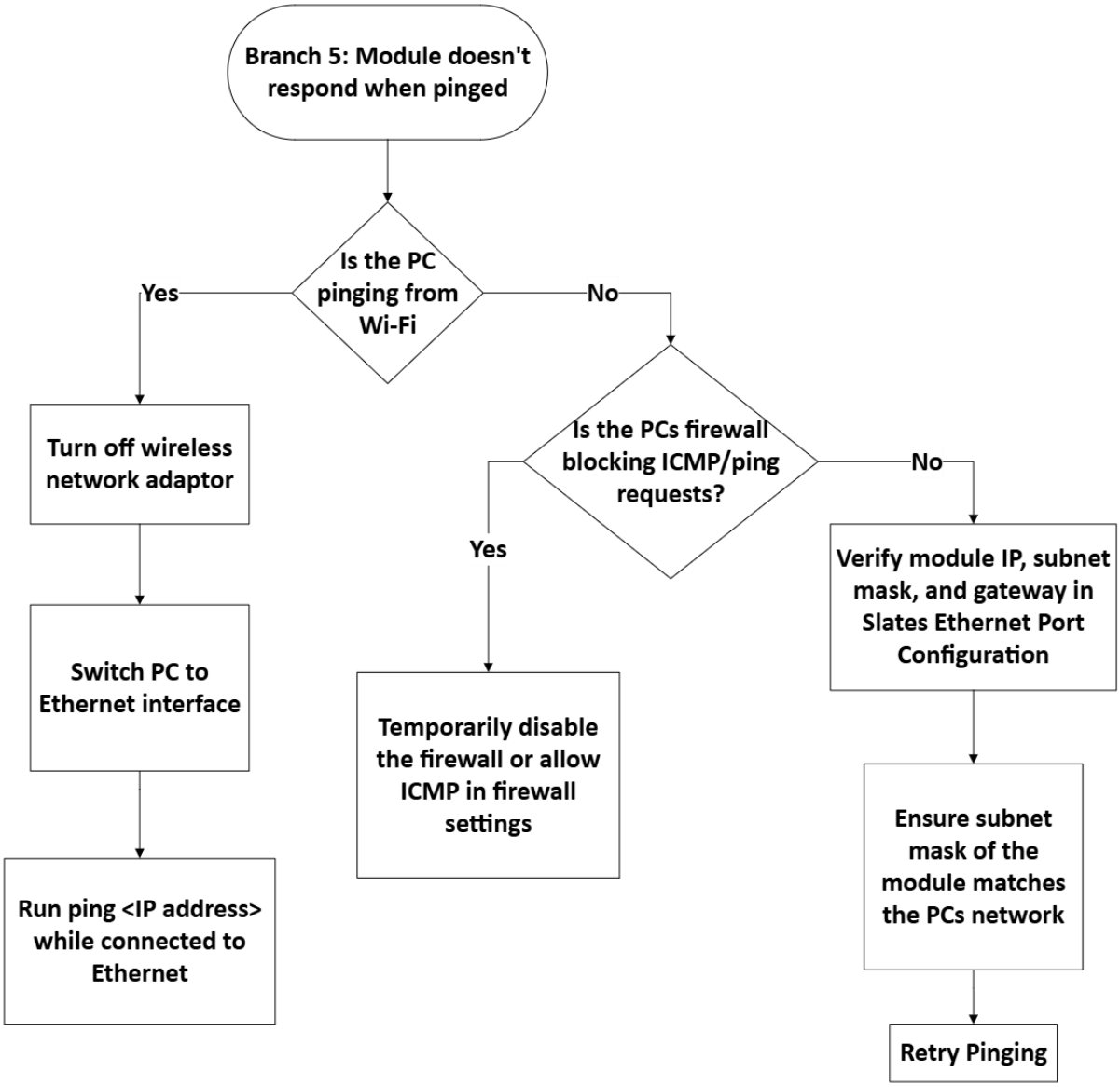


- Run command prompt as administrator and type arp -d to clear the arp table
- Check if there is an IP conflict:
    - Power down the module from the network (unplug its Ethernet cord or power it down).
    - Run ping <IP Address> in command prompt (Use the IP address you're trying to set e.g., ping 192.168.1.55)
        - Are replies received?
            - **Yes**:
                - IP is in use. Use a different IP address

- **No**:
  - If it replies with “destination host unreachable” or “Request timed out” IP is likely available.
  - Use the Slate Ethernet Port Configuration in Target Browser to manually assign or verify the IP settings.

- Run ipconfig/all in command prompt
- Is the PC on the same subnet as your module IP address?
  - **Yes**:
    - Retry DHCP assignment.
  - **No**:
    - Correct subnet mask and gateway in the Slate Ethernet Port Configuration.
    - Retry DHCP assignment.

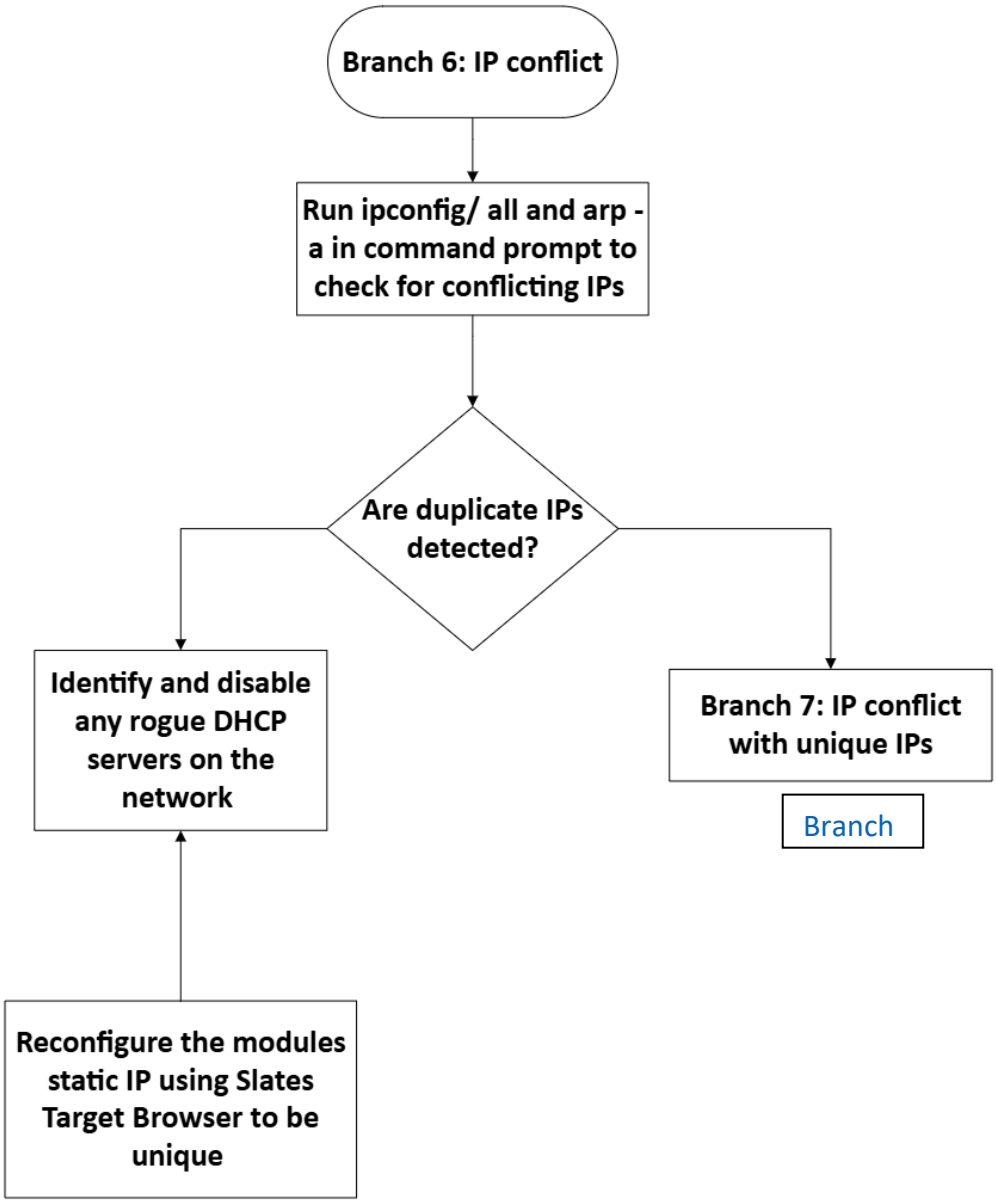
2.2.3 BRANCH 5: MODULE DOESN'T RESPOND WHEN PINGED



- Is the PC pinging from Wi-Fi?
  - **Yes**:
    - Temporarily disable wireless adaptor by going to settings/network & internet/advanced network settings/disable Wi-Fi
    - Switch PC to the Ethernet interface.
    - Run command prompt as administrator and type arp -d to clear the arp table.
    - Run ping <IP address> while connected via Ethernet.

- **No**:
  - Is the PC's firewall blocking ICMP/ping requests?
    - **Yes**:
      - Temporarily disable the firewall or allow ICMP in firewall settings
      - Retry pinging the module.
    - **No**:
      - Verify module's IP, subnet mask, and gateway in the Slate Ethernet Port Configuration.
      - Ensure the Subnet mask of the module matches the PC's network.
      - Retry pinging.

2.2.4 BRANCH 6: IP CONFLICT



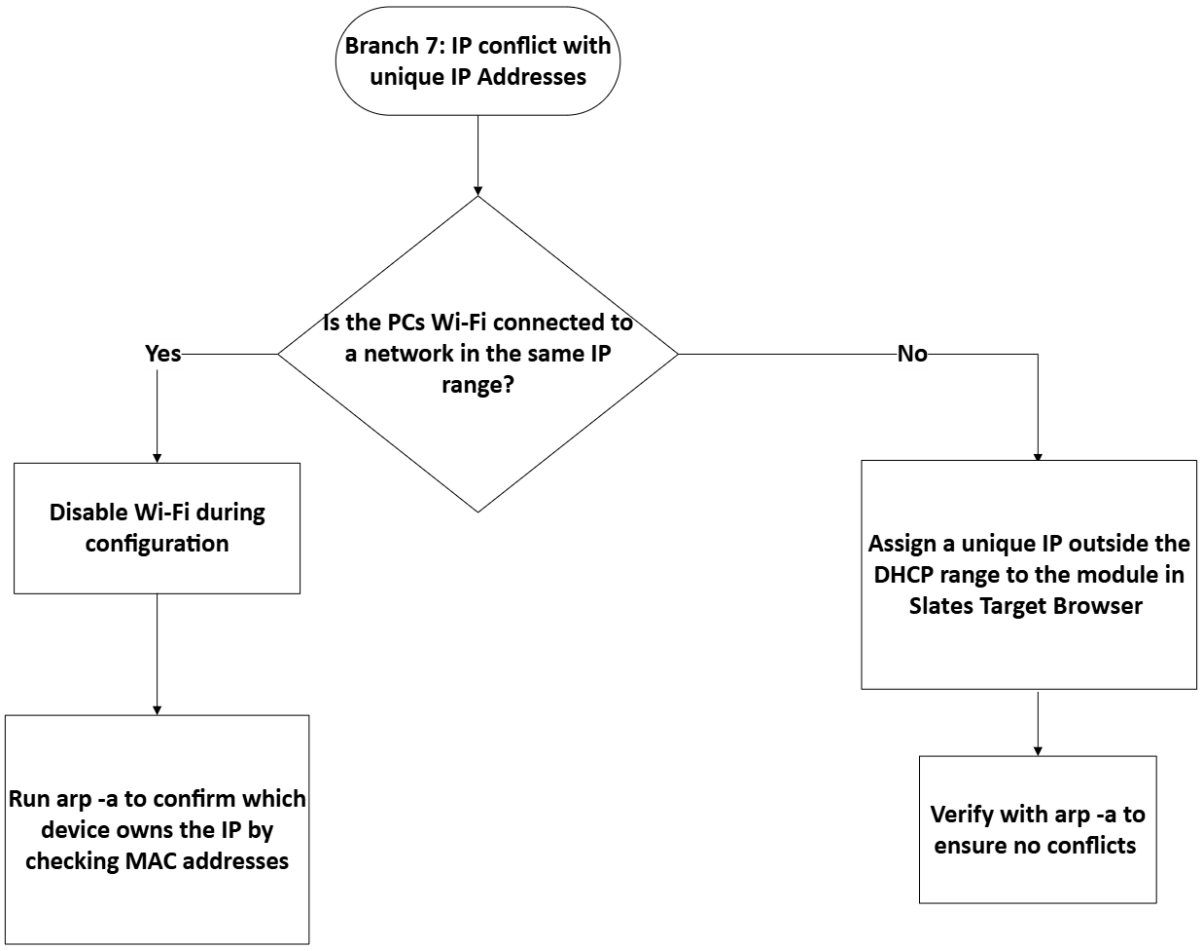
- Run ipconfig/all and “arp -a” in Command Prompt to check for conflicting IP addresses.

```
C:\Users\MatthewGreener>arp -a

Interface: 192.168.15.107 --- 0x17
  Internet Address      Physical Address      Type
  192.168.15.1          14-eb-b6-1c-f4-17     dynamic
  192.168.15.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 192.168.1.58 --- 0x1e
  Internet Address      Physical Address      Type
  192.168.1.65          b4-45-06-0e-f6-8e     dynamic
  192.168.1.221         b4-45-06-0e-f9-5f     dynamic
  192.168.1.255         ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
```

Figure 2.9 – “arp -a”

- Are duplicate IP addresses detected?
  - **Yes**:
    - Reconfigure the modules static IP using the Slate Target Browser to be unique.
    - Identify and disable any rogue DHCP servers on the network
  - **No**:
    - Verify manual/static IP assignments in Slate.
    - Assign a new unique IP if necessary.

2.2.5 BRANCH 7: IP CONFLICT WITH UNIQUE IP ADDRESS



- Is the PCs Wi-Fi connected to a network in the same IP range?
  - **Yes**:
    - Disable wireless adaptor during configuration by going to settings / network & internet / advanced network settings / and disabling Wi-Fi

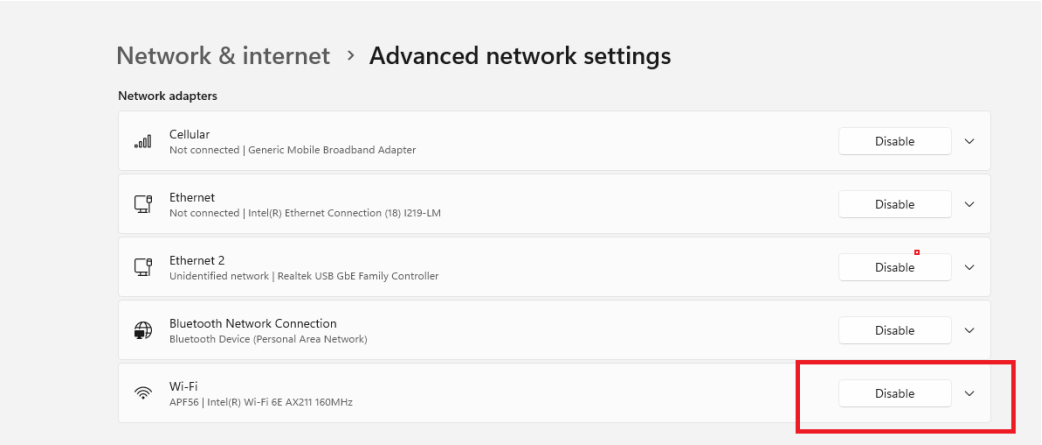
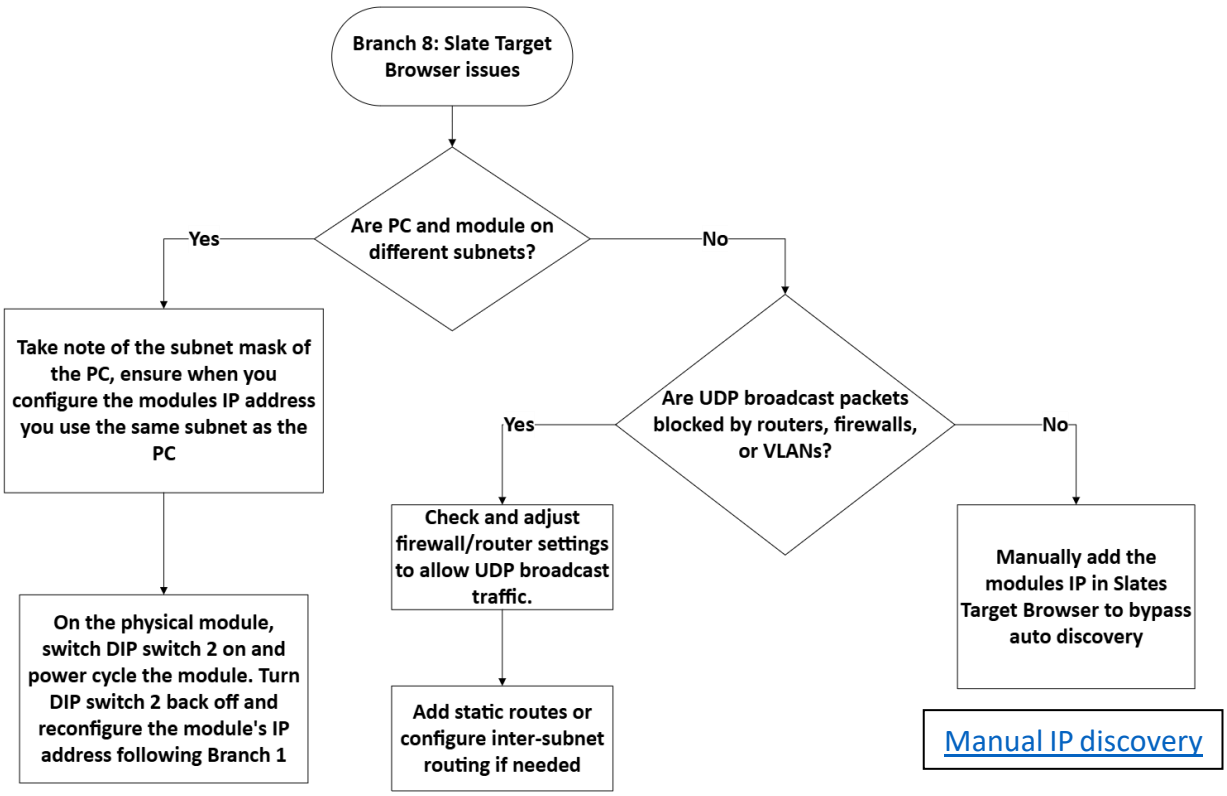


Figure 2.10 – Disable wireless adaptor

- Run “arp -a” to confirm which device owns the IP by checking MAC addresses.

- **No**:
  - Assign a unique IP address outside the Wi-Fi adapter’s IP address range to the module in the Slate Target Browser.
  - Verify with “arp -a” to ensure no conflicts.

2.2.6 BRANCH 8: SLATE TARGET BROWSER ISSUES

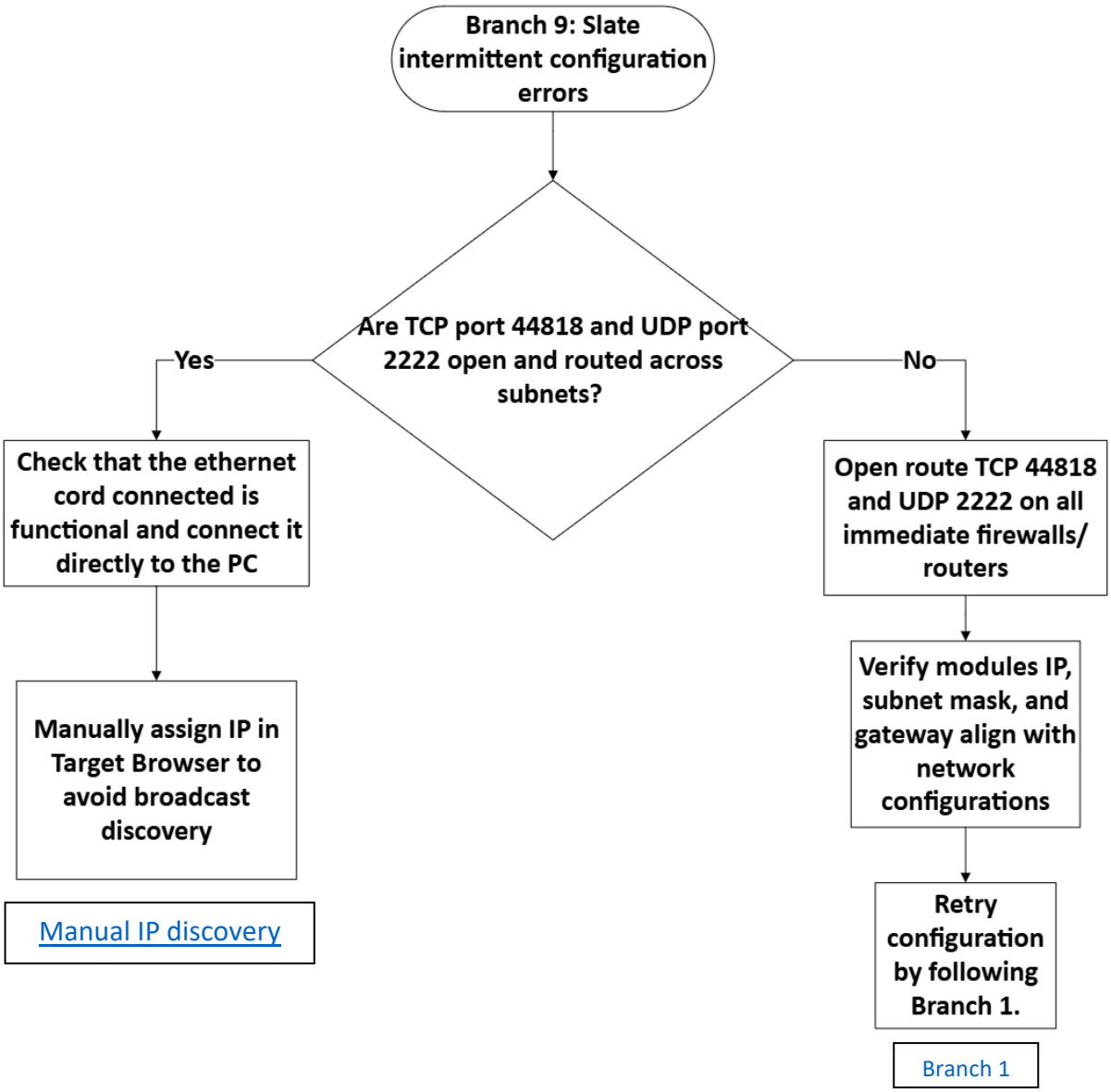


- Are PC and module on different subnets (e.g., PC on 192.168.1.x, module on 192.168.2.x)?
  - **Yes**:
    - Manually add the module’s IP in the Slate Target Browser
    - Using port configuration change the modules IP address to match the PCs subnet mask
    - Reconfigure the modules IP address following branch one using DIP switch 2 ensuring the subnet masks match.
  - **No**:
    - Are UDP broadcast packets blocked by modules, firewalls, or VLANs.
      - **Yes**:
        - Check and adjust firewall/module settings to allow UDP broadcast traffic.

- Add static routes or configure inter-subnet routing if needed.

- **No**:
  - Manually add the module's IP in the Slate target browser to bypass auto-discovery by following Branch 2: Manually discovering the IP address

2.2.7 BRANCH 9: SLATE INTERMITTENT CONFIGURATION ERRORS



- Are TCP port 44818 and UDP port 2222 open and routed across subnets?
  - **Yes**:

- Check that the Ethernet cord is working, try a new ethernet port and plug it directly into the PC.
- Manually assign IP in Target Browser to avoid broadcast discovery by following Branch 2: Manually discovering the IP Address.

- **No**:
  - Open and route TCP 44818 and UDP 2222 on all immediate firewalls/modules.
  - Verify modules IP, subnet mask, and gateway align with network configurations.
  - Retry configuration by following steps in Branch 1: Setting IP address with DHCP server.

3 GLOSSARY

3.1.1 WHAT IS A SUBNET MASK?

A 32-bit number used in IP networking to divide an IP address into two parts. The two parts are the network portion and host portion. The network portions purpose is to identify the specific network, while the host portion is used to identify the devices (hosts) in that network. An IP Address is not able to tell you on its own where the network ends and where the host begins. The subnet mask is what defines this boundary (Kanade, 2022).

For example a subnet mask that says 255.255.255.0 means that the first 3 octets of the IP address define the network while the last octet defines the host device. It depends on the subnet mask how many hosts are able to be on the network. For a subnet mask of 255.255.255.0 only 254 hosts can be connected to the network, however for the subnet mask 255.255.0.0, 64 534 hosts can be connected to the network as both the 3rd and 4th octets define the hosts IP configuration.

3.1.2 WHAT IS THE TARGET BROWSER?

The target browser allows for users to access and alter all of the network configurations of their Aparian devices by right clicking the device and selecting the Port Configuration option. It can be accessed under the tools menu.

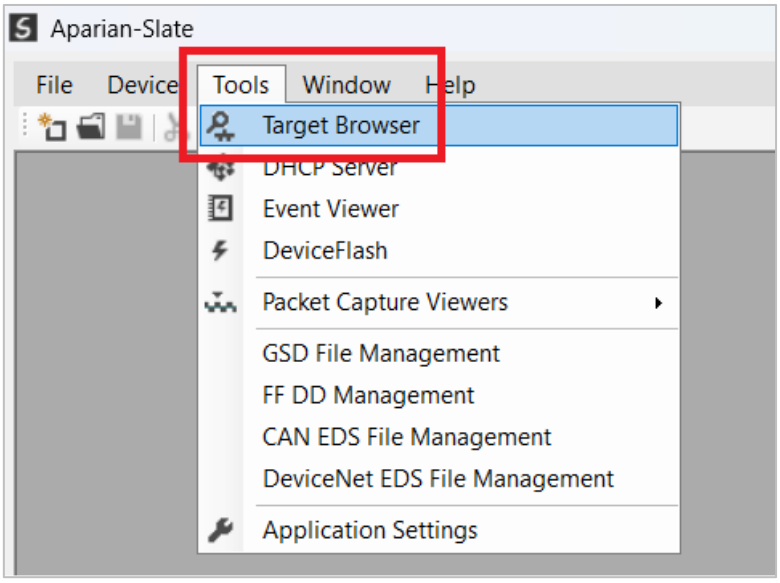


Figure 3.1 – Launch Target Browser

3.1.3 WHAT IS DHCP SERVER

DHCP (Dynamic Host Configuration Protocol) is a protocol that automatically assigns IP addresses and network settings to devices on a network. The DHCP server is an tool in Slate that gives the user the ability to set the IP address of their devices themselves when they are in DHCP/non-static mode.

3.1.4 USEFUL COMMANDS FOR COMMAND PROMPT

Command	Description	Example Usage	Expected output
Ipconfig/all	Displays detailed network adapter settings	Ipconfig/all	IP address, subnet mask, gateway, MAC address, etc.
Ping <IP Address>	Tests network connectivity to a specific device.	ping 192.168.1.22	Reply from device if reachable, else timeout/error.
Arp -a	Shows the ARP cache with resolved MAC addresses.	Arp -a	List of IP Addresses and corresponding MAC addresses.

Table 3.1. – Support Details

4 BIBLIOGRAPHY

Kanade, V. (2022). *What Is a Subnet Mask? Definition, Working, and Benefits* |. [online] SpiceWorks. Available at: https://www.spiceworks.com/tech/networking/articles/what-is-subnet-mask/.